

Environmental  
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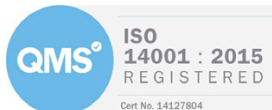
## PHASE 3

# REMEDIATION STRATEGY REPORT

|              |            |
|--------------|------------|
| job number   | date       |
| site address |            |
| written by   | checked by |
| issued by    |            |



Please consider the environment before printing this report.



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**Rogers Geotechnical Services Ltd**  
**Offices 1 & 2 Barncliffe Business Park, Near Bank, Shelley, Huddersfield, HD8 8LU**  
**☎ 01484 604354      Company No. 5130864**

<ENVIRONMENTAL> <GEOTECHNICAL>

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## Phase 3: Remediation Statement

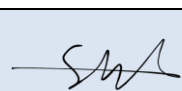
Location: **Barnsley Road**  
Grange Moor, Wakefield, West Yorkshire WF4 4DS

For: PC Specialist Limited

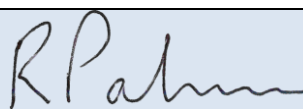
Report No. C3224/25/E/8244\_Rev1

Report date: January 2026

For and on behalf of **Rogers Geotechnical Services Ltd**



**Steven Hale** BSc FGS  
Geo-environmental Technician



**Rob Palmer** MSc FGS ACIEH  
Engineering Director

### 1. Introduction

Further to the site-specific risk assessments provided within the geo-environmental report (C3224/24/E/4914, February 2024), the additional environmental report (C3224/25/E/8007, June 2025), subsequent gas risk assessment (C3224/24/E/6470, April 2024), and most recent environmental investigation (C3224/25/E/8845, January 2026), it is considered that some remediation will be required at this site. This report provides the strategy for that remediation.

From the geo-environmental investigations, it was considered that the soils present at the site were generally found to be suitable for the intended end use. However, asbestos contamination was detected within borehole WS103 located within the north east of the site, albeit this was present in low concentrations (<0.001%). In any event, it was recommended that a watching brief be carried out during the ground works and construction phase of the development to identify any unexpected or previously unidentified contamination.

It is understood that a cut and fill exercise is to be undertaken on this site shown on the diagram provided by the client (Ref: P3849-DR-07). This exercise shows that a significant amount of made ground, natural soils and rock will be wholly removed from the northern area in order to create the desired formation level. It is anticipated that this exercise shall result in the removal of the majority of identified contamination.

With reference to the landscape management plan (ZLA\_1386 rev F, by Zebra Landscape Architects), the majority of new development is to be undertaken in the north. Indeed, it should be appreciated that the soft landscaped areas within the southern portion of the site will remain as is, albeit a new pond will be installed. It should be noted that this particular area (i.e. southern portion) was proven to be uncontaminated and, as such, it is not considered that any specific remediation will be required for this section of the site. Indeed, no spills have been identified within this southern section. However, contamination was identified within the northern section where the building is to be constructed and peripheral landscaping is to be installed.

Elevated levels of ground gas were detected during the monitoring programme. As such, Characteristic Situation Level 3 has been classified for the site (see gas risk assessment), thus protection from bulk ground gasses is also required.

## 2. Remediation Strategy

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### 2.1 Remediation Objectives

Based on the site-specific risk assessment provided in the geo-environmental report and gas monitoring letter, the object of remediation at the site is as follows:

- To protect the site operatives during the construction process from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust.
- To protect the end user and neighbours from the ingestion of soil or dust, dermal contact with the soil and inhalation of dust.
- To protect the plants from contaminated ground.
- To protect operatives and end users from the accumulation of bulk ground gases.

### 2.2 Development Requirements.

The site is to be developed by the construction of a warehouse with a lower ground floor level with hard-standing and soft landscaped areas. Therefore, it is considered that the site may be classified as being a commercial development.

## 3. Scope

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In order to fulfil the objectives defined above the following remedial strategy will be utilised. A pragmatic approach will be undertaken, with observational techniques being employed at each stage of the work.

### 3.1 Groundworks

During the ground-works phase of the development, protection to the site operatives is required. The risk to site operatives is considered under the Health and Safety at Work Act 1974, together with regulations made under the act, which includes the Control of Substances Hazardous to Health (COSHH) regulations. Therefore, the risks to site personnel will be considered under the Construction Design and Management (CDM) regulations at the planning stage and be included in the contractor's Health and Safety Plan and site-specific Method Statements. These documents shall include the following main elements.

- Site operatives at all levels shall be made aware of the hazards of working with contaminated soils and the hazards of working in an area where accumulations of bulk ground gasses (carbon dioxide or methane) could occur.
- Personal hygiene facilities, including washing and messing, will be provided and site operatives will be encouraged to use them.

- Where work is undertaken in dry weather the site will be dampened down to avoid dust. In addition, dust masks will be provided to all site operatives for use in dry weather.
- Where vehicles are transferring soil to the landfill site they will be covered to prevent contamination of the surrounding area by dust.
- Any stockpiles of contaminated soil on site will be sheeted over to prevent excessive amounts of airborne dust.
- Where work is undertaken in wet weather, vehicle and wheel washing facilities will be provided to ensure that the vehicles leaving the site do not transfer contamination to surrounding areas.

