

5.0 GROUND PENETRATING RADAR SURVEY

KGS Group performed a Geophysical Survey using Ground Penetrating Radar (GPR) at 61 Princess Street on February 3rd, 2016 in order to help identify any buried objects or anomalies, such as potential underground storage tanks (USTs). Possible UST locations as identified in the Phase I ESA interviews included the northwest and southwest corners of the parking lot which were likely associated with a former service station on site.

5.1 SITE CONDITIONS AND FIELD OBSERVATIONS

Jonathan McInnis of KGS Group completed the GPR survey on February 3rd, 2016. The weather condition for the survey consisted of a temperature of -19°C cloudy and snowing. The City of Winnipeg parking lot surveyed was approximately 65 metres long by 22 metres wide. The surface of the parking lot was snow packed with no vehicles present at the time. The snow cover on the parking surface had no interference with the GPR Survey results.

5.2 RESULTS AND INTERPRETATION

The GPR survey data collected identified a number of areas on the subject property with buried object and anomalies including two potential UST locations, old building foundations, an underground pipe and scattered unknown anomalies throughout the site. The areas are described below with the locations identified on Figure 3. Figures 3A to 3E display the GPR log data (hyperbolas) of the specific transect lines which correspond to the identified areas of buried objects and anomalies in the areas of interest (A, B, C and D).

Areas A and B – Potential USTs

Two possible UST locations were identified on site. The two potential UST locations are labeled Area A and Area B in Figure 3 (yellow). The areas are situated in the northwest corner of the site near Princess Street. The potential UST (Area A) closest to Princess Street is approximately 0.8 to 1.0 metres below grade and approximately 2 metres wide as displayed in Figure 3A. The second potential UST (Area B) is located northeast of the first UST (Area A) and is approximately 0.4 to 0.5 metres below grade and 1.5 metres wide as displayed in Figure 3B.

Due to the dimensions of these targets, there is strong indication that these buried objects may be USTs.

Areas C and D – Possible Building Foundations

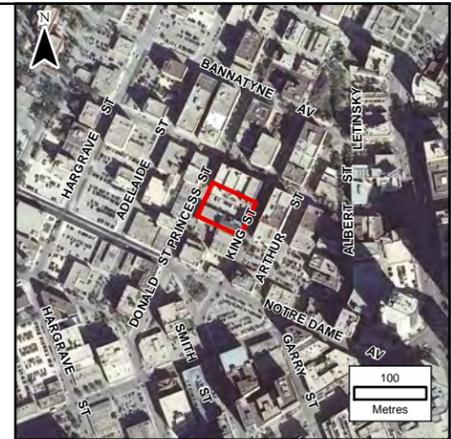
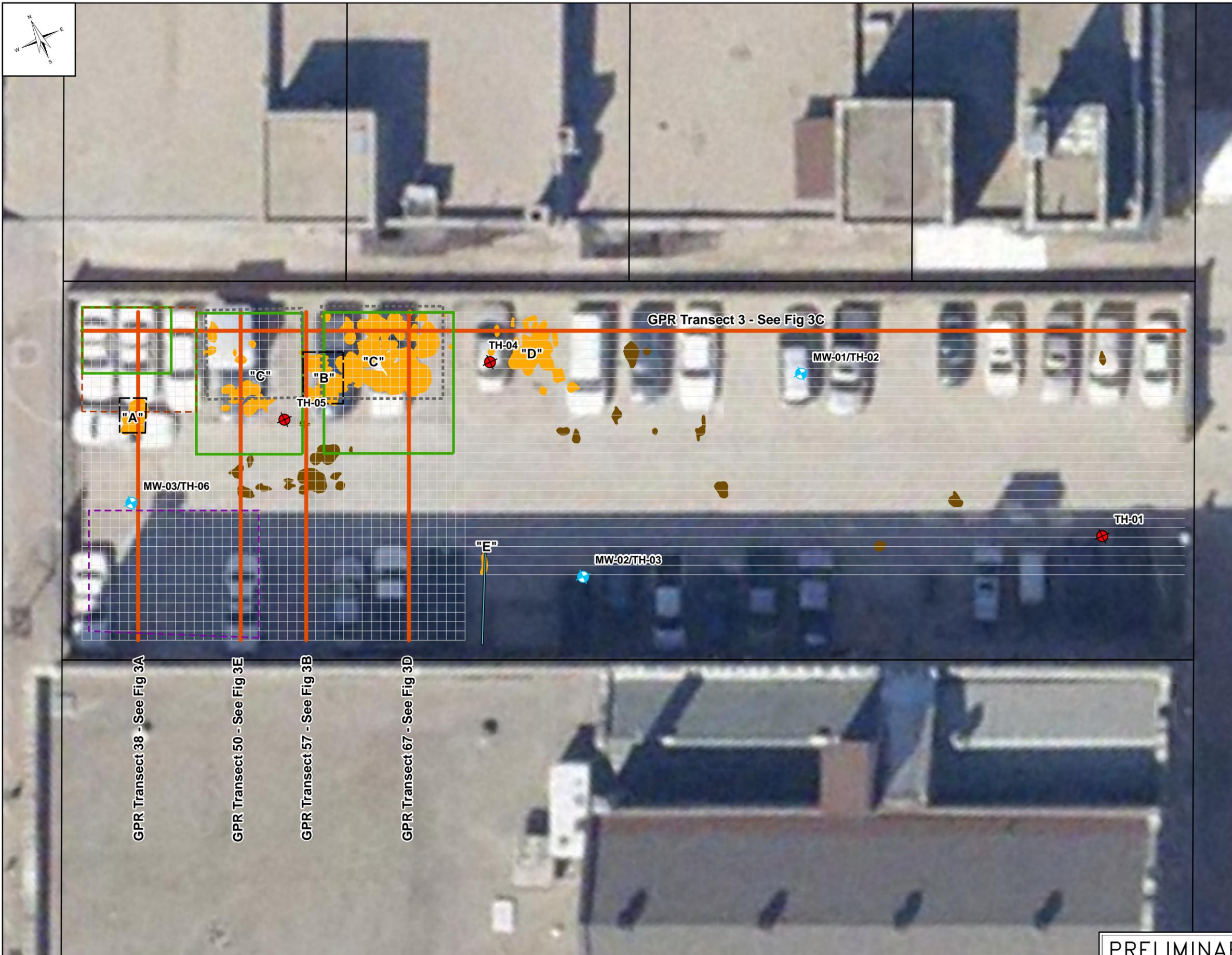
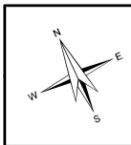
The completion of the GPR survey identified at least two old building footprints labeled Area C in Figure 3 (yellow). The foundations of the two old buildings were identified at approximately 0.5 metres below grade. The GPR logs of transect lines in this area display a distinct edge of the foundations with rubble inside it and the footprint of the foundations are continuous (Figures 3D and 3E). The locations of these two foundations roughly correspond to the historical buildings identified in the 1950 aerial photograph (Appendix B). A third potential building foundation was identified east of these two foundations displayed in Figure 3 and labeled as Area D. No distinct foundation footprint was identified, but a hard surface at 0.5 metres below grade was visible in the GPR log for the transect line in this area with rubble below it (Figure 3C). The close proximity of this area to the foundation footprints (Area C) indicates that it may be a possible third foundation, or remnants from the adjacent foundations or former buildings on site.

