# ANNEX 1 Bill of Quantities for Ground Investigation

**Preamble amendments and additions**

The following clauses are amended or added to the Preamble:

None

## Bill A General items, provisional services and additional items

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **A** | **General items, provisional sums and additional items** |  |  |  |  |
| A1 | Offices and stores for the Contractor | sum | Not required |  |  |
| A2 | Establish on site all plant, equipment and services for a Green Category site | sum | 1 |  |  |
| A3 | Extra over Item A2 for a Yellow Category site | sum | 1 |  |  |
| A4 | Maintain on site all site safety equipment for a Yellow Category site | week | Not required |  |  |
| A5 | Decontamination of equipment during and at end of intrusive investigation for a Yellow Category site | sum | Not required |  |  |
| A6 | Appropriate storage, transport and off- site disposal of contaminated arisings and any PPE equipment, excluding laboratory testing | provisional sum |  |  |  |
| A7 | Provide professional attendance in accordance with Clause 3.5.2 |  |  |  |  |
| A7.1 | Provide Technician | p.day | 1 |  |  |
| A7.2 | Provide Graduate Ground Engineer | p.day | Not required |  |  |
| A7.3 | Provide Experienced Ground Engineer | p.day | 5 |  |  |
| A7.4 | Provide Registered Ground Engineering Professional | p.day | Not required |  |  |
| A7.5 | Provide Registered Ground Engineering Specialist | p.day | Not required |  |  |
| A7.6 | Provide Registered Ground Engineering Advisor | p.day | Not required |  |  |
| A8 | Establish the location and elevation of the ground at each exploratory hole | sum | 1 |  |  |
| A9 | Preparation of Health and Safety documentation and Safety Risk Assessment | sum | 1 |  |  |
| A10 | Facilities for the Investigation Supervisor | sum | Not required |  |  |
| A11 | Vehicle(s) for the Investigation Supervisor | v.wk | Not required |  |  |
| A12 | Fuel for vehicle for the Investigation Supervisor | provisional sum | Not required |  |  |
| A13 | Investigation Supervisor's telephone and facsimile charges | provisional sum | Not required |  |  |
| A14 | Deliver selected cores and samples to the specified address | provisional sum | Not required |  |  |
| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| A15 | Special testing and sampling required by Investigation Supervisor | provisional sum | Not required |  |  |
| A16 | Traffic safety and management | provisional sum | 1 |  |  |
| A17 | One master copy of the Desk Study Report | sum | Not required |  |  |
| A18 | Additional copies of the Desk Study Report | nr | Not required |  |  |
| A19 | One master copy of the Ground Investigation Report (or specified part thereof) | sum | 1 |  |  |
| A20 | Additional copies of the Ground Investigation Report (or specified part thereof) | nr | Not required |  |  |
| A21 | Electronic copy of Ground Investigation Report (or specified part thereof) | sum | 1 |  |  |
| A22 | One master copy of the Geotechnical Design Report (or specified part thereof) | sum | Not required |  |  |
| A23 | Additional copies of the Geotechnical Design Report (or specified part thereof) | nr | Not required |  |  |
| A24 | Electronic copy of Geotechnical Design Report in (or specified part thereof) | sum | Not required |  |  |
| A25 | Digital data in AGS transfer format | sum | 1 |  |  |
| A26 | Hard-copy photographs | nr | Not required |  |  |
| A27 | Photographic volume | nr | Not required |  |  |
| A28 | Long term storage of geotechnical samples (Appendix B) | provisional sum | Not required |  |  |
| A29 | Long term storage of geoenvironmental samples (Appendix B) | provisional sum | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
| A30 | Service clearance – appropriate technique the responsibility of the Contractor | Sum | 1 |  |  |
| Total section A carried to summary | | | | |  |
|  | | | | |  |

