

**Photo Summary – April 17, 2012**



**Photo 3  
Reach 1 Emergency Channel Inlet**



**Photo 4  
Reach 1 Emergency Channel Outlet**

**Station:** 2+000  
**Description:** Lake St-Martin Emergency Channel System  
Reach 1

**Date:** August 9, 2012  
**Time:** 11:30 AM to 12:00 PM



Client: MIT  
 File No: 11-0300-18 - 1000.4  
 Project: Emergency Reduction of LMB and  
 LSM Water Levels - Flow Metering  
 Sheet: 1 of 1  
 Date: 10-Aug-12 By: GW  
 Checked: 14-Aug-12 By: PAL

**Measurement**

Info: Lake St-Martin Emergency Channel System Reach 1  
 Date: 9-Aug-12  
 Time: 11:30:00 AM  
 Station: 2+000

**Crew** Patrice Leclercq  
 Garrett Wellwood

**Discharge Summary for Flow in Channel**

Equipment: ADCP - RDI River Ray 600  
 Metering Location: Measurement taken at cableway location

Transect	Start Bank	Total Q (m <sup>3</sup> /s)	Delta Q %	Corrected Q for Bed Movement (m <sup>3</sup> /s)
002	Right	115.8	0.7	-
003	Left	116.3	1.1	-
004	Right	114.2	-0.7	-
005	Left	113.8	-1.1	-

Average (m<sup>3</sup>/s): 115.0 -  
 St. Dev. (m<sup>3</sup>/s): 1.2 -  
 St. Dev. / avg: 0.010 -

Gauge: n/a

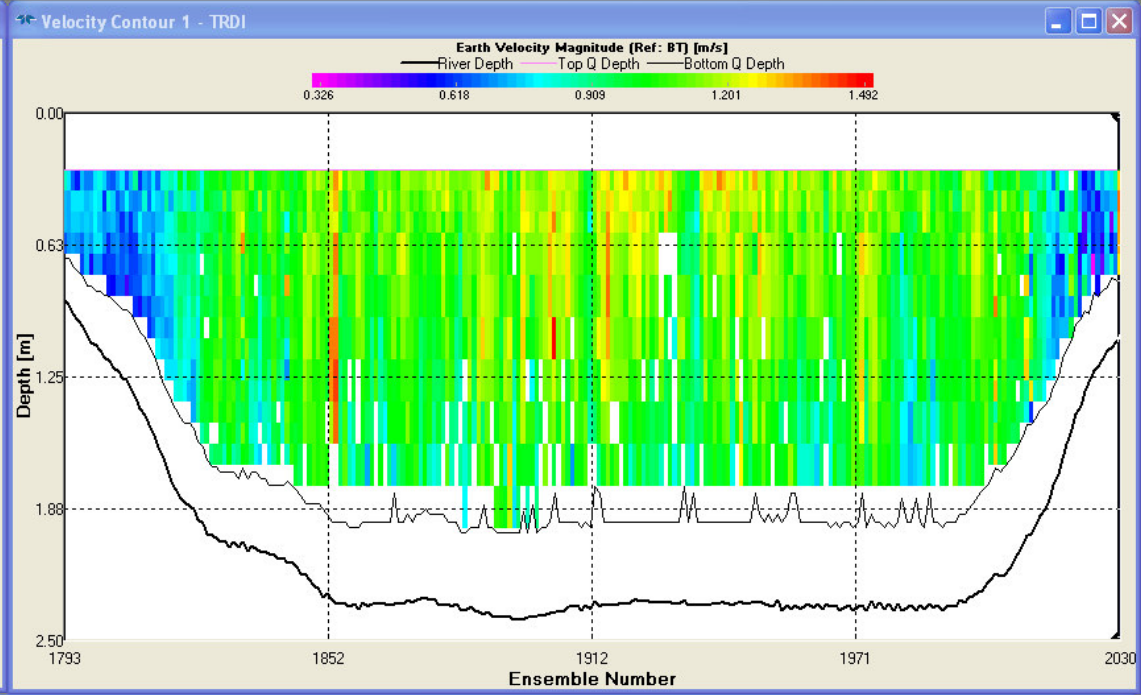
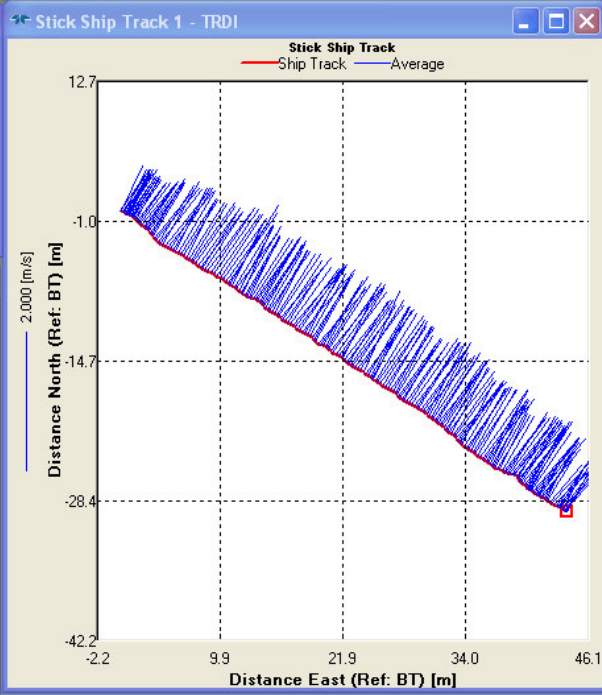
Notes: No bed movement observed

Gauge Boards Damaged

**Final Discharge:** 115 m<sup>3</sup>/s  
 4,060 ft<sup>3</sup>/s

MeasurementCtrl - TRDI

- Calibration\_0.mmt
- Site Information
- Site Discharge
  - Transect 000
  - Transect 001
  - Transect 002
  - Transect 003
  - Transect 004
  - Transect 005
- Discharge Summary



Composite Tabular 1 - T...

Ens. Nmb.	Nmb. of Ens.	Last Ens.
2030	238	0
Bad Ens.	%Bad Bins	Delta Time
0	3%	0.61
<b>May 12, 2012 23:35:00.85</b>		
Pitch	Roll	Heading
-2.80°	-1.40°	243.90°
Temp.	Press. Sensor	
21.06°C	NA	
<b>Discharge (Ref: BT) Left to Right</b>		
Good Bins	5	
Top Q	15.920	[m³/s]
Measured Q	74.891	[m³/s]
Bottom Q	21.926	[m³/s]

Discharge Summary - TRDI

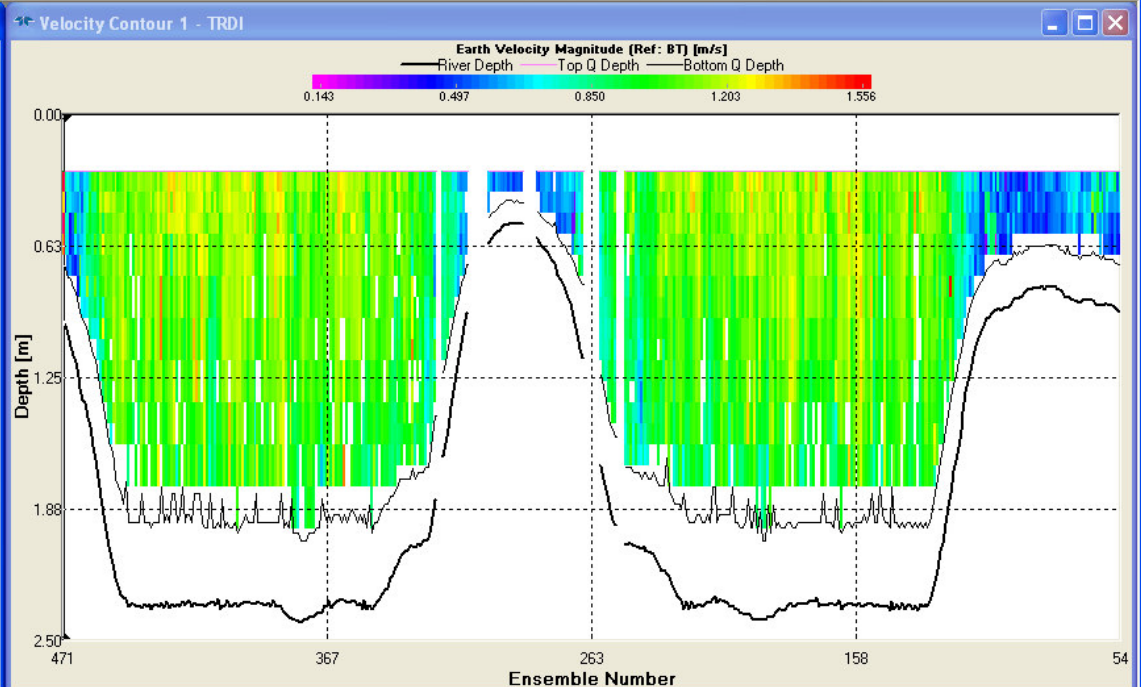
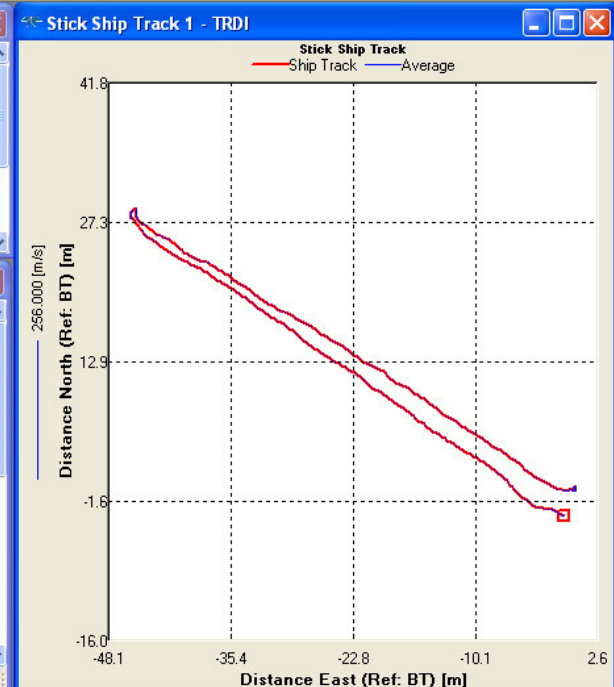
Transect	Start Bank	# Ens.	Start Time	Total Q m³/s	Delta Q %	Top Q m³/s	Meas. Q m³/s	Bottom Q m³/s	Left Q m³/s	Left Dist. m	Right Q m³/s	Right Dist. m	Width m	Total Area m²	Q/Area m/s	Boat m
Calibration002	Right	241	23:21:43	115.800	0.67	16.191	74.813	23.212	0.391	2.00	1.193	3.00	57.87	117.65	0.984	0.0
Calibration003	Left	222	23:25:28	116.274	1.08	16.207	75.966	22.678	0.456	2.00	0.968	3.00	57.60	117.58	0.989	0.0
Calibration004	Right	303	23:28:21	114.223	-0.70	16.198	75.528	21.824	0.321	2.00	0.352	2.00	58.56	118.14	0.967	0.0
Calibration005	Left	238	23:32:18	113.811	-1.06	15.920	74.891	21.926	0.522	2.00	0.551	2.00	56.84	117.32	0.970	0.0
Average		251		115.027	0.00	16.129	75.299	22.410	0.422	2.00	0.766	2.50	57.72	117.67	0.978	0.0
Std Dev.		36		1.194	1.04	0.139	0.548	0.657	0.086	0.00	0.383	0.58	0.71	0.34	0.011	0.0
Std./  Avg.		0.14		0.01	0.00	0.01	0.01	0.03	0.20	0.00	0.50	0.23	0.01	0.00	0.01	0.0

MeasurementCtrl - TRDI

- Calibration\_0.mmt
- Site Information
- Site Discharge
  - Transect 000
  - Transect 001**
  - Transect 002
  - Transect 003
  - Transect 004
  - Transect 005
- Discharge Summary

Composite Tabular 1 - T...

Ens. Nmb.	Nmb. of Ens.	Last Ens.
471	394	24
Bad Ens.	%Bad Bins	Delta Time
0	4%	0.62
<b>May 12, 2012 23:18:59.65</b>		
Pitch	Roll	Heading
-2.20°	-1.30°	241.90°
Temp.	Press. Sensor	
21.13°C	NA	
Discharge (Ref: BT) Right to Left		
Good Bins	4	
Top Q	-0.431	[m³/s]
Measured Q	-2.407	[m³/s]
Bottom Q	-0.088	[m³/s]



Discharge Summary - TRDI

Transect	Start Bank	# Ens.	Start Time	Total Q m³/s	Delta Q %	Top Q m³/s	Meas. Q m³/s	Bottom Q m³/s	Left Q m³/s	Left Dist. m	Right Q m³/s	Right Dist. m	Width m	Total Area m²	Q/Area m/s	Boat m
Calibration002	Right	241	23:21:43	115.800	0.67	16.191	74.813	23.212	0.391	2.00	1.193	3.00	57.87	117.65	0.984	0.0
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Average		251		115.027	0.00	16.129	75.299	22.410	0.422	2.00	0.766	2.50	57.72	117.67	0.978	0.0
Std Dev.		36		1.194	1.04	0.139	0.548	0.657	0.086	0.00	0.383	0.58	0.71	0.34	0.011	0.0
Std./  Avg.		0.14		0.01	0.00	0.01	0.01	0.03	0.20	0.00	0.50	0.23	0.01	0.00	0.01	0.0

August 9 - Processed Loop File

LC Version 3.20, July 8, 2010

Processed on: 14-Aug-2012

Loop File: Calibration\_0\_001\_12-08-09\_ASC.TXT

Distance Made Good (m)	Loop Time (sec)	Moving Bed Velocity (m/s)	Moving Bed Direction (degrees)	Flow Direction (degrees)	Estimated Percent Correction (percent)
3.22	275.05	0.01	198.10	32.62	1.29

Percent Bad Bottom Track: 5.7

WARNING: Percentage of bad bottom track values exceeds 5.  
Loop may not be accurate. Please review data.

Difference in flow direction between out and back sections: 2.8 deg

\*\*\*\*\*

Moving Bed Vel. (MBV) < Minimum MBV Criteria -- No Correction Recommended

\*\*\*\*\*

**Photo Summary – August 9, 2012**



**Photo 1**  
**Reach 1 Emergency Channel Looking Upstream of Metering Location**



**Photo 2**  
**Reach 1 Emergency Channel Looking Downstream of Metering Location**

**Photo Summary – August 9, 2012**



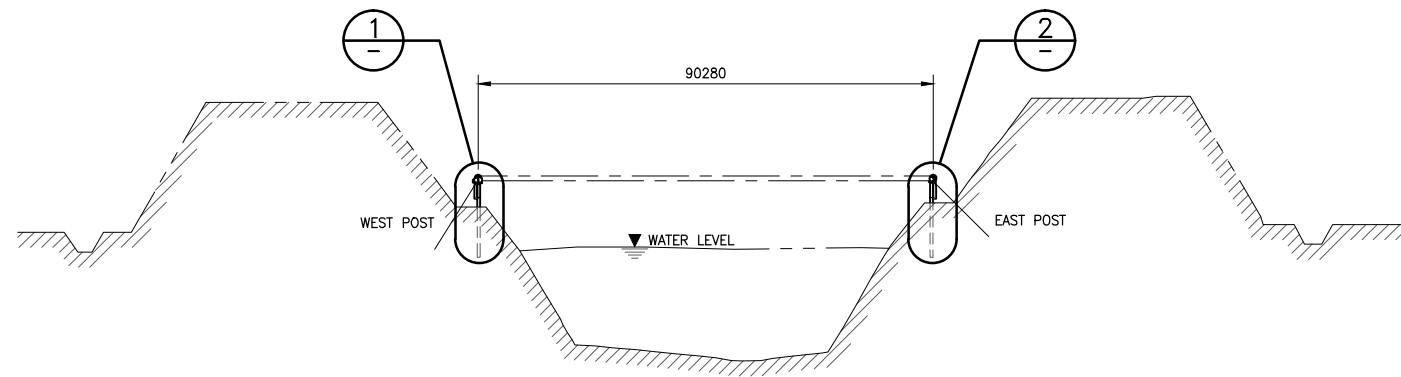
**Photo 3**  
**Reach 1 Emergency Channel Inlet**



**Photo 4**  
**Reach 1 Emergency Channel Outlet**

**APPENDIX B**  
**CABLEWAY INSTALLATION**

File: \\ngm\p\Projects\2011\11-0300-18\DWG\Struct\11-0300-18\_S04-Rev.0.dwg - Tab: S04 Plotted By: EChubey 14/03/04 [Tue 10:44am]  
 24 x 36 / PLOT SCALE: 1:40mm (11"x17")



**TYPICAL CROSS SECTION**  
SCALE: NTS (LOOKING DOWNSTREAM)

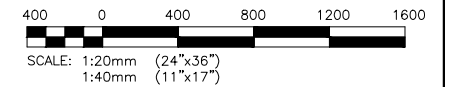
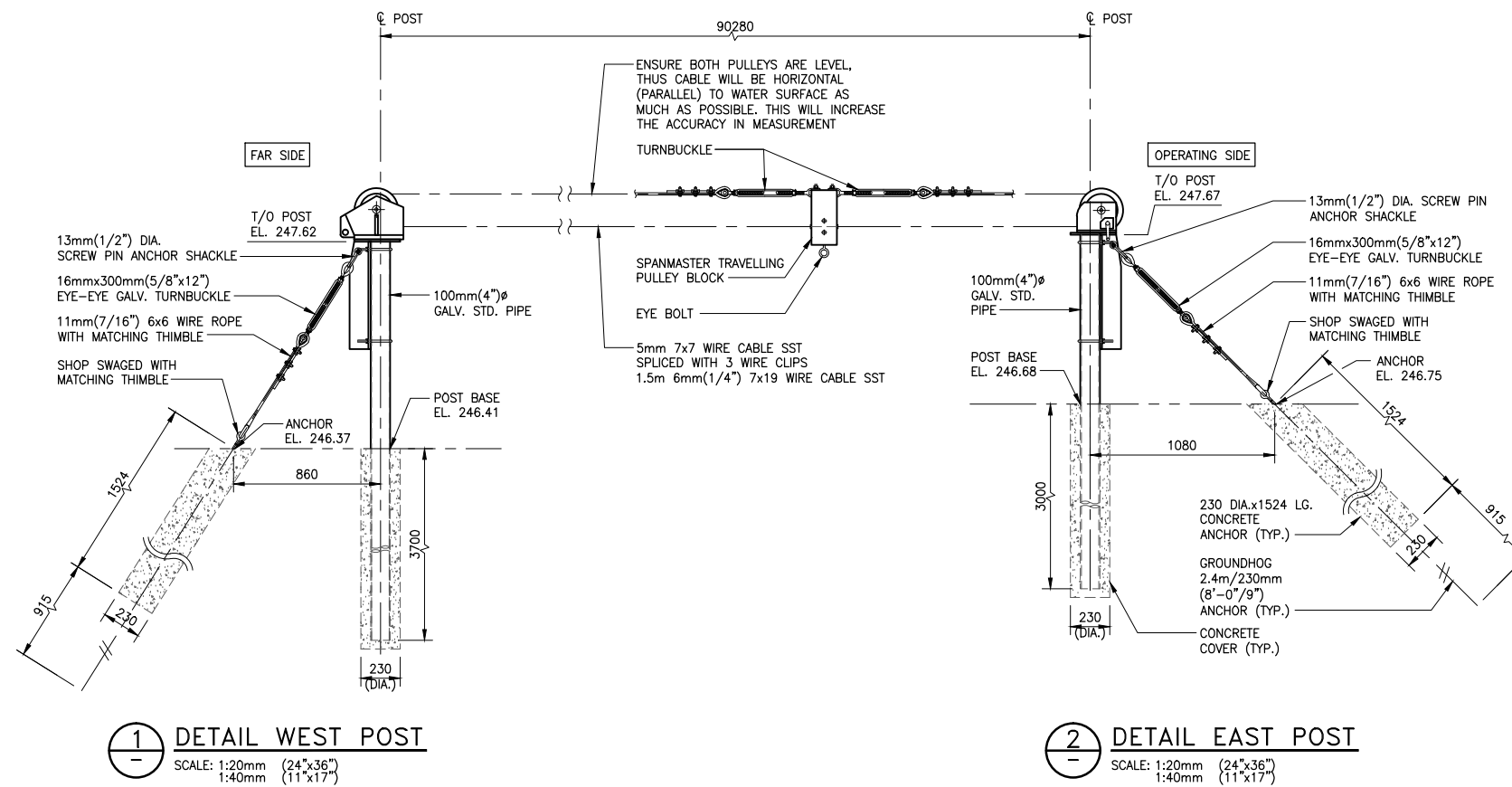
**COORDINATES:**

WEST POST		
TOP	5740827.336,	554249.101
BASE	5740827.336,	554249.088
ANCHOR	5740828.014,	554248.559
EAST POST		
TOP	5740768.857,	554317.863
BASE	5740768.856,	554317.863
ANCHOR	5740768.189,	554318.71

- HORIZONTAL AND VERTICAL VALUES FOR PRIMARY CONTROL WERE ESTABLISHED BY USING SURVEY GRADE TOPCON GPS.
- A GPS BASE WAS SETUP ON A KNOWN CONTROL POINT ESTABLISHED IN A PREVIOUS CONTROL NETWORK WHILE ROVER WAS USED TO TIE IN THE BASE, TOPS AND ANCHORS.
- SHOTS TAKEN IN RTK WAS SET AT 3 EPOCHS.

