

ENGINEERING REPORT

for

**MORRIS ROAD DRAIN**

**Town of Bradford West Gwillimbury**

(Geographic Township of West Gwillimbury)

County of Simcoe

Date: April 14, 2016

File No. 12-267



**K. SMART ASSOCIATES LIMITED**  
Kitchener Sudbury

SCHEDULE A - SCHEDULE OF ASSESSMENTS  
MORRIS ROAD DRAIN  
TOWN OF BRADFORD WEST GWILLIMBURY

FTC	Con	Lot	Roll No.	Owner	Approx ha Affected	Benefit	Outlet	Total
			(4312)	<u>Township of BWG</u>				
			010-005-07700	C. Yesanko	0.065		98	98
			010-005-07800	1920557 Ontario Ltd.	0.09		135	135
			010-005-07900	N. Tupling	0.20		301	301
	6	16	010-005-15000	P. Stasinaki & C. Batingal	1.41		2,121	2,121
*	6	16	010-005-15100	S. & H. Rak	1.42		2,136	2,136
*	6	16	010-005-15200	J. & A. Caivano	1.42		2,136	2,136
*	6	16	010-005-15300	B. Bokor	1.41		2,121	2,121
	6	16	010-005-15400	M. & M. Bednarz	1.44		2,166	2,166
*	6	16	010-005-15500	D. Renaud	2.89		4,348	4,348
*	6	16	010-005-15700	J. Lowry & E. Bortignon	1.42		2,136	2,136
	6	16	010-005-15800	R. & A. Irlini	0.40		602	602
**	6	16	010-005-15900	F. Sarvi	2.93		4,408	4,408
*	6	16	010-005-16000	M. Murillo	2.95		4,438	4,438
	6	16	010-005-16010	L. & J. Stellato	0.23		346	346
*	6	16	010-005-16200	S. & T. Wadsworth	2.87		4,318	4,318
*	6	16	010-005-16400	A. Fox & B. Scott	1.56		2,347	2,347
*	6	16	010-005-16500	T. Ye	2.96		4,453	4,453
	6	16	010-005-16600	A. Al-Khatib & S. Jassim	2.61		3,927	3,927
*	6	16	010-005-16700	S. Kamali & S. Sabet	5.03		7,568	7,568
*	6	16	010-005-16800	M. Raposa	2.80		4,213	4,213
	6	16	010-005-16900	Town of BWG	2.48		3,731	3,731
	6	16	010-005-17000	Town of BWG	1.11		1,670	1,670
	6	16	010-005-17100	Town of BWG	1.26		1,896	1,896
*	6	16	010-005-17200	C. Yesanko	2.44		3,671	3,671
	6	16	010-005-17300	C. Yesanko	0.25		376	376
	6	17	010-005-17400	1514157 Ontario Inc.	0.06		90	90
	6	17	010-005-17401	1400084 Ontario Ltd.	0.54		812	812
	6	17	010-005-17500	Wendy's Restaurants of Canada	0.41		617	617
	6	17	010-005-17600	Philips Construction Inc.	0.93		1,399	1,399
	6	17	010-005-17700	C. Bak	0.05		75	75
	6	17	010-005-17800	C. Bak	0.05		75	75
*	6	17	010-005-17900	C. Bak	0.05		75	75
*	6	17	010-005-18000	Walter Bak Farms Ltd.	4.11		6,183	6,183
	6	17	010-005-18001	C. Bak	0.11		165	165
*	6	17	010-005-18100	Walter Bak Farms Ltd.	2.86		4,333	4,333
	6	17	010-005-18200	Kavama Canada Inc.	5.82		8,756	8,756
*	6	17	010-005-18301	Walter Bak Farms Ltd.	3.98		5,988	5,988
*	6	17	010-005-18400	A. & L. Marques	4.27		6,424	6,424
*	6	17	010-005-18500	1010698 Ontario Ltd.	2.02		3,039	3,039
*	6	17	010-005-18600	A. & M. Caletta	2.62		3,942	3,942
	6	18	010-005-18700	658026 Ontario Ltd.	0.16		271	271
*			010-005-18800	658026 Ontario Ltd.	1.90		2,859	2,859
*			010-005-18900	F. & L. Marques	2.08		3,129	3,129
*			010-005-19000	A. Caletta	5.44		8,184	8,184
			010-005-19001	A. & D. Gulseppa	0.19		286	286
			010-005-19200	D. Wickson	0.12		181	181
			010-005-19301	Town of BWG	0.25		376	376
			010-005-19400	L. Gaudet	0.81		1,219	1,219
			020-005-12401	J. Lakatos	3.78		5,657	5,657
			Block Assessment	Town of BWG	434.00		2,148,825	2,148,825
<b>Total Assessments on Lands:</b>					<b>520.28</b>	<b>0</b>	<b>2,278,622</b>	<b>2,278,622</b>
			Morris Road	Town of BWG	0.05		77	77
			Peterman Street	Town of BWG	1.30		1,959	1,959
			Center Street	Town of BWG	0.30		453	453
			Back Street	Town of BWG	0.40		604	604
			Anne Street	Town of BWG	0.70		1,055	1,055
			5-6 Concession Rd.	Town of BWG	0.70		1,055	1,055
<b>Total Assessments on Roads:</b>					<b>3.45</b>	<b>0</b>	<b>5,203</b>	<b>5,203</b>
<b>TOTAL ON MORRIS ROAD DRAIN</b>					<b>523.73</b>	<b>0</b>	<b>2,283,825</b>	<b>2,283,825</b>