## Bill B Percussion Boring

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **B** | **Percussion Boring** |  |  |  |  |
| B1 | Move boring plant and equipment to the site of each exploratory hole and set up | nr | Not required |  |  |
| B2 | Extra over Item BI for setting up on a slope of gradient greater than 20% | nr | Not required |  |  |
| B3 | Break out surface obstruction where present at exploratory borehole | h | Not required |  |  |
| B4 | Advance borehole between existing ground level and 10 m depth | m | Not required |  |  |
| B5 | As Item B4 but between 10 m and 20 m depth | m | Not required |  |  |
| B6 | As Item B4 but between 20 m and 30 m depth | m | Not required |  |  |
| B7 | As Item B4 but between 30 m and 40 m depth | m | Not required |  |  |
| B8 | As Item B4 but between 40 m and 50 m depth | m | Not required |  |  |
| B9 | Advance borehole through hard stratum or obstruction | h | Not required |  |  |
| B10 | Provide aquifer protection measures at a single aquiclude/aquifer boundary or cross contamination control measures at a single soil boundary in a borehole | nr | Not required |  |  |
| B11 | Backfill borehole with cement/bentonite grout or bentonite pellets | m | Not required |  |  |
| B12 | Standing time for borehole plant, equipment and crew | h | Not required |  |  |
|  | Dynamic sampling |  |  |  |  |
| B13 | Move dynamic sampling equipment to the site of each exploratory hole and set up | nr | 5 |  |  |
| B14 | Extra over Item BI3 for setting up on a slope of gradient greater than 20% | nr | Not required |  |  |
| B15 | Advance dynamic sample hole between existing ground level and 5 m depth | m | 15 |  |  |
| B16 | As Item B15 but between 5 m and 10 m depth | m | Rate Only |  |  |
| B17 | As Item B15 but between 10 m and **30 m** depth | m | Not required |  |  |
| B18 | Standing time for dynamic sampling equipment and crew | hr | Rate only |  |  |
| B19 | Provision of dynamic sampling equipment and crew for sampling as directed by the Investigation Supervisor; maximum depth 15 m | day | Not required |  |  |
| B20 | Backfill dynamic sampling hole with cement/bentonite grout or bentonite pellets | m | 15 |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section B carried to summary | | | | |  |

## Bill C Rotary Drilling

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **C** | **Rotary drilling** |  |  |  |  |
|  | Hand augering |  | Not required |  |  |
|  | Continuous flight and hollow stem flight augering |  | Not required |  |  |
|  | Rotary drilling with and without core recovery |  |  |  |  |
| C15 | Move rotary drilling plant and equipment to the site of each exploratory drillhole and set up | nr | Included in B13 |  |  |
| C16 | Extra over Item C15 for setting up on a slope of gradient greater than 20% | nr | Not required |  |  |
| C17 | Extra over Item C15 for setting up drilling plant for inclined drillhole | nr | Not required |  |  |
| C18 | Break out surface obstructions where present at exploratory drillhole | h | Not required |  |  |
| C19 | Standing time for rotary drilling plant, equipment and crew | h | Rate only |  |  |
| C20 | Provide aquifer protection measures at a single aquiclude/aquifer boundary in a drillhole | nr | Not required |  |  |
|  | Drilling without cores |  |  |  |  |
|  | Drilling to obtain cores |  |  |  |  |
| C34 | Rotary drill in materials other than hard strata to obtain cores of the specified diameter between existing ground level and 10 m depth | m | Rate only |  |  |
| C35 | As Item C34 but between 10 m and 20 m depth | m | Not required |  |  |
| C36 | As Item C34 but between 20 m and 30 m depth | m | Not required |  |  |
| C37 | As Item C34 but between 30 m and 40 m depth | m | Not required |  |  |
| C38 | As Item C34 but between 40 m and 50 m depth | m | Not required |  |  |
| C39 | Extra over Items C34 to C38 for use of semi-rigid core liner | m | Rate only |  |  |
| C40 | Extra over Items C34 to C38 for coring inclined rotary drillhole | m | Not required |  |  |
| C41 | Rotary drill in hard strata to obtain cores of the specified diameter between existing ground level and 10 m depth | m | 20 |  |  |
| C42 | As Item C41 but between 10 m and 20 m depth | m | Rate only |  |  |
| C43 | As Item C41 but between 20 m and 30 m depth | m | Not required |  |  |
| C44 | As Item C41 but between 30 m and 40 m depth | m | Not required |  |  |
| C45 | As Item C41 but between 40 m and 50 m depth | m | Not required |  |  |
| C46 | Extra over items C41 to C45 for use of semi-rigid liner | m | Not required |  |  |
| C47 | Extra over items C41 to C45 for coring inclined rotary drillhole | m | Not required |  |  |
| C48 | Backfill rotary drillhole with cement/bentonite grout or bentonite pellets | m | 20 |  |  |
| C49 | Core box to be retained by client | nr | Not required |  |  |
|  | Rotary percussive drilling |  | Not required |  |  |
|  | Resonance (sonic) drilling |  | Not required |  |  |
|  | Sonic drilling without cores |  | Not required |  |  |
|  | Sonic drilling to obtain cores |  | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section C carried to summary | | | | |  |

