



e3p

Geotechnical Performance Specification

Waddington Fell Tunnel - Restoration

Reference:14-513-R1-RevA

Date: January 2021



GEOTECHNICAL PERFORMANCE SPECIFICATION

Waddington Fell Tunnel
Restoration project.

Prepared for:

The Mineral Planning Group Ltd (On Behalf of their Client)



Report Ref: 14-513-R1-RevA

Date Issued: January 2021







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1. INTRODUCTION

1.1. BACKGROUND

E3P has been instructed by The Mineral Planning Group (On behalf of their client) to prepare a Geotechnical Performance Specification that will be used to define the engineering requirements for the placement, compaction and engineering of soil materials to ensure compliance as placed fill within the requirements of the proposed restoration project and future landscaping cover.

The overarching philosophy for the geotechnical engineering works will be to re-use material generated as part of 'tunnelling operations' and to import/nominally compact/engineer soils to ensure suitability and minimal long term settlement for the construction of the final planted landscaping area to the required standard.

The land use classification is the restoration of the site to form the naturalised topography, therefore the geotechnical engineering requirements are less than that of a design situation for infrastructure and structures. E3P has therefore prepared a site specific performance specification that is designed to ensure the placement and compaction of backfill to provide a stable and safe development platform with uniform settlement to ensure long term suitability.

E3P have been provided with a topographical site survey (completed by Linear Surveys Ref: WFQ/OCT20-01) that will form the basis of the cross sectional fill model completed by E3P (included as an attachment), which details the proposed high level volumetric appraisal:

- ☉ Reuse site won minerals from quarrying process;
- ☉ Import up to 753,557m³ tunnelling rock/minerals to achieve levels;

The requirement to import material will necessitate the use of a CL:AIRE DoW CoP MMP. It is understood that this report will feed into the suitable mechanism for restoration completed by MPG Ltd.

1.2. SITE DETAILS

TABLE 1.1 SITE DETAILS

| | |
|--------------------------------|--|
| Site Address | Waddington Fell Quarry, Slaidburn Road, Waddington, Clitheroe, BB7 3DL |
| National Grid Reference | E371685, N447856 |
| Importation Area | Circa 8ha |

All acronyms used within this report are defined in the Glossary presented in Appendix II.

A site location plan is presented in Appendix III as Drawing 14-513-001.

1.3. REPORT OBJECTIVES

This Geotechnical Performance Specification is intended to be used in connection with the landforming and biodiversity net gain through engineering fill with certain areas of the site designated for upfill to achieve the required development formation level and future landscaping.

The objectives of this report are to:

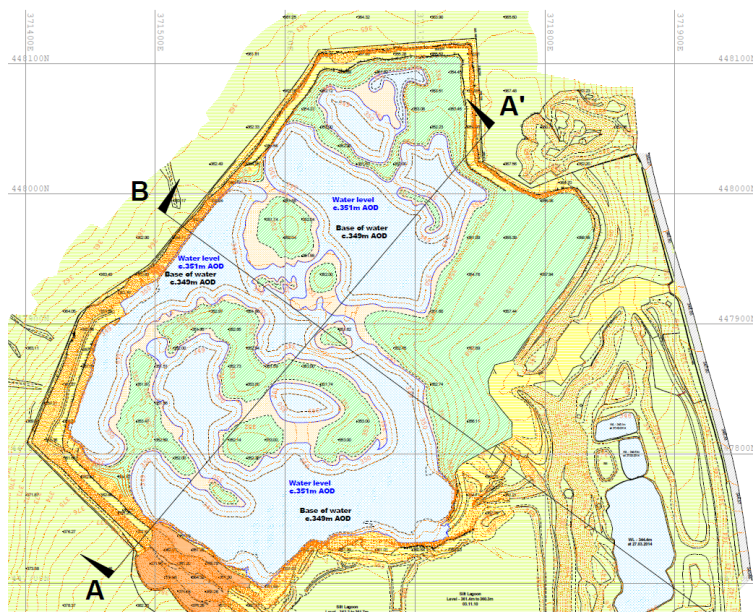


- ✿ Provide a detailed performance specification for the re-engineering of imported soils to be compacted as an engineered fill to uplift levels to support the proposed general landscaping development;
- ✿ Outline placement of materials in a uniform manner that ensures no voiding within the backfill and limited potential for unacceptable differential settlement or distortion of the constructed landform;
- ✿ Ensure the placement and engineering of imported material to achieve limited settlement in the future land use;
- ✿ Detail validation testing specification and testing methodologies to demonstrate that the fill material has been constructed in accordance with the requirements of the performance specifications as documented herein;
- ✿ Control import material to ensure chemical suitability for use and to not decrease the environmental condition of the site; and,
- ✿ Provide validation monitoring during the site works to facilitate the production of a suitably detailed verification report.
- ✿ Outline management of surface water ingress which will be critical to avoiding erosion of engineered upfill.

1.4. DEVELOPMENT PLAN

E3P understands that MPG’s client are shortly to cease extracting minerals at the site and enhance the sites existing restoration scheme in order to restore the site to achieve ecological net gain by way of green space, planting and landscaping. The proposed development layout is shown in Figure 1.1. This is included as an attachment to this letter.

FIGURE 1.1 SNAPSHOT OF EXISTING SITE



1.5. SUMMARY OF PARTIES INVOLVED

TABLE 1.2 PARTIES INVOLVED

| FUNCTION/INTEREST | NAME OF PARTY |
|---|---------------------------|
| Restoration Operator | Armstrongs Aggregated Ltd |
| Environmental Permitting Consultant | Mineral Planning Group |
| Geotechnical Consultant | E3P |
| Main Contractor | Armstrongs Aggregated Ltd |
| Earthworks Contractor | Armstrongs Aggregated Ltd |
| Human Health Regulator/Local Planning Authority | Lancashire County Council |
| Fill Materials Regulator | CL:AIRE |

1.6. SUMMARY OF MATERIALS QUANTITIES & MOVEMENT

E3P have been completed a generalised earthworks volumetric assessment as part of this report (ref: 14-513-004) dated January 2021 which details the proposed high level volumetric appraisal:

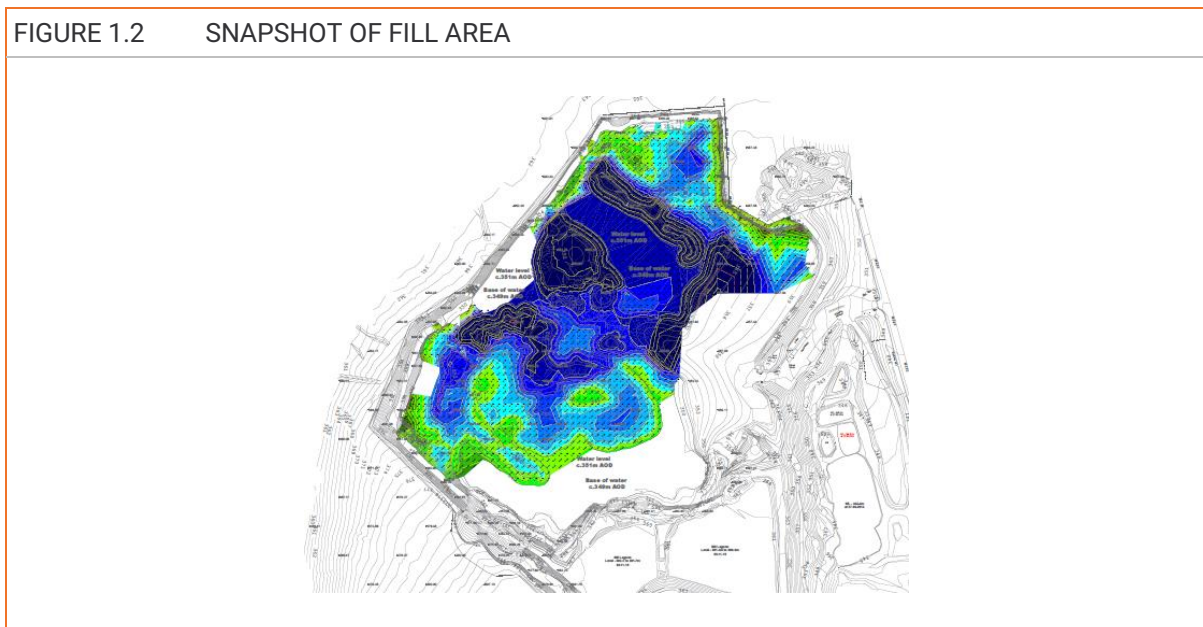
- ✳ Import 775,284m³ to achieve plateau design levels.

E3P has made no assessment of the volume of material that will be generated during the site mineral extraction or the tunnelling project operations or the bulking of materials.

The Cut / Fill model indicates the reduction in levels around the periphery of the site in line with the designers dictated levels. Uphill in the centre of the site where the quarry has formed a notably deep void with fill materials being placed to depths in excess of 10m in some areas.

