081-12459-00 (8570)

September 15, 2014

Mr. Ross Wallace, Landfill Manager
Waste Management of Canada Corporation
1271 Beechwood Road
Town of Greater Napanee, ON K7R 3L1

Re: Richmond Landfill
Supplemental Information to 2012 and 2013 Annual Monitoring Reports

Dear Mr. Wallace:

Conditions of the current Environmental Compliance Approval (ECA) No. A371203 outline the requirements for submission of an annual monitoring report pertaining to development, operation, and closure of the Richmond Landfill site, owned and operated by Waste Management of Canada (WM). The annual monitoring report for the calendar year 2012 (Monitoring Report No. 26) was submitted to WM, the Ministry of the Environment and Climate Change (MOECC) and various stakeholders on March 26, 2013, while the report for the 2013 calendar year (Monitoring Report No. 27) was submitted on March 25, 2014.

In July 2014, an internal audit completed by WM found that Condition 5.11, pertaining to the reporting requirements for the phytoremediation system, had been omitted from inclusion in the 2012 and 2013 annual reports. The condition was initially introduced to the site's Certificate of Approval on May 2, 2011 as Notice 8, and was included when the MOECC consolidated all Notices and issued Environmental Compliance Approval No. A371203 on January 9, 2012. The condition in its entirety is presented below:

5.11 *Reporting on the phytoremediation system shall be part of the annual monitoring report for the Site and shall include but not be limited to the following:*

i. *Results and an analysis of the results of the monitoring programs for the phytoremediation system;*

ii. *Assessment of the results of the phytoremediation system as related to the stated objectives for the existing and proposed phytoremediation system;*

iii. *Assessment of the need to change the monitoring program for the phytoremediation system and a recommendation of the required changes;*

WSP Canada Inc.
1450 1st Ave. W.
Suite 101
Owen Sound, ON N4K 6W2

Phone: 519-376-7612
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iv. *A report on operational problems identified during the operation of the phytoremediation system and a discussion of each problem and details of what was done to rectify each problem;*

v. *Assessment of the need for operational changes for the phytoremediation system and a recommendation of the required changes; and*

vi. *a Site plan which shows the location of the phytoremediation system and any changes made to the phytoremediation system.*

To supplement the annual reports, we have prepared two (2) attachments as follows:

Attachment 1: Supplemental Information to Monitoring Report No. 26; and
Attachment 2: Supplemental Information to Monitoring Report No. 27

The attachments specifically address each clause under Condition 5.11. Monitoring data has been provided by Blu-Metric Inc., while WM has provided information pertaining to operational problems.

It should be noted that Monitoring Report No. 25, issued for the 2011 calendar year, reported that the phytoremediation system had been constructed and its location was included on a site plan. Therefore, no addendum to this report is required.

It is our recommendation that this information be submitted to the MOECC along with a cover letter explaining the reasoning for the submission.

We trust you will find the above information satisfactory. However, should you have any questions or comments, please do not hesitate to contact the undersigned.

Yours truly,

WSP Canada Inc.

Beverly D. Leno, C.E.T. rcji
Environmental Technologist
/bdl/dlw
Encl.

Jeff E. Armstrong, P.Eng.
Senior Engineer, Solid Waste

Attachment 1

3.22 RECOMMENDATIONS

Condition 14.3 xxiii of the ECA requires recommendations regarding any proposed changes in operations of the site.

GENIVAR does not have any recommendations for changes in the site operations.

NOTE: The following information is intended to supplement the 2012 annual monitoring report by addressing Condition 5.11:

3.23 PHYTOREMEDIATION SYSTEM

Condition 5.11 of the ECA lists the reporting requirements for the phytoremediation system at the Richmond Landfill, which includes the following:

i. Results and an analysis of the results of the monitoring programs for the phytoremediation system;
ii. Assessment of the results of the phytoremediation system as related to the stated objectives for the existing and proposed phytoremediation system;
iii. Assessment of the need to change the monitoring program for the phytoremediation system and a recommendation of the required changes;
iv. A report on operational problems identified during the operation of the phytoremediation system and a discussion of each problem and what was done to rectify each problem;
v. Assessment of the need for operational changes for the phytoremediation system and a recommendation of the required changes; and
vi. A Site plan which shows the location of the phytoremediation system and any changes made to the phytoremediation system.

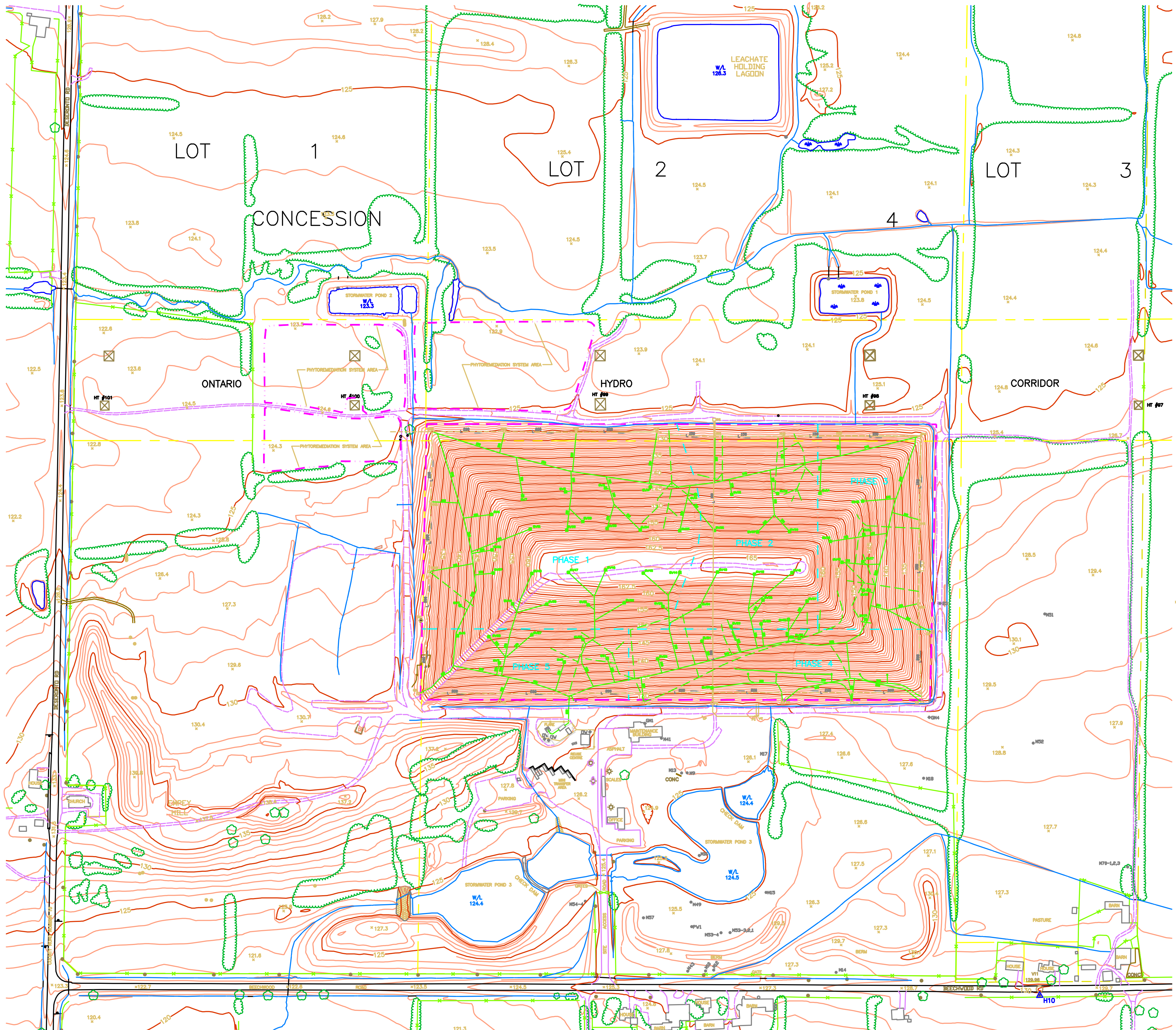
The approval for the phytoremediation system was initially issued by the MOE on May 2, 2011 through Notice 8 to amend C of A No. A371203. As noted in previous annual monitoring reports, the system was planted in late May 2011 in the northwest corner of the landfill property. No monitoring results or assessment of the system's operation were available for 2011 as the trees required time to establish in their environment.

