

ALLTERRA



CONSTRUCTION & ENVIRONMENTAL

ESQUIMALT HARBOUR



POST IN-SITU DRILLING PROGRAM TO IDENTIFY "KIDNEY"

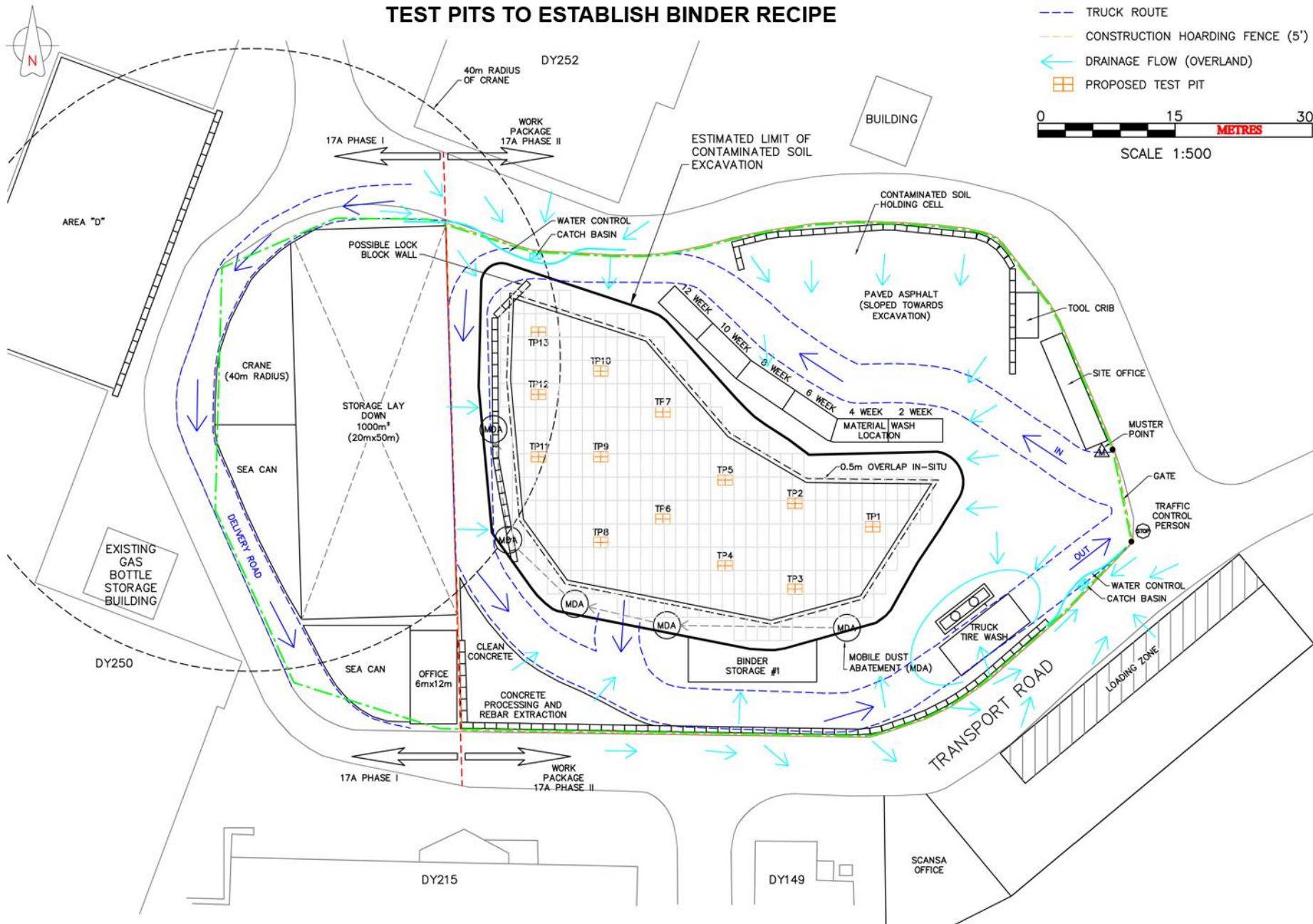
SOIL CLASSIFICATION THROUGH EX-SITU SOIL SAMPLING FROM TEST PITS TO ESTABLISH BINDER RECIPE

LEGEND

- LIMIT OF CONSTRUCTION (FENCED FOR WORK PACKAGE 17A PHASE II)
- TRUCK ROUTE
- CONSTRUCTION HOARDING FENCE (5')
- DRAINAGE FLOW (OVERLAND)
- PROPOSED TEST PIT