Figure 1.2 indicates areas of shallow fill in green and deeper fill in blue, the full drawing (Ref: 14-513-004) is included within Appendix III of this report.

FIGURE 1.2 SNAPSHOT OF FILL AREA



1.7. REGULATORY COMPLIANCE

This specification has been prepared for use as a Geotechnical Performance Document; it does not constitute a CL:AIRE DoW Cop Materials Management Plan (MMP) which will be required when full regulatory approval is obtained for the development and definitive sources of material have been established.

1.8. CURRENT AND PROPOSED SITE TOPOGRAPHY AND SLOPE INTERACTION

The current and proposed site topography, changes in elevation and any existing or new slopes are beyond the scope of this specification. It is assumed that any existing slopes have been made safe or are mainly rock walls. Where any earth slopes exceed a design gradient of 1 (vertical) in 3 (horizontal) on site, extreme care should be taken with a full and detailed geotechnical slope analysis to inform the retained design solution.

Once backfilled, it is assumed that the majority of slopes/walls will be made safe due to the process of infilling and so will no longer be a concern in the finished development.



2. GEOTECHNICAL ENGINEERING SPECIFICATION

2.1. SUMMARY

The salient features of the site enabling works will be the delivery of the following:

- ✿ Placement of fill materials to ensure compliance with the design end use;
- ✿ Careful management of works to ensure no disturbance of sub-formation;
- ✿ Placement and engineering of upfill to be compliant with performance specification as documented herein;

The contractor should employ a suitably experienced engineer to be present on site during these earthwork operations to ensure that soil suitability, placement, compaction and testing is undertaken in accordance with this specification and to ensure that any unforeseen circumstances, such as adverse weather, do not compromise the earthworks process.

Works should be halted during periods of intermittent or prolonged rainfall to ensure the materials are not placed in a manner that would result in softening of either the formation or the newly placed material. It will be the contractor's responsibility to determine appropriate weather conditions and determine the suitability of works.

Particular attention must be given to variable weather conditions when re-engineering clay soils as a moisture content fluctuation of the tolerable limit will result in inability to compact and work materials.

2.2. IMPORTED FILL MATERIAL

The E3P Isopachyte drawing indicates a shortfall of approximately 775,284m³ of fill material. It is proposed to import these materials from the tunnelling works near the site it is anticipated given the material expected that characterisation testing, OMC/DD analysis to determine the maximum dry density will not be possible.

Given that the materials are likely to be 'as dug' directly imported from tunnelling activities the materials may not conform to a specific grading by MCHW series 600.

It is considered appropriate to assume in accordance with the Manual of Contract Documents for Highway Works, Volume 1, Specification for Highway Works, Series 600 that the materials can be classified in accordance with a Class 4 material.

This performance specification should be read in conjunction with the following:



- ✿ The Manual of Contract Documents for Highway Works, Volume 1, Specification for Highway Works, Series 600, Earthworks as amended in February 2016; an
- ✿ BS 1377-1:2016 Methods of test for soils for civil engineering purposes. General requirements and sample preparation

2.2.1. USE OF FILL MATERIALS

In addition to any grading requirement, the maximum particle size of any fill material shall be no more than two-thirds of the compacted layer thickness, except that cobbles having an equivalent diameter of more than 150 mm shall not be deposited within the restored surface level unless directed otherwise by the engineer.

Unburnt colliery spoil, pulverised fuel ash or furnace bottom ash shall not be used as a fill material.

2.3. GENERAL REQUIREMENTS

The contractor shall employ only plant and working methods that are suited to the materials to be handled and traversed. They shall be responsible for maintaining the nature of the acceptable material so that when it is placed and compacted it remains acceptable in accordance with the contract.

A generalised flow chart is included as Table 2.1 to provide an overview of works operations and tasks that should be completed to ensure compliance with this specification.



TABLE 2.1 OVERVIEW OF WORKS OPERATIONS

| | |
|---------------|--|
| Step 1 | <p>(Where possible) carefully segregate materials excavated during civil engineering works (on site and import) into the following soil types:</p> <ul style="list-style-type: none"> ✿ Sand/granular soils; ✿ Dry cohesive soil; ✿ Wet cohesive soil; and <p>Ensure all stockpiles are sealed to minimise water ingress in approved locations.</p> |
| Step 2 | <p>Analyse bulk sample from each (site-won or imported) soil matrix as per the requirements of the E3P specification for:</p> <ul style="list-style-type: none"> ✿ Dry density/optimum moisture content (Procter); and ✿ Particle size grading coefficient. <p>Where the materials do not allow for laboratory sampling/testing instruction based on the experience from the supervising engineer should be adopted (As above assuming Class 4 materials).</p> |
| Step 3 | <p>On-site observations in conjunction with particle size distribution (PSD) grading will confirm the classification of material and thus the corresponding method for compaction.</p> |
| Step 4 | <p>The dry density/moisture content testing is unlikely to be practicable and so the operator should avoid compaction of materials that are saturated and retain cohesive materials to finish the works.</p> |
| Step 5 | <p>The classified material should be placed and compacted in accordance with the corresponding method for the material under conditions where the moisture content is within the tolerable limits.</p> |
| Step 6 | <p>Once placed and compacted, the material at each layer should be checked by the supervising engineer to confirm there is no voiding and material is not placed in a saturated state.</p> <p>Where possible in situ geotechnical testing should be completed</p> <p>The testing will include:</p> <ul style="list-style-type: none"> ✿ CBR by Plate Load testing. |

Acceptability shall be determined by the supervising engineer.

Laboratory testing for the purposes of determining acceptability and compaction requirements will be conducted by the supervising engineer.

Haulage of material to embankments or other areas of fill shall proceed only when sufficient spreading and compaction has been completed.

No excavated acceptable material or unacceptable material required to be processed, other than surplus to the requirements of the contract, shall be removed from the site.



Those responsible for placement of materials once received into the subject site (herein referred to as 'the contractor') shall make their own arrangements for the stockpiling of acceptable material, any unacceptable material to be processed, and for the provision of site for this purpose.

The contractor shall ensure that they do not adversely affect the stability of excavations or fills by their methods of stockpiling materials, use of plant or siting of temporary buildings or structures.

Excavations requiring backfilling shall remain open only for the minimum period necessary.

The contractor shall keep earthworks free of water including:

- ✿ Arranging the rapid removal of water that is shed on to the earthworks or entering the earthworks from any source.
- ✿ Providing, where necessary, temporary watercourses, drains, pumping and the like to:
 - Discharge accumulated water and groundwater into the permanent outfalls of the drainage system where practicable; and
 - Provide adequate means for trapping silt on temporary systems discharging into permanent drainage systems.

The contractor shall carry out and maintain groundwater lowering or other treatment required.

Where materials are designated either Class U1B or Class U2 (according to the Highways Specification), the contractor shall carry out any special requirements for their handling. Where such materials are encountered during the progress of the works, the contractor shall make all necessary arrangements for their safe handling and disposal after consultation with the appropriate environmental authority.

2.3.1. UNACCEPTABLE MATERIAL

The contractor is solely responsible for ensuring full and detailed analysis of all reported ground conditions and areas of risk in terms of the potential for unacceptable material to be present within the proposed earthworks. Limitations in the available information should be highlighted to the supervising engineer prior to the commencement of earthworks. The contractor is to make full and unequivocal arrangements to investigate the potential presence for unsuitable materials within the earthworks and construction of highway fill. All unsuitable materials are to be identified for removal in accordance with this specification.

Unacceptable material Class U1A shall be:

Material which does not comply with the permitted constituents and material properties are as below:



- ✿ Peat, materials from swamps, marshes and bogs;
- ✿ Logs, stumps and perishable material;
- ✿ Materials in a frozen condition;
- ✿ Clay having a liquid limit determined in accordance with BS 1377: Part 2, exceeding 90 or plasticity index determined in accordance with BS 1377: Part 2, exceeding 65; and,
- ✿ Material susceptible to spontaneous combustion except unburnt colliery spoil complying with sub-Clause 15 of this Clause;(ii)unacceptable material
- ✿ Contaminated materials, including controlled wastes (as defined in the Environmental Protection Act 1990 Part IIA) whose level of contamination is above that given in the permit contract specifics

2.4. EARTHWORKS MATERIAL TESTS

Prior testing of the potential sources of fill shall be undertaken by the contractor and submitted to the consulting engineers for approval. This testing shall include, but not necessarily be limited to, the compaction and backfill requirements detailed in Table 2.2.