For 2012, the following is noted:

- No information is available to address Conditions 5.11 (i through iii) inclusive, as the initial plantation had performed poorly and had no impact on monitoring results.
- In regards to Condition 5.11 (iv), WM noted that wet conditions in the area of the phytoremediation system had resulted in very little plant growth. In September 2012, WM plowed under the phytoremediation system and re-worked the ground by disking. WM will replant the phytoremediation system in spring 2013.
- For Condition 5.11 (v), there are no operational recommendations at this time, as the system will be replanted in spring 2013.
- Please refer to the site plan located in **Appendix J** of this report, which shows the location of the phytoremediation system area as required by Condition 5.11 (vi).

Appendix J

SITE PLAN – 2012 EXISTING CONDITIONS



LEGEND:

- INDEX CONTOURS
- INTERVAL CONTOURS
- REFERENCE GRID LINE
- LEGAL BOUNDARIES
- APPROVED LIMIT OF LANDFILL
- PHASING LIMITS
- EXISTING DRAINAGE DITCH
- EXISTING WEEPER
- EXISTING GAS LATERAL
- EXISTING FENCE LINE
- EXISTING TREE LINE
- HT #98 EXISTING HYDRO TOWER (ID #)
- EXISTING HYDRO POLE
- EXISTING ROAD EDGE
- BEDROCK WELL LOCATION
- GAS MONITOR LOCATION
- OVERBURDEN WELL LOCATION
- MH3 EXISTING LEACHATE MANHOLE
- GW GAS WELL
- EXISTING TREE

NOTES:

1) EXISTING GROUND CONTOURS AND TOPOGRAPHIC INFORMATION SHOWN IS BASED ON INFORMATION OBTAINED FROM AERIAL PHOTOGRAPHY FLOWN ON JUNE 27, 2009 BY BASE MAPPING. WELL LOCATIONS AND LANDFILL MOUND CONTOURS WERE UPDATED FROM FIELD SURVEY DATA BY GENIVAR INC ON NOVEMBER 2011 AND FEBRUARY 22, 2012

2) CONTOUR INTERVAL SHOWN IS 0.5m

3) THE LOCAL SITE GRID IS BASED ON 0+000N BEING THE NORTH LANDFILL LIMIT. THE NORTH WEST CORNER OF THE LANDFILL LIMIT IS 0+300E AND IS PERPENDICULAR TO THE EAST/WEST GRID LINE. THE WEST LIMIT OF THE LANDFILL IS LOCATED ALONG THE LOT LINE BETWEEN LOTS 1 AND 2, CONCESSION 4.

4) THE PHYTOREMEDIATION SYSTEM IN THE NORTHWEST CORNER OF THE LANDFILL WAS PLANTED IN THE SPRING OF 2011. DUE TO WET CONDITIONS AND POOR GROWTH, ALL AREAS WERE PLOWED UNDER IN SEPTEMBER 2012, AND GROUND CONDIITONS WERE REWORKED. ALL AREAS WILL BE REPLANTED IN SPRING 2013.

B.M. #1 ELEV. = 124.667
TOP OF BRACKET, NORTH WEST LEG OF HYDRO TOWER No. 99. LOCATED ±25m NORTH AND ±180m EAST OF NORTH WEST CORNER OF APPROVED LANDFILL LIMIT.

B.M. #2 ELEV. = 125.146
TOP OF BRACKET, NORTH WEST LEG OF HYDRO TOWER No. 100. LOCATED ±25m NORTH AND ±80m WEST OF NORTH WEST CORNER OF APPROVED LANDFILL LIMIT.

SCALE : 1:2000
0 100 200m

DATE	DESCRIPTION	APP BY

GENIVAR
1450 1st Ave W, Suite 101, Owen Sound, ON, N4K 6W2
Telephone: (519) 376-7612 / Fax: (519) 376-8008
Toll Free: 1-888-376-7612

WASTE MANAGEMENT

SITE PLAN
2012 EXISTING CONDITIONS

RICHMOND LANDFILL
NAPANEE, ONTARIO

DWN BY: B D L
CHK BY: J E A
DATE: AUGUST 14, 2014
SCALE: SEE BAR SCALE

WASTE MANAGEMENT OF CANADA CORP.

DRAWING NO. 0857013 - 2012 EXCO

SHEET
2012

Attachment 2

In late 2011, WM applied to the MOE to modify the C of A (Air) to permit the operation of a candlestick flare at the Richmond Landfill. The candlestick flare installation would address a contingency plan for the landfill gas collection system, in that it would be operational only when the enclosed flare is shut down for maintenance or repair. To date, WM has not received any comments from MOE regarding the status of this application.

