

GEOTECHNICAL AND GEO-ENVIRONMENTAL ASSESSMENT REPORT



FOR HANGAR No.5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOUCESTER GL2 9QL

Report No. 5160

Report Production Record		
Report No	5160	
Site Name	Hangar No. 5, Safran Landing Systems, Meteor Business Park, Staverton GL2 9QL	
Client	Rowntree Consulting Limited & Safran Landing Systems	
Report on	Geotechnical and Geo-Environmental Assessment	
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Report Issue / Revision Record		
Issue No.	Date	Revision Details
1	19 June 2023	Final
2	22 June 2023	Additional Water Monitoring Data

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GEOTECHNICAL & GEO-ENVIRONMENTAL ASSESSMENT
REPORT FOR BUILDING No.5, SAFRAN LANDING SYSTEMS,
STAVERTON, GL2 9QH
ROWNTREE CONSULTING & SAFRAN LANDING SYSTEMS

1 INTRODUCTION

- 1.1** The site is located at E388410 - N222020 where internal redevelopment involving the excavation and construction of a concrete lined pit to house zinc and nickel line machinery is planned. As instructed an intrusive ground investigation has been undertaken to inform the design team requirements.
- 1.2** The geotechnical investigation has been carried out in general accordance with Eurocode 7 'Geotechnical Design', in particular BS EN 1997-1:2004 and 1997-2:2007 and BS EN ISO 14688-1:2002 and 14688-2:2004. The proposed development is considered to fall into the Geotechnical Category 2 classification, thus routine field and laboratory testing methods have been adopted. Note however that traditional 'British Standard' bearing capacity assessment has been requested by the structural engineer. Reference has also been made to BS5930:2015 Code of Practice for Ground Investigations, and National House Building Council (NHBC) Standards Chapter 4.2 – 'Building Near Trees'.
- 1.3** A basic geo-environmental assessment has also been carried out, following the principles of BS10175:2011 "Code of Practice for the Investigation of Potentially Contaminated Sites" and Environment Agency (EA) document "Land Contamination Risk Management" (LCRM 2020), although because it is understood that there is no planning condition regarding ground contamination, only a basic 'due diligence' assessment has been undertaken.
- 1.4** This report has been prepared in line with the agreed scope of works as set out within our proposal Q23101 dated 12 April 2023 and minor subsequent amendments, with emailed instruction from Paul Preston of Rowntree Partnership, received 3 May 2023. Reliance on this report is granted to Safran Landing Systems and Rowntree Consulting Limited.

2 **BACKGROUND SETTING/ DESK STUDY RESEARCHES**

2.1 A basic desk study was conducted to outline the geological setting and possible hazards. Pertinent details are summarised as follows:

TABLE 1: SUMMARY GEO-ENVIRONMENTAL SEARCH RESULTS

Item	Site Affected?	Abnormals Identified?
Site History	OS maps show development of factories/hangars from the 1970s with no clear indication of an active airfield or taxiways on the site prior to then; possible prior military use may predicate the existence of a concrete layer i.e. underlying historical taxiway	No
Bedrock geology	Rugby Limestone Member	No
Superficial deposits	None	No
Aquifer designation	Bedrock Secondary A aquifer	No
Groundwater Source Protection Zone	No	No
Groundwater vulnerability	Medium-Low	No
Drinking water safeguard zone	No	No
Nitrate Vulnerable Zone	Yes	Surface water vulnerable (Hatherley Bank)
Abstractions	No	No
Recorded landfills <250m distance	No	No
Potentially infilled features	None	No
Radon affected	No	HSA radon mapping indicates probability of <1% that property is above the Action Level ie no radon protection is required; local Building Control should be consulted in case minimum levels of protection exceed this
UXO risk	Low, however nearby Gloucester Airport and surrounding hangars are mapped as a Luftwaffe target	No
Environmentally sensitive	No	No
Pollution Incidents on/near site?	No	Negligible risk. 1No. waste oil spill into Hatherley Brook 159NE in 1998.

- The long-term industrial site usage may have resulted in near-surface ground contamination/impaction, however the Hangar 5 building and surrounds are effectively total hard-cover so potential human health exposure pathways are considered to be essentially non-viable
- The development proposal involves the installation of new large specialist machines which will require foundation pit excavations, however any short-term exposure to groundworkers will be covered by the necessary Health & Safety Construction Plan

3 GROUND INVESTIGATION REPORT

Site Works

- 3.1** The intrusive investigation was undertaken on 11th May 2023 by way of 'window sampling' borehole drilling using a tracked Terrier drilling rig. Borehole positions were, as far as access and known buried services allowed, targeted upon proposed machine base footprints within the workshop as indicated on drawing 5160/2. A CAT electrical service scanner was deployed prior to concrete slab coring, no buried services were encountered.
- 3.2** Four boreholes (WS1-WS4) were drilled to depths of between 0.60 and 3.00mbgl, and in order to assess the relative density of the material penetrated in-situ standard penetration tests (SPT) were carried out at c1m depth increments, with the resulting N values (uncorrected) indicated on the respective borehole logs in Appendix 1. A monitoring well was installed in WS1. The borehole cores were logged in accordance with Eurocode 7 (BS EN ISO 14688-1:2002 and 14688-2:2004) by a geo-environmental engineer from this practice, and representative samples taken for geotechnical and geo-environmental testing as appropriate. Upon completion of logging and sampling all holes were backfilled with surplus arisings mixed with bentonite pellets, and reinstatement made with ballast underlying fresh concrete.

Laboratory Testing – Geotechnical

- 3.3** A number of disturbed samples were taken for routine geotechnical classification testing, comprising moisture content and plasticity determinations, along with classification to the Unified Soil Classification Scheme (USCS) and NHBC Standards,

plus acidity and sulphate analysis to BRE Special Digest 1 requirements. Results are summarised in Tables 2 and 3 below (and presented in Appendix 2), whilst the concrete floor slab details are summarised in Table 4.

TABLE 2: MOISTURE CONTENT AND PLASTICITY RESULTS

BH Ref	Depth (m)	Material	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Plasticity / USCS	Consistency Index	<425um (%)	Modified PI	Volume Change Potential (NHBC)
WS1	1.90-2.10	RLs	25								
WS1	2.60-2.90	RLs	25								
WS3	0.6-0.8	RLs	29	66	28	38	CIH	0.97	100	38	Medium
WS3	1.60-1.80	RLs	25								
WS4	1.40-1.60	RLs	21	49	26	23	CIM	1.22	100	23	Medium
WS4	2.60-2.80	RLs	27	62	28	34	CIH	1.03	100	34	Medium

Classification to EN ISO 14688-2:2004. RLs: Rugby Limestone Member

TABLE 3: CHEMICAL TEST RESULTS

BH	Depth (m)	Material	Moisture Content (%)	pH	Water soluble sulphate SO ₄ (mg/l)	Total sulphur (%)	Total sulphate SO ₄ (%)	Total potential sulphate SO ₄ (%)	Overall BRE Special Digest 1 (2005) classification	
									DS	ACEC
WS1	1.90-2.10	RLs	17	7.7	991	0.246	0.613	0.738	DS-3	AC-3
WS1	2.60-2.90	RLs	17	7.8	1400	1.26	3.95	3.78	DS-4	AC-4
WS3	0.6-0.8	RLs	20	8.2	87.7	0.063	0.085	0.189	DS-1	AC-1
WS3	1.60-1.80	RLs	17	8.2	222	0.072	0.102	0.216	DS-1	AC-1
WS4	1.40-1.60	RLs	18	8.2	78.1	0.053	0.118	0.159	DS-1	AC-1
WS4	2.60-2.80	RLs	16	7.8	1630	1.23	3.14	3.69	DS-4	AC-4

RLs: Rugby Limestone Member

TABLE 4: SUMMARY CONCRETE FLOOR SLAB DETAILS

BH	Base Depth (m) of		Concrete Details	
	Concrete Slab	Granular Sub-Base	Depth (mm) of 8mm diam. Steel Mesh Reinforcement	Unconfined Compressive Strength (MPa)*
WS1	0.25	0.60	220	33.4
WS2	0.29	N/A 2 nd slab underneath	N/A	50.7
WS3	0.33	0.55	255	44.2
WS4	0.22	0.65	N/A	N/A – Sample cracked

* all tested samples excluded any reinforcement

Laboratory Testing - Contamination

3.4 The contamination sampling scheme was conducted in accordance with BS10175:2011 and based on the possible historical military airfield site use and the contaminants of concern specified within in the tabulated desk study at the beginning of this report. Sampling was targeted on the shallow made ground and the areas likely to be excavated to enable new machine base foundation construction. Since the equipment is to be installed within a new concrete lined trench the main risk is to the ground workers or future machine operatives. An appropriate risk assessment has been undertaken and results have been screened for 'commercial' end use.

3.5 Representative samples of made ground and natural undisturbed soil to be encountered during the pit excavation were taken from up to 2.6m depth and sent to the UKAS-accredited i2 laboratory in Watford, where analysis selectively comprised the following:

- Toxic and phytotoxic metals including hexavalent chromium (Cr VI)
- pH
- Speciated polycyclic aromatic hydrocarbons (PAH)
- Banded total petroleum hydrocarbons (TPH)
- Speciated petroleum hydrocarbons (TPH CWG) incl. BTEX compounds
- Asbestos fibre screening
- Soil Organic Matter

- 3.6** Due to the proposed development being wholly contained within the existing Hangar 5 building with no potential to create new ‘percolation’ pathways via any soft-landscaping, the potential risk to controlled surface waters and/or groundwater resources was seen as negligible so leachate testing was deemed unnecessary.
- 3.7** The certified laboratory test results are presented in Appendix 3 and for convenience have been summarized to facilitate comparison against relevant assessment criteria. All results are further discussed in Section 5.

Discussion on Ground Conditions

- 3.8** The boreholes have shown natural ground conditions to be commensurate with geological mapping, proving locally gravelly clay of the Rugby Limestone Member overlain by made ground and the Hangar 5 concrete floor slab. A summary of the observed strata is presented in Table 5 below, although for specific descriptions reference should be made to the borehole logs in Appendix 1.

TABLE 5: SUMMARY OF OBSERVED STRATA

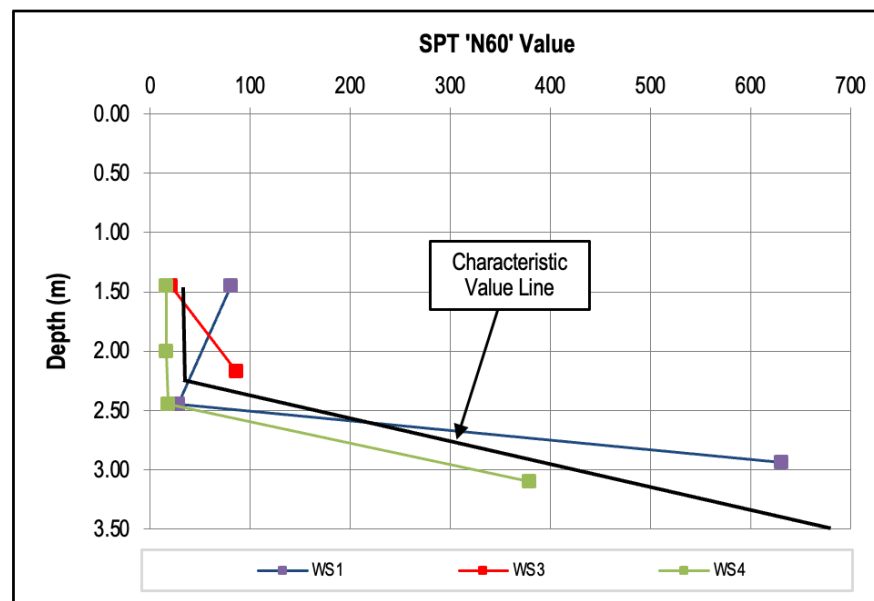
Stratum	Base Depth (m)	Notes
CONCRETE: internal floor slab (reinforced)	0.15 - 0.33	All boreholes. 2 nd layer found in WS2 only (unproven thickness)
SUB-BASE: loose to dense grey angular medium to coarse crushed limestone/concrete	0.55 – 0.65	WS3 & WS4 only
MADE GROUND: Loose black/dark brown. very sandy/slightly gravelly clay. Gravel is subangular to subrounded claystone with occasional brick. Slight hydrocarbon odour in WS4	0.55 – 1.00	WS1 & WS4 only
CLAY/ MUDSTONE: firm to stiff bluish grey, silty and slightly gravelly CLAY, grading to very stiff dark brown gravelly CLAY then weak dark brown laminated mudstone/limestone (<i>Rugby Limestone Member</i>)	2.90 – 3.00 In WS1 & WS4	All boreholes
Groundwater	GW encountered at 1.9 to 2.9m rising to 0.43m to 0.81m bgl GW was remeasured at 0.84mbgl on 8 th June	
Roots / desiccation	No roots/ desiccation encountered	

- 3.9** The internal reinforced concrete floor slab is of largely consistent thickness other than at WS2 where the slab is underlain by a second concrete slab of unproven thickness. This may be a relic of a historical taxiway or concrete associated with the adjacent inspection trench. The compressive strengths of the WS1, WS2 and WS3 cores were

commensurate with a 'medium strong' rock strength description with a range of between 33.4 and 50.7MPa. The WS4 core was fractured on retrieval and was not able to be tested. A granular sub-base layer was only found in WS3 and WS4, with the slab at all other positions directly underlain by gravelly clay made ground. The RLs Member classifies as intermediate to high plasticity silty clay of medium volume change potential. Consistency Index values are locally elevated in WS4 however the lack of trees or other vegetation precludes the possibility of desiccation, which accords with our visual inspection.

3.10 Standard Penetration Test (SPT) results are indicated on the borehole logs in Appendix 1 and normalized 'N60' values are plotted against depth in Fig 1 below. The SPTs were not able to penetrate to the likely footing depth of 3.7m but bedrock was encountered at the extent of the boreholes and SPT data of that strata was recorded to 3.0m and extrapolated to 3.5mbgl in Fig. 1.

FIG 1: SPT 'N60' VALUE -v- DEPTH



3.11 The site conditions and particular groundwater level are subject to seasonal variation, dependent on the prevailing weather conditions, and the situation encountered and described above could potentially change in the future, especially in a period of seemingly ever-apparent but unpredictable climate change.

