

**National Asset Delivery
Technical Surveys and Testing**

**569243 - A46 NB SB Sixhills Geotech –
Water Erosion: Ground Investigation**

Works Information

CONTENTS AMENDMENT SHEET

Amend. No.	Revision No.	Amendments	Initials	Date
0	0	Original version issued with tender	LR	14/10/2019
1	0	Formatting and dates added	SM	08/11/2019
1	1	Amended removal of rotary and minor updates	PW	12/11/2019

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LIST OF ANNEXES

Appendix 1 Supplementary Constraints

1 DESCRIPTION OF THE WORKS

1.1 Project objectives

1.1.1 The principle objective of this project is to undertake intrusive ground investigation as stated in drawings HE569243 – KIER – HGT – A46 Sixhills – DR – CE – 0600_01 and to provide a subsequent factual report including AGS data in accordance with the requirements detailed in the specification.

1.1.2 The specification that applies to the *works* is included in Section 6.

1.2 Scope of works

1.2.1 The *works* to be provided under this contract are:

- (1) Intrusive investigation is proposed to provide information for design of repairs to geotechnical defects including the nature and strength of the embankment fill & underlying natural ground.
- (2) The scope of the investigation comprises of cable percussion boreholes (BH) and window sampler holes (WS). Borehole installations include vibrating wire piezometer installations.
- (3) Samples of soil shall be taken from the inspection pits for environmental tests. In the event contaminated ground is suspected or identified below the base of the inspection pits further samples shall be obtained.
- (4) Testing will include in situ testing (SPT) and laboratory geotechnical, chemical and environmental tests. If bedrock is encountered the boreholes shall prove 100mm of rock.
- (5) Full details are given in Schedule 2 and the drawings listed in Section 2.1.1.
- (6) The works will be undertaken during traffic management at night. GI contractor is to liaise with the principal contractor (TM provider) to assure that the GI works are carried out during the northbound and southbound lane 1 closures, which will occur in sequence.
- (7) A pre start meeting can be arranged on request in Stirling House, Lakeside Court, Osier Drive, Sherwood Business Park, Nottingham, NG15 0DS at least two weeks prior to mobilisation to site.

1.3 Deliverables

1.3.1 The *Contractor* is required to produce the following deliverables:

- (1) The factual section of the ground investigation report and AGS data, to include full details of the site works undertaken (the number, type and termination depths of all exploratory holes), the results of in situ

and laboratory tests, laboratory testing restrictions, exploratory hole records, drillers daily records and drawings showing the site location and exploratory hole locations.

- (2) The exploratory hole locations given in Schedule 2, and drawing HE569243 – KIER – HGT – A46 Sixhills – DR – CE – 0600_01, are provisional and the locations may be adjusted by +/-5m to avoid constraints imposed by utilities and other infrastructure. Locations may be further adjusted if necessary, subject to seeking the approval of the Investigation Supervisor.
- (3) Drillers daily records to be submitted within 24 hours of completion of each exploratory hole, from which the Investigation Supervisor will schedule testing based on the daily records.
- (4) The Investigation Supervisor has provided a testing philosophy and required tests in Schedule 2.
- (5) The Contractor shall select suitable core sub samples and prepare a blank schedule of all samples recovered.
- (6) The draft factual report including draft AGS data to be submitted to the Investigation Supervisor for review within six weeks of completion of the site works.
- (7) The final factual report and AGS data to be submitted to the Investigation Supervisor within two weeks of receipt of comments on the draft report.
- (8) During the period of the site operations, the elevation of the ground at each as-built exploratory hole, related to Ordnance Datum, shall be established to the nearest 0.05 m.

2 EXISTING INFORMATION

2.1.1 The Drawings listed below apply to this contract. Refer to the site information for details of existing site conditions including ground conditions, limitation on access, position of existing structures etc.

Drawing Number	Title	Revision / Date
HE569243 – KIER – HGT – A46 Sixhills – DR – CE – 0600_01	Drainage Features and Borehole Locations	C1/ 14.10.2019
HE569243 – KIER – HGT – A46 Sixhills – DR – EN – 0600_02	Vegetation Clearance	C1/ 14.10.2019
HE569243-KIER-VUT-A46 Sixhills- DR-CE-0600_03 to 12	C2 Drawings	C1/ 14.10.2019

3 CONSTRAINTS ON HOW THE CONTRACTOR PROVIDES THE WORKS

3.1 General

- 3.1.1 The *Contractor* Provides the Works in such manner as to minimise the risk of damage or disturbance to or destruction of third party property.
- 3.1.2 The *Contractor* complies with the constraints and meets with the requirements outlined in Appendix 1.
- 3.1.3 The *Contractor* submits information detailing how the *Contractor* will provide the Works to the *Employer* prior to the *works* commencing. This information will include any lifting plans, risk assessments, method statements, the *Contractor's* staff training information and any other relevant Health and Safety requirements.