On completion of the ground-works a careful site inspection of the sub-grade will take place. Should visual or olfactory evidence of contamination be revealed, then suitably qualified specialists will be consulted. Further testing and updates to the site-specific ground model, risk assessment, and remediation strategy will be undertaken where necessary.

### 3.2 Construction

During the construction phase of the contract the following items are required to protect the end user from the potential contaminants revealed at this site.

- Beneath buildings, pavements and hard-standings clean inert granular sub-base shall be employed.
- New plastic services will be constructed in a surround of clean inert material and a risk assessment will be carried as instructed by the statutory water authority for the area. Where necessary testing as recommended in the United Kingdom Water Industry Research (UKWIR) website under Report Ref. No. 10/WM/03/21 - 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites' will be carried out.
- The redundant services revealed at this site will be de-commissioned and piped services sealed. Any existing services that are to be employed in the new development will be carefully inspected to ensure that they are serviceable and will not allow the ingress of contamination.
- Buried concrete placed at the site will conform to the guidance given in BRE Special Digest SD1 in accordance with a design sulphate class of DS-1.

### 3.3 Gas Protection Measures

In order to assess the protection measures required BS8485: 2015: Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings has been employed. In accordance with Table 3, Building types, of the code, the development may be considered to conform to Type D. Therefore, on the basis of Table 4 Gas protection score by CS and type of building, the minimum gas protection score (points) is 2.5. The gas protection system should consist of at least two different elements. The elements work independently and collaboratively, and a single element should not be used because there would be no redundancy to allow for defects in the component.

In order to achieve this score, the following shall be undertaken.

**Table 1: Combination of Protection Elements (BS8485: 2015) for CS2**

| Reference            | Protection Element                                                                                | Score      |
|----------------------|---------------------------------------------------------------------------------------------------|------------|
| Table 5              | Cast in situ ground-bearing floor slab (with only nominal mesh reinforcement) <b>(Note 1)</b>     | 0          |
| Table 6 <sup>1</sup> | Passive sub-floor dispersal layer <b>(Note 2)</b> :                                               | 1.5        |
| Table 7              | Gas resistant membrane complying with the requirements given in Table 7 of BS8485 <b>(Note 3)</b> | 2          |
| <b>Total Score</b>   |                                                                                                   | <b>3.5</b> |

**Note 1:**

Due to the size of the development, it is understood that the ground-bearing floor slab will not exist as a monolithic foundation. Instead, it is understood that these will be separate, smaller slabs connected with construction joints. As such, it is not considered possible to attribute the score of 0.5 given in Table 5 of BS8485:2015.

**Note 2:**

The score is given for a 'Good' performance sub-floor dispersal layer. On this occasion, the dispersal layer shall comprise a no-fines gravel layer – Type 3 to Clean Stone grading.

**Note 3:**

The gas resistant membrane shall meet the following criteria (from Table 7, BS 8485: 2015):

- Sufficiently impervious (methane gas transmission rate <40.0ml/day/m<sup>2</sup>/atm (average) BS ISO 15105-1 manometric method).
- Sufficiently durable and strong to remain serviceable for the anticipated life of the building, to withstand in-service stresses and installation process.
- Capable, after installation, of providing a complete barrier to the entry of the relevant gas.
- Verified in accordance with CIRIA C735: 2014: *Good practice on the testing and verification of protection systems of buildings against hazardous ground gasses*.
- Chemically resistant to degradation by other contamination that might be present.

It should be appreciated that if the membrane installed does not meet all the criteria above, then the score for the membrane is considered to be zero.

In addition to the above, the following points shall be considered.

- Technical drawings of the incorporation of the gas protection measures into the sub-structure will be provided by a suitably qualified engineer/architect and produced in accordance with the guidance given in BRE 414.
- Where possible the installation of membranes will take place as a unique activity on site and shall not take place until sub-structure construction is complete.
- During and following the installation of the membrane, all parties in attendance at the site shall be made aware that a gas protection system is to be employed within the construction. Such communications should include, but not be limited to, the CDM documentation for the site and site inductions.

<sup>1</sup> For details on the criteria for good and very good performance see Annex B of BS8485: 2015.

- The installation of the membrane shall be carried out only by suitable personnel and the qualifications or experience/training will be included as part of any verification report. The suitability of personnel will be assessed in accordance with Annex 1 of CIRIA C735.
- The installation shall be in strict accordance with manufacturer specifications and recommendations.
- The membrane system employed will not be an ensemble (i.e. a system comprising a mixture of products from different manufacturers will not be employed).
- Membranes shall be supplied to site on a single wound roll, creased product will not be accepted or employed.
- Whilst membranes are exposed, signage will be provided to indicate the access to the installation area is prohibited unless authorised. Footwear will be checked prior to accessing the membrane surface to ensure no sharp objects are apparent, such as stones caught in treads. The use of sharp objects or hot-works around the exposed membrane will be strictly prohibited unless the risk of damaging the membrane has been fully assessed and mitigated.
- Non-conformance of manufacturer recommendations shall be discussed and agreed as acceptable, in writing, with a suitably qualified person from the manufacturer.