NOTE: The following information is intended to supplement the 2013 annual monitoring report by addressing Condition 5.11:

3.23 PHYTOREMEDIATION SYSTEM

Condition 5.11 of the ECA lists the reporting requirements for the phytoremediation system at the Richmond Landfill, which includes the following:

i. Results and an analysis of the results of the monitoring programs for the phytoremediation system;
ii. Assessment of the results of the phytoremediation system as related to the stated objectives for the existing and proposed phytoremediation system;
iii. Assessment of the need to change the monitoring program for the phytoremediation system and a recommendation of the required changes;
iv. A report on operational problems identified during the operation of the phytoremediation system and a discussion of each problem and what was done to rectify each problem;
v. Assessment of the need for operational changes for the phytoremediation system and a recommendation of the required changes; and
vi. A Site plan which shows the location of the phytoremediation system and any changes made to the phytoremediation system.

The approval for the phytoremediation system was initially issued by the MOE on May 2, 2011 through Notice 8 to amend C of A No. A371203. As noted in previous annual monitoring reports, the system was planted in late May 2011 in the northwest corner of the landfill property. No monitoring results or assessment of the system's operation were available for 2011 as the trees required time to establish in their environment. In late September 2012, the entire plantation was plowed under due to poor growth and wet site conditions.

In April 2013, the ground within the entire phytoremediation area was disked, and low areas were drained to remove standing water. All planting areas were frost seeded with white clover and barley at this time. In

May 2013, under the direction of Mr. Steve Shaw from Landscape Rehab, approximately 6,700 dogwoods and willows were planted, and the area was sprayed with the chemical “Round Up” to retard weed growth. WM monitored the growth of the plantation throughout late spring, and by July 2013 reported a tree growth rate of 100 millimetres to 200 millimetres. Grass was mowed between the rows to promote continued growth. In October 2013, “Round Up” was again sprayed for weed control in the planted areas, and grass was mowed between tree rows. WM reported a live tree plantation of approximately 60%, with an average tree height between 250 millimetres to 350 millimetres.

To address Condition 5.11 for 2013, the following is noted:

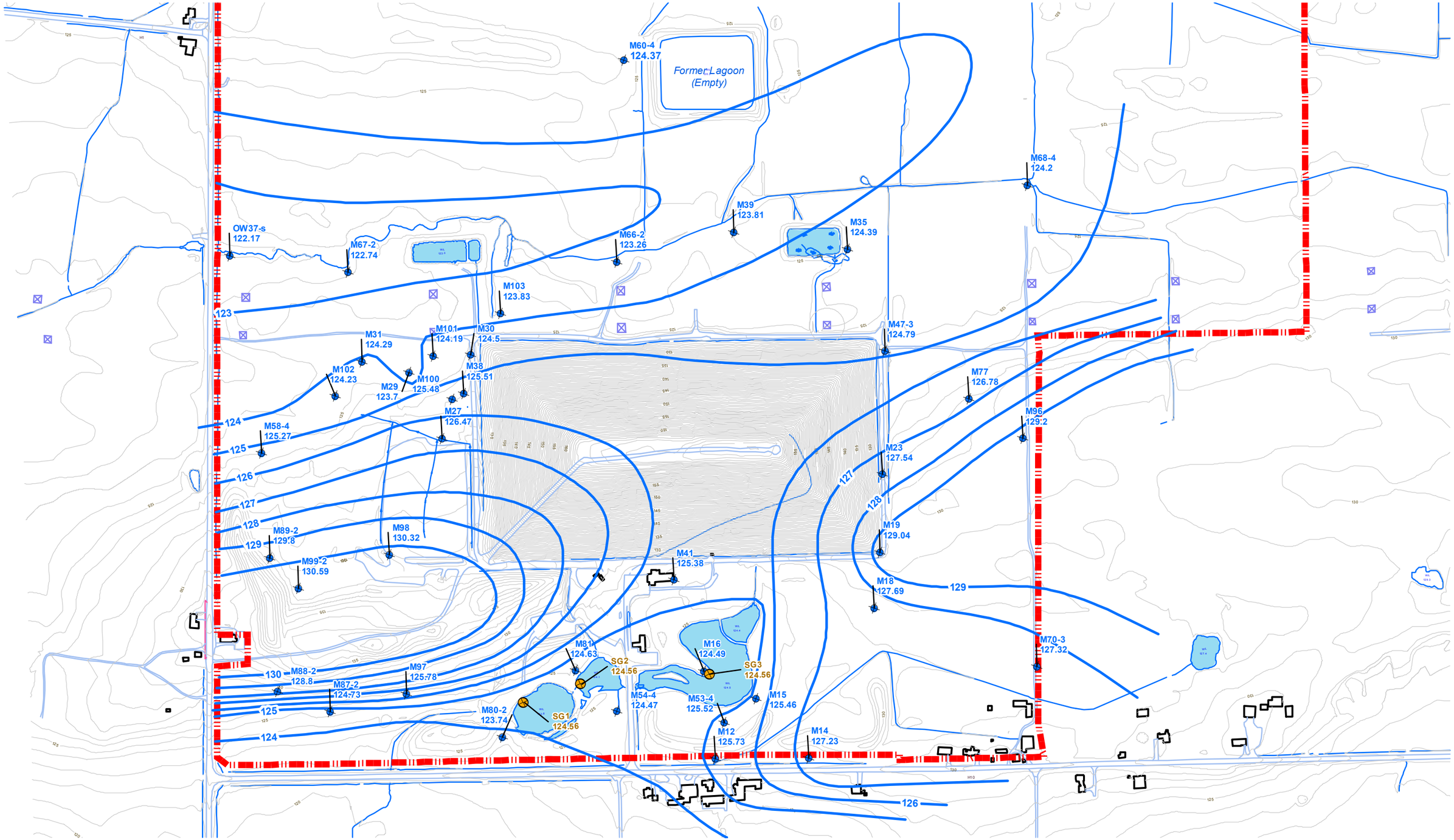
- For Condition 5.11 (i), please refer to **Appendix I** for the results of the 2013 monitoring program for the phytoremediation area, as provided by Water and Earth Science Associates (WESA). Since the plantation has yet to become fully established, no trends have been discerned by WESA pertaining to the results. A full interpretation of the 2013 Environmental Monitoring Plan results can be found in the semi-annual monitoring reports issued to the MOE by WESA under separate cover.
- No information is available to address Conditions 5.11 (ii and iii) inclusive, as the system is establishing itself. These conditions will be addressed in future monitoring reports.
- In regards to Conditions 5.11 (iv and v) inclusive, no operational issues were noted by WM as the system was replanted in early spring. WM reports the plantation experienced good growth in 2013, and will continued to be monitored for any signs of impairment. No operational recommendations are presented at this time.
- Please refer to the site plan located in **Appendix J** of this report, which shows the location of the phytoremediation system area as required by Condition 5.11 (vi).