3.2 Working hours & site specific constraints

- 3.2.1 The Contractor's working hours will be limited by the traffic management (TM) constraints (see also cl 5.1.1). TM is only able to be placed between 8pm and 6am. It can take up to 1 hour to put out and to remove TM. The working hours will therefore be constrained to 8 hrs at night-time. All machinery left on site during the day must be stored behind the VRS.
- 3.2.2 The site can be accessed from the carriageway.
- 3.2.3 The TM Provider will arrange for TM to be provided and will also arrange any necessary vegetation clearance and (temporary) removal of the VRS barriers for access. The requirements and instructions of the Traffic Safety Control Officer (TSCO) shall be complied with at all times.
- 3.2.4 All vehicles used on site shall comply with Chapter 8 marking requirements, which as a minimum comprises high visibility chevrons on the rear, high visibility side stripes and double amber flashing beacons.
- 3.2.5 All staff working on the carriageway must have received a 1-day Highways England Common Induction and a Highways England EMAD induction.
- 3.2.6 Highways England rules require that no person may cross the carriageway on foot unless traffic management is in place.

3.3 Health, Safety and Environment & Risk Management

Health and Safety requirements

- 3.3.1 In Providing the Works the *Contractor* meets the requirements of Annex 2 of the supplementary constraints relation to health and safety duties.
- 3.3.2 The *Contractor* shall comply with the requirements of Highways England's safety passport scheme and ensure that all of his employees, and any of his subcontractor's, are registered in accordance with the implementation of the scheme. Details on the scheme can be found here: <http://www.highwaysafetyhub.com/safety-passport.html>
- 3.3.3 For details of the CDM duty holders, refer to the pre-construction information which can be found in the TST package under the file name "A46 Sixhills Pre-Construction Information".
- 3.3.4 Before commencing the construction phase of the *works*, the *Contractor* confirms to the *Employer* that adequate welfare facilities are in place. Where the facilities detailed in section 5 are not deemed adequate, the *Contractor* provides all necessary facilities to Provide the Works and to comply with the minimum requirements set out in HSE guidance document L153.

Environmental requirements

- 3.3.5 In Providing the Works the *Contractor* meets the requirements of Annex 2 of the supplementary constraints in relation to environmental duties.

Risk Management

- 3.3.6 The *Contractor* identifies, manages and mitigates risks in accordance with the principles of ISO31000.
- 3.3.7 The *Contractor* submits a risk register, which captures all risks associated with the delivery of the *works* including those identified by the *Employer* (see risk register provided), with his tender and maintains it for the contract period. The risk register can be found here 'SHEMS-FOR-HIG-094 Designers Hazard Checklist and Risk Reduction Schedule'.

4 REQUIREMENTS FOR THE PROGRAMME

- 4.1.1 The *Contractor* submits programme to the *Employer* with his tender.
- 4.1.2 The *Contractor* Provides the Works taking into account the following programme constraints:
- (i) the *starting date* and *completion date* and any post site works, reporting and review period
 - (ii) The services and other things provided by *Employer* (see Section 5)
 - (iii) The site works shall be completed within the timeframe of the TM, to be advised, for which an allowance of 4 shifts has been assumed. The draft factual report and AGS data to be issued for review within 6 weeks of completion of the fieldworks. (Note: due to topo and drainage survey being carried out at the same time, TM will be on site for 1 month – estimated to be between 01/03/2020 – 31/03/2020)
 - (iv) The final factual report and final AGS data to be issued within 2 weeks of receipt of comments on the draft report.
- 4.1.3 The programme to be in the form of an activity and time related bar chart produced as a result of a critical path analysis.
- 4.1.4 The programme must be provided in a PDF or MS Project or MS Excel format and cover the full contract period including post site activities. All activities should be clearly defined and named and the following shall be shown on the programme:
- (i) the *starting date*, *completion date* & *Contractor's* planned completion
 - (ii) for each activity, the proposed resources (plant & labour) expected to deliver each activity should be shown on the programme
 - (iii) review periods for any reporting requirements
 - (iv) key dates for the *Employer* to provide 'services and other things'
 - (v) key dates for co-ordination with Others
- 4.1.5 The *Contractor* updates the programme every week. The *Contractor* submits an updated programme to the *Employer* upon request.