4 GEOTECHNICAL MODEL AND RECOMMENDATIONS FOR FOUNDATION DESIGN

- 4.1** The investigations have proven the ground conditions to be commensurate with geological mapping, comprising 'bedrock' of the Rugby Limestone Member overlain by a nominal mantle of made ground. It is understood that the new machine bases will be founded upon a combination of large raft/slab and/or localised pad foundations. As ever the choice of foundation type is affected by a combination of bearing resistance, groundwater and access conditions.
- 4.2** Foundations should be constructed through any made ground (encountered to 1.0m) to found in undisturbed, natural RLs clay material; given the lack of trees rooted and/or desiccated soils are not anticipated. The RLs is of medium volume change potential thus dictating a minimum 0.9m founding depth, subject to bearing resistance calculations and depth of made ground, although the proposal puts the footings at 2.5m depth along the majority of the pit. The site is broadly uniform in relation to the undisturbed clay encountered although the varying depths of the pit required to house the plant machinery is taken into account such that the 4m long pit section in the vicinity of WS3 which will be founded at 3.7m bgl and is discussed separately.
- 4.3** Whilst we would normally undertake bearing capacity calculations in accordance with BS EN 1997-2:2007 and BS EN ISO 22475-1:2006, in this instance they have as per the structural engineer's requirements been undertaken in line with traditional 'British Standard' methods, as below.
- 4.4** At 2.5mbgl a 1m² square pad foundation may be designed to a bearing capacity of 268kN/m². The deeper section of pit proposed to 3.7mbgl will found on the weak mudstone with a significantly higher bearing capacity, with an SPT value of 300 at 3.0mbgl suggesting an allowable bearing capacity of 500kN/m². We think it likely that the strength of the underlying rock to 3.7m bgl would be no lower than this unless the RLs reverts to clay at depth, which is not something that has been encountered during other investigations in the vicinity.
- 4.5** Based on the sulphate results in Table 2, since excavations will extend below 1.8mbgl concrete of DS/AC-4 mix design should be used.

Recommendations for Monitoring of Ground Conditions During Construction

- 4.6** In view of the importance of founding on natural ground, a careful watch must be maintained during all foundation excavations to ensure that this requirement has been satisfied.
- 4.7** A shallow water table was recorded at between 0.73m and 0.85m bgl in WS1 during monitoring visits on 8th and 21st June. Therefore, during the works a sump type pumping solution should be utilised used in conjunction with shoring equipment to maintain pit wall stability where necessary. If/where possible, foundation construction would be better undertaken during drier summer months.
- 4.8** Although thought unlikely at this site, a careful watch should be maintained during foundation excavation for the presence of any rooted and/or desiccated soils, which should not be founded upon.
- 4.9** In the event of any doubt in the above matters, this Practice would be pleased to attend site as instructed.

5 CONTAMINATION RISK ASSESSMENT***Human Health***

- 5.1** The contamination risk assessment has been carried out in general accordance with the methodology described within Appendix 2. Table 6 below presents a comparison of laboratory test results with guideline values (LQM/CIEH S4UL). The 'deterministic' CLEA software model (Version 1.07) has been used to generate Tier 2 site-specific assessment criteria (SSACs) as necessary.

TABLE 6: COMPARISON OF SOIL CHEMICAL TEST RESULTS WITH GUIDELINE VALUES

Determinand	Maximum Measured Concentration	LQM/CIEH S4UL Commercial (mg/kg)	No of Exceedances/ Tests Undertaken	Notes
Arsenic	13	640	0/4	
Cadmium	0.4	190	0/4	
Chromium III	38	8,600	0/4	

Determinand	Maximum Measured Concentration	LQM/CIEH S4UL Commercial (mg/kg)	No of Exceedances/ Tests Undertaken	Notes
Chromium VI	<1.2	33	0/4	
Lead	25	2330*	0/4	
Mercury	<0.3	1100	0/4	
Selenium	<1	12,000	0/4	
Nickel	39	980	0/4	
Copper	38	68,000	0/4	
Zinc	84	730,000	0/4	
All speciated PAH determinands	All below <LOD or <<S4UL		0/4	
All BTEX compounds	All below <LOD or <<S4UL		0/4	
All other TPH bands	All below <LOD or <<S4UL		0/4	
Asbestos	N.D		0/4	
Notes				
* provisional C4SL				
** most sensitive fraction within wider TPH band				
based upon SOM of 1%				

5.2 It will be seen from the above table and summary sheets in Appendix 3 that concentrations of all individual toxic / phytotoxic metals, speciated PAH and TPH compounds fall below respective Tier 1 S4UL thresholds (and mainly below limits of detection) for commercial end-use, so progression into Tier 2 analysis is unnecessary. All four samples of made ground subjected to asbestos fibre screening all returned 'non-detect' results which suggests that no remedial measures are necessary.

5.3 All results fall below the relevant S4UL thresholds or limits of detection. The insignificant results suggest no obvious presence of volatile organic compounds, on which basis there is no envisaged hydrocarbon risk and no requirement for remedial measures to address potential human health risk, although note that localised impaction could have occurred beneath specific machine bases which were inaccessible to the investigation to date.

Landfill Gas and Radon Gas

5.4 The development proposals are for new machinery within the existing testing storage building which will not be influenced by any landfill and/or radon gas risks, albeit that the nominal proven thicknesses of made ground do not suggest the former to be viable. Furthermore, the site does not lie within a radon-affected area.

Controlled Waters

- 5.5** On the basis that the existing and proposed developments are completely hardstand covered with no areas of soft-landscaping, and on review of the soils contamination testing results all falling below Tier 1 S4UL/ C4SL thresholds, the risk to controlled waters is seen as negligible. Given also that the site does not lie within a groundwater Source Protection Zone (SPZ) there is no envisaged risk to controlled waters.

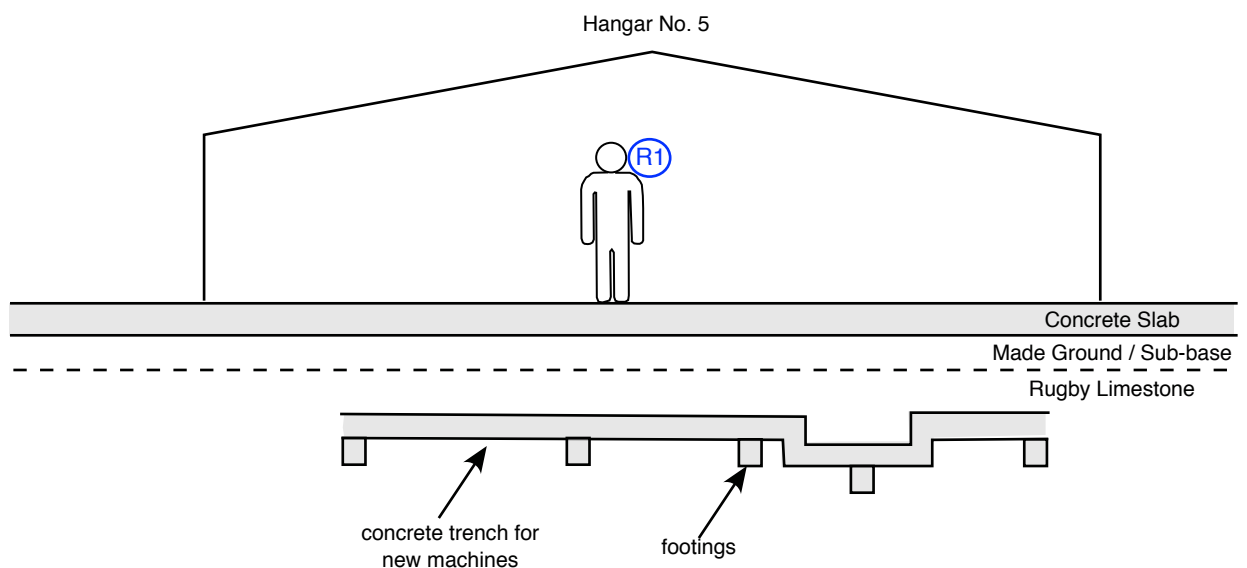
Waste Classification for Off-site Disposal of Arisings

- 5.6** In accordance with current legislation all soil arisings generated for disposal as part of this development site are by definition a “commercial waste” and will be classified as both a directive and controlled waste. In view of the proposed construction and hence likely derivative of excavated arisings for off-site disposal, then as per the European Waste Catalogue (EWC) such material will be coded 1705, that is “soil (including excavated soil from contaminated sites), stones and dredging spoil”.
- 5.7** An initial waste classification was carried out. This classifies the material as Non-Hazardous Waste (EWC Code 17 05 04).
- 5.8** Subsequently, a WAC test was performed upon a composite sample of made ground recovered from all boreholes and the results presented in Appendix 4 show that arisings from the site works classify, and therefore should be disposed of, as Stable Non-reactive Hazardous Waste (EWC Code 17-05-04), and certification should be issued to the receiving landfill operator prior to disposal.

6 CONCEPTUAL SITE MODEL

6.1 In view of the above discussions the conjectured Conceptual Site Model is shown in Figure 2 below.

FIG 2: CONCEPTUAL SITE MODEL



6.2 No sources of ground contamination have been identified sufficient to pose a potential health risk to site workers or pollution risk to local controlled waters. Even if future foundation excavations might reveal hitherto unrecorded contamination that would be contained within the building and hence protected from rainfall, thus there is no viable pathway for percolation into/through the unsaturated zone. Any such discovery should however be reported to us such that any potential health risks could be evaluated.

6.3 In summary this assessment indicates no perceived risk to human health or controlled waters thus no pre-construction remediation is considered necessary, although there is a requirement for sulphate-resistant concrete in buried foundations at depth. The ground profile and contamination status can differ between investigation positions, so careful inspection of the ground during excavation is advised to identify any areas of potentially contaminated soil not previously identified, which should be reported back to this practice to enable any appropriate assessment.

6.4 In line with best industry practice the scope of contamination testing has been based upon the site history, proposed land usage and actual findings, with reference where necessary to DoE Industry Profiles and DEFRA/EA guidance. To the best of our

knowledge information concerning the land quality assessment is accurate at the date of issue, however subsurface conditions including ground contamination may vary spatially and with time. There may be conditions pertaining to the site not disclosed by the sources of information previously assessed which might have a bearing upon the recommendations made, were such conditions known. We have however used our professional judgement in order to limit this during the investigation.

6.5 The conclusions and recommendations made in respect of land quality do not address any potential risks to site operatives or ground workers during the construction stage. These issues should be addressed by the Principal Contractor in accordance with the relevant statutory procedures and regulations (CDM Regulations 2015).

6.6 It is important that these limitations be clearly recognised when the findings and recommendations of this report are being interpreted. Additional assessment may be necessary should a significant delay occur between report date and implementation of the proposed scheme to which it relates.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 The foregoing discussions and recommendations are based upon the results of a borehole investigation, which has recorded relatively consistent natural ground conditions overlain by a nominal mantle of made ground. The weathered mantle of “bedrock” of the Rugby Limestone Member was mostly encountered as locally gravelly clay grading with depth into weak mudstone at c2.9mbgl with possible shallower mudstone/limestone cobbles at 1.8mbgl indicated by refusal in that area. Groundwater rose to 0.43m bgl in WS3 during the investigation works and stabilised between 0.73m and 0.85m bgl in WS1 during subsequent monitoring. Therefore, it would be recommended to employ dewatering/pumping during the excavation works. The secondary concrete slab encountered at WS2 is to an unproven depth and a deeper localised area of breaking out should be expected in that vicinity. Ground conditions may vary between investigation points however thus a careful watch should be maintained for any abnormalities encountered during foundation excavation which might require referral back to this Practice.

7.2 It is understood that the proposed new items of machinery are to be founded in a concrete lined pit, nominally of 4.0m x 45.5m area. British Standard-compliant

calculations demonstrate bearing capacity of 268 kN/m² at 2.5m bgl which is relevant for the design depth of the majority of the trench. At the deeper (3.7mbgl) proposed section in the vicinity of WS3 refusal on weak mudstone at c3.0mbgl prevented deeper investigation. However, the SPT value of 300 at 3.0mbgl suggesting an allowable bearing capacity of 500kN/m² at that depth. This indicates weak rock and the ground strength would not be expected to be less at 3.7mbgl. It is therefore recommended that 268kN/m² be used as the worst-case bearing capacity across the development. If it is required to definitively 'prove' the ground to/below 3.7mbgl we could remobilise but would need a rotary rig.

- 7.3** In view of acidity and soluble sulphate testing, since excavations will be below 1.8mbgl concrete of a DS/AC-4 mix should be used due to the aggressive conditions.
- 7.4** Land use has historically been and is proposed to continue as commercial with no existing/proposed soft-landscaping, thus the health risk to future users is seen as negligible. This has effectively been confirmed by detailed ground contamination risk assessment including toxic and phytotoxic metals, TPH, PAH and BTEX compounds plus asbestos analysis, which indicates all results below Tier1 S4UL/ C4SL thresholds for commercial end-use. As such there is no evidence that pre-development remedial measures are necessary to make to site 'fit for use', and neither radon or landfill gas protection measures are necessary.
- 7.5** Should offsite disposal of arisings be required, initial waste classification classifies the material as Non Hazardous Waste (EWC Code 17 05 04), and a subsequent Waste Acceptance Criteria analysis undertaken on a composite sample of ground from 0.55m to 0.60m bgl classifies it as Stable Non-reactive Hazardous Waste (EWC Code 17-05-04). However, final waste classification/acceptance lies with the receiving landfill operator.
- 7.6** Should planning consent be subject to certain conditions, this report and attachments should be lodged with the local planning authority, such that they can update their records.
- 7.7** The above recommendations must not be used in respect of any development differing in any way from the proposals described in this report, without reference back to this Practice or to another geo-environmental specialist.