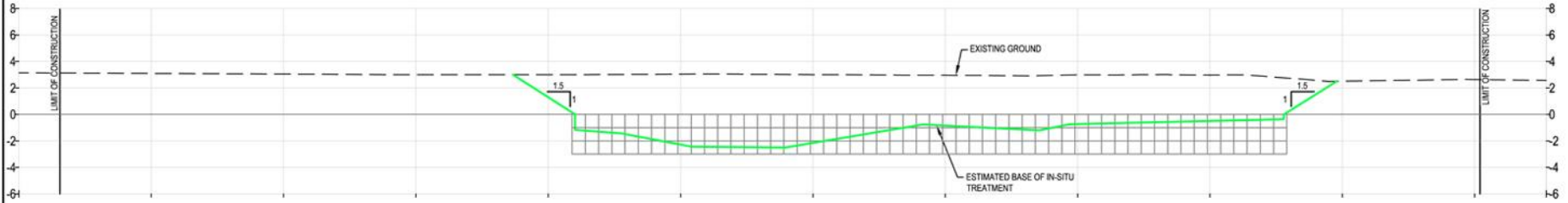


SCALE 1:500

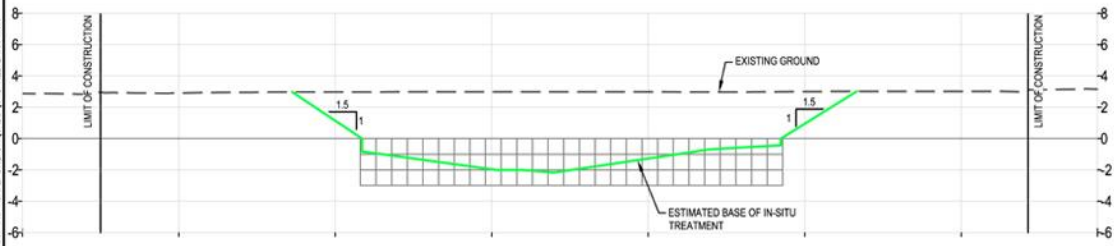




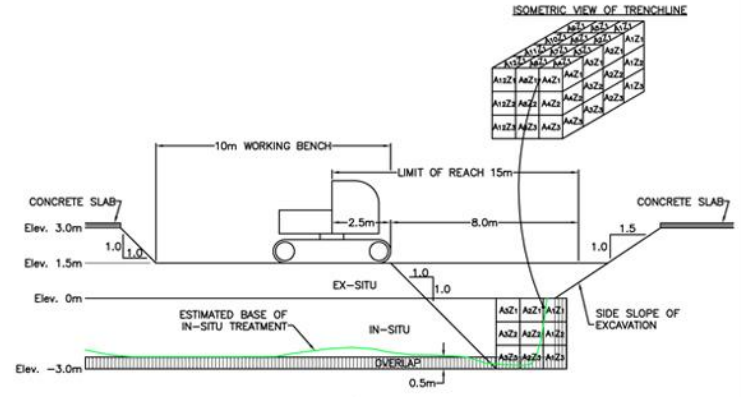
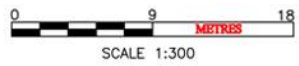
CROSS SECTION OF "KIDNEY"



A SECTION
SCALE: 1:300H 1:300V



B SECTION
SCALE: 1:300H 1:300V



C SECTION
SCALE: N.T.S.



TITLE: CROSS SECTIONS FMF CAPE BRETON PHASE 5 WORK PACKAGE 17A			
DWN BY: GM	DWG NAME: 648A-6	DATE: 2014-03-31	FIGURE 6
CHKD: DM	PLOT:	CADFILE: 648	

PATH: C:\USERS\GLENMORA\PROPOSAL (ACTIVE EARTH)\DWARDS PROJECTS\17A - ALLTERRA FMF CAPE BRETON\CADD\648 ALLTERRA 17A

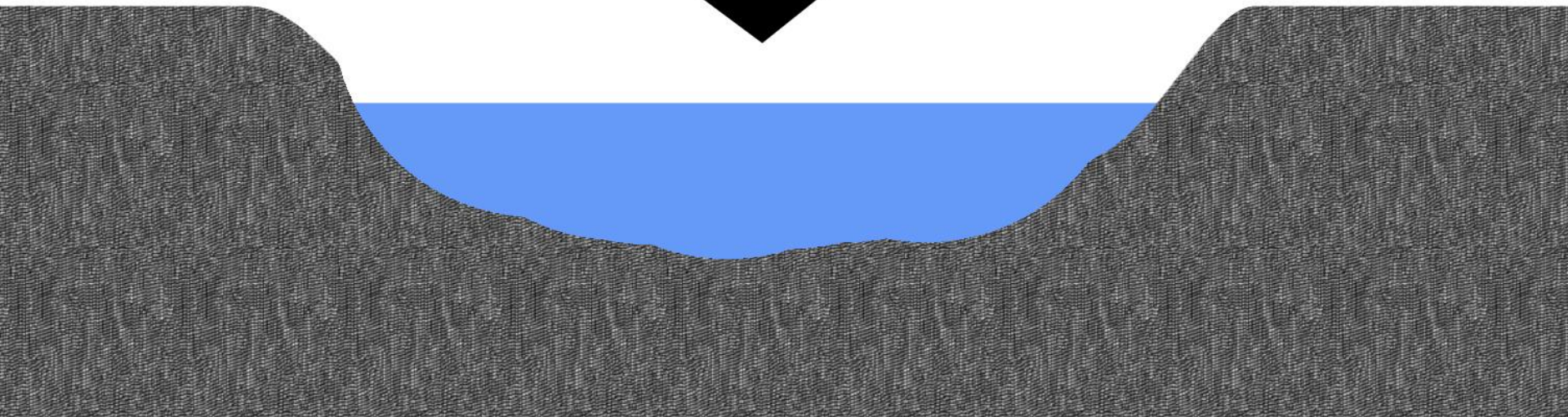
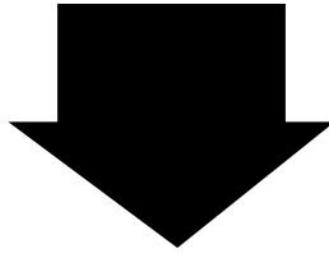
INFILLED COVE