Area E - Underground Pipe

At a depth of approximately 0.5 metres, a Manitoba Hydro underground pipe labeled Area E in Figure 3 (yellow) was identified in the middle of the site entering into the southern building. This pipe is identifiable from its distinct target shape and hyperbolas displayed in the GPR log data.

Area F - Anomalies

A number of unknown anomalies were identified across the site and are labeled as Area F in Figure 3 (brown color). These anomalies shown in the figure do not resemble buried tanks, but are most likely buried concrete, rubble or boulders.

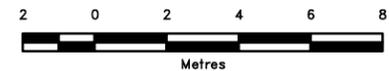


LEGEND:

- Monitoring Well (KGS Group)
- Testhole (KGS Group)
- MB Hydro Gas
- Potential Location UST's
- Historic 1950 Building Foundation Limits (GPR Survey)
- 1950 Building Footprint (Image)
- Rebar Limits
- Concrete Pad
- Property Lines (Approximate)
- GPR Transect
- GPR Anomalies
- GPR Anomalies "F"

NOTES:

1. GPR survey conducted by KGS Group Feb 3, 2016.
2. Image: City of Winnipeg, 2009.
3. Property Limit shown has been provided by City of Winnipeg.
4. All units are metric and in metres unless otherwise specified. Transverse Mercator Projection, NAD 1983, Zone 14. Elevations are in metres above sea level (MSL).



SCALE: 1:200 METRIC 11"x17"