TABLE 2.2 COMPACTION/BACKFILL REQUIREMENTS

| LAND USE | COMPACTION METHODOLOGY AND GENERAL PERFORMANCE CRITERIA | | | | |
|--|---|-------------|------------------|-----------------|------------------------------|
| Liquid and Plastic Limits | BS 1377: Part 2 | | | | |
| Grading | BS 1377: Part 2 | | | | |
| Uniformity Coefficient | Calculated from grading curve | | | | |
| Moisture Content Multi-point moisture condition value (MCV) (to assess optimum moisture content). | BS 1377: Part 2 | | | | |
| Organic Matter (Maximum 6% Total Organic Content) | BS 1377: Part 3 | | | | |
| Water Soluble Sulphate | TRL Report 447 Test No 1 | | | | |
| Total Sulphate Content | TRL Report 447 Test No 4 | | | | |
| Earthwork In-situ Tests Subsequent to the filling and compaction of the material, a series of in-situ tests shall be undertaken to confirm the success of the compaction process. This testing shall include, but necessarily be limited to, the following: <table border="1" data-bbox="199 1680 885 1780" style="margin-left: 20px;"> <thead> <tr> <th>TEST</th> <th>TEST METHOD</th> </tr> </thead> <tbody> <tr> <td>Plate Load Tests</td> <td>BS 1377: Part 9</td> </tr> </tbody> </table> | TEST | TEST METHOD | Plate Load Tests | BS 1377: Part 9 | Clause 632 (BS 1377: Part 4) |
| TEST | TEST METHOD | | | | |
| Plate Load Tests | BS 1377: Part 9 | | | | |
| Disposal of Materials The contractor shall be responsible for the safe disposal of any excess of unsuitable material found on the site. | | | | | |
| Proctor Compaction Testing | BS 1377: Part 4 | | | | |



2.5. METHOD FOR COMPACTION

In the absence of geotechnical testing, which is not likely to be possible, the appointed engineer should as best possible classify the materials as they are imported and engineer the materials accordingly to ensure no void space and placement in unsaturated condition.

As a guide materials should be placed in layers and tracked in passes similar to those in table 2.3 in accordance with a Class 4 material.



TABLE 2.3 SUMMARY OF COMPACTION METHOD – MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAY WORKS VOLUME 1 SPECIFICATION FOR HIGHWAY WORKS

| E3P EARTHWORKS GEOTECHNICAL COMPACTION SPECIFICATION | | | | | |
|--|--------------|-------------------------------------|--|------------------------|----------------------|
| SOIL/MATERIAL TYPE | CLASS | DESCRIPTION | COMPACTION EQUIPMENT | LAYER THICKNESS | ROLLER PASSES |
| Granular fill (Sand and Gravel matrices) | 1A | Sandy Gravel with some cobbles | > 5000 kg vibrating roller | 225 mm | 4 |
| | 1B | Sand or Gravel of same grading size | > 5000 kg vibrating roller | 250 mm | 10 |
| | 1C | Coarse gravels with many cobbles | > 5000 kg vibrating roller | 400 mm | 5 |
| Cohesive fill (Clay with minor sand and gravel component) | 2A | Wet Clays | > 5000 kg vibrating tamping roller (sheep's foot only) | 275 mm | 9 |
| | 2B | Dry Clay | > 5000 kg vibrating tamping roller (sheep's foot) or > 5000 kg vibrating roller | 275 mm or 225 mm | 9 or 4 |
| | 2C | Gravelly Clay | > 5000 kg metric ton vibrating tamping roller (sheep's foot) or > 5000 kg vibrating roller | 275 mm or 225 mm | 9 or 4 |
| | 2D | Silty/sandy Clay | > 5000 kg metric ton vibrating tamping roller (sheep's foot) | 300 mm | 7 |
| Fill to Landscape Areas | 4 | Various | See Clause 620 description below | | |



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| | | | | | |
|--|-----|--|----------------------------|--------|---|
| Recycled aggregate crush (< 125 mm well graded) | 6F2 | Any combination of inert hard materials, other colliery spoil, or rock with substantial amounts of clay-like component | > 5000 kg vibrating roller | 250 mm | 6 |
| From the discussions prior to the completion of this document the tunnelling spoil will not be to a specific specification, however are likely to be the same Sandstone materials found at the site. The grading will be poor and so is most likely to fall in line with a 1C. | | | | | |

Clause 620 of the Manual of Contract Documents for Highway Works, Volume 1, Specification for Highway Works, Series 600 stipulates the below for a class 4 material used in the upfilling of landscaping areas:

Unless method compaction to Clause 612 is required in contract specific the degree of compaction of Class 4 materials shall be sufficient to remove large voids and to produce a coherent mass whilst preventing over-compaction and any build up of excess pore pressures.

Following completion of filling of landscape areas, Class 4 material shall where require in contract specific, be shaped as described therein

Class 4 materials shall be deposited in landscape areas after any adjoining embankment or other area of fill has been completed. Where permitted in contract specific and provided the adjoining embankment or other area of fill is always kept at least 1m higher than the landscape area fill, construction of such landscape area may proceed until completion (as is understood to be the case)

Landscape areas shall be topsoiled in accordance with clause 618 and seeded or turfed in accordance with the requirements of the contract specifics.



TABLE 2.4 E3P VALIDATION TESTING CRITERIA

| CONSTRUCTION DETAIL | MATERIAL | TEST TYPE | FREQUENCY | PERFORMANCE REQUIREMENT |
|---|---------------------------------|---|----------------------------------|---|
| Pre-commencement Material Testing | All Bulk Fill | Particle size distribution (PSD) and natural moisture content | 1 per 10,000 m ³ . | None – classify material type. |
| | | Proctor compaction tests using 4.5 kg rammer – optimum moisture content | 1 per 10,000 m ³ . | Moisture content to be within ± 3% of optimum. |
| | | Laboratory moisture condition value (MCV) | 1 per 10,000 m ³ . | MCV 6.5–12.5 (acceptable range) to demonstrate suitability of material for upfill. |
| In-situ Validation Engineered Upfill | Engineered Granular or Cohesive | In-situ Moisture Condition Value (MCV) | 1 per 10,000 m ³ . | MCV 6.5-12.5 (acceptable range) to demonstrate suitability of material for structural upfill. |
| | Cohesive | Undrained Shear Strength by HSV | 1 test per 5000 m ² . | Cu > 30 kN/m ² . |



3. RECORD-KEEPING AND VERIFICATION

3.1. RECORD-KEEPING

During the course of the remediation and site enabling works, the on-site consultant will undertake the following record-keeping protocols:

- ✿ Detailed daily site diary including material movements;
- ✿ Sampling register, testing results, photographs; and
- ✿ Detailed surveys (volumes).

Record-keeping on site, in particular movements and analysis of specific material types, will be in the form of site diaries and a remediation excavation record. This record will remain on site and will be completed by the on-site engineer during the course of the remediation and site enabling works.

3.2. VERIFICATION

The records listed above should then be compiled into a validation report, produced on completion of the remediation and site enabling works, clearly referencing the origin of the materials used and testing carried out to confirm its suitability for use, where required. An as-built development drawing will be prepared clearly detailing the materials present on site to be cross-referenced with the supporting validation documentation.

The Validation Report should include the following:

- ✿ Detailed surveys of all excavations and production of as-built drawings for the earthworks;
- ✿ Copy of Consignment Notes relating to the movement of wastes to the licenced site;
- ✿ Detailed drawings showing all sampling locations for both chemical and geotechnical testing;
- ✿ Chemical test results;
- ✿ Geotechnical test results;
- ✿ Details of qualified persons signed declaration; and
- ✿ Monitoring results if undertaken (asbestos in air, gas water etc.).



4. CONTINGENCY PLAN

4.1. PREVIOUSLY UNIDENTIFIED CONTAMINANTS

Should any significantly impacted material be encountered during the development, then it will be excavated and stockpiled on an impermeable material and sampled and tested for an appropriate range of determinants.

Once the laboratory analysis of the material is available, an assessment will be undertaken to determine whether it can be retained on site as part of the Material Management Plan or whether it should be disposed of off site.

Depending on the nature of any such impact, it may be necessary to undertake validation testing of the excavation faces in order to demonstrate that no such materials are left in situ.



5. ENVIRONMENTAL MONITORING AND VALIDATION

5.1. SITE MANAGEMENT

The tracking of materials will be based on the following hierarchy:

- ✦ The principal contractor will have the responsibility for setting out areas of the site on the basis of the contract specification.
- ✦ Operatives will have instructions only to place materials in specified areas as assigned by the site manager/foreman.
- ✦ The site manager (employed by the principal contractor) will issue daily instructions to drivers regarding the placement of materials sourced from specific stockpiles or areas, ensuring that appropriate documentary evidence is collected that details which materials are going where and why.
- ✦ The site manager will:
 - Conduct spot checks on loaded vehicles to ensure compliance with this Geotechnical Performance Specification; and
 - Ensure that any loads which fail visual, olfactory or spot checks either remain on the vehicle or, if unloaded, are excavated and set aside. This material will be treated according to the recommendations of E3P.
- ✦ All material imported to site will have duty of care/consignment notes, copies of which will be retained on site by the site manager.
- ✦ Materials directly reusable will be incorporated into the earthworks, subject to operational conditions and phasing of excavations, in which case they will be stockpiled prior to final placement.