8 **REFERENCES**

Geotechnical

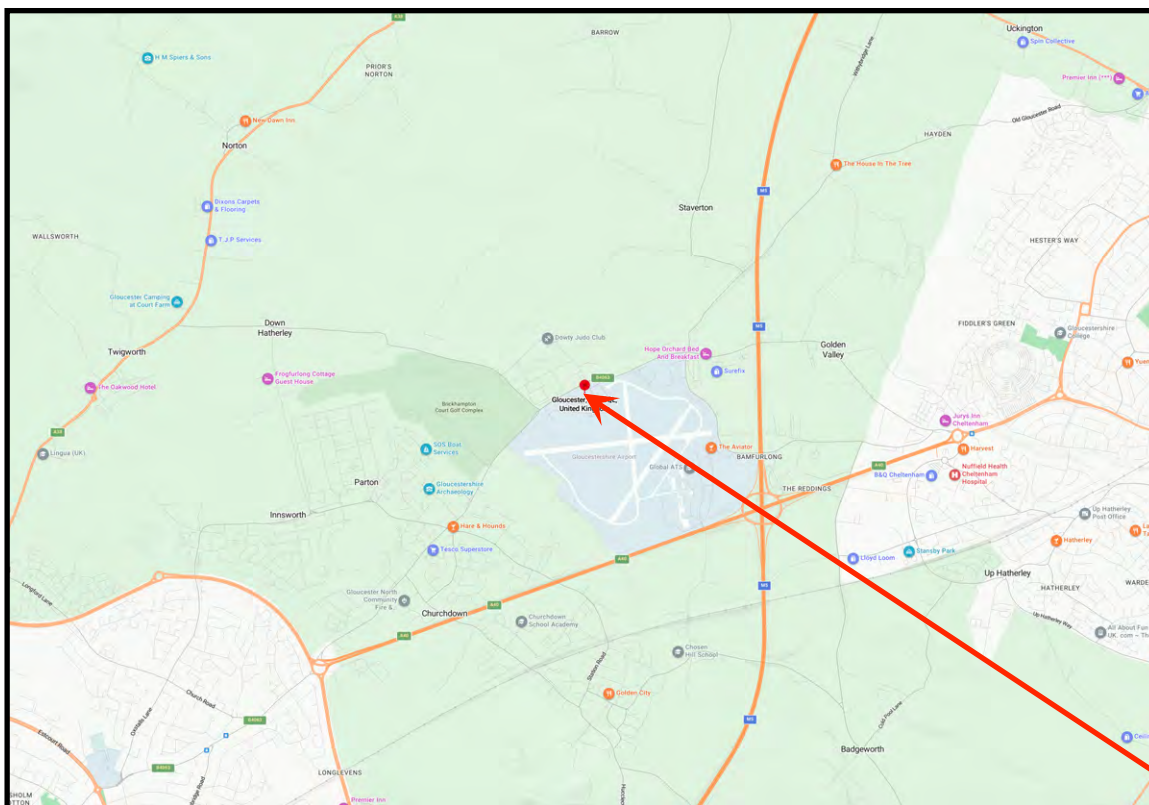
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Environmental

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- Environment Agency: '*Land Contamination Risk Management*' (LCRM:2020)
- Environment Agency/National House Building Council (NHBC) R&D 66 '*Guidance for the Safe Development of Housing on Land Affected by Contamination*' (2000)
- Health Security Agency (www.gov.uk)
- The Water Framework Directive (Standards and Classification) Directions (England and Wales)' (2015)
- The Water Supply (Water Quality) Regulations 2000 (Amendment) Regulations (2007)
- UK WIR report '*Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites*' (2010)
- WA Report 4319 – '*Ground Investigation Report for No.3 Shop Demolition*' (29-May-2018)
- WA Report 4319/2 – '*Phase 1 Geo-environmental Desk study report for Building Number 4 Safran Landing systems*' (02-11-2018)
- WA Report 4319/3 – '*Ground Investigation Report for Building No.4*' (January 2019)
- Zetica (www.zetica.com)

SITE LOCATION (based on Microsoft Bing Mapping)

Job No.	Drawing No.	Scale:	Date:
5160	5160/1	NTS	16-06-23



THE SITE





HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOUCESTER GL2 9QL



PROPOSED DEVELOPMENT LAYOUT (based upon Midland Survey Ltd drg 43223A, dated March 2023) SHOWING INVESTIGATION LOCATIONS

Job No.	Drawing No.	Scale:	Date:
5160	5160/2		02-11-21

APPENDIX 1

BOREHOLE LOGS WITH PHOTOGRAPHS

KEY TO BOREHOLE LOG SYMBOLS

Symbol	Explanation
D or J	Small Disturbed Sample (tub or jar sample)
B	Large Disturbed Sample
U	Undisturbed Sample
W	Water Sample
U70	Undisturbed Sample

Undrained Shear Strength Test (HSV)

90	Hand vane - direct reading in kN/m ²
----	---

Standard Penetration Test (SPT)

15	SPT 'N' Value (BS EN ISO 22476-3:2005)
125/50	Where full test drive not completed, penetration (125mm) and blow count (50) recorded
NR	No effective penetration

Water



Water struck



Water standing

Test/Core Range

TCR	Total Core Recovery - as percentage of core run. Where value significantly exceeds 100%, a note is given on remarks on log
SCR	Solid Core Recovery - as percentage of core run. Note: assessment of solid core is based on full diameter
RQD	Rock Quality Designation - the amount of solid core greater than 100mm expressed as percentage of core run Where SPT has been carried out at beginning of core run, disturbed section of core excluded from SCR and RQD assessment

Instrumentation



Bentonite Seal



Solid / Perforated Standpipe



Granular Response Zone

BOREHOLE LOG

Project HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOS GL2 9QL				BOREHOLE No WS1	
Job No 5160	Date 11-05-23	Ground Level (c.m,AOD) 34.00	Co-Ordinates (c.) E 388,437 N 222,015		
Contractor Cook Ground Investigation Limited				Sheet 1 of 1	

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill			
Depth	Type No	Test Result	Water	Undrained Shear Strength	Legend	Depth (Thick- ness)	DESCRIPTION					
0.25-0.40	ES	N50/ 235 mm				0.25	CONCRETE: strong grey reinforced CONCRETE.					
							0.22 - 8mm diameter steel reinforcement					
							MADE GROUND: black/dark brown, very sandy, gravel of sub-angular, fine to coarse concrete (poor recovery)	RLs				
1.00-1.45	SPT C					(0.60)	CLAY: firm, bluish grey, slightly silty, gravelly CLAY. Gravel is sub-angular, fine to coarse claystone/limestone					
1.10	H					70	1.20	RLs				
						106	1.40			GRAVEL: very dense, light brown, gravelly claystone. Gravel is sub-angular, fine to coarse of claystone		
1.45								(1.50)	CLAY: dark brown, stiff, thinly laminated CLAY 1.50 - becoming stiff 1.90 - gypsum crystals	RLs		
1.50-1.80	ES					98						
1.50	H					94						
1.50-1.80	WAC											
1.70	H		50									
1.80-2.00	D		62									
1.90	H											
2.00-2.45	SPT C				62							
2.30	H					2.90						
2.40-2.60	ES	N22					2.90 - refused on weak dark brown mudstone/limestone					
2.45							Core Recovery;					
2.50	H											
2.60-2.90	D									0.00 - 1.00m: 5%		
2.70	H									1.00 - 2.90m: 95%		
2.90-2.94	SPT C											
2.94					N50/ 30 mm					Borehole drilled from surface with continuous disturbed sampling using 101mm sample barrel: 0.00-2.90m. No casing used. Groundwater encountered at 2.90m, rising to 0.81m after 20 minutes monitoring. Upon completion borehole reinstated with 50mm ID HDPE slotted pipe with washed gravel response zone: 0.90-2.90m. 50mm ID HDPE plain pipe with bentonite pellet seal: 0.10-0.90m. Flush 150mm steel cover set in concrete: 0.00-0.10m. Gas valve fitted		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Hole Dia. mm	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
11/05/2023	101	2.9			2.9						Borehole position scanned using Cable Avoidance Tool (CAT), no service detected RLs = Rugby Limestone Member
All dimensions in metres Scale 1:50			Client CJS ENGINEERING			Method/ Plant Used Archway Competitor Dart			Logged By DB		

Project HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOS GL2 9QL		Borehole No. WS1
Job No. 5160	Date: 11/05/2023	



Borehole: 0.0-1.0m



Borehole Core: 0.0-2.90m

Client Rowntree Consulting & Safran Landing Systems	Method/Plant Used Window Sampling / Archway Competitor Dart	Logged By DB
---	---	------------------------

BOREHOLE LOG

BOREHOLE PHOTOGRAPHS

Project HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOS GL2 9QL		Borehole No. WS2
Job No. 5160	Date: 11/05/2023	



Borehole: 0.0-0.6m



Borehole Core: 0.0-0.6m

Client Rowntree Consulting & Safran Landing Systems	Method/Plant Used Window Sampling / Archway Competitor Dart	Logged By DB
---	---	------------------------

BOREHOLE LOG

Project HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOS GL2 9QL				BOREHOLE No WS3
Job No 5160	Date 11-05-23	Ground Level (c.m,AOD) 34.00	Co-Ordinates (c.) E 388,408 N 222,011	
Contractor Cook Ground Investigation Limited				Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Undrained Shear Strength	Legend	Depth (Thickness)	DESCRIPTION		
0.00	C		1			0.33	CONCRETE: strong grey reinforced CONCRETE (150mm core)		
						0.55	0.26 - 8mm rebar		
0.60-0.80	D					63	MADE GROUND: dense grey angular medium to coarse concrete gravel		
0.60	H					68	0.50 - 0.60 - some staining into clay with occasional slag		
0.80	H					50	CLAY: firm bluish grey, slightly gravelly CLAY. Gravel is sub-rounded, fine to medium claystone		
1.00	H					65			
1.00-1.45	SPT C					60			
1.20	H					70	1.40 - becoming increasingly stiff and gravelly		
1.40	H					94			
1.45		N16				1.80	1.80 - refused on suspected mudstone/limestone		
1.60-1.80	D								
1.60	H						Core Recovery:		
1.80	H						0.00 - 1.00m: 100%		
1.80-2.17	SPT C						1.00 - 1.80m: 75%		
2.17		N50/ 220 mm					Borehole drilled from surface with continuous disturbed sampling using 101mm sample barrel: 0.00-1.80m. No casing used. Groundwater encountered at 1.80m, rising to 0.43m after 20 minutes monitoring. Upon completion backfilled with arisings and surface reinstated with concrete		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Hole Dia. mm	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
11/05/2023	101	2			1.8						Borehole position scanned using Cable Avoidance Tool (CAT), no service detected RLs = Rugby Limestone Member
All dimensions in metres Scale 1:50			Client CJS ENGINEERING			Method/ Plant Used Archway Competitor Dart			Logged By DB		

Project HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOS GL2 9QL		Borehole No. WS3
Job No. 5160	Date: 11/05/2023	



Borehole: 0.0-1.0m



Borehole Core: 0.0-1.0m

Client Rowntree Consulting & Safran Landing Systems	Method/Plant Used Window Sampling / Archway Competitor Dart	Logged By DB
---	---	------------------------

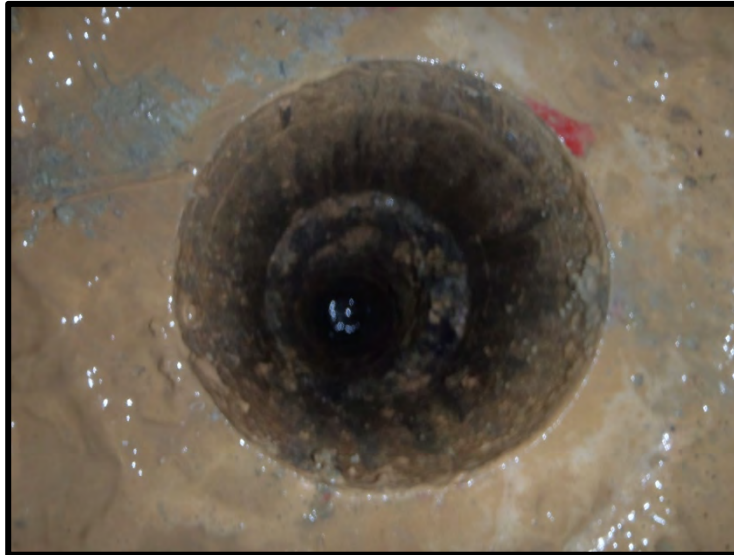
BOREHOLE LOG

Project HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOS GL2 9QL				BOREHOLE No WS4
Job No 5160	Date 11-05-23	Ground Level (c.m,AOD) 34.00	Co-Ordinates (c.) E 388,392 N 222,011	
Contractor Cook Ground Investigation Limited				Sheet 1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument/ Backfill		
Depth	Type No	Test Result	Water	Undrained Shear Strength	Legend	Depth (Thick- ness)	DESCRIPTION				
						0.22	CONCRETE: strong grey, non-reinforced CONCRETE				
							(0.43) 0.65	MADE GROUND: light brown, loose, sandy GRAVEL of sub-angular fine to coarse concrete			
0.65-1.00	ES	N13			20		1.00	MADE GROUND: soft to firm, dark brown, firm, slightly gravelly CLAY. Gravel is sub-angular to sub-rounded claystone with occasional brick. Slightly hydrocarbon odour			
0.70	H										
1.00-1.45	C										
1.00	H										
1.40-1.60	D										
1.40	H				54		(1.00)	CLAY: firm to stiff, bluish grey, slightly gravelly CLAY with some light brown silt		RLs	
1.45											
1.60	H										
1.60-2.00	SPT C										
1.80	H										
2.00	H										
2.00-2.45	SPT C										
2.00		N13									
2.20	H										
2.40	H										
2.45		N14									
2.60-2.80	D										
3.00-3.10	SPT C										
3.10		N50/ 50 mm									

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Hole Dia. mm	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
11/05/2023	101	3			1.60						Borehole position scanned using Cable Avoidance Tool (CAT), no service detected RLs = Rugby Limestone Member
All dimensions in metres Scale 1:50			Client CJS ENGINEERING			Method/ Plant Used Archway Competitor Dart			Logged By DB		

Project HANGAR 5, SAFRAN LANDING SYSTEMS, METEOR BUSINESS PARK, GLOS GL2 9QL		Borehole No. WS4
Job No. 5160	Date: 11/05/2023	



Borehole: 0.0-1.0m



Borehole Core: 0.0-3.0m

Client Rowntree Consulting & Safran Landing Systems	Method/Plant Used Window Sampling / Archway Competitor Dart	Logged By DB
---	---	------------------------