Notes:

- All of the above lands as noted with an asterisk (\*) are classified as agricultural and have the Farm Property Class Tax Rate (F.P.C.T.R.).
- Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected. The affected parcels of land have been identified using the roll number from the last revised assessment roll for the Town. For convenience only, the owners' names as shown by the last revised assessment roll, has also been included.

**SCHEDULE B - SCHEDULE OF ASSESSMENTS FOR FUTURE MAINTENANCE  
MORRIS ROAD DRAIN  
TOWNSHIP OF BRADFORD WEST GWILLIMBURY**

Con	Lot	Roll No. (010-010)	Owner	Total Cost	%
<b>Township of BWG</b>					
0	0	010-005-07700	C. Yesanko	98	0.004
0	0	010-005-07800	1920557 Ontairo Ltd.	135	0.006
0	0	010-005-07900	N. Tupling	301	0.013
6	16	010-005-15000	P. Stasinaki & C. Balingal	2,121	0.093
6	16	010-005-15100	S. & H. Rak	2,136	0.094
6	16	010-005-15200	J. & A. Caivano	2,136	0.094
6	16	010-005-15300	B. Bokor	2,121	0.093
6	16	010-005-15400	M. & M. Bednarz	2,166	0.095
6	16	010-005-15500	D. Renaud	4,348	0.190
6	16	010-005-15700	J. Lowry & E. Bortignon	2,136	0.094
6	16	010-005-15800	R. & A. Irini	602	0.026
6	16	010-005-15900	F. Sarvi	4,408	0.193
6	16	010-005-16000	M. Murillo	4,438	0.194
6	16	010-005-16010	L. & J. Stellato	346	0.015
6	16	010-005-16200	S. & T. Wadsworth	4,318	0.189
6	16	010-005-16400	A. Fox & B. Scott	2,347	0.103
6	16	010-005-16500	T. Ye	4,453	0.195
6	16	010-005-16600	A. Al-Khalib & S. Jassim	3,927	0.172
6	16	010-005-16700	S. Kamali & S. Sabat	7,568	0.331
6	16	010-005-16800	M. Raposa	4,213	0.184
6	16	010-005-16900	Town of BWG	3,731	0.163
6	16	010-005-17000	Town of BWG	1,670	0.073
6	16	010-005-17100	Town of BWG	1,896	0.083
6	16	010-005-17200	C. Yesanko	3,671	0.161
6	16	010-005-17300	C. Yesanko	376	0.016
6	17	010-005-17400	1514157 Ontario Inc.	90	0.004
6	17	010-005-17401	1400084 Ontario Ltd.	812	0.036
6	17	010-005-17500	Wendy's Restaurants of Canada	617	0.027
6	17	010-005-17600	Philips Construction Inc.	1,399	0.061
6	17	010-005-17700	C. Bak	75	0.003
6	17	010-005-17800	C. Bak	75	0.003
6	17	010-005-17900	C. Bak	75	0.003
6	17	010-005-18000	Walter Bak Farms Ltd.	6,183	0.271
6	17	010-005-18001	C. Bak	165	0.007
6	17	010-005-18100	Walter Bak Farms Ltd.	4,333	0.190
6	17	010-005-18200	Kavama Canada Inc.	8,756	0.383
6	17	010-005-18301	Walter Bak Farms Ltd.	5,988	0.262
6	17	010-005-18400	A. & L. Marques	6,424	0.281
6	17	010-005-18500	1010688 Ontario Ltd.	3,039	0.133
6	17	010-005-18600	A. & M. Caietta	3,942	0.173
6	18	010-005-18700	658026 Ontario Ltd.	271	0.012
0	0	010-005-18800	658026 Ontario Ltd.	2,859	0.125
0	0	010-005-18900	F. & L. Marques	3,129	0.137
0	0	010-005-19000	A. Caietta	8,184	0.358
0	0	010-005-19001	A. & D. Guiseppa	286	0.013
0	0	010-005-19200	D. Wickson	181	0.008
0	0	010-005-19301	Town of BWG	376	0.016
0	0	010-005-19400	L. Gaudet	1,219	0.053