BLASTING BEDROCK

SCRAP METAL

SHIPYARD WASTE

WELDING SLAG





DEERE

450C LC



JOHN DEERE

Link-Belt

330W

3









ENVIRONMENTAL

**LEACHABLE METALS
HYDRO CARBONS
PCBS**

GEOTECHNICAL

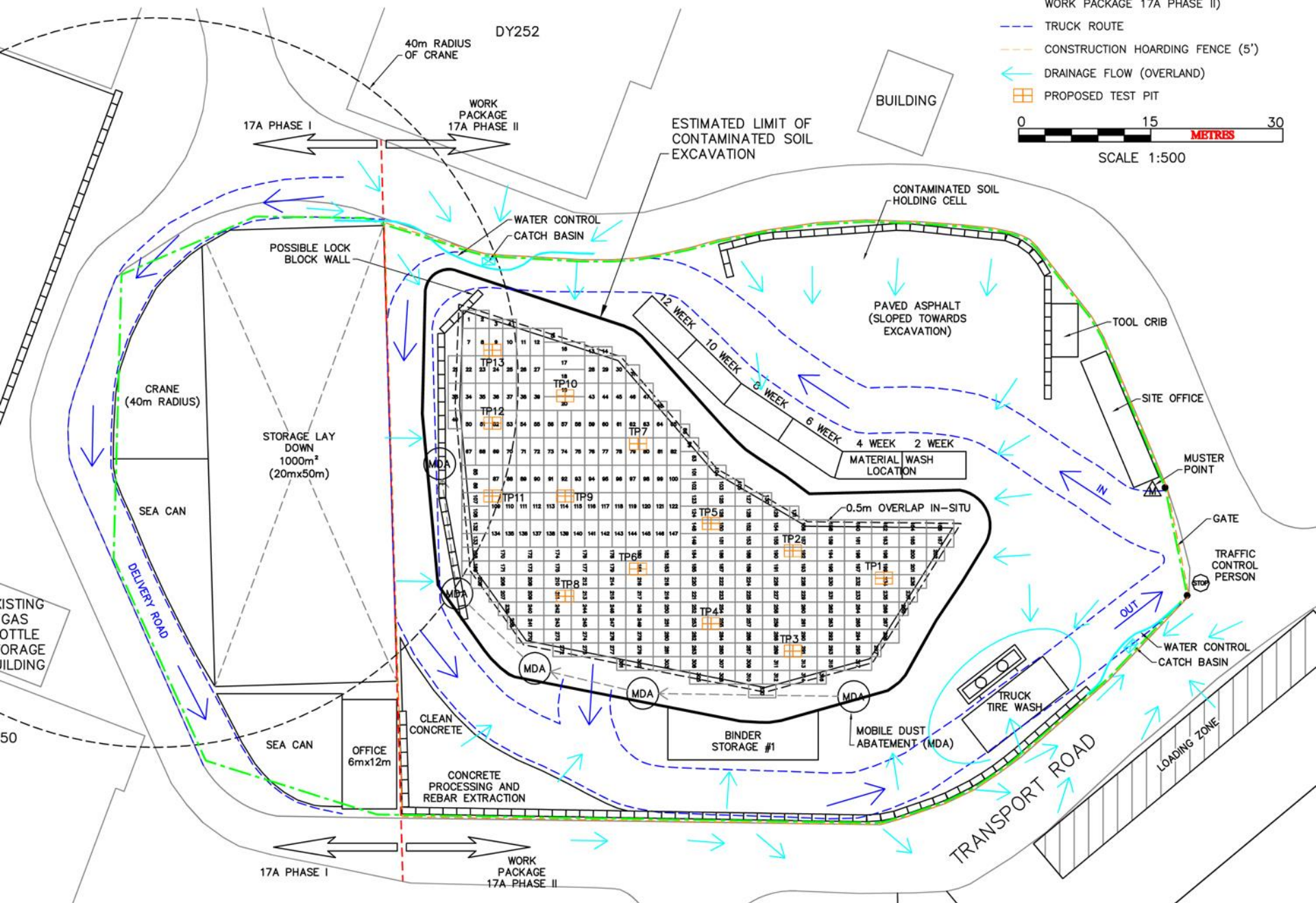
SOFT SOIL



MASS STABILIZATION PLAN

LEGEND

- LIMIT OF CONSTRUCTION (FENCED FOR WORK PACKAGE 17A PHASE II)
 - TRUCK ROUTE
 - CONSTRUCTION HOARDING FENCE (5')
 - DRAINAGE FLOW (OVERLAND)
 - PROPOSED TEST PIT
- 0 15 30
METRES
SCALE 1:500





Harbour 1:1

y7	.	.	.	.	.	.

y5	.	.	.	.	.	.

13m	.	.	.	.	.	.

y1	.	.	.	.	.	.