Appendix I

2013 PHYTOREMEDIATION SYSTEM MONITORING RESULTS (AS PROVIDED BY WESA, A DIVISION OF BLUEMETRIC ENVIRONMENTAL INC.

Table 3: Groundwater Elevations - Spring and Fall, 2013

Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)
April 19, 2013		October 16, 2013	
Shallow Groundwater Flow Zone			
M27	126.47	M27	126.09
M29	123.70	M29	dry
M30	124.50	M30	123.43
M31	124.29	M31	123.33
M38	125.51	M38	124.30
M66-2	123.26	M66-2	122.93
M67-2	122.74	M67-2	122.23
M100	125.48	M100	124.27
M101	124.19	M101	123.41
M102	124.23	M102	123.60
M103	123.83	M103	123.04
Intermediate Bedrock Groundwater Flow Zone			
M3A-3	124.97	M3A-3	124.64
M5-3	122.47	M5-3	123.31
M6-3	122.91	M6-3	123.18
M74	123.90	M74	124.33
M75	123.16	M75	123.45



WASTE MANAGEMENT
RICHMOND LANDFILL
SPRING 2013 SEMI-ANNUAL REPORT

Figure 2:
Shallow Groundwater Flow Zone Potentiometric Surface - April 19, 2013

M58-4 Shallow Groundwater Zone Elevation Monitor
Pond Elevation
Hydro Tower
Topographic Contour Lines
Surface Water
Potentiometric Surface (masl)
Property Boundary

Project : K-B11166-00-02
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: May 2013

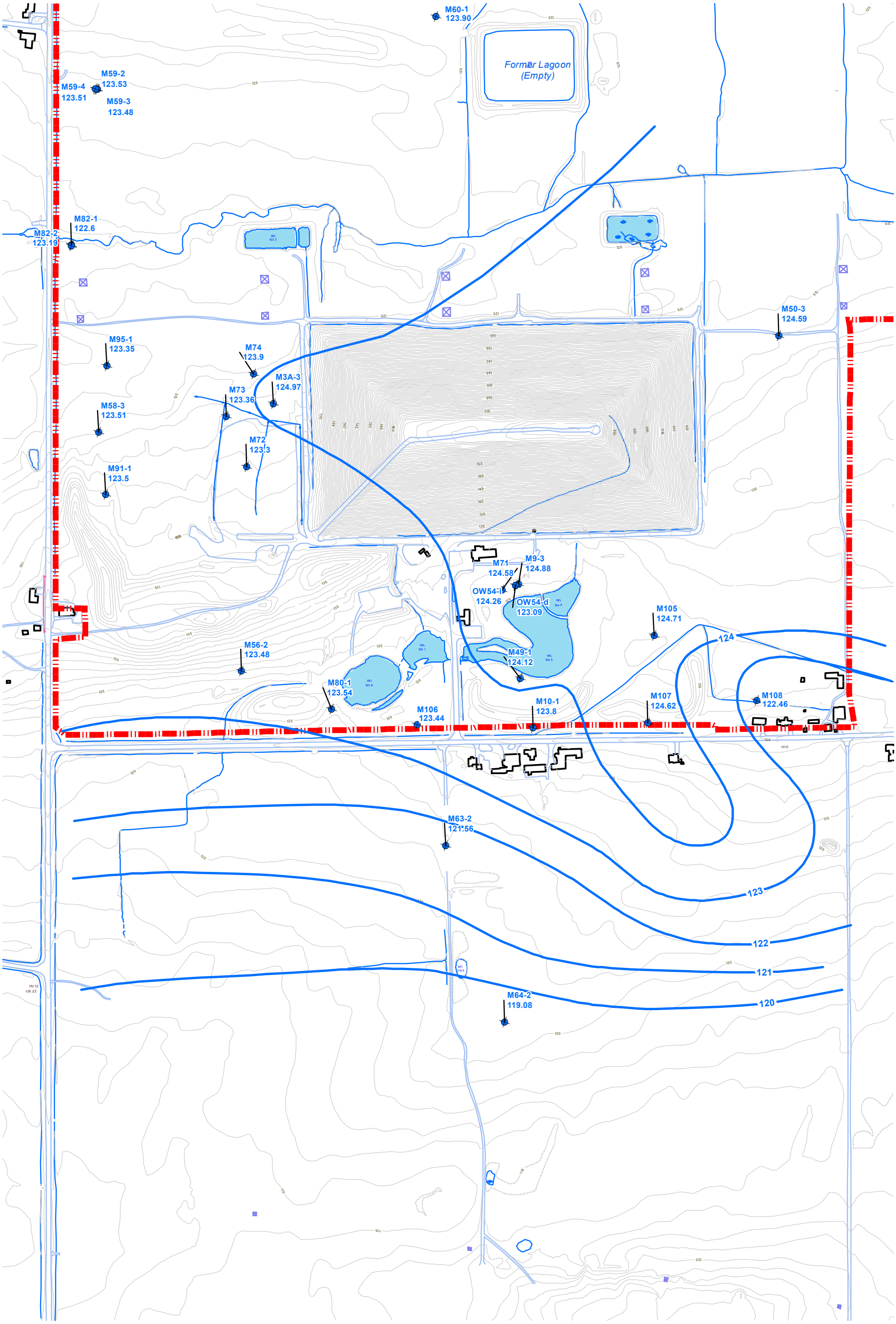
0 12.5 25 50 75 100
Meters

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:5000

WESA
a BluMetric company
WM WASTE MANAGEMENT



WASTE MANAGEMENT
RICHMOND LANDFILL
SPRING 2013 SEMI-ANNUAL REPORT

M58-3 Intermediate Groundwater Zone Elevation Monitor
Topographic Contour Lines
Potentiometric Surface (masl)
Hydro Tower
Surface Water
Property Boundary

Project : K-B11166-00-02
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: May 2013

50 25 0 50 100
Meters

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:5000

Figure 3:
Intermediate Bedrock Groundwater Flow Zone Potentiometric Surface - April 19, 2013