0	0	020-005-12401	J. Lakatos	5,657	0.248
0	0	Block Assessment	Town of BWG	2,148,825	94.092
<b>Total Assessments on Lands:</b>				<b>2,278,622</b>	<b>99.773</b>
		Morris Road	Town of BWG	77	0.003
		Peterman Street	Town of BWG	1,959	0.086
		Center Street	Town of BWG	453	0.020
		Back Street	Town of BWG	604	0.026
		Anne Street	Town of BWG	1,055	0.046
		5-6 Concession Rd.	Town of BWG	1,055	0.046
<b>Total Assessments on Roads:</b>				<b>5,203</b>	<b>0.227</b>
<b>TOTAL ON MORRIS ROAD DRAIN</b>				<b>2,283,825</b>	<b>100.000</b>

**Notes:**

- All of the above lands as noted with an asterisk ( \* ) are classified as agricultural and have the Farm Property Class Tax Rate (F.P.C.T.R.).
- Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected. The affected parcels of land have been identified using the roll number from the last revised assessment roll for the Town. For convenience only, the owners' names as shown by the last revised assessment roll, has also been included.



**Morris Road Drain  
Town of Bradford West Gwillimbury  
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April 14, 2016

File No. 12-267

## MORRIS ROAD DRAIN

### Town of Bradford West Gwillimbury

#### SUMMARY

This Report is prepared pursuant to Sections 4 and 78 of the Drainage Act in accordance with a resolutions by the Town of Bradford West Gwillimbury per the Holland Marsh Drainage System Joint Municipal Services Board (HMDSJMSB). The component pursuant to Section 4 is in accordance with a petition dated December 8, 2015 and the subsequent appointment by the Town (per the HMDSJMSB). The component pursuant to Section 78 is in accordance with the adoption of the Preliminary Report and the appointment to complete the report dated September 1, 2015.

The primary purpose of this Report is to provide for improvements to and reconstruction of what has been called the Morris Road component of the Bradford Marsh Small Drainage Scheme (BMSDS/the Small Scheme) in the Town of Bradford West Gwillimbury. For purposes of this Report, this component is now called the Morris Road Drain.

This Report can be considered as the Final Report for the Morris Road Drain. A Preliminary Report for the Morris Road Drain was filed on July 24, 2015. The Preliminary Report recommendations were accepted by Council on September 1, 2015 as noted above. The Final Report implements all of the recommendations of the Preliminary Report. Additional work as found required/desirable by the studies for the Final Report have been included. Highlights of the Preliminary Report are included in **Appendix C**. A paper copy of the full Preliminary Report is available at the office of the HMDSJMSB on Dissette Street in Bradford. An electronic version may be available for viewing by email from the office of the Engineer.