SPT Calibration Report

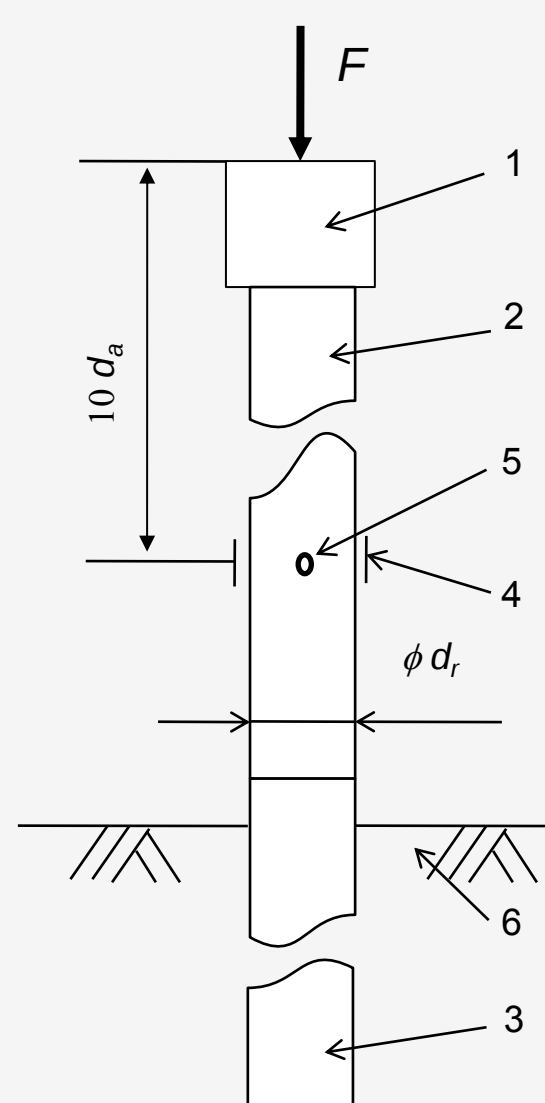
Hammer Energy Measurement Report

Type of Hammer Dart
Test No EQU2022_219
Client Cook GI

Test Depth (m) 9.80
Mass of hammer $m = 63.5\text{kg}$
Falling height $h = 0.76\text{m}$
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

Characteristics of the instrumented rod

Diameter $d_r = 0.052\text{ m}$
Length of instrumented rod 0.558 m
Area $A = 11.61\text{ cm}^2$
Modulus $E_a = 206843\text{ MPa}$



Key

- 1 Anvil
- 2 Part of instrumented rod
- 3 Drive Rod
- 4 Strain Gauge
- 5 Accelerometer
- 6 Ground

F Force
 d_r Diameter of rod

Fig. B.1 and B.2
BS EN ISO 22476-3 : 2005 + A1 : 2011

DATE OF TEST VALID UNTIL HAMMER ID

18/07/2022

18/07/2023

Dart 497

$E_{\text{meas}} = 0.358\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

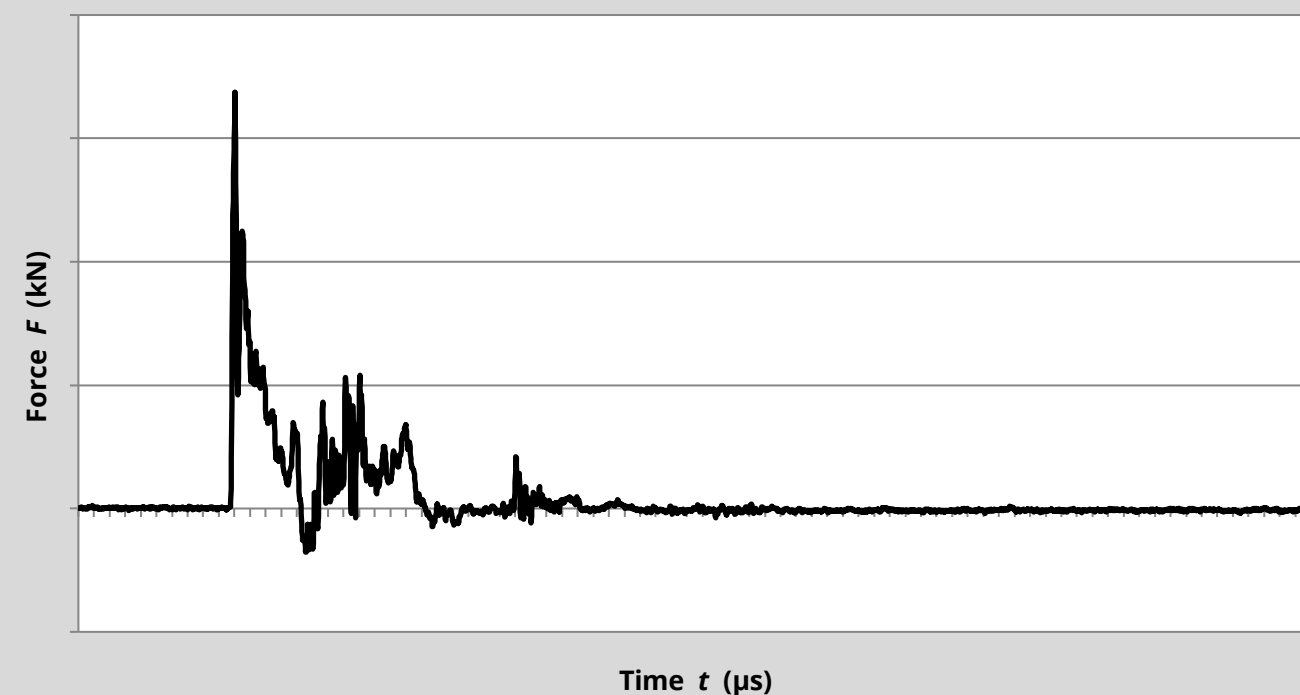
Comments

$$\text{Energy Ratio (Er)} = \frac{E_{\text{meas}}}{E_{\text{theor}}}$$

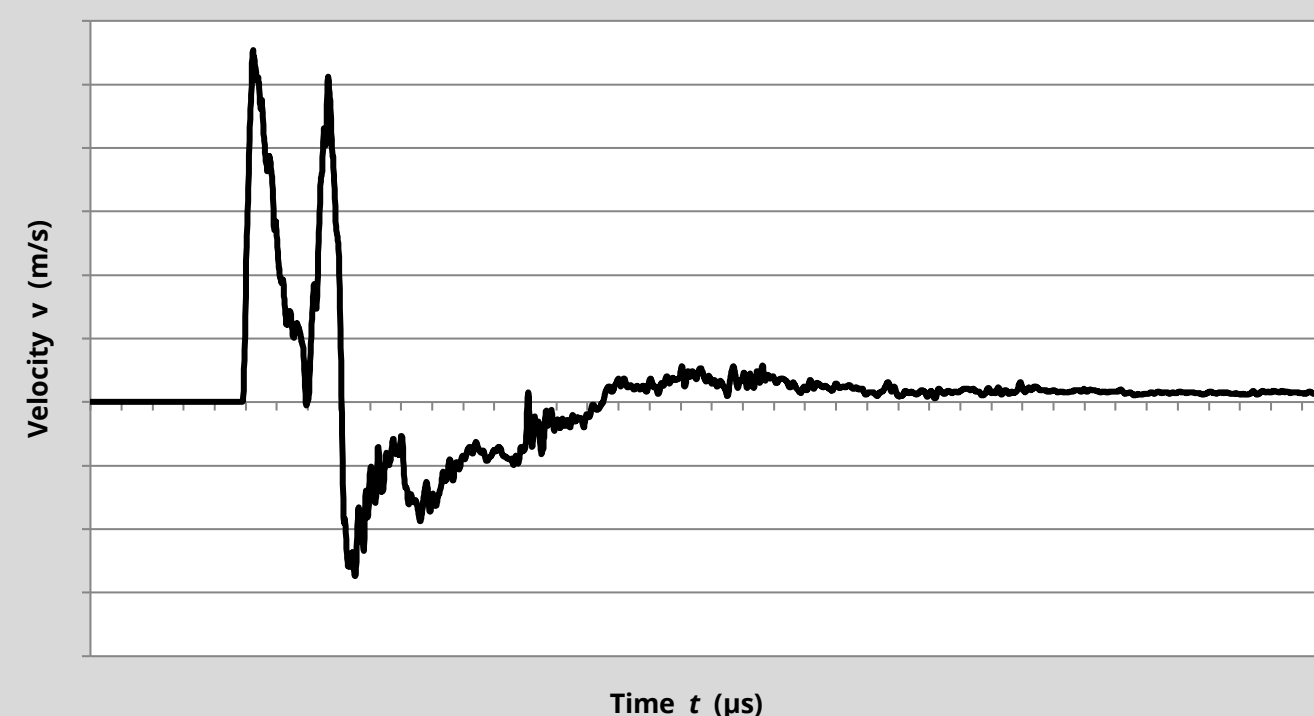
75.73%

© COPYRIGHT 2022

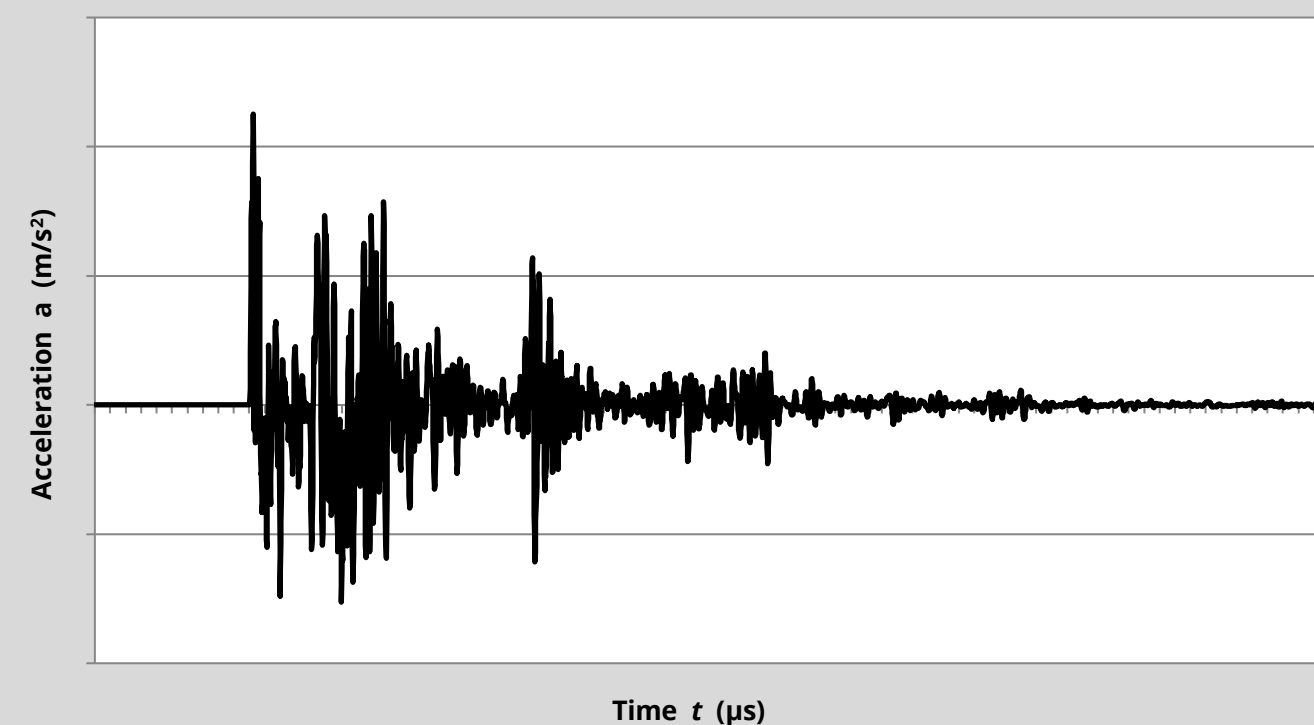
Force



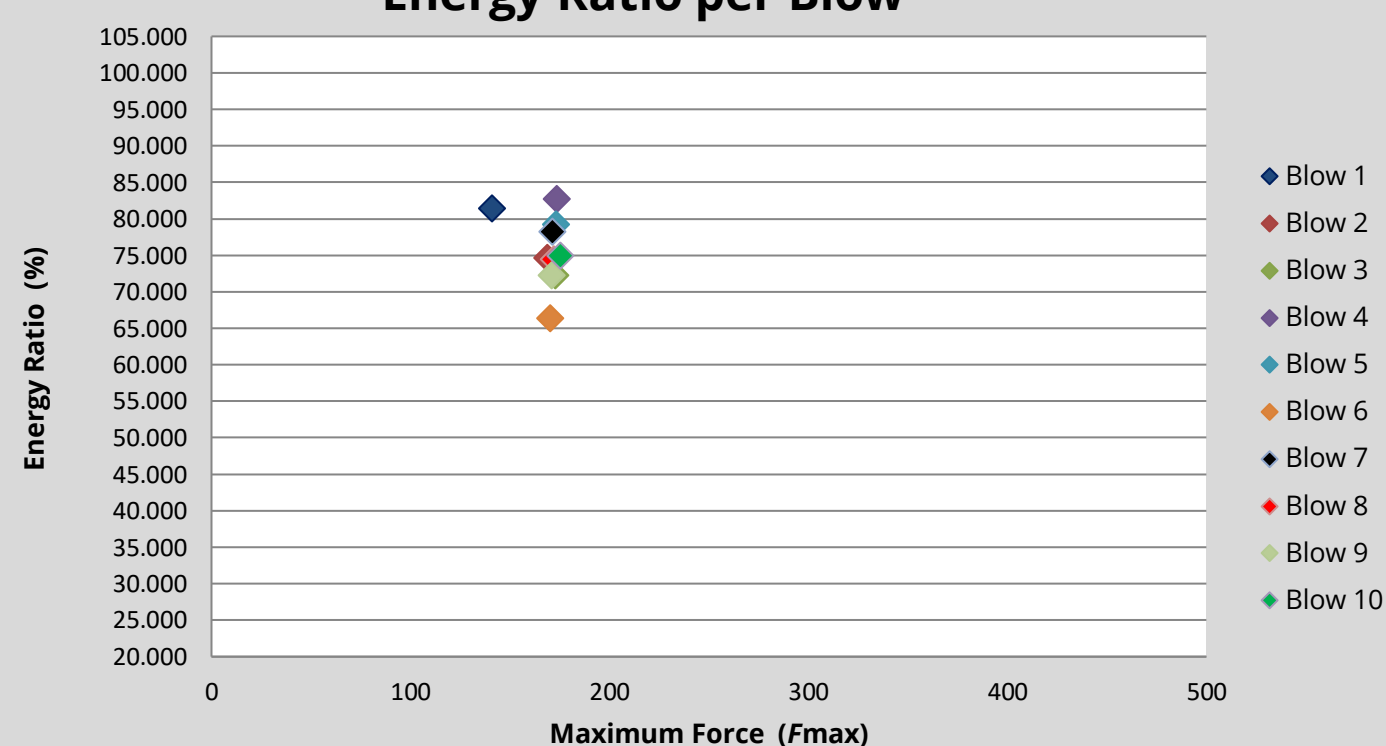
Particle Velocity



Acceleration



Energy Ratio per Blow



Equipe SPT Analyzer Operator

KS

Certificate prepared by

21/07/2022

Certificate checked by

21/07/2022

Certificate date

21/07/2022

APPENDIX 2

CERTIFIED GEOTECHNICAL TEST RESULTS

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: Wilson Associates (Consulting) Limited