5.2. VALIDATION SAMPLING PROTOCOL

In accordance with the current requirements of the regulatory authorities, validation samples will be collected from all materials that are to be subject to movement under the protocols outlined within this Geotechnical Performance Specification, or for materials to be imported onto site to facilitate the proposed residential development.

Soil samples destined for chemical analysis will be collected at regular intervals in appropriate sampling containers. All samples will subsequently be stored in cooled boxes prior to submission to a UKAS/MCERTS-accredited laboratory.

All samples will be collected using appropriate PPE and sampling equipment, which will be cleaned at each sampling location.

A detailed copy of E3P Sampling Methodology, QA Procedures and Laboratory Chain of Custody forms will be documented within the site records and presented within the final validation report for the site.



Where material is found to contain concentrations of potential contaminants at levels in excess of the site-specific screening criteria (as detailed within Appendix V), E3P will undertake further assessment and recommendations on the appropriate use for the material in question, which may involve the disposal of such materials off site to a suitable waste management facility.

The chemical sampling frequency for materials to be managed in accordance with the requirements of the approved permit.

Where is it possible to chemically analyse the materials, E3P would anticipate this to include a suite of analysis included (but not limited to):

- ✦ Speciated PAH.
- ✦ Speciated TPH (C5-C35).
- ✦ Asbestos (ID).
- ✦ CLEA inorganic heavy metals.
- ✦ Speciated PAH, banded TPH and VOCs.
- ✦ SVOC/speciated TPH.
- ✦ On-site screening for VOC using calibrated PID.
- ✦ Leachate 2:1 speciated PAH and banded TPH.
- ✦ Leachate analysis of inorganic heavy metals, TPH, sulphate and PAH.

All analysis prescribed above to be completed by UKAS-accredited laboratory.

5.3. REMEDIATION CONTRACTOR SITE MANAGEMENT AND RESPONSIBILITY

The appointed remediation contractor will take full and overarching responsibility for all methods of work required to complete the site remediation and enabling operations to ensure the delivery of the site and the completion of the objectives in a safe, legislatively compliant manner that ensures no pollution to the subject site or the wider environs.

For individual remediation operations as set out within this performance specification, the contractor will provide site-specific methods of work for individual operations pertaining to the removal and treatment of contaminated liquids and soils. For each and every operation as set out herein the contractor will provide a written methodology of works to be supplied to the supervising geoenvironmental engineer prior to the instigation of operations on site.

The site manager will be responsible for documentation of each day's activities with a full recorded schedule of works completed and corresponding site-specific method statements, which have been utilised to ensure the completion of the task to the required standard.



5.4. COMPLETION

Following the completion of the works, a report will be compiled by the geoenvironmental consultant detailing all site enabling works undertaken, waste consignment notes, and all site investigations, laboratory test certificates, and validation testing undertaken.

A certificate of completion of earthworks should be included within the report, which should then be issued to the local authority for their approval.

E3P considers that, with the adoption of the above best practices, the site can be safely redeveloped. The site enabling works process and presence of any residual contamination (if this is the case) should be recorded for future reference by landowners/occupiers. Future development at the site, where this may result in penetration of new areas of hardstanding should be subject to no less stringent measures with respect to assessment and, where appropriate, monitoring, than those set out above.

END OF REPORT



APPENDIX I LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the Client as indicated in Section 1.2.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II

GLOSSARY

TERMS

| | | | |
|--------------|--|----------------|--|
| ACM | Asbestos-containing material | MMP | Materials management plan |
| ADS | Acoustic design statement | ND | Not detected |
| AST | Above-ground storage tank | NDP | Nuclear density probe |
| BGS | British Geological Survey | NMP | Noise management plan |
| BSI | British Standards Institute | NPSE | Noise policy statement for England |
| BTEX | Benzene, toluene, ethylbenzene, xylenes | NR | Not recorded |
| CA | Coal Authority | PAH | Polycyclic aromatic hydrocarbon |
| CBR | California bearing ratio | PCB | Polychlorinated biphenyl |
| CIEH | Chartered Institute of Environmental Health | PI | Plasticity index |
| CIRIA | Construction Industry Research Association | PID | Photo ionisation detector |
| CLEA | Contaminated land exposure assessment | POS | Public open space |
| CML | Council of Mortgage Lenders | PPE | Personnel protective equipment |
| CoC | Contaminants of concern | ProPG | Professional practice guidance |
| CSM | Conceptual site model | QA | Quality assurance |
| DNAPL | Dense non-aqueous phase liquid (chlorinated solvents, PCB) | SGV | Soil guideline value |
| DWS | Drinking water standard | SPH | Separate-phase hydrocarbon |
| EA | Environment Agency | SPT | Standard penetration test |
| EQS | Environmental quality standard | SVOC | Semi-volatile organic compound |
| FFL | Finished floor level | TPH | Total and speciated petroleum hydrocarbon |
| GAC | General assessment criteria | TPH CWG | Total Petroleum Hydrocarbon (Criteria Working Group) |
| GL | Ground level | UKWIR | United Kingdom Water Infrastructure Risk |
| GSV | Gas screening value | UST | Underground storage tank |
| HCV | Health criteria value | VCC | Vibro-concrete column |
| ICSM | Initial conceptual site model | VOC | Volatile organic compound |
| LEL | Lower explosive limit | VRSC | Vibro-replacement stone columns |
| LMRL | Lower method reporting limit | VSC | Vibro-stone columns |
| LNAPL | Light non-aqueous phase liquid (petrol, diesel, kerosene) | WHO | World Health Organisation |