**NOTES:**

- CABLE PULLED TO AN INITIAL UNLOADED SAG OF 2 FEET.
- ALL ELEVATIONS ARE GIVEN IN METRES AND CAN BE CONVERTED TO FEET BY MULTIPLYING BY 3.28083.
- SPANMASTER MODEL SMK1 IS DESIGNED AND MANUFACTURED BY HYDROLOGICAL SERVICES PTY LTD.
- ALL CONNECTIONS COMPONENTS MANUFACTURED BY MACMOR INDUSTRIES LTD. UNLESS OTHERWISE NOTED.
- STRUCTURAL AND MISCELLANEOUS STEEL FABRICATION AND ERECTION IN ACCORDANCE WITH CAN/CSA S16 (LATEST).
- STANDARD PIPE MET THE REQUIREMENTS OF ASTM A53.
- CABLEWAY PULLEY CAN BE OPERATED WITH HAND CRANK OR POWER DRILL USING A 17mm SIZE SOCKET.



**1** **DETAIL WEST POST**  
SCALE: 1:20mm (24"x36")  
1:40mm (11"x17")

**2** **DETAIL EAST POST**  
SCALE: 1:20mm (24"x36")  
1:40mm (11"x17")

0	14/03/03	ISSUED FOR INFORMATION	CMS
NO.	YY/MM/DD	DESCRIPTION	BY
REVISIONS / ISSUE			
CLIENT:			
PROJECT:			
EMERGENCY REDUCTION OF LAKE MANITOBA AND LAKE ST. MARTIN WATER LEVELS			
DWG. DESCRIPTION:			
ADCP CABLEWAY & SUPPORTS SECTIONS & DETAILS			
	DESIGN BY:	DJS	DATE (YY/MM/DD): 12/06/21
	DESIGN CHECK:	CMS	DATE:
	DRAWN BY:	FBV	DATE: 12/06/21
	DWG CHECK:	CMS	DATE:
DWG. NO.	11-0300-18 S04		REV: 0

ENG. STAMP

## **APPENDIX C**

### **BATHYMETRIC AND CROSS-SECTION DATA**

**Comprised of 4 Separate Appendices:**

- Annex 1: 1980 Fairford River Cross-Section Data**
- Annex 2: 2011 Fairford River Bathymetric Survey**
- Annex 3: 2011 Dauphin River Bathymetric Survey**
- Annex 4: 2011 Buffalo Creek Cross-Section Locations**

## **APPENDIX C - ANNEX 1**

### **1980 FAIRFORD RIVER CROSS-SECTION DATA**

115 1  
630.

December 10, 1980

File: 81.2

Mr. Neil Harden, P. Eng.,  
Ducks Unlimited (Canada),  
1190 Waverley Street,  
Winnipeg, Manitoba.  
R3T 2K2

Dear Mr. Harden:

Re: Fairford River Cross-section Data.

I have compiled the data, which you requested a while ago by telephone, for use in your Pineimuta Lake-Fairford River Project.

Figure 1 is a map showing the location of the cross-section information (cross-hatched area) that I am sending to you. The downstream end begins with cross-section 18440 where it may be assumed that Pineimuta Lake begins under high flow conditions. The cross-sections continue upstream and terminate at cross-section -535 (Lake Manitoba).

Table 1 contains the data which describe the various cross-sections. Each cross-section is tabulated going from left to right looking upstream. In general, the zero coordinate is the thalweg. All values are in feet.

Figure 2 is a water profile along the Fairford River produced by a backwater analysis done under 1974 flow and water level conditions. The stations as listed in Table 1 are shown on the plot.

I am also forwarding to you, under separate cover, a map of the Pineimuta Lake area which may help in your studies. As you will notice, some of the contour elevations have been changed by +2.5 feet to correct for the datum error of the 1931 survey. This datum correction applies to all elevations on the map.

Yours truly,

<Original signed by>

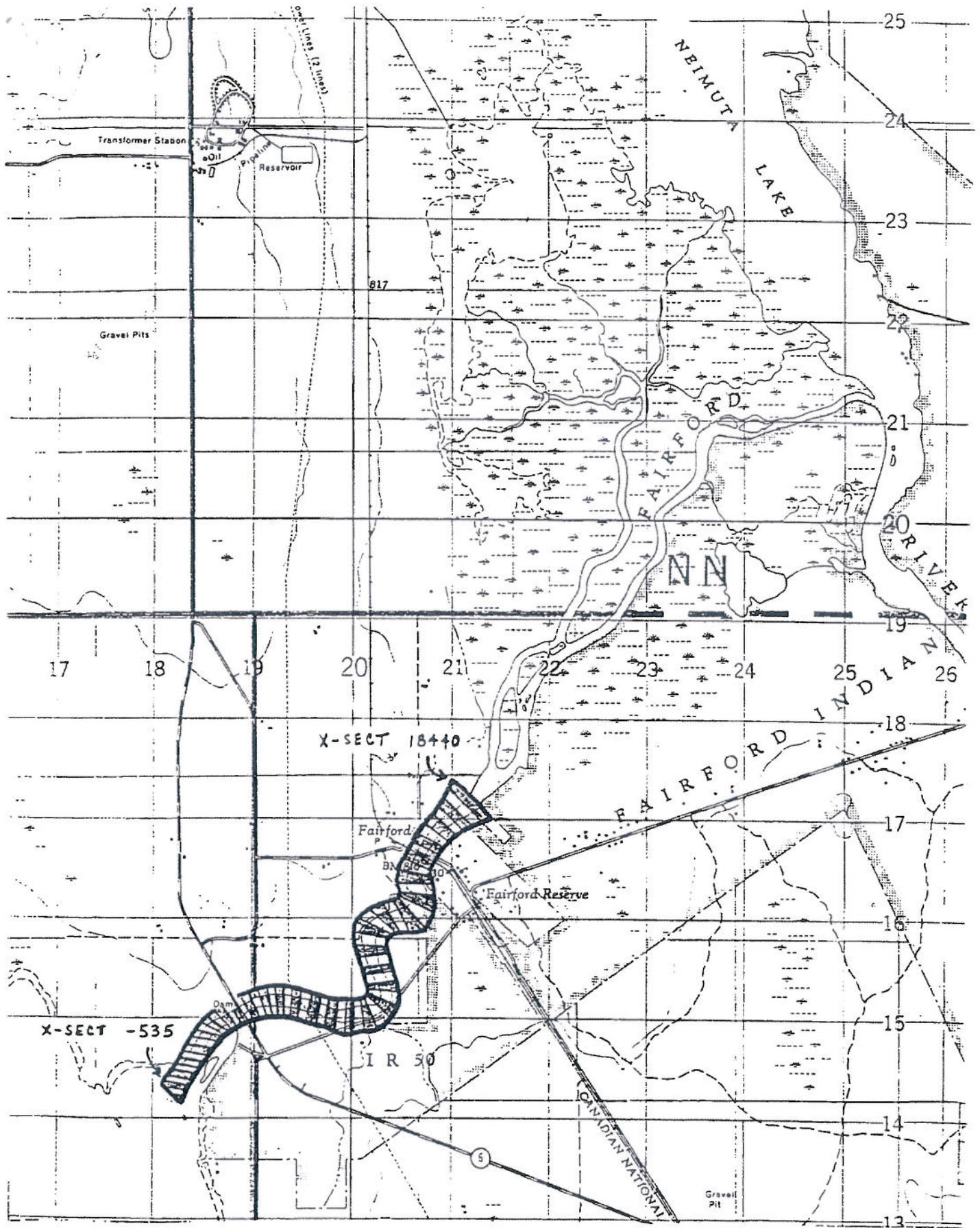
D. E. Kelln, P. Eng.,  
Hydrologist.

DEK/ems  
Enclosures.

	X-SECT.	CHAINAGE	FROM THALWAS	ELEVATION					
18440									
1976	1976	-340807.7	-170797.7	-100792.7	-50790.7	0790.2	40790.7		
		150797.7	200807.7	620812.7					
		-360817.7	-195812.7	-170807.7	-150802.7	-190807.0	-60792.7		
		0790.2	30790.7	120797.7	170802.7	190807.0	210812.7		
780	780	-690819.5	-600816.5	-560815.7	-530814.8	-500811.0	-490808.0		
		-390807.3	-340811.5	-290812.7	-270815.0	-230815.8	-190812.7		
		-110803.9	-85802.9	-10799.7	0792.2	40792.7	55794.7		
		100809.5	125804.9	160816.0	240817.7	30816.0	60817.5		
960	960	325816.7	345816.4	430817.9	470817.7	510817.0	540817.3		
		53	590819.6	525814.4	485812.5	470809.9	450812.7		
		-620818.9	-340810.6	-310813.1	-280813.0	-240813.9	-210814.0		
		-125804.7	-80801.7	-70800.7	-45799.7	-30798.7	0797.2		
		100797.7	120800.7	240803.2	275807.7	295813.8	310813.5		
		340813.7	385814.1	410815.9	450813.2	475814.0	485813.5		
940	940	510811.2	520809.6	555809.7	590812.1	600813.9	635813.4		
		700814.4	715815.3	755817.2	780818.0				
		0	830819.5	775818.2	730818.2	650818.0	630817.7		
		-865820.5	-540812.7	-490818.2	-460818.2	-425816.7	-380816.4		
700	700	-575816.4	-295812.2	-210802.3	-195803.0	-160803.4	-110803.7		
		-305816.2	-30803.9	80802.7	90800.7	140800.7	160802.7		
		-90803.7	310812.7	440815.4	520816.9	610816.9	670814.2		
		270804.4	300807.2	375816.9	440815.4	490815.9	440815.9		
		131804.9	760816.9	700817.0	620816.3	575816.4	440815.9		
		-860818.9	-295812.7	-265812.7	-210807.5	-90800.4	-30798.7		
		-380796.9	130801.7	185807.5	250817.2	335815.6	345814.9		
1320	1320	370815.9	390816.5	450817.7	500816.6	540816.2	550816.0		
		610816.7	630816.4	640814.6	700815.9	740816.2			
		11864.9	990813.5	940814.7	845814.0	650816.5	550809.6		
		-460812.7	-450813.2	-420812.7	-380808.6	-360806.7	-225800.7		
		-200807.8	-170801.7	-80801.0	90802.7	170809.4	230808.3		
		580814.6	300808.6	350810.0	425811.9	460812.5	530814.8		
		10924.8	650816.5	715817.3	700815.9	740816.2			
		-530817.8	-750815.2	-700816.3	-650811.2	-585812.7	-555815.1		
		-160802.3	-70801.5	-420815.6	-290817.7	-210815.9	-205812.7		
1420	1420	160815.3	210815.2	270816.2	350817.8	410816.3	470815.8		
		560816.5	610816.3	805816.8	325817.7	375817.2	470815.8		
		9504.7	-290814.0	-250813.6	-210812.7	-195807.7	0797.7		
		-670817.7	-350813.9	-180812.2	-250817.7	-280818.4			
840	840	50802.7	130807.7	180812.2	205815.5	280818.4			
		8664.7	160807.7	130806.7	-100805.7	65802.7	90803.0		
		200803.7	240804.7	265806.7	550812.7	660815.7			
		7700.7	-220812.7	-194806.4	-152803.1	-132799.6	-94799.5		
		-720814.7	-35799.8	0800.6	44800.1	135800.4	181812.3		
		685817.7	200818.2	-165810.5	-126801.4	-119800.9	-96800.4		
		6700.2	-61800.9	-29800.6	43800.8	80800.7	135800.9		
500	500	157806.6	176807.8	190812.7	200817.7	475817.7			
		620.2	-200817.7	-185807.7	-161802.6	-144802.6	-107801.4		
		-220817.7	-210812.7	-185807.7	-161802.6	-144802.6	-107801.4		

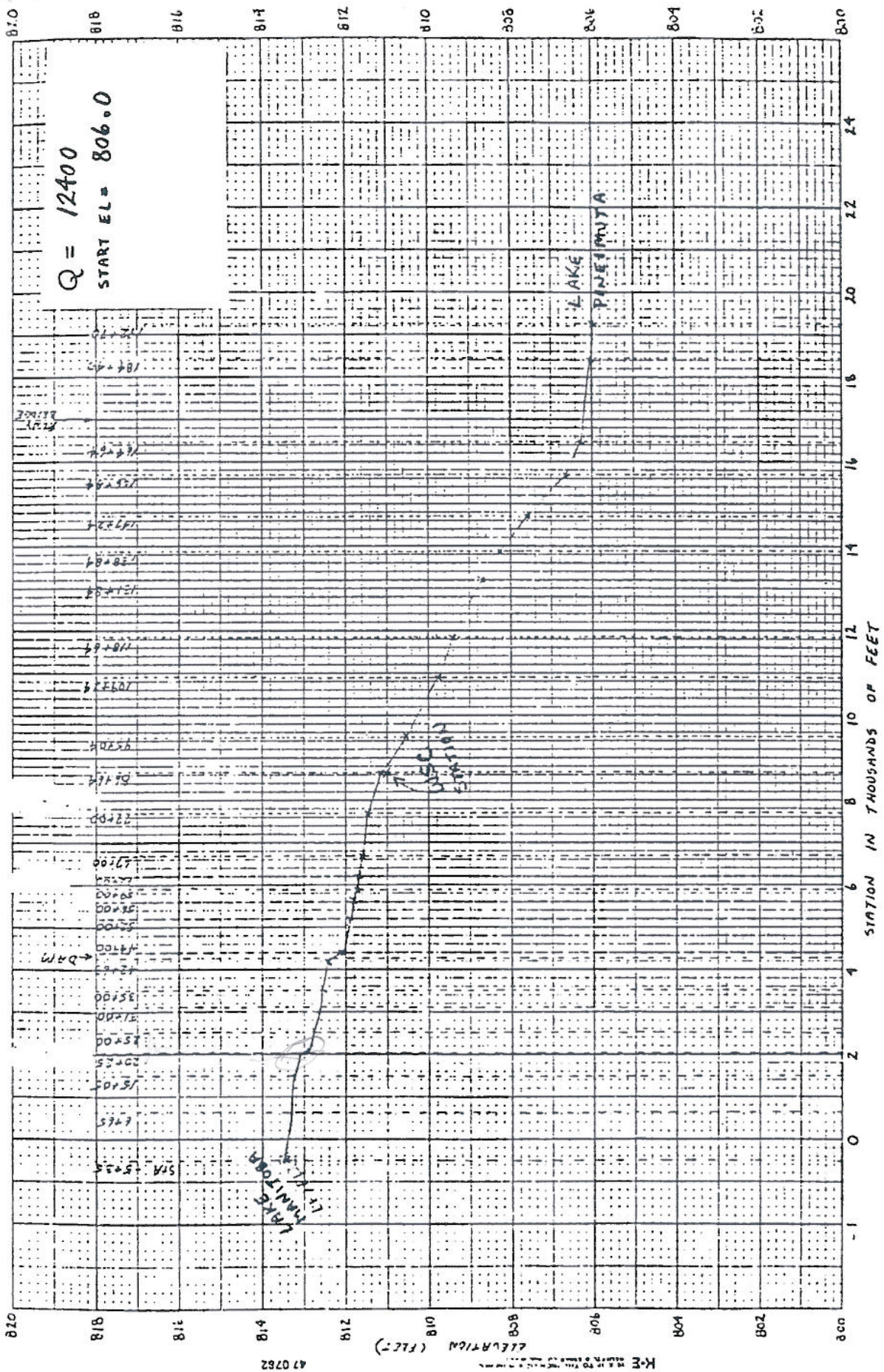
TABLI cont'd

300	5900	-175806.2	-158806.7	-147802.4	-135801.4	-130801.4	-120801.0	-111801.1	-85801.6
		-371801.4	-371801.5	0801.2	48801.2	73801.4	100801.6	135801.6	146803.9
		177807.6	200812.7						
		5600	-194815.9	-181811.0	-178810.0	-167808.8	-150804.6	-135801.6	-128801.2
		-121800.6	-110800.6	-76800.0	-60801.5	0801.5	19800.8	50801.4	100801.6
		135801.2	149805.0	154805.8	186807.8	210812.7	260817.7		
		5200	-205812.7	-185810.9	-164809.1	-150806.0	-135802.5	-117802.5	-93802.0
		-55801.9	-28802.1	0801.9	22801.8	60801.6	100801.8	135802.1	157807.6
		177813.0	193817.2	200817.2					
		4400	-610817.7	-427814.4	-418814.3	-396811.8	-378810.6	-345809.6	-315802.1
		-45802.1	4374	17817.6	40817.6				
		18	-180815.0	-122813.0	0802.1	120802.1	122813.0	178815.0	
		4356	-175818.7	-116802.5	0802.2	118802.5	121816.7	178818.7	
		45	-175818.7	-116802.5	0802.2	118802.5	121816.7	170818.7	
		15	-180816.0	-122802.2	0802.2	122802.2	125813.0	175816.0	
		4296	-200816.0	-135802.2	0802.2	135802.2	180812.0	240812.0	255816.0
		33	-200817.4	-175814.4	-156808.6	-135803.6	-68802.8	-32803.2	0802.9
		763	47802.2	86802.8	135802.6	200819.0			
		500	-196800.0	-180813.3	-165809.6	-152807.1	-140805.1	-96803.1	-37803.2
		3000	-11802.8	108803.1	135804.8	144805.8	155807.7	169811.0	176812.3
		500	185815.1	200817.7					
		2500	-192808.1	-171812.6	-158809.0	-145806.0	-142805.8	-136805.1	-130804.3
		400	-120804.0	-17803.2	0803.3	53803.0	93803.2	127803.0	140805.3
		146806.0	155808.5	163810.0	170811.6	179813.9	184815.0		
		2100	-155808.8	-137805.6	-130803.7	-109802.9	0802.2	104803.0	123803.0
		140804.0	178817.8	185815.3	195817.4				
		75	-510813.5	-440808.7	-300806.7	-210806.7	-150808.7	-80810.7	-57809.0
		2025	-30803.7	-10802.9	90802.2	204803.1	224803.1	240804.0	278813.8
		520	1505	40					
		1240813.5	-1190811.0	-1160810.5	-1090809.5	-1050809.0	-900808.0	-805807.5	-805807.5
		-1785807.5	-740808.0	-670809.0	-530809.5	-450810.0	-160810.0	-145809.5	-140809.0
		-1258803.0	-105807.0	-50806.0	-20805.0	0804.0	30803.0	50802.0	80802.0
		958803.0	115804.0	130805.0	150806.0	200807.0	230808.0	280809.0	300809.5
		840	325	500810.5	600810.5	760811.0	870811.5	900812.0	960813.5
		665	-950813.5	-870811.5	-60810.5	-595808.0	-570807.0	-529807.0	-509811.0
		-501811.0	-495810.0	-350810.0	-285810.0	-270809.5	-255809.0	-215809.0	-200809.5
		-175810.0	7160810.0	-120809.5	-109809.0	-90807.0	-80806.0	-70806.0	-55805.0
		-40804.0	-9804.0	0805.0	111806.0	15807.0	20808.0	40809.0	60809.5
		85811.0	120810.0	140809.5	150809.0	290809.5	320810.0	345810.5	360810.5
		375811.0	420810.5	450810.0	560810.0	595810.5	600811.0	650811.0	660810.5
		670810.0	720809.5	750809.5	770810.0	795810.5	1000810.5	1380811.0	1620815.0
		-535	-120813.5	-475810.0	-385809.0	-160809.0	0808.5	140809.0	200809.0
		425809.5	1000809.5	1595810.0	1640810.0	1690810.0	1840810.5	1925811.0	1960811.5
		200813.0							



FAIRFORD RIVER CROSS-SECTIONS FROM LAKE MANITOBA  
TO LAKE PINEIMUTA

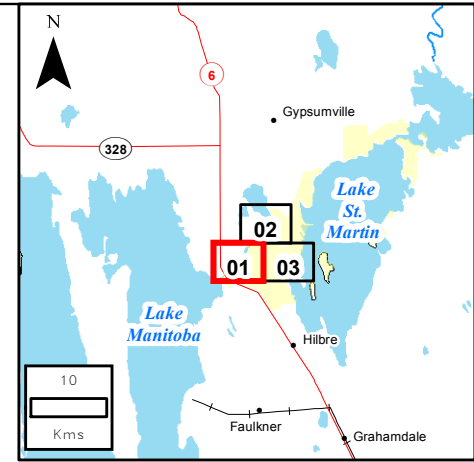
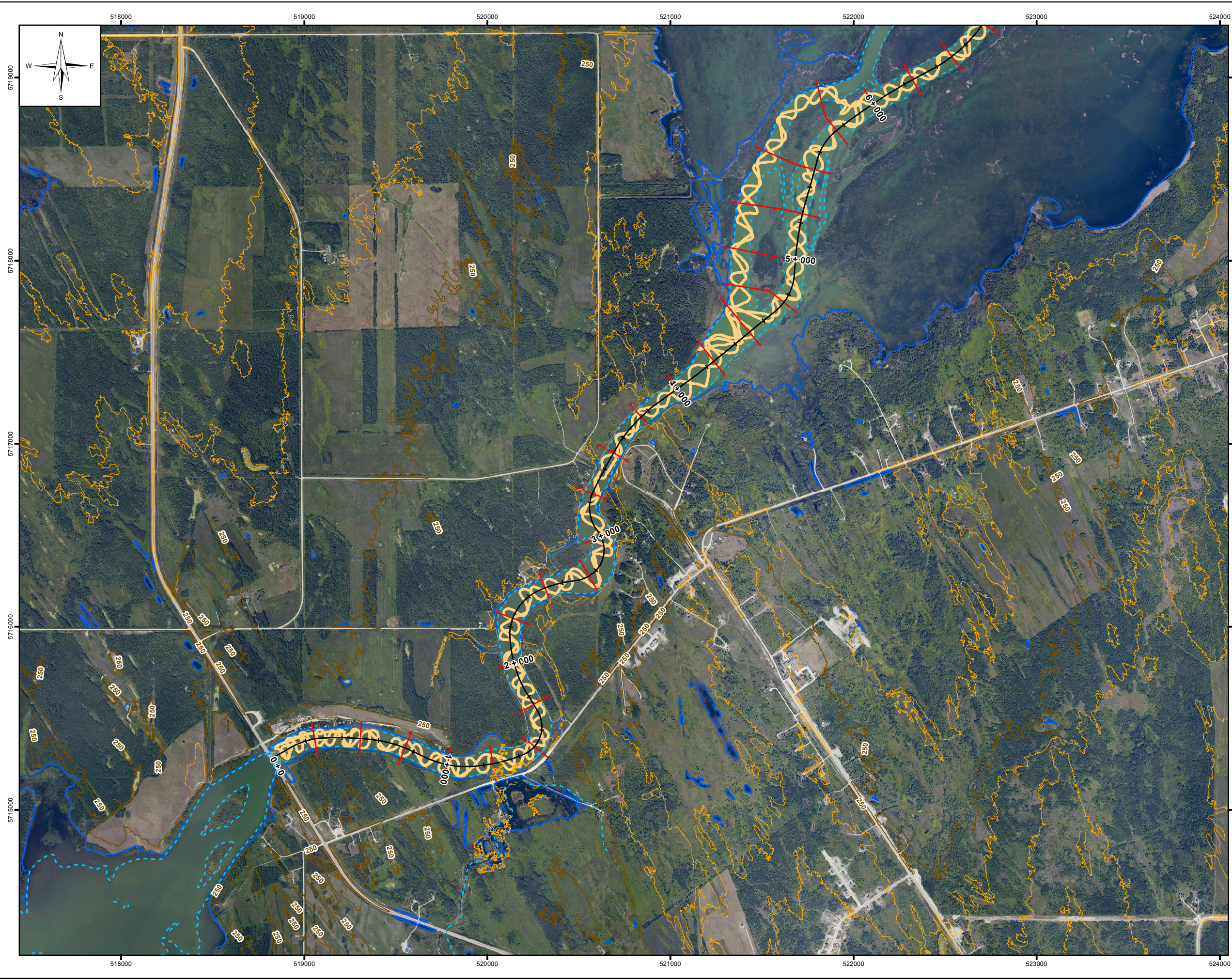
FIGURE 2