Client Address: 36 Brunswick Road, Gloucester,
GL1 1JJ

Contact: Dave Boswell

Site Address: Safran Hangar 5

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 5160

Job Number: 23-33689-1

Date Sampled: 11/05/2023

Date Received: 12/05/2023

Date Tested: 22/05/2023

Sampled By: Not Given

Test Results:

Laboratory Reference: 2678574

Hole No.: WS3

Sample Reference: Not Given

Sample Description: Brownish grey CLAY

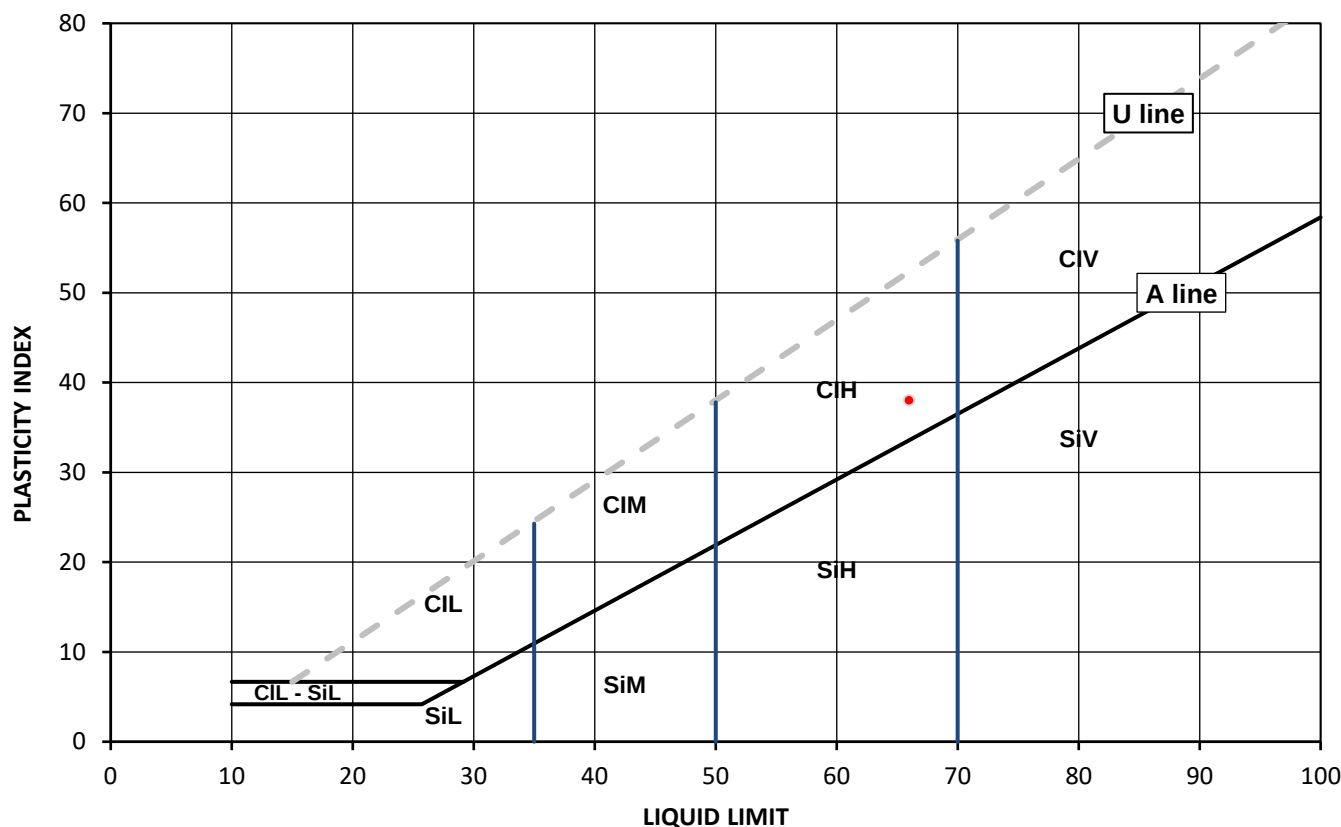
Depth Top [m]: 0.60

Depth Base [m]: 0.80

Sample Type: B

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
29	66	28	38	100



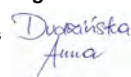
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: Wilson Associates (Consulting) Limited

Client Address: 36 Brunswick Road, Gloucester,
GL1 1JJ

Contact: Dave Boswell

Site Address: Safran Hangar 5

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 5160

Job Number: 23-33689-1

Date Sampled: 11/05/2023

Date Received: 12/05/2023

Date Tested: 22/05/2023

Sampled By: Not Given

Test Results:

Laboratory Reference: 2678576

Hole No.: WS4

Sample Reference: Not Given

Sample Description: Brownish grey slightly sandy CLAY

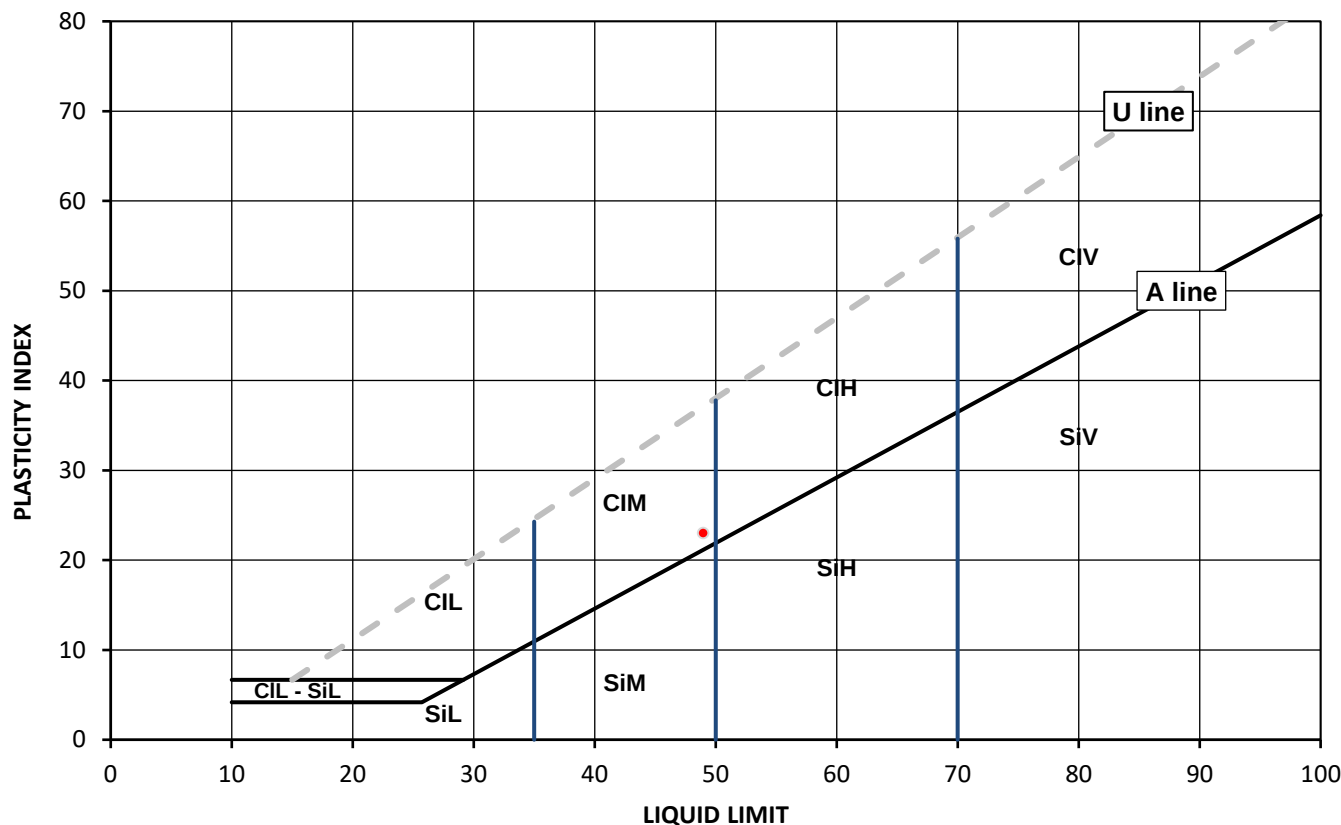
Depth Top [m]: 1.40

Depth Base [m]: 1.60

Sample Type: B

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	49	26	23	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.4 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: Wilson Associates (Consulting) Limited

Client Address: 36 Brunswick Road, Gloucester,
GL1 1JJ

Contact: Dave Boswell

Site Address: Safran Hangar 5

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 5160

Job Number: 23-33689-1

Date Sampled: 11/05/2023

Date Received: 12/05/2023

Date Tested: 22/05/2023

Sampled By: Not Given

Test Results:

Laboratory Reference: 2678577

Hole No.: WS4

Sample Reference: Not Given

Sample Description: Brownish grey CLAY

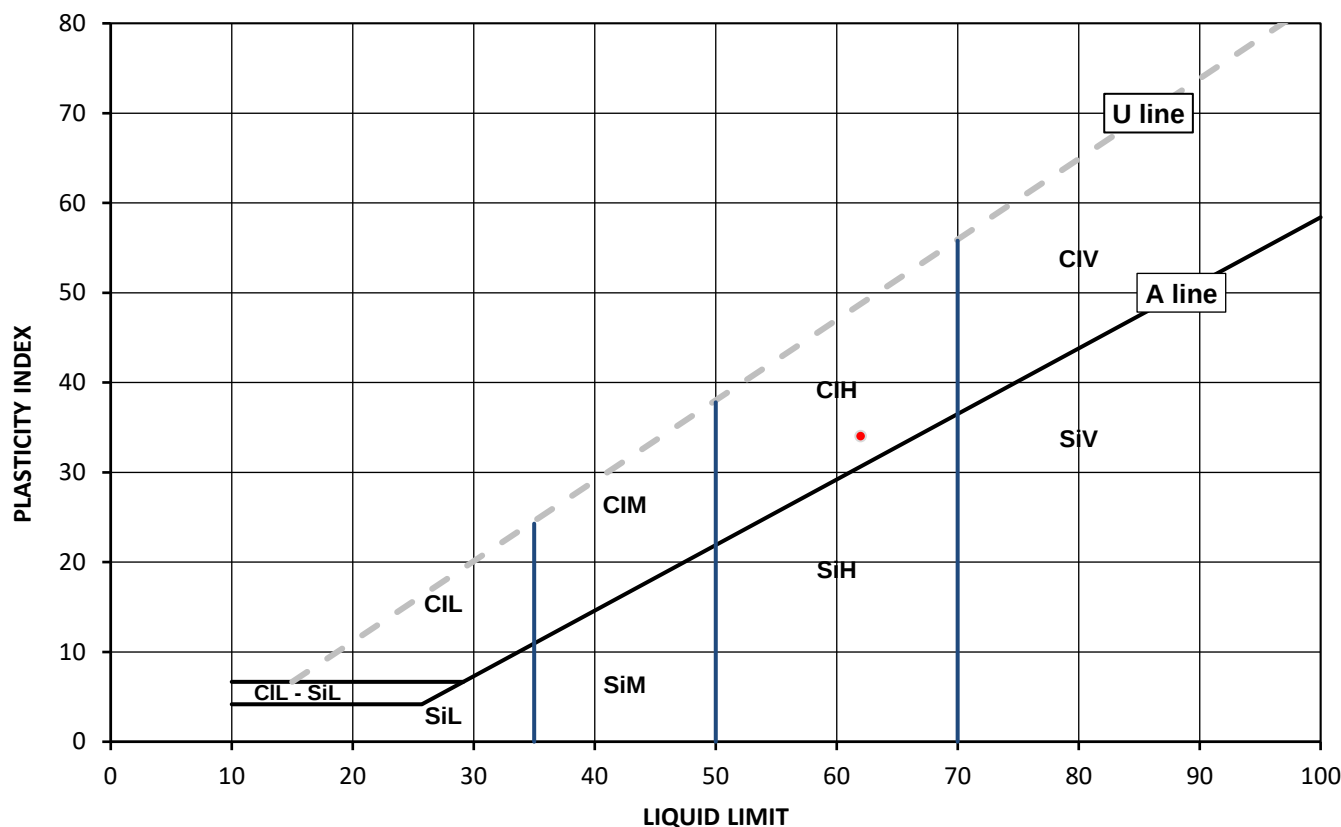
Depth Top [m]: 2.60

Depth Base [m]: 2.80

Sample Type: B

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
27	62	28	34	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Wilson Associates (Consulting) Limited

Water Content by BS 1377-2:1990: Clause 3.2 Atterberg by BS 1377-2: 1990:
Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5

Client Reference: 5160

Client Address: 36 Brunswick Road, Gloucester,
GL1 1JJ

Job Number: 23-33689-1

Date Sampled: 11/05/2023

Date Received: 12/05/2023

Contact: Dave Boswell

Date Tested: 22/05/2023

Site Address: Safran Hangar 5

Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W] %	Water Content BS EN ISO 17892-1 [W] %	Atterberg				Density			Total Porosity# %		
		Reference	Depth Top	Depth Base	Type					% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
			m	m															
2678570	WS1	Not Given	1.90	2.10	B	Brownish grey silty CLAY		25											
2678571	WS1	Not Given	2.60	2.90	B	Brownish grey silty CLAY		25											
2678574	WS3	Not Given	0.60	0.80	B	Brownish grey CLAY	Atterberg 1 Point	29		100	66	28	38						
2678575	WS3	Not Given	1.60	1.80	B	Brownish grey silty CLAY		25											
2678576	WS4	Not Given	1.40	1.60	B	Brownish grey slightly sandy CLAY	Atterberg 1 Point	21		100	49	26	23						
2678577	WS4	Not Given	2.60	2.80	B	Brownish grey CLAY	Atterberg 1 Point	27		100	62	28	34						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