### 3.4 Removal of Soil, Landscaped Areas and Import of Fill Materials

As highlighted on the cut and fill drawing (Ref: P3849-DR-07), the majority of the made ground shall be removed from the northern area. Therefore, any made ground and/or contamination associated with historical localised spills is likely to be fully removed as part of the cut and fill exercise, with the resulting formation level comprising sandstone bedrock. In any event, the majority of the site is to be covered by hard-standing, whether this be the building footprint or external car-parking and hard-standing, therefore any made ground left in situ is to be capped. Notwithstanding this, peripheral landscaping is proposed in the northern area, therefore a suitable clean cover system shall be required for the areas highlighted on the Landscaped Plan presented in Appendix 1. Given trees are proposed in the peripheral landscaping, the clean cover system will need to be 900mm in thickness and include a suitable growing medium.

Any materials to be used as fill at the site, will be subjected to the following assessment to determine its suitability.

Fill materials will be initially screened, by a suitably qualified engineer, for the following.

- It is a suitable growing medium where is to be employed as such, including compliance with BS3883 (2007)
- It is free from obvious contamination i.e. visual or olfactory evidence
- It has not come from areas where Japanese Knotweed or other invasive or injurious plants are suspected to be growing
- It is not a statutory nuisance, such as being odorous
- It is free from unsuitable material i.e. whole bricks, brick ties, timber or glass.

It should also be appreciated that any fill will be subjected to validation testing to assess its suitability. The following table has been taken from YALPAG<sup>2</sup> documentation and will be used in the first instance. Depending on the origin and nature of the material, not all fill will require the sampling frequency and testing indicated, although this will be in agreement with any regulatory bodies (such as the Local Authority).

<sup>2</sup> YALPAG Technical Guidance for Developers, Landowners and Consultants – Verification Requirements for Cover Systems V4.1 Appendix 1a, June 2021.

**Table 2: Validation Sampling and Testing**

| Fill Type                      | Frequency                                                                                                     | Minimum Determinands                                                                                                                                                                                                                             |
|--------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Virgin Quarried Material       | 1 or 2 depending on the type of stone (to confirm the inert nature of the material)                           | Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)                                                                                                                                                |
| Crushed Hardcore, Stone, Brick | Minimum 1 per 500m <sup>3</sup>                                                                               | Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, Total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).                                              |
| Greenfield/ Manufactured Soils | Minimum 3<br><br>Dependent on source and receptor, between 1 per 50m <sup>3</sup> and 1 per 250m <sup>3</sup> | Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).                                                                                    |
| Brownfield/ Screened Soils     | Minimum 6<br><br>Dependent on source and receptor, between 1 per 50m <sup>3</sup> and 1 per 100m <sup>3</sup> | Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE). |

It should be noted that screening values for the above regime have been included within Appendix 2 of this report. The screening values will need to be agreed with any regulatory bodies. It is anticipated, for example, that 1% SOM values will be employed for typical granular fill and 6% SOM for topsoil. However, organic matter testing will determine which screening values are appropriate for each material. Moreover, testing will comply with UKAS and MCERTS, where applicable, and undertaken by an accredited laboratory.

Where the material has been derived from a commercial company, certificates or other industry quality protocol compliance i.e. WRAP shall be obtained. However, it will be necessary to ensure that this documentation is specifically related to the material being imported, is no more than two months old and complies with the screening and frequency requirements given above.

Suitable fill materials will either be placed immediately or sufficiently quarantined to prevent cross-contamination. If it is necessary, the quarantined material will be placed on appropriate sheeting and covered to prevent it becoming mixed with contaminated soils or dust, or penetrated by mobile contaminants.

## 4. Verification Report

In order to demonstrate that the remediation has been sufficiently carried out and risks highlighted in the conceptual ground model are mitigated, a verification report will be produced and submitted to any statutory authorities.

The report will be produced by a suitably qualified engineer or engineers and will include the following:



#### 4.1 Ground Works

- A record of the measures taken to cap and seal any disused services.
- The methods used for handling and final destination of any contaminated soils removed from the site.
- The qualifications or relevant experience/training of the persons carrying out the verification.

#### 4.2 Imported Fill and Removal of Made Ground/Topsoil

- Characterisation of the suitability of clean imported fill employed at the site including the derivation of the material, comments from a visual screen, the tests results of chemical screening, delivery tickets where appropriate and the conditions by which the clean material has been stored and handled on site.
- Photographic and logged evidence the clean material has been handled on site and placed in a sufficient thickness over areas where made ground remains. This may be either at the time of placement or after placement by means of hand excavated trial pits. Photographs shall include visual site references or reference boards to prove the location and date taken. A measurement reference shall be visible in the photographs to substantiate the thickness of material placed. Please note that it may also be necessary to undertake a topographical survey and the requirement for which should be checked with any statutory authorities.

