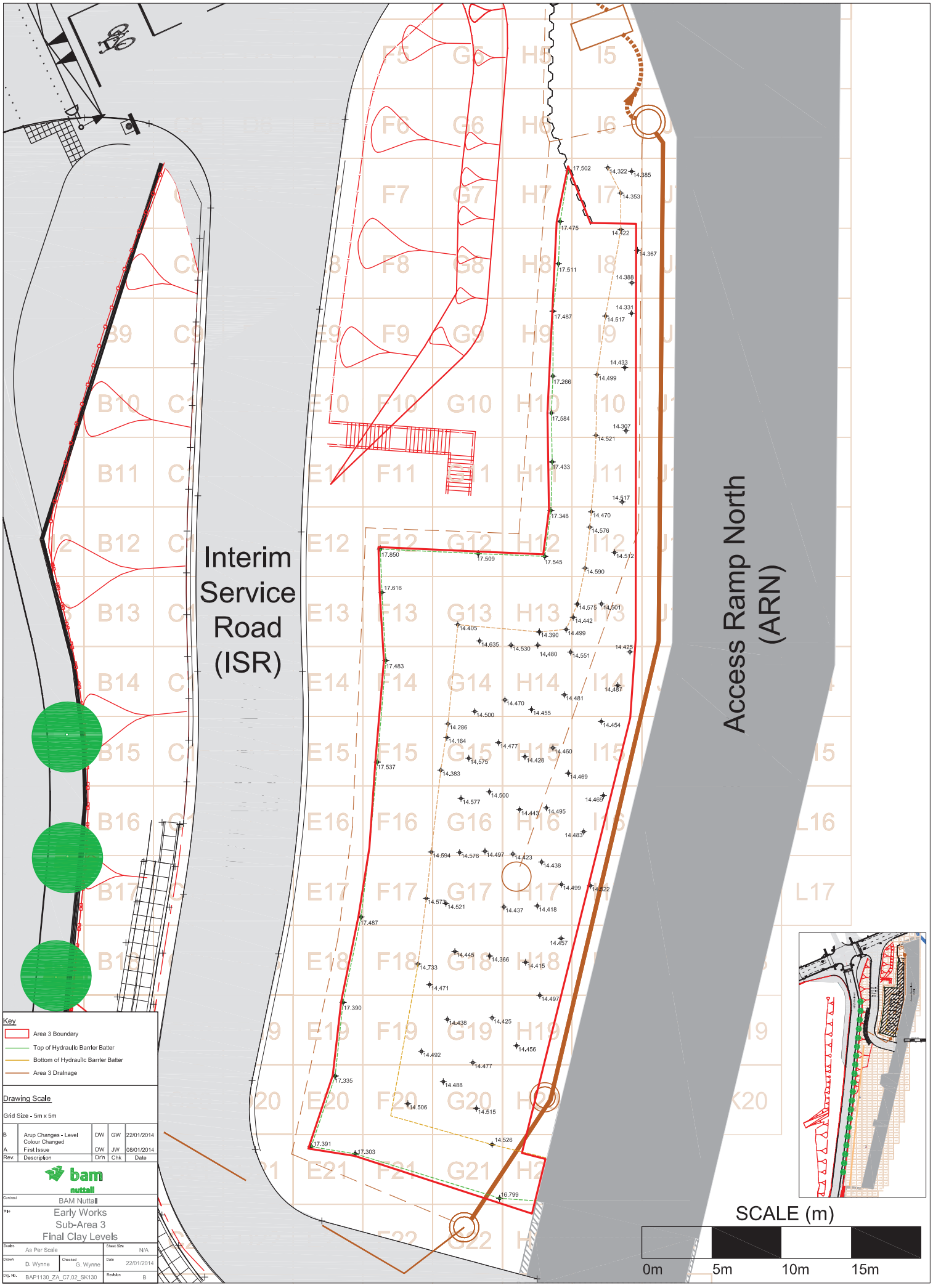