5 SERVICES AND OTHER THINGS PROVIDED BY THE *EMPLOYER*

5.1.1 The following temporary traffic management will be provided by the *Employer* to allow the *Contractor* to Provide the Works:

- (i) Highways England's TM Provider will arrange for TM to be provided. The requirements and instructions of the Traffic Safety Control Officer (TSCO) shall be complied with at all times.
- (ii) The TM window is to be confirmed, but see sections 3.2.1 and 4.12 above for general guidance.

5.1.2 Mobile welfare facilities are expected to be made available on the site by the TM Provider.

6 SPECIFICATION FOR THE WORKS

The *Contractor* shall undertake the works in accordance with:

The UK Specification for Ground Investigation published by ICE Publishing, with information, amendments and additions as described in the following Schedules:

- Schedule 1. Information and site-specific requirements
- Schedule 2. Exploratory holes
- Schedule 3. Investigation Supervisor's facilities
- Schedule 4. Specification amendments
- Schedule 5. Specification additions

Where “as specified” is used this indicates that the wording within the UK Specification for Ground Investigation is to be used and there are no particular restrictions or relaxations of that clause.

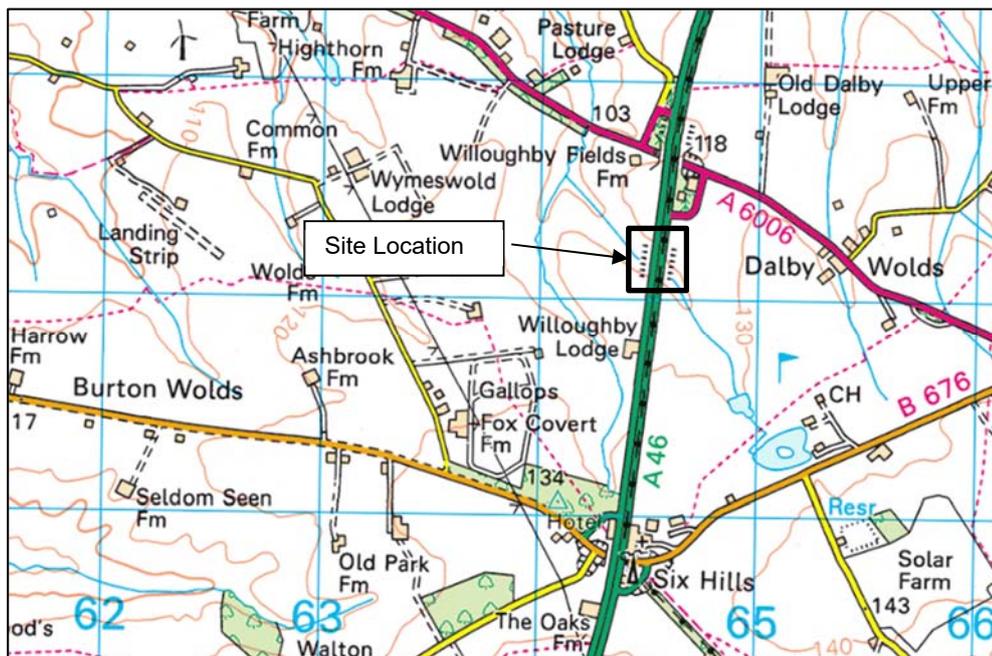
1 Information and site specific requirements

1.1 The name of the contract is “A46 NB SB Sixhills Geotech – Slope & Drainage Renewal”.

1.2 The employer and investigation supervisor is Highways England. The named person is to be confirmed.

1.3 The site is centered around Grid Reference 464537, 322124 on the A46 north and southbound, immediately north of Sixhills. The site location is shown on Figure 1 below. A number of significant defects are present in close proximity to a culvert that connects both embankments drainage to one another. The site is at an elevation of 122m OD at the northern extent of the site, increasing to 125m OD at the southern extent of the site on approximately 6m high earthworks.