## Bill D Pitting and Trenching

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **D** | **Pitting and trenching** |  |  |  |  |
|  | Inspection pits |  |  |  |  |
| D1 | Excavate inspection pit by hand to 1.2 m depth | nr | 5 |  |  |
| D2 | Extra over Item D1 for breaking out surface obstructions | h | 2.5 |  |  |
|  | Trial pits and trenches |  | Not required |  |  |
| D14  D15  D16  D17  D18  D19  D20  D21  D22  D23  D24  D25  D26  D27  D28 | Observation pits and trenches  Move equipment to the site of each  observation pit or trench of not greater  than 4.5m depth  Extra over Item D14 for setting up on a  slope of gradient greater than 20%  Extra over Item D14 for trial pit or trench  between 4.5 and 6m depth  Excavate observation pit between ground  level and 3.0m depth  As Item D17 but between 3.0m and 4.5m  Depth  As Item D17 but between 4.5m and 6.0m  Depth  Extra over Item D17 for hand excavation  Excavate observation trench between  ground level and 3.0m depth  As Item D21 but between 3.0m and 4.5m  Depth  As Item D21 but between 4.5m and 6.0m  Depth  Extra over Item D21 for hand excavation  Extra over Items D17 to D19 and D21 to  D23 for breaking out hard strata or  Obstructions  Extra over Items D17 D21 for breaking  out hard strata or obstructions by hand  Standing time for excavation plant,  equipment and crew for machine dug  observation pit or trench  Standing time for excavation plant,  equipment and crew for hand dug  observation pit or trench | nr  nr  nr  m  m  m  m  m2  m2  m2  m2  h  h  h  h | Not required  5  Not required  Not required  7.50  Not required  Not required  7.5  Not required  Not required  Not required  Not required  Not required  Rate only  Not required  Rate only |  |  |
|  | Daily provision of pitting crew and equipment |  | Not required |  |  |
|  | General |  | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | Provision of plant and crew for horizontal  diamond concrete core holes through the  retaining wall | sum | 1 |  |  |
| Total section D carried to summary | | | | |  |

## Bill E Sampling and monitoring during intrusive investigation

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **E** | **Sampling and monitoring**  **during intrusive investigation** |  |  |  |  |
|  | Samples for geotechnical purposes |  |  |  |  |
| E1 | Small disturbed sample | nr | 30 |  |  |
| E2 | Bulk disturbed sample | nr | 33 |  |  |
| E3 | Large bulk disturbed sample | nr | Rate only |  |  |
| E4.1 | Open tube sample using thick-walled (OS-TK/W) sampler | nr | Rate only |  |  |
| E4.2 | Open tube sample using thin-walled (OS-T/W) sampler | nr | Rate only |  |  |
| E5 | Piston sample | nr | Not required |  |  |
| E6 | Groundwater sample | nr | Rate only |  |  |
| E7 | Ground gas sample | nr | Not required |  |  |
| E8 | Cut, prepare and protect core sub sample | nr | 20 |  |  |
|  | Continuous or semi-continuous sampling |  | Not required |  |  |
|  | Containers for contamination assessment and WAC testing |  |  |  |  |
| E14.1 | Provision of containers and collection of samples for contamination Suite E (S1.20.3) | nr | 23 |  |  |
| E14.2 | Provision of containers and collection of samples for contamination Suite F (S1.20.3) | nr | Rate only |  |  |
| E14.3 | Provision of containers and collection of samples for contamination Suite G (S1.20.3) | nr | Rate only |  |  |
| E15.1 | Provision of containers and collection of samples for WAC Suite H (S1.20.5) | nr | Not required |  |  |
| E15.2 | Provision of containers and collection of samples for WAC Suite I (S1.20.5) | nr | Not required |  |  |
| E15.3 | Provision of containers and collection of samples for WAC Suite J (S1.20.5) | nr | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section E carried to summary | | | | |  |