x1 x5 x6

Working cell Selected cell

kg/m³ kg/m³

5%	97%
5%	101%
62%	106%
103%	97%
100%	99%

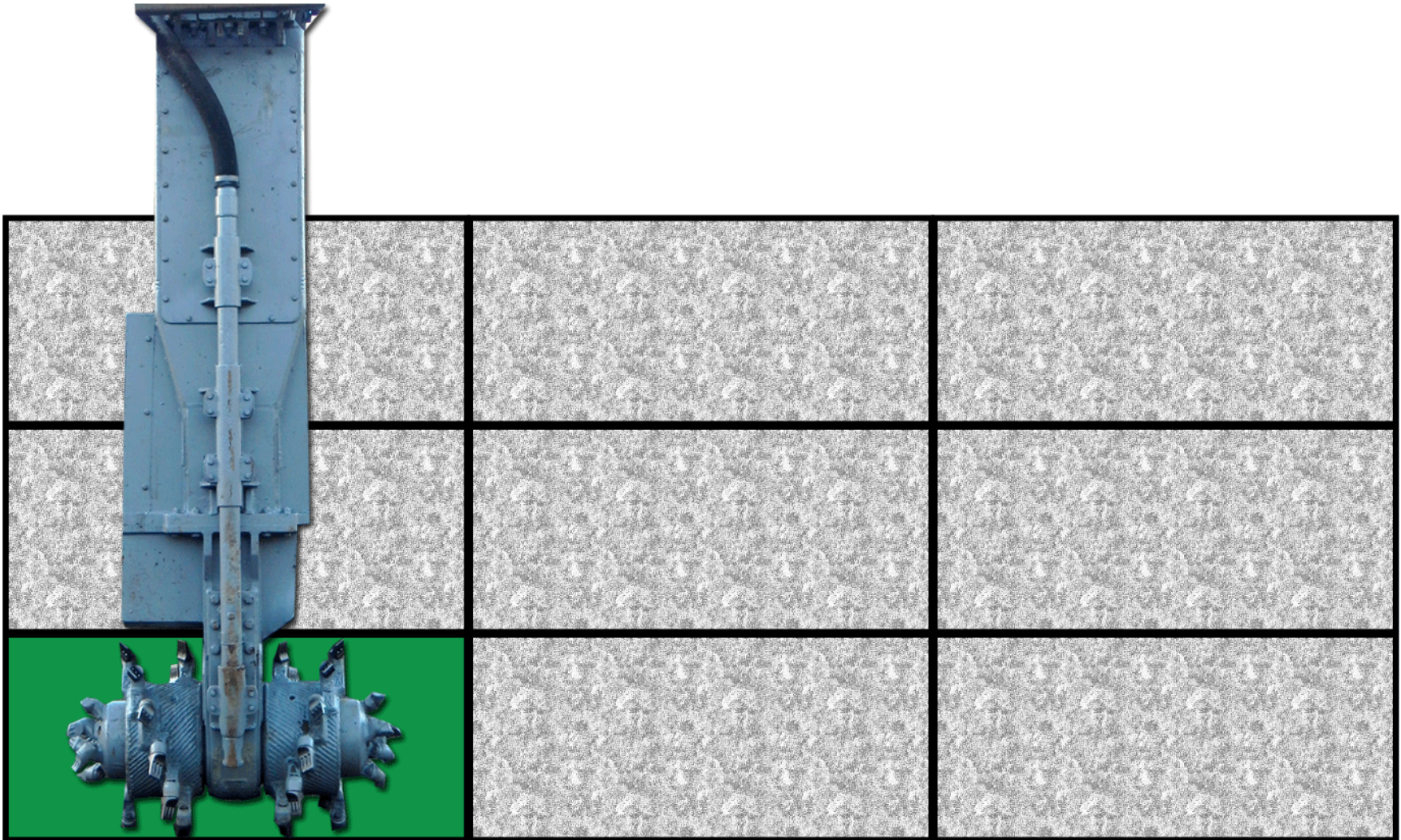
x=3 y=1 x=1 y=1

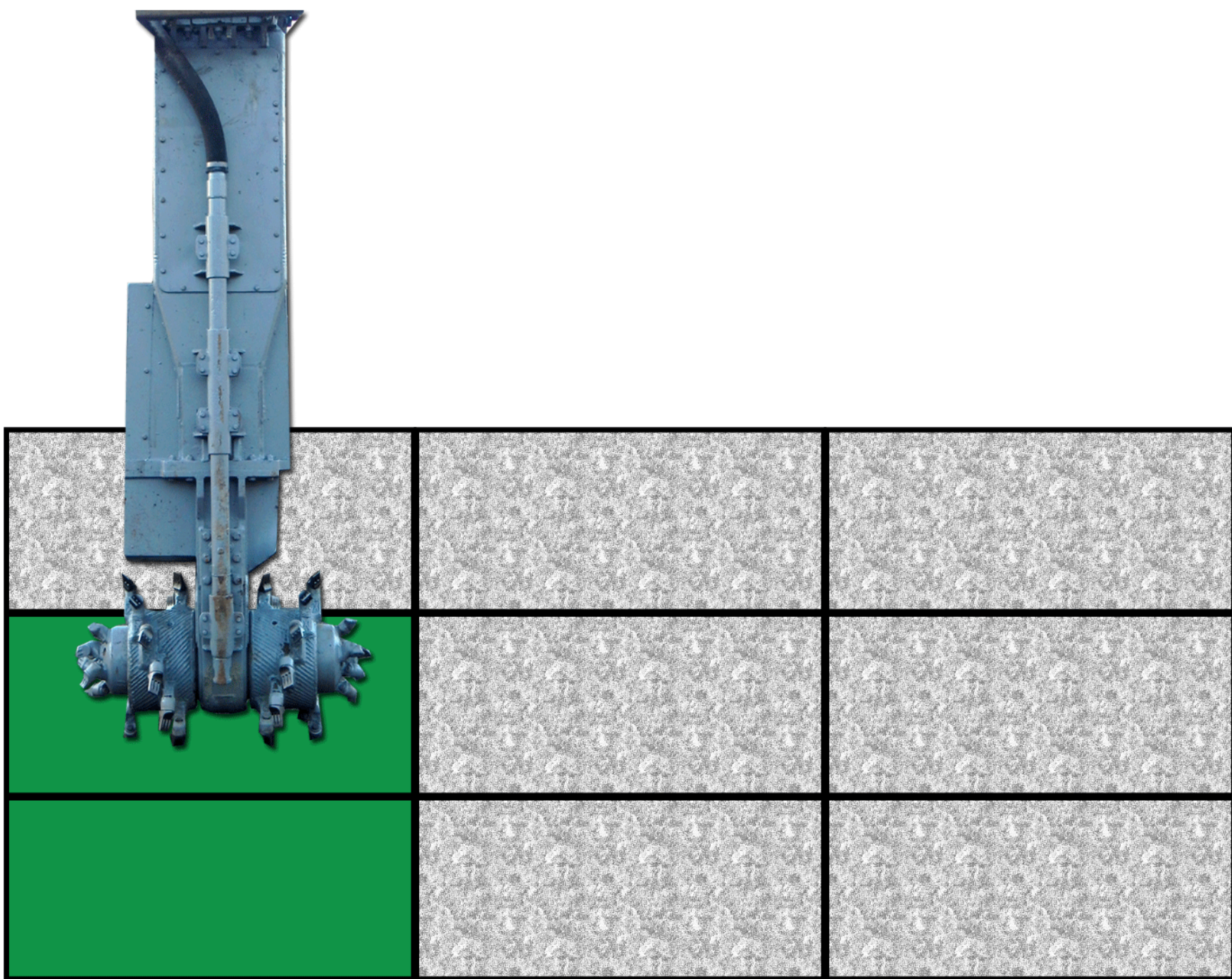
Number Of Satellites: 14

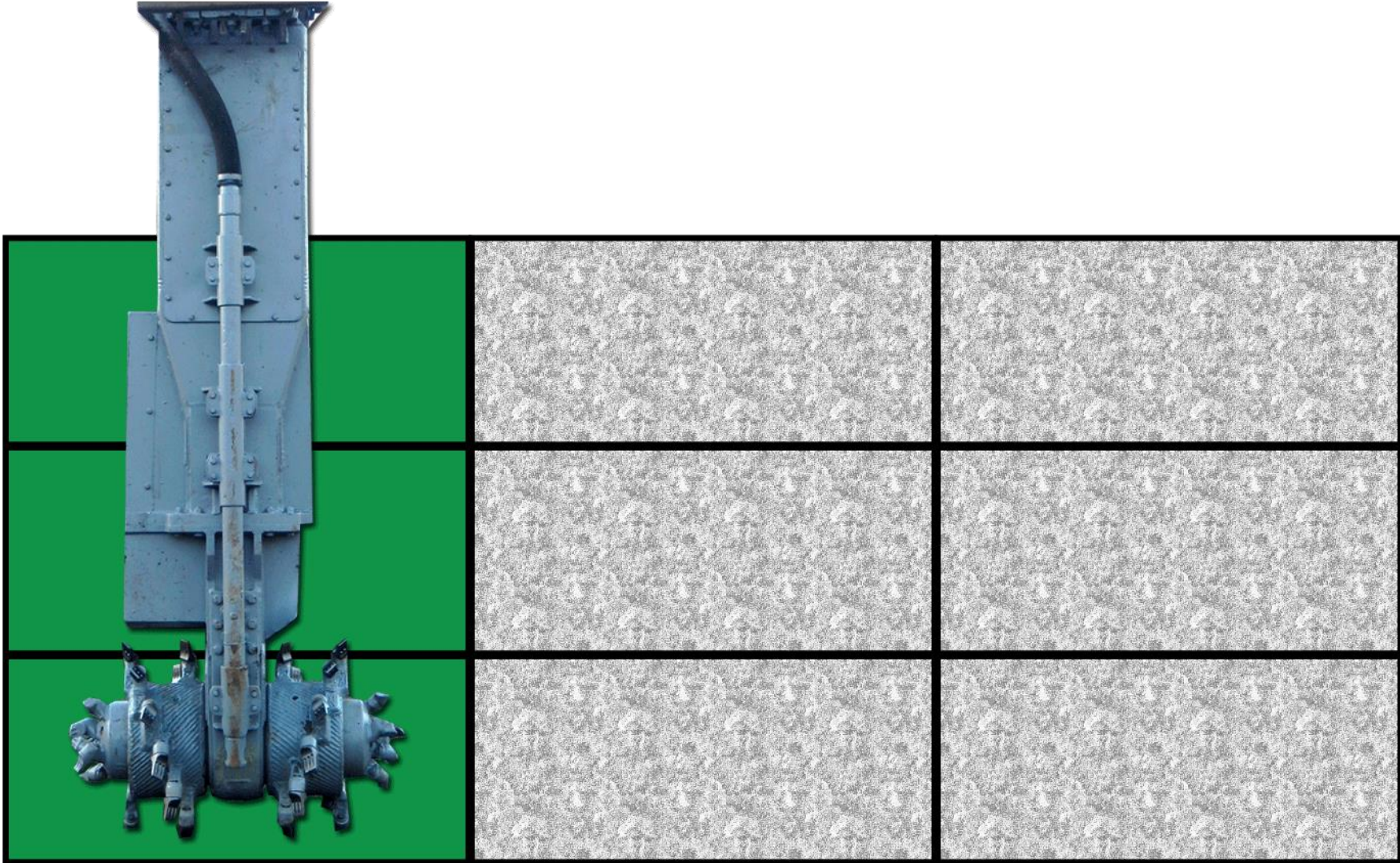
Tank 1 level: 61748 kg Current flow: 25,5 kg/s Machine heading: 0° Inclination: 0°