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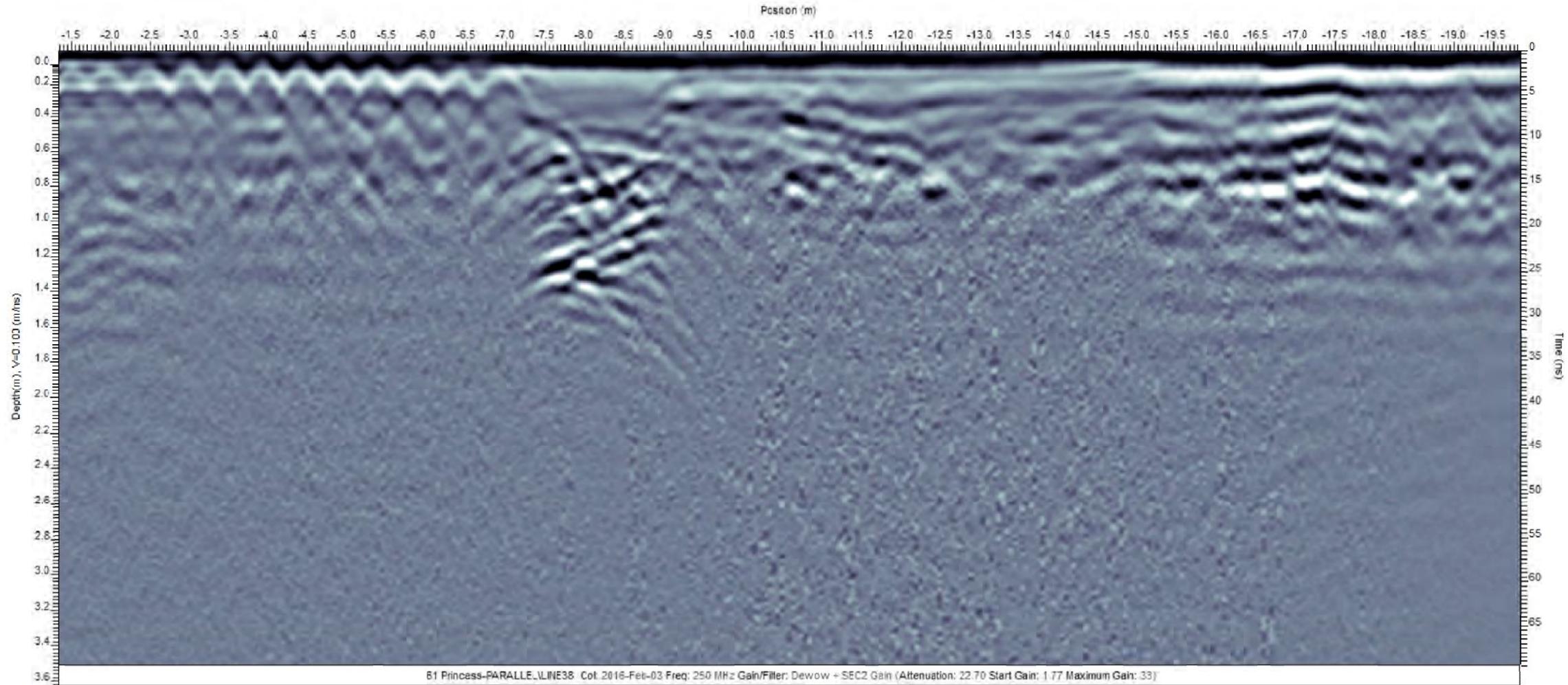
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COMBINED PHASE I/II ENVIRONMENT SITE ASSESSMENT (ESA)
61 PRINCESS STREET, WINNIPEG, MB

PRELIMINARY
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GPR SURVEY RESULTS	
JULY 2016	FIGURE 03
REV: 0	

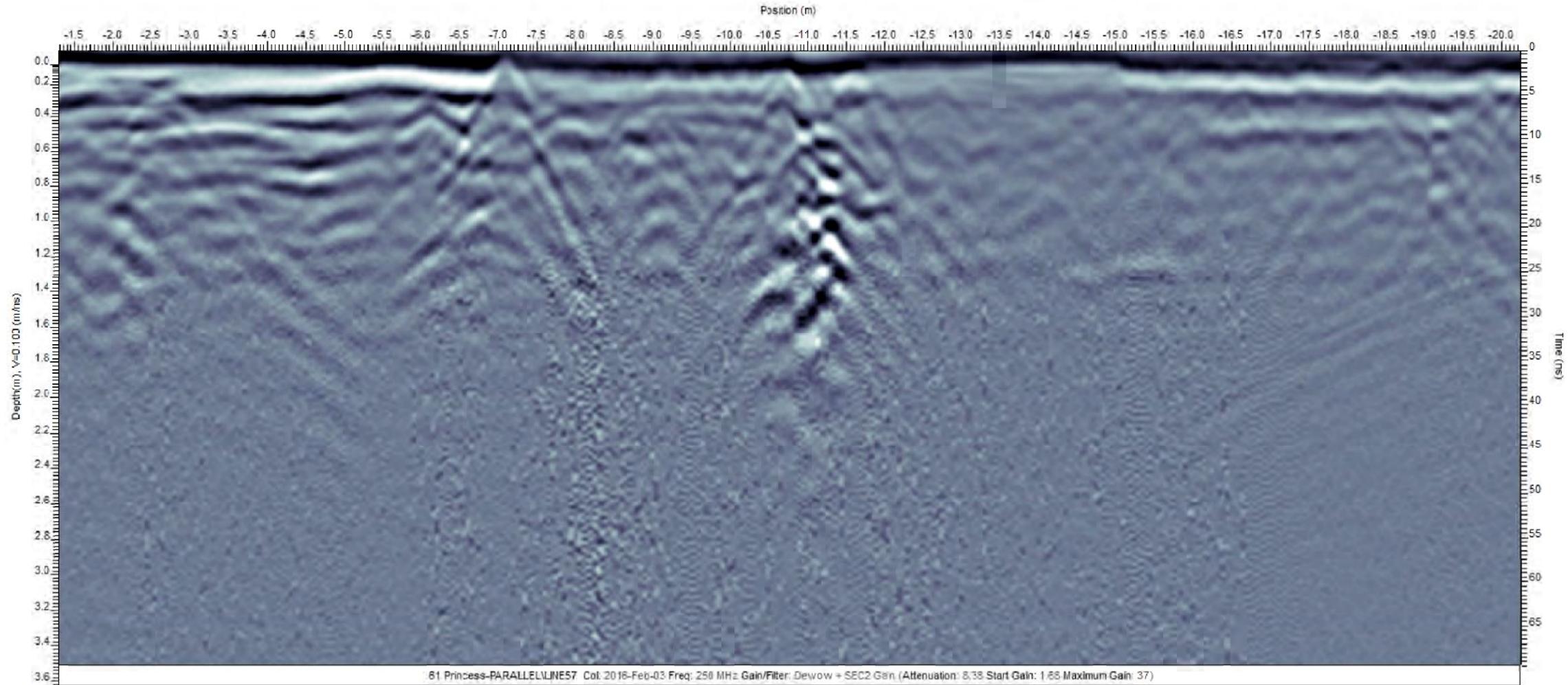
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 11"x17" PLOT SCALE 1:1



