

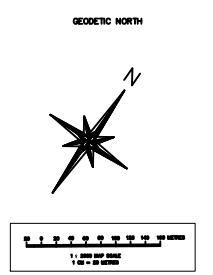
CAD FILE: B8831-FIGURE 13C

- LEGEND :**
- LEGAL FABRIC
 - EXISTING DITCH, SWALE
 - EXISTING FENCE LINE
 - EXISTING ASPHALT ROADS
 - EXISTING GRAVEL ROADS
 - EXISTING GUIDE RAIL
 - EXISTING HYDRO POLES
 - WETLAND
 - EXISTING BUILDINGS

● DEEP BEDROCK MONITORING WELLS
 124.73 GROUNDWATER ELEVATION - AUGUST 2011 (masl)

- LEGEND**
- SHORELINE / WATER ELEVATION
 - DITCH / STREAM / CULVERT
 - MARSH
 - BUILDING
 - PEIZOMETRE
 - POST
 - ROAD SIGN
 - MANHOLE
 - CATCH BASIN
 - HYDRO POLE
 - LIGHT STANDARD
 - FIRE HYDRANT
 - MISC. AREA OUTLINE
 - PAVED / CURBED / LOOSE ROAD
 - PAVED / LOOSE PARKING

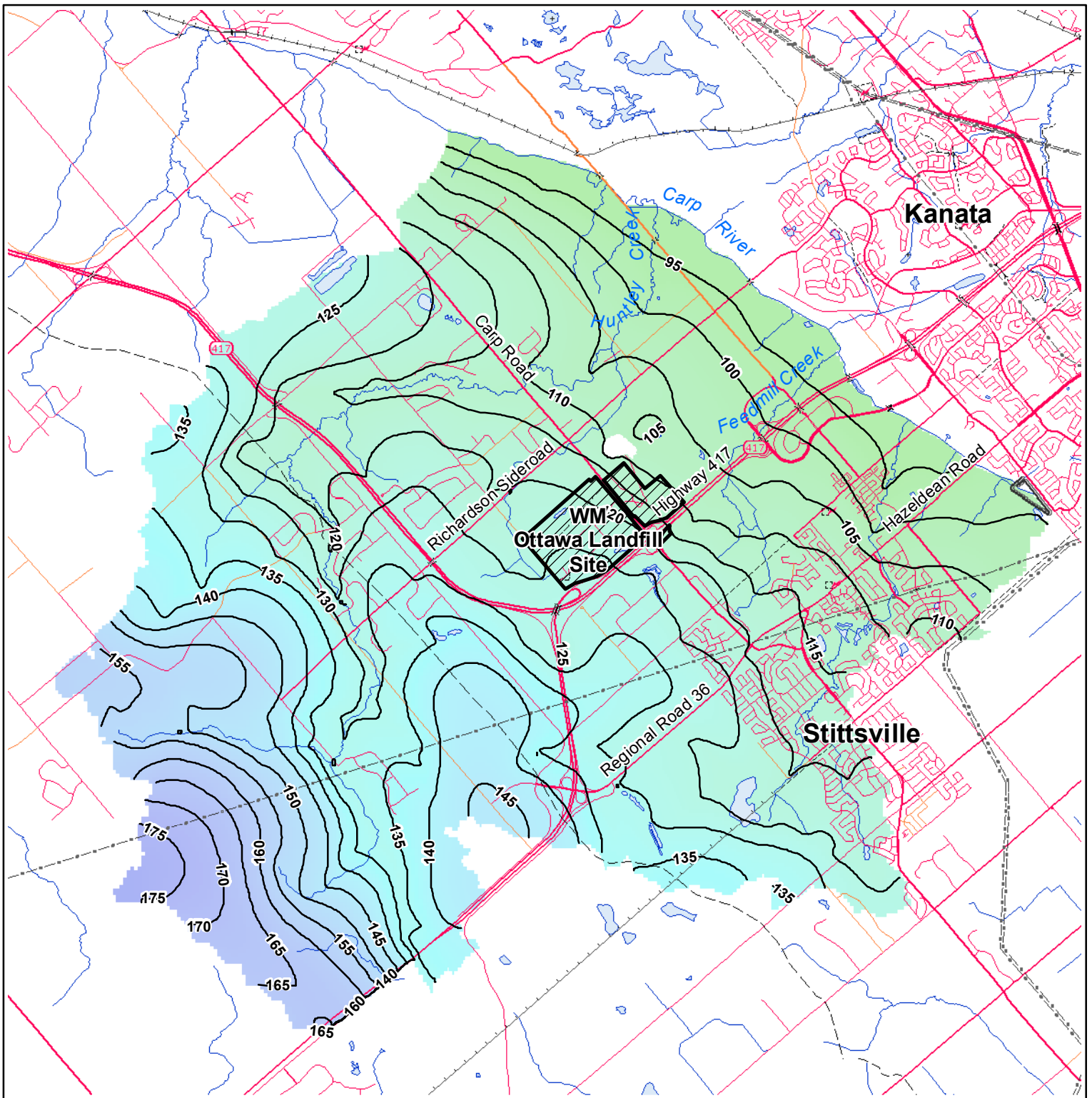
WASTE MANAGEMENT 2301 CAMP ROAD, R.R. 3 CARR, ONTARIO K0A 1L0 TEL: (613) 838-2481			
MAP SCALE 1:2000	CONTOUR INT. 1 METRE	HORIZ. DATUM NAD 27	VERTICAL DATUM GEODETIC
PHOTO SCALE 1:4000	PHOTO DATE JUNE 29, 2007	CONTRACT NO. 2124-07	
PROJECT LOCATION TRP. OF W. CARLETON			
BASE MAPPING 37-81 ALBERCA DRIVE, OTTAWA, ONTARIO K2E 7V0 TEL: 613 723-9100 FAX: 613 723-9089 WWW.BASEMAP.CA			