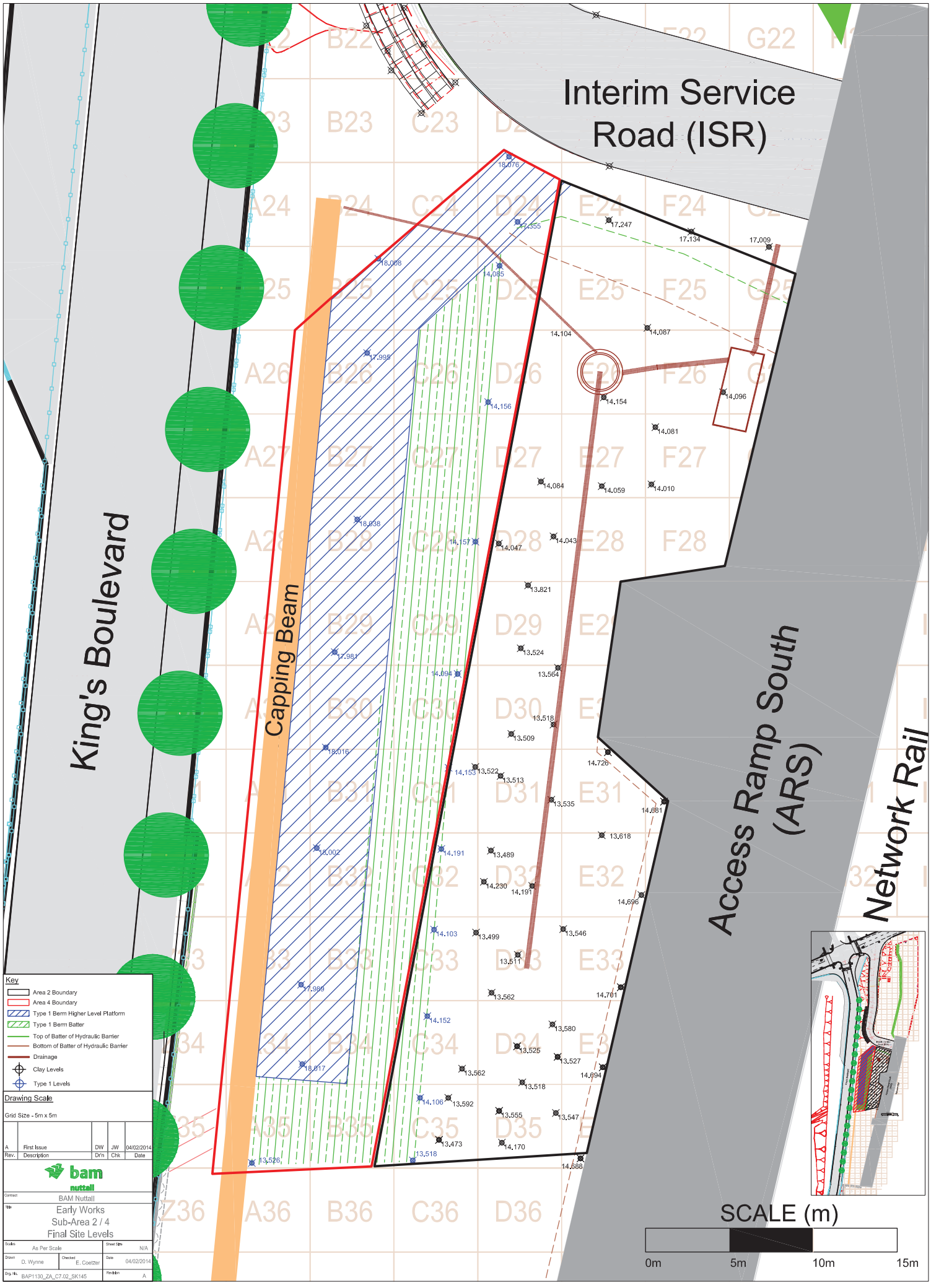