47 0762

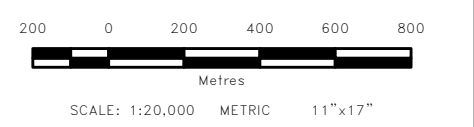
FIGURE 2

**APPENDIX C - ANNEX 2**  
**2011 FAIRFORD RIVER BATHYMETRIC SURVEY**



- LEGEND:**
- Fairford River Sonar
  - Cross Sections
  - Fairford River Centreline
  - 10m Index Contour
  - 2m Contour
  - Edge of Water (At Time of Sonar)
  - Edge of Water (Normal Water Level)

- NOTES:**
1. Survey completed by KGS Group on August 31 and September 1, 2011.
  2. Satellite image provided by Atis Geomatics, July 2011.
  3. 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)



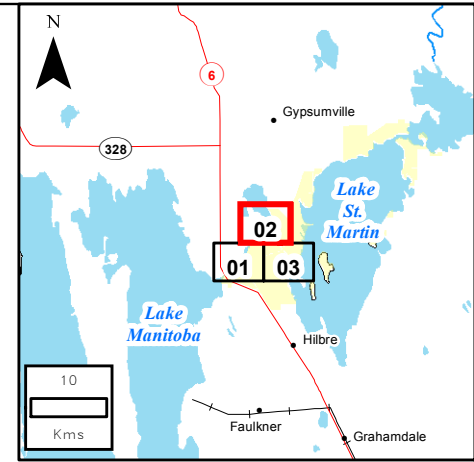
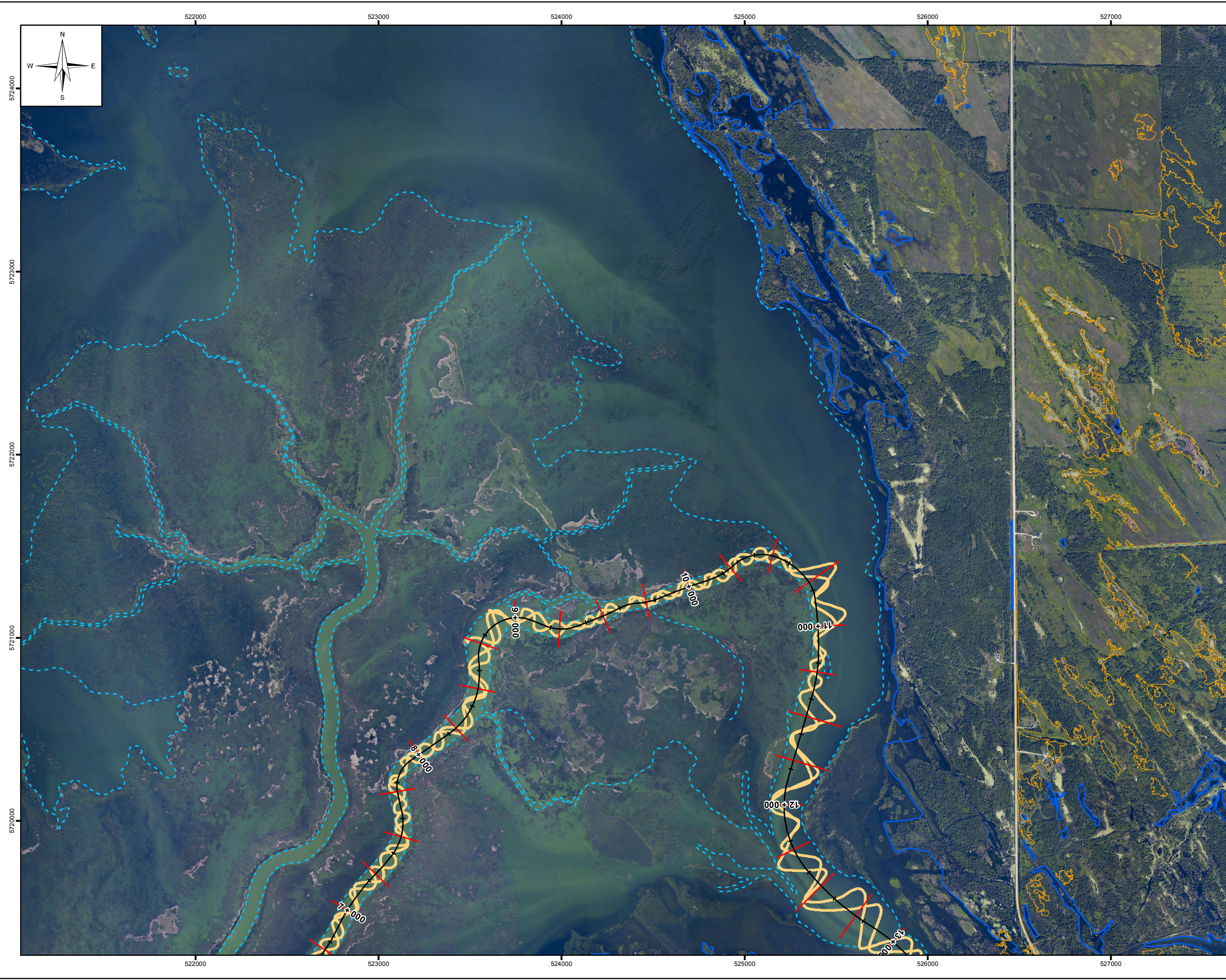
NO.	DATE	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

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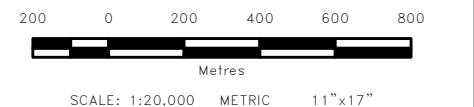
**Manitoba**  
INFRASTRUCTURE AND TRANSPORTATION

EMERGENCY REDUCTION OF LMB & LSM WATER LEVELS – ANALYSIS & MONITORING OF DISCHARGES & ICE PROCESSES		
2011 FAIRFORD RIVER BATHYMETRIC SURVEY		
SHEET 1 OF 3		
MARCH 2014	FIGURE C2-1	REV: 0



- LEGEND:**
- Fairford River Sonar
  - Cross Sections
  - Fairford River Centreline
  - 10m Index Contour
  - 2m Contour
  - Edge of Water (At Time of Sonar)
  - - - Edge of Water (Normal Water Level)

- NOTES:**
1. Survey completed by KGS Group on August 31 and September 1, 2011.
  2. Satellite image provided by Atis Geomatics, July 2011.
  3. 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)



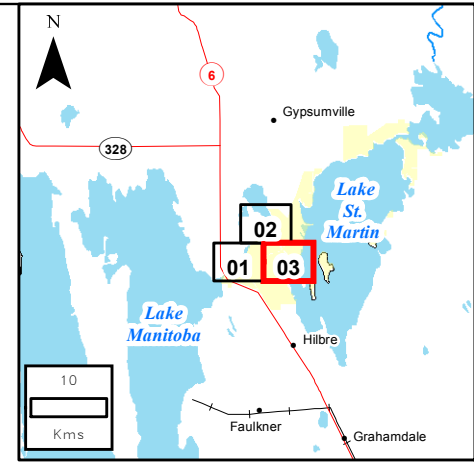
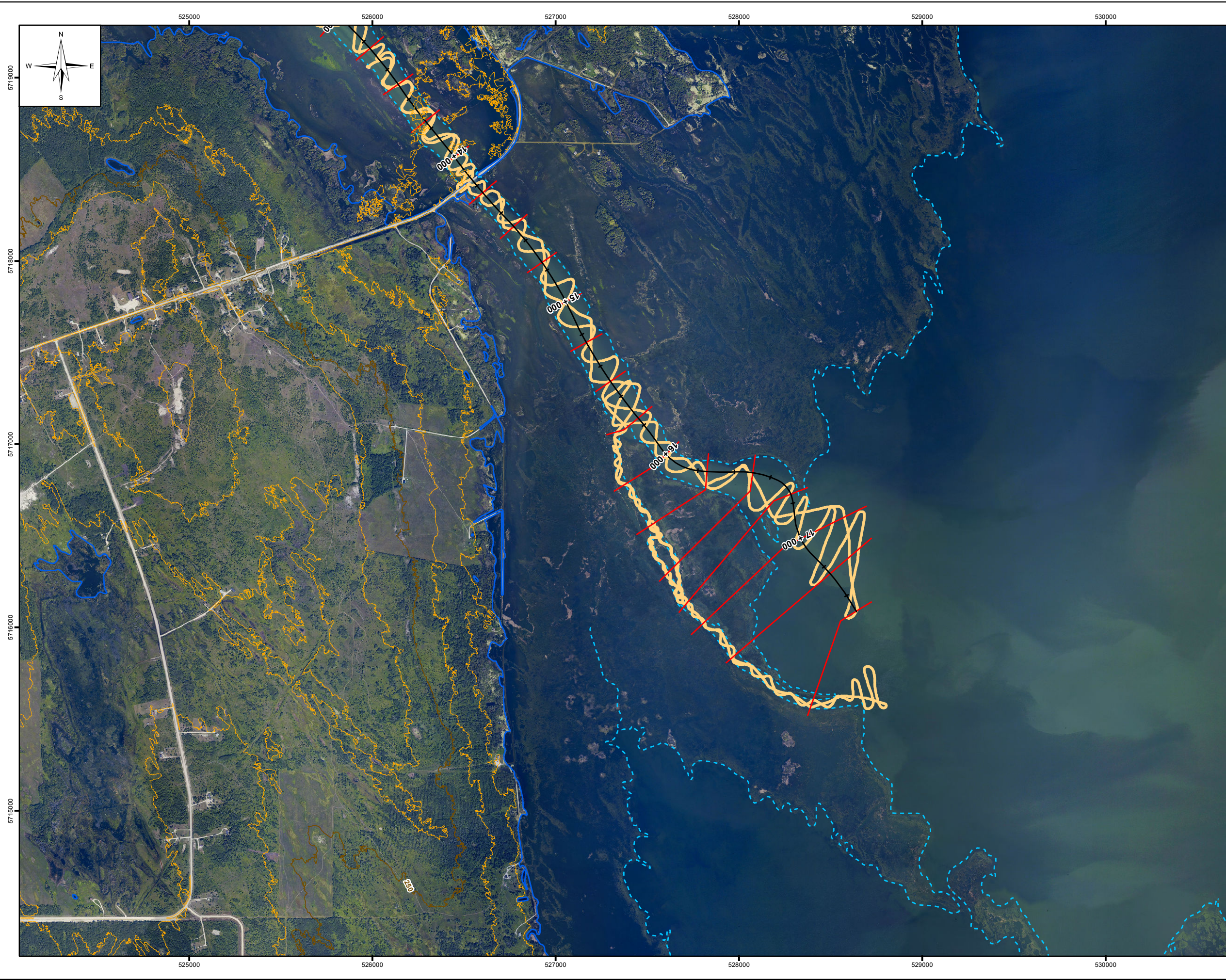
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EMERGENCY REDUCTION OF LMB & LSM WATER LEVELS – ANALYSIS & MONITORING OF DISCHARGES & ICE PROCESSES		
2011 FAIRFORD RIVER BATHYMETRIC SURVEY SHEET 2 OF 3		
MARCH 2014	FIGURE C2-1	REV: 0

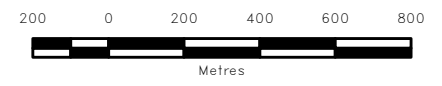


**LEGEND:**

- Fairford River Sonar
- Cross Sections
- Fairford River Centreline
- 10m Index Contour
- 2m Contour
- Edge of Water (At Time of Sonar)
- - - Edge of Water (Normal Water Level)

**NOTES:**

1. Survey completed by KGS Group on August 31 and September 1, 2011.
2. Satellite image provided by Atis Geomatics, July 2011.
3. 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)



NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

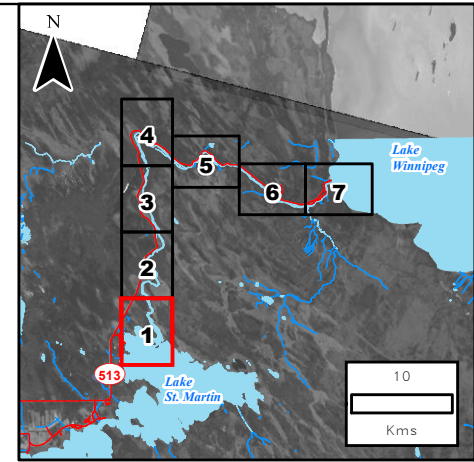
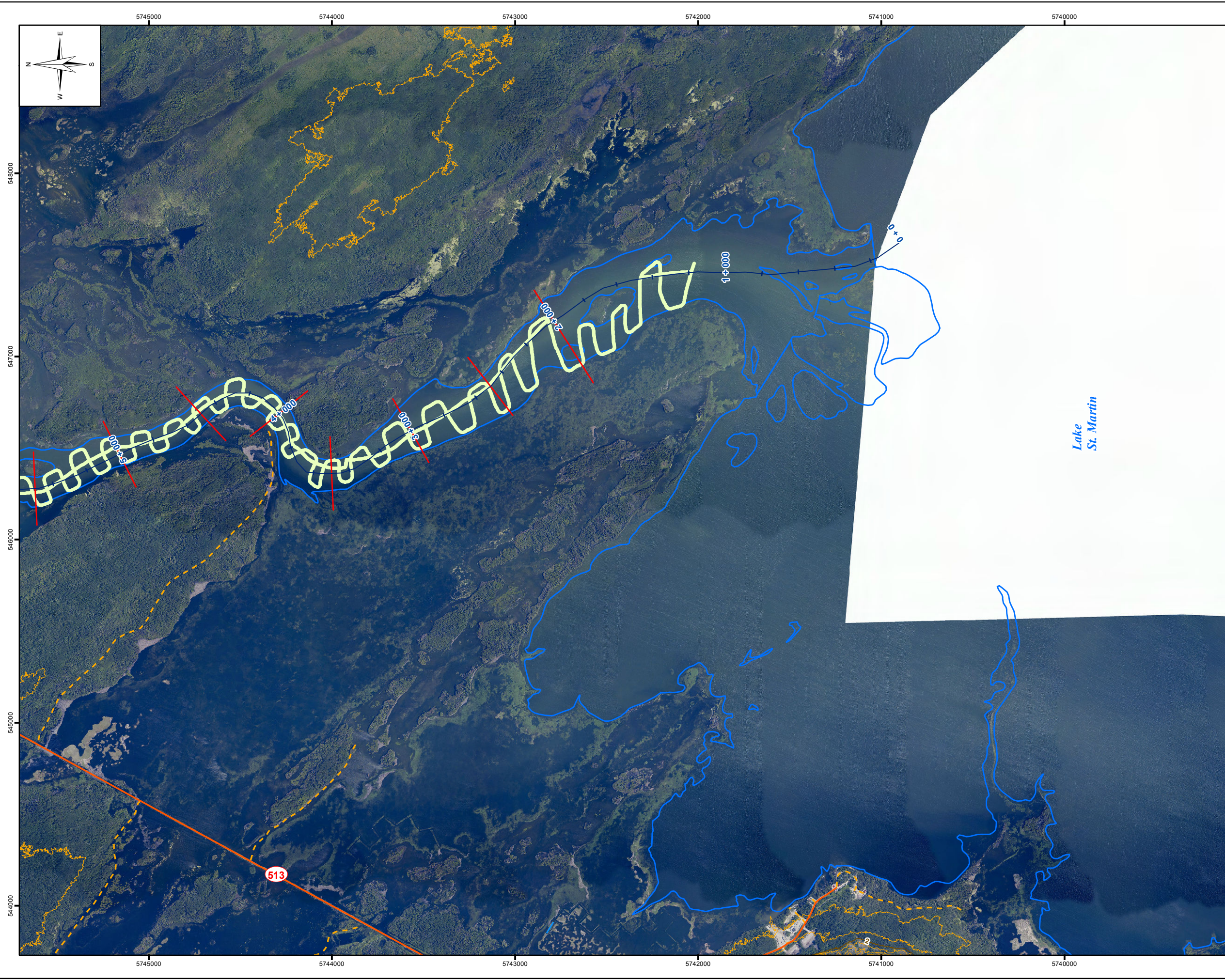
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EMERGENCY REDUCTION OF LMB & LSM WATER LEVELS – ANALYSIS & MONITORING OF DISCHARGES & ICE PROCESSES		
2011 FAIRFORD RIVER BATHYMETRIC SURVEY		
SHEET 3 OF 3		
MARCH 2014	FIGURE C2-1	REV: 0

**APPENDIX C – ANNEX 3**  
**2011 DAUPHIN RIVER BATHYMETRIC SURVEY**

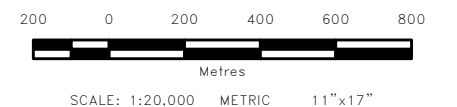


- LEGEND:**
- Dauphin River Sonar
  - Cross Sections
  - Dauphin River Centreline
  - 10m Index Contour
  - 2m Contour

**NOTES:**

1. Survey completed by KGS Group on July 2nd, 2011.
2. Satellite image provided by Atlis Geomatics, July 2011.
3. 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)



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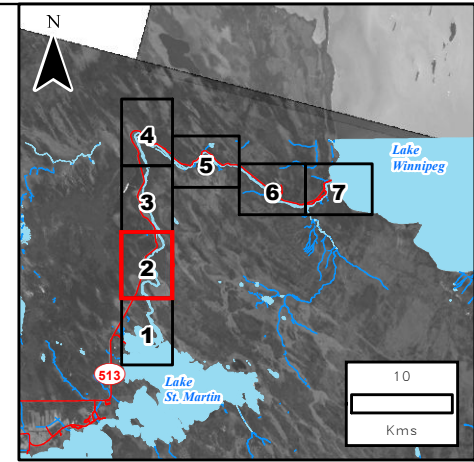
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EMERGENCY REDUCTION OF LMB & LSM  
WATER LEVELS – ANALYSIS & MONITORING  
OF DISCHARGES & ICE PROCESSES

2011 DAUPHIN RIVER BATHYMETRIC  
SURVEY  
(SHEET 1 OF 7)

MARCH 2014	FIGURE C3-1
	REV: 0

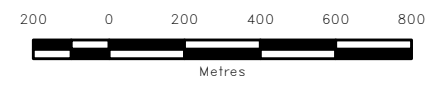


**LEGEND:**

- Dauphin River Sonar
- Cross Sections
- Dauphin River Centreline
- 10m Index Contour
- - - 2m Contour

**NOTES:**

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  2. Satellite image provided by Atlis Geomatics, July 2011.
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- Transverse Mercator Projection, NAD 1983, Zone 14  
Elevations are in metres above sea level (MSL)



SCALE: 1:20,000 METRIC 11"x17"