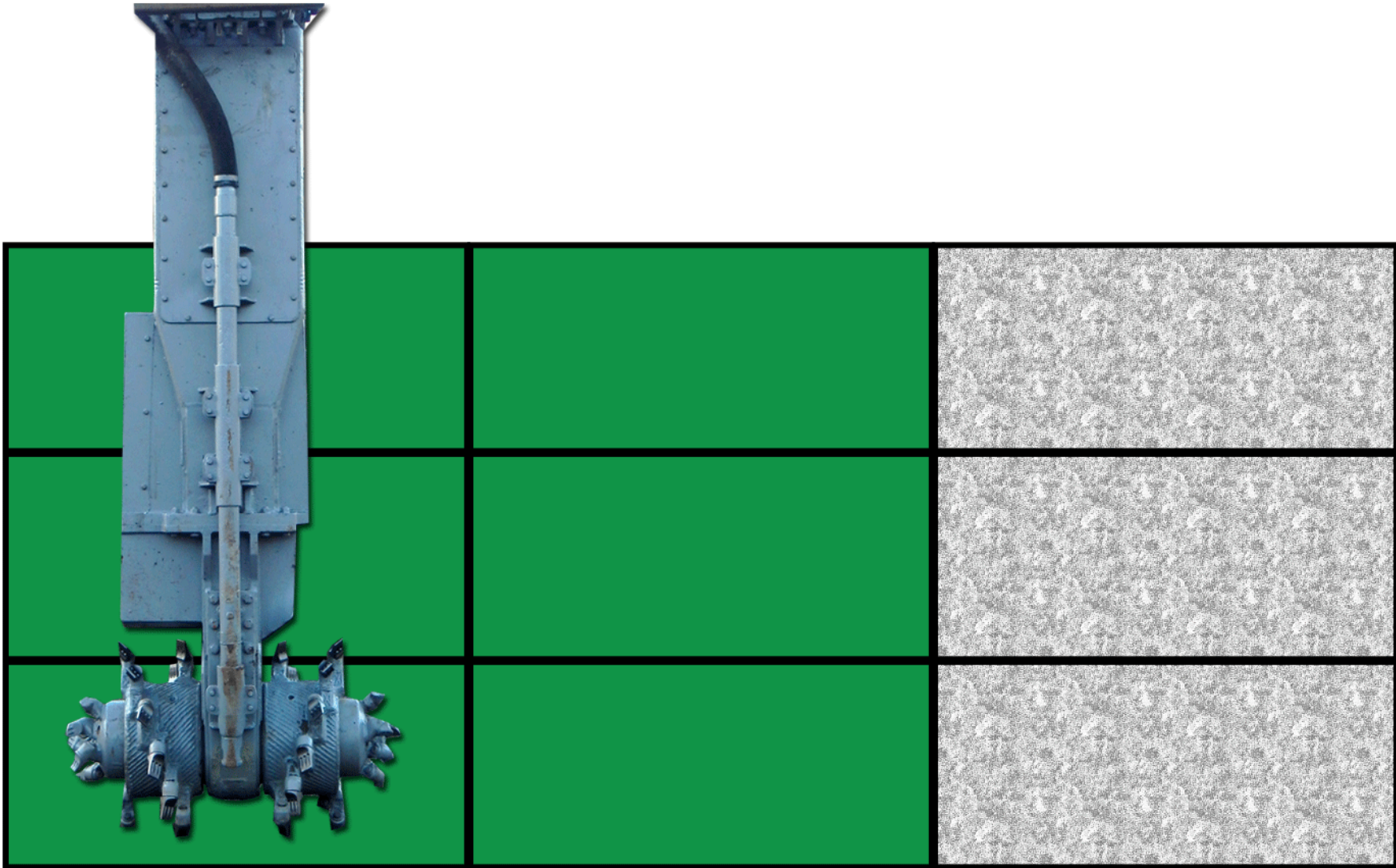
Tank 2 level: 257 kg

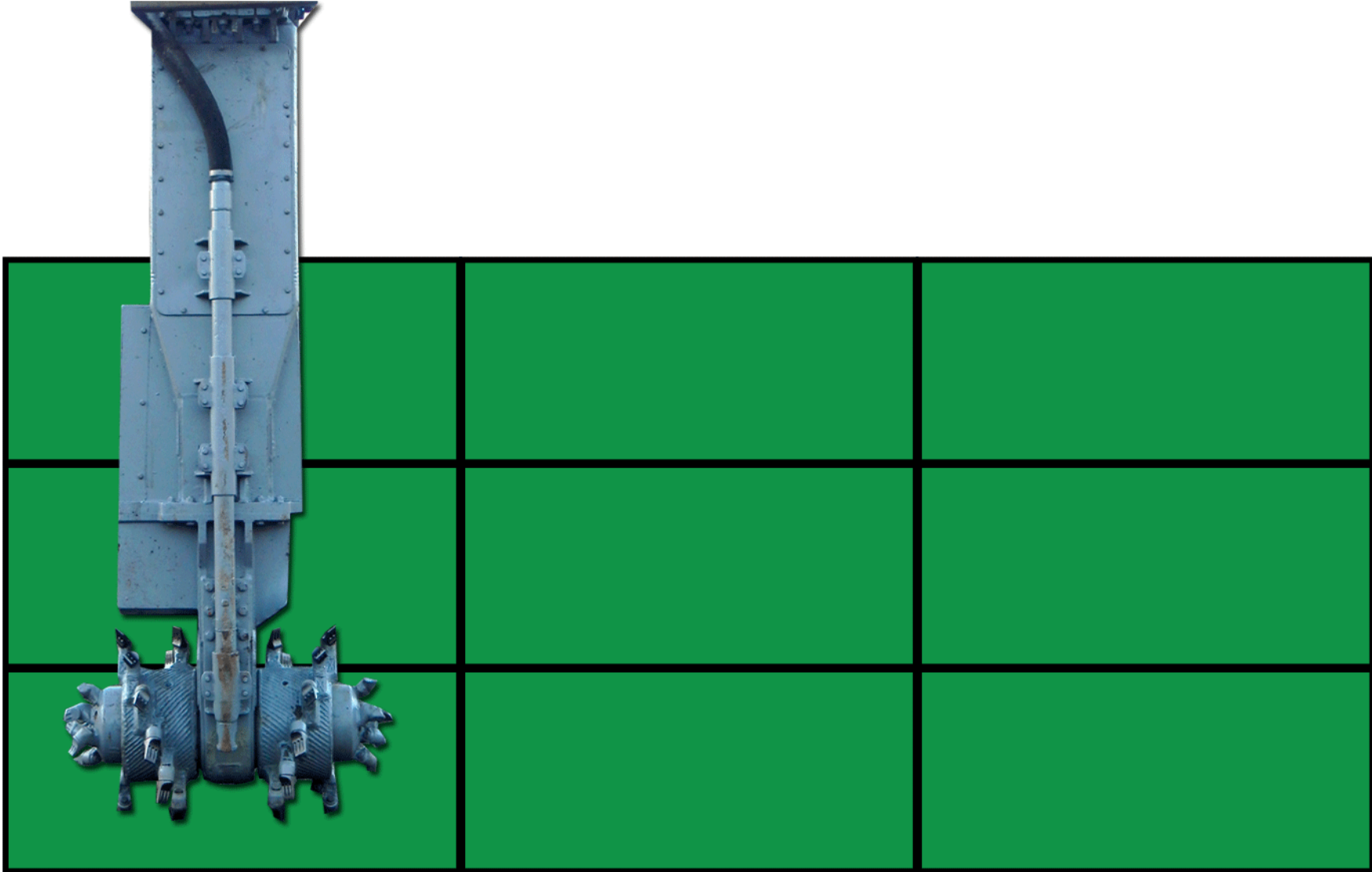














1.5m

1m

1/2m

DO NOT
REAR END
OPERATORS
OR MOUNTS ONLY

10

ALTEERRA
CAT
2400



RYZUK GEOTECHNICAL

ENGINEERING & MATERIALS TESTING

28 Crease Avenue
 Victoria, B.C.
 V8Z 1S3
 Tel: 250-475-3131
 Fax: 250-475-3611
 mail@ryzuk.com

Soilcrete Test Summary Report

Project No.: 8-6134-25
 Project: In-Situ Soil Mixing - WP17A, CFB Esquimalt
 Client: Allterra Construction
 Contact: Mr. Derek Killburn
 Email / Fax No.: derek@allterraconstruction.ca
 Date: September 5, 2014

Copy to:

Copy to:

Sample Identification	Break Date	Specimen Age (Days)	Average Diameter (mm)	Length (mm)	Load (N)	Area (mm ²)	Corrected Strength (kPa)
17A-C022-1.0	11-Jul-14	3	100.0	203.0	3820	7854	490
17A-C022-1.0	15-Jul-14	7	99.5	203.0	6304	77	
17A-C022-1.5	11-Jul-14	3	101.5	203.0	3860	80	
17A-C022-1.5	15-Jul-14	7	98.0	203.0	5504	75	
17A-C026-0.5	9-Jul-14	5	101.5	203.0	14304	80	
17A-C026-0.5	16-Jul-14	7	101.0	203.0	24568	80	
17A-C026-1.5	9-Jul-14	5	100.0	203.0	16652	7854	2121
17A-C026-1.5	16-Jul-14	7	101.5	203.0	18704	8091	2310
17A-C026-2.5	9-Jul-14	5	100.0	203.0	10112	7854	1288
17A-C029-1.0	7-Jul-14	3	101.5	203.0	2376	8091	294
17A-C029-1.0	11-Jul-14	7	101.5	203.0	4144	8091	511
17A-C029-1.5	7-Jul-14	3	101.5	203.0	2940	8091	487
17A-C029-1.5	11-Jul-14	7	101.5	203.0	5380	8091	665
17A-C035-0.5	18-Jul-14	4	101.0	203.0	10820	8012	
17A-C035-0.5	22-Jul-14	8	100.0	203.0	14388	7854	
17A-C035-1.5	18-Jul-14	4	101.0	203.0	10480	8012	
17A-C035-1.5	22-Jul-14	8	101.0	203.0	18948	8012	
17A-C035-2.5	18-Jul-14	4	101.0	203.0	15632	8012	
17A-C035-2.5	22-Jul-14	8	101.0	203.0	18744	8012	2338
17A-C046-0.5	11-Jul-14	3	101.5	203.0	8420	8091	1040
17A-C046-0.5	18-Jul-14	7	101.0	203.0	13412	8012	1673
17A-C046-1.5	11-Jul-14	3	101.5	203.0	18420	8091	2275
17A-C046-1.5	18-Jul-14	7	101.0	203.0	33960	8012	4239
17A-C046-2.5	11-Jul-14	3	101.5	203.0	21296	8091	2632
17A-C046-2.5	18-Jul-14	7	101.0	203.0	25560	8012	3192
17A-C052-0.5	22-Jul-14	5	101.0	203.0	12076	8012	1509
17A-C052-0.5	24-Jul-14	7	101.0	203.0	11996	8012	1498