#### 4.3 Ground Gas Protection System

- The qualifications or relevant experience/training of the persons carrying out the installation.
- The independence of the person carrying out the verification, along with evidence of their qualifications or relevant experience/training.
- Details of the verification process including the dates of inspections and findings.
- Signed statements to confirm that protection measures were constructed as agreed. These statements shall also include confirmation that:
  - Membranes were free from tears and punctures, and installed in accordance within manufacturer guidelines.
  - Suitable granular material has been installed
- Clear photographic evidence of the construction of membranes
- Details of non-conformances and how they were rectified.
- A declaration that remedial objectives set out in the conceptual site model have been achieved.

We trust that this information is of interest, clearly Rogers Geotechnical Services Ltd would be happy to offer advice with respect to the above and assist where necessary.

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## Appendix 1

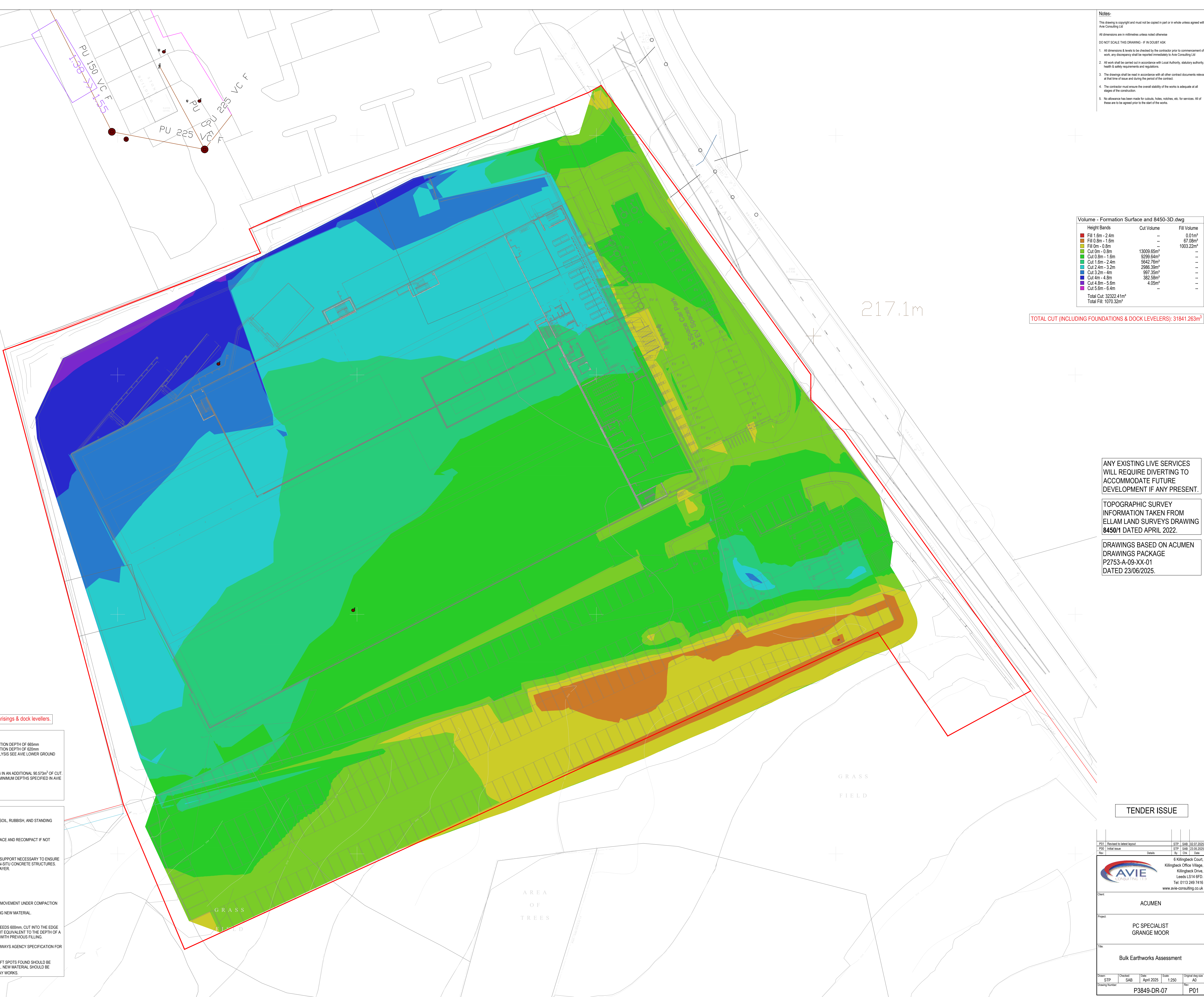
### Site Plans

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OS GRID REFERENCE  
422159, 415353



An additional 589.173 Cu. m of Cut has been calculated from foundation arisings & dock levellers.