Interim Service Road (ISR)
Access Ramp North (ARN)
Key
Area 3 Boundary
Top of Hydraulic Barrier Batter
Bottom of Hydraulic Barrier Batter
Area 3 Drainage
Drawing Scale
Grid Size - 5m x 5m
B Arup Changes - Level Colour Changed DW GW 22/01/2014
A First Issue DW JW 08/01/2014
Rev. Description Drn Chk Date
bam nuttall
Contract BAM Nuttall
Title Early Works Sub-Area 3 Final Clay Levels
Scales As Per Scale Sheet Size N/A
Drawn D. Wynne Checked G. Wynne Date 22/01/2014
Drg. No. BAP1130_ZA_C7.02_SK130 Revision B
SCALE (m)
0m 5m 10m 15m



Key

- Area 2 Boundary
- Area 4 Boundary
- Type 1 Berm Higher Level Platform
- Type 1 Berm Batter
- Top of Batter of Hydraulic Barrier
- Bottom of Batter of Hydraulic Barrier
- Drainage
- Clay Levels
- Type 1 Levels

Drawing Scale

Grid Size - 5m x 5m

Rev.	Description	Drn	Chk	Date
A	First Issue	DW	JW	04/02/2014

bam nuttall

Contract: BAM Nuttall

Title: Early Works Sub-Area 2 / 4 Final Site Levels

Scale: As Per Scale		Sheet Size: N/A	
Drawn: D. Wynne	Checked: E. Coetzer	Date: 04/02/2014	
Dwg No: BAP1130_ZA_C7.02_SK145		Revision: A	

Appendix B

Hanson Aggregates Material Data Sheet

Hanson Aggregates

General Output

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□

GRADATION ANALYSIS TEST REPORT
for Product: 064B544/ 4/40 Gc90/15
Supplier/ source: 064/Whatley Quarry

Material type: BS EN 12620 Test method: Dry grading to BS EN 933-1

SAMPLE INFORMATION

Sampled/ tested
Thu 12 December 2013/ 16-12-13
at 1010 hrs

Sample number	SWE28369AGG		
Sample Origin	STOCK / RLO	Ticket No.	-
Sampler	AC9008	Site/Client Address	-
Your Sample Ref.	340659	Aggregate type	L
Oven No.(Lab only)	23	Tag No.(Lab only)	751 / 407

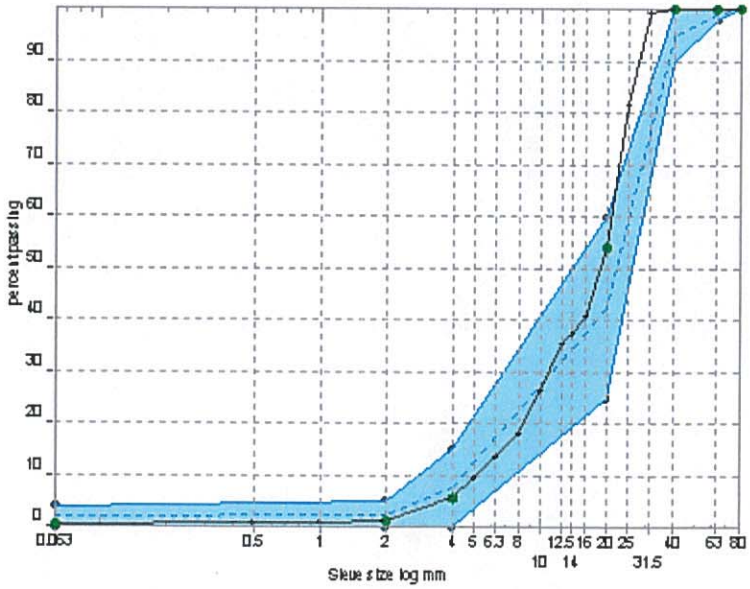
SAMPLE ANALYSIS

Sieve size	Percent passing	Specification limits	Complies ?
80mm	100	100 - 100	yes
63mm	100	98 - 100	yes
40mm	100	90 - 100	yes
31.5mm	99	-	-
25mm	81	-	-
20mm	54	25 - 60	yes
16mm	41	-	-
14mm	37	-	-
12.5mm	35	-	-
10mm	27	-	-
8mm	18	-	-
6.3mm	14	-	-
5mm	9	-	-
4mm	6	0 - 15	yes
2mm	1	0 - 5	yes
1mm	1	-	-
0.500mm	1	-	-
0.063mm	0.4	0.0 - 4.0	yes
Moisture content %	3.0	not specified	-
Flakiness index	no result	<=35	-