17A-C052-1.5	22-Jul-14	5	101.0	203.0	14052	8012	1754
17A-C052-1.5	24-Jul-14	7	100.5	203.0	15156	7933	1911
17A-C052-2.5	22-Jul-14	5	100.0	203.0	9080	7854	1155
17A-C052-2.5	24-Jul-14	7	100.0	203.0	9288	7854	1183
17A-C057-0.5	22-Jul-14	6	100.0	203.0	7232	7854	921
17A-C057-0.5	23-Jul-14	7	100.5	203.0	8040	7933	1015
17A-C057-1.5	22-Jul-14	6	100.0	203.0	9040	7854	1152
17A-C057-1.5	23-Jul-14	7	100.0	203.0	9204	7854	1173
17A-C057-2.5	22-Jul-14	6	100.5	203.0	6432	7933	812
17A-C057-2.5	23-Jul-14	7	101.5	203.0	8752	8091	1082
17A-C063-0.5	18-Jul-14	3	101.0	203.0	16440	8012	2051
17A-C063-0.5	22-Jul-14	7	101.5	203.0	27808	8091	3437
17A-C063-1.0	18-Jul-14	3	101.0	203.0	10564	8012	1320
17A-C063-1.0	22-Jul-14	7	101.5	203.0	17832	8091	2205
17A-C063-1.5	18-Jul-14	3	101.0	203.0	9368	8012	1169
17A-C063-1.5	22-Jul-14	7	101.5	203.0	14556	8091	1799
17A-C068-0.5	28-Jul-14	5	100.0	203.0	760	7854	105
17A-C063-1.5	22-Jul-14	7	101.5	203.0	14556	8091	1799
17A-C068-0.5	28-Jul-14	5	100.0	203.0	760	7854	105
17A-C068-0.5	31-Jul-14	8	99.0	203.0	1680	7698	210
17A-C068-0.5	20-Aug-14	28	101.5	203.0	2000	8091	245
17A-C068-2.0	28-Jul-14	5	100.0	203.0	4160	7854	525
17A-C068-2.0	31-Jul-14	8	101.0	205.0	3680	8012	455
17A-C068-2.0	20-Aug-14	28	100.0	203.0	4600	7854	595
17A-C073-0.5	25-Jul-14	3	101.5	203.0	2948	8091	364
17A-C073-0.5	29-Jul-14	7	101.5	203.0	5000	8091	630
17A-C073-0.5	25-Jul-14	3	101.5	203.0	4820	8091	595
17A-C073-0.5	29-Jul-14	7	101.5	203.0	11840	8091	1470
17A-C073-0.5	25-Jul-14	3	101.5	203.0	9536	8091	1180
17A-C073-2.5	25-Jul-14	3	101.5	203.0	15840	8091	1715
17A-C073-2.5	25-Jul-14	7	101.5	203.0	1944	7854	249
17A-C080-0.5	23-Jul-14	5	100.0	203.0	1944	7854	249
17A-C080-0.5	25-Jul-14	7	101.5	203.0	2904	8091	361
17A-C080-0.5	15-Aug-14	28	100.0	203.0	2640	7854	350
17A-C080-1.0	25-Jul-14	7	101.5	203.0	14984	8091	1852
17A-C080-2.0	23-Jul-14	5	101.0	203.0	15200	8012	1897
17A-C080-2.0	25-Jul-14	7	101.5	203.0	18988	8091	2345
17A-C088-0.5	28-Jul-14	3	101.5	203.0	10320	8091	1260
17A-C088-0.5	1-Aug-14	7	100.0	203.0	15960	7854	2030
17A-C088-1.5	28-Jul-14	3	101.5	203.0	11000	8091	1365
17A-C088-1.5	1-Aug-14	7	101.0	203.0	15680	8012	1960