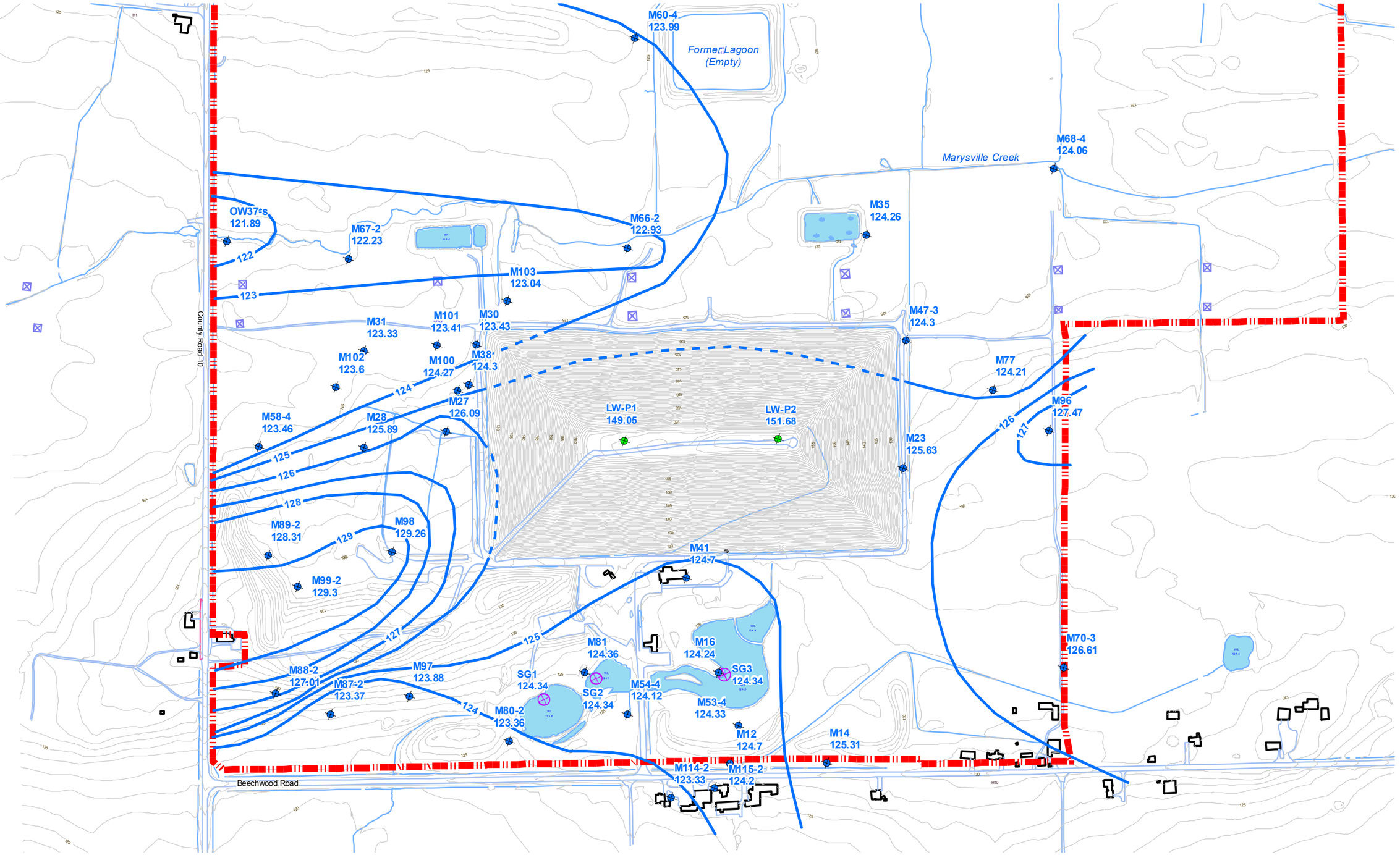
Table 1: Groundwater Quality Results - April, 2013

Name	Date	Alkalinity	Ammonia	Arsenic	Barium	Biochemical Oxygen Demand	Boron	Cadmium	Calcium	Chemical Oxygen Demand	Chloride	Chromium	Conductivity	Copper	Dissolved Organic Carbon	Hardness	Iron	Lead	Magnesium	Manganese	Mercury	Naphthalene	Nitrate	Nitrite	pH (Lab)	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Kjeldahl Nitrogen	Zinc
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Shallow Groundwater Flow Zone[1]																																	
M66-2	23/04/2013	280	0.17	0.0014	0.024	< 2	0.7	< 0.0001	150	10	140	0.0084	1770	< 0.001	1.8	620	0.24	< 0.0005	58	0.02	< 0.0002	< 0.0005	< 0.1	< 0.01	8.12	< 0.001	0.06	6.5	180	370	1160	0.8	0.025
M67-2	23/04/2013	360	0.6	0.0014	0.22	< 2	0.72	< 0.0001	58	21	5	0.0058	744	< 0.001	3.2	280	0.79	< 0.0005	33	0.053	< 0.0002	< 0.0005	< 0.1	< 0.01	8.21	0.026	0.16	8.3	70	33	394	1.6	< 0.005
M101	23/04/2013	400	< 0.15	< 0.001	0.16	< 2	0.076	< 0.0001	150	10	80	0.0059	1160	< 0.001	3.4	610	< 0.1	< 0.0005	54	0.023	< 0.0002	< 0.0005	< 0.1	< 0.01	7.93	< 0.001	0.2	4.1	19	98	698	0.7	< 0.005
M102	23/04/2013	440	< 0.15	< 0.001	0.13	< 2	0.025	< 0.0001	170	10	34	< 0.005	1050	< 0.001	3.7	550	0.23	< 0.0005	33	0.16	< 0.0002	< 0.0005	< 0.1	< 0.01	7.9	< 0.001	0.1	1.9	26	71	640	< 0.7	< 0.005
M103	23/04/2013	750	< 0.15	< 0.001	0.16	< 2	0.29	< 0.0001	140	19	150	< 0.005	1880	0.001	5	770	< 0.1	< 0.0005	99	0.0079	< 0.0002	< 0.0005	< 0.1	< 0.01	7.92	< 0.001	0.11	7.7	150	48	1060	< 0.7	< 0.005
Intermediate BedrockGroundwater Flow Zone																																	
M5-3	23/04/2013	450	1.48	< 0.001	0.17	13	1.1	< 0.0001	39	12	44	< 0.005	1010	< 0.001	2.1	220	< 0.1	< 0.0005	31	0.0052	< 0.0002	< 0.0005	< 0.1	< 0.01	8.13	0.042	0.04	14	160	5	546	1.7	< 0.005
M6-3	23/04/2013	2100	6.65	< 0.002	1.4	8	0.17	< 0.0001	860	140	1100	0.022	11900	0.0043	47.3	2100	< 0.1	0.00059	0.14	< 0.002	< 0.0002	< 0.0005	< 0.1	< 0.01	12.5	0.03	< 0.15	57	590	1	4420	11	< 0.005
M74	25/04/2013	300	1.7	0.0016	0.057	< 2	0.93	< 0.0001	27	39	26	< 0.005	729	< 0.001	3	140	< 0.1	< 0.0005	17	0.013	< 0.0002	< 0.0005	< 0.1	< 0.01	8.19	0.0035	0.71	15	100	44	434	1.7	< 0.005
M75	25/04/2013	440	2.43	< 0.001	0.077	5	1.2	< 0.0001	34	130	73	0.012	1130	< 0.001	1.7	180	< 0.1	< 0.0005	23	0.011	< 0.0002	< 0.0025	< 0.1	< 0.01	8.18	0.033	1.3	15	170	50	646	2.6	< 0.005

[1] Shallow groundwater monitoring well M29 was not sampled; insufficient water for sampling.