ASSUMED FORMATION LEVELS USED IN ANALYSIS:

- MACADAM ROAD/CAR PARK (HGV LOADINGS) - FINISHED ROAD LEVEL MINUS CONSTRUCTION DEPTH OF 665mm
- MACADAM ROAD/CAR PARK (CAR LOADINGS) - FINISHED ROAD LEVEL MINUS CONSTRUCTION DEPTH OF 620mm
- BUILDING FFL MINUS 450mm TO UNDERSIDE OF PLINTH, FOR FOUNDATION ASSING ANALYSIS SEE AVE LOWER GROUND FLOOR SLAB DRAWING PCS-AVE-B1-FN-DR-S-0150.
- FOOTPATHS - FINISHED LEVEL MINUS 160mm
- CONCRETE HANDSTANDING - FINISHED LEVEL MINUS 630mm
- DOCK LEVELLER HEIGHT TO BE CONFIRMED. DEPTH ASSUMED TO BE 0.887m RESULTING IN AN ADDITIONAL 90.573m³ OF CUT.
- FOUNDATIONS HAVE BEEN CALCULATED TO BE 496.6m³ OF ADDITIONAL CUT BASED ON MINIMUM DEPTHS SPECIFIED IN AVE STRUCTURAL DRAWING PCS-AVE-B1-FN-DR-S-0100 & PCS-AVE-B1-FN-DR-S-0120.
- NO BULKING FACTOR HAS BEEN CONSIDERED WITHIN THE ANALYSIS
- NO TOPSOIL STRIP HAS BEEN CONSIDERED WITHIN THE ANALYSIS

EARTHWORKS REQUIREMENTS:

WHEN PLACING FILL, EXCAVATIONS AND AREAS TO BE FILLED MUST BE FREE FROM LOOSE SOIL, RUBBISH, AND STANDING WATER.

IN FREEZING CONDITIONS:  
DO NOT PLACE FILL ON FROZEN SURFACES. REMOVE MATERIAL AFFECTED BY FROST. REPLACE AND RECOMPACT IF NOT DAMAGED AFTER THAWING.

ADJACENT STRUCTURES, MEMBRANES, AND BURIED SERVICES:  
DO NOT OVERLOAD, DESTABILISE, OR DAMAGE. SUBMIT PROPOSALS FOR ANY TEMPORARY SUPPORT NECESSARY TO ENSURE STABILITY DURING FILLING. ALLOW A MINIMUM OF 14 DAYS BEFORE BACKFILLING AGAINST IN-SITU CONCRETE STRUCTURES. FILL MATERIAL IS TO BE PLACED SO THAT ONLY ONE TYPE OF MATERIAL OCCURS IN EACH LAYER.

EARTHMOVING EQUIPMENT:  
VARY ROUTES TO AVOID RUTTING.

COMPACTION - IN GENERAL:  
COMPACT FILL AS SOON AS POSSIBLE AFTER PLACING.  
AFTER COMPACTION, THE SURFACE OF EACH LAYER MUST BE WELL CLOSED, SHOWING NO MOVEMENT UNDER COMPACTION PLANT, AND WITHOUT CRACKS, HOLES, RIDGES, LOOSE MATERIAL, OR SIMILAR DEFECTS.  
DEFECTIVE AREAS: REMOVE AND RECOMPACT TO THE FULL THICKNESS OF THE LAYER USING NEW MATERIAL.

BENCHING REQUIREMENTS:  
IF, DURING FILLING, THE DIFFERENCE IN LEVEL BETWEEN ADJACENT AREAS OF FILLING EXCEEDS 600mm, CUT INTO THE EDGE OF THE HIGHER FILLING TO FORM BENCHES WITH A MINIMUM WIDTH OF 600mm AND A HEIGHT EQUIVALENT TO THE DEPTH OF A LAYER OF COMPACTED FILLING. SPREAD AND COMPACT TO ENSURE MAXIMUM CONTINUITY WITH PREVIOUS FILLING.

COMPACTION/GENERAL FILLING OF EARTHWORKS IS TO BE IN ACCORDANCE WITH THE HIGHWAYS AGENCY SPECIFICATION FOR HIGHWAY WORKS, EARTHWORKS SECTION (SERIES 600), TABLE 6.1.

ALL FORMATION LAYERS ARE TO BE PROOF ROLLED TO IDENTIFY ANY SOFT SPOTS. ANY SOFT SPOTS FOUND SHOULD BE TREATED BY REMOVAL OF THE MATERIAL AND REPLACED WITH ACCEPTABLE FILL MATERIAL. NEW MATERIAL SHOULD BE COMPACTED IN LAYERS IN ACCORDANCE WITH TABLE 1 OF THE SPECIFICATION FOR HIGHWAY WORKS.