The Morris Road Drain recommended in this Report will consist of the following components:

- Morris Road South Branch
- Morris Road Centre Branch
- Morris Road North Branch
- Diversion Branch
- Edward Street Branch
- Simcoe Road Branch
- Line 6 Branch
- Reid Branch
- Pumping Station

The work involved with the actual preparation of this report has followed the normal procedures of the Drainage Act. The initial work of course was the Preliminary Report. The work since the Preliminary Report has involved a further on-site meeting, a further review of the site, undertaking of final surveys and design, and the preparation of a report to include plan and profile drawings, cost estimates, specifications, assessment & future maintenance schedules, and miscellaneous paragraphs regarding the description of the work, etc.

The estimated cost of the project is \$2,283,825. The physical components of the work are:



- approximately 1862m of existing channel cleanout and reconstruction
- approximately 875m of new diversion channel construction including berm work
- approximately 380m of sediment deposition channel
- approximately 1871m of tributary channel incorporation and improvement
- one pumping station with auto start diesel power and based on 2000 gpm capacity

The interior watershed of the Small Scheme protected by the Morris Road Drain works is approximately 86.6 hectares (214 acres). The exterior/upstream watershed draining to the Morris Road Drain is approximately 434 hectares (1072 acres).

The estimated cost of this project is to be assessed out in accordance with the schedule of assessment for such which is noted to be Schedule A attached to this report. Schedule A shows that the majority of the costs are to be assessed to the affected built-up area of Bradford which is the upstream watershed as a Block Assessment.

Schedule B, the future maintenance schedule, is to be used to assess out future maintenance costs on the Morris Road Drain as provided for by the "Maintenance" section of this report. Schedules A and B are on Pages 39 and 40 of this Report.

A separate enclosure is available, for information only, to indicate the estimated net assessments to those properties not part of the Block Assessment. The net assessments to these properties are the gross assessments reduced by possible available provincial grants and further reduced by deducting allowances where applicable. This enclosure can be obtained from the office of the Drainage Superintendent or Engineer.

## **BACKGROUND**

As noted in the Preliminary Report, the Bradford Marsh Small Drainage Scheme was constructed as a Drainage Act project pursuant to a report of A. Baird, CE/OLS dated July 7, 1925.

Records of the original report are minimal but data available indicates the project was constructed as a canal/dyke/pumping station system to serve 200± acres of land that were to be reclaimed for agriculture. The system was constructed adjacent to the downstream portion of the north side canal of the main Holland Marsh Drainage System which had been constructed only a few years earlier.

The original dykes of the small scheme system have, in much of their length, been developed as roads in Bradford now known as parts of Bridge Street (old Highway 11), Holland Street, Ann Street, Morris Road and Peterman Lane.

The principal exterior channels carrying upstream waters around the system are known as the Morris Road Drain (on the west side) and the Holland Marsh Drainage System Interval 8 on the south side. The original report provided for approximately 2170m of internal channels, the main channel of which would be what is called the Small Scheme Ditch. This ditch is on the inside of the dyke starting at the south limits of what is called Morris Road and continuing to what is known as Peterman Lane. This ditch runs to the original pumping station now called the Professor Day pumping station. This is a station with an electric motor/pumping system.

A backup pumping station with diesel power was constructed as per a separate Engineering Report by C. S. Balon, B.A.Sc.ME. in 1984. It is known as the Peterman Pumping Station.

When the Small Scheme was constructed in the 1930's, the upstream watershed draining to the main external channel (Morris Road Drain component) consisted of approximately 40 hectares of built up land in Bradford and 340 hectares of rural lands.

Today the same upstream watershed is almost fully urbanized with more than 340 ha being built up and less than 40 ha remaining as open space lands (golf course, natural areas). Also additional urban lands are now deemed part of the drain.

Whereas the main external channel (Morris Road Drain channel) would have been bounded by rural undeveloped lands on its outside and by an earthen dyke with no development on the inside, today residential lots and urban land uses back onto over 60% of the channel on the outside and residential and/or agricultural buildings have been developed on 50% of the frontage of the Morris Road dyke on the inside.