Table 1: Groundwater Quality Results - April, 2013

Name	Date	1,1,1,2-Tetrachloroethane mg/L	1,1,1-Trichloroethane mg/L	1,1,2,2-Tetrachloroethane mg/L	1,1,2-Trichloroethane mg/L	1,1-Dichloroethane mg/L	1,1-Dichloroethylene mg/L	1,2-Dibromoethane mg/L	1,2-Dichlorobenzene mg/L	1,2-Dichloroethane mg/L	1,2-Dichloropropane mg/L	1,3,5-Trimethylbenzene mg/L	1,3-Dichlorobenzene mg/L	1,4-Dichlorobenzene mg/L	Benzene mg/L	Bromodichloromethane mg/L	Bromoform mg/L	Bromomethane mg/L	Carbon Tetrachloride mg/L	Chlorobenzene mg/L	Chloroethane mg/L	Chloroform mg/L	Chloromethane mg/L	Cis-1,2-Dichloroethylene mg/L	Cis-1,3-Dichloropropylene mg/L	Dibromochloromethane mg/L	Dichloromethane mg/L	Ethylbenzene mg/L	m&p-Xylene mg/L	o-Xylene mg/L	Styrene mg/L	Tetrachloroethylene mg/L	Toluene mg/L	Trans-1,2-dichloroethylene mg/L	Trans-1,3-dichloropropylene mg/	Trichloroethylene mg/L	Trichlorofluoromethane mg/L	Vinyl Chloride mg/L
Shallow Groundwater Flow Zone[1]																																						
M66-2	23/04/2013	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0002
M67-2	23/04/2013	< 0.02	< 0.01	< 0.02	< 0.02	< 0.01	< 0.01	< 0.02	< 0.02	< 0.02	< 0.01	< 0.0002	< 0.02	< 0.02	< 0.01	< 0.01	< 0.02	< 0.05	< 0.01	< 0.01	< 0.02	< 0.01	< 0.05	< 0.01	< 0.02	< 0.02	< 0.05	< 0.01	< 0.01	< 0.01	< 0.02	< 0.01	0.63	< 0.01	< 0.02	< 0.01	< 0.02	< 0.02
M101	23/04/2013	< 0.0002	< 0.0001	< 0.0002	< 0.0002	0.00021	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0002
M102	23/04/2013	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0002
M103	23/04/2013	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0002
Intermediate BedrockGroundwater Flow Zone																																						
M5-3	23/04/2013	< 0.01	< 0.005	< 0.01	< 0.01	< 0.005	< 0.005	< 0.01	< 0.01	< 0.01	< 0.005	< 0.0002	< 0.01	< 0.01	< 0.005	< 0.005	< 0.01	< 0.025	< 0.005	< 0.005	< 0.01	< 0.005	< 0.025	< 0.005	< 0.01	< 0.01	< 0.025	< 0.005	< 0.005	< 0.005	< 0.01	< 0.005	0.44	< 0.005	< 0.01	< 0.005	< 0.01	< 0.01
M6-3	23/04/2013	< 0.005	< 0.0025	< 0.005	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.005	< 0.005	< 0.0025	< 0.0002	< 0.005	< 0.005	< 0.0025	< 0.0025	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.005	< 0.0025	< 0.013	< 0.0025	< 0.005	< 0.005	< 0.013	< 0.0025	< 0.0025	< 0.0025	< 0.005	< 0.0025	0.24	< 0.0025	< 0.005	< 0.0025	< 0.005	< 0.005
M74	25/04/2013	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0002	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0005	< 0.0001	< 0.0002	< 0.0002	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0001	< 0.0002	< 0.0002
M75	25/04/2013	< 0.001	< 0.0005	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.0005	< 0.001	< 0.001	< 0.001	< 0.0005	< 0.0005	< 0.001	< 0.0025	< 0.0005	< 0.0005	< 0.001	< 0.0005	< 0.0025	< 0.0005	< 0.001	< 0.001	< 0.0025	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.0005	0.025	< 0.0005	< 0.001	< 0.0005	< 0.001	< 0.001



WASTE MANAGEMENT
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FALL 2013 SEMI-ANNUAL REPORT

Figure 2c:
Shallow Groundwater Flow Zone Potentiometric Surface - October 16, 2013

M58-4 Shallow Groundwater Zone Elevation Monitor
Staff Gauge Location
Leachate Monitoring Location

Surface Water
Potentiometric Surface (masl)
Property Boundary
Hydro Tower
Topographic Contour Lines

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: October 2013

0 12.5 25 50 75 100
Meters

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:5000

WESA
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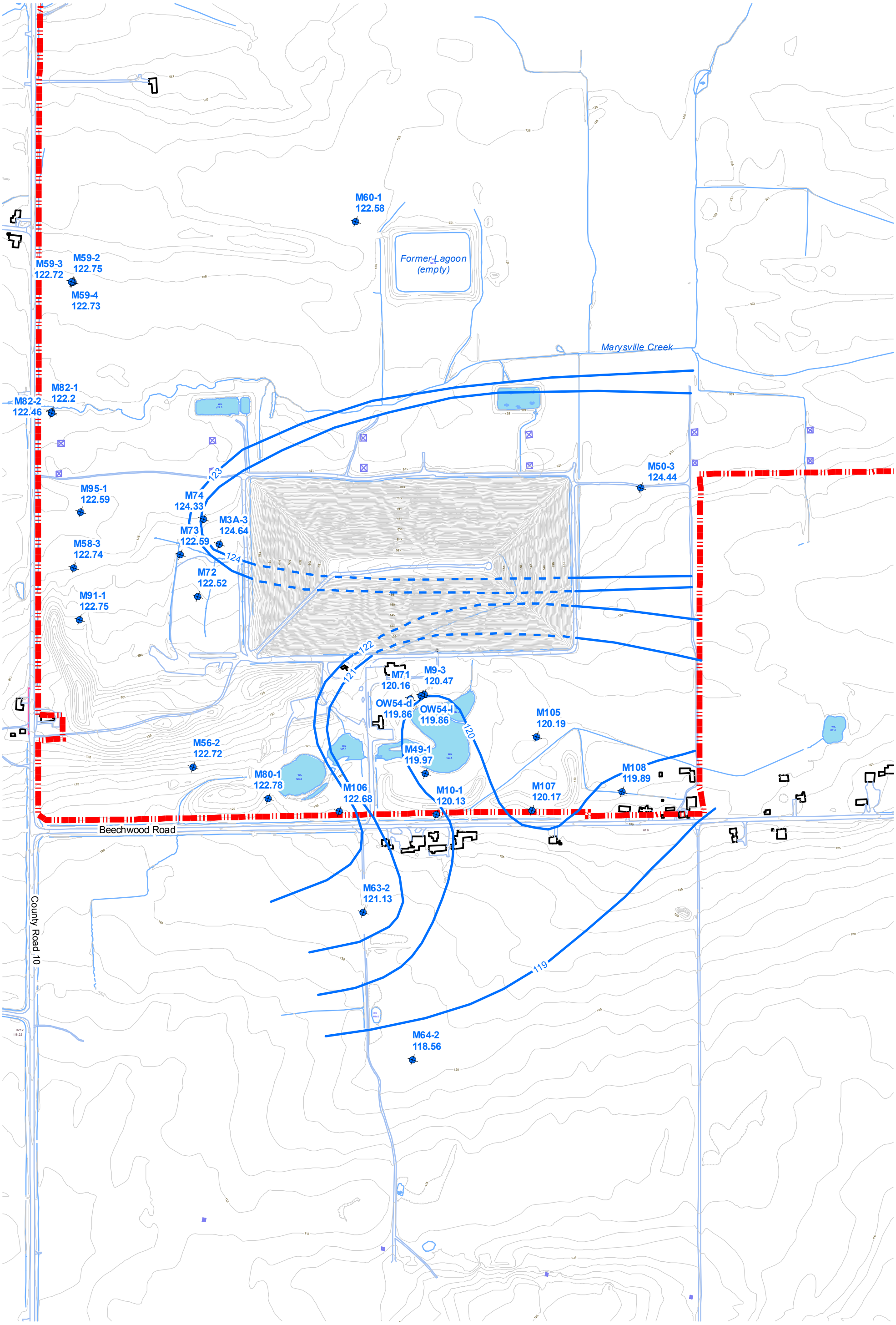