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## Bill F Probing and cone penetration testing

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **F** | **Probing and cone penetration testing** |  |  |  |  |
|  | Dynamic probing |  | Not required |  |  |
|  | Cone penetration testing |  | Not required |  |  |
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|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section F carried to summary | | | | |  |

## Bill G Geophysical testing

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **G** | **Geophysical testing** |  |  |  |  |
|  | Land based mapping techniques |  | Not required |  |  |
|  | Land based profiling techniques |  | Not required |  |  |
|  | Land based borehole techniques |  | Not required |  |  |
|  | Overwater |  | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section G carried to summary | | | | |  |

## Bill H In situ testing

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **H** | **In situ testing** |  |  |  |  |
| H1 | Standard penetration test in borehole | nr | 10 |  |  |
| H2 | Standard penetration test in rotary drillhole | nr | 15 |  |  |
| H3 | In situ density testing |  |  |  |  |
| H3.1 | Small pouring cylinder method | nr | Not required |  |  |
| H3.2 | Large pouring cylinder method | nr | Not required |  |  |
| H3.3 | Water replacement method | nr | Not required |  |  |
| H3.4 | Core cutter method | nr | Not required |  |  |
| H3.5 | Nuclear method | day | Not required |  |  |
| H4 | California Bearing Ratio test | nr | Not required |  |  |
| H5 | Vane shear strength test in borehole | nr | Not required |  |  |
| H6 | Penetration vane test, penetration from ground level | nr | Not required |  |  |
| H7 | Hand penetrometer test (set of 3 readings) | nr | Not required |  |  |
| H8 | Hand vane test (set of 3 readings) | nr | Rate only |  |  |
|  | Other tests |  | Not required |  |  |
|  | Permeability testing |  | Not required |  |  |
|  | Self-boring pressuremeter |  | Not required |  |  |
|  | High pressure dilatometer |  | Not required |  |  |
|  | Driven or push-in pressuremeter |  | Not required |  |  |
|  | Menard pressuremeter |  | Not required |  |  |
|  | Soil infiltration test |  | Not required |  |  |
|  | Miscellaneous site testing |  | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section H carried to summary | | | | |  |

## Bill I Instrumentation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
|  |  |  |  |  |  |
| **I** | **Instrumentation** |  |  |  |  |
| I1  I2  I3  I4  I5  I6  I7  I8  I9  I10  I11  I12  I13  I14 | Standpipes and piezometers  Backfill exploratory hole with  cement/bentonite grout below standpipe  or standpipe piezometer  Provide and install standpipe (19 mm)  Provide and install standpipe piezometer  (19 mm)  Provide and install standpipe piezometer  (50 mm)  Provide and install standpipe piezometer  (75 mm)  Provide and install ground gas monitoring  standpipe (19 mm)  Provide and install ground gas monitoring  standpipe (50 mm)  Provide and install ground gas monitoring  standpipe (75 mm)  Provide and install headworks for ground  gas monitoring standpipe, standpipe or  standpipe piezometer  Provide and install protective cover  (flush)  Provide and install protective cover  (raised)  Extra over Item I10 for heavy duty cover  in highways  Supply and erect protective fencing  around standpipe or piezometer  installation  Supply and erect 1.5 m high marker post | m  m  m  m  m  m  m  m  nr  nr  nr  nr  nr  nr | Rate only  Rate only  Not required  Not required  Not required  Not required  Not required  Not required  Not required  Rate only  Not required  Rate only  Not required  Not required |  |  |
| I15 | Standpipe and piezometer development  Inclinometer | Provisional sum | Not required  Not required |  |  |
|  | Slip indicators |  | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section I carried to summary | | | | |  |