Parameters are evaluated to the accuracy of spec. limits

REMARKS

Compliance status ok
Category A of A-C includes secondary parameters

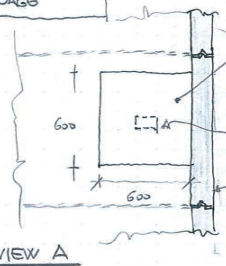


Signed _____□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□ Date ___/___/2014

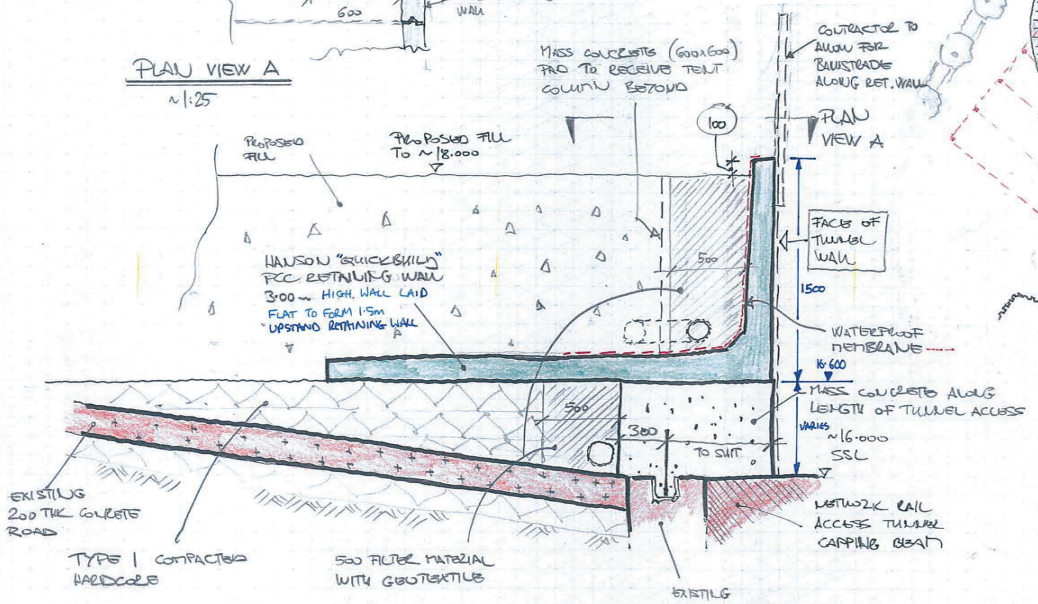
Appendix C

Temporary Retaining Wall Drawing

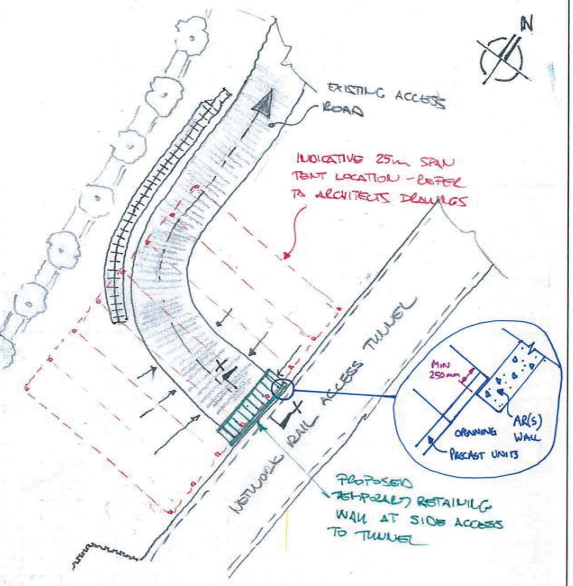
GENERAL NOTES:
- REFER TO ARUP SPECIFICATIONS FOR FILL AND DRAINAGE



PLAN VIEW A
~1:25



TYPICAL SECTION (X-X)
~1:25



SITE PLAN
~1:500

PROPOSED RETAINING WALL DETAILS

MASS CONCRETE GRADE TO BE MIN GEN 3

ARUP	Axo Sheet	
Sketch Title	PROPOSED RETAINING WALL DET.	
Job Title	RAILWAY CHILDREN	
Job No. 233634	Sketch No. SK-16	Rev.
Made by RR	Date 23/09/14	Chd. CCH

Appendix D

Environmental Testing Requirements

D1 Chemical Requirements

Samples of granular fill used to construct the raised platform shall be sampled and tested for the 'General Suite of Contaminants' as set out in Table A1 below.