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M58-3 Intermediate Groundwater Zone Elevation Monitor
Topographic Contour Lines
Potentiometric Surface (masl)
Hydro Tower
Surface Water
Property Boundary

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: October 2013

50 25 0 50 100
Meters

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

Figure 3c:
Intermediate Bedrock Groundwater Flow Zone Potentiometric Surface - October 16, 2013

Table 2: Groundwater Quality Results - October 2013

Name	Date	Alkalinity	Ammonia	Arsenic	Barium	Biochemical Oxygen Demand	Boron	Cadmium	Calcium	Chemical Oxygen Demand	Chloride	Chromium	Conductivity	Copper	Dissolved Organic Carbon	Hardness	Iron	Lead	Magnesium	Manganese	Mercury	Naphthalene	Nitrate	Nitrite	pH (Lab)	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Kjeldahl Nitrogen	Zinc
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Shallow Groundwater Flow Zone[1]																																	
M66-2	21/10/2013	340	0.18	0.0014	0.028	< 2	1	< 0.0001	120	15	140	0.025	1640	< 0.001	1.7	480	0.37	< 0.0005	44	0.016	< 0.0002	< 0.0005	< 0.1	< 0.01	7.94	< 0.001	< 0.15	7.4	170	310	1030	1	< 0.005
M67-2	22/10/2013	360	1.2	0.0012	0.22	< 2	0.76	< 0.0001	49	9.9	5	0.0071	723	< 0.001	1.8	240	0.45	< 0.0005	28	0.052	< 0.0002	< 0.0005	< 0.1	0.016	8.13	0.0011	0.15	8.6	58	24	402	6.2	< 0.005
M101	22/10/2013	430	0.17	< 0.001	0.18	< 2	0.063	< 0.0001	160	11	78	0.01	1160	< 0.001	6.2	600	< 0.1	< 0.0005	50	0.024	< 0.0002	< 0.0005	< 0.1	< 0.01	7.65	< 0.001	0.31	3.7	17	87	666	0.8	0.0051
M102	22/10/2013	430	< 0.15	< 0.001	0.13	< 2	0.055	< 0.0001	140	7	26	0.0082	953	< 0.001	2.5	480	0.61	< 0.0005	31	0.054	< 0.0002	< 0.0005	< 0.1	0.01	7.78	< 0.001	0.25	2.6	25	58	592	0.8	< 0.005
M103	22/10/2013	820	0.18	0.0016	0.21	< 2	0.31	< 0.0001	160	18	170	< 0.005	2030	< 0.001	5.7	830	0.15	< 0.0005	100	0.034	< 0.0002	< 0.0005	< 0.1	< 0.01	7.54	< 0.001	0.26	7.6	140	45	1100	1.2	< 0.005
Intermediate BedrockGroundwater Flow Zone																																	
M5-3	21/10/2013	450	1.4	< 0.001	0.19	4	1.2	< 0.0001	36	18	39	< 0.005	997	< 0.001	1.4	200	< 0.1	< 0.0005	28	0.0032	< 0.0002	< 0.0005	< 0.1	< 0.01	7.99	0.011	< 0.06	14	150	20	556	1.6	< 0.005
M6-3	21/10/2013	1000	4.08	< 0.002	1.8	< 2	0.17	< 0.0001	880	150	1300	0.021	8170	0.0043	48	2200	< 0.1	0.00083	0.098	< 0.002	< 0.0002	< 0.0013	< 0.1	0.28	12.1	0.019	< 0.6	61	560	59	3790	8	< 0.005
M74	23/10/2013	310	1.16	< 0.001	0.11	9	0.95	< 0.0001	35	25	13	< 0.005	652	< 0.001	1.3	180	< 0.1	< 0.0005	23	0.027	< 0.0002	< 0.0005	< 0.1	< 0.01	8.19	< 0.001	0.55	12	77	26	382	2	< 0.005
M75	21/10/2013	440	2.02	< 0.001	0.072	< 2	1.4	< 0.0001	32	63	80	< 0.005	1200	< 0.001	1.4	160	< 0.1	< 0.0005	21	0.019	< 0.0002	< 0.0005	< 0.1	0.01	8.13	< 0.001	1.1	17	190	83	698	16	< 0.005

[1] Shallow groundwater monitoring well M29 was not sampled; insufficient water for sampling.