Figure 1: Site Location Plan



- 1.4 The main works associated with this investigation is the renewal of the drainage pertaining to the scheme and remediation of the earthworks that have developed defects due to defective drainage. The investigation will be the main intrusive investigation for geotechnical and geo-environmental purposes.
- 1.5 The scope of the investigation is to establish the ground conditions at the site in order to inform the choice and design of the drainage and earthworks. The proposed investigation comprises 2 No boreholes, both to a depth of 10m and 2 window sampler holes to a depth of 5m. Undisturbed driven thin-wall tube samples, SPTs and small disturbed samples are required in the boring. Geotechnical laboratory testing will be scheduled by the Investigation Supervisor on selected samples. Groundwater monitoring instruments are required in all boreholes. Only the factual part of the Ground Investigation Report is to be provided by the Contractor.
- The following Schedules are not required for this investigation:
S1.13 Probing and cone penetration testing & S1.14 (Geophysical testing)
The associated Bills F & G are also not required.
- 1.6 The published geology indicates the site is underlain by glacial to post glacial superficial deposits of the Oadby Member (glacial) and Head units (post glacial) and Alluvial superficial deposits outcropping within the floodplain of the stream. The solid geology pertaining to the site is of the Scunthorpe Mudstone Formation.
- 1.7 The Site Location is shown on Figure 1 in Section 1.3 of this document. The proposed exploratory hole locations are shown on drawing HE569243-KIER-HGT-A46 SIXHILLS-DE-CE-0600_01 but are provisional and the locations may be adjusted by +/-5m to avoid constraints imposed by utilities and other infrastructure. Locations may be further adjusted if necessary, subject to seeking the approval of the Investigation Supervisor.

- 1.8 The following general requirements apply:-
- 1.8.1 Quality management to BSENISO 9001, BSENISO 14001 and BSOHSAS 18001 required. The works are preparatory to construction, so CDM 2015 applies. The investigation supervisor will provide a PCIP. Kier Highways will act in the role of Principal Contractor. The GI contractor shall provide RAMS to contribute to the construction phase H&S plan.
- 1.8.2 The contractor shall provide an experienced ground engineer to supervise all site activities.
- 1.8.3 None required.
- 1.8.4 Contaminated land is not anticipated however the GI contractors should stay vigilant for signs of contaminated ground and ground water. Should suspected contaminated materials be encountered, the contractor should collect samples for laboratory testing.
- 1.8.5 A collated services plan is included in drawing ref HE569243-KIER-VUT-A46 Sixhills-DR-CE-0600_03 to 12
- 1.8.6 None.
- 1.8.7 Any protected species will be identified during the environmental survey which will be undertaken in advance on the ground investigation.
- 1.8.8 Any archaeological constraints will be identified during the environmental survey which will be undertaken in advance on the ground investigation.
- 1.8.9 It is anticipated that site access will be gained from Highways England network however if third party access is required, the investigation supervisor shall be consulted to arrange access to each site with the relevant landowner. Security of the site works is the responsibility of the investigation contractor.

- 1.8.10 Traffic Management will be provided by Highways England as the works are in close proximity to the road. TM will provide a lane 1 closure of both the north and southbound carriageway in sequence. TM will temporarily remove VRS from the crest to allow for access to the earthwork crest.
 - 1.8.11 It is anticipated that works will be carried out at night under a Lane 1 closure. The GI contractor is not required to provide TM but will need to liaise with the TM provider/HE to fit their works into the planned closures.
 - 1.8.12 Trainee operatives are permitted, providing this does not compromise delivery of the works.
 - 1.8.13 Not required.
 - 1.8.14 The maximum period for progressing through hard material before seeking instruction is 1 hour.
 - 1.8.15 As specified.
 - 1.8.16 No facilities required in excess of the minimum welfare facilities.
 - 1.8.17 Not required.
 - 1.8.18 As specified.
 - 1.8.19 As specified plus sufficient photographs to show the condition of the whole of the site prior to the start of investigation works and an analogous set of photographs on completion of the investigation.
- 1.9 Percussion boring.
- 1.9.1 There are no particular restrictions.
 - 1.9.2 See 1.16.4. (both boreholes will have VWP installations)
 - 1.9.3 Not required.
- 1.10 Rotary drilling. Not required
- 1.11 Pitting and trenching.
- 1.11.1 As specified
 - 1.11.2 Not required.
 - 1.11.3 No man entry into inspection pits is permitted.
 - 1.11.4 Not required.
 - 1.11.5 Not required.
 - 1.11.6 Not required.
 - 1.11.7 As specified.
 - 1.11.8 Required if there is insufficient light to provide clear images of the strata exposed in each hand pit.
 - 1.11.9 Not required.
- 1.12 Sampling and monitoring during intrusive investigation.
- 1.12.1 Not required.
 - 1.12.2 As specified.
 - 1.12.3 As specified.
 - 1.12.4 100mm diameter samples to be taken using thin-wall sampler type UT100 (OS-T/W).
 - 1.12.5 Soil from the cutting shoe of an open tube shall be retained as a small disturbed sample.
 - 1.12.6 Not required.
 - 1.12.7 As specified.
 - 1.12.8 Not required.
 - 1.12.9 Not required.
 - 1.12.10 As specified.
 - 1.12.11 Samples will be required where evidence of contamination is observed. At least one near surface sample per exploratory hole shall be suitably preserved and protected to enable contamination assessment and