## Bill J Installation monitoring and sampling

| **Number** | **Item description** | **Unit** | **Quantity** | | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |
| **J**  J1 | **Installation monitoring and sampling** (during Fieldwork Period)  Reading of water level in standpipe or  standpipe piezometer during fieldwork  period | nr | Rate only | |  |  |
|  | **Installation monitoring and sampling** (post Fieldwork Period) |  | Not required | |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |  |
|  | None |  |  |  |  |  |
| Total section J carried to summary | | | | | |  |

## Bill K Geotechnical laboratory testing

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **K** | **Geotechnical laboratory testing** |  |  |  |  |
| K1 | Classification |  |  |  |  |
| K1.1 | Moisture content | nr | 7 |  |  |
| K1.2 | Liquid limit, plastic limit and plasticity index | nr | 7 |  |  |
| K1.3 | Volumetric shrinkage | nr | Not required |  |  |
| K1.4 | Linear shrinkage | nr | Not required |  |  |
| K1.5 | Density by linear measurement | nr | Not required |  |  |
| K1.6 | Density by immersion in water or water displacement | nr | Not required |  |  |
| K1.7 | Dry density and saturation moisture content for chalk | nr | Not required |  |  |
| K1.8 | Particle density by gas jar or pyknometer | nr | Not required |  |  |
| K1.9 | Particle size distribution by wet sieving | nr | Rate only |  |  |
| K1.10 | Particle size distribution by dry sieving | nr | 20 |  |  |
| K1.11 | Sedimentation by pipette | nr | Rate only |  |  |
| K1.12 | Sedimentation by hydrometer | nr | Not required |  |  |
| K2 | Chemical and electrochemical |  |  |  |  |
| K2.1 | Organic matter content | nr | Not required |  |  |
| K2.2 | Mass loss on ignition | nr | Not required |  |  |
| K2.3 | Sulphate content of acid extract from soil | nr | Not required |  |  |
| K2.4 | Sulphate content of water extract from soil | nr | Not required |  |  |
| K2.5 | Sulphate content of groundwater | nr | Not required |  |  |
| K2.6 | Carbonate content by rapid titration | nr | Not required |  |  |
| K2.7 | Carbonate content by gravimetric method | nr | Not required |  |  |
| K2.8 | Water soluble chloride content | nr | Not required |  |  |
| K2.9 | Acid soluble chloride content | nr | Not required |  |  |
| K2.10 | Total Sulphur content | nr | Not required |  |  |
| K2.11 | Total dissolved solids | nr | Not required |  |  |
| K2.12 | pH value | nr | Not required |  |  |
| K2.13 | Resistivity | nr | Not required |  |  |
| K2.14 | Redox potential | nr | Not required |  |  |
| K3 | Compaction related |  |  |  |  |
| K3.1 | Dry density/moisture content relationship using 2.5 kg rammer | nr | Not required |  |  |
| K3.2 | Dry density/moisture content relationship using 4.5 kg rammer | nr | Not required |  |  |
| K3.3 | Dry density/moisture content relationship using vibrating rammer | nr | Not required |  |  |
| K3.4 | Extra over Items K3.1, K3.2 and K3.3 for use of CBR mould | nr | Not required |  |  |
| K.3.5 | Maximum and minimum dry density for granular soils | nr | Not required |  |  |
| K3.6 | Moisture Condition Value at natural moisture content | nr | Not required |  |  |
| K3.7 | Moisture Condition Value/moisture content relationship | nr | Not required |  |  |
| K3.8 | Chalk crushing value | nr | Not required |  |  |