Table A1 General Suite of Contaminants

Parameter	Accreditation	Laboratory Method
pH value	MCERTS	Potentiometric
Moisture Content	None	Gravimetric
Carbon (TOC)	MCERTS	Titrimetric
Loss on Ignition@ 450oC	MCERTS	Gravimetric
Stone Content	None	Gravimetric
Elemental Sulphur	None	GCMS
Sulphate (as SO4) - Water Soluble (2:1)	MCERTS	ICP-OES
Chloride - Water Soluble (2:1)	MCERTS	Titrimetric
Asbestos Screen	ISO17025	Stereobinocular Microscope
Ammonium (NH4+)	MCERTS	ISE
Particle size distribution	BS1377.	Sub-contracted
Arsenic	MCERTS	ICP-OES
Beryllium	MCERTS	ICP-OES
Boron	MCERTS	ICP-OES
Barium	MCERTS	ICP-OES
Cadmium	MCERTS	ICP-OES
Chromium	MCERTS	ICP-OES
Copper	MCERTS	ICP-OES
Lead	MCERTS	ICP-OES
Mercury	MCERTS	ICP-OES
Nickel	MCERTS	ICP-OES
Anitmony	MCERTS	ICP-OES
Selenium	MCERTS	ICP-OES
Vanadium	MCERTS	ICP-OES
Zinc	MCERTS	ICP-OES
Hexavalent chromium	MCERTS	Skalar CFA
Phenols (total)	MCERTS (Monohydric)	HPLC
Cyanide total	MCERTS	Skalar CFA
Total Petroleum Hydrocarbons (TPH CWG) with BTEX and MTBE	MCERTS	GC/MS-
Speciated & Total Polyaromatic Hydrocarbons (USEPA 16)	MCERTS	GC/MS

A minimum of 1 sample shall be tested for each source and the results supplied prior to any placement of fill at the site from that source. Additional sampling and testing shall be at a minimum rate of 1 sample/1,000m^3 placed.

The results of the testing shall be compared to the Zone A Remediation Validation Criteria given in Table below (where a limiting criteria is given). Samples shall be

deemed acceptable if the measured concentration is less than the criteria in Table A2. If any results exceed the validation criteria the source material shall not be used unless a qualitative/semi-quantitative risk assessment acceptable to the Environ (UK) Limited is provided by the Contractor.

Table A2 Remediation Validation Criteria

Parameter	Units	Validation Criteria
Inorganics		
Total Cyanide	mg/kg	78
BTEX		
Benzene	mg/kg	28
Toluene	mg/kg	200
Ethylbenzene	mg/kg	200
Xylenes (total)	mg/kg	200
Petroleum Hydrocarbons		
TPH Aliphatic EC5-EC6	mg/kg	3,380
TPH Aliphatic >EC6-EC8	mg/kg	1440[(a)]
TPH Aliphatic >EC8-EC10	mg/kg	780[(a)]
TPH Aliphatic >EC10-EC12	mg/kg	480[(a)]
TPH Aliphatic >EC12-EC16	mg/kg	240[(a)]
TPH Aliphatic >EC16-EC35	mg/kg	6500[(b)]
TPH Aliphatic >EC35-EC44	mg/kg	6500[(b)]
TPH Aromatic >EC8-EC10	mg/kg	3670
TPH Aromatic >EC10-EC12	mg/kg	3620[(a)]
TPH Aromatic >EC12-EC16	mg/kg	1680[(a)]
TPH Aromatic >EC16-EC21	mg/kg	6500[(b)]
TPH Aromatic >EC21-EC35	mg/kg	6500[(b)]
TPH Aromatic >EC35-EC44	mg/kg	6500[(b)]
Polyaromatic Hydrocarbons		
Acenaphthene	mg/kg	567[(a)]
Acenaphthylene	mg/kg	855[(a)]
Anthracene	mg/kg	2000[(b)]
Benz(a)anthracene	mg/kg	90
Benzo(a)pyrene	mg/kg	14
Benzo(b)fluoranthene	mg/kg	100
Benzo(k)fluoranthene	mg/kg	140
Benzo(ghi)perylene	mg/kg	650
Chrysene	mg/kg	135
Dibenzo(ah)anthracene	mg/kg	13
Indeno(123-cd)pyrene	mg/kg	60
Fluoranthene	mg/kg	2000[(b)]
Fluorene	mg/kg	308[(a)]
Naphthalene	mg/kg	204
Phenanthrene	mg/kg	2000[(b)]
Pyrene		2000[(b)]
Total PAH	mg/kg	2,000[(b)]
Phenols		
Phenol	mg/kg	500