61 Princess-PARALLE_VLINE38 Cot. 2016-Feb-03 Freq: 250 MHz Gain/Filler: Dewow + SEC2 Gain (Attenuation: 22.70 Start Gain: 1.77 Maximum Gain: 33)

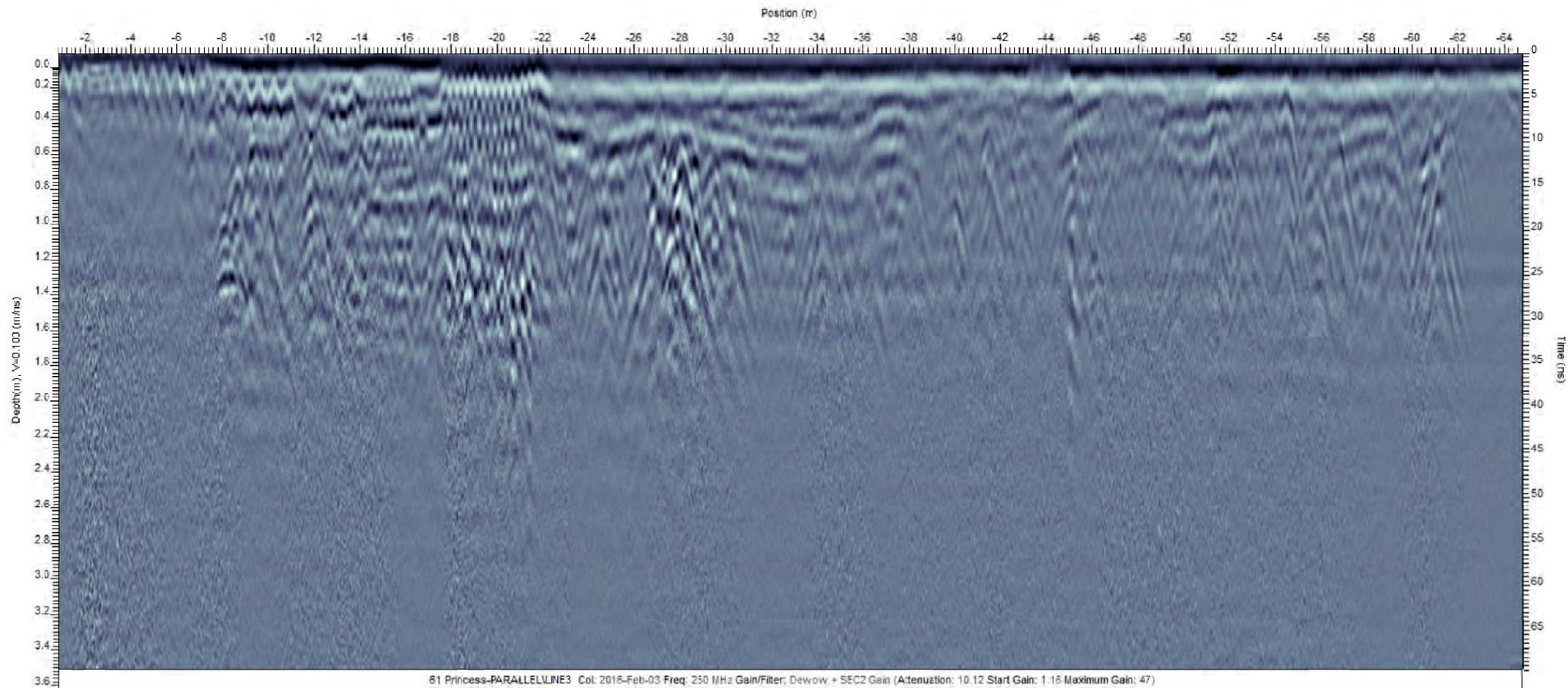
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COMBINED PHASE I/II ENVIRONMENT SITE ASSESSMENT (ESA) 61 PRINCESS STREET, WINNIPEG, MB				
GPR TRANSECT 38				
PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		JULY 2016	FIGURE 03A	REV: 0