GROUNDWATER ELEVATIONS,
 DEEP BEDROCK (AUGUST 2011)
 WEST CARLETON ENVIRONMENTAL CENTRE
 OTTAWA, ONTARIO

DATE: 07/09/11
 SCALE: AS SHOWN
 DWN BY: C.M.R.
 CHK BY: J.H.
WM - OTTAWA LANDFILL SITE

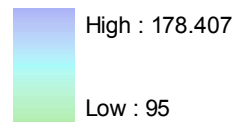
FIGURE:
 13(c)



LEGEND

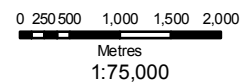
— Simulated Head (masl)

Simulated Head (masl)



REFERENCE

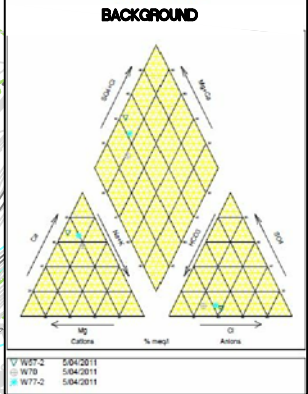
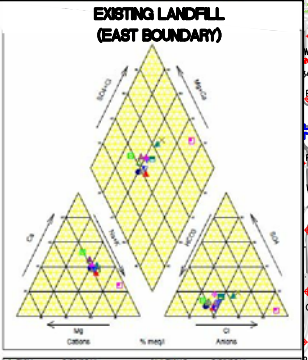
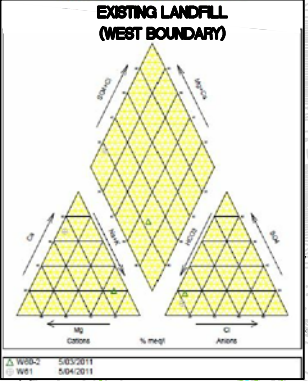
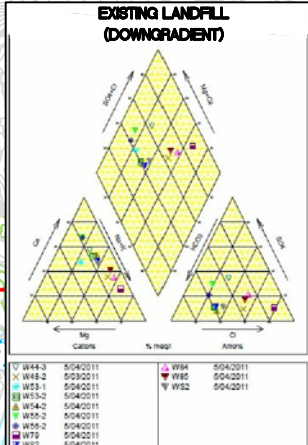
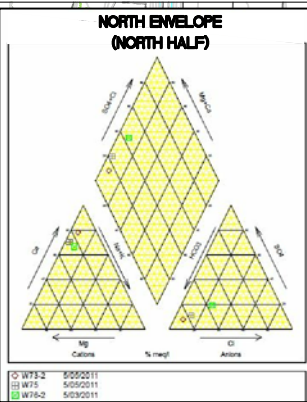
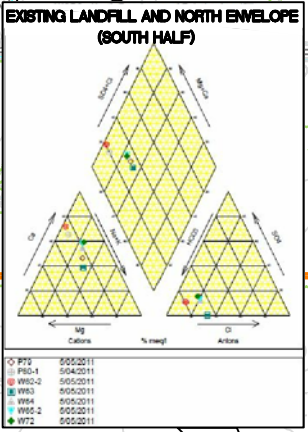
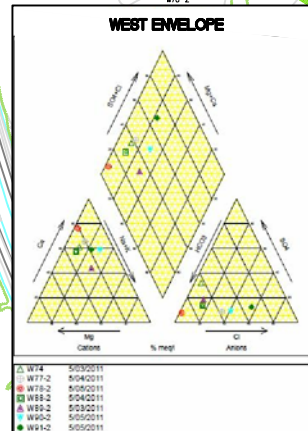
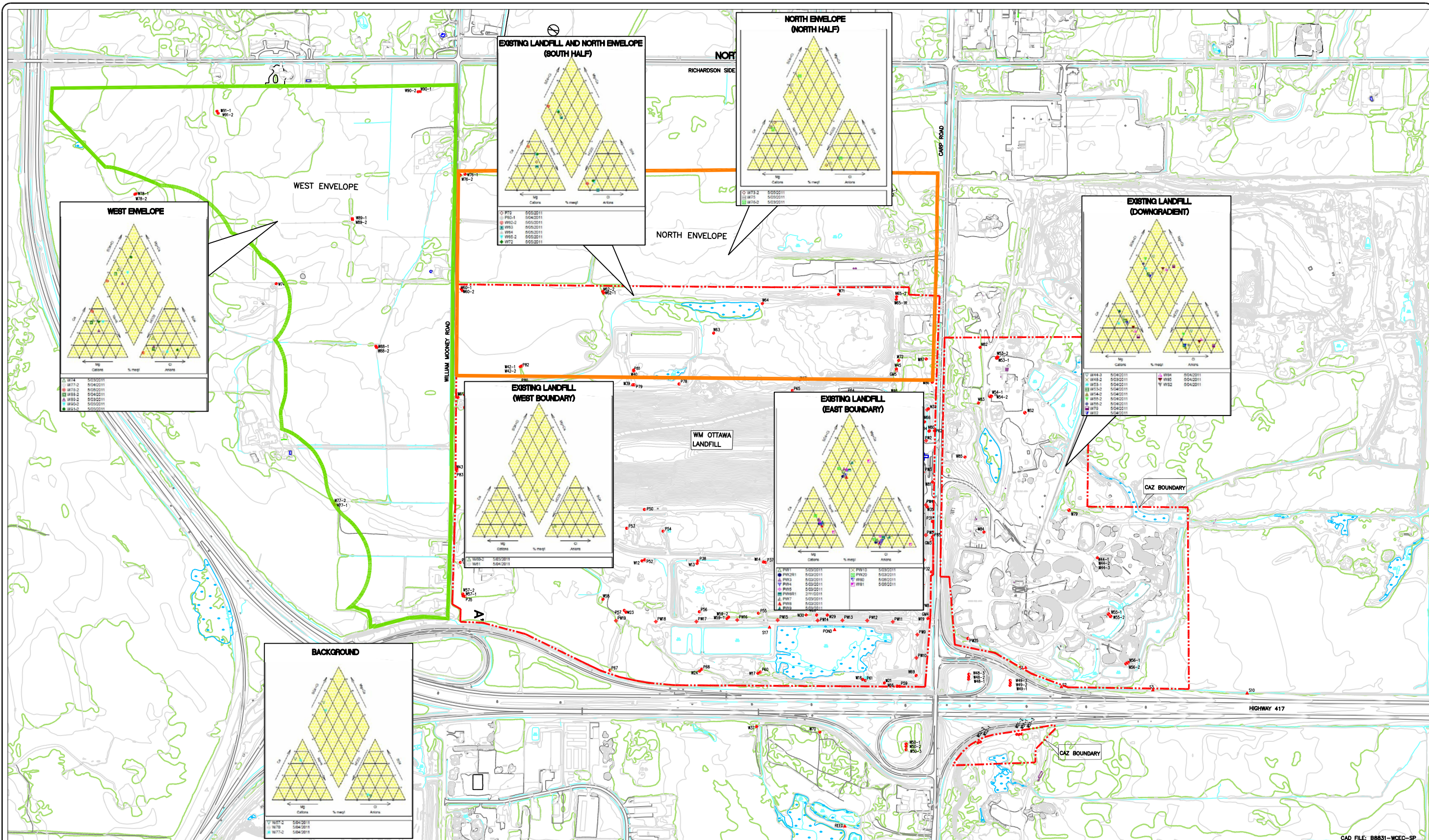
Source:
 -Toporama, LIO 2011
 -North American Datum 1983, Zone 18 N.