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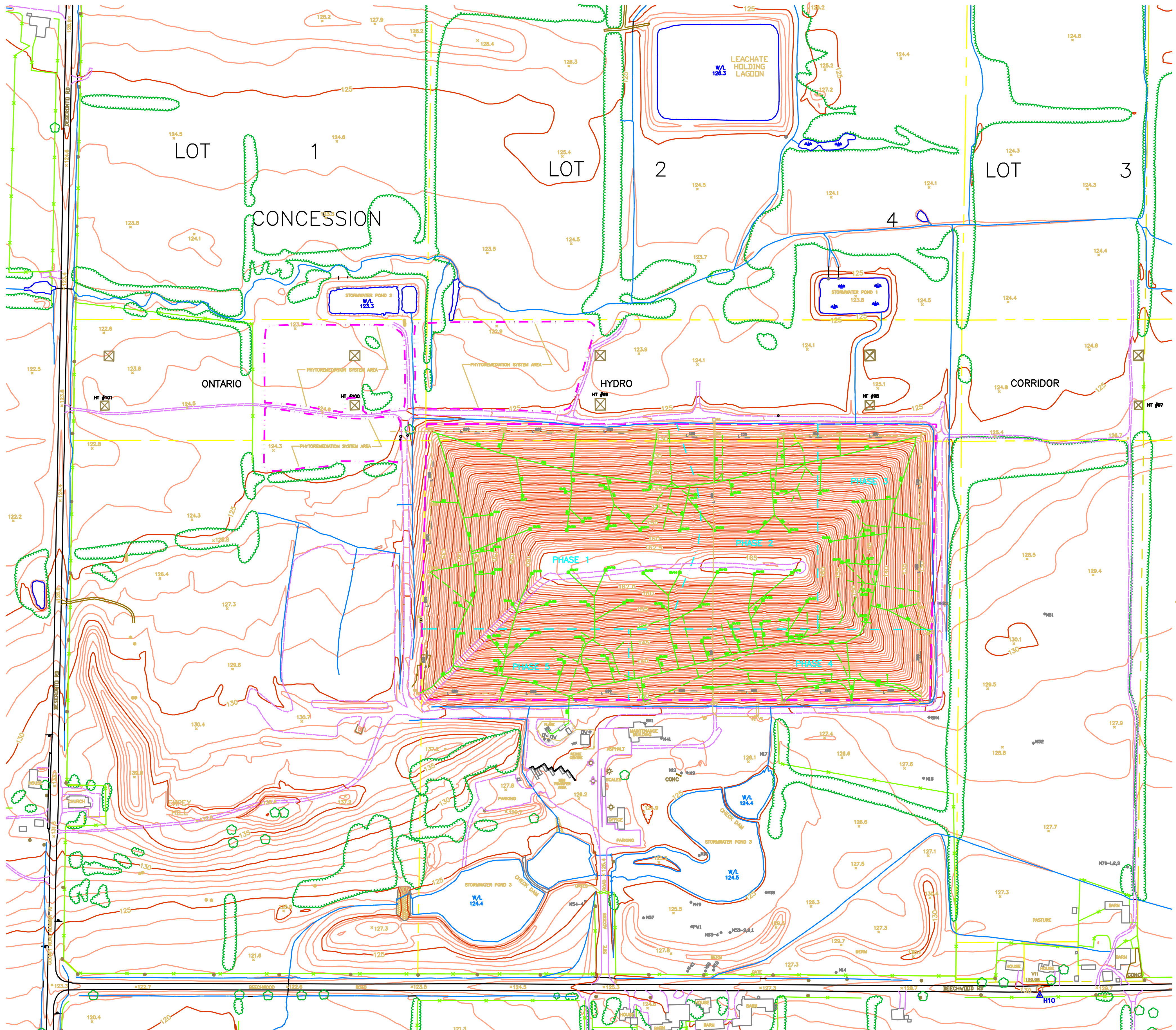
Appendix J

SITE PLAN – 2012 EXISTING CONDITIONS



LEGEND:

- INDEX CONTOURS
- INTERVAL CONTOURS
- REFERENCE GRID LINE
- LEGAL BOUNDARIES
- APPROVED LIMIT OF LANDFILL
- PHASING LIMITS
- EXISTING DRAINAGE DITCH
- EXISTING WEEPER
- EXISTING GAS LATERAL
- EXISTING FENCE LINE
- EXISTING TREE LINE
- HT #98 EXISTING HYDRO TOWER (ID #)
- EXISTING HYDRO POLE
- EXISTING ROAD EDGE
- BEDROCK WELL LOCATION
- GAS MONITOR LOCATION
- OVERBURDEN WELL LOCATION
- MH3 EXISTING LEACHATE MANHOLE
- GW GAS WELL
- EXISTING TREE

NOTES:

1) EXISTING GROUND CONTOURS AND TOPOGRAPHIC INFORMATION SHOWN IS BASED ON INFORMATION OBTAINED FROM AERIAL PHOTOGRAPHY FLOWN ON JUNE 27, 2009 BY BASE MAPPING. WELL LOCATIONS AND LANDFILL MOUND CONTOURS WERE UPDATED FROM FIELD SURVEY DATA BY GENIVAR INC ON NOVEMBER 2011 AND FEBRUARY 22, 2012

2) CONTOUR INTERVAL SHOWN IS 0.5m

3) THE LOCAL SITE GRID IS BASED ON 0+000N BEING THE NORTH LANDFILL LIMIT. THE NORTH WEST CORNER OF THE LANDFILL LIMIT IS 0+300E AND IS PERPENDICULAR TO THE EAST/WEST GRID LINE. THE WEST LIMIT OF THE LANDFILL IS LOCATED ALONG THE LOT LINE BETWEEN LOTS 1 AND 2, CONCESSION 4.

4) THE PHYTOREMEDIATION SYSTEM IN THE NORTHWEST CORNER OF THE LANDFILL WAS PLANTED IN THE SPRING OF 2011. DUE TO WET CONDITIONS AND POOR GROWTH, ALL AREAS WERE PLOWED UNDER IN SEPTEMBER 2012, AND GROUND CONDIITONS WERE REWORKED. ALL AREAS WILL BE REPLANTED IN SPRING 2013.

B.M. #1 ELEV. = 124.667

TOP OF BRACKET, NORTH WEST LEG OF HYDRO TOWER No. 99. LOCATED ±25m NORTH AND ±180m EAST OF NORTH WEST CORNER OF APPROVED LANDFILL LIMIT.

B.M. #2 ELEV. = 125.146

TOP OF BRACKET, NORTH WEST LEG OF HYDRO TOWER No. 100. LOCATED ±25m NORTH AND ±80m WEST OF NORTH WEST CORNER OF APPROVED LANDFILL LIMIT.

SCALE : 1:2000

0 100 200m

DATE	DESCRIPTION	APP BY

GENIVAR
1450 1st Ave W, Suite 101, Owen Sound, ON, N4K 6W2
Telephone: (519) 376-7612 / Fax: (519) 376-8008
Toll Free: 1-888-376-7612

WASTE MANAGEMENT

SITE PLAN
2012 EXISTING CONDITIONS
RICHMOND LANDFILL
NAPANEE, ONTARIO

DWN BY: B D L
CHK BY: J E A
DATE: AUGUST 14, 2014
SCALE: SEE BAR SCALE

WASTE MANAGEMENT OF CANADA CORP.

DRAWING NO. 0857013 - 2012 EXCO

SHEET 2012