| K3.9 | California Bearing Ratio on recompacted disturbed sample | nr | Not required |  |  |
| K3.10 | Extra over Item K3.9 for soaking | day | Not required |  |  |
| K4 | Compressibility, permeability, durability |  |  |  |  |
| K4.1 | One-dimensional consolidation properties, test period 5 days | nr | Not required |  |  |
| K4.2 | Extra over Item K4.1 for test period in excess of 5 days | day | Not required |  |  |
| K4.3 | Measurements of swelling pressure, test period 2 days | nr | Not required |  |  |
| K4.4 | Measurement of swelling, test period 2 days | nr | Not required |  |  |
| K4.5 | Measurement of settlement on saturation, test period 1 day | nr | Not required |  |  |
| K4.6 | Extra over Items K4.3 to K4.5 for test period in excess of 2 or 1 day (s) | day | Not required |  |  |
| K4.7 | Permeability by constant head method | nr | Not required |  |  |
| K4.8 | Dispersibility by pinhole method | nr | Not required |  |  |
| K4.9 | Dispersibility by crumb method | nr | Not required |  |  |
| K4.10 | Dispersibility by dispersion method | nr | Not required |  |  |
| K4.11 | Frost heave of soil | nr | Not required |  |  |
| K5 | Consolidation and permeability in hydraulic cells |  | Not required |  |  |
| K6 | Shear strength (total stress) |  |  |  |  |
| K6.1 | Shear strength by the laboratory vane method (set of 3) | nr | Not required |  |  |
| K6.2 | Shear strength by hand vane (set of 3) | nr | Not required |  |  |
| K6.3 | Shear strength by hand penetrometer (set of 3) | nr | Not required |  |  |
| K6.4 | Shear strength of a set of three 60 mm × 60 mm square specimens by direct shear, test duration not exceeding 1 day per specimen | nr | 10 |  |  |
| K6.5 | Extra over Item K6.4 for test durations in excess of 1 day per specimen | sp.day | Not required |  |  |
| K6.6 | Shear strength of a single 300 mm × 300 mm square specimen by direct shear, test duration not exceeding 1 day | nr | Rate only |  |  |
| K6.7 | Extra over Item K6.6 for test durations in excess of 1 day | day | Rate only |  |  |
| K6.8 | Residual shear strength of a set of three 60 mm × 60 mm square specimens by direct shear, test duration not exceeding 4 days per specimen | nr | Not required |  |  |
| K6.9 | Extra over Item K6.8 for test durations in excess of 4 days per specimen | sp.day | Not required |  |  |
| K6.10 | Residual shear strength of a 300 mm square specimen by direct shear, test duration not exceeding 4 days | nr | Not required |  |  |
| K6.11 | Extra over Item K6. 10 for test duration in excess day of 4 days | day | Not required |  |  |
| K6.12 | Residual shear strength using the small ring shear apparatus at three normal pressures, test duration not exceeding 4 days | nr | Not required |  |  |
| K6.13 | Extra over Item K6.12 for test duration in excess of 4 days | day | Not required |  |  |
| K6.14 | Unconfined compressive strength of 38 mm diameter specimen | nr | Not required |  |  |
| K6.15 | Undrained shear strength of a set of three 38 mm diameter specimens in triaxial compression without the measurement of pore pressure | nr | Not required |  |  |
| K6.16 | Undrained strength of a single 100 mm diameter specimen in triaxial compression without the measurement of pore pressure | nr | Rate only |  |  |