- Notes:
- This drawing is copyright and must not be copied in part or in whole unless agreed with Ave Consulting Ltd
- All dimensions are in millimetres unless noted otherwise
- DO NOT SCALE THIS DRAWING - IF IN DOUBT ASK
- All dimensions & levels to be checked by the contractor prior to commencement of work, any discrepancy shall be reported immediately to Ave Consulting Ltd
  - All work shall be carried out in accordance with Local Authority, statutory authority, health & safety requirements and regulations.
  - The drawings shall be read in accordance with all other contract documents relevant at that time of issue and during the period of the contract.
  - The contractor must ensure the overall stability of the works is adequate at all stages of the construction.
  - No allowance has been made for culverts, holes, notches, etc. for services. All of these are to be agreed prior to the start of the works.

| Volume - Formation Surface and 8450-3D.dwg |            |             |
|--------------------------------------------|------------|-------------|
| Height Bands                               | Cut Volume | Fill Volume |
| Fill 1.6m - 2.4m                           | --         | 0.01m³      |
| Fill 0.8m - 1.6m                           | --         | 67.08m³     |
| Fill 0m - 0.8m                             | 13009.65m³ | 1003.22m³   |
| Cut 0m - 0.8m                              | 9299.64m³  | --          |
| Cut 0.8m - 1.6m                            | 5642.76m³  | --          |
| Cut 1.6m - 2.4m                            | 2986.59m³  | --          |
| Cut 2.4m - 3.2m                            | 997.35m³   | --          |
| Cut 3.2m - 4m                              | 382.58m³   | --          |
| Cut 4m - 4.8m                              | 4.05m³     | --          |
| Cut 4.8m - 5.6m                            | --         | --          |
| Cut 5.6m - 6.4m                            | --         | --          |
| Total Cut: 32322.41m³                      |            |             |
| Total Fill: 1070.32m³                      |            |             |

TOTAL CUT (INCLUDING FOUNDATIONS & DOCK LEVELERS): 31841.263m³

ANY EXISTING LIVE SERVICES  
WILL REQUIRE DIVERTING TO  
ACCOMMODATE FUTURE  
DEVELOPMENT IF ANY PRESENT.

TOPOGRAPHIC SURVEY  
INFORMATION TAKEN FROM  
ELLAM LAND SURVEYS DRAWING  
8450/1 DATED APRIL 2022.

DRAWINGS BASED ON ACUMEN  
DRAWINGS PACKAGE  
P2753-A-09-XX-01  
DATED 23/06/2025.

TENDER ISSUE

|                                                                                       |                          |                  |              |                       |
|---------------------------------------------------------------------------------------|--------------------------|------------------|--------------|-----------------------|
| P01                                                                                   | Revised to latest layout | STP              | SAB          | 02.07.2025            |
| P00                                                                                   | Initial issue            | STP              | SAB          | 19.05.2025            |
| Rev                                                                                   | Details                  | By               | CHK          | Draw                  |
|  |                          |                  |              |                       |
| Client: ACUMEN                                                                        |                          |                  |              |                       |
| Project: PC SPECIALIST GRANGE MOOR                                                    |                          |                  |              |                       |
| File: Bulk Earthworks Assessment                                                      |                          |                  |              |                       |
| Drawn: STP                                                                            | Checked: SAB             | Date: April 2025 | Scale: 1:250 | Original day size: A0 |
| Drawing Number: P3849-DR-07                                                           | No: P01                  |                  |              |                       |







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## Appendix 2

### Soil Screening Values

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## Atkins ATRISK Soil Screening Values (SSVs) - Commercial Landuse