(a) Ten times saturation limit

(b) Value capped based on professional judgement (visual and olfactory issues)

The Contractor must allow sufficient time for the sampling, analysis and decision making process required to meet the design objectives. A standard turnaround for the chemical analysis of soil samples is ten working days. A contract must be set up in advance with a UKAS accredited laboratory.

D2 Laboratory Standards

The Contractor shall provide the following information in advance of the Works for approval by the ENVIRON (UK) LIMITED.

- Details on the laboratories accreditation to ISO 17025.
- Confirmation that the soil analysis specified for the verification of the remediation with be undertaken in accordance with MCERTS. If the soils analysis cannot be undertaken in accordance with MCERTS the reason why should be stated.
- State the analyses for which the laboratory holds UKAS accreditation for in respect to the detection limits stated in **Error! Reference source not found.**.
- Details on the laboratory procedures for quantifying analytical errors, eg running replicate samples, standards and blanks.
- Details of whether the analytical methods are fully validated and documented with assigned uncertainty values.
- Samples shall be kept cold (below a maximum of 6°C) and transferred to the lab within 24 hours of sampling, unless agreed otherwise by the ENVIRON (UK) LIMITED.
- Samples shall be received at the laboratory and analysed within the holding times required for each analysis, as specified by the laboratory. Samples must be received by the laboratory within the temperature range specified by the laboratory. Holding times and temperature on receipt by the laboratory must be reported to the ENVIRON (UK) LIMITED within 1 week of samples being obtained. Results from deviant samples (i.e. samples held outside the required holding times or received at temperatures outside the required temperature range) will not be accepted and shall be re-sampled on site.

Any asbestos analysis shall be undertaken in accordance with the methodology presented in **Error! Reference source not found.**.

All chemical analyses shall be undertaken to the method detection limits specified in **Error! Reference source not found.**.

D3 Waste and Materials Management

No material classified as a ‘waste’ shall be imported onto the Site, either for use in temporary works or for incorporation into the permanent platform works.

Where the CONTRACTOR intends to or is required to discard soils, materials or waters/sludges that are removed from the Site, they are classified as a waste under the Waste Framework Directive.

Wastes that require disposal or treatment off-site shall undergo waste classification assessment and waste acceptance criteria assessment, as necessary, to determine the appropriate disposal route and facility.

Records of wastes sent off site shall be kept on site for inclusion within the Verification Report.

The CONTRACTOR shall prepare a Site Waste Management Plan (SWMP) for the works, and shall:

- Obtain relevant information from subcontractors and waste receivers;
- Ensure that subcontractors are appropriately licensed to carry out waste classification and handling activities;
- Ensure that all appropriate permits are in place to transfer waste from the Site;
- Keep the SWMP on site during the project;
- Keep the SWMP up-to-date;
- Ensure that other contractors know where the SWMP is kept;
- Allow other contractors and the client access to the SWMP during the project; and
- Keep the SWMP for two years after the completion of the project.

The SWMP is required to contain the following information:

- The types of waste removed from the site;
- The identity of the person who removed the waste and their waste carrier registration number;
- A description of the wastes;
- Details of the site that the waste was taken to; and
- Details of the Environmental Permit or exemption held by the site where the material is taken.

D4 Verification

D4.1 Verification Report Detailed Data Requirements

The Contractor shall be required to keep detailed records for inclusion in a Verification Report. Examples of the information required are given below:

- Material movement and material import inspection records.
- Waste Disposal Transfer Notes and summary.
- Haulage contractor licences.
- Copies of Environmental Permits and confirmation of their surrender.
- Raw chemical and geotechnical laboratory and field testing results.