Dudzińska Anna

Anna Dudzińska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

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4041

Client: Wilson Associates (Consulting) Limited

Client Address: 36 Brunswick Road, Gloucester,
GL1 1JJ

Contact: Dave Boswell

Site Address: Safran Hangar 5

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT**DETERMINATION OF WATER CONTENT**

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client Reference: 5160

Job Number: 23-33689-1

Date Sampled: 11/05/2023

Date Received: 12/05/2023

Date Tested: 22/05/2023

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type							
2678570	WS1	Not Given	1.90	2.10	B	Brownish grey silty CLAY		25	Sample was quartered, oven dried at 106.3 °C			
2678571	WS1	Not Given	2.60	2.90	B	Brownish grey silty CLAY		25	Sample was quartered, oven dried at 106.3 °C			
2678574	WS3	Not Given	0.60	0.80	B	Brownish grey CLAY		29	Sample was quartered, oven dried at 106.3 °C			
2678575	WS3	Not Given	1.60	1.80	B	Brownish grey silty CLAY		25	Sample was quartered, oven dried at 106.3 °C			
2678576	WS4	Not Given	1.40	1.60	B	Brownish grey slightly sandy CLAY		21	Sample was quartered, oven dried at 106.3 °C			
2678577	WS4	Not Given	2.60	2.80	B	Brownish grey CLAY		27	Sample was quartered, oven dried at 106.3 °C			

Comments:

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Signed:

Anna Dudzinska
PL Deputy Head of Reporting Team
for and on behalf of i2 Analytical Ltd

APPENDIX 3

**CONTAMINATION
STATUTORY FRAMEWORK / METHODOLOGY
AND
CERTIFIED CONTAMINATION TEST RESULTS**

A3 CONTAMINATION RISK ASSESSMENT

Statutory Framework

A3.1 Part 2A of the Environmental Protection Act 1990 (inserted by Section 57 of the Environment Act 1995) provides a regime for the control of specific threats to health or the environment from existing land contamination. In accordance with the Act and the statutory guidance document on the Contaminated Land (England) Regulations 2000, the definition of contaminated land is intended to embody the concept of risk assessment. Within the meaning of the Act, land is only 'contaminated land' where it appears to the regulatory authority to be in such a condition, by reason of substances within or under the land, that:

- harm is being caused or has significant possibility of significant harm to be caused to human health, or
- pollution is being caused or has significant possibility of significant pollution to be caused to controlled waters.

A3.2 In 2012 revised Statutory Guidance for Part 2A of the Environmental Protection Act (1990) came into force for England and Wales. This introduced a new four category approach for classifying land affected by contamination to assist decisions by regulators in cases of Significant Possibility of Significant Harm (SPOSH) to specified receptors, including humans, and significant pollution of controlled waters.

Category 1 describes land which is clearly problematic e.g. because similar sites are known to have caused a significant problem in the past. The legal definition is where "there is an unacceptably high probability, supported by robust science-based evidence, that significant harm would occur if no action is taken to stop it".

Categories 2 and 3 cover land where detailed consideration is needed before deciding whether it may be contaminated land. Category 2 is defined as land where "there is a strong case for considering that the risks from the land are of sufficient concern that the land poses a significant possibility of significant harm". Category 3 is defined as land where there is not the strong case described in the test for Category 2, and may include "land where the risks are not low, but nonetheless the authority considers that regulatory intervention under Part 2A is not warranted". The decision basis is initially related to human health risks, and if this is not conclusive due to uncertainty over risks, wider socio-economic factors (e.g. cost, local perception etc).

Category 4 describes land that is clearly not contaminated land, where there is no risk or the level or risk posed is low.

A3.3 This same 4 category system has also been introduced to assist in identifying whether there is a significant possibility of significant pollution of controlled waters. Part 2A states that normal levels of contaminants in soil should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise.

A3.4 Once land has been determined as contaminated land, the enforcing authority must consider how it should be remediated and, where appropriate, it must issue a remediation notice to require such remediation. The enforcing authority for the purposes of remediation may be the local authority which determined the land, or the Environment Agency which takes on responsibility once land has been determined if the land is deemed to be a “special site”. The rules on what land is to be regarded as special sites, and various rules on the issuing of remediation notices, are set out in the Contaminated Land (England) Regulations 2006.

A3.5 The UK guidance on the assessment of land contamination has developed as a direct result of the introduction of the above two Acts. The current technical guidance supporting the legislation has been summarised in the document Land Contamination Risk Management (LCRM), originally published in October 2020 by the Environment Agency (EA).

Contamination Assessment Methodology

A3.6 LCRM guidance proposes a three-stage risk based assessment process for identifying if a hazard exists within a site.

- Stage 1: Risk assessment
- Stage 2: Options appraisal
- Stage 3: Remediation and verification

A3.7 Stage 1 is to collect detailed information about the site, firstly to establish the likelihood of a hazard being present, and if a potential hazard is identified, to assess (through the source-pathway-receptor potential pollutant linkage concept) whether it has the

potential to pose an unacceptable risk. That unacceptable risk is subsequently estimated and /or evaluated.

- A3.8** Stage 1 can be achieved through a preliminary desk-based risk assessment and if considered appropriate, by progression to a generic or detailed quantitative risk assessment using appropriate intrusive investigation methods supported by UKAS accredited laboratory testing.
- A3.9** Quantitative assessment of human health risk posed by ground contamination is achieved by comparison of soil concentrations with Tier 1 Suitable for Use Levels (S4UL) as published by LQM/CIEH (2015) or (in the case of the toxic metal Lead only) with a Category Four Screening Level (C4SL) published by DEFRA (2014). The official Soil Guideline Values utilise a soil organic matter content of 6% which is considered to be higher than typical UK soils, however three sets of S4UL's have been developed for organic matter contents of 1%, 2.5% and 6%, thus the most appropriate set is selected based upon proven site conditions.
- A3.10** Contaminant concentrations below the threshold screening values are considered not to warrant further risk assessment. Concentrations of contaminants above these screening values require further consideration of potential pollutant linkages and may indicate potentially unacceptable risks to site users that warrants either further detailed quantitative risk assessment or progression to Stage 2. It should be noted that S4UL/C4SL's are not absolute thresholds and an exceedance does not necessarily indicate that a potential pollutant linkage is automatically established.
- A3.11** In order to assess any risk to controlled waters posed by contaminants within the underlying soils and groundwater, laboratory results are screened against Level 1 Environmental Quality Standard (EQS) values derived from the Water Framework Directive (Standards & Classification) Directions (England & Wales) 2015 and the current UK Drinking Water Supply (Water Quality) Regulations (DWS), dependent upon the most vulnerable receptor. The EQS is usually an upper concentration set for the receiving watercourse and not the discharge itself. The DWS is established for compliance at the point of use or abstraction and not the source area.
- A3.12** Stage 2 follows on from the risk assessment completed in Stage 1 by firstly identifying all feasible remediation options, then through consideration of additional factors including but not limited to; sustainability, limitations, timescales and budgets and regulatory controls, narrow the list of remediation options down to a favoured

remediation/mitigation approach. Note that this approach is not restrictive and may include the adoption of as many remediation options as necessary in order to achieve the remediation objective(s).

A3.13 Stage 3 takes the chosen remediation/mitigation approach from Stage 2 and from which a remediation strategy 'that can be implemented in practice' is developed and agreed with the regulatory authority. Once agreed the approved remediation works can take place as per the strategy, whilst still being mindful of whether the chosen remedial strategy is working as anticipated and also for the presence of unexpected contamination. Subject to findings, the agreed remedial strategy may require adjustment in order to ensure that the remediation objectives(s) can be met.

A3.14 Upon completion of the remedial works a verification plan is produced detailing the works undertaken and demonstrating that the risk has been reduced, that the remediation objective(s) and criteria have been met and that the site no longer presents a risk to human health and/or controlled waters, and therefore can be considered 'suitable for use'.

Waste Classification

A3.15 In terms of controlled off-site disposal to landfill of site arisings, if/where intended, waste classification is carried out in line with European Waste Catalogue (EWC) and Technical Guidance Waste Management 3 (TGWM3, EA Version 1.2, October 2021) using contamination test results obtained for that material. The assessment utilises the 'HazWasteOnline' software to establish a 'Hazardous' (170503*) / 'Non-hazardous' (170504) classification. Where required, the foregoing may be supplemented by Waste Acceptance Criteria (WAC) analysis, in order that the waste can further be designated as 'Hazardous' / 'Stable non-reactive' / 'Inert', for use by the receiving landfill operator. It should be noted that WAC is only required for disposal of wastes at certain classes of landfill; if arisings are not intended for removal to landfill, then WAC testing is not applicable.

Sample Ref Sample Depth (m)		SOILS				TIER 1: GENERIC ASSESSMENT CRITERIA						TIER 2: SITE SPECIFIC	
		WS1	WS1	WS3	WS4	S4UL (Residential with plant uptake)	S4UL (Residential without plant uptake)	S4UL (Allotments)	S4UL (Commercial)	S4UL (Public Open Space - Residential)	S4UL (Public Open Space - Park)	Upper Confidence Limit (on true mean concentration, u) (CIEH Statistical Calculator)	Site-Specific Assessment Criteria (SSAC's) residential with homegrown produce
Sample of													
DETERMINAND (mg/kg)													
TOXIC METALS	pH												
	Arsenic	6.3	6.8	13	12	37	40	43	640	79	170		
	Cadmium	0.4	0.3	0.4	0.4	11	85	19	190	120	532		
	Chromium VI	< 1.2	< 1.2	< 1.2	< 1.2	6	6	1.8	33	8	220		
	Chromium	25	11	38	36	910	910	18,000	8,600	1,500	33,000		
	Lead	14	6.9	19	25	200 ♦	310 ♦	80 ♦	2330 ♦	630 ♦	1300 ♦		
	Mercury	< 0.3	< 0.3	< 0.3	< 0.3	40	56	19	1100	120	240		
	Nickel	31	12	39	33	180	180	230	980	230	800		
	Selenium	< 1.0	< 1.0	< 1.0	< 1.0	250	430	88	12000	1100	1800		
PHYTOTOXIC METALS	Copper	38	23	34	30	2,400	7,100	520	68,000	12,000	44,000		
	Zinc	51	29	61	84	3,700	40,000	620	730,000	81,000	170,000		
	Moisture Content (%)	19	13	20	22								
	Stone Content (%)	< 0.1	< 0.1	< 0.1	< 0.1								
	Asbestos Screen	ND	ND	ND	ND								
SPECIATED POLYAROMATIC HYDROCARBONS (PAH)	Total PAH	< 0.80	< 0.80	< 0.80	< 0.80								
	Naphthalene	< 0.05	< 0.05	< 0.05	< 0.05	13	13	24	1,100(432)s	4,900	3,000		
	Acenaphthylene	< 0.05	< 0.05	< 0.05	< 0.05	920	6,000 (506)s	160	100,000	15,000	30,000		
	Acenaphthene	< 0.05	< 0.05	< 0.05	< 0.05	1,100	6,000 (336)s	200	100,000	15,000	30,000		
	Fluorene	< 0.05	< 0.05	< 0.05	< 0.05	860	4,500 (183)s	160	71,000	9,900	20,000		
	Phenanthrene	< 0.05	0.09	< 0.05	< 0.05	440	1,500	90	23,000	3,100	6,300		
	Anthracene	< 0.05	< 0.05	< 0.05	< 0.05	11,000	37,000	2,200	540,000	74,000	150,000		
	Fluoranthene	< 0.05	0.1	< 0.05	< 0.05	890	1600	290	23,000	3,100	6,400		
	Pyrene	< 0.05	0.08	< 0.05	< 0.05	2,000	3,800	620	54,000	7,400	15,000		
	Benzo(a)anthracene	< 0.05	< 0.05	< 0.05	< 0.05	13	15	13	180	29	62		
	Chrysene	< 0.05	< 0.05	< 0.05	< 0.05	27	32	19	350	57	120		
	Benzo(b)fluoranthene	< 0.05	< 0.05	< 0.05	< 0.05	3.7	4	3.9	45	7.2	16		
	Benzo(k)fluoranthene	< 0.05	< 0.05	< 0.05	< 0.05	100	110	130	1200	190	440		
	Benzo(a)pyrene	< 0.05	< 0.05	< 0.05	< 0.05	3.0	3.2	3.5	36	5.7	13		
	Indeno(1,2,3-cd)pyrene	< 0.05	< 0.05	< 0.05	< 0.05	41	46	39	510	82	180		
	Dibenz(a,h)anthracene	< 0.05	< 0.05	< 0.05	< 0.05	0.3	0.32	0.43	3.6	0.58	1.4		
	Benzo(ghi)perylene	< 0.05	< 0.05	< 0.05	< 0.05	350	360	640	4000	640	1,600		
BTEX	Benzene			<0.005	<0.005	0.37	1.4	0.075	90	73	110		
	Toluene			<0.005	<0.005	660	3,900	120	180,000 (4,360)v 27,000	56,000	100,000 (4,360)v 27,000		
	Ethylbenzene			<0.005	<0.005	260	440	91	2,840v 30,000	25,000	12,840v 31,000		
	P & M-Xylene			<0.005	0.026	310	430	160	3,120s 33,000	43,000	13,120s 33,000		
	O-Xylene			<0.005	0.015	330	480	160	12,620s	43,000	12,620s		
	Methyl tert-Butyl Ether			<0.005	<0.005								
(TPH) ALIPHATIC	C5 - C6			< 0.001	< 0.001	160	160	3,900	12,000 (1,150)s	600,000	180,000 (1,150)s		
	C6 - C8			< 0.001	< 0.001	530	530	180,000	40,000 (736)s	620,000	320,000 (736)s		
	C8 - C10			< 0.001	< 0.001	150	150	1,700	11,000 (451)v	13,000	21,000 (451)v		
	C10 - C12			< 1.0	< 1.0	760 (283)v	760 (283)v	7300	47,000 (283)v	13000	24,000 (283)v		
	C12 - C16			< 2.0	< 2.0	760 (283)v	760 (283)v	7,300	47,000 (283)v	13,000	24,000 (283)v		
	C16 - C21			< 8.0	< 8.0	4,300 (142)s	4,400 (142)s	13,000	90,000 (142)s	13,000	26,000 (142)s		
	C21 - C35			< 8.0	< 8.0	110,000	110,000	270,000	1,800,000	250,000	490,000		
(TPH) AROMATIC	C5 - C35			< 10	< 10	110,000	110,000	270,000	1,800,000	250,000	490,000		
	C5 - C7			< 0.001	< 0.001	300	1,400	57	86,000 (4,710)s 180,000	56,000	92,000 (4,710)s 100,000		
	C7 - C8			< 0.001	< 0.001	660	3,900	120	4,360v 17,000	56,000	14,360v 17,000		
	C8 - C10			< 0.001	0.038	190	270	51	3,580v 34,000	5,000	9,300 (3,580)v		
	C10 - C12			< 1.0	< 1.0	380	1,200	74	2,150s	5,000	10,000		
	C12 - C16			< 2.0	< 2.0	660	2,500	130	38,000	5,000	10,000		
	C16 - C21			< 10	< 10	930	1,900	260	28,000	3,800	7,800		
TOTAL PETROLEUM HYDROCARBONS (TPH) BANDED	C21 - C35			< 10	< 10	1,700	1,900	1,600	28,000	3,800	7,900		
	C5 - C35			< 10	< 10	1,700	1,900	1,600	28,000	3,800	7,900		
	C6 - C8	< 0.1	< 0.1			530	530	17,000	4,000	620,000	320,000		
	C8 - C10	< 0.1	< 0.1			150	150	51	11,000	5,000	9,300		
	C10 - C12	< 1.0	< 1.0			380	760	74	34,000	5,000	10,000		
	C12 - C16	< 4.0	< 4.0			660	2,500	130	38,000	5,000	10,000		
	C16 - C21	< 10	< 10			930	1,900	260	28,000	3,800	7,800		
	C21 - C40	< 10	< 10			1,700	1,900	1,600	28,000	3,800	7,900		
	C6 - C40	< 10	< 10										