| K6.17 | Undrained shear strength of single 100 mm diameter specimen in triaxial compression with multistage loading and without measurement of pore pressure | nr | Not required |  |  |
| K7 | Shear strength (effective stress) |  |  |  |  |
| K7.1 | Consolidated undrained triaxial compression test with measurement of pore pressure (set of three 38 mm specimens), test duration not exceeding 4 days per specimen | nr | Not required |  |  |
| K7.2 | As K7.1 but single-stage or multi-stage test using 100 mm diameter specimen | nr | Not required |  |  |
| K7.3 | Consolidated drained triaxial compression test with measurement of volume change (set of three 38 mm specimens), test duration not exceeding 4 days per specimen | nr | Not required |  |  |
| K7.4 | As Item K7.3 but single stage or multi stage test using 100 mm diameter specimen, test duration not exceeding 4 day | nr | Rate only |  |  |
| K7.5 | Extra over Items K7.1 and K7.3 for test duration in excess of 4 days per specimen | sp.day | Not required |  |  |
| K7.6 | Extra over Items K7.2 and K7.4 for test duration in excess of 4 days | day | Rate only |  |  |
| K8 | Rock testing |  |  |  |  |
| K8.1 | Natural water content of rock sample | nr | 15 |  |  |
| K8.2 | Porosity/density using saturation and calliper techniques | nr | Not required |  |  |
| K8.3 | Porosity/density using saturation and buoyancy | nr | Not required |  |  |
| K8.4 | Slake durability index | nr | Not required |  |  |
| K8.5 | Soundness by magnesium sulphate | nr | Not required |  |  |
| K8.6 | Magnesium sulphate test | nr | Not required |  |  |
| K8.7 | Shore scleroscope | nr | Not required |  |  |
| K8.8 | Schmidt rebound hardness | nr | Not required |  |  |
| K8.9 | Resistance to fragmentation | nr | Not required |  |  |
| K8.10 | Aggregate abrasion value | nr | Not required |  |  |
| K8.11 | Polished stone value | nr | Not required |  |  |
| K8.12 | Aggregate frost heave | nr | Not required |  |  |
| K8.13 | Resistance to freezing and thawing | nr | Not required |  |  |
| K8.14 | Uniaxial compressive strength | nr | 15 |  |  |
| K8.15 | Deformability in uniaxial compression | nr | Not required |  |  |
| K8.16 | Indirect tensile strength by Brazilian test | nr | Not required |  |  |
| K8.17 | Undrained triaxial compression without measurements of porewater pressure | nr | Not required |  |  |
| K8.18 | Undrained triaxial compression with measurement of porewater pressure | nr | Not required |  |  |
| K8.19 | Direct shear strength of a single specimen | nr | 10 |  |  |
| K8.20 | Swelling pressure test | nr | Not required |  |  |
| K8.21 | Measurement of point load strength index of rock specimen (set of ten individual determinations) | nr | Not required |  |  |
| K8.22 | Single measurement of point load strength on core sample (either axial or diametral test | nr | 45 |  |  |
|  | Ground/groundwater aggressivity |  |  |  |  |
| K9.1 | Suite A (Greenfield site – pyrite absent), Schedule 1.19.6 | nr | Not required |  |  |
| K9.2 | Suite B (Greenfield site – pyrite present), Schedule 1.19.6 | nr | Not required |  |  |
| K9.3  K9.4 | Suite C (Brownfield site – pyrite absent), Schedule 1.19.6  Suite D (Brownfield site – pyrite present), Schedule 1.19.6 | nr  nr | 15  Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section K carried to summary | | | | |  |