| Tox Data Report No.                                                                                                                           | Compound                          | Commercial (mg/kg) |                 |              |                 | Reference |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------|-----------------|--------------|-----------------|-----------|
|                                                                                                                                               | <i>Metals</i>                     | 1% SOM             |                 | 6% SOM       |                 |           |
| 3                                                                                                                                             | Cadmium                           | 410                |                 | 410          |                 | C         |
| 4                                                                                                                                             | Chromium VI                       | 19.7               | 49.1            | 19.7         | 49.1            | B/C       |
|                                                                                                                                               | Copper                            | 106000             |                 | 106000       |                 | A+        |
| 7                                                                                                                                             | Mercury                           | 350.00             |                 | 405.00       |                 | A/D       |
| 8                                                                                                                                             | Nickel                            | 1770               |                 | 1770         |                 | A+        |
|                                                                                                                                               | Lead                              | 2310               |                 | 2310         |                 | C         |
|                                                                                                                                               | Zinc                              | 1100000            |                 | 1100000      |                 | A+        |
|                                                                                                                                               | Vanadium                          | 7490               |                 | 7490         |                 | A+        |
|                                                                                                                                               | <i>Semi and Non Metals</i>        |                    |                 |              |                 |           |
| 1                                                                                                                                             | Arsenic                           | 635                |                 | 635          |                 | C         |
| 10                                                                                                                                            | Selenium                          | 13000              |                 | 13000        |                 | A         |
|                                                                                                                                               | Free Cyanide                      | 373                |                 | 373          |                 | A         |
| 9                                                                                                                                             | Phenols (total)                   | 685                |                 | 3170         |                 | A         |
|                                                                                                                                               | <i>Poly Aromatic Hydrocarbons</i> | Free product       | No free product | Free product | No free product |           |
| 20                                                                                                                                            | Naphthalene                       | 75                 | 90.1            | 432          | 1050            | A+        |
|                                                                                                                                               | Acenaphthene                      | 156.8              | 83600           | 106000       |                 | A+        |
|                                                                                                                                               | Fluorene                          | 66500              |                 | 72000        |                 | A+        |
|                                                                                                                                               | Anthracene                        | 535000             |                 | 544000       |                 | A+        |
|                                                                                                                                               | Fluoranthene                      | 72200              |                 | 72600        |                 | A+        |
|                                                                                                                                               | Pyrene                            | 54100              |                 | 54400        |                 | A+        |
|                                                                                                                                               | Benzo(a)anthracene                | 1.71               | 131             | 10.3         | 142             | A         |
| 2                                                                                                                                             | Chrysene                          | 0.44               | 14000           | 2.64         | 14300           | A         |
| 2                                                                                                                                             | Benzo(b)fluoranthene              | 1.22               | 142             | 7.29         | 144             | A         |
| 2                                                                                                                                             | Benzo(k)fluoranthene              | 0.686              | 1430            | 4.12         | 1440            | A         |
| 2                                                                                                                                             | Benzo(a)pyrene                    | 26.1               | 76.3            | 26.2         | 76.3            | B/C       |
| 2                                                                                                                                             | Dibenz(a,h)anthracene             | 0.00393            | 14.3            | 0.0236       | 14.4            | A*        |
| 2                                                                                                                                             | Indeno(1,2,3-cd)pyrene            | 0.0614             | 142             | 0.368        | 144             | A*        |
| 2                                                                                                                                             | Benzo(g,h,i)perylene              | 0.0187             | 1440            | 0.112        | 1450            | A*        |
|                                                                                                                                               | <i>Petroleum Hydrocarbons</i>     |                    |                 |              |                 |           |
|                                                                                                                                               | Aliphatic C5-C6                   | 327                | 4490            | 1100         | 29400           | A+        |
|                                                                                                                                               | Aliphatic C6-C8                   | 157                | 10400           | 769          | 98200           | A+        |
|                                                                                                                                               | Aliphatic C8-C10                  | 82.4               | 1370            | 476          | 14800           | A+        |
|                                                                                                                                               | Aliphatic C10-C12                 | 49.9               | 7900            | 297          | 69500           | A+        |
|                                                                                                                                               | Aliphatic C12-C16                 | 20.9               | 34000           | 126          | 139000          | A+        |
|                                                                                                                                               | Aliphatic C16-C21                 | 3620000            |                 | 3620000      |                 | A+        |
|                                                                                                                                               | Aliphatic C21-C35                 | 3620000            |                 | 3620000      |                 | A+        |
|                                                                                                                                               | Aromatic C5-C7 (Benzene)          | 12.5               |                 | 98           |                 | A+        |
|                                                                                                                                               | Aromatic C7-C8 (Toluene)          | 834                | 27900           | 4360         | 183000          | A+        |
|                                                                                                                                               | Aromatic C8-C10                   | 613                | 2210            | 3600         | 20800           | A+        |
|                                                                                                                                               | Aromatic C10-C12                  | 369                | 12300           | 2190         | 53800           | A+        |
|                                                                                                                                               | Aromatic C12-C16                  | 155                | 41300           | 65400        |                 | A+        |
|                                                                                                                                               | Aromatic C16-C21                  | 28400              |                 | 28400        |                 | A+        |
|                                                                                                                                               | Aromatic C21-C35                  | 28400              |                 | 28400        |                 | A+        |
|                                                                                                                                               | <i>Others</i>                     |                    |                 |              |                 |           |
| Asbestos                                                                                                                                      |                                   |                    |                 |              |                 |           |
| A = WS ATKINS PLC, ATRISK SOIL SCREENING VALUES BASED ON 1% SOIL ORGANIC MATTER                                                               |                                   |                    |                 |              |                 |           |
| A+ = Values updated June 2017.                                                                                                                |                                   |                    |                 |              |                 |           |
| A* Atrisk's SSV is lower than Chemtest's detectable limit for this compound.                                                                  |                                   |                    |                 |              |                 |           |
| B = health criterion values, which are available from toxicological reviews published in the C4SL project methodology report.                 |                                   |                    |                 |              |                 |           |
| C = Category 4 Screening Levels (C4SLs) based on 1% soil organic matter.                                                                      |                                   |                    |                 |              |                 |           |
| D - Value provided is based on Methyl Mercury. Should elemental mercury be observed or a source be known then a limit of 7.95 should be used. |                                   |                    |                 |              |                 |           |