The intended maintenance of the original system involving working from the dyke and levelling excavated materials on or adjacent to the dyke can not be undertaken. Maintenance of the system now requires excavation with off-site hauling and such work is not easily completed due to the encroachment in all directions.

The last recorded billing of maintenance was dated 2008 but it is known spot cleanouts are needed almost every year due to the rapid deposition of sediments into the channel and the almost full blockage of the channel in one area or another each year.

Due to the difficulty of undertaking maintenance, due to the frequency of maintenance becoming evident based on the extent of sediments being deposited, due to the lack of specifications supporting the type of maintenance being undertaken and due to the unfairness of the existing maintenance schedule which provides that all costs of maintenance are only to be assessed to the interior Small Scheme lands protected, the Drainage Superintendent recommended to the HMDSJMSB in 2012± that an Engineer be appointed to report on the Morris Road components of the Bradford Marsh Small Drainage Scheme.

The undersigned Engineer was appointed in March 2013 to prepare a Preliminary Report to address the problems related to, and solutions available for, drainage in the Morris Road Drain component of the scheme.

## **PRELIMINARY REPORT**

The Preliminary Report was prepared over the period of March 2013 to July 2015. The Report concentrated on the Morris Road Drain component but the Engineer was also requested to report on the tributary channels draining to the channel.

As part of the work for the Preliminary Report, preliminary surveys were completed, discussions with landowners were undertaken, preliminary hydrology work was undertaken and the various tributaries emptying into the channel were investigated.

The Preliminary Report identified that the Morris Road channel was undersized for the waters that it should carry and that there was insufficient area along the channel to enlarge it so that it could provide the required capacity. All analyses were taken for the 100 year storm runoff conditions and the conventionally used 100 year storms were analyzed. The Preliminary Report also acknowledged the difficulty of undertaking maintenance, the frequency at which maintenance was being required, and the lack of proper specifications and a maintenance schedule.

All of the Preliminary Report studies undertaken for the Morris Road Drain improvement were developed simultaneously with plans and design for a new arterial roadway to be called the Southeast Arterial Roadway (SEAR). This roadway would link Simcoe Street to Holland/Bridge Street and would pass through the northwest part of the watershed for the Small Scheme. The new alignment would actually cross and run parallel to Morris Road in part of its route.

The studies for the Preliminary Report for the Morris Road also recognized and considered that Line 6 and portions of Walker Avenue were being improved by the Municipality during the design stages for the Morris Road report.

The principal conclusion/recommendation of the Preliminary Report was that a new diversion channel should be constructed across the Small Scheme farmlands commencing in the area of the Morris Road Channel/Edward Street Branch junction and running downstream to Interval 8 of the Holland Marsh Drain System Canal Improvement Project (HMDSCIP) at the location of the Peterman Pumping Station.

The Report recommended that the original Morris Road channel remain as well but with improvements. The Report recommended the existing channel be cleaned throughout, that an area of deep pool and littoral shelves be constructed in the downstream portion, that the length of the channel bounded by existing residential lots be stabilized on both sides with resultant channel narrowing and that the work to be done in the channel by the South East Arterial Roadway (SEAR) project be incorporated into the final design. It was also recommended that the Diversion channel be linked to the existing channel to provide low flow maintenance and fisheries habitat continuation. The culvert in the link however was recommended to be sized so that only minor flows would continue into the existing channel south of the SEAR/Diversion work.

The Preliminary Report also recommended that four tributary channels to the Morris Road channel be made part of the Morris Road Drain and that a petition by the Roads Department be filed to incorporate such.

The Preliminary Report acknowledged that new specifications and maintenance schedules should be prepared.