PROJECT WASTE MANAGEMENT
 WEST CARLETON ENVIRONMENTAL CENTRE

TITLE SIMULATED GROUNDWATER ELEVATIONS
 NUMERICAL MODELING

	PROJECT No. CB8831-00-01	<p>FIGURE 14</p>
	DESIGN JFD	
	GIS JFD 08/05/2011	
	CHECK DH	
	REVIEW	



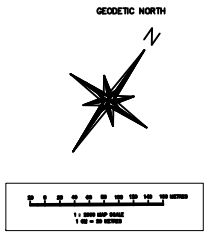
LEGEND :

	WM PROPERTY BOUNDARY (APPROX)
	EXISTING DITCH, SWALE
	EXISTING FENCE LINE
	EXISTING ASPHALT ROADS
	EXISTING GRAVEL ROADS
	EXISTING TREE LINE
	EXISTING HYDRO POLES
	EXISTING BUILDINGS

MONITOR SYMBOLS

	P59	DENOTES OVERBURDEN WELL
	W37	DENOTES BEDROCK WELL
	S1	DENOTES SURFACE WATER SAMPLING LOCATION
	GM3	DENOTES GAS MONITOR / WELL
	PW1	DENOTES PURGE WELL

WASTE MANAGEMENT 2301 CAMP ROAD, R.R. 3 CAMP, ONTARIO R0A 1L0 TEL: (913) 838-2481			
MAP SCALE 1:2000	CONTOUR INT. 1 METRE	HORIZ. DATUM NAD 27	VERTICAL DATUM GEODEIC
PHOTO SCALE 1:4000	PHOTO DATE JUNE 28, 2007	CONTRACT NO. 2124-07	
PROJECT LOCATION TWP. OF N. CARLETON		 <small>37-81 ALBION DRIVE, OTTAWA, ONTARIO K2E 7G3 TEL: 613 752-8800 FAX: 613 752-8800 WWW.BASEMAPPING.CA</small>	



PIPER WATER QUALITY DIAGRAMS
FOR DETAILED STUDY AREA
WEST CARLETON ENVIRONMENTAL CENTRE
OTTAWA, ONTARIO

WM - OTTAWA LANDFILL SITE
DATE: 30/05/11
SCALE: AS SHOWN
DWN BY: C.M.R.
CHK BY: D.H.