Table 1: Analytical Results for Metals in Soil - WP17A - Solidification & Stabilization Samples

Sample Description	CCME (IL) ¹	CSR (IL) ²	SRA ³	17a-C63-0.5- Day3	17a-C63-1.0- Day3	17a-C63-1.5- Day3	17a-C57-0.5- Day 3	17a-C57-1.5- Day 3	17a-C57-2.5- Day 3	17a-c52-0.5- Day3	17a-c52-1.5- Day3	17a-c52-2.5- Day3	17a-c80-0.5- Day3	17a-c80-1.0- Day3	17a-c80-2.0- Day3	17a-C73-0.5- Day3	17a-C73-1.5- Day3	17a-C73-2.5- Day3
				07/15/2014	07/15/2014	07/15/2014	07/16/2014	07/16/2014	07/16/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/22/2014	07/22/2014	07/22/2014
Corrected Strength (kPa)																		
Date Sampled (mm/dd/yyyy)																		
pH 1:2	6 to 8	-	-	11.6	11.4	11.5	11.5	11.5	11.2	11.5	11.7	11.8	10.9	11.5	11.7	11.9	11.8	11.8
Metals																		
Antimony (Sb)	40	40	20	46.4	31.3	43	47.5	39.8	40.4	30.5	67.1	32.8	36.5	37.9	35.4	32.1	32.8	39.8
Arsenic (As)	12	25	15	30.3	26.3	27.7	21.9	25	17.3	13.7	16.6	14.7	19.4	23.2	20.9	16.6	20.4	19.7
Barium (Ba)	2000	1500	400	446	660	496	662	754	761	521	621	538	857	782	832	650	696	664
Beryllium (Be)	8	8	4	0.4	0.4	0.5	0.4	0.4	0.4	0.3	0.4	0.3	0.5	0.5	0.5	0.3	0.3	0.3
Boron (B) (Hot Water Soluble)	-	-	-	1.5	1.3	1.5	1.1	1.1	1.0	1.5	1.4	1.3	2.1	1.5	1.7	1.0	1.0	1.1
Cadmium (Cd) pH < 7.0		2																
pH 7.0 -< 7.5		3.5																
pH 7.5 -< 8.0		35																
pH >= 8.0		200		7.1	6.4	10.4	7.5	22.9	5.9	2.85	3.2	2.9	6.3	5.9	5.3	2.8	3.4	2.9
Chromium (Cd)	87	60	60	103	274	72	70	61	56	47	43	41	54	61	55	44	59	85
Cobalt (Cr)	300	300	50	17.8	15.4	15.0	14.9	15.6	14.8	11.3	12.0	11.1	12.1	13.2	12.9	12.5	12.9	13.3
Copper (Cu) pH < 5.0		90																
pH 5.0 -< 5.5		100																
pH 5.5 -< 6.0		200																
pH >= 6.0		250		1760	93400	1480	1040	1040	926	519	793	1500	1110	1250	950	572	1100	737
Lead (Pb) pH < 5.5		150																
pH 5.5 -<6.0		250																
pH >= 6.0		2000		1940	1460	1350	1300	1150	734	623	755	627	1350	1240	1200	691	707	867
Mercury (Hg)	50	150	15	4.0	3.2	3.0	1.7	1.9	1.4	1.3	1.6	1.3	5.9	3.3	2.6	1.4	1.7	1.4
Molybdenum (Mo)	40	40	10	14.6	12.4	14	9.0	13	8.1	5.4	6.3	5.5	9.9	10.6	8.5	6.7	7.1	7
Nickel (Ni)	50	500	100	132	206	99.8	79.9	85	64.9	49	51.8	54.1	82.3	93.9	77.5	50.3	60.4	63.6
Selenium (Se)	2.9	10	3	0.5	0.9	0.6	0.7	0.9	0.9	0.4	0.5	0.6	0.6	0.7	0.6	0.4	0.5	0.6
Silver (Ag)	40	40	20	1.0	2.1	1.6	0.6	0.6	0.8	<0.5	0.6	0.9	0.8	1.1	1.1	0.7	0.5	0.5
Thallium (Ti)	1	-	-	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1	0.1
Tin (Sn)	300	300	50	319	203	293	284	177	75.1	79.3	57.2	90.9	135	163	144	53.4	67.1	127
Uranium (U)	300	200	-	1.5	1.3	1.5	1.4	1.5	1.1	1.2	1.3	1.2	1.3	1.4	1.3	-	-	-
Vanadium (V)	130	-	200	68.0	55.0	58.0	62.0	58.0	64.0	54.0	55.0	52.0	60.0	56.0	56.0	50.0	53.0	56.0
Zinc (Zn) pH < 6.5		150																
pH 6.5 -< 7.0		300																
pH >= 7.0		600		3730	2860	3290	2150	2420	1620	1210	1310	1120	2090	2520	2250	1230	1450	1280