Waddington Fell Tunnel

Geotechnical Performance Specification

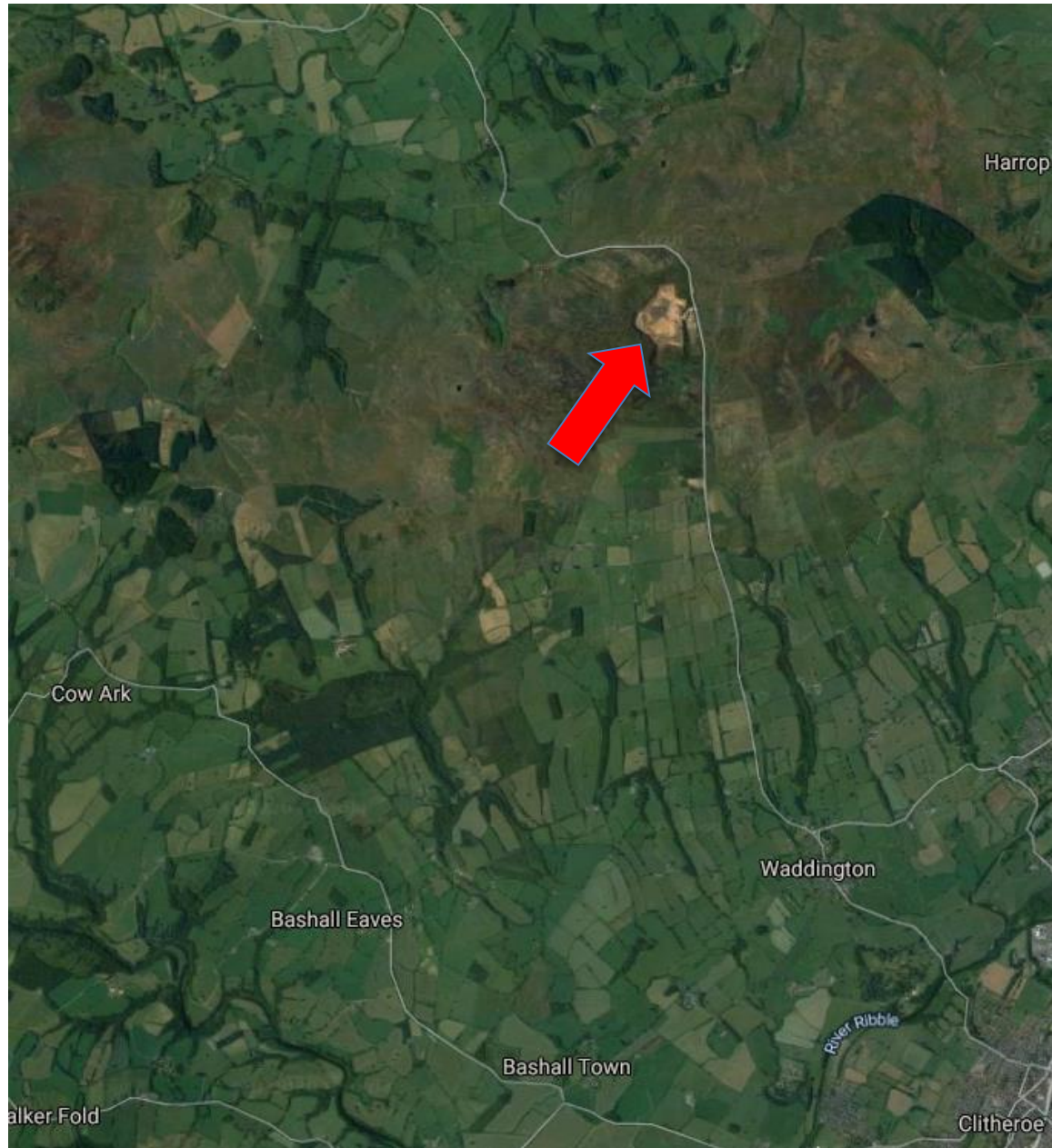
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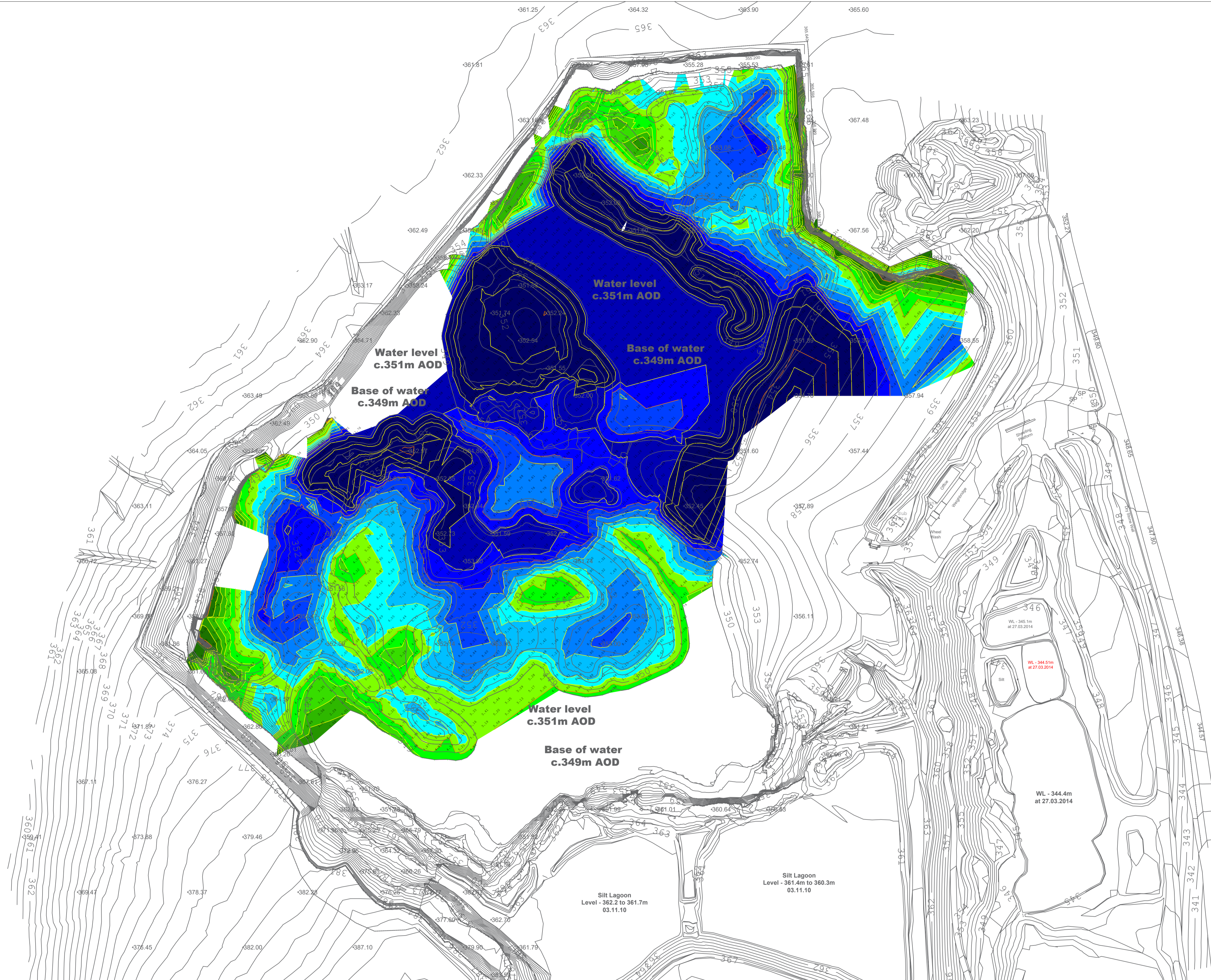
| | | | |
|--------------|---|-------------------------|---|
| MCV | Moisture condition value | WRAP | Waste and Resources Action Programme |
| MIBK | Methyl isobutyl ketone | WTE | Water table elevation |
| m | Metres | ppm | Parts per million |
| km | Kilometres | mg/m³ | Milligram per metre cubed |
| % v/v | Percent volume in air | m bgl | Metres below ground level |
| mb | Millibars (atmospheric pressure) | m bcl | Metre below cover level |
| l/hr | Litres per hour | mAOD | Metres above ordnance datum (sea level) |
| µg/l | Micrograms per litre (parts per billion) | kN/m² | Kilonewtons per metre squared |
| ppb | Parts per billion | µm | Micrometre |
| mg/kg | Milligrams per kilogram (parts per million) | | |



APPENDIX III DRAWINGS

DRAWING 14-513-001 – SITE LOCATION PLAN





Volumetrics

| | |
|---------------------|-----------------------|
| 0.00 - 0.99m (Fill) | 8.00 - 8.99m (Fill) |
| 1.00 - 1.99m (Fill) | 9.00 - 9.99m (Fill) |
| 2.00 - 2.99m (Fill) | 10.00 - 10.99m (Fill) |
| 3.00 - 3.99m (Fill) | 11.00 - 11.99m (Fill) |
| 4.00 - 4.99m (Fill) | >12.00m (Fill) |
| 5.00 - 5.99m (Fill) | |
| 6.00 - 6.99m (Fill) | |
| 7.00 - 7.99m (Fill) | |

Summary of Material Movement

| Groups | Depths | Volumes (m³) | | | Areas (m²) | | |
|--------------|--------|----------------|--------------|--------------|------------|-------------|-------------|
| | | Cut (Material) | Fill (Void) | Balance | Cut | Fill | Total |
| POS | 300mm | - | -775284.247 | -775284.2470 | - | 135802.078 | 135802.0780 |
| Total | | - | -775284.2470 | -775284.2470 | - | 135802.0780 | 135802.0780 |

Notes:

Client:

Job No:

Date:

The Mineral Planning Group

14-513

06.01.2021

Drawing No:

Scale:

003

NTS @ A1

Job Title:

Drawing Title:

| | | | | |
|-------|-------|------------|-------|---------|
| P1 | REVB | 06.01.2021 | CB | RJW |
| P1 | REVA | 17.11.2020 | CB | RJW |
| Phase | Issue | Date | Drawn | Checked |

Waddington Fell


Isopachyte Between
Topographical Survey and
Formation Depths

e3p

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| | | | | |
|--|--------------------------------------|------------|-------|---------|
| Section Location  Line of Section | | | | |
| Notes: | Client: | | | |
| | The Mineral Planning Group | | | |
| | Job No: 14-513 | | | |
| | Date: 06.01.2021 | | | |
| | Drawing No: 001 | | | |
| | Scale: NTS @ A3 | | | |
| | Job Title: Waddington Fell | | | |
| | Drawing Title: Section Location Plan | | | |
| P1 | REVB | 06.01.2021 | CB | RJW |
| P1 | REVA | 16.11.2020 | CB | RJW |
| Phase | Issue | Date | Drawn | Checked |

| | | | | |
|--------------------------------------|-------|------------|-------|---------|
| Notes: | | | | |
| Client: | | | | |
| The Mineral Planning Group | | | | |
| Job No: 14-513 | | | | |
| Date: 06.01.2021 | | | | |
| Drawing No: 001 | | | | |
| Scale: NTS @ A3 | | | | |
| Job Title: Waddington Fell | | | | |
| Drawing Title: Section Location Plan | | | | |
| P1 | REVB | 06.01.2021 | CB | RJW |
| P1 | REVA | 16.11.2020 | CB | RJW |
| Phase | Issue | Date | Drawn | Checked |

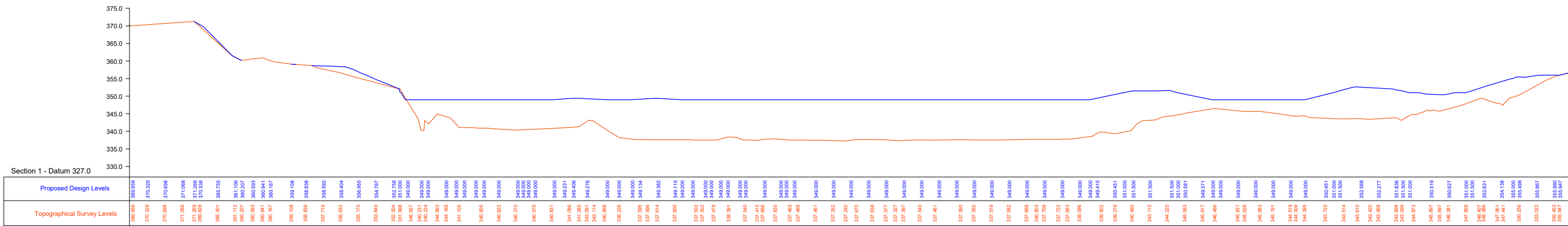
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| Notes: | |
| Client: | |
| The Mineral Planning Group | |
| Job No: 14-513 | |
| Date: 06.01.2021 | |
| Drawing No: 001 | |
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| Job Title: Waddington Fell | |
| Drawing Title: Section Location Plan | |
| P1 | REVB |
| P1 | REVA |
| Phase | Issue |