# Rogers Geotechnical Services Ltd.

## Atkins ATRISK Soil Screening Values (SSVs) - Public Open Space Landuse

| Tox Data Report No.                                                                                                  | Compound                   | Public Open Space Landuse (mg/kg) |                 |              |                 | Reference |
|----------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------|-----------------|--------------|-----------------|-----------|
|                                                                                                                      | Metals                     | SOM: 1%                           |                 | SOM: 6%      |                 |           |
| 3                                                                                                                    | Cadmium                    | 882                               |                 | 882          |                 | C         |
| 4                                                                                                                    | Chromium VI                | 132                               | 251             | 132          | 251             | B/C       |
|                                                                                                                      | Copper                     | 45200                             |                 | 45200        |                 | A+        |
| 7                                                                                                                    | Mercury                    | 94.30                             |                 | 96.90        |                 | A/D       |
| 8                                                                                                                    | Nickel                     | 804                               |                 | 804          |                 | A+        |
|                                                                                                                      | Lead                       | 1340                              |                 | 1340         |                 | C         |
|                                                                                                                      | Zinc                       | 201000                            |                 | 201000       |                 | A+        |
|                                                                                                                      | Vanadium                   | 7490                              |                 | 7490         |                 | A+        |
|                                                                                                                      | Semi and Non Metals        |                                   |                 |              |                 |           |
| 1                                                                                                                    | Arsenic                    | 168                               |                 | 168          |                 | C         |
| 10                                                                                                                   | Selenium                   | 2550                              |                 | 2550         |                 | A         |
|                                                                                                                      | Free Cyanide               | 34                                |                 | 34           |                 | A         |
| 9                                                                                                                    | Phenols (total)            | 685                               |                 | 3170         |                 | A         |
|                                                                                                                      | Poly Aromatic Hydrocarbons | Free product                      | No free product | Free product | No free product |           |
| 20                                                                                                                   | Napthalene                 | 75.04                             | 623             | 2280         |                 | A+        |
|                                                                                                                      | Acenaphthene               | 28600                             |                 | 30100        |                 | A+        |
|                                                                                                                      | Fluorene                   | 19600                             |                 | 20200        |                 | A+        |
|                                                                                                                      | Anthracene                 | 150000                            |                 | 152000       |                 | A+        |
|                                                                                                                      | Fluoranthene               | 20200                             |                 | 20300        |                 | A+        |
|                                                                                                                      | Pyrene                     | 15100                             |                 | 15200        |                 | A+        |
|                                                                                                                      | Benzo(a)anthracene         | 1.71                              | 9.52            | 10.3         | 12.2            | A         |
| 2                                                                                                                    | Chrysene                   | 0.44                              | 993             | 2.64         | 1160            | A         |
| 2                                                                                                                    | Benzo(b)fluoranthene       | 1.22                              | 11.5            | 7.29         | 13              | A         |
| 2                                                                                                                    | Benzo(k)fluoranthene       | 0.686                             | 123             | 4.12         | 137             | A         |
| 2                                                                                                                    | Benzo(a)pyrene             | 8.6                               | 21.4            | 8.99         | 21.4            | B/C       |
| 2                                                                                                                    | Dibenzo(a,h)anthracene     | 0.0614                            | 11.2            | 3.68         | 12.7            | A*        |
| 2                                                                                                                    | Indeno(1,2,3-cd)pyrene     | 0.00393                           | 1.27            | 0.236        | 1.42            | A         |
| 2                                                                                                                    | Benzo(g,h,i)perylene       | 0.0187                            | 143             | 0.112        | 154             | A         |
|                                                                                                                      | Petroleum Hydrocarbons     |                                   |                 |              |                 |           |
|                                                                                                                      | Aliphatic C5-C6            | 327                               | 109000          | 1098         | 3400            | A+        |
|                                                                                                                      | Aliphatic C6-C8            | 157                               | 163000          | 768          | 54200           | A+        |
|                                                                                                                      | Aliphatic C8-C10           | 82.4                              | 9720            | 475          | 22700           | A+        |
|                                                                                                                      | Aliphatic C10-C12          | 49.9                              | 17700           | 297          | 27800           | A+        |
|                                                                                                                      | Aliphatic C12-C16          | 20.9                              | 23800           | 126          | 30000           | A+        |
|                                                                                                                      | Aliphatic C16-C21          | 86400                             |                 | 86400        |                 | A+        |
|                                                                                                                      | Aliphatic C21-C35          | 86400                             |                 | 86400        |                 | A+        |
|                                                                                                                      | Aromatic C5-C7 (Benzene)   | 139                               |                 | 231          |                 | A+        |
|                                                                                                                      | Aromatic C7-C8 (Toluene)   | 835                               | 69900           | 4350         | 101000          | A+        |
|                                                                                                                      | Aromatic C8-C10            | 613                               | 5140            | 3604         | 10094           | A+        |
|                                                                                                                      | Aromatic C10-C12           | 369                               | 8260            | 11600        | 11600           | A+        |
|                                                                                                                      | Aromatic C12-C16           | 155                               | 10600           | 12200        | 10600           | A+        |
|                                                                                                                      | Aromatic C16-C21           | 7870                              |                 | 7870         |                 | A+        |
|                                                                                                                      | Aromatic C21-C35           | 7870                              |                 | 7870         |                 | A+        |
| Others                                                                                                               |                            |                                   |                 |              |                 |           |
| Asbestos Not Detected                                                                                                |                            |                                   |                 |              |                 |           |
| A+ = Values update June 2017.                                                                                        |                            |                                   |                 |              |                 |           |
| A* Atrisk's SSV is lower than Chemtest's detectable limit for this compound.                                         |                            |                                   |                 |              |                 |           |
| B = Health Criterion Values (available from toxicological reviews published in the C4SL project methodology report). |                            |                                   |                 |              |                 |           |
| C = Category 4 Screening Levels (C4SLs).                                                                             |                            |                                   |                 |              |                 |           |
| D = SSV provided is for Methyl Mercury.                                                                              |                            |                                   |                 |              |                 |           |