FIGURE:
15

CAD FILE: B8831-WCEC-SP

Tables



Table 1: Summary of Vertical Hydraulic Gradients

Monitors (deep/shallow)	Vertical Hydraulic Gradients				
	Apr. 26/05	May 21/08	Apr. 26/10	Jan. 19/11	Apr. 27/11
W42-1/W42-2	↓	↓	↓	↓	↓
W44-1/W44-3	↓	↓	↓	↓	↓
W46-1/W46-2	↓	↓	↓	↓	↓
W48-1/W48-2	↓	↓	↓	↓	↓
W50-1/W50-2	↓	↓	↓	↓	↓
W53-1/W53-2	↓	↓	↓	↓	↓
W54-1/W54-2	↓	↓	↓	↓	↓
W55-1/W55-2	↓	n.m.	n.m.	↓	n.m.
W56-1/W56-2	↓	↓	↓	↓	↓
W57-1/W57-2	↑	↓	↓	↓	↓
W59-1/W59-2	↓	↓	↓	↓	↓
W60-1/W60-2	↑	↓	↓	↑	↓
W62-1/W62-2	↓	↓	↓	↓	↑
W65-1R/W65-2	↓	↓	↓	↓	↓
W67-1/W67-2	↑	↓	↓	↓	↓
W73-1/W73-2	n.a.	n.m.	n.m.	↓	↓
W76-1/W76-2	n.a.	no vertical gradient	no vertical gradient	↓	↓
W77-1/W77-2	n.a.	↓	↑	↓	↑
W78-1/W78-2	n.a.	n.m.	n.m.	↓	↓
W88-1/W88-2 ¹	n.a.	n.a.	n.a.	n.a.	↑
W89-1/W89-2 ¹	n.a.	n.a.	n.a.	n.a.	↑
W90-1/W90-2 ¹	n.a.	n.a.	n.a.	n.a.	↑
W91-1/W91-2 ¹	n.a.	n.a.	n.a.	n.a.	↓

n.m. - denotes water levels not measured.

n.a. - denotes data not available (monitoring wells not yet installed).

1 - water levels in these monitoring wells may not have equilibrated following drilling at time of measurement.

Table 2 - Summary of Hydraulic Testing Results

Borehole	Area	Hydraulic Conductivity (m/s)
W57-2	Existing Landfill	1.6E-05
W58		2.3E-05
W59-2		4.0E-06
W61		9.1E-06
W66		>2.8E-04
W67-2		>2.8E-04
W68		>2.8E-04
W69		1.9E-04
W70		6.7E-06
W72		1.6E-04
W53-1	Existing Landfill; downgradient	6.5E-06
W53-2		4.7E-06
W55-2		1.4E-05
W56-2		1.2E-05
W84		9.5E-06
W85		8.9E-06
W86		1.4E-05
W60-2	Existing Landfill; North Envelope	5.2E-05
W62-2		7.1E-06
W63		3.6E-05
W64		>2.8E-04
W65-2		>2.8E-04
W73-2	North Envelope	>1.0E-03
W75		2.4E-04
W76-2		>1.0E-03
W74	West Envelope	1.9E-05
W77-2		3.3E-04
W78-2		3.1E-04
W88-2		1.4E-05
W89-2		>1.0E-03
W90-2		>1.0E-03
W91-2		2.7E-05