- WAC testing. 1 No sample of groundwater to be taken where encountered.
- 1.12.12 As specified.
 - 1.12.13 Not required.

 - 1.13 Not used

 - 1.14 Not used

 - 1.15 In situ testing.
 - 1.15.1 Alternate SPTs and U100s in cable percussion boreholes shall be undertaken at 1m intervals. i.e. SPT at 1.2m, U100 at 2.0m, SPT at 3.0m to base of the borehole.
 - 1.15.2 Not required
 - 1.15.3 Not required
 - 1.15.4 Not required
 - 1.15.5 Not required
 - 1.15.6 Not required
 - 1.15.7 Not required
 - 1.15.8 Not required
 - 1.15.9 Not required
 - 1.15.10 Not required

 - 1.16 Instrumentation.
 - 1.16.1 All instrumentation is to be installed in the verge with a flush fitting lockable cover.
 - 1.16.2 Not required.
 - 1.16.3 Not required.
 - 1.16.4 Vibrating wire piezometers will be installed in boreholes on completion. Actual installation depths of response zones and seals to be determined on site by the Investigation Supervisor.
 The top of response zone to be at least 1m below highest water strike and at least 1m below carriageway level. A 1m thick sand filter response zone shall be placed surrounding the tip, with 0.5m bentonite seal above & below the instrument.
 Piezometers shall be maintained at a constant temperature fully saturated and de-aired for a period of at least 12 hrs and, immediately prior to installation.
 The data gateway shall be fitted with a data sim card and the address supplied to the Investigation Supervisor upon installation so that data can be downloaded. Gateways shall be solar or battery powered, with a battery life of at least 2 years. All data / telephony transmission costs for a period of up to 2 years shall be included.
 All nodes & gateways shall be painted in a neutral colour and clearly marked as containing no electronic components of value.
 An operation, calibration & maintenance manual shall be supplied for all installations with the factual report on the investigation
 - 1.16.5 Not required.
 - 1.16.6 Not required.
 - 1.16.7 Not required.
 - 1.16.8 Not required.
 - 1.16.9 Not required.
 - 1.16.10 Not Required.
 - 1.16.11 Not required.
 - 1.16.12 Not required.

- 1.17 Installation monitoring and sampling.
 - 1.17.1 A zero / baseline reading shall be recorded on all piezometers after:-
 - Completion of de-airing, Prior to installation
 - On completion of installation, prior to grouting
 - On completion of groutingAll zero readings, temperature corrections, calibration values and baseline readings shall be supplied to the investigation supervisor upon installation.
 - 1.17.2 Not required.
 - 1.17.3 Not required.
 - 1.17.4 Not required.
 - 1.17.5 Not required.
 - 1.17.6 Not required.

- 1.18 Daily records.
 - 1.18.1 As specified.
 - 1.18.2 Not required.

- 1.19 Geotechnical laboratory testing.
 - 1.19.1 Investigation Supervisor to schedule testing based on the daily records.
 - 1.19.2 Granular materials:
 - Particle size distribution by wet sieving, sedimentation by hydrometer.
 - Small Shear Box TestingCohesive materials:
 - Natural moisture content
 - Atterberg limits
 - Undrained Triaxial Testing
 - 1.19.3 Not required
 - 1.19.4 UKAS accreditation required.
 - 1.19.5 Unconfined Compressive Strength and Point Load testing.
 - 1.19.6 BRE SD1 testing for Suite B greenfield locations that contain pyrite is anticipated.
 - 1.19.7 Not required.
 - 1.19.8 Not required.