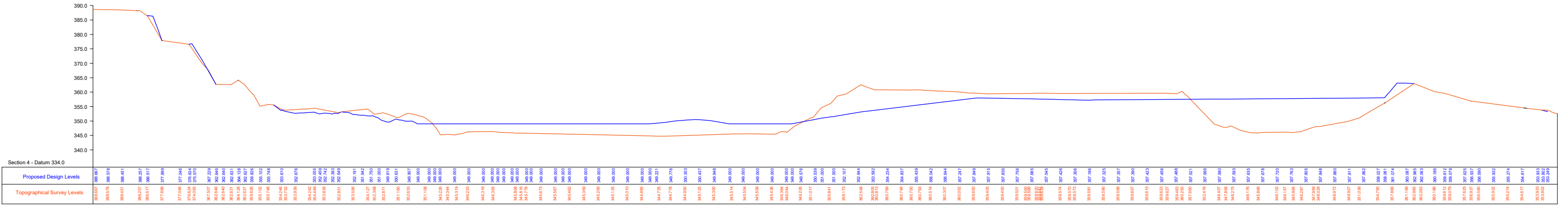
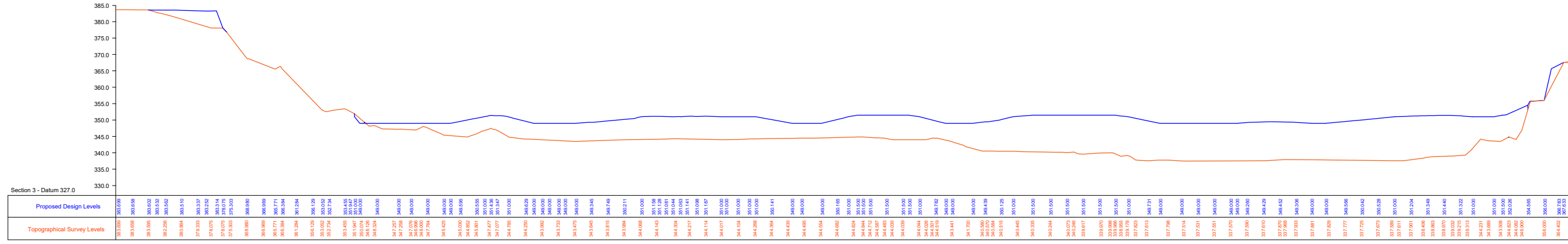
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|--------------------------------------|-------|
| Notes: | |
| Client: | |
| The Mineral Planning Group | |
| Job No: 14-513 | |
| Date: 06.01.2021 | |
| Drawing No: 001 | |
| Scale: NTS @ A3 | |
| Job Title: Waddington Fell | |
| Drawing Title: Section Location Plan | |
| P1 | REVB |
| P1 | REVA |
| Phase | Issue |



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Cross Sections

- Proposed Design Levels
- Topographical Survey Levels

| Phase | Issue | Date | Drawn | Checked |
|-------|-------|------------|-------|---------|
| P1 | REVA | 06.01.2021 | CB | RJW |
| P1 | REVA | 16.11.2020 | CB | RJW |

Notes:

| | | | | |
|----|------|------------|----|-----|
| P1 | REVA | 06.01.2021 | CB | RJW |
| P1 | REVA | 16.11.2020 | CB | RJW |

Client:

The Mineral Planning Group

Job Title:

Waddington Fell

Job No:

14-513

Drawing No:

003

Date:

06.01.2021

Scale:

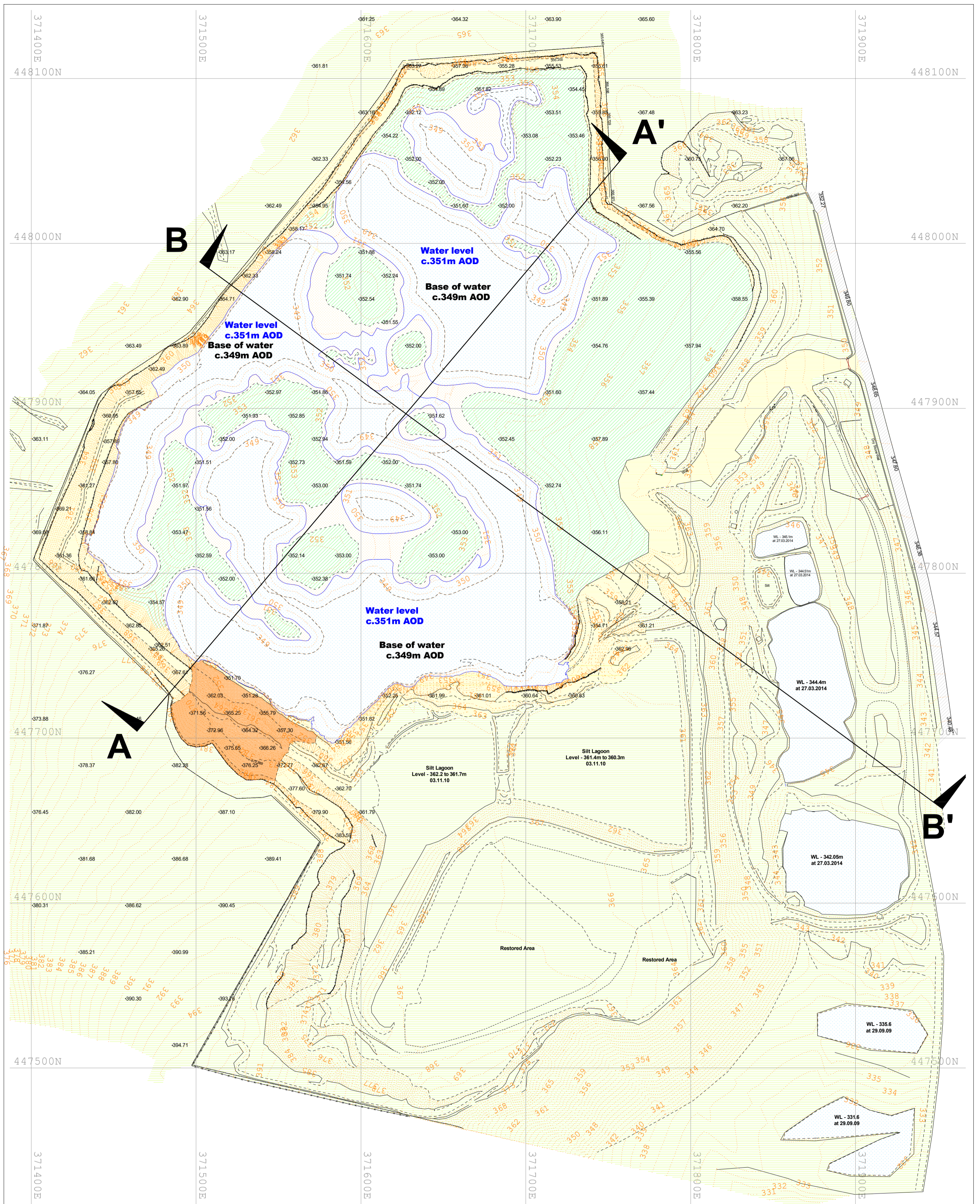
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Drawing Title:

Sections 3 & 4

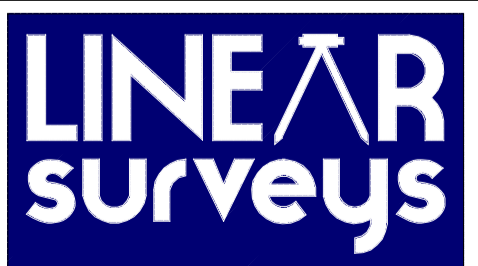


Legend:

- Land Under Control of Applicant
- Planning Application Area
- Top of Banking
- Bottom of Banking
- Kerb - Top
- Kerb - Channel
- Fence - Post & Wire
- Fence - Secure
- Gate
- Track / Footpath
- Wall
- Edge of Waterline
- Hedgeline
- Overhead Cable
- 1m Contour Intervals
- OS Backcloth
- Building/Structure
- Verge Line
- Foliage Line
- Top of Rock Face
- MH
- IC
- BT
- G
- LP
- TP
- EP
- ST
- GV
- WL
- IL
- CL
- EL
- RL
- Lamp Post
- Telegraph Pole
- Electric Pole
- Stop Tap
- Gas Valve
- Water Level
- Invert Level
- Cover Level
- Elve Level
- Ridge Level
- Borehole / Trial Pit
- Spot Level
- Trees
- Survey Control Station