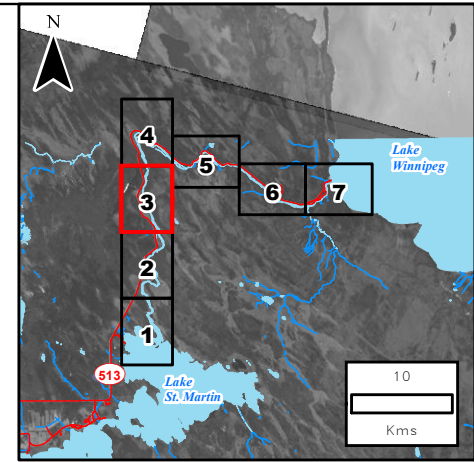
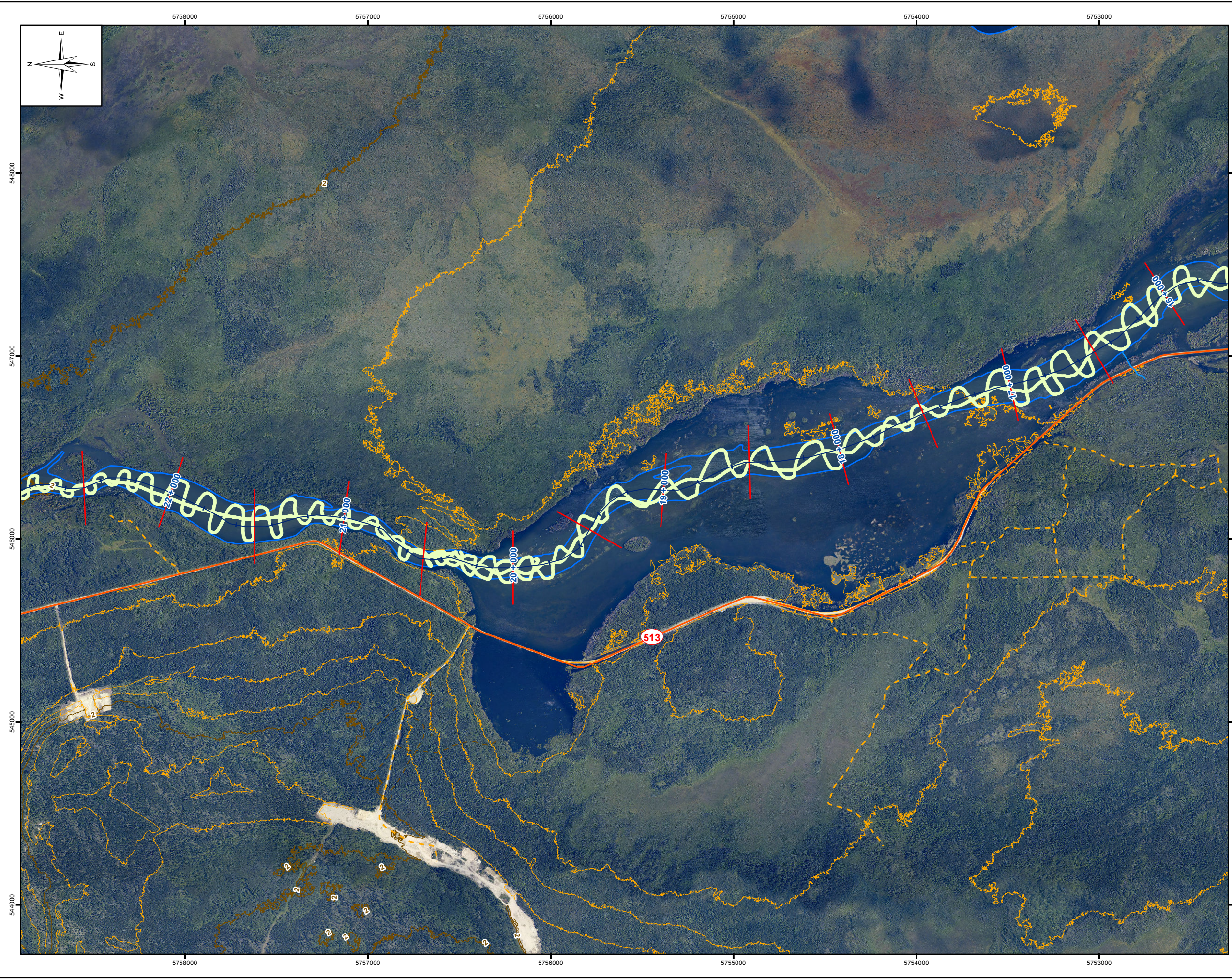
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2011 DAUPHIN RIVER BATHYMETRIC SURVEY (SHEET 2 OF 7)		
MARCH 2014	FIGURE C3-1	REV: 0

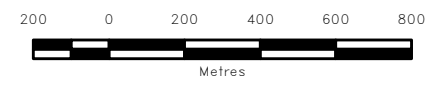


**LEGEND:**

- Dauphin River Sonar
- Cross Sections
- Dauphin River Centreline
- 10m Index Contour
- 2m Contour

**NOTES:**

1. Survey completed by KGS Group on July 2nd, 2011.
  2. Satellite image provided by Atllis Geomatics, July 2011.
  3. All units are metric and in metres unless otherwise specified.
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Elevations are in metres above sea level (MSL)



SCALE: 1:20,000 METRIC 11"x17"

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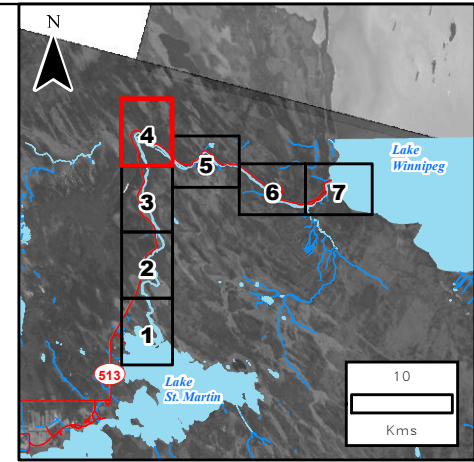
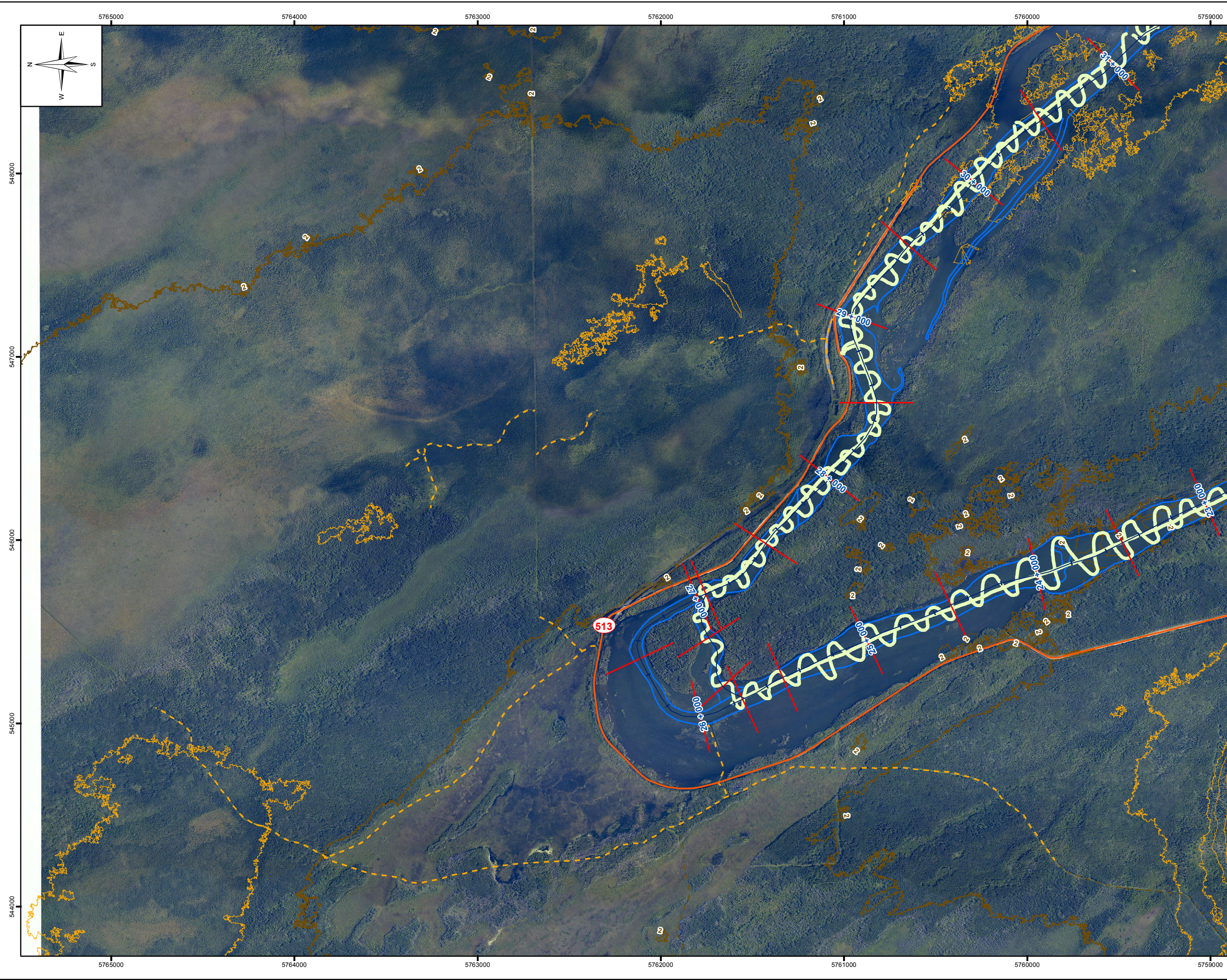
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INFRASTRUCTURE AND TRANSPORTATION

EMERGENCY REDUCTION OF LMB & LSM  
WATER LEVELS – ANALYSIS & MONITORING  
OF DISCHARGES & ICE PROCESSES

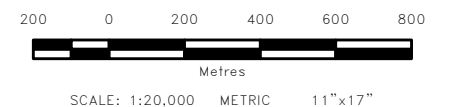
2011 DAUPHIN RIVER BATHYMETRIC  
SURVEY  
(SHEET 3 OF 7)

MARCH 2014	FIGURE C3-1	REV: 0
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- LEGEND:**
- Dauphin River Sonar
  - Cross Sections
  - Dauphin River Centreline
  - 10m Index Contour
  - 2m Contour

- NOTES:**
1. Survey completed by KGS Group on July 2nd, 2011.
  2. Satellite image provided by Atllis Geomatics, July 2011.
  3. 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)



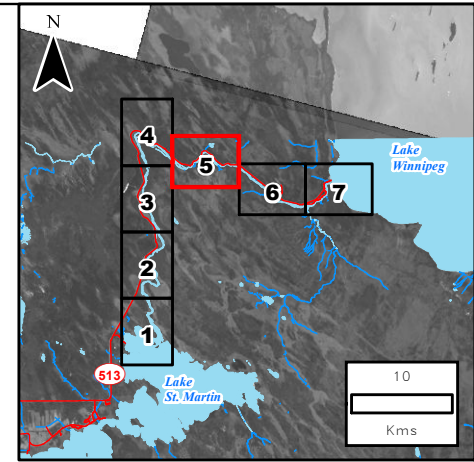
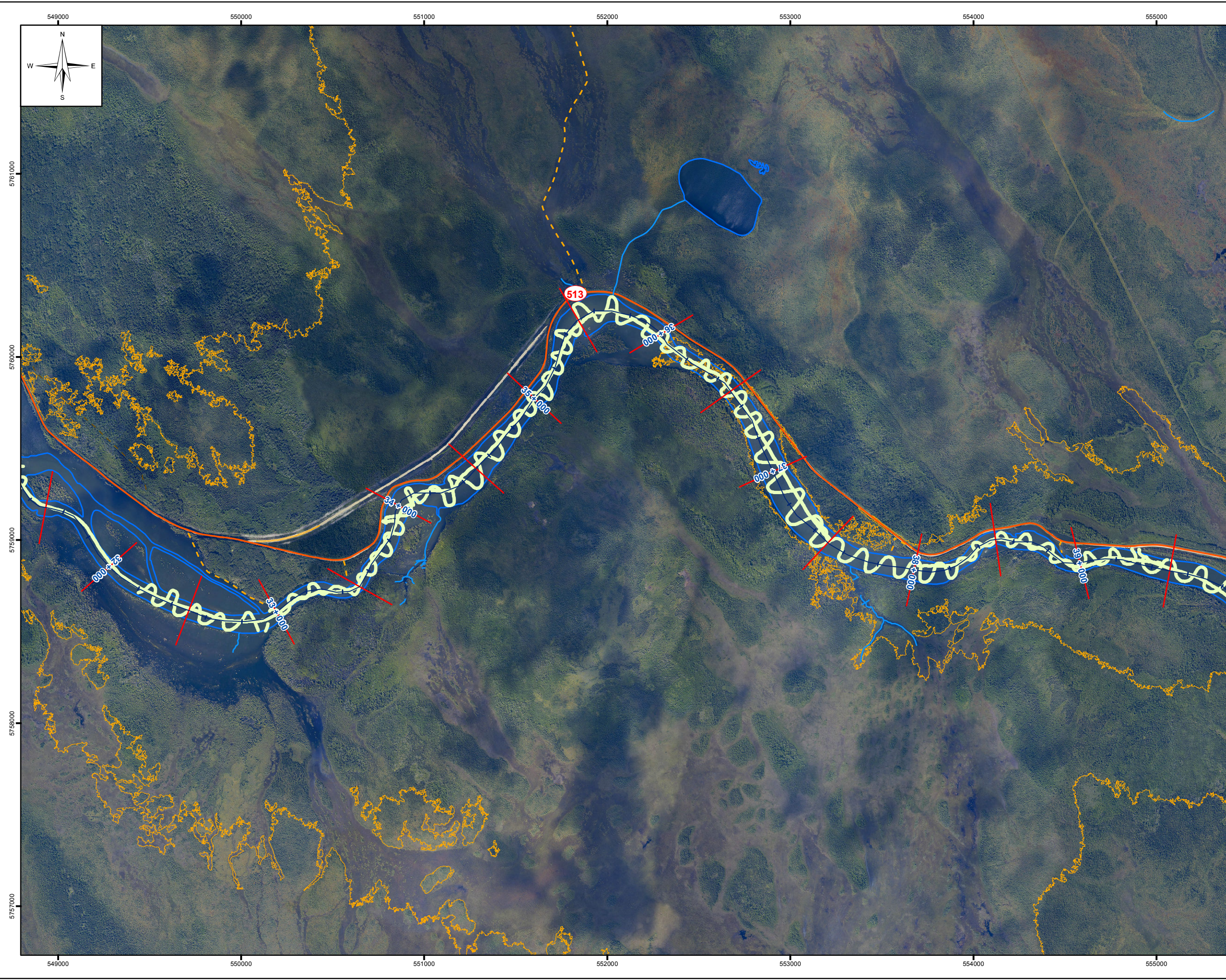
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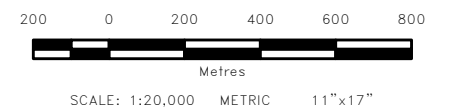
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INFRASTRUCTURE AND TRANSPORTATION

EMERGENCY REDUCTION OF LMB & LSM WATER LEVELS – ANALYSIS & MONITORING OF DISCHARGES & ICE PROCESSES		
2011 DAUPHIN RIVER BATHYMETRIC SURVEY (SHEET 4 OF 7)		
MARCH 2014	FIGURE C3-1	REV: 0



- LEGEND:**
- Dauphin River Sonar
  - Cross Sections
  - Dauphin River Centreline
  - 10m Index Contour
  - 2m Contour

- NOTES:**
1. Survey completed by KGS Group on July 2nd, 2011.
  2. Satellite image provided by Atllis Geomatics, July 2011.
  3. 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)



NO.	DATE	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

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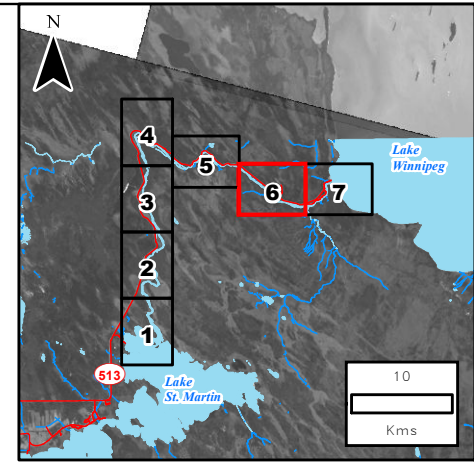
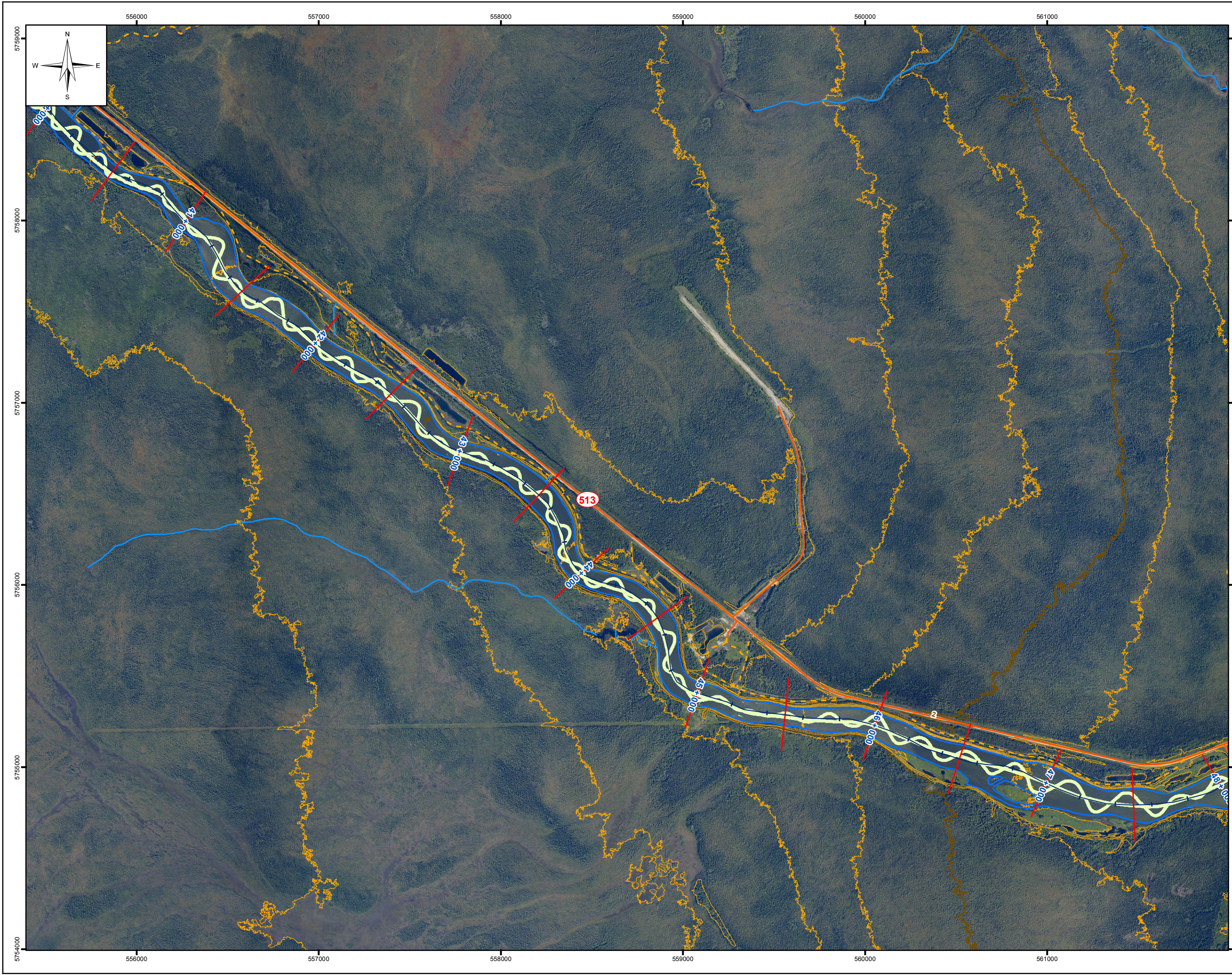
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EMERGENCY REDUCTION OF LMB & LSM  
WATER LEVELS – ANALYSIS & MONITORING  
OF DISCHARGES & ICE PROCESSES

2011 DAUPHIN RIVER BATHYMETRIC  
SURVEY  
(SHEET 5 OF 7)

MARCH 2014	FIGURE C3-1	REV: 0
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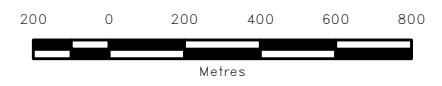


**LEGEND:**

- Dauphin River Sonar
- Cross Sections
- Dauphin River Centreline
- 10m Index Contour
- 2m Contour

**NOTES:**

1. Survey completed by KGS Group on July 2nd, 2011.
  2. Satellite image provided by Atlis Geomatics, July 2011.
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- Transverse Mercator Projection, NAD 1983, Zone 14  
Elevations are in metres above sea level (MSL)



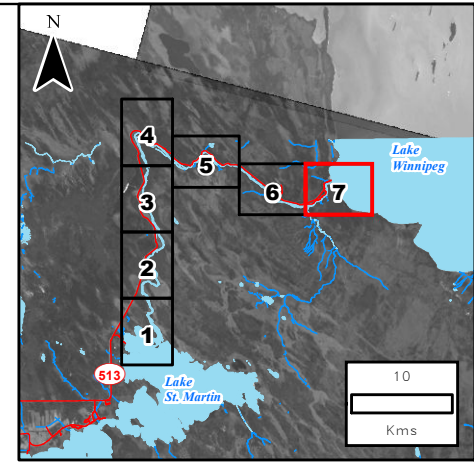
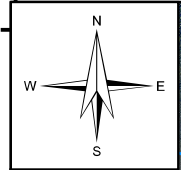
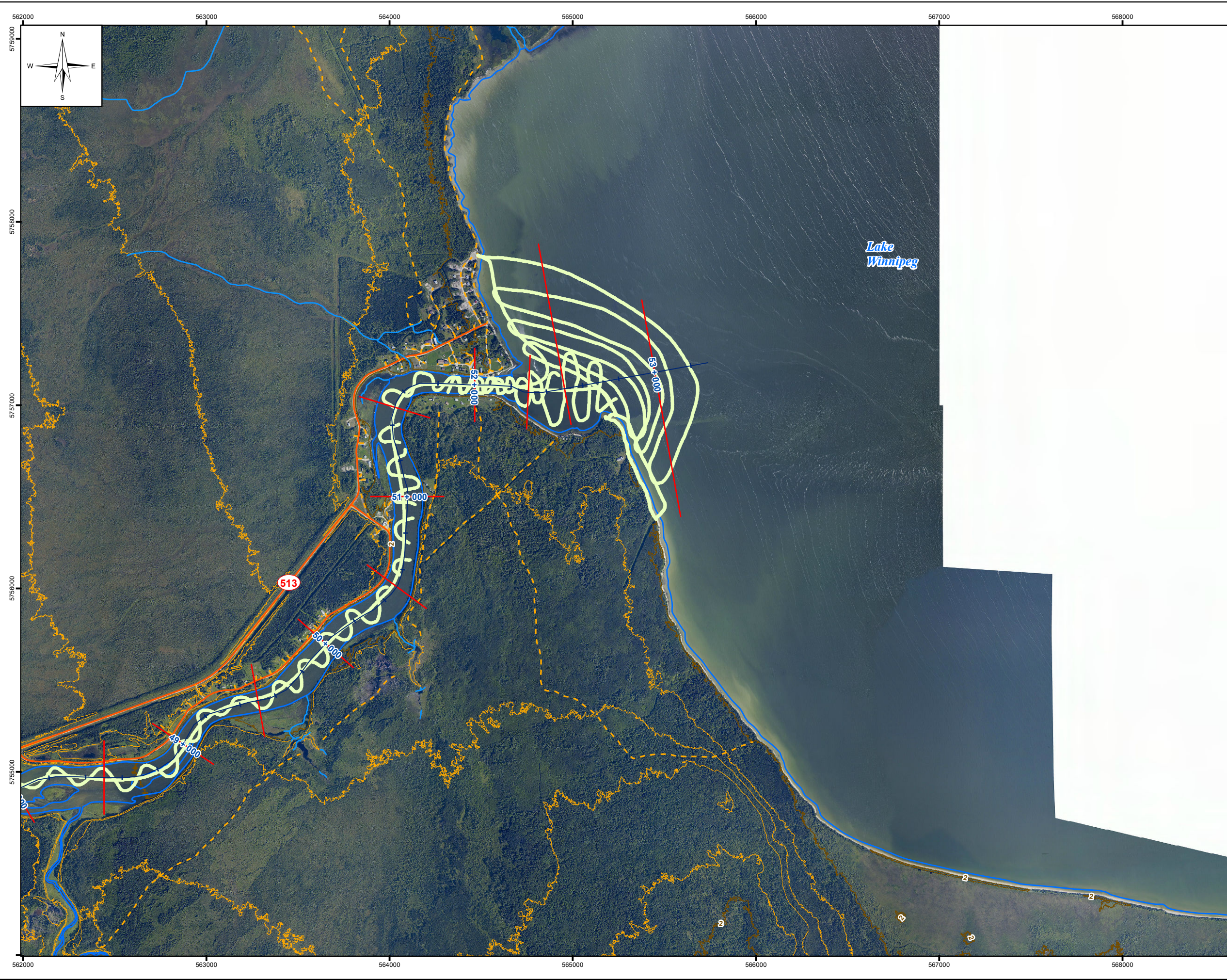
NO.	YY/MM/DD	DESCRIPTION	BY
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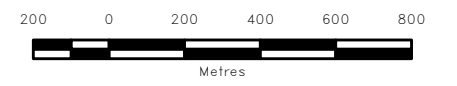
**Manitoba**  
INFRASTRUCTURE AND TRANSPORTATION