(b) Packer Test Results

Borehole	Area	Mid-Packer Depth below Bedrock Surface (m)						Hydraulic Conductivity (m/s)
		2.7	5.5	8.0	10.5	13.0		
W57-1	Existing Landfill	9.3E-07	1.2E-08	3.6E-08	3.6E-09	1.2E-08		
W59-1	Existing Landfill	1.5	4.1	6.5	8.9	11.3	13.7	
W60-1	Existing Landfill; North Envelope	7.8E-07	<1.0E-11	6.9E-08	3.5E-10	1.0E-07	4.3E-07	
W62-1	Existing Landfill; North Envelope	1.3	3.8	6.4	8.9	11.6	13.9	
W65-1	Existing Landfill; North Envelope	1.1E-06	3.7E-10	8.4E-09	8.1E-10	1.9E-07	9.7E-08	
W73-1	Existing Landfill; North Envelope	1.6	3.3	6.1	8.3	10.6	12.9	
W76-1	North Footprint	4.0E-07	1.9E-08	2.6E-08	<1.0E-11	9.7E-07	<1.0E-11	
W77-1	North Footprint	1.2	3.6	6.1	8.5	11		
W78-1	North Footprint	4.8E-09	2.1E-11	4.1E-07	1.3E-09	1.1E-08		
W79-1	North Footprint	4.0	6.0	8.0	10.0	12.0		
W84-1	North Footprint	2.8E-08	4.4E-08	6.9E-09	5.5E-10	3.6E-08		
W85-1	North Footprint	3.0	4.2	6.2	8.2			
W86-1	North Footprint	2.0E-06	1.3E-06	1.1E-06	1.2E-06			
W87-1	West Footprint	4.1	6.1	8.1	10.1			
W88-1	West Footprint	5.1E-07	1.8E-11	4.2E-07	2.4E-07			
W89-1	West Footprint	2.9	4.3	6.3	8.3	10.3	12.3	
W90-1	West Footprint	9.2E-07	8.0E-07	2.9E-07	5.8E-07	8.9E-07	8.8E-07	
W91-1	West Footprint	0.3	1.4	2.6	4.8	7.0	9.2	
W92-1	West Footprint	3.3E-06	8.4E-06	7.6E-06	3.9E-06	3.4E-06	4.1E-06	
W93-1	West Footprint	0.7	1.6	2.8	5.0	7.2	9.4	
W94-1	West Footprint	4.6E-05	3.3E-05	2.7E-05	2.8E-06	3.6E-06	2.6E-06	
W95-1	West Footprint	2.4	3.7	5.4	7.6	9.8	12.0	
W96-1	West Footprint	5.0E-05	3.4E-05	2.7E-06	2.9E-06	2.7E-06	1.9E-06	
W97-1	West Footprint	2.4	3.7	5.4	7.6	9.8	12.0	
W98-1	West Footprint	8.4E-07	8.5E-07	5.2E-07	3.2E-07	1.3E-05	5.8E-06	
W99-1	West Footprint							
W100-1	West Footprint							
W101-1	West Footprint							
W102-1	West Footprint							
W103-1	West Footprint							
W104-1	West Footprint							
W105-1	West Footprint							
W106-1	West Footprint							
W107-1	West Footprint							
W108-1	West Footprint							
W109-1	West Footprint							
W110-1	West Footprint							
W111-1	West Footprint							
W112-1	West Footprint							
W113-1	West Footprint							
W114-1	West Footprint							
W115-1	West Footprint							
W116-1	West Footprint							
W117-1	West Footprint							
W118-1	West Footprint							
W119-1	West Footprint							
W120-1	West Footprint							
W121-1	West Footprint							
W122-1	West Footprint							
W123-1	West Footprint							
W124-1	West Footprint							
W125-1	West Footprint							
W126-1	West Footprint							
W127-1	West Footprint							
W128-1	West Footprint							
W129-1	West Footprint							
W130-1	West Footprint							
W131-1	West Footprint							
W132-1	West Footprint							
W133-1	West Footprint							
W134-1	West Footprint							
W135-1	West Footprint							
W136-1	West Footprint							
W137-1	West Footprint							
W138-1	West Footprint							
W139-1	West Footprint							
W140-1	West Footprint							
W141-1	West Footprint							
W142-1	West Footprint							
W143-1	West Footprint							
W144-1	West Footprint							
W145-1	West Footprint							
W146-1	West Footprint							
W147-1	West Footprint							
W148-1	West Footprint							
W149-1	West Footprint							
W150-1	West Footprint							
W151-1	West Footprint							
W152-1	West Footprint							
W153-1	West Footprint							
W154-1	West Footprint							
W155-1	West Footprint							
W156-1	West Footprint							
W157-1	West Footprint							
W158-1	West Footprint							
W159-1	West Footprint							
W160-1	West Footprint							
W161-1	West Footprint							
W162-1	West Footprint							
W163-1	West Footprint							
W164-1	West Footprint							
W165-1	West Footprint							
W166-1	West Footprint							
W167-1	West Footprint							
W168-1	West Footprint							
W169-1	West Footprint							
W170-1	West Footprint							
W171-1	West Footprint							
W172-1	West Footprint							
W173-1	West Footprint							
W174-1	West Footprint							
W175-1	West Footprint							
W176-1	West Footprint							
W177-1	West Footprint							
W178-1	West Footprint							
W179-1	West Footprint							
W180-1	West Footprint							
W181-1	West Footprint							
W182-1	West Footprint							
W183-1	West Footprint							
W184-1	West Footprint							
W185-1	West Footprint							
W186-1	West Footprint							
W187-1	West Footprint							
W188-1	West Footprint							
W189-1	West Footprint							
W190-1	West Footprint							
W191-1	West Footprint							
W192-1	West Footprint							
W193-1	West Footprint							
W194-1	West Footprint							
W195-1	West Footprint							
W196-1	West Footprint							
W197-1	West Footprint							
W198-1	West Footprint							
W199-1	West Footprint							
W200-1	West Footprint							