File Name: P:\Projects\2016\16-0107-001\Dwg\GIS\MXD\GPR_Survey\Rev0\16-0107-001_Fig03B_Rev0.mxd
 11"x17" PLOT SCALE 1:1



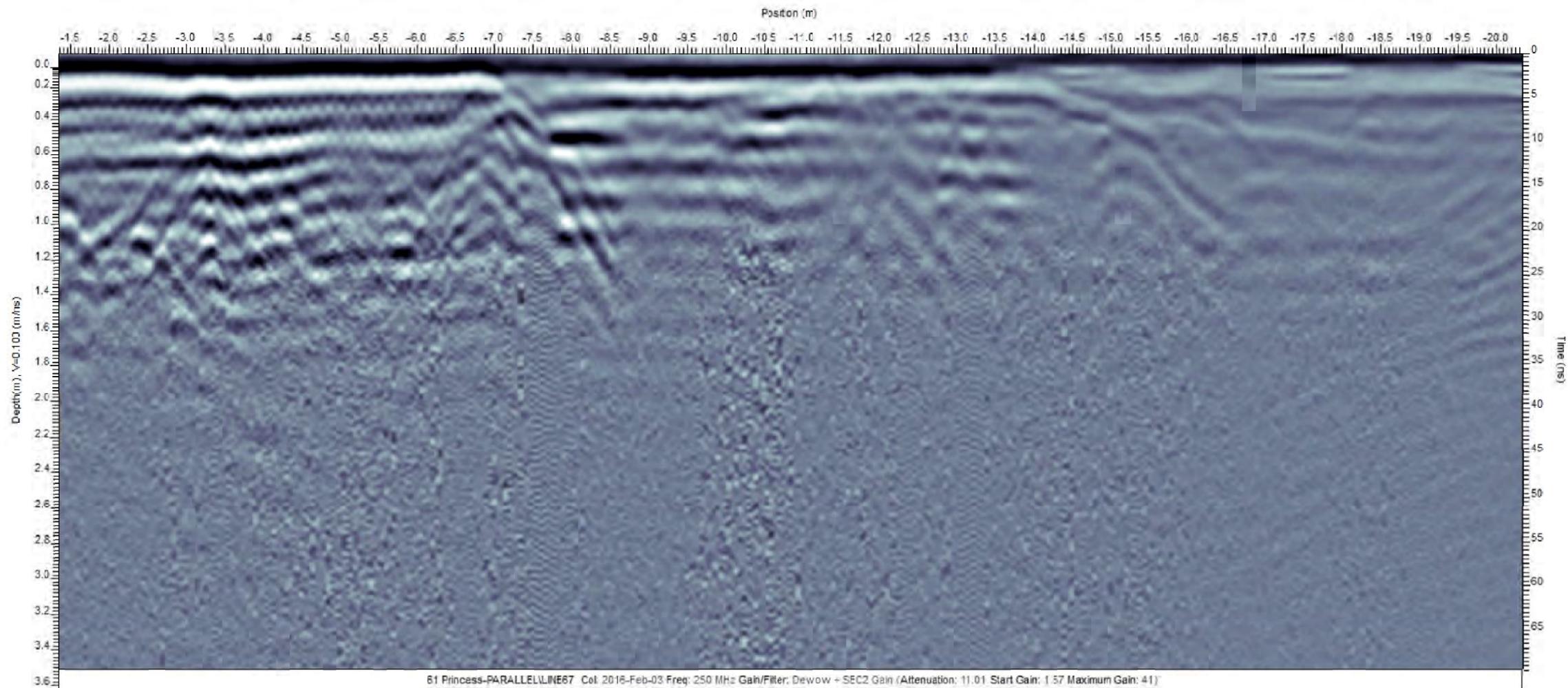
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COMBINED PHASE I/II ENVIRONMENT SITE ASSESSMENT (ESA) 61 PRINCESS STREET, WINNIPEG, MB				
GPR TRANSECT 57				
PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		JULY 2016	FIGURE 03B	REV: 0