### **OPEN HOUSE MEETING PRIOR TO THE CONSIDERATION OF THE PRELIMINARY REPORT**

During the afternoon of the date of the consideration of the Preliminary Report (September 1, 2015), an open house was set up to allow the proposals of the Preliminary Report to be presented to owners of lands to be affected by the work. Most owners adjacent to the Morris Road channel, most owners within the Bradford Marsh Small Drainage Scheme, affected owners of lots east of Walker Avenue, Townsend Avenue, and Buce Avenue, and west of the Morris Road channel to the south of the Municipal Community Centre lands, affected owners along Edward, Bingham and Back Streets, and affected owners along the branch/tributary drains being constructed were notified.

A summary of the primary comments received at this open house were:

- The overall recommendations were appropriate
- That owners wished that Morris Road be ultimately connected to the SEAR to the north generally as shown by this Final Report;
- That the barricaded crossing connection of Morris Road to Walker Avenue be retained even though it may be barricaded;
- That irrigation be addressed for those owners in the Small Scheme where adjacent to the existing Morris Road channel and where adjacent to the proposed diversion channel;
- That Morris Road be restored with new asphalt upon completion of the Morris Road Drainage work and SEAR road work; and
- That the Morris Road channel where adjacent to the rear yards of properties fronting on Walker, Buce and Townsend be improved as shown by the Preliminary Report Option which would involve restoring the top of bank of the channel to its legal location and also stabilizing the channel on the east bank which is the Morris Road embankment.

## **HIGHLIGHTS OF THE PRELIMINARY REPORT**

Many of the applicable and important components of the Preliminary Report are included in **Appendix C** to this report. The sections included in the Appendix are: Conclusions/Summary of the Project Scoping Meeting, Overall Summaries of Components, Morris Road Branch Options, Existing Conditions and Hydrology/Hydraulics, Table A Summary of Options, Assessment Considerations, Environmental Considerations, Utility Impacts, Impacts of a Regional Storm, Agency Approvals, Cost Benefits, Summary of Preliminary Report Recommendations.

A paper copy of the full Preliminary Report is available at the office of the HMDSJMSB on Dissette Street in Bradford. An electronic version may be available for viewing from the office of the Engineer.

## **CONSIDERATION OF PRELIMINARY REPORT**

The Consideration of the Preliminary Report occurred on September 1, 2015 at the Town of Bradford West Gwillimbury Council Chambers in Bradford. A number of people attended but no major comments on the report were offered. The discussions generally concluded that the work recommended by the Preliminary Report be undertaken. Accordingly, at this consideration, the Town of Bradford West Gwillimbury directed that the Final Report be prepared.

At the meeting for the Consideration of the Preliminary Report, the Engineer described the comments that were received from the landowners at the open house. The Engineer advised Council that owners wished irrigation addressed, wished to have the option involving narrowing the channel and restoring the channel to its original top of bank conditions with stability of Morris Road implemented where adjacent to the rear of the residential lots, advised of the wish of the owners that the barricaded Walker Avenue crossing remain, or at a very minimum that a footbridge crossing be constructed to replace the current barricaded culvert crossing, and that the majority of owners preferred an ultimate connection of Morris Road to the SEAR Road near the Community Centre lands area.

## **SUBMISSION OF LETTERS TO OWNERS SUBSEQUENT TO THE ADOPTION OF THE PRELIMINARY REPORT**

To facilitate work on the final report, two different letters were prepared and submitted to landowners within the Morris Road watershed. The first letter was submitted to owners of lands within the Small Scheme to summarize the irrigation proposals to date.

The second letter was submitted to the owners of the residential lots that back onto the channel to summarize the proposals to stabilize the channel.

These letters are included in **Appendix A** to this report.

The response to the letters was minimal. Only one owner responded from the Small Scheme lands to express concern re the irrigation work. (Note the proposals for irrigation have now changed since those presented by the Preliminary Report.) There was one response from an owner on the west side of the channel in the area of the residential development, asking to have more unhealthy trees removed on the property, if possible.

## **FILING OF THE PETITION**

Subsequent to the Consideration of the Preliminary Report, and pursuant to a recommendation of the Preliminary Report, on December 8, 2015, a petition was signed by the individual responsible for roads in the Town of Bradford West Gwillimbury, requesting that the channels along Edward Street, the channel known

as the Simcoe Road Outlet, the channel along Line 6 and the channel known as the Reid Drain be incorporated with improvements as necessary as part of the Morris Road Drain.