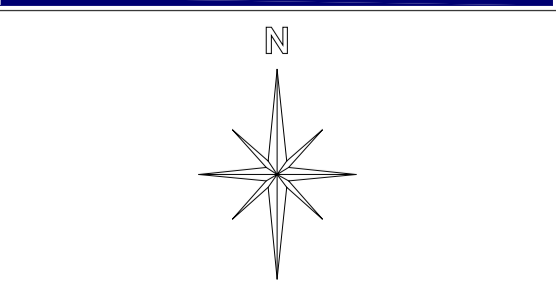
REVISIONS

| Date | Description | By |
|------|-------------|----|
| | | |
| | | |
| | | |



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Client
**ARMSTRONGS
 AGGREGATES LIMITED**



Job Title
Waddington Fell Quarry

Project Title

Scale: 1:1500@A2 Date: DEC 2020 Drawn by: SW Surveyed By: SW/PR

Dwg. title
Restoration Design - Version 5

DWG No.
WFQ/OCT20-03

**APPENDIX IV
HIGHWAYS DESIGN
MANUAL SERIES 600
PERFORMANCE CRITERIA**

TABLE 6/1: (02/16) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

| Class | General Material Description | Typical Use | Permitted Constituents (All Subject to Requirements of Clause 601 and contract specific Appendix 6/1) | Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631) | | | | Compaction Requirements in Clause 612 | Class |
|-------|------------------------------------|-------------------------|---|---|--|---------------------------|------------|---------------------------------------|-------|
| | | | | Property (See Exceptions in Previous Column) | Defined and Tested in Accordance with: | Acceptable Limits Within: | | | |
| | | | | | | Lower | Upper | | |
| L | Various | Fill to landscape areas | See App 6/1 | (i) grading | BS 1377: Part 2 | App 6/1 | App 6/1 | See Clause 620 and App 6/1 | 4 |
| A | | | | (ii) mc | BS 1377: Part 2 See Note 4 | - | App 6/1 | | |
| N | | | | (iii) MCV | Clause 632 | App 6/1 | App 6/1 | | |
| D | | | | | | | | | |
| S | | | | | | | | | |
| C | | | | | | | | | |
| A | | | | | | | | | |
| P | | | | | | | | | |
| E | | | | | | | | | |
| F | | | | | | | | | |
| I | | | | | | | | | |
| L | | | | | | | | | |
| L | | | | | | | | | |
| T | Topsoil, or turf, existing on site | Topsoiling | Topsoil or turf designated as Class 5A in the Contract | (i) grading | Clause 618 | - | Clause 618 | - | 5 |
| O | | | | | | | | | |
| P | Imported topsoil | Topsoiling | General purpose grade complying with BS 3882 | - | - | - | - | - | 5 |
| S | | | | | | | | | |
| O | | | | | | | | | |
| I | | | | | | | | | |
| L | | | | | | | | | |

APPENDIX V
E3P MATERIAL IMPORT
CRITERIA

Human Health Remediation Targets – Low-Rise Residential End Use

| DETERMINAND | UNITS | WITHIN 600 MM COVER SYSTEM (GARDEN) | HARDSTAN DING AND > 600 MM OF COVER | PUBLIC OPEN SPACE 300 mm COVER | PUBLIC OPEN SPACE > 300 mm | PATH -WAY |
|--|-------|-------------------------------------|-------------------------------------|--------------------------------|-----------------------------|-----------|
| Arsenic | mg/kg | 37 ⁽ⁱ⁾ | 40 ⁽ⁱⁱ⁾ | 79 ⁽ⁱⁱⁱ⁾ | 640 ^(iv) | 1 |
| Cadmium | mg/kg | 11 ⁽ⁱ⁾ | 85 ⁽ⁱⁱ⁾ | 120 ⁽ⁱⁱⁱ⁾ | 532 ^(iv) | 1 |
| Chromium (Hexavalent) | mg/kg | 6 ⁽ⁱ⁾ | 6 ⁽ⁱⁱ⁾ | 7.7 ⁽ⁱⁱⁱ⁾ | 220 ^(iv) | 1 |
| Lead | mg/kg | 210 ^(vi) | 330 ^(vii) | 760 ^(viii) | 760 ^(viii) | 1 |
| Elemental Mercury | mg/kg | 1.2 ⁽ⁱ⁾ | 1.2 ⁽ⁱⁱ⁾ | 16 ⁽ⁱⁱⁱ⁾ | 30 ^(iv) | 2 |
| Nickel | mg/kg | 180 ⁽ⁱ⁾ | 180 ⁽ⁱⁱ⁾ | 230 ⁽ⁱⁱⁱ⁾ | 3400 ^(iv) | 1 |
| Selenium | mg/kg | 250 ⁽ⁱ⁾ | 430 ⁽ⁱⁱ⁾ | 1100 ⁽ⁱⁱⁱ⁾ | 1800 ^(iv) | 1 |
| Copper | mg/kg | 2400 ⁽ⁱ⁾ | 7100 ⁽ⁱⁱ⁾ | 12,000 ⁽ⁱⁱⁱ⁾ | 44,000 ^(iv) | 1 |
| Zinc | mg/kg | 3700 ⁽ⁱ⁾ | 40,000 ⁽ⁱⁱ⁾ | 81,000 ⁽ⁱⁱⁱ⁾ | 170,000 ^(iv) | 1 |
| Phenol | mg/kg | 280 ^{(i)(xi)} | 280 ^{(xiv)(xi)} | 760 ^{(iii)(xi)} | 760 ^{(iv)(xi)} | 2 |
| Naphthalene | mg/kg | 2.3 ^{(i)(xi)} | 2.3 ^{(xiv)(xi)} | 1200 ^{(iv)(xi)} | 1200 ^{(iv)(xi)} | 2 |
| Acenaphthylene | mg/kg | 170 ^{(i)(xi)} | 500 ^(v) | 15,000 ^{(iii)(xi)} | 29,000 ^{(iv)(xi)} | 3 |
| Acenaphthene | mg/kg | 210 ^{(i)(xi)} | 500 ^(v) | 15,000 ^{(iii)(xi)} | 29,000 ^{(iv)(xi)} | 1 |
| Fluorene | mg/kg | 170 ^{(i)(xi)} | 500 ^(v) | 9900 ^{(iii)(xi)} | 20,000 ^{(iv)(xi)} | 1 |
| Phenanthrene | mg/kg | 95 ^{(i)(xi)} | 500 ^(v) | 3100 ^{(iii)(xi)} | 6200 ^{(iv)(xi)} | 3 |
| Anthracene | mg/kg | 500 ^{(i)(xi)} | 500 ^(v) | 74,000 ^{(iii)(xi)} | 150,000 ^{(iv)(xi)} | 3 |
| Fluoranthene | mg/kg | 280 ^{(i)(xi)} | 500 ^(v) | 3100 ^{(iii)(xi)} | 6300 ^{(iv)(xi)} | 3 |
| Pyrene | mg/kg | 500 ^{(i)(xi)} | 500 ^(v) | 7400 ^{(iii)(xi)} | 15,000 ^{(iv)(xi)} | 3 |
| Benzo(a)Anthracene^(c) | mg/kg | 7.2 ^{(i)(xi)} | 11 ^{(ii)(xi)} | 29 ^{(iii)(xi)} | 49 ^{(iv)(xi)} | 3 |
| Chrysene | mg/kg | 15 ^{(i)(xi)} | 30 ^{(ii)(xi)} | 57 ^{(iii)(xi)} | 93 ^{(iv)(xi)} | 3 |
| Benzo(b)Fluoranthene⁽ⁱⁱⁱ⁾ | mg/kg | 2.6 ^{(i)(xi)} | 3.9 ^{(ii)(xi)} | 7.1 ^{(iii)(xi)} | 13 ^{(iv)(xi)} | 3 |
| Benzo(k)Fluoranthene⁽ⁱⁱⁱ⁾ | mg/kg | 77 ^{(i)(xi)} | 110 ^{(ii)(xi)} | 190 ^{(iii)(xi)} | 370 ^{(iv)(xi)} | 3 |
| Benzo(a)Pyrene^(vii) | mg/kg | 2.2 ^{(i)(xi)} | 3.2 ^{(ii)(xi)} | 5.7 ^{(iii)(xi)} | 11 ^{(iv)(xi)} | 3 |
| Indeno(123-cd)Pyrene | mg/kg | 27 ^{(i)(xi)} | 45 ^{(ii)(xi)} | 82 ^{(iii)(xi)} | 150 ^{(iv)(xi)} | 3 |
| Dibenzo(a,h)Anthracene | mg/kg | 0.24 ^{(i)(xi)} | 0.31 ^{(ii)(xi)} | 0.57 ^{(iii)(xi)} | 1.1 ^{(iv)(xi)} | 3 |
| Benzo(ghi)Perylene | mg/kg | 320 ^{(i)(xi)} | 360 ^{(ii)(xi)} | 640 ^{(iii)(xi)} | 1400 ^{(iv)(xi)} | 3 |
| TPH C₅-C₆ (aliphatic) | mg/kg | 42 ^{(i)(xi)} | 42 ^{(ii)(xi)} | 42 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |
| TPH C₆-C₈ (aliphatic) | mg/kg | 100 ^{(i)(xi)} | 100 ^{(ii)(xi)} | 100 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |
| TPH C₈-C₁₀ (aliphatic) | mg/kg | 27 ^{(i)(xi)} | 27 ^{(ii)(xi)} | 27 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |
| TPH C₁₀-C₁₂ (aliphatic) | mg/kg | 130 ^{(i)(xi)} | 130 ^{(ii)(xi)} | 130 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |