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 11"x17" PLOT SCALE 1:1



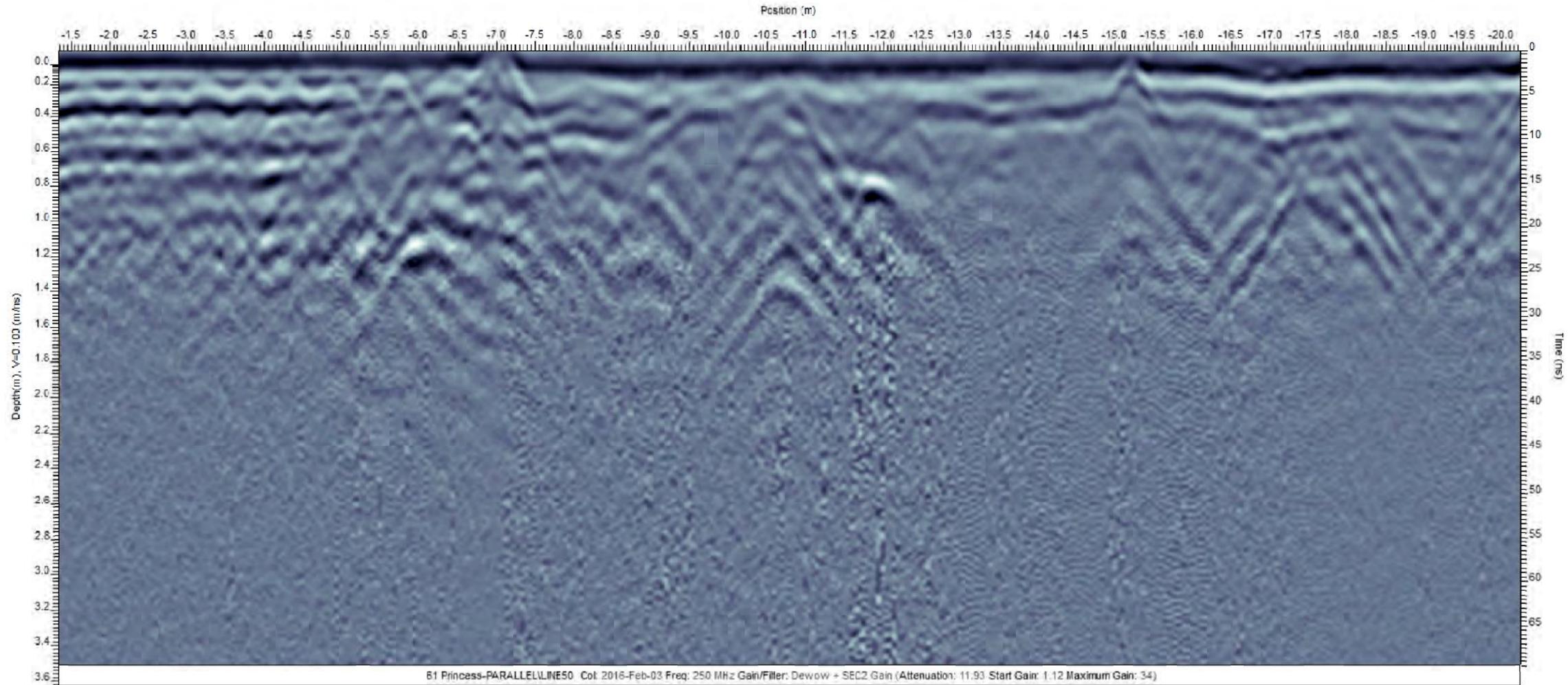
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COMBINED PHASE I/II ENVIRONMENT SITE ASSESSMENT (ESA) 61 PRINCESS STREET, WINNIPEG, MB				
GPR TRANSECT 3				
PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		JULY 2016	FIGURE 03C	REV: 0