## **ON-SITE MEETING**

On February 17, 2016 the required on-site meeting for the petition by the Town to have the Branch Drains incorporated was convened. The meeting occurred inside but on site between the hours of 2:30 and 4:00 p.m. The petitioner plus all owners adjacent to the work and the affected agencies were invited. The parties present are indicated by the sign-in sheet which is attached to this report in **Appendix B**.

At the start of the meeting, the Engineer indicated the purpose of the meeting and indicated why the petition had been submitted. The Town was represented by Terry Foran who had signed the petition plus by Joe Coleman (Manager of Business Operations). It was confirmed that the Municipality did wish the Edward Street Branch, Simcoe Road Branch, Line 6 Branch and the Reid Branch incorporated as part of the Morris Road Drain.

It was also confirmed that the storm water management facility at the top end of the Line 6 Branch plus the pipe outlets for it were not to be incorporated at this time.

The Engineer indicated that the various channels to be incorporated were required for road drainage and he concluded that the petition was sufficient in accordance with the Drainage Act.

The Engineer then described, for the benefit of the other owners present, what the status of the balance of the project was. He indicated that the majority of the work was to be undertaken as per the Preliminary Report. The only variations would pertain to irrigation, to the work to be done on the former Bak farm (and possibly on the former Balon farm), to the construction of a footbridge across the Edward Street Branch, and with respect to the pumphouse work.

He indicated that the proposal with respect to irrigation was now to supply a sleeve either through the small scheme dyke or through the new Diversion dykes to provide irrigation. He indicated that a culvert would be put in the ditches adjacent to the dykes to afford walking access by the landowners involved to insert the inlets into the water bodies, but the pumps would be on the private property.

With respect to the former Bak (and Balon possibly) farm, he indicated that the whole of the former Bak farm plus the whole of the Balon farm to the north had been acquired by the Town for Road purposes and were to be stripped of organics. He then stated the proposal was to develop a substantial storm water management area/sediment deposition area certainly on the Bak property and perhaps on the Balon property. He indicated that the clays that would be excavated on the Bak property would be used in the new berms of the Diversion work on these farms. Imported clays would be necessary for much of the balance of the diversion channel berm. He indicated that a weir/embankment area would be constructed to assist in containing sediments in the sediment collection water body to be excavated.

With respect to the work at the pumping station, the Engineer indicated that it had been determined that the existing pumping station was on a tilt and it had to be stabilized. The proposals may involve replacing the existing station and the existing diesel pump with a new diesel pump that would be auto-start. An electric pump was not being recommended since 3 phase power was not close by. He indicated that the additional work at the pumping station would increase the cost estimate of the Preliminary Report.

He indicated that it was hoped that access would be made available for the importing of clays down or alongside the SEAR embankment to the Bak/Balon farm sites stockpile area. He indicated that Morris Road would then have to be used as a haul route from the stockpile area for the clays that would be used to build

up the back yards along Morris Road. Also he described that the excavated materials starting from just south of Line 6 would be hauled north on Morris Road to the former Bak farm.

It was indicated that the small scheme dyke between the unopened Line 6 road allowance and the new Diversion would be built up and improved with clay as part of the project. There may also be work undertaken on the small scheme dyke along Peterman Lane to widen and elevate it where necessary. It was indicated both of these portions may have to be used as haul routes.

It was indicated that it was desired to submit the report sometime in March/April and have it processed and ready for tendering and construction in the summer months. It was indicated that the SEAR may be tendered and under construction prior the drain construction.

As far as questions from the people present, one question was if the Morris Road Drain had been just repaired as a Superintendent project, what would the cost be? The Engineer indicated that it could be in the magnitude of \$200,000 if there were no properties built up adjacent to it (which of course is not the situation).

There was a discussion about irrigation lines and whether it would be possible to determine from each owner whether they would want an irrigation line. The suggestion was made that perhaps there should be a sleeve put on the line between each two properties that back onto the Small Scheme dyke so that the number of lines could be reduced but so any owner could access an irrigation inlet if needed.