CIEH/LQM s= GAC/S4UL presented exceeds the solubility saturation limit, which is presented in brackets
CIEH/LQM v= GAC/S4UL presented exceeds the vapour saturation limit, which is presented in brackets
CIEH/LQM d= S4UL based on a threshold protective of direct skin contact with phenol (guideline in brackets based on health effects following long term exposure provided for illustration only)
S4UL LQM/CIEH published Suitable for use levels (2015)
DEFRA ♦= C4SL (2014)
ND = None detected
Based on Soil Organic Matter of 6% (all levels expressed as mg/kg)

WFD (groundwater) WFD "Water Framework Directive Standards & Classification (England & Wales)" 2015
WFD (fresh surface water)
EA EQS River Basin Districts Typology, Standards & Groundwater Threshold Values (Water Framework Directive) (England & Wales) Directions 2010
UK DWS UK Drinking Water Standards "The Water Supply (Water Quality) Regulations 2000"
WHO World Health Organisation Guidelines

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Analytical Report Number : 23-33504

Project / Site name: Safran Hangar 5

Samples received on: 12/05/2023

Your job number: 5160

**Samples instructed on/
Analysis started on:** 12/05/2023

Your order number:

Analysis completed by: 22/05/2023

Report Issue Number: 1

Report issued on: 22/05/2023

Samples Analysed: 4 soil samples



Signed:

Elżbieta Suchy
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 23-33504
Project / Site name: Safran Hangar 5

Lab Sample Number				2677318	2677319	2677320	2677321
Sample Reference				WS1	WS1	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.40-2.60	0.25-0.40	0.55-0.70	0.65-1.00
Date Sampled				11/05/2023	11/05/2023	11/05/2023	11/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	19	13	20	22
Total mass of sample received	kg	0.001	NONE	0.8	1	0.8	0.8

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	IZJ	IZJ	IZJ	IZJ

Speciated PAHs

Naphthalene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	NONE	< 0.05	0.09	< 0.05	< 0.05
Anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	NONE	< 0.05	0.1	< 0.05	< 0.05
Pyrene	mg/kg	0.05	NONE	< 0.05	0.08	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Chrysene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	< 0.80	< 0.80	< 0.80	< 0.80
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.3	6.8	13	12
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.4	0.3	0.4	0.4
Chromium (hexavalent)	mg/kg	1.2	NONE	< 1.2	< 1.2	< 1.2	< 1.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	11	38	36
Copper (aqua regia extractable)	mg/kg	1	MCERTS	38	23	34	30
Lead (aqua regia extractable)	mg/kg	1	MCERTS	14	6.9	19	25
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	31	12	39	33
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	51	29	61	84

Monoaromatics & Oxygenates

Benzene	µg/kg	5	NONE	-	-	< 5.0	< 5.0
Toluene	µg/kg	5	NONE	-	-	< 5.0	< 5.0
Ethylbenzene	µg/kg	5	NONE	-	-	< 5.0	< 5.0
p & m-xylene	µg/kg	5	NONE	-	-	< 5.0	26
o-xylene	µg/kg	5	NONE	-	-	< 5.0	15
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	5	NONE	-	-	< 5.0	< 5.0

Analytical Report Number: 23-33504
Project / Site name: Safran Hangar 5

Lab Sample Number				2677318	2677319	2677320	2677321
Sample Reference				WS1	WS1	WS3	WS4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.40-2.60	0.25-0.40	0.55-0.70	0.65-1.00
Date Sampled				11/05/2023	11/05/2023	11/05/2023	11/05/2023
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	NONE	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	NONE	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	NONE	-	-	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	NONE	-	-	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	NONE	-	-	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	NONE	-	-	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	NONE	-	-	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	NONE	-	-	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	NONE	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	NONE	-	-	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	NONE	-	-	< 0.001	0.038
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	NONE	-	-	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	NONE	-	-	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	NONE	-	-	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	NONE	-	-	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	NONE	-	-	< 10	< 10

TPH Texas (C6 - C8) _{HS_1D_TOTAL}	mg/kg	0.1	NONE	< 0.1	< 0.1	-	-
TPH Texas (C8 - C10) _{HS_1D_TOTAL}	mg/kg	0.1	NONE	< 0.1	< 0.1	-	-
TPH Texas (C10 - C12) _{EH_CU_1D_TOTAL}	mg/kg	1	NONE	< 1.0	< 1.0	-	-
TPH Texas (C12 - C16) _{EH_CU_1D_TOTAL}	mg/kg	4	NONE	< 4.0	< 4.0	-	-
TPH Texas (C16 - C21) _{EH_CU_1D_TOTAL}	mg/kg	10	NONE	< 10	< 10	-	-
TPH Texas (C21 - C40) _{EH_CU_1D_TOTAL}	mg/kg	10	NONE	< 10	< 10	-	-
TPH Texas (C6 - C40) _{EH_CU+HS_1D_TOTAL}	mg/kg	10	NONE	< 10	< 10	-	-

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected

Analytical Report Number : 23-33504

Project / Site name: Safran Hangar 5

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2677318	WS1	None Supplied	2.40-2.60	Grey clay with gravel.
2677319	WS1	None Supplied	0.25-0.40	Brown clay and sand with gravel.
2677320	WS3	None Supplied	0.55-0.70	Brown clay.
2677321	WS4	None Supplied	0.65-1.00	Brown clay.

Analytical Report Number : 23-33504

Project / Site name: Safran Hangar 5

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
TPH Texas (Soil)	TPH Texas bands C6-C10 by HS/GC-MS & C10-C40 by GC-FID	In-house method	L088/L076	D	NONE
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	NONE
Hexavalent chromium in soil (Lower Level)	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	NONE

Analytical Report Number : 23-33504

Project / Site name: Safran Hangar 5

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
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For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
_	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX 4

WASTE CLASSIFICATION REPORT AND WASTE ACCEPTANCE CRITERIA (WAC) TEST RESULTS

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



TM3CF-SJ3BD-1CKLZ

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in pale yellow.

Job name

23-33504_HWOL_Results

Description/Comments

Project

5160

Site

Safran Hangar 5

Classified by

Name:

Richard Stokes

Date:

15 Jun 2023 16:03 GMT

Telephone:

Company:

Wilson Associates

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

-

Course

Hazardous Waste Classification

Date

-

Purpose of classification

2 - Material Characterisation

Address of the waste

Safran Landing Systems, Meteor Business Park, Gloucester

Post Code GL2 9QL

SIC for the process giving rise to the waste

43290 Other construction installation

Description of industry/producer giving rise to the waste

Aerospace

Description of the specific process, sub-process and/or activity that created the waste

Excavation of machine installation pit

Description of the waste

Made Ground and natural soil

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	WS1--11052023-2.40		Non Hazardous		3
2	WS1--11052023-0.25		Non Hazardous		5
3	WS3--11052023-0.55		Non Hazardous		7
4	WS4--11052023-0.65		Non Hazardous		9

Related documents

#	Name	Description
1	23-33504_HWOL_Results.hwol	i2 Analytical .hwol file used to populate the Job
2	Example waste stream template for contaminated soils	waste stream template used to create this Job

Report

Created by: Richard Stokes

Created date: 15 Jun 2023 16:03 GMT

Appendices

	Page
Appendix A: Classifier defined and non GB MCL determinands	11
Appendix B: Rationale for selection of metal species	12
Appendix C: Version	12

Classification of sample: WS1--11052023-2.40

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS1--11052023-2.40	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
19%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 19% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				6.3	mg/kg	1.32	6.738	mg/kg	0.000674 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.4	mg/kg	1.142	0.37	mg/kg	0.000037 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				25	mg/kg	1.462	36.539	mg/kg	0.00365 %		
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1.2	mg/kg	2.27	<2.724	mg/kg	<0.000272 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				38	mg/kg	1.126	34.655	mg/kg	0.00347 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	14	mg/kg	1.56	17.688	mg/kg	0.00113 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				31	mg/kg	2.976	74.734	mg/kg	0.00747 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				51	mg/kg	2.774	114.6	mg/kg	0.0115 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH									
12	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
15	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
16	phenanthrene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.0295 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS1--11052023-0.25

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS1--11052023-0.25	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
13%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	Entry:

Hazard properties

None identified

Determinands

Moisture content: 13% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				6.8	mg/kg	1.32	7.811	mg/kg	0.000781 %	✓	
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				0.3	mg/kg	1.142	0.298	mg/kg	0.0000298 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				11	mg/kg	1.462	16.077	mg/kg	0.00161 %		
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1.2	mg/kg	2.27	<2.724	mg/kg	<0.000272 %		<LOD
	024-017-00-8											
5	copper { dicopper oxide; copper (I) oxide }				23	mg/kg	1.126	22.529	mg/kg	0.00225 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	6.9	mg/kg	1.56	9.364	mg/kg	0.0006 %	✓	
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury dichloride }				<0.3	mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
8	nickel { nickel chromate }				12	mg/kg	2.976	31.072	mg/kg	0.00311 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { nickel selenate }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5									
10	zinc { zinc chromate }				29	mg/kg	2.774	69.992	mg/kg	0.007 %	✓	
	024-007-00-3	236-878-9	13530-65-9									
11	TPH (C6 to C40) petroleum group				<10	mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH									
12	naphthalene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9									
15	fluorene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7									
16	phenanthrene				0.09	mg/kg		0.0783	mg/kg	0.00000783 %	✓	
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
18	fluoranthene	205-912-4	206-44-0		0.1 mg/kg		0.087 mg/kg	0.0000087 %	✓	
19	pyrene	204-927-3	129-00-0		0.08 mg/kg		0.0696 mg/kg	0.00000696 %	✓	
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
Total:								0.017 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
•	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS3--11052023-0.55

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS3--11052023-0.55	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
20%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 20% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	arsenic { arsenic trioxide }				13 mg/kg	1.32	13.731 mg/kg	0.00137 %	✓	
	033-003-00-0	215-481-4	1327-53-3							
2	cadmium { cadmium oxide }				0.4 mg/kg	1.142	0.366 mg/kg	0.0000366 %	✓	
	048-002-00-0	215-146-2	1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				38 mg/kg	1.462	55.539 mg/kg	0.00555 %		
		215-160-9	1308-38-9							
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1.2 mg/kg	2.27	<2.724 mg/kg	<0.000272 %		<LOD
	024-017-00-8									
5	copper { dicopper oxide; copper (I) oxide }				34 mg/kg	1.126	30.624 mg/kg	0.00306 %	✓	
	029-002-00-X	215-270-7	1317-39-1							
6	lead { lead chromate }			1	19 mg/kg	1.56	23.709 mg/kg	0.00152 %	✓	
	082-004-00-2	231-846-0	7758-97-6							
7	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
8	nickel { nickel chromate }				39 mg/kg	2.976	92.859 mg/kg	0.00929 %	✓	
	028-035-00-7	238-766-5	14721-18-7							
9	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5							
10	zinc { zinc chromate }				61 mg/kg	2.774	135.378 mg/kg	0.0135 %	✓	
	024-007-00-3	236-878-9	13530-65-9							
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4							
12	benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
13	toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
14	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
15	xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
17	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
18	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
19	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
20	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8							
21	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
22	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0							
23	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0							
24	benzo[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
25	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
26	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
27	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
28	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
29	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5							
30	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
31	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2							
Total:								0.035 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: WS4--11052023-0.65

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
WS4--11052023-0.65	Chapter:
Moisture content:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
22%	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
(wet weight correction)	

Hazard properties

None identified

Determinands

Moisture content: 22% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	arsenic { arsenic trioxide }				12 mg/kg	1.32	12.358	mg/kg	0.00124 %	✓	
	033-003-00-0	215-481-4	1327-53-3								
2	cadmium { cadmium oxide }				0.4 mg/kg	1.142	0.356	mg/kg	0.0000356 %	✓	
	048-002-00-0	215-146-2	1306-19-0								
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				36 mg/kg	1.462	52.616	mg/kg	0.00526 %		
		215-160-9	1308-38-9								
4	chromium in chromium(VI) compounds { chromium(VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex }				<1.2 mg/kg	2.27	<2.724	mg/kg	<0.000272 %		<LOD
	024-017-00-8										
5	copper { dicopper oxide; copper (I) oxide }				30 mg/kg	1.126	26.346	mg/kg	0.00263 %	✓	
	029-002-00-X	215-270-7	1317-39-1								
6	lead { lead chromate }			1	25 mg/kg	1.56	30.416	mg/kg	0.00195 %	✓	
	082-004-00-2	231-846-0	7758-97-6								
7	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406	mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7								
8	nickel { nickel chromate }				33 mg/kg	2.976	76.609	mg/kg	0.00766 %	✓	
	028-035-00-7	238-766-5	14721-18-7								
9	selenium { nickel selenate }				<1 mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
	028-031-00-5	239-125-2	15060-62-5								
10	zinc { zinc chromate }				84 mg/kg	2.774	181.762	mg/kg	0.0182 %	✓	
	024-007-00-3	236-878-9	13530-65-9								
11	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005 mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4								
12	benzene				<0.005 mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-020-00-8	200-753-7	71-43-2								
13	toluene				<0.005 mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-021-00-3	203-625-9	108-88-3								
14	ethylbenzene				<0.005 mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	601-023-00-4	202-849-4	100-41-4								
15	xylene				0.041 mg/kg		0.032	mg/kg	0.0000032 %	✓	
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
16	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
17	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
18	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
19	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
20	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8							
21	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
22	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0							
23	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0							
24	benzo[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
25	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
26	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
27	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
28	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
29	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5							
30	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
31	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2							
Total:								0.0376 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because No liquid phase present.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

xylene: (conc.: 3.2e-06%)