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 11"x17" PLOT SCALE 1:1

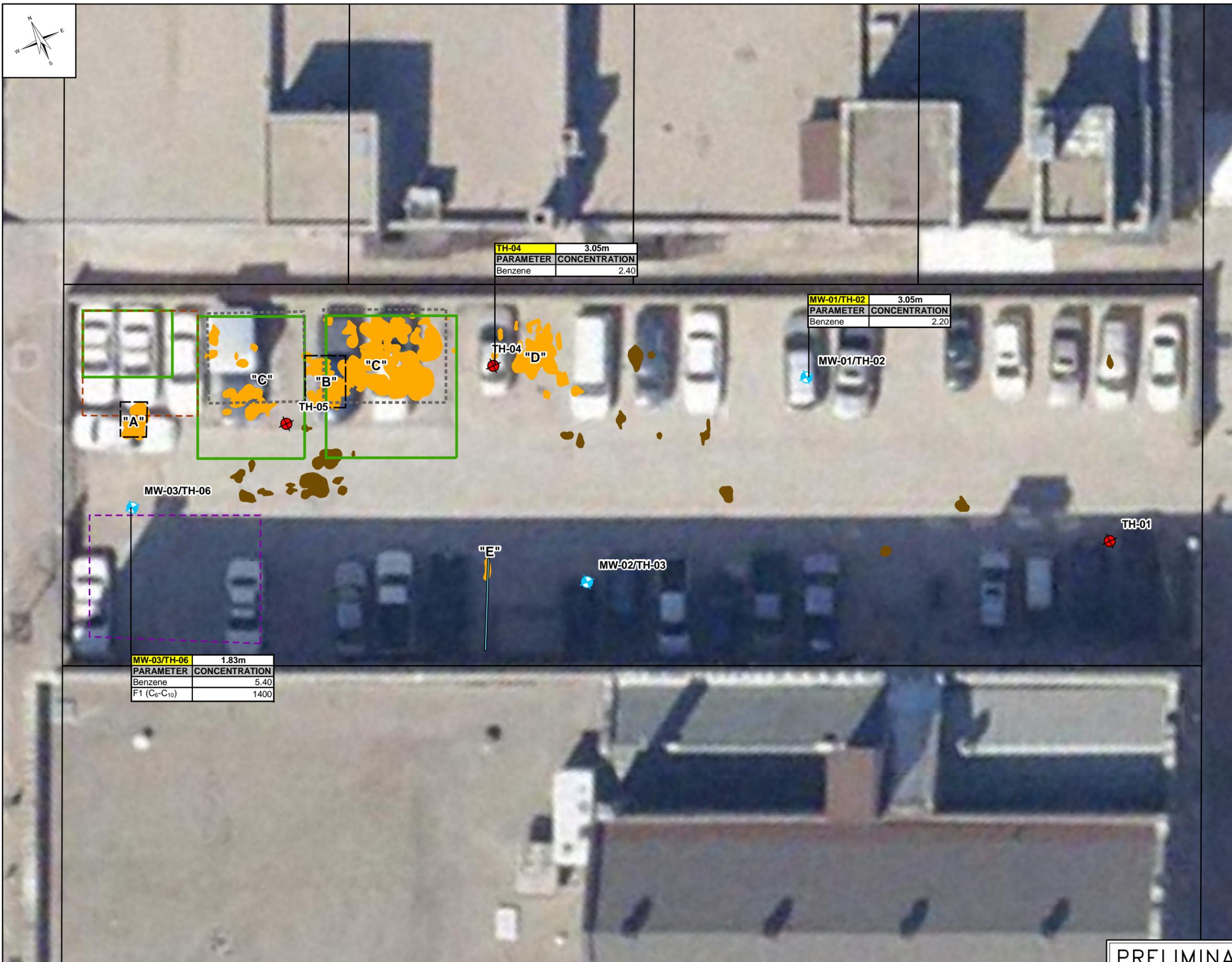


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COMBINED PHASE I/II ENVIRONMENT SITE ASSESSMENT (ESA) 61 PRINCESS STREET, WINNIPEG, MB				
GPR TRANSECT 67				
PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		JULY 2016	FIGURE 03D	REV: 0

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 11"x17" PLOT SCALE 1:1



0	16/07/04	ISSUED FOR FINAL REPORT	MSW	BMH
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COMBINED PHASE I/II ENVIRONMENT SITE ASSESSMENT (ESA) 61 PRINCESS STREET, WINNIPEG, MB				
GPR TRANSECT 50				
PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		JULY 2016	FIGURE 03E	REV: 0



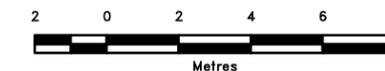
LEGEND:

- Monitoring Well (KGS Group)
- Testhole (KGS Group)
- MB Hydro Gas
- Potential Location UST's
- Historic 1950 Building Foundation Limits (GPR Survey)
- 1950 Building Footprint (Image)
- Rebar Limits
- Concrete Pad
- Property Lines (Approximate)
- GPR Anomalies
- GPR Anomalies "F"

MW-01/TH-02	DEPTH	PARAMETER	CONCENTRATION	Parameters above Criteria
		Benzene	2.20	

NOTES:

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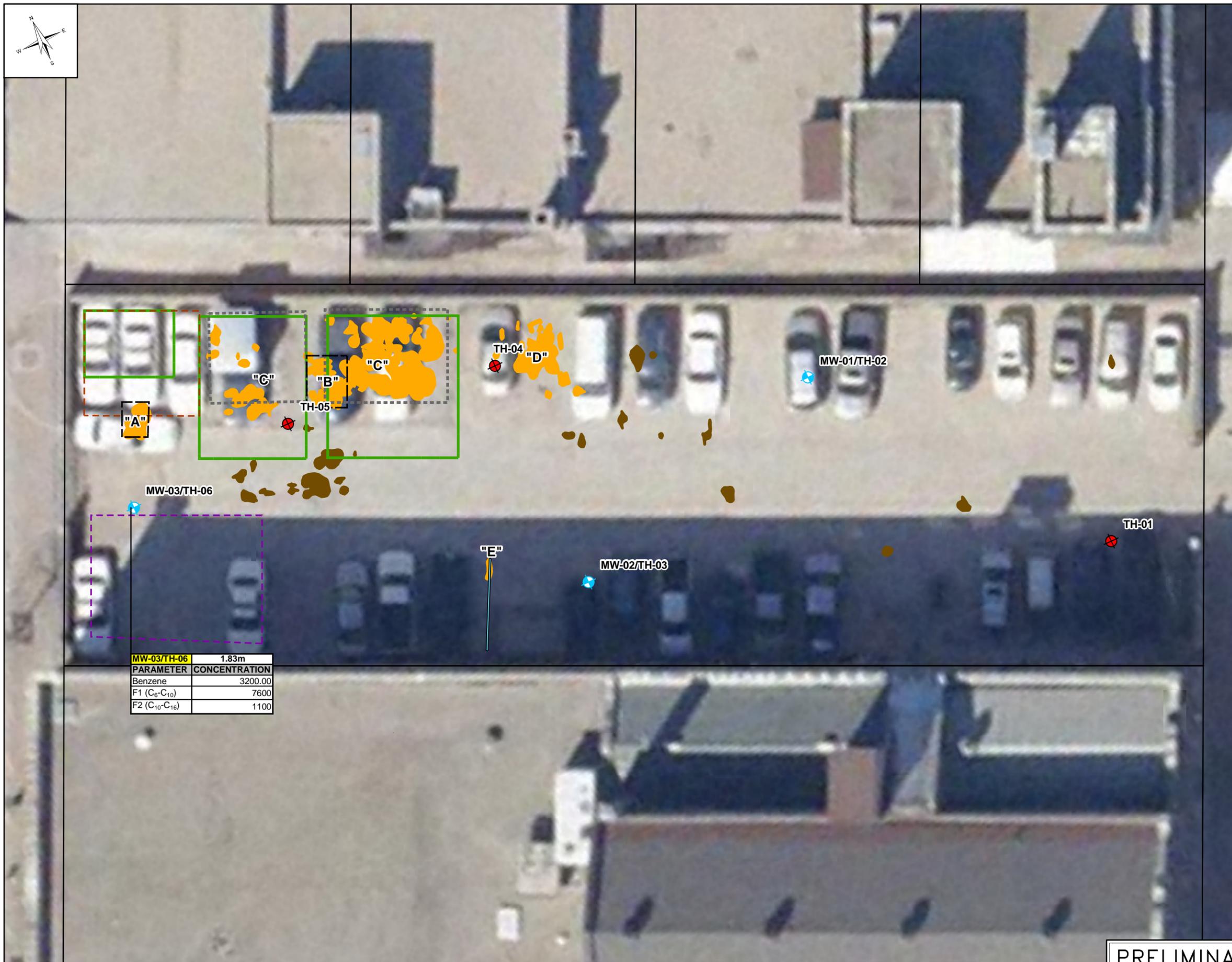
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NO.	YY/MM/DD	DESCRIPTION	ISSUED BY	CHECK BY
0	16/07/04	ISSUED FOR FINAL REPORT	MSW	BMH

COMBINED PHASE I/II ENVIRONMENT
 SITE ASSESSMENT (ESA)
 61 PRINCESS STREET, WINNIPEG, MB

HYDROCARBON IMPACTS IN SOIL

PRELIMINARY	NOT TO BE USED FOR CONSTRUCTION
JULY 2016	FIGURE 04
REV: 0	



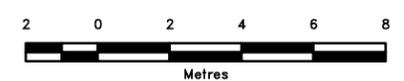
LEGEND:

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- Testhole (KGS Group)
- MB Hydro Gas
- Potential Location UST's
- Historic 1950 Building Foundation Limits (GPR Survey)
- 1950 Building Footprint (Image)
- Rebar Limits
- Concrete Pad
- Property Lines (Approximate)
- GPR Anomalies
- GPR Anomalies "F"

MW-03/TH-06	DEPTH
PARAMETER	CONCENTRATION
Benzene	3200.00
F1 (C ₆ -C ₁₀)	7600
F2 (C ₁₀ -C ₁₆)	1100

Parameters above Criteria

- NOTES:**
- GPR survey conducted by KGS Group Feb 3, 2016.
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NO.	YY/MM/DD	DESCRIPTION	ISSUED BY	CHECK BY

REVISIONS / ISSUE

COMBINED PHASE I/II ENVIRONMENT
 SITE ASSESSMENT (ESA)
 61 PRINCESS STREET, WINNIPEG, MB
 HYDROCARBON IMPACTS IN
 GROUNDWATER

PRELIMINARY
 NOT TO BE USED FOR CONSTRUCTION