## Bill L Geoenvironmental laboratory testing

| **Number** | **Item description** | **Unit** | **Quantity** | **Rate** | **Amount £** |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| **L** | **Geoenvironmental laboratory testing** |  |  |  |  |
|  | Contamination testing |  |  |  |  |
| L1.1 | Suite E (Soil samples Schedule S1.20.3) | nr | 10 |  |  |
| L1.2 | Suite F (Water samples Schedule S1.20.3) | nr | Rate only |  |  |
| L1.3 | Suite G (Gas samples Schedule S1.20.3) | nr | Rate only |  |  |
|  | Waste acceptance criteria testing |  |  |  |  |
| L2.1 | Suite H (Inert waste landfill Schedule S1.20.5) | nr | Not required |  |  |
| L2.2 | Suite I (Stable non-reactive hazardous waste in non-hazardous waste landfill Schedule S1.20.5) | nr | Not required |  |  |
| L2.3 | Suite J (Hazardous waste landfill Schedule S1.20.5) | nr | Not required |  |  |
|  | **Contract specific additional bill items** |  |  |  |  |
|  | None |  |  |  |  |
| Total section L carried to summary | | | | |  |

# Summary of Bill of Quantities

|  |  |  |
| --- | --- | --- |
|  |  | £ |
| A. | General items and provisional sums |  |
| B. | Percussion boring |  |
| C. | Rotary drilling |  |
| D. | Pitting and trenching |  |
| E. | Sampling during intrusive investigation |  |
| F. | Probing and cone penetration testing |  |
| G. | Geophysical testing |  |
| H. | In situ testing |  |
| I. | Instrumentation |  |
| J. | Installation monitoring and sampling |  |
| K. | Geotechnical laboratory testing |  |
| L. | Geoenvironmental laboratory testing |  |
| Total tender | |  |

CV of Supervising Engineer enclosed **Yes/No**

Method Statements enclosed **Yes/No**

**Signature…………………………………………………………………………………………...**

**Signed By…………………………………………………………………………………………..**

**On Behalf of (Company)…………………………………………………………………………**

**Date………………………………………………………………………………………………….**

## Appendix A. Rates for Ground Practitioners and other Personnel

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Item Description | Unit | Rate |
| 1 | Technician | h |  |
| 2 | Graduate ground engineer | h |  |
| 3 | Experienced ground engineer | h |  |
| 4 | Registered Ground Engineering Professional | h |  |
| 5 | Registered Ground Engineering Specialist | h |  |
| 6 | Registered Ground Engineering Advisor | h |  |
| 7 | Expenses incurred by staff on site visits who are resident by agreement with the Investigation Supervisor | day |  |
| 8 | Rate per kilometer1 from Contractor’s premises and return for Items 1, 2 and 3 | km1 |  |
| 9 | As above but for Items 4, 5 and 6 | km1 |  |
| 10 | All other expenses incurred in conjunction with a site visit where a return journey is made on the same day for Items 1, 2 and 3 | visit |  |
| 11 | As above but for Items 4, 5 and 6 | visit |  |
| 12 | All other expenses incurred in connection with a visit where an overnight stay is necessary for Items 1, 2 and 3 | overnight |  |
| 13 | As above but for Items 4, 5 and 6 | overnight |  |
| 1 where considered more appropriate, ‘mile’ may be used | |  |  |

Estimate of costs under Appendix A to the Bill of Quantities where the provision of the Contractor’s staff for work in

accordance with Specification Clauses 3.5.2, 3.6.1 and 3.6.2 cannot be adequately specified at tender.

**(To be assessed by the Investigation Supervisor)**

## Appendix B. Long-term sample storage

|  |  |  |  |
| --- | --- | --- | --- |
| Item | Item Description | Unit | Rate |
| **Geotechnical Samples** | |  |  |
| 1 | Dynamic (windowless) samples | nr |  |
| 2 | Rotary drilling core in core box | nr |  |
| 3 | Rotary drilling core sub-samples | nr |  |
| 4 | Bulk samples | nr |  |
| 5 | Large bulk samples | nr |  |
| 6 | Open-tube samples (thick-wall sampler) | nr |  |
| 7 | Open-tube samples (thin-wall sampler) | nr |  |
| 8 | Disturbed samples | nr |  |
| 9 | Groundwater samples | nr |  |
| 10 | Delft samples | nr |  |
| 11 | Mostap samples | nr |  |
| 12 | Piston Samples | nr |  |
| **Contamination Samples** | | nr |  |
| 13 | Soil samples in plastic tubs | nr |  |
| 14 | Soil samples in glass containers | nr |  |
| 15 | Groundwater samples | nr |  |
| 16 | Gas samples | nr |  |
| Where samples comprise more than one container, the rate entered shall be per container | |  |  |

Estimate of costs under Appendix B to the Bill of Quantities for long-term storage of samples where required in S1.12.2 and S1.12.10. **(To be assessed by the Investigation Supervisor)**