EMERGENCY REDUCTION OF LMB & LSM WATER LEVELS – ANALYSIS & MONITORING OF DISCHARGES & ICE PROCESSES		
2011 DAUPHIN RIVER BATHYMETRIC SURVEY (SHEET 6 OF 7)		
MARCH 2014	FIGURE C3-1	REV: 0



- LEGEND:**
- Dauphin River Sonar
  - Cross Sections
  - Dauphin River Centreline
  - 10m Index Contour
  - 2m Contour

- NOTES:**
1. Survey completed by KGS Group on July 2nd, 2011.
  2. Satellite image provided by Atlis Geomatics, July 2011.
  3. All units are metric and in metres unless otherwise specified.
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SCALE: 1:20,000 METRIC 11"x17"

NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

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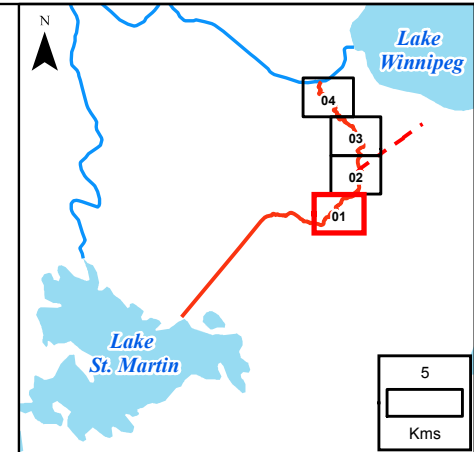
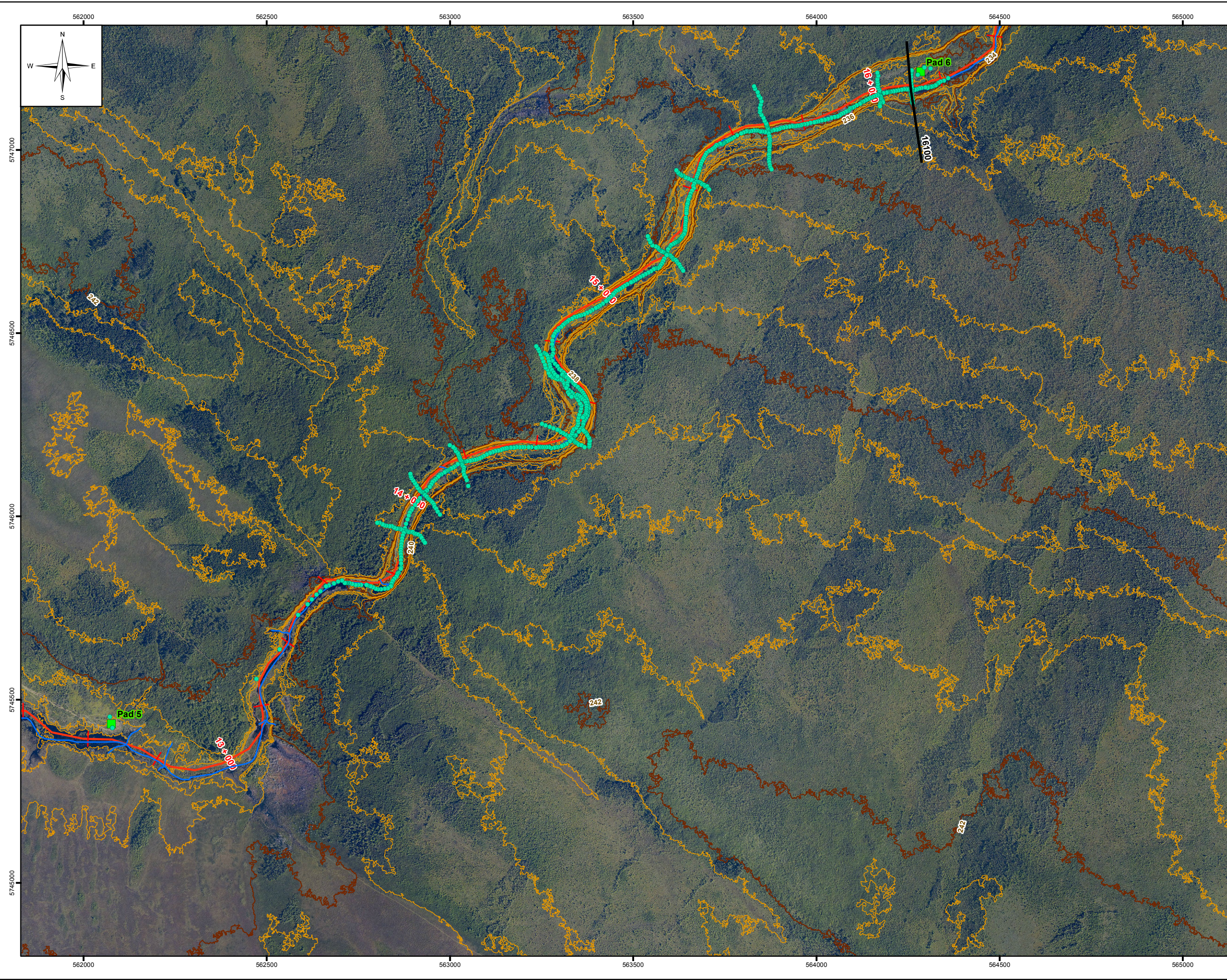
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INFRASTRUCTURE AND TRANSPORTATION

EMERGENCY REDUCTION OF LMB & LSM  
WATER LEVELS – ANALYSIS & MONITORING  
OF DISCHARGES & ICE PROCESSES

2011 DAUPHIN RIVER BATHYMETRIC  
SURVEY  
(SHEET 7 OF 7)

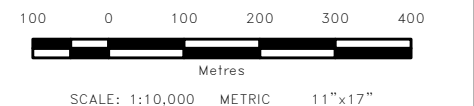
## **APPENDIX C - ANNEX 4**

### **2011 BUFFALO CREEK CROSS-SECTION LOCATIONS**



- LEGEND:**
- AECOM Survey Point
  - Helicopter Landing Pad
  - LiDAR Cross-Section Location
  - Water Feature
  - 2m Index Contour
  - 0.5m Contour
  - Buffalo Creek Centreline

- NOTES:**
1. Topography from LiDAR; Compiled by KGS Group.
  2. Imagery: Atlas Geomatics - July 2011.



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)

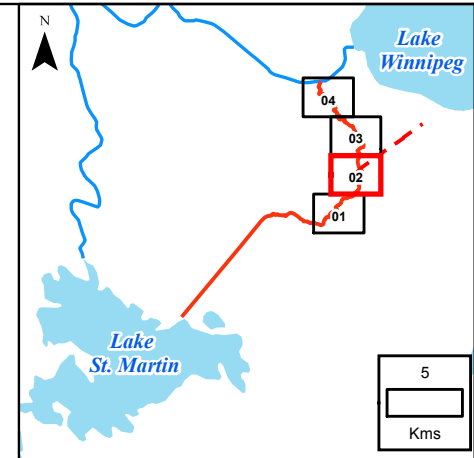
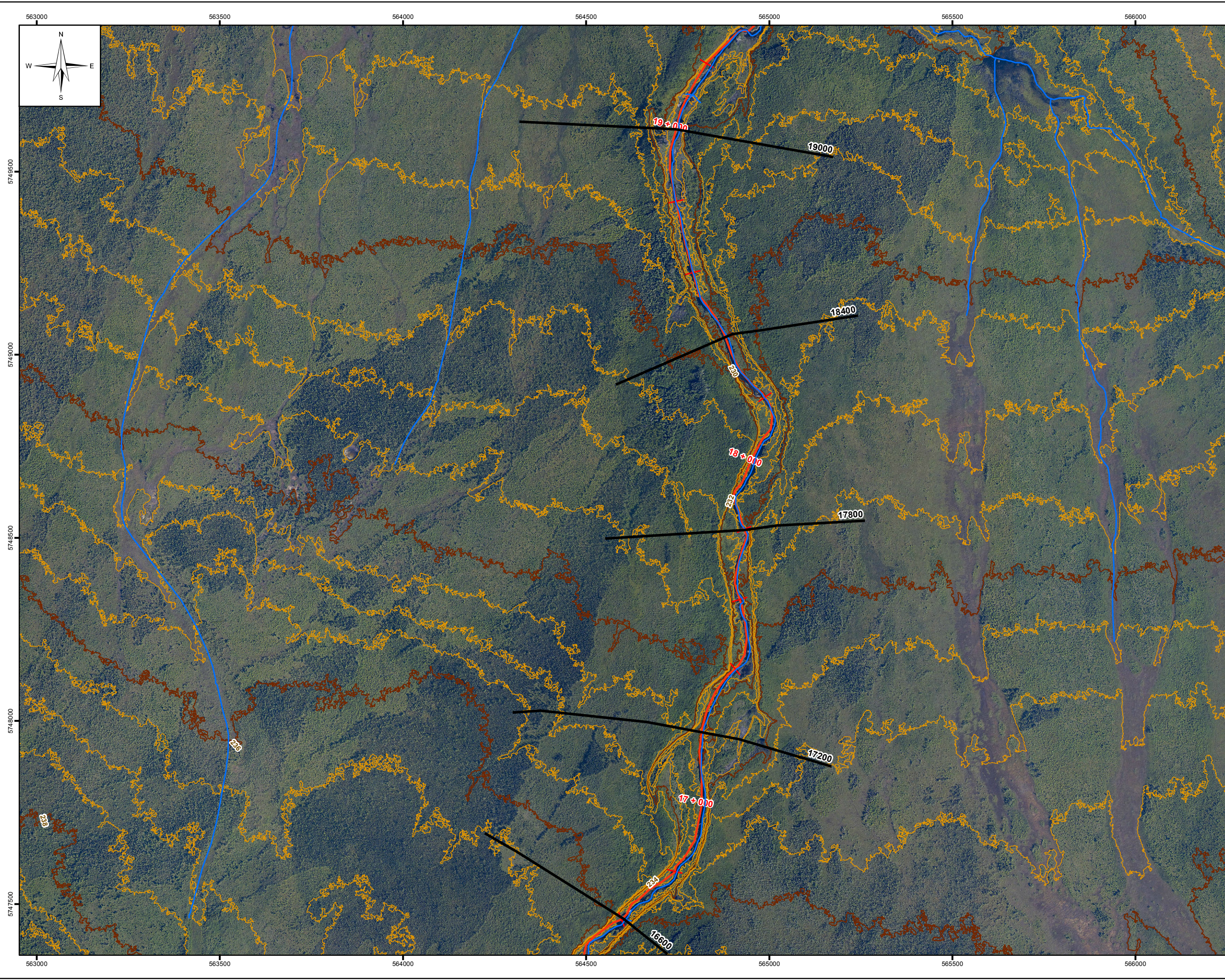
NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

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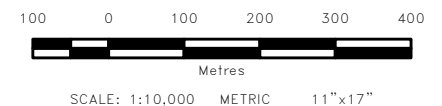
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INFRASTRUCTURE AND TRANSPORTATION

EMERGENCY REDUCTION OF LMB & LSM  
 WATER LEVELS - ANALYSIS & MONITORING  
 OF DISCHARGES & ICE PROCESSES  
**BUFFALO CREEK CROSS SECTION  
 LOCATIONS  
 (SHEET 1 OF 4)**  
 MARCH 2014      FIGURE C4-1      REV: 0



- LEGEND:**
- AECOM Survey Point
  - Helicopter Landing Pad
  - LiDAR Cross-Section Location
  - Water Feature
  - 2m Index Contour
  - 0.5m Contour
  - Buffalo Creek Centreline

- NOTES:**
1. Topography from LiDAR; Compiled by KGS Group.
  2. Imagery: Atlas Geomatics - July 2011.



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)

NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

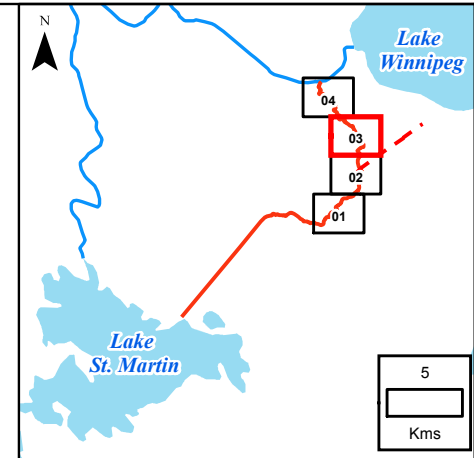
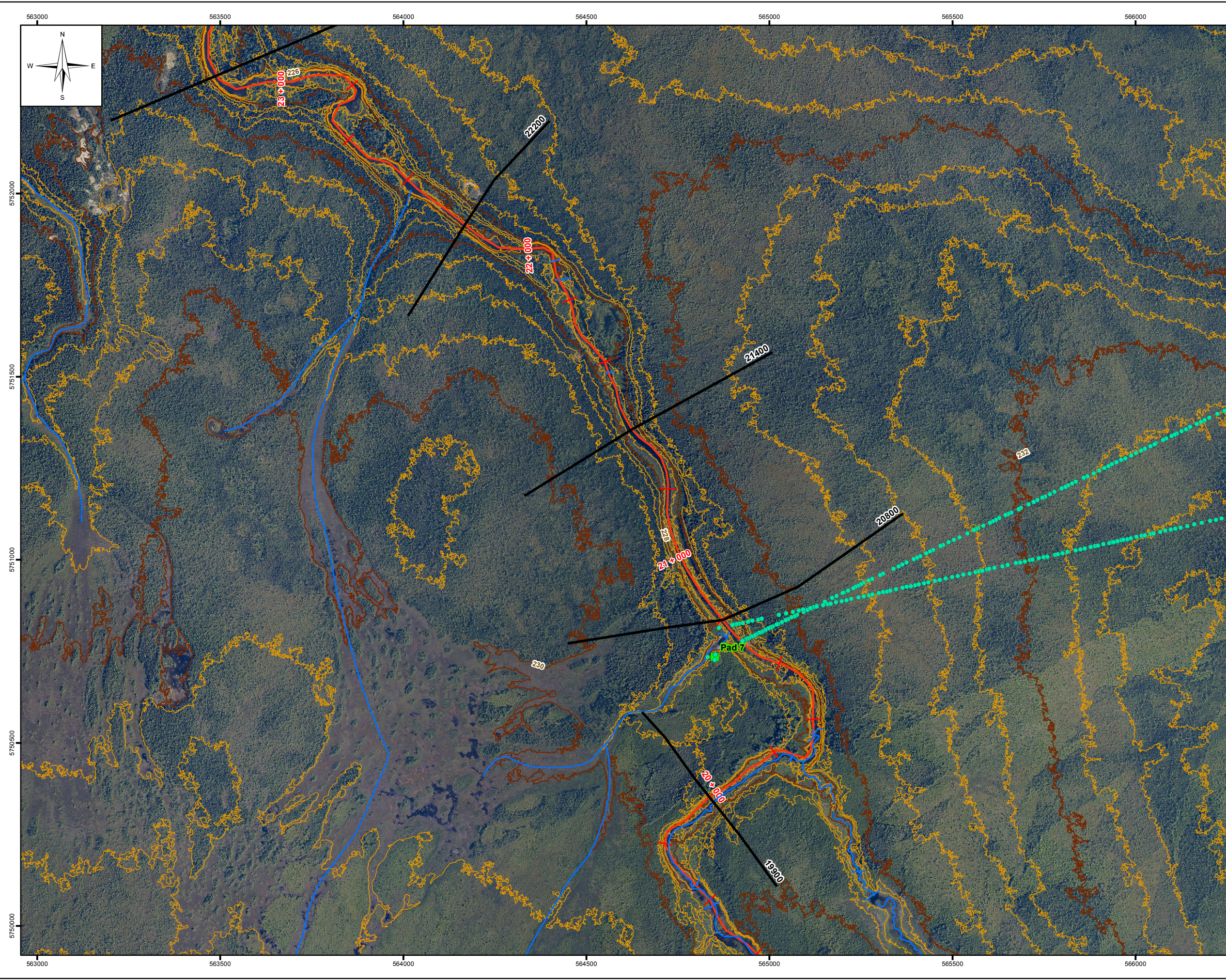
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**Manitoba**  
INFRASTRUCTURE AND TRANSPORTATION

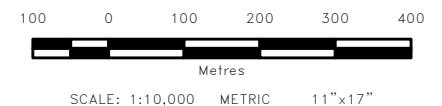
EMERGENCY REDUCTION OF LMB & LSM  
WATER LEVELS - ANALYSIS & MONITORING  
OF DISCHARGES & ICE PROCESSES  
BUFFALO CREEK CROSS SECTION  
LOCATIONS  
(SHEET 2 OF 4)

MARCH 2014	FIGURE C4-1	REV: 0
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- LEGEND:**
- AECOM Survey Point
  - Helicopter Landing Pad
  - LiDAR Cross-Section Location
  - Water Feature
  - 2m Index Contour
  - 0.5m Contour
  - Buffalo Creek Centreline

- NOTES:**
1. Topography from LiDAR; Compiled by KGS Group.
  2. Imagery: Atlas Geomatics - July 2011.