There was an indication from the landowners that they would request that the organics to be stripped on the Bak and Balon properties by the SEAR project be saved and be made available to farmers. The Engineer indicated that it may be desirable to have a site rented that the organics could be stockpiled on until they could be received by the farmers. There were some owners who indicated that they would be prepared to consider renting space for the organics.

There was a discussion about the connection of Morris Road to the SEAR. The Engineer indicated that it was his and the Town's recommendation that the Walker Avenue culvert barricades be temporarily removed and that access be used here for Morris Road owners during drain and SEAR construction. He indicated he also proposed to recommend that upon completion of drain and SEAR construction, that the existing culvert at the barricaded crossing be removed and be replaced and that the crossing be rebuilt as it was and be barricaded, with the ultimate connection of Morris Road to the SEAR being opposite the soccer fields on the Town property.

One owner requested that the culvert that is put across the reconstructed barricaded crossing be sufficiently large to allow canoe and small boats to pass as existing. It was suggested that a clearance of 3' (1 metre) between water level and the underside of the culvert should be available.

There was a question as to whether the loss of property at the backs of those lots fronting on Buce, Townsend and Walker was because of landowner practise or because of nature. The Engineer indicated that he was not aware of all of the activities that have occurred over the years but he thought the previous land use planning decisions and nature might be the biggest reasons the channel has encroached.

There was also a question whether garbage would be allowed to build up at the back of the properties once construction occurred. The Engineer felt that the improved work in the channel would be an enticement/encouragement to all landowners to not dump garbage at the rear in the future.

One owner asked if the restoration above the stabilization clays at the backs of the properties could be anything other than topsoil and seed. The Engineer said no but if an owner wished to place something on the topsoil other than seed, such may be possible, but by the owner, if pre-approval was given.

One owner of a small scheme farm indicated that it would be more difficult to irrigate from the back since the lands closer to the houses were 5' higher than the lands back by the canal. The Engineer said the irrigation connections proposed would be left at the back since the HMDSCIP does not wish irrigation lines to cross Morris Road.

### **SUFFICIENCY OF PETITION**

It was determined at the on-site meeting for the Town's petition, that improved drainage was required along Edward Street, downstream of Simcoe Road along a channel near the south limits of the Community Centre lands, along Line 6 and for an outlet for Simcoe Road into the Reid Branch. Accordingly the petition was deemed sufficient in accordance with Section 4(1)(c) of the Drainage Act.

### **SUITABILITY OF SECTION 78 FOR OTHER WORKS**

Section 78(1)(1) recognizes that a report may be prepared pursuant to Section 78 to change the course of, and/or an outlet for, a municipal drain, to improve and/or alter the drain and to construct/reconstruct dykes, reservoirs and pumping stations. All of the works being undertaken for or along the existing channels of the Morris Road Drain project could be undertaken pursuant to Section 78(1)(1).

### **STATUS OF SEAR PROJECT**

As at the time of the preparation of this final report, the SEAR project was in the process of being tendered with a start-up of construction anticipated to be in May 2016.

**Appendix D** is an aerial photograph of the work proposed as part of the SEAR project. From this drawing, it is evident that the alignment of the SEAR will commence westerly at the Simcoe Road/Luxury Road intersection, will run in generally an easterly direction along the south limits of the Community Centre lands, will cross Morris Road to the east of the soccer fields, will run northerly for a distance of 200 to 250m just to the east of Morris Road, and then the will angle over to Bridge Street/Holland Street at the intersection of Dissette Street. It is evident that the SEAR proposal will re-route what is known as the Simcoe Road Branch to be parallel to and just to the north of the new alignment. It is evident that the relocation of the Simcoe Road Branch will retain one portion of the existing Morris Road channel north to the location of the new 12 x 3m culvert. It is evident that this new culvert will be constructed below the new alignment to allow the diversion channel to intersect the Morris Road channel at the junction with the Edward Street channel. It is also evident that the Morris Road channel to the south-east of the new culvert will be diverted along the east side of the new alignment, to join the diversion route on the downstream side of the proposed culvert.

Details of