| | | | | | | |
|--|----------------------------|---------------------------|---------------------------|---------------------------|-----------------------------|---|
| TPH C₁₂-C₁₆ (aliphatic) | mg/kg | 1000 ^{(xiv)(xi)} | 1000 ^{(xiv)(xi)} | 1000 ^{(xiv)(xi)} | 10,000 ^{(xiv)(xi)} | 1 |
| TPH C₁₆-C₂₁ (aliphatic) | mg/kg | 1000 ^{(xiv)(xi)} | 1000 ^{(xiv)(xi)} | 1000 ^{(xiv)(xi)} | 10,000 ^{(xiv)(xi)} | 1 |
| TPH C₂₁-C₃₅ (aliphatic) | mg/kg | | | | | 1 |
| TPH C₅-C₇ (aromatic) | mg/kg | 70 ^{(i)(xi)} | 370 ^{(ii)(xi)} | 370 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |
| TPH C₇-C₈ (aromatic) | mg/kg | 130 ^{(i)(xi)} | 860 ^{(ii)(xi)} | 860 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |
| TPH C₈-C₁₀ (aromatic) | mg/kg | 34 ^{(i)(xi)} | 47 ^{(ii)(xi)} | 47 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |
| TPH C₁₀-C₁₂ (aromatic) | mg/kg | 74 ^{(i)(xi)} | 250 ^{(ii)(xi)} | 250 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 2 |
| TPH C₁₂-C₁₆ (aromatic) | mg/kg | 140 ^{(i)(xi)} | 1800 ^{(ii)(xi)} | 1800 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 1 |
| TPH C₁₆-C₂₁ (aromatic) | mg/kg | 260 ^{(i)(xi)} | 1900 ^{(ii)(xi)} | 1900 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 1 |
| TPH C₂₁-C₃₅ (aromatic) | mg/kg | 1000 ^{(xiv)(xi)} | 1900 ^{(ii)(xi)} | 1900 ^{(ii)(xi)} | 10,000 ^{(xiv)(xi)} | 1 |
| Asbestos | Fibres Volume Weight | NFD | 0.001% | NFD | 0.001 | 1 |

Notes 1

Asbestos will be screened visually on site by a qualified environmental consultant and where potential asbestos-containing material is identified, representative samples will be subject to quantitative analysis of %volume by weight.

Should any ACM be identified within the soil matrices, further detailed % assessment would be required when the reported laboratory result exceeds the limit of detection for the analytical method at 0.01% by volume (weight).

Notes 2

Excludes matrices where free product is observed.

Commercial Tier 1 GAC modelled to assume no exposure pathway.

No viable exposure pathway beneath hardstanding and cover system.

Notes 3

Main exposure pathways: 1 = soil ingestion, 2 = vapour inhalation (indoor), 3 = dermal contact and ingestion, 4 = dust inhalation.

Abbreviations: GAC = general assessment criteria, n = number of samples, MC = maximum concentration, N/A = Not Applicable (no exceedance of assessment criteria), Loc of MC = location of exceedances.

- i. Value derived from LQM Sutable 4 Use Levels (S4ULs) for residential end use with plant uptake.
- ii. Value derived from LQM Sutable 4 Use Levels (S4ULs) for residential end use without plant uptake – these levels used below 600 mm cover system within residential gardens as soils will be present within a residential setting yet soils will not be disturbed and garden plants will not reach these soils.
- iii. Value derived from LQM Sutable 4 Use Levels (S4ULs) for public open space (POS) residential.
- iv. Value derived from LQM Sutable 4 Use Levels (S4ULs) for public open space (POS) park – these levels used below 300 mm POS cover system as soils will not be disturbed by any future site users and exposure to these soils will be similar to a park end use.
- v. Value derived from LQM Sutable 4 Use Levels (S4ULs) alongside assessment with WM3 to ensure that materials remaining on site do not exceed the WM3 toxicity criteria for hazardous waste.



Waddington Fell Tunnel


Geotechnical Engineering Specification

January 2021

- vi. Value derived from Category 4 Screening Levels (C4SL) for residential land use with homegrown produce.
- vii. Value derived from Category 4 Screening Levels (C4SL) for residential land use without homegrown produce.
- viii. Value derived from Category 4 Screening Levels (C4SL) for public open space (POS) residential.
- ix. Value derived from Category 4 Screening Levels (C4SL) for public open space (POS) park.
- x. Mercury – based on elemental mercury.
- xi. PAH and TPH levels used are for 1% SOM.
- xii. Xylenes based on p-xylene (o-xylene 2600 mg/kg, m-xylene 3500 mg/kg) and is capped by its solubility.
- xiii. Value derived from LQM Suitable 4 Use Levels (S4ULs) for residential end use with plant uptake due to the volatilisation risk.
- xiv. BTEX is not SOM-related due to inhalation pathway.



APPENDIX VI
E3P MATERIAL IMPORT
DOCUMENTATION

| | | | |
|--|---|--|---|
| SITE OF IMPORTATION ADDRESS | | E3P |  |
| Client | | HELIPORT | |
| Main Contractor | | BUSINESS PARK, LIVERPOOL ROAD, | |
| Earthworks Contractor | | ECCLES, MANCHESTER, | |
| Haulier | | M30 7RU | |
| Date of Planned Import | | +44 (0) 161 707 9612 info@e3p.co.uk | |
| Overview of Planned Material Import | | | |
| Material Source (Site of Origin) and Postcode | | | |
| Site Investigation Report | Report Title and Reference: Date: Information Supplied By: | | |
| Reason for Generation of Excess Material at Site of Origin | | | |
| Chemical Test Results for Stockpile at Site of Origin | Date: Laboratory Certificate Ref: Organisation Responsible for Stockpile Sampling: | | |
| Geotechnical Material Classification and Testing | Delete as Appropriate: Class 1 / Class 2 / Class 6 / Topsoil | | |
| Pictures of Material Stockpile Pending Transportation | Delete as Appropriate: Yes / No | | |
| Person or Organisation Responsible for Ensuring Quality Control at Site of Origin | | | |
| Quantity of Material to Be Imported (m³) | | | |
| Proposed Area of Deposition (Site of Reuse) | | | |
| Waste Exemption/Permit or CL:AIRE MMP | Delete as Appropriate: U1 Standard Rules / CL:AIRE MMP (Direct Transfer) / Bespoke | | |



**APPENDIX VII
CONTRACTOR
COMPLETION
CHECK SHEET**

GEOTECHNICAL ENABLING WORKS COMPLETION FORM

Upon completion of all site remediation and enabling works, this form will be completed by E3P, in the presence of the appointed contractor, to ensure that all pertinent geotechnical enabling works activities are complete or, where a deviation from the specification has occurred, all future limitations and issues are documented for the client's records.

| ACTIVITY | COMPLETE | | | SIGNATURE |
|---|-----------------|-----------|------------|------------------|
| | YES | NO | N/A | (INITIAL) |
| Removal of all vegetation | | | | |
| Removal of all root bulbs and root networks | | | | |
| Stockpiling of topsoil and certification of suitability for reuse | | | | |
| Stockpiling of subsoil and certification of suitability for reuse | | | | |
| Engineering of all plots for shallow spread foundation in accordance with E3P Geotechnical Specification | | | | |
| Engineering of all plots for pile foundation in accordance with E3P Geotechnical Specification | | | | |
| Engineering of all plots for raft foundation in accordance with E3P Geotechnical Specification | | | | |
| Engineering of highways bulk upfill in accordance with E3P Specification with compliant validation testing | | | | |
| Engineering of highways subgrade in accordance with E3P Specification with compliant validation testing | | | | |
| Engineering of highways capping in accordance with E3P Specification with compliant validation testing | | | | |
| Cut-and-fill the development site to client's required elevation with as-built survey | | | | |



POST - ENABLING LIMITATIONS

All and every deviation from the approved specification for works should be documented by the remediation and enabling works contractor below.