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)

NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

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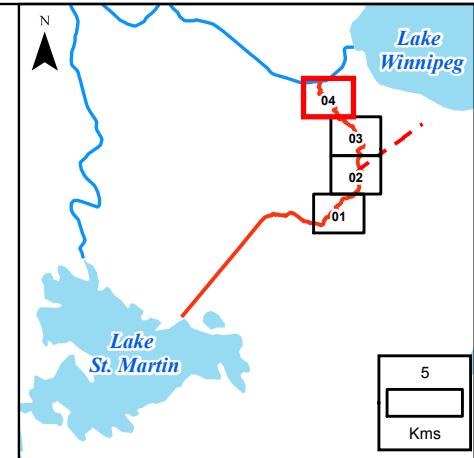
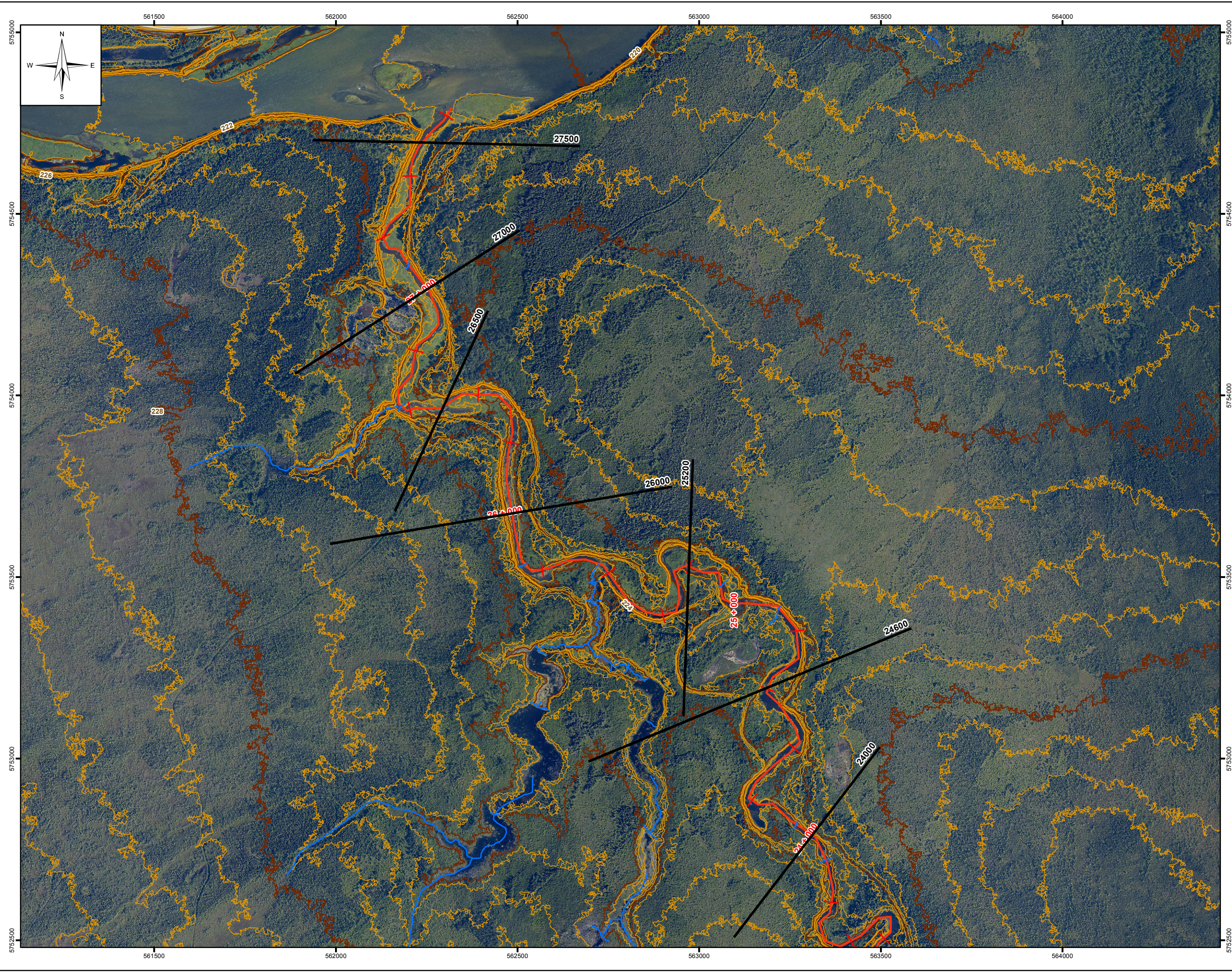
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**Manitoba**  
INFRASTRUCTURE AND TRANSPORTATION

EMERGENCY REDUCTION OF LMB & LSM  
WATER LEVELS - ANALYSIS & MONITORING  
OF DISCHARGES & ICE PROCESSES

**BUFFALO CREEK CROSS SECTION  
LOCATIONS  
(SHEET 3 OF 4)**

MARCH 2014	FIGURE C4-1	REV: 0
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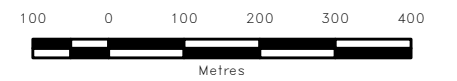


**LEGEND:**

- AECOM Survey Point
- Helicopter Landing Pad
- LiDAR Cross-Section Location
- Water Feature
- 2m Index Contour
- 0.5m Contour
- Buffalo Creek Centreline

**NOTES:**

1. Topography from LiDAR; Compiled by KGS Group.
2. Imagery: Atlas Geomatics - July 2011.



SCALE: 1:10,000 METRIC 11"x17"

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)

NO.	YY/MM/DD	DESCRIPTION	BY
0	14/03/05	ISSUED WITH FINAL REPORT	PAL

REVISIONS / ISSUE

**KGS**  
GROUP  
CONSULTING  
ENGINEERS

**Manitoba**  
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(SHEET 4 OF 4)**

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## **APPENDIX D**

### **HISTORIC PHOTOS AND NOTES**

**Comprised of 4 Separate Appendices:**

- Annex 1: Fairford River January 26, 2004 Photos**
- Annex 2: Fairford River November 30, 2007 Photos**
- Annex 3: Dauphin River 2005, 2006, and 2010 Photos**
- Annex 4: Dauphin River Ice Notes 2007-2011**

**APPENDIX D - ANNEX 1**

**FAIRFORD RIVER JANUARY 26, 2004 PHOTOS**



*Jan 26/04*  
*109-0926 looking east from Pt 6 BEIDGE*



*109-0928 - LOOKING WEST FROM PTH 6 Bridge Jan 26/04*



109-0929 looking south on O/S side of Bridge Jan 24/04

**APPENDIX D - ANNEX 2**

**FAIRFORD RIVER NOVEMBER 30, 2007 PHOTOS**



**PHOTO #1**



**PHOTO #2**



**PHOTO #3**

**APPENDIX D - ANNEX 3**

**DAUPHIN RIVER 2005, 2006, AND 2010 PHOTOS**



**PHOTO #1 – NOVEMBER 25, 2005  
ICE FLOW AT HARBOUR DOCK**



**PHOTO #2 – NOVEMBER 26, 2005  
HARBOUR DOCK AT FISH STATION**



**PHOTO #3 – NOVEMBER 26, 2005  
COMMUNITY RD AT WEST END OF COMMUNITY**



**PHOTO #4 – NOVEMBER 11, 2006  
FLOODING AT HARBOUR DOCK**



**PHOTO #5 – NOVEMBER 13, 2006  
PRIVATE PROPERTY**



**PHOTO #6– NOVEMBER 20, 2010  
DAUPHIN RIVER**



**PHOTO #7– NOVEMBER 21, 2010  
WATER ACROSS COMMUNITY RD**



**PHOTO #8 – NOVEMBER 22, 2010  
DAUPHIN RIVER NEAR FIRE HALL**



**PHOTO #9 – NOVEMBER 22, 2010  
SAME LOCATION AS PHOTO #5**



**PHOTO #10 – DECEMBER 2, 2010  
EAST OF BUFFALO CREEK**



**PHOTO #11 – DECEMBER 3, 2010  
ACROSS FROM BUFFALO CREEK**



**PHOTO #12 – DECEMBER 4, 2010  
COMMUNITY RD NEAR HYDRO**



**PHOTO #13 – DECEMBER 4, 2010  
ACROSS FROM HARBOUR DOCK**

**APPENDIX D – ANNEX 4**  
**DAUPHIN RIVER ICE NOTES 2007-2011**

PR 513 2007

NOV 28/07 -17°C

START TO GET DETOUR READY AT KM 56  
WENT WITH SNOW MACHINE THAT WE BORROWED  
FROM RESOURCES AND PACKED DOWN SNOW  
SO IT WOULD START TO FREEZE.

ALSO WENT WITH 28208 TO FILL IN APPROACHES  
AT KM 61, 56 + BIG BEND

NOV 30/07 -26°C

WENT BACK TO KM 56 WITH SNOW MACHINE  
AND SMALL DRAG AND DRAGGED DETOUR  
WITCH IS FROZEN GOOD IN MOST SPOT'S  
CUT DOWN WILLOW'S AND IT LOOK VERY GOOD.  
JEFF ASHKEY AND SOME OTHER'S ARE PACKING

DEC 02/07 SUNDAY WINTER Rd KM 61 TO  
BIG ROCK

GOT CALL FROM D.R. THAT WATER IS  
GOING OVER THE RD AT KM 56. WENT  
WITH SID + JIM AND PUT UP RD CLOSED  
FLOOD WATER SIGNS. TRAFFIC IS USING  
THE DETOUR BUT IT HAS SOME SOFT

ROUGH SPOT'S

CALLED WPG DISPATCH AT 8:00 P.M.

P.R. 513 CLOSED BUT TRAFFIC IS STILL  
GETTING THROUGH. WATER OVER RD FOR 100 METERS

30CMS DEEP.

DEC 03/07 -20°C

WENT BACK TO KM 56 WITH SNOW MACHINE AND DRAG TO SMOOTH DETOUR.

THE DETOUR IS FROZEN GOOD AND NO PROBLEM GETTING THROUGH.

BY AFTERNOON SO MUCH TRAFFIC WENT THROUGH THE DETOUR THAT IT BROKE THROUGH THE FROST AND IS HARD TO GET THROUGH THE SOFT SPOTS. SID IS FIXING UP THE APPROCHES AT BIG BEND.

WATER AT BIG BEND IS COMING UP GOING THROUGH THE CULVERTS TO THE NORTH SIDE BUT MAY BE ON OR OVER BY TOMORROW.

TALKED TO TIM AT D.R. AND HIM AND TERRY STAG WILL GO WITH BOMADIARS AND SOME SORT OF DRAG RIGHT FROM KM 61 TO BIG ROCK.

DEC 04/07 -16°C

WENT WITH MICKEY TO ANAMA BAY DETOUR AT KM 56 HAS A SOFT SPOT BUT TRAFFIC IS GOING THROUGH NO PROBLEM.

CHECKED ICE ON RD AND THERE IS 3 TO 4" WITH 3 TO 4" WATER. LIGHT TRAFFIC (CARS) WILL BE TRYING TO GO ON ICE TOMMOROW TIM IS DRAGGING FROM KM 61 TO BIG ROCK

DEC 05/07

-29°C

PATROL TO D.R. 8:30 AM. THE WATER AT KM 34 HAS COME UP TO THE EDGE OF THE RD FOR ABOUT 300 METERS AND STARTED TO GO THROUGH THE CULVERTS.

KM. 56 THE TRAFFIC STARTED TO DRIVE OVER THE ICE. THERE IS A SHORT PIECE WHERE CHUNKS OF ICE ARE BREAKING OUT. ABOUT A 5 METER LENGTH. GOT SID + BRIAN TO THROUGH OUT THE BIGGER CHUNKS AND THE TRAFFIC IS DRIVING OVER.

THE DETOUR IS FROZEN HARD AND TRAFFIC CAN USE IT IF THEY HAVE TO.

AT 2:00 P.M. THE WATER AT KM 34 HASN'T CHANGED MUST. MAYBE UP JUST A BIT. NO PROBLEM YET.

DEC 06/07

-15°C

WENT WITH MICKEY TO D.R. THE WATER AT KM 34 HAS STOPPED COMING UP AND EVERYTHING IS O.K. FOR NOW.

WENT WITH SMALL LOADER TO KM 56 AND FILLED IN ON 513 RD WHERE ICE CHUNK WERE BROKEN OUT WITH SNOW AND PUMPED WATER TO FREEZE EVERYTHING IN. WORKED OUT VERY GOOD. SNOWPLOW DROVE OVER NO PROBLEM

OPENED RD AT 11:30 AM TO LIGHT TRAFFIC

Hiboy

DEC 07/07 -23°C

BRIAN + SID WENT TO CHECK RD.  
EVERYTHING IS GOOD NO CHANGE.  
BARRICADE SIGNS ARE LEFT UP AT KM 56  
BUT TOOK OFF RD CLOSED. LEFT ON  
FLOOD WATER AND ADDED 50 KM/HR ADVISORY.  
TURNED RD CLOSED AT L.S.M. TO SIDE.

DEC 08/07 -24°C NO CHANGE (JOHN)

DEC 09/07 -23°C NO CHANGE (JOHN)

DEC 10/07 -19°C

THE RIVER CAME UP A BIT AT  
FRENCHMEN RAPIDS BUT NO HARM DONE  
TIM + TERRY ARE DRAGGING WINTER RD  
TODAY

DEC 11/07 -14°C

SID PATROL TO D.R.  
NO CHANGE

DEC 12/07 -15°C

NO CHANGE

DEC 18 -17°C

DRAGING WINTER Rd FROM Big ROCK  
TO Big BEND

DEC 19/07 -10°C

DRAGING WINTER Rd FROM Big BEND  
TO SNAKE POINT.

DEC 20/07 -10°C

DRAGING WINTER Rd  
LEFT THE DRAG AT Big BEND

JAN 02/08 -30°C

DRAG WINTER Rd FROM Big BEND BACK  
TO Big ROCK. LAST TIME  
PICKED UP DRAG AND BROUGHT IT BACK  
TO YARD.

PR 513 2008

ALL TEMP ARE AT 7:30 A.M.

NOV 17/08 -15°C CLEAR

MICKEY + MYSELF HAD A MEETING WITH CHIEF EMERY STAGG AND MADE A PLAN FOR D.R. BAND TO LOOK AFTER MAKING THE WINTER RD UP TO WHERE WE CAN DRAG IT OURSELF WITH JOHN DEERE  $\frac{1}{2}$ W OUR OWN DRAG.

NOV 18/08 -8°C CLOUDY

SENT 2 MEN WITH SMALL LOADER TO FILL IN CROSSING'S WHERE WINTER RD COMES ON TO P.R. 513.  
LOOK LIKE SNOW MACHINES HAVE STARTED TO PACK KM 56 DETOUR.

NOV 25/08 TO DEC 05/08

TEMP RANGE FROM -4°C TO -22°C

CHECKED KM 56 DETOUR A COUPLE TIMES PER WEEK. MOST OF IT IS FROZE BUT THERE IS ABOUT 6 SPOT'S THAT ARE NOT FREEZING BECAUSE WATER IS DRAINING ACCROSS OUT OF THE SWAMP AND NOT COLD ENOUGH TO FREEZE. THE RIVER IS NOT COMING UP SO NO PROBLEMS YET.

DEC 08/08 -18°C Cloudy

JOHN DID RD PATROL TO D.R. AND WATER CAME UP AT CRANBERRY CREEK ABOUT 10" AND IS KNOWN TO THE TOP OF 36" CULVERT. STILL NO PROBLEM. RIVER IS FROZEN ALL THE WAY BACK TO WHERE CABLE CROSSES RIVER.

DEC 09/08 -20°C Cloudy

PATROL TO D.R. 8:30 A.M.  
NO CHANGE AT CRANBERRY CREEK AND KM 56 IS GOOD.  
WATER AT KM 32 IS COMING UP IN THE FIRST PART OF THE SWAMP AND IF IT RISES ANOTHER 6" WILL BE LEVEL WITH THE SHOULDER OF THE RD.

DEC 10/08 -21°C Cloudy - 2cms Plus  
3 MORE DURING DAY

NO CHANGE FROM YESTERDAY - WATER NOT COMING UP ANY AT KM 32 OR ANY OTHER PLACE.

DEC 11/08 -26°C CLEAR.

NO CHANGE

Hilroy

DEC 12/08 -20°C Cloudy

SENT 2 MEN WITH SMALL LOADER TO  
FILL IN THE CROSSING SOME MORE.  
NO CHANGE IN THE RIVER

DEC 15/08 -33°C CLEAR

NO CHANGE THE RIVER IS MOSTLY  
FROZEN EVEN AT FRENCHMEN RAPIDS  
IS FROZEN. SHOULDN'T HAVE ANY  
PROBLEMS WITH FLOODING

DEC 17/08 -30°C CLEAR

WENT WITH MICKEY TO D.R. TO SIGN  
EQUIP RENTAL AGREEMENT WITH THE CHIEF.  
THE RIVER IS O.K. SO THERE SHOULDN'T BE  
ANY MORE CHARGES FOR MAKING WINTER RD.

<u>RATE'S</u>	SNOWMOBILE LONG TRACK	50. <sup>00</sup>	HR
	SNOWMOBILE DOUBLE TRACK	60. <sup>00</sup>	HR
	BOMBARDEIR w/ DRAG	100. <sup>00</sup>	HR.

TOTAL COST.

SNOWMOBILE LONG TRACK - 20 HRS @ 50.<sup>00</sup>/HR = 1000.  
SNOWMOBILE DOUBLE TRACK - 10 HRS @ 60.<sup>00</sup>/HR = 600.  
BOMBARDEIR w/ DRAG - 67 HRS @ 100.<sup>00</sup>/HR = 6700.

ENTER IN MMS DEC 19/08 TOTAL \$ 8,300.<sup>00</sup>  
COST ADJUSTMENT 200086930

PR 513 2009

ALL TEMP ARE AT 7:30 A.M.

NOV 26/09 -6°C CLOUDY

MICKEY, RICK AND MYSELF HAD A MEETING WITH CHIEF EMERY STA99 TO DISCUSS MAKING A WINTER RD AND BRUSHING CURVES FROM GRAVEL PIT TO CRANBERRY CREEK. EMERY AGREED TO DO BOTH. HE WILL GET STARTED ON THE WINTER RD A.S.A.P. WILL HAVE TO WAIT WITH BRUSHING UNTILL RICK IS SURE MONEY IS AVAILABLE. MICKEY OR RICK WILL NOTIFY EMERY AS SOON AS THEY ARE SURE. THERE IS A LITTLE BIT OF FRAZZLE<sup>ICE</sup> STARTING TO FLOW. ONLY HAVE ABOUT 1" OF SNOW AND THE GROUND IS NOT FREEZING ANYWHERE THERE IS GRASS OR IN THE BUSH.

DEC 02/09 -9°C CLOUDY -2 CMS OVER NIGHT.

JOHN DID RD PATROL TO D.R. AND ABOUT 2 TO 4 CMS OVER NIGHT. RIVER IS STARTING TO FILL UP WITH FLOWING ICE BUT NOT PILING UP ANYWHERE.

Ritroy

DEC 03/09 -13°C Cloudy 3cms OVER NIGHT.

Rd PATROL TO D.R. IN A.M. AND SNOW GETS MORE GOING EAST UP TO 15 TO 20cm's AT D.R. LOTS OF FRAZZLE ICE FLOWING, ALMOST ALL THE WAY. STILL NOT PILING UP. THE MOUTH OF THE RIVER IS MOSTLY OPEN SO ICE IS FLOWING OUT INTO THE LAKE. 20008 FLOWING. NOTHING HAPPENING WITH EMERY PACKING WINTER Rd.

DEC 04/09 -16°C Cloudy NO PRECIP

SENT BRIAN + JIM WITH 28208 TO FILL IN ACCESS CROSSING'S WITH SNOW FOR ACCESS ONTO WINTER Rd.

DEC 05/09 -11°C Cloudy - FLURRY'S

HELGI CALL 3:00 P.M. TO PICK UP A COUPLE BARRICADES BECAUSE WATER IS GOING ACCROSS FINARSON Rd ABOUT 30cm DEEP BY 100 METERS LONG. PICKED UP 2 BARRICADES

DEC 07/09 -20°C Cloudy - Flurry's

8:30 Rd PATROL TO D.R. PR 513 IS STILL O.K. LOTS OF ICE FLOWING IN THE RIVER AND THE MOUTH OF RIVER IS RIGHT FULL AND PILED UP SO EINARSON RD IS FLOODED. CLOSED BY HELGI. D.R. BAND STARTED PACKING DETOUR AT KM 56 + HIGH GRADE END

DEC 08/09 -30°C CLEAR - NO PRECIP

JOHN Rd PATROL TO D.R. WATER DROPPED DOWN OFF EINARSON RD LOT'S OF ICE LEFT ON EINARSON RD. P.R. 513 IS NO CHANGE. (O.K.)

DEC 09/09 -30°C CLEAR NO PRECIP

DOUG Rd PATROL TO D.R. EVERYTHING O.K. RIVER IS SLOWLY FREEZING BACK ALL THE WAY TO SNAKE POINT.

DEC 10/09 -24°C Cloudy - NO PRECIP

JIM Rd PATROL TO D.R. NO CHANGE

DEC 11/09

-26°C CLEAR NO PRECIP

Doug Rd PATROL TO D.R. WATER CAME UP AT HIGH GRADE ENOUGH TO COME THROUGH TWO CULVERTS JUST EAST OF WINTER Rd ACCESS. CAME UP AT CRANBERRY CREEK ENOUGH TO GO THROUGH CULVERT'S FROM RIVER NORTH. NOT SO MUCH AT KM 56 NOT GOING THROUGH CULVERT. DROVE THROUGH WINTER Rd AT KM 56 FROZEN GOOD, ROUGH AND SHOULD CUT SOME WILLOW'S USEABLE IF NEEDED. VEHICLES ARE DRIVING ACROSS RIVER AT LETANDER'S

DEC 12/09

-30°C P. Cloudy NO PRECIP

DEC 13/09

-29°C CLEAR NO PRECIP.

DEC 14/09

-31°C CLEAR NO PRECIP

Doug Rd PATROL TO D.R. WATER CAME UP OVER WEEKEND AT KM 56. CAME UP TO THE TOP OF THE CULVERT INTO DITCH ON NORTH SIDE AND THEN DROPPED DOWN 4" SHOULD BE OK. RIVER IS FROZEN ALL THE WAY BACK TO KM 33. SOME OPEN SPOTS BUT 80% FROZEN. DROVE THROUGH KM 56 + Big Bend DETOUR IN TWO WHEEL DRIVE. BRIAN + JIM FILLING IN DETOUR ACCESS WITH SNOW AGAIN.

DEC 15/09 -29°C CLEAR NO PREP

Doug Rd PATROL TO D.R. NO CHANGE FROM YESTERDAY JUST A BIT MORE FROZEN SHOULDN'T BE ANY PROBLEMS. THERE'S NOT TOO MUCH OPEN WATER LEFT. TALKED TO MELVIN STAGG. HE SAID THEY PACKED THE LAST PIECE FROM BIG ROCK TO BIG BEND AND COULD DRIVE THROUGH IF NEEDED. IT'S VERY ROUGH NOT ENOUGH SNOW TO DRAG INTO HOLES

DAUPHIN RIVER FIRST NATION  
BOX 58 GYPSUMVILLE M.B.

WINTER RD PREP

RATES      SNOWMOBILE LONG TRACK 65.00 HR  
                 SNOWMOBILE DOUBLE TRACK 65.00 HR  
                 BOMBARDEIR C/W DRAG 110.00 HR

TOTAL COST

SNOWMOBILE LONG TRACK 32 HRS @ 65.00/HR = 2080.00  
SNOWMOBILE DOUBLE TRACK 32 HRS @ 65.00/HR = 2080.00  
BOMBARDEIR C/W DRAG NOT USED 00

TOTAL \$ 4,160.00

Hilroy

PR 513 2010

ALL TEMP ARE AT 7:30 A.M.

NOV 15/10

TALKED TO EMMY AT DAUPHIN RIVER TO FIND OUT IF HE WOULD BE INTERESTED IN DOING THE WINTER RD. HE SAID HE WOULD GET STARTED AS SOON AS POSSIBLE

NOV 18/10

6" OF SNOW AT D.R. THE RIVER HAS LOTS OF SLUSH FROM THE HEAVY SNOW BUT NOT CAUSING ANY TROUBLE YET.

NOV 20th/10

ANOTHER 2" SNOW AT D.R.

NOV 21/10

12:15 CALL FROM HEL91 TO BORROW BARRICADES FOR EINARSON RD IS FLOODED.