Appendix A: Classifier defined and non GB MCL determinands

■ **chromium(III) oxide (worst case)** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H332 , Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Resp. Sens. 1; H334 , Skin Sens. 1; H317 , Repr. 1B; H360FD , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013

Data source: WM3 1st Edition 2015

Data source date: 25 May 2015

Hazard Statements: Flam. Liq. 3; H226 , Asp. Tox. 1; H304 , STOT RE 2; H373 , Muta. 1B; H340 , Carc. 1B; H350 , Repr. 2; H361d , Aquatic Chronic 2; H411

■ **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Acute Tox. 4; H302 , Acute Tox. 1; H330 , Acute Tox. 1; H310 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315

■ **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Aquatic Chronic 2; H411

■ **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

■ **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Reasonable case CLP species based on hazard statements/molecular weight and most common (stable) oxide of arsenic. Industrial sources include: smelting; main precursor to other arsenic compounds (edit as required)

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium (VI) compounds, with the exception of barium chromate and of compounds specified elsewhere in this Annex}

Worst case species based on hazard statements/molecular weight (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {nickel selenate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

Appendix C: Version

HazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**
HazWasteOnline Classification Engine Version: 2023.111.5569.10274 (13 Jun 2023)
HazWasteOnline Database: 2023.111.5569.10274 (22 Apr 2023)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021

CLP Regulation - Regulation 1272/2008/EC of 16 December 2008

1st ATP - Regulation 790/2009/EC of 10 August 2009

2nd ATP - Regulation 286/2011/EC of 10 March 2011

3rd ATP - Regulation 618/2012/EU of 10 July 2012

4th ATP - Regulation 487/2013/EU of 8 May 2013

Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013

5th ATP - Regulation 944/2013/EU of 2 October 2013

6th ATP - Regulation 605/2014/EU of 5 June 2014

WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014

Revised List of Waste 2014 - Decision 2014/955/EU of 18 December 2014

7th ATP - Regulation 2015/1221/EU of 24 July 2015

8th ATP - Regulation (EU) 2016/918 of 19 May 2016

9th ATP - Regulation (EU) 2016/1179 of 19 July 2016

10th ATP - Regulation (EU) 2017/776 of 4 May 2017

HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017

13th ATP - Regulation (EU) 2018/1480 of 4 October 2018

14th ATP - Regulation (EU) 2020/217 of 4 October 2019

15th ATP - Regulation (EU) 2020/1182 of 19 May 2020

The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)

Regulations 2020 - UK: 2020 No. 1567 of 16th December 2020

The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020 - UK:

2020 No. 1540 of 16th December 2020

GB MCL List - version 1.1 of 09 June 2021

**Dave Boswell**

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Analytical Report Number : 23-33507

Project / Site name: Safran Hangar 5

Samples received on: 12/05/2023

Your job number: 5160

**Samples instructed on/
Analysis started on:** 12/05/2023

Your order number:

Analysis completed by: 19/05/2023

Report Issue Number: 1

Report issued on: 19/05/2023

Samples Analysed: 10 :1 WAC sample


Signed:

Anna Goc
Junior Reporting Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

i2 Analytical

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email:reception@i2analytical.com

Waste Acceptance Criteria Analytical Results

Report No:	23-33507						
					Client: WILSONASSO		
Location	Safran Hangar 5						
Lab Reference (Sample Number)	2677337 / 2677338				Landfill Waste Acceptance Criteria		
					Limits		
Sampling Date	11/05/2023				Inert Waste Landfill	Stable Non- reactive HAZARDOUS waste in non- hazardous Landfill	Hazardous Waste Landfill
Sample ID	Combine Sample WS						
Depth (m)	0.55-2.60						
Solid Waste Analysis							
TOC (%)**	1.1				3%	5%	6%
Loss on Ignition (%) **	4.4				--	--	10%
BTEX (µg/kg)	< 5.0				6000	--	--
Sum of PCBs (mg/kg)	< 0.007				1	--	--
Mineral Oil (mg/kg) EH, ID, CU, AL	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85				100	--	--
pH (units)**	7.8				--	>6	--
Acid Neutralisation Capacity (mmol / kg)	18				--	To be evaluated	To be evaluated
Eluate Analysis							
(BS EN 12457 - 2 preparation utilising end over end leaching procedure)	10:1			10:1	Limit values for compliance leaching test		
	mg/l			mg/kg	using BS EN 12457-2 at L/S 10 l/kg (mg/kg)		
Arsenic *	< 0.0010			< 0.0100	0.5	2	25
Barium *	0.104			0.844	20	100	300
Cadmium *	< 0.0001			< 0.0008	0.04	1	5
Chromium *	< 0.0004			< 0.0040	0.5	10	70
Copper *	0.0072			0.059	2	50	100
Mercury *	< 0.0005			< 0.0050	0.01	0.2	2
Molybdenum *	0.0149			0.121	0.5	10	30
Nickel *	0.0024			0.019	0.4	10	40
Lead *	< 0.0010			< 0.010	0.5	10	50
Antimony *	< 0.0017			< 0.017	0.06	0.7	5
Selenium *	< 0.0040			< 0.040	0.1	0.5	7
Zinc *	0.011			0.088	4	50	200
Chloride *	4.6			37	800	15000	25000
Fluoride*	0.36			2.9	10	150	500
Sulphate *	580			4700	1000	20000	50000
TDS*	610			5000	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.010			< 0.10	1	-	-
DOC	8.14			66.1	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	0.80						
Dry Matter (%)	80						
Moisture (%)	20						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.							
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation							
** = UKAS accredited (liquid eluate analysis only)							
** = MCERTS accredited							

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 23-33507

Project / Site name: Safran Hangar 5

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2677337	Combine Sample V	None Supplied	0.55-2.60	Brown clay.

Analytical Report Number : 23-33507

Project / Site name: Safran Hangar 5

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-2 (10:1) Leachate Prep	10:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-2.	L043-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance an Sampling and Testing of Wastes to Meet Landfill Waste Acceptance"	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil (Soil) C10 - C40	Determination of mineral oil fraction extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L076-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270.	L064-PL	D	NONE
PCB's By GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	NONE
pH at 20oC in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	NONE
Total BTEX in soil (Poland)	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073-PL	W	NONE
Metals in leachate by ICP-OES	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025
Chloride 10:1 WAC	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride 10:1 WAC	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Use of Total Ionic Strength Adjustment Buffer for Electrode Determination"	L033B-PL	W	ISO 17025
Sulphate 10:1 WAC	Determination of sulphate in leachate by ICP-OES	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025

Analytical Report Number : 23-33507
Project / Site name: Safran Hangar 5

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total dissolved solids 10:1 WAC	Determination of total dissolved solids in water by EC probe using a factor of 0.6.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L031	W	ISO 17025
Monohydric phenols 10:1 WAC	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Dissolved organic carbon 10:1 WAC	Determination of dissolved inorganic carbon in leachate by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	NONE

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

CONDITIONS OF CONTRACT - CONSULTANCY SERVICES

- 1 Wilson Associates (Consulting) Limited ("the Consultant") shall carry out the Services, including any proposal, report or other document, as detailed in any relevant correspondence, which forms part of this Agreement, for the Client with reasonable skill, care and diligence. The Consultant shall use reasonable endeavours to adhere to any agreed programme. Each instruction or acceptance of a quotation shall be deemed to be an offer to purchase the services subject to the conditions laid out in this document.
- 2 An interim invoice will normally be submitted upon completion of the site works, to include all disbursements and fees to date, and for contracts extending over a long period, monthly invoices will be submitted for payment. The final report will not be issued until payment of the first interim invoice has been received, unless agreed with this Practice beforehand. Invoices are not to be assigned to a third party without prior agreement. Should the contract be cancelled after either preparatory or fieldwork has commenced then a claim will be made for work completed to that date.
- 3 The rates quoted, are net of Value Added Tax (VAT) which will be added to invoices at the standard prevailing rate, and are valid for a period of 12 weeks from the date of the quote. The Consultant shall issue accounts monthly in respect of that part of the Services carried out in the preceding period. The Client shall make payment of accounts without discount or retention within 30 days of submission. Disputes should be raised within 10 days. In the event of non-payment of the account(s) within the specified period the Consultant reserves the right to charge, from time to time, interest on the unpaid amount at the rate of 2% per calendar month above the Bank of England base rate (at time of original invoice date).
- 4 In the event of non-payment of the account(s), the Client undertakes to pay to the Consultant all costs and expenses, on an indemnity basis, incurred by the Consultant in: (i) the recovery from the Client of money or arrears (ii) the enforcement of any of the provisions of these conditions of contract (iii) the service of any notice relating to the breach by the Client of any of their obligations under this contract whether or not the same shall result in court proceedings (iv) the cost of any bank or other charges incurred by the Consultant if any cheque written by the Client is dishonoured or if any standing order payment is withdrawn by the Client's bankers (v) compensation for the breach of any terms of this agreement.
- 5 Unless expressly stipulated to the contrary, payment of the account(s) is not dependent upon the Client achieving regulatory approval for or discharge of a planning condition relating to the project, nor is it dependent upon the Client's securing of funding for the development where this may be conditional upon the prior granting of planning or building regulations approval, nor the Client's onward sale of the site to another party. In the case of provision of services to another consultant, payment of our account is not dependent upon the prior settlement of their own account by their Client.
- 6 No work will commence until an official written order or completed Quote Acceptance form has been received by post or email. Such order will be deemed to constitute acceptance of the quotation and these terms and conditions. Where the instruction to undertake the Services may have been issued by an intermediary on behalf of the Client, full Client details including confirmation of and contact details for the person responsible for authorising payment must be provided to the Consultant. In the event that the Client defaults or otherwise fails to pay the due account, the Consultant reserves the right to pursue and recover any unpaid amount from the instructing intermediary.
- 7 Neither party shall assign any obligation or benefit under this Agreement without prior written consent of the other Party. The Client shall not be entitled to assign the report(s) or any part of it without our prior written consent. Re-assignment of reports can be provided on request, subject to liaison with our Insurers and standard administration costs. Any assignment shall exclude the Contracts (Rights of Third Parties) Act 1999. Provision of a Collateral Warranty can only be considered if it is agreed at the pre-works stage, and fees for legal advice and warranty provision agreed before the works commence.
- 8 The Client guarantees that it has the right to have the Services performed and that he has obtained all the necessary certificates, licences, permits and consents required by Statute or any order or regulation made there under or by any regulation or by-law of any authority undertaker. The Client shall indemnify and hold harmless the Consultant from and against all consequences of a failure in this respect. The Client shall arrange such rights of access to property and use of Client's facilities as described in (or reasonably to be inferred from) this Agreement. The Client shall use reasonable endeavours to supply to the Consultant, promptly and free of charge: (a) any other necessary things in accordance with this Agreement; (b) any instructions, decisions, consents and approvals; and (c) any relevant data and information in the Client's possession; all of which the Consultant may reasonably require in order to carry out the Services. The Client will indemnify the Consultant in respect of any failure by the Client under this Clause.
- 9 In line with the Construction (Design & Management) Regulations 2015 and AGS guidance, neither the Consultant nor any sub-contractor shall be held responsible for any accidental damage or the consequences of any damage to buried services such as cables, pipes, sewers, etc., the positions and nature of which have not been clearly indicated to the Consultant in writing prior to the commencement of the work, unless the locating of same is expressly part of the Services. Where necessary it is assumed that the Client will permit the use of their toilet/welfare facilities by Consultant's staff and sub-contractors, including domestic properties. We will normally undertake the role of Contractor on a ground investigation project, but may occasionally 'inherit' the role of Principal Contractor. In either case that role is restricted to the ground investigation phase ONLY and not the subsequent build.
- 10 The Consultant shall not be held responsible for any loss, damage or injury arising from actions or omissions of the Client, his agents, servants and/or independent contractors. The Client shall indemnify the Consultant from any such acts or omissions.
- 11 Each Party shall retain the copyright of its documents. Information relating to the contract will only be disclosed to those employees who require it to carry out their job. If necessary this may include subcontractors. Any other third party enquiry about the purposes of these works will be referred back to the Client. Upon completion any technical information or ground investigation data obtained as part of your commission will thereafter be archived as 'in-house' data, and may be used (without specific reference to your site) on other projects in the future; this specifically excludes any personal data.
- 12 Copyright And Non-Disclosure Notice - The contents and layout of any report produced by the Consultant are subject to copyright owned by Wilson Associates save to the extent that copyright has been legally assigned by us to another party or is used by Wilson Associates under licence. To the extent that we own the copyright of a particular report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in that report. The methodology (if any) contained in that report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of Wilson Associates. Disclosure of such a information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to that report by any means will, in any event, be subject to the Third Party Disclaimer set out below.
- 13 Third Party Disclaimer - Any disclosure of our report(s) to a third party is subject to this disclaimer. Reports are prepared by Wilson Associates at the instruction of, and for use by, our client named on the front of that report. It does not in any way constitute advice to any third party who is able to access it by any means. Wilson Associates excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of that report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability. Legal re-assignment to another party can be arranged - see Clause 7.
- 14 The Consultant's liability under this Agreement shall be limited to £500,000 (five hundred thousand pounds). The Consultant shall maintain professional indemnity insurance in this amount providing that such insurance cover is available at commercially reasonable rates.
- 15 To comply with the General Data Protection Regulation (GDPR) 2018, we will only request contact details sufficient to complete our project with you, name/job title, address/postcode/email. Any data collected will be used only by authorised personnel in the context of that project. We are committed to ensuring that your information is secure and in order to prevent unauthorised access or disclosure, we have put in place suitable physical, electronic and managerial procedures to safeguard and secure the information we collect. We will not share your information with third parties.