- Details of permits held and confirmation that they have been surrendered.
- Results of ambient monitoring.
- Supervisor's weekly reports.
- Site photographs of all activities.
- 'As built' drawings of fill, retaining walls, and drainage, to include depths, materials etc.

D4.2 Data Management

All the required data for the Verification Report shall be stored electronically. The final data management system shall be agreed with ENVIRON (UK) LIMITED and Arup. The Contractor shall provide a nominated document controller to manage the data and provide responses to any data queries from ENVIRON (UK) LIMITED and Arup.

D5 Laboratory Method Detection Limits

Parameter	Detection level
Soil Samples - metals	
Arsenic	1 mg/kg
Cadmium	0.5 mg/kg
Chromium	10 mg/kg
Chromium - hexavalent	5 mg/kg
Copper	10 mg/kg
Lead	10 mg/kg
Mercury	0.5 mg/kg
Nickel	10 mg/kg
Selenium	0.5 mg/kg
Zinc	10 mg/kg
Antimony	0.1 mg/kg
Barium	1 mg/kg
Beryllium	1 mg/kg
Iron	10 mg/kg
Manganese	5 mg/kg
Molybdenum	0.5 mg/kg
Vanadium	0.5 mg/kg
Organotins (dibutyltin/tributyl-tin/tetrabutyltin/triphenyl-tin)	0.1mg/kg
Soil Samples - non metal inorganics	
Asbestos (identification and quantification) refer to method A1 below	0.001%w/w
Cyanide - total	5 mg/kg
Cyanide - thiocyanates*	5 mg/kg
pH	0.1 units
Sulphate - total	200 mg SO4/kg
Sulphate - 2:1 extract	0.1 g SO4/l

Free Sulphur	100 mg/kg
Sulphides	10 mg/kg
Boron (water soluble)	0.5 mg/kg
Chloride	5 mg/kg
Fluoride	0.1 mg/kg
Soil Samples - organics	
Phenols - total	1 mg/kg
Phenols - monohydric*	1 mg/kg
Mineral oils (by IR)	50 mg/kg
Polyaromatic Hydrocarbons (USEPA Priority 16 PAHs speciated and totalled by CGMS)	0.2 mg/kg
Total Petroleum Hydrocarbons* (C8 to C40 by GC FID)	50 mg/kg
Diesel Range Organics (C10 to C26)	50 mg/kg
Petrol Range Organics (C5 to C10)	1 mg/kg
BTEX (by GCMS)	0.05 mg/kg
Polychlorinated Biphenyls	0.005 mg/kg
Semi-Volatile Hydrocarbons (by GC-MS with speciation of compounds)	0.01 mg/kg
Volatile Hydrocarbons (by GC-MS with speciation of compounds)	0.01 mg/kg
TPH by GC-FID with aliphatic and aromatic class separation and carbon banding Aliphatic - C5-C6 ,C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, Aromatic - C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44	10 mg/kg
Total Organic Carbon (ASTM D2974-87)	0.1% w/w
Loss On Ignition	0.1% w/w
Herbicides including atrazine and simazine	0.01mg/kg
Organ-chlorine pesticides including 'drins'	0.01mg/kg
Water Samples - general properties	
pH value	0.1 pH units
BOD	2 mg O2/l
COD	10 mg O2/l
Alkalinity	2 mg/l
Hardness	2 mg/l
Water Samples - metals	
Arsenic	5 µg As/l
Cadmium	1 µg Cd/l
Chromium	5 µg Cr/l
Chromium - hexavalent	10 µg Cr/l
Copper	10 µg Cu/l
Lead	4 µg Pb/l
Mercury	0.1 µg Hg/l
Nickel	10 µg Ni/l
Selenium	5 µg Se/l
Zinc	8 µg Zn/l
Calcium	10 µg Ca/l