4:55 CALL FROM K. ANDERSON 659-2701 THAT PR 513 IS FLOODED AT CRANBERRY CREEK TOOK BARRICADES TO CRANBERRY CREEK BUT THERE WAS NO FLOOD.



NOV 26/10 -20°C CLEAR NO PRECIP  
2 FILL IN CROSSINGS AGAIN  
CROSSINGS SHOULD BE GOOD ENOUGH TO  
USE IF NEEDED.

Rd PATROL TO D.R. IN THE AFTERNOON  
NO CHANGE IN RIVER CONDITIONS

NOV 27/10 -16°C CLOUDY NO PRECIP  
Rd. PATROL TO CRANBERRY CREEK.  
NO CHANGE

NOV 29/10 -9°C CLOUDY NO PRECIP

LOOKS LIKE THE WATER CAME UP JUST  
ENOUGH TO START GOING THROUGH THE  
CULVERT AT KM 56 AND THEN WENT  
DOWN - NO PROBLEM YET.

NOV 30/10 -12°C CLOUDY TRACE OF SNOW  
NO CHANGE

DEC 01/10 -21°C CLOUDY NO PRECIP  
NO CHANGE RIVER SLOWLY FILLING WITH ICE

DEC 02/10 -22°C CLEAR NO PRECIP  
NO CHANGE

DEC 03/10 -17°C CLOUDY - NO PRECIP  
NO CHANGE

DEC 04/10 + 05/10  
NO RD PATROL

DEC 06/10 -21°C CLEAR NO PRECIP  
Doug RD PATROL 9:30 A.M.  
LOOK LIKE RIVER PLUGGED AT THE LAKE  
AND THE WATER CAME UP FROM  
FINARSON'S TO LAKE BUT NO HARM  
DONE. THE REST OF THE RIVER IS  
FREEZING VERY SLOWLY

DEC 07/10 -22°C CLEAR NO PRECIP  
NO CHANGE

DEC 08/10 -22°C CLEAR NO PRECIP  
CREW CHECKED KM 56 DETOUR - NOT FROZEN  
IN SOME PLACES  
NO CHANGE IN RIVER

DEC 09/10 -13°C CLOUDY SNOWING  
4 CMS IN GYP OVER NIGHT 8 CMS AT  
CRANBERRY CREEK AREA  
LOTS OF SLUSH IN THE RIVER NOW

DEC 10/10 -22°C CLEAR NO PRECIP

WATER FROM SNAKE POINT EAST FOR 2 MILES  
IS STARTING TO COME UP NOT CAUSING A  
PROBLEM YET. History

DEC 04/10 + 05/10  
NO RD PATROL

DEC 06/10 -21°C CLEAR NO PRECIP  
Doug RD PATROL 9:30 A.M.  
LOOK LIKE RIVER PLUGGED AT THE LAKE  
AND THE WATER CAME UP FROM  
FINARSON'S TO LAKE BUT NO HARM  
DONE. THE REST OF THE RIVER IS  
FREEZING VERY SLOWLY

DEC 07/10 -22°C CLEAR NO PRECIP  
NO CHANGE

DEC 08/10 -22°C CLEAR NO PRECIP  
CREW CHECKED KM 56 DETOUR - NOT FROZEN  
IN SOME PLACES  
NO CHANGE IN RIVER

DEC 09/10 -13°C CLOUDY SNOWING  
4 CMS IN GYP OVER NIGHT 8 CMS AT  
CRANBERRY CREEK AREA  
LOTS OF SLUSH IN THE RIVER NOW

DEC 10/10 -22°C CLEAR NO PRECIP

WATER FROM SNAKE POINT EAST FOR 2 MILES  
IS STARTING TO COME UP NOT CAUSING A  
PROBLEM YET. History

DEC 10/10

7:30 P.M. GOT CALL FROM HELGI THAT THE WATER AT KM 56 IS GOING OVER THE RD. DID RD PATROL TO KM 56 AND THE WATER IS GOING OVER APPROX 12" DEEP BY 150 METERS IN LENGTH. PUT UP RD CLOSED BARRICADE AT WEST END OF FLOODED AREA AND HELGI PUT THE BARRICADE AT EAST END. VEHICLES ARE STILL DRIVING THROUGH AND PEOPLE ARE LEAVING D.R. CONTACTED WPG DISPATCH TO LET THEM KNOW RD WAS CLOSED. ALSO CONTACTED RC.MP. + MURRY JACKSON.

DEC 11/10 -25°C P. CLOUDY NO PRECIP

10:00 A.M. PATROL TO KM 56, THE WATER IS NOT GETTING ANY HIGHER AND IS FROZE ACCROSS BUT NOT ENOUGH FOR TRAFFIC TO DRIVE ON.

WALKED THROUGH DETOUR AND THINK THAT MAY BE FROZE ENOUGH TO USE. THE PROBLEM SEEMS TO BE CROSSING THE DITCH TO GET ON TO THE DETOUR. TALKED DALE FINARSON AT 1:00 P.M. AND HELGI IS WORKING ON THE DETOUR AND EAST ENTRANCE. TALKED TO HELGI AT 8:30 P.M. AND DETOUR SHOULD BE READY FOR TOMMOROW

DEC 12/10 -30°C CLEAR NO PRECIP

Rd PATROL TO CRANBERRY CREEK AT 10:30 A.M.  
LIGHT TRAFFIC ALEX LATANDER HAS BEEN  
DRIVING ACROSS ICE BUT HAS HOLLOW SPOTS  
UNDER 2½" OF ICE WITH UP TO 4" OF  
WATER BETWEEN ICE + Rd.

HEL91 HAS BEEN DRIVING ON DETOUR WITH  
4x4 TRUCK + DRAG. DETOUR IS USABLE IF  
NEEDED BUT ONLY WITH 4x4<sup>s</sup>

DEC 13/10 -28°C CLEAR NO PRECIP

Rd PATROL TO D.R. 10:30 A.M AT CRANBERRY  
CREEK. DETOUR IS GOOD TRAFFIC IS USING  
NO PROBLEM FOR TRUCKS 2 AND 4 WHEEL  
DRIVES AND VANS GOING THROUGH.

THE Rd PART HAS 4" OF ICE BUT IS  
HOLLOW UNDER SO TRAFFIC IS BREAKING  
THROUGH IN SOME SPOTS. WE TOOK THE  
LOADER AND BROKE DOWN THE HOLLOW AREA  
ABOUT 10 METERS LONG AND REFILL WITH  
SNOW IN ABOUT 8" OF WATER AND PACKED  
WITH LOADER. LIGHT TRAFFIC COULD DRIVE  
ACROSS O.K. EXCEPT FOR ONE SMALL SPOT  
ABOUT 1 METER BY ½ METER THAT WAS SOFT.  
MARKED BAD SPOTS AND LEFT TO FREEZE  
CALL FROM RCMP AT 1:00 A.M. FOR INFO  
ABOUT DETOUR/Rd CONDITION BECAUSE OF  
AMBULANCE CALL TO D.R. TOLD THEM DRIVING  
ACROSS DETOUR/Rd WOULD BE TAKING A CHANCE

Hilroy

DEC 14/10 -15°C CLOUDY NO PRECIP

Rd PATROL TO Km 56 8:30 A.M.  
THE AREA WHERE WE FILLED IN WITH SNOW IS FROZEN SOLID AND TRAFFIC CAN DRIVE ACCROSS NO PROBLEM IF THEY STAY TO THE CENTRE. NOT SURE HOW SOLID IT IS OVER TO THE SIDES. CREW IS CHECKING AND FLOODING THE SIDES AND ENDS WERE EVER. LOOSE ICE IS.

DEC 15/10 -10°C P. CLOUDY NO PRECIP

CREW CHECKED Km 56 AND IT IS GOOD TO CROSS BUT WILL WAIT TILL TOMORROW TO OPEN TO ALL TRAFFIC.

WATER IS COMING UP AT Big BEND BUT IS NOT CAUSING A PROBLEM FOR TRAFFIC YET. FIXED UP CROSSING

DEC 16/10 -18°C CLEAR NO PRECIP

WENT WITH 20008 TO LEVEL OFF FLOOD AREA TOOK DOWN BARRICADE / ROAD CLOSED SIGNS AND OPENED PR 513 AT 11:00 A.M. TO ALL TRAFFIC. Put up 60 KM/HR SIGNS AT Km 56 AND FLOOD WATER SIGNS AT Big BEND BECAUSE WATER CAME UP ON INSIDE CURVE PARTLY ONTO Rd

DEC 17/10

3cm's OVER NIGHT

Rd PATROL TO KM 56 IN AFTERNOON.  
4" OF SNOW FROM BIG ROCK TO D.R.  
NO CHANGE IN FLOOD CONDITION BUT THE  
WATER AT FRENCHMEN RAPIDS CAME  
UP ENOUGH TO START GOING THROUGH THE  
CULVERT. NO PROBLEM IN THE CONSTRUCTION  
AREA

DEC 18/10 -9°C Cloudy 1cm OVER NIGHT.

NO Rd PATROL

20008 Plowing - NO CHANGE

DEC 19/10 -11°C Cloudy - NO PRECIP

NO Rd PATROL

DEC 20/10 -19°C Cloudy 1cm OVER NIGHT

8:00 A.M. RANDY Rd PATROL  
WATER STARTING TO COME UP AT THE  
SWAMP JUST BEFORE FRENCHMEN RAPIDS  
NOT GOING ONTO Rd.

History

DEC 21/10 -15°C Cloudy 1cm OVER NIGHT

8:00 A.M. Doug Rd PATROL TO D.R.  
THE WATER AT THE SWAMP JUST  
BEFORE FRENCHMEN RAPIDS IS NOT  
COME UP. WATER AT Big BEND HAS  
COME UP ENOUGH OVER NIGHT TO START  
GOING ACCROSS AT THE TWO CULVERT  
ONLY ABOUT 1" DEEP FOR 20' LONG  
AND STARTED TO FREEZE. AREA IS  
MARKED WITH FLOOD WATER SIGN.

DEC 22/10 -14°C Cloudy - TRACE

8:30 A.M. PATROL TO Big BEND. WATER  
CAME UP A BIT AT Big BEND CULVERTS  
JUST ONTO THE INSIDE CURVE BUT NOT  
CAUSING ANY PROBLEM. 19916 SANDING  
CURVES AND ANY ICE PATCHES (INSIDE OF  
SOME CURVES)

DEC 23/10 -15°C Cloudy - TRACE

8:30 A.M. PATROL TO D.R. WATER AT  
Big BEND IS NOT COMING UP ANY MORE  
AND WHATEVER DID COME UP YESTERDAY  
IS FROZE NOT CAUSING ANY PROBLEM.

DEC 24/10 -13°C CLOUDY 1 CM OVER NIGHT

JIM + RANDY PATROL TO CRANBERRY CREEK  
PUT UP MARKERS AT BIG BEND  
NO CHANGE IN CONDITIONS

DEC 25/10 -15°C CLOUDY TRACE  
NO RD PATROL

DEC 26/10 -16°C CLEAR - NO PRECIP  
NO RD PATROL

DEC 27/10 -14°C CLEAR - NO PRECIP

CALL FROM HEL91 EINARSON AT 12:40 P.M.  
WATER OVER RD IN CONSTRUCTION AREA.  
PATROL BIG BEND. WATER IS OVER RD AT  
KM 35.4 FOR A DISTANCE OF 150 METERS X 6"  
PUT UP FLOOD WATER SIGNS TRAFFIC IS  
DRIVING THROUGH WITHOUT MUCH PROBLEMS.

DEC 28/10 -10°C CLOUDY NO PRECIP  
CALLED WPG DISPATCH 3:30 CAR TRAFFIC NOT ADVISED.  
RD PATROL TO BIG BEND. WATER IS OVER THE  
RD IN 3 PLACES @ KM 35.4 - 2 PLACES  
ARE 150 METERS X 6" TO 8" TRAFFIC IS STILL  
DRIVING BUT CARS + VAN ARE HAVING TROUBLE WITH  
SLUSH AT THE ENDS - WENT WITH MURRY JACKSON  
AT 3:00 P.M. NO CHANGE FROM THIS MORNING

DEC 29/10 -12°C CLOUDY NO PRECIP

7:30 A.M. Rd PATROL TO Km 35.  
NO CHANGE IN WATER LEVEL IN THE 3  
FLOOD AREAS. ABOUT  $1\frac{1}{2}$ " OF ICE OVER  
NIGHT NOT ENOUGH TO HOLD A VEHICLE.  
PASSABLE WITH 4x4'S ONLY. WENT WITH  
LOADER TO GET RID OF THE SLUSH PILES  
AT THE END TO MAKE IT EASIER FOR 4x4'S  
PUT UP BARRICADE WITH Rd CLOSED/FLOOD  
WATER. TALKED TO DAUPHIN DISPATCH TO  
INFORM OF Rd CLOSED. GETTING TRACTOR  
28214 FROM ASHER AND WILL TRY TO DRAG  
DETOUR.

DEC 30/10 -25°C CLEAR NO PRECIP

Rd PATROL TO Km 35 @ 7:30 A.M.  
THE CENTER FROZE OVER ABOUT  $2\frac{1}{2}$ " THICK  
BUT THE TRAFFIC IS DRIVING ALONG SIDE  
OF WHERE THEY WERE DRIVING YESTERDAY.  
THE ICE ALONG SIDE IS THICK ENOUGH TO  
HOLD  $\frac{1}{2}$  TRUCK BUT STILL CRACK'S IN SOME  
PLACE AND WATER COMES ONTO ICE  
Rd STILL CLOSED BUT TRAFFIC GOING THROUGH.  
STARTED TO DRAG WINTER Rd FROM  
BIG ROCK TO (T. DINNER CORNER) WITH  
28214. WENT ALL THE WAY TO T. AND  
BACK NO PROBLEM BUT NOT PULLING ANY DRAG  
HOOKED ON TO DRAG AND STARTED BACK  
BUT GOT TO FAR OVER AND GOT STUCK  
PULLED OUT WITH 28208 AND WENT BACK TO YARD

TALKED TO JIM BAKER IN THE EVENING  
HE DRAGGED FROM GYP TO BIG ROCK  
WITH SNOWMOBILE CLUB GROOMER AND  
WILL GO FROM BIG ROCK TO BIG BEND  
TOMORROW.

DEC 31/10 -25°C CLEAR NO PRECIP

Rd. PATROL TO Km 35 AT 7:30 A.M.  
TRAFFIC IS STILL DRIVING ALONG SIDE  
ROUGH CENTRE NO PROBLEM NOT EVEN  
CRACKING ICE. RANDY + JIM WILL TAKE  
WATER PUMP AND FLOOD CENTER TO MAKE  
ICE THICKER AND SMOOTHER.

10:40 Rd STILL CLOSED, OPEN TO LOCAL  
TRAFFIC ONLY NO HEAVY TRAFFIC  
TALKED TO ROY + RICK AND DECIDED TO  
TRY AND GET ST. MARTIN CLUB TO  
DRAG FROM BIG BEND TO SNAKE POINT  
NEXT WEEK OF SOONER.

JAN 01/11 -15°C PARTLY CLOUDY NO PRECIP

NO Rd PATROL

JAN 02/11 -27°C CLEAR NO PRECIP

NO Rd PATROL

JAN 03/11 -26°C CLEAR NO PRECIP

NO Rd PATROL <sup>Hilroy</sup>

JAN 04/11 -16°C CLOUDY TRACE

9:30 A.M. PATROL WITH ROY TO D.R.  
KIM 35 FLOOD AREA IS ALL FROZEN  
SOLID DOWN TO THE ROAD. WENT WITH  
20008 TO SMOOTH ROUGH AREA THAT WE  
FLOODED ON FRIDAY 31ST. EVERYTHING LOOKS  
GOOD AND OPENED TO ALL TRAFFIC AT 10:30 A.M.  
PUT UP 50 KM/HR IN FLOODED AREA. WENT  
ON WINTER RD FROM BIG BEND TO BIG ROCK  
EVERYTHING IS GOOD READY TO USE IF  
NEEDED.

1:00 P.M. STOPPED AT R.C.M.P. TO LET  
THEM KNOW P.R. 513 IS OPEN TO ALL  
TRAFFIC

JAN 05/11 -26°C CLEAR NO PRECIP  
NO CHANGE WINTER RD IS ALL USEABLE

JAN 06/11 -23°C CLOUDY NO PRECIP  
NO CHANGE

JAN 07/11 -20°C P. CLOUDY NO PRECIP  
NO CHANGE

JAN 08/11 -17°C CLOUDY TRACE  
NO CHANGE

JAN 09/11 -17°C P. CLOUDY NONE

JAN 10/11 -25°C P. Cloudy NO PRECIP

STRILKIWSKI CONSTRUCTION CAME BACK TO  
START WORKING AT KM 35.

EVERYTHING SHOULD BE FROZEN ENOUGH IN  
THE RIVER SO THERE SHOULDN'T BE ANY  
MORE PROBLEMS

TOTAL COST  
DAUPHIN RIVER FIRST NATION  
Box 58 GYPSUMVILLE MB

RATES SNOWMOBILE LONG TRACK \$ 50.00 HR  
SNOWMOBILE DOUBLE TRACK \$ 50.00 HR  
BOMBARDEIR 9W DRAG \$ 60.00 HR

SNOWMOBILE LONG TRACK 92 HRS @ 50.00/HR = \$4,600.  
SNOWMOBILE DOUBLE TRACK 50 HRS @ 50.00/HR = \$2,500.  
BOMBARDEIR 9W DRAG 42 HRS @ 60.00/HR = \$2,520.

FINAL WINTER Rd PREP

ST. MARTIN SNOWMOBILE CLUB  
Box 159 GYPSUMVILLE M.B.

BR160 BOMBARDEIR 9W DRAG \$130.00 / HR

Big Rock TO SNAKE POINT 20HRS @ \$130.00 = \$2,600.00

MARCH 27/11

STARTING TO FLOOD OVER FROM RIVER  
3 PLACES BIG BEND, ROCK IN RIVER +  
CRANBERRY CREEK. PUT UP SIGNS + MARKERS

MARCH 28/11

WATER OVER RD AT BIG BEND.  
ONE LANE TRAFFIC FROM EINAREONS FOR  
250 METERS THEN OVER RD 350 METERS X 12" DEEP  
ROCK IN RIVER 2 SECTIONS BOTH 180 METERS LONG  
BY 8" TO 10" DEEP.  
CRANBERRY CREEK ONE LANE FOR 500 METERS +  
OVER RD FOR 100 METERS X 10" DEEP.  
RD CLOSED LOCAL TRAFFIC ONLY

MARCH 29/11

WATER STILL COMING UP 2" DEEPER THEN  
YESTERDAY. TRAFFIC STILL DRIVING THROUGH  
BUT HARD WITH LOTS OF ICE FLOATING IN  
WATER

MARCH 30/11

WATER STILL COMING UP 2 MORE INCHES.  
WENT WITH 20407 TO TRY TO PUSH SOME  
ICE OFF TO THE SIDE BUT MOST OFF  
IT FLOATED BACK. TRAFFIC STILL DRIVING  
THROUGH. 3:30 CLOSED ROAD TO ALL TRAFFIC

MARCH 31/11

WATER STILL COMING HIGHER FLOODED BACK ALL THE WAY TO HUNTERS SHACK. NEVER DROVE THROUGH.

APRIL 01/11

NO CHANGE

APRIL 01/11

NO CHANGE

APRIL 02/11 NO CHANGE

APRIL 03/11 NO CHANGE

APRIL 04/11 NO CHANGE

APRIL 05/11

WATER AT Big BEND IS STARTING TO GO DOWN SLOWLY. DROPEd 1" OVER NIGHT AND ANOTHER 1" BY 2:30 P.M. THE WATER IS RUNNING DOWN THE Rd FROM HUNTERS EAST AND GOING BACK INTO THE RIVER AT THE CULVERTS TOOK 30355 LOADER TO CRANBERRY CREEK TO PUSH OFF SOME BIG ICE CHUNKS

Hibon

APRIL 06/11

WATER AT BIG BEND WENT DOWN ANOTHER 1"  
THE 3 OTHER PLACES ARE NO CHANGE  
WENT WITH 30355 TO CRANBERRY CREEK TO  
PUSH OFF BIG CHUNKS OF ICE OFF RD.

APRIL 07/11

WATER AT BIG BEND WENT DOWN ANOTHER  
5" BUT OTHER 3 PLACES NO CHANGE  
WENT WITH 30355 TO PUSH OFF MORE ICE  
AT CRANBERRY

APRIL 08/11

WATER AT BIG BEND IS GONE RIGHT  
DOWN. ONLY 90 METER IS STILL GOING  
OVER RD AT THE CULVERTS  
THE 2ND LOCATION HAS GONE DOWN 2"  
THE 3RD LOCATION HAS GONE DOWN 6"  
CRANBERRY CREEK HAS GONE DOWN 2"  
PUSHED MORE CHUNKS OFF AT CRANBERRY

APRIL 09/11

WATER AT 2ND + 3RD LOCATION HAS GONE  
DOWN OFF RD. JUST A SMALL TRICKLE OVER  
AT EACH LOCATION. WATER AT CRANBERRY WENT  
DOWN ONLY 2" MORE. STEAMED CULVERT AT  
BIG BEND

APRIL 10/11

STILL JUST A TRICKLE OVER AT 2nd + 3rd LOCATIONS.