Notes:
 Associated AGAT Files: 14V864334, 14V865558, 14V865746, 14V867519
 All concentrations in mg/kg unless otherwise noted.
 *-< less than the laboratory detection limit indicated.
 - means not analyzed or no standard or guideline applies.
 * RPDs are not normally calculated where one or more concentrations are less than five times MDL.
 (1) Canadian Soil Quality Guidelines (CEQG) for the Protection of Environmental and Human Health, Canadian Council of Ministers of the Environment (CCME), 1999, including updates to 2014. Guidelines for Industrial Land Use, Surficial Soils. The exposure pathway(s) used for determining the guidelines for this site include: general, direct contact, eco soil contact, general incl. gw, protection of gw for aquatic life and management limit (whichever is most stringent).
 (2) BC Contaminated Sites Regulation (CSR BC Reg. 375/96 includes amendments up to BC Reg. 97/2011) Generic Numerical Soil Standards (Schedules 4 and 10) and Matrix Numerical Soil Standards (Schedule 5), considering the site specific factors of groundwater flow to surface water used by marine aquatic life, Industrial (IL) Land Use.
 (3) BC Contaminated Sites Regulation (CSR BC Reg. 375/96 includes amendments up to BC Reg. 286/2010) Standards Triggering Contaminated Soil Relocation Agreements (Schedule 7) for Soil Relocation to Non-Agricultural Lands (Column II). If soils exceed these standards, a Soil Relocation Agreement is required to dispose of soils off-Site, without authorization.

BOLD, BLUE SHADING	Concentration greater than CCME Industrial Land Use (IL) Standard
BOLD, RED SHADING	Concentration greater than CSR Industrial Land Use (IL) Standard
<u>Underline, Grey Shading</u>	Concentration >CSR SRA Standard.

Table 2: Analytical Results for Leachable Metals in Soil - WP17A - Solidification & Stabilization Samples

Sample ID	Hazardous Waste Standards ⁽¹⁾	17a-C63-0.5-Day3	17a-C63-1.0-Day3	17a-C63-1.5-Day3	17a-C57-0.5-Day3	17a-C57-1.5-Day3	17a-C57-2.5-Day3	17a-c52-0.5-Day3	17a-c52-1.5-Day3	17a-c52-2.5-Day3	17a-c80-0.5-Day3	17a-c80-1.0-Day3	17a-c80-2.0-Day3	17a-C73-0.5-Day3	17a-C73-1.5-Day3	17a-C73-2.5-Day3	
		07/15/2014	07/15/2014	07/15/2014	07/16/2014	07/16/2014	07/16/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/17/2014	07/22/2014	07/22/2014	07/22/2014
Corrected Strength (kPa)																	
Date Sampled (mm/dd/yyyy)																	
TCLP Metals (mg/L)																	
Antimony (Sb)-Leachable	-	0.02	0.02	0.02	0.07	<0.01	0.03	0.05	0.05	0.03	0.11	0.02	0.02	0.01	0.02	<0.01	
Arsenic (As)-Leachable	2.5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Barium (Ba)-Leachable	100.0	0.49	0.43	0.37	0.31	<0.05	0.34	0.36	0.52	0.68	0.17	0.67	0.58	0.71	0.60	1.01	
Beryllium (Be)-Leachable	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	
Boron (B)-Leachable	500.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.70	<0.5	<0.5	<0.5	<0.5	<0.5	
Cadmium (Cd)-Leachable	0.5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Chromium (Cr)-Leachable	5.0	0.02	0.01	<0.01	0.02	<0.01	0.01	0.03	0.01	0.02	<0.01	0.02	0.02	0.02	0.03	0.02	
Cobalt (Co)-Leachable	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Copper (Cu)-Leachable	100.0	0.20	0.14	0.10	0.10	<0.05	0.11	0.22	0.15	0.19	0.10	0.14	0.16	0.07	0.10	0.08	
Iron (Fe)-Leachable	-	2.00	4.00	2.00	<1	<1	<1	5.00	<1	2.00	3.00	<1	1.00	<1	1.00	<1	
Lead (Pb)-Leachable	5.0	0.16	0.17	0.06	0.04	<0.01	0.02	0.16	0.05	0.10	0.11	0.06	0.05	0.03	0.05	0.30	
Mercury (Hg)-Leachable	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Nickel (Ni)-Leachable	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Selenium (Se)-Leachable	1.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Silver (Ag)-Leachable	5.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Thallium (Tl)-Leachable	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Uranium (U)	10.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	
Vanadium (V)-Leachable	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	
Zinc (Zn)-Leachable	500.0	0.10	0.10	<0.1	<0.1	<0.1	<0.1	0.10	<0.1	0.10	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	
Zirconium	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	

Notes:
Associated AGAT Files: 14V864334, 14V865558, 14V865746, 14V867519
All concentrations in mg/L, except pH.

BOLD, MAGENTA SHADING Concentration greater than Hazardous Waste (HW) Standards

"<" less than the laboratory method detection limit (MDL) indicated.

"-" means not analyzed or no standard or guideline applies.

(1) BC Hazardous Waste Regulation, Schedule 4, Table 1



PROJECTED COST \$43 MILLION

ACTUAL COST \$5 MILLION

ALLTERRA



CONSTRUCTION & ENVIRONMENTAL