Iron	10 µg Fe/l
Magnesium	30 µg Mg/l
Manganese	10 µg Mn/l
Sodium	10 µg Na/l
Potassium	10 µg K/l
Antimony	5 µg /l
Beryllium	5 µg /l
Vanadium	5 µg /l
Organotins (dibutyltin/tributyl-tin/tetrabutyltin/triphenyl-tin)	0.02 µg /l
Water Samples - non metal inorganics	
Ammoniacal nitrogen	0.01 mg N/l
Chlorides	20 mg Cl/l
Cyanide - total	30 µg CN/l
Cyanide - ferro and ferri-cyanide*	30 µg CN/l
Cyanide - free*	30 µg CN/l
Cyanide - thiocyanates*	30 µg CN/l
Sulphates	2000 µg SO4/l
Sulphides	200 µg S/l
Nitrate	0.3 mg/l
Nitrite	0.01 mg/l
Water Samples - organics	
Phenols - total (monohydric)	20 µg C6H5OH/l
Phenols - specialised by HPLC*	0.5 µg C6H5OH/l
Mineral Oils by IR	100 µg/l
Total Petroleum Hydrocarbons (C8 to C40 by GC-FID)	50 µg/l
Diesel Range Organics (C10 to C26 by GC-FID)	50 µg/l
Petrol Range Organics (C5 to C10 by GC-FID)	50 µg/l
Volatile Organics (by GC-MS with speciation)	1 µg/l
Semi-Volatile Organics (by GC-MS with speciation)	1 µg/l
BTEX	1 µg/l
Polyaromatic Hydrocarbons (16 USEPA by GCMS)	0.05 µg PAH/l
TPH by GC-FID with aliphatic and aromatic class separation and carbon banding	50 µg/l
Herbicides including atrazine and simazine	0.01 µg/l
Organ-chlorine pesticides including ‘drins’	0.01 µg/l

D6 Asbestos Analysis Method A1

D6.1 Initial Stereo-binocular/PLM - Screening Stage

Each sample is thoroughly mixed, spread across a clean plastic tray and examined visually for the presence of asbestos. Any obvious asbestos material (asbestos cement, pieces of loose lagging etc.) is removed by hand picking and set aside for weighing.

The samples in which asbestos is detected are dried and weighed along with any materials removed to determine the proportion of asbestos in the original soil sample. The asbestos content of the asbestos containing materials (ACM) is determined by comparison with standard reference materials and reference to MDHS 100 (HSE, 2001).

A representative sub-sample of approximately for each soil is selected by coning and quartering. These samples are analysed visually under stereo binocular microscope and by Polarised Light Microscopy (PLM) using the method described in HSG 248 (HSE, 2005).

D6.2 Quantitative Phase Contrast Microscopy Assessment

Approximately 1gram of each sample is transferred to a clean 500ml conical flask and 300mls of filtered distilled water added. The sample/water mixture shall be agitated for 20 seconds and allowed to stand for ten seconds. After sedimentation time, aliquots shall be removed from just below the liquid surface and deposited onto a 0.8µm pore size blank tested membrane filter. The filters shall be carefully dried, cleared and fixed onto glass microscope slides using the acetone/triacetin method described in HSG 248 (HSE, 2005).

Two microscope slides shall be produced from each sample and the estimated mass percentage calculated as the mean of the two results for each sample.

The Phase Contrast Microscopy (PCM), shall be based closely on HSG 248 (HSE, 2005) including reagents, equipment and filter clearing and mounting. A specific Walton-Beckett graticule shall be used for fibre sizing.

A countable fibre for the purpose of estimating the asbestos mass percentage is defined as an amphibole asbestos or chrysotile fibre. Non-asbestos fibres shall not also be counted.

The fibre dimensions (length and diameter [µm]), number of ends falling in the graticule and fibre identity shall be recorded for each individual countable fibre. Measurements recorded to the nearest 5µm for length and to the nearest 0.5µm for diameter, up to a maximum of 5µm. The identity of each fibre shall be recorded as amphibole or chrysotile where possible. Fibre identification shall be based on morphology and optical properties determined by PLM.

The overall mass percentage of asbestos is given by the formula below:

$$A\ W\ (\Sigma V\ p^{A}\ + \Sigma V\ p^{C}\ )\ x\ 100/\ a\ N\ q\ S$$

pA = average density of amphibole asbestos (3.0 x 10-6µg µm-3)
pc = density of chrysotile (2.5 x 10-6µg µm-3)
A = area of filter (mm2)
V = volume of fibre (µm3)
a = area of graticule (mm2)
W = volume of water in suspension (ml)
N = number of graticules evaluated
S = weight of soil in suspension (µg)
q = aliquot on filter (ml)

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