THE WATER AT CRANBERRY CREEK HAS GONE DOWN OFF RD BUT HAS LEFT UP TO 4 FT OF ICE ON RD. GOT RANDY WITH 30355 TO PUSH OFF ICE TOOK ALL DAY

APRIL 11/11

8:30 A.M. CALLED WPG DISPATCH TO OPEN PR 513 TO ALL TRAFFIC

Hibroy

## **APPENDIX E**

### **WATER TEMPERATURE DATA**

**Comprised of 2 Separate Appendices:**

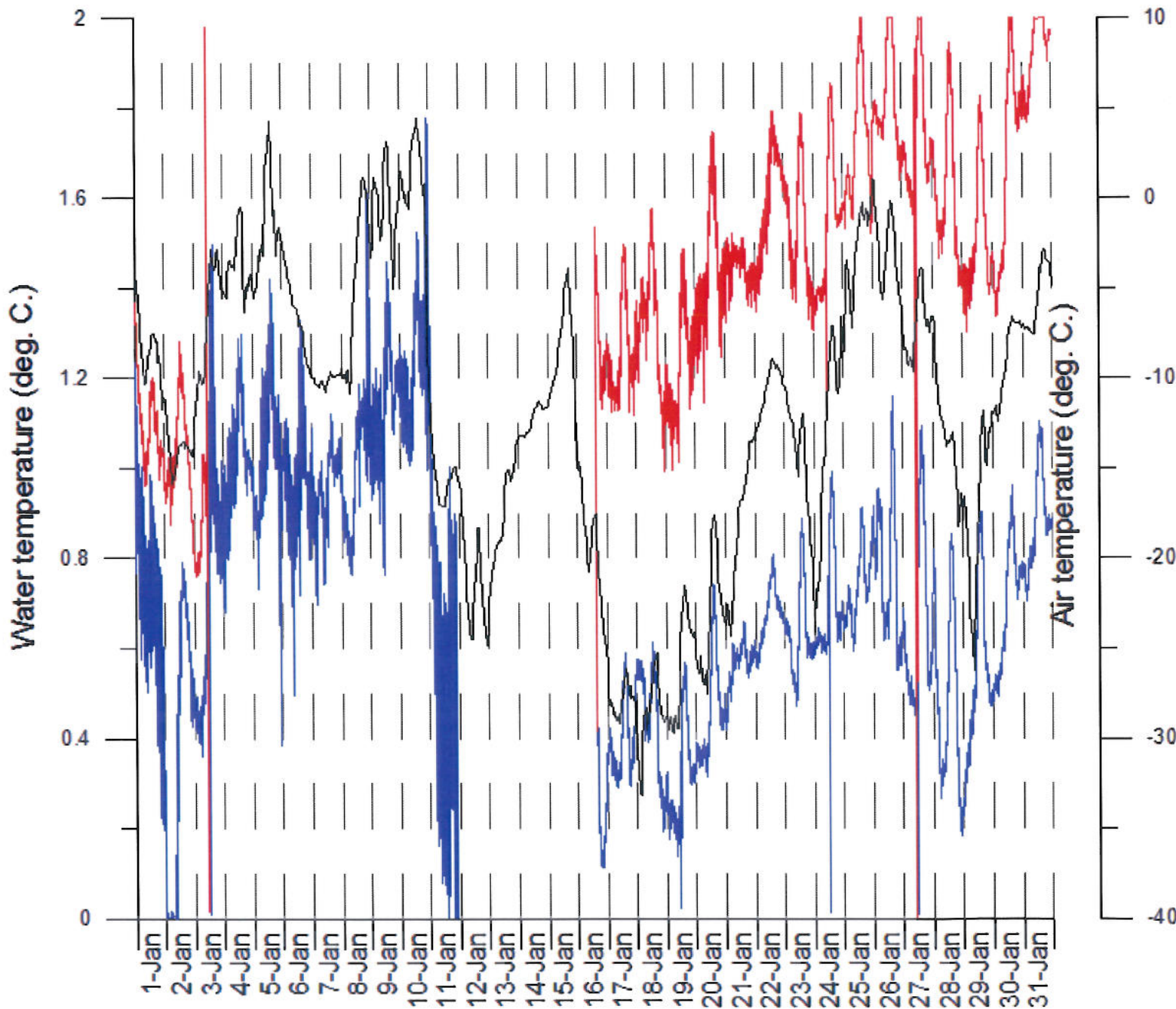
**Annex 1: Fairford River  
Annex 2: Dauphin River**

## **APPENDIX E - ANNEX 1**

### **FAIRFORD RIVER**

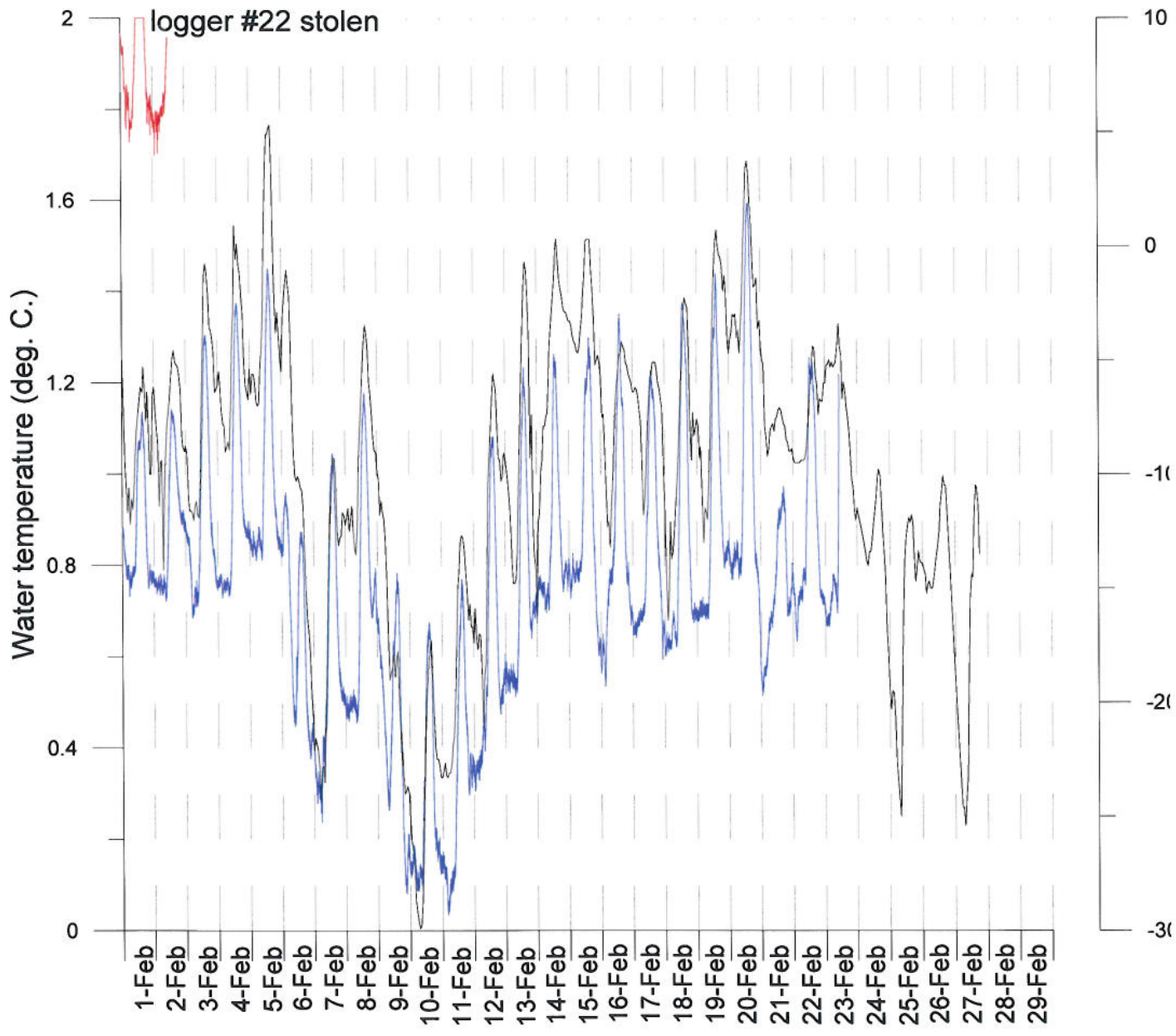
### January 2012 Water Temperatures

- Water temperature at Railway Bridge (22)
- Water temperature at Fairford Dam (21)
- Air temperature at Fisher Branch (hourly)



**February 2012 Temperatures**

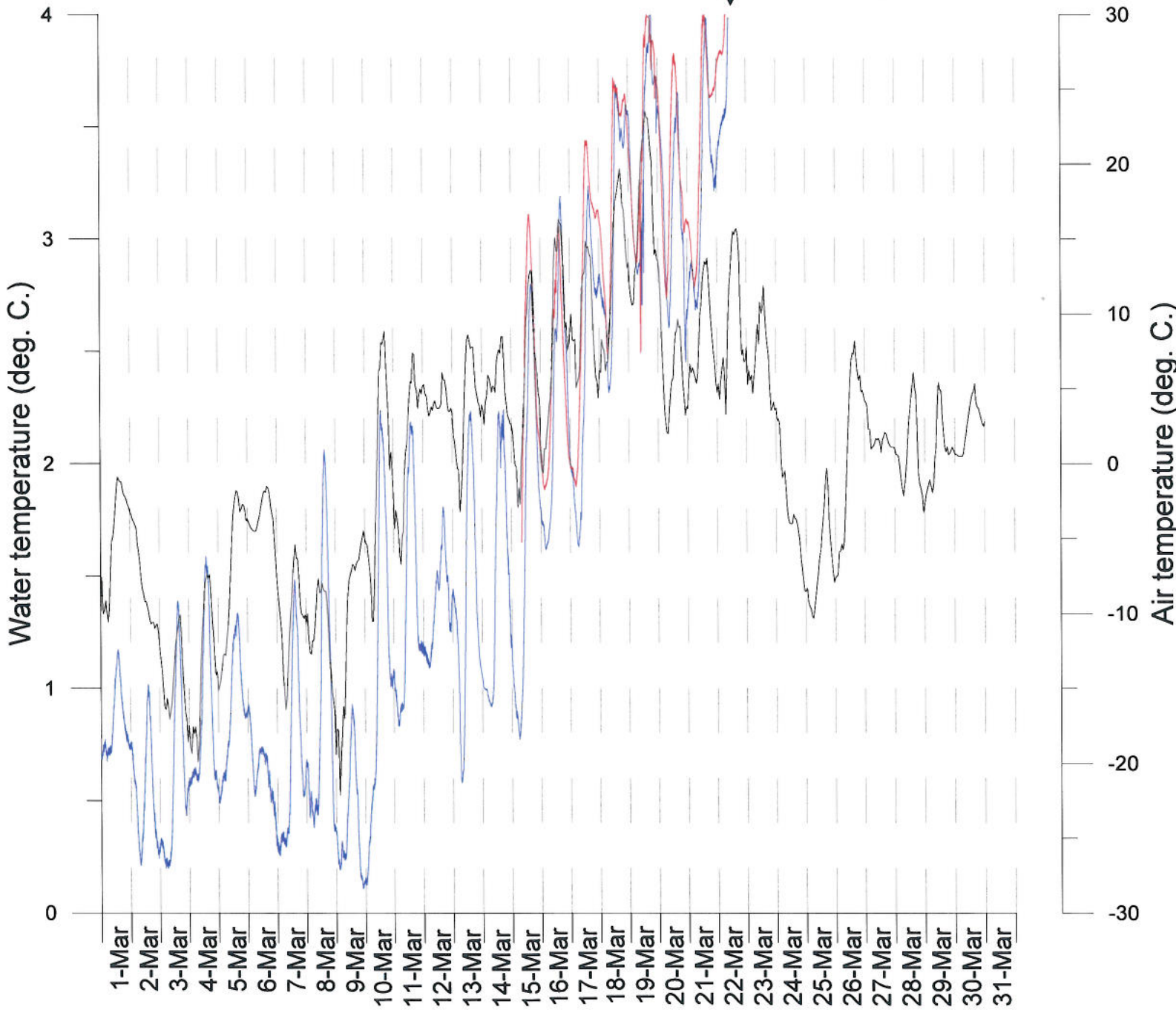
- Water temperature at Railway Bridge (22)
- Water temperature at Fairford Dam (21)
- Air temperature at Fisher Branch (hourly)



### March 2012 Temperatures

- Water temperature at Railway Bridge (22)
- Water temperature at Fairford Dam (21)
- Air temperature at Fisher Branch (hourly)

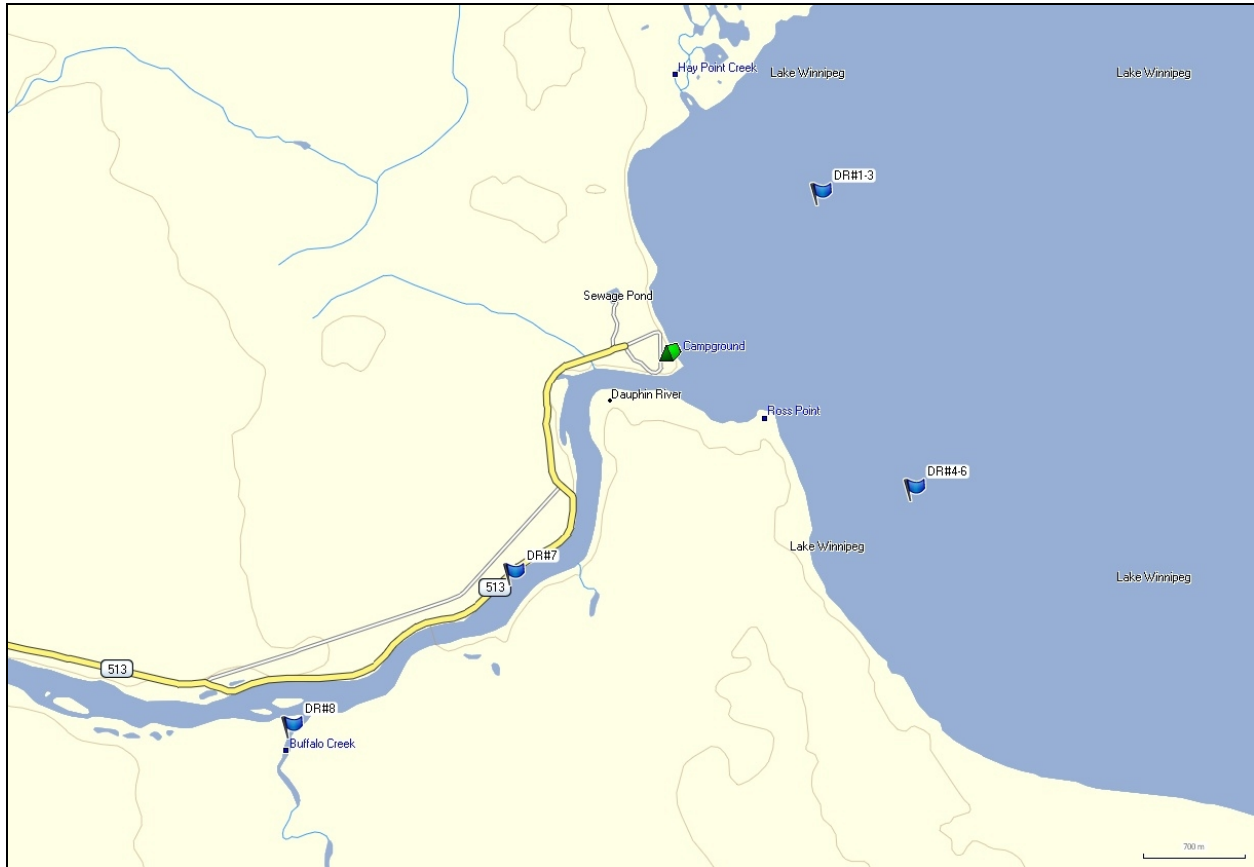
recording terminated  
and loggers removed



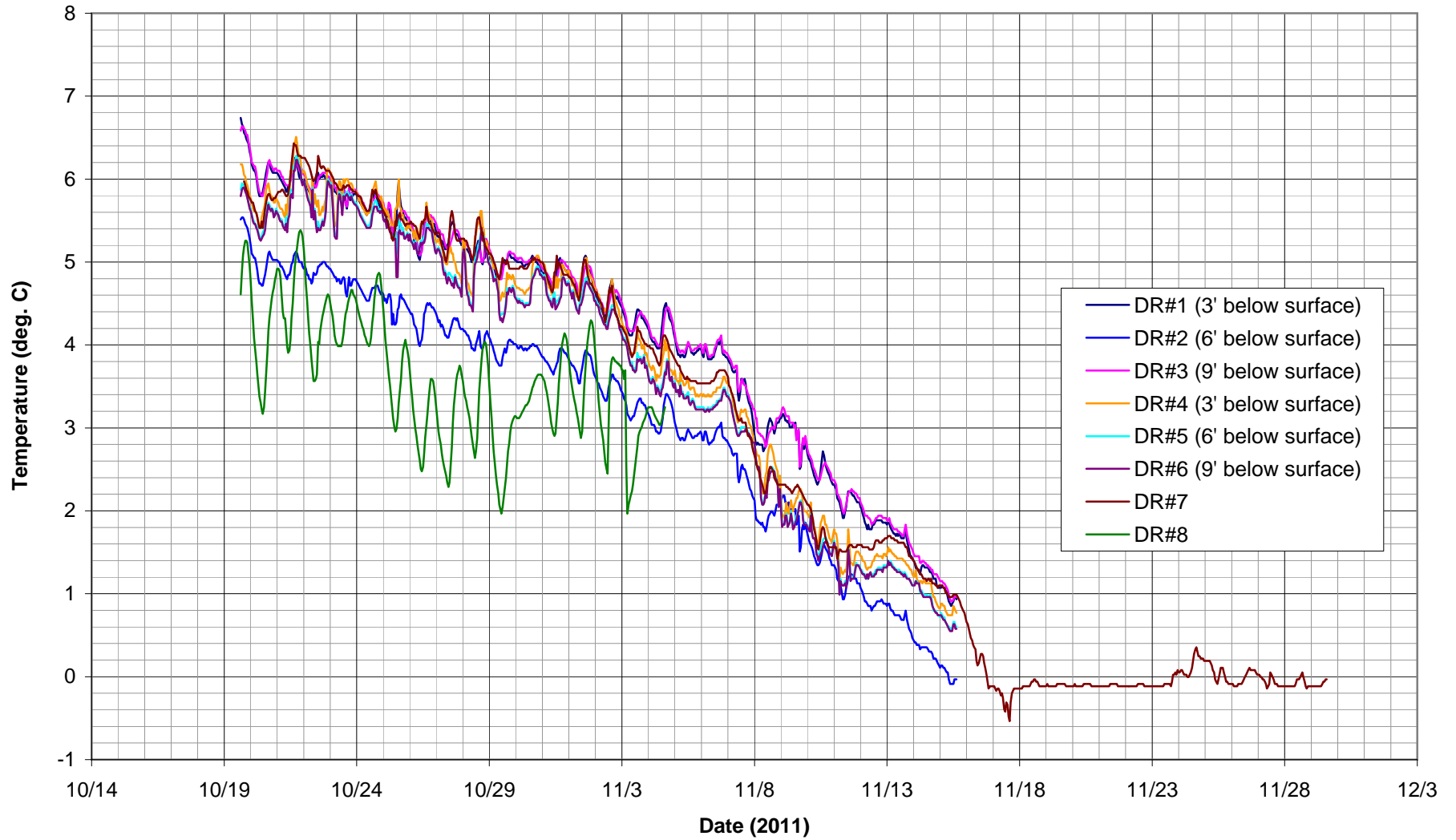
## **APPENDIX E - ANNEX 2**

### **DAUPHIN RIVER**

Figure E2-1: Location Plan of Dauphin River Temperature Loggers



**FIGURE E2-2**  
**Dauphin River Temperature Data 2011**  
*Lake Winnipeg - North of Dauphin River Mouth*



**APPENDIX F**  
**DESCRIPTION OF “VARY-ICE” MODEL**

## 1.0 INTRODUCTION

The principles used by the computer model VARY-ICE were originally developed in the early 1970's to investigate river ice in the design of hydroelectric power plants on the Nelson River in Manitoba. KGS Group has expanded and improved that concept, building on the experience gained by numerous applications of the methodology for over 10 rivers in North America. The current version of VARY-ICE is able to simulate both the formation process at freeze up, and the breakup process under a wide variety of conditions and types of rivers.

VARY-ICE has proven to be a reliable tool in developing operation criteria for hydroelectric plants subject to ice conditions, for designing hydraulic works and investigation of operating procedures for ice control, and for delineating areas prone to ice jam flooding.

## 2.0 THEORY

The VARY-ICE computer model considers, in discrete time steps, the various ice processes that affect the water surface profile along a river, namely

- a) rate of ice generation
- b) ice cover advancement by juxtaposition
- c) ice deposition and transport
- d) ice erosion
- e) border ice growth
- f) ice retreat by shoving
- g) variation in flow and water level as the simulation proceeds

In general, after a change in the ice regime in any given time step, the water surface profile is recomputed to update the hydraulic conditions in the river. VARY-ICE is, in effect, a hydrodynamic river model that accounts for the presence of an evolving ice cover or jam.

A description follows of the calculations of ice formation process and water surface profiles, and the underlying assumptions.

### 2.1 RATE OF ICE GENERATION

It is important to simulate in a realistic manner the volume of ice entering the reach under study with time. Daily volumes of ice can be input directly to the program, or the program can

calculate these ice volumes using heat transfer theory, given mean daily temperatures as model input.

Michel (1971) has studied the detailed heat balance processes prevalent in river ice generation. The thermal processes considered by Michel are summarized as follows:

- heat transfer by evaporation and convection when water temperature is approximately 0°C
- total solar radiation absorbed by water, considering direct and diffuse radiation gained from the sun
- longwave radiation exchange
- heat loss from snow precipitation
- heat gain from friction losses in a river
- heat gain from groundwater flow

An approximate engineering formula which calculates the total heat loss per unit surface was derived from this theory and is used in VARY-ICE as a basis for calculating ice generation.

The rate of ice generation per day is calculated from the total estimated heat loss, divided by the average density of the ice pack and the latent heat of ice, multiplied by the upstream area of open water.

## 2.2 ICE COVER ADVANCEMENT BY JUXTAPOSITION

Incoming frazil / slush pans overturn and pile up under the ice cover, causing a rise in water level until the ice front is able to progress upstream at a determined thickness. The point at which the ice cover begins to move upstream is defined by the critical Froude number  $FR_{CRIT}$ , which is an input variable in VARY-ICE. If the open water section has a Froude number less than  $FR_{CRIT}$ , the ice cover will advance upstream at a thickness calculated using the following equation derived by Michel (1965).