- 1.20 Geoenvironmental laboratory testing..
 - 1.20.1 Investigation Supervisor to schedule testing
 - 1.20.2 Contractor to detail the accreditation which can be offered on a test-by-test basis.
 - 1.20.3 The Contractor shall complete the proforma page 'Suite E – soil samples' in Appendix A to provide for the case of unforeseen contamination being encountered. Test Suites F and G are not required and have been deleted.
 - 1.20.4 Contractor to carry out assessment for waste characterization.
 - 1.20.5 A program of chemical laboratory testing is required for a range of potential contaminants to allow an initial classification of the materials for waste disposal purposes. The GI Contractor is required to undertake the Hazard Assessment Screen using the HazWasteOnline Toolkit, to establish whether the sampled soils should be considered as inert, hazardous or non-hazardous

waste in line with the EA guidance WM3 "Guidance on the classification and assessment of waste", (Version 1.1 2018) and WAC classification testing is then to be carried out to confirm or deny suitability for a specific type of landfill site. The contractor is required to notify the Investigation Supervisor of the results of the initial screening before undertaking WAC testing and to discuss the suggested number of further tests and the associated costs.

Test Suites I and J testing required for non-hazardous and hazardous assessment respectively. The Contractor is to detail what test methods can be offered to comply with the accreditation requirements.

Tests Suite H is not required and has been deleted.

1.20.6 Not required.

1.20.7 Not required.

1.21 Reporting.

1.21.1 As specified.

1.21.2 As specified

1.21.3 Data to be in AGS4 format. Digital data to be in a single file.

1.21.4 Preliminary digital data to be issued to the Investigation Supervisor by email attachment within 3 days of completion of fieldwork.

1.21.5 Factual part of Ground Investigation Report including all information required by CI 16.8.1.

1.21.6 Media to be via email or a file share site, maximum file size 10 Mb and photographs to be in JPG format.

1.21.7 Not required.

1.21.8 Factual part of Geotechnical Investigation Report in accordance with Specification Clause 16.8.1.

1.21.9 Not required.

1.21.10 Complete set of digital data shall be submitted with the draft and final factual reports and not later than 6 weeks after completion of the field works.

1.21.11 Preliminary information to be transmitted by email or file share.

1.21.12 Within 1 week of the completion of laboratory testing, an electronic copy of the draft report are to be submitted to the Investigation Supervisor who shall approve the draft report (or instruct on any required revisions) within 1 week following its receipt. One hard and one electronic copy of the final report are to be submitted to the Investigation Supervisor within 1 week after draft copy approval.

2 Schedule of Exploratory holes

Hole Number	Type	Scheduled Depth (m)	Purpose	National Grid Reference		Approx. ground level (mOD)	Remarks
				Easting (m)	Northin g (m)		
BH01	Cable percussion	10	Obtain soil samples for logging & testing for design of earthwork and drainage renewal.	464529	322139	122	Alternate SPT's & UT100s plus installation of a vibrating wire piezometer.
BH02	Cable percussion	10	Obtain soil samples for logging & testing for	464558	322122	122	Alternate SPT's & UT100s plus

			design of earthwork and drainage renewal.				installation of a vibrating wire piezometer.
WS01	Window Sampler	5	Obtain soil samples for logging & testing for design of earthwork and drainage renewal.	464515	322149	118	
WS02	Window Sampler	5	Obtain soil samples for logging & testing for design of earthwork and drainage renewal.	464573	322113	118	

- 3 **Supervisors Facilities** - the contractor's welfare facilities shall be extended to include for use by the investigation supervisor. One of the contractors staff shall hold a first aid qualification and first aid shall be extended to the investigation supervisor if needed.
- 4 **Specification Amendments**– Not Used
- 5 **Specification Additions** - Not used

Appendix A

SCHEDULE 1.20.3

CHEMICAL LABORATORY TESTING FOR CONTAMINATION

Nominated Test Laboratory - Contractor to specify proposed laboratory

Required Testing Turnaround Times - 10 days

SUITE E – Soil Samples			
Determinand	Limit of detection required/offered¹	Test method required/offered¹	Accreditation required/offered¹
Arsenic			
Boron			
Cadmium			
Chromium (total)			
Copper			
Lead			
Mercury			
Nickel			
Zinc			
pH			
Water soluble sulphate (as SO ₄)			
Organic matter			
Speciated petroleum hydrocarbons			
Speciated polyaromatic hydrocarbons (USEPA 16)			
Phenol			
Cyanide (total)			
Asbestos Identification			

¹ Contractor to detail what can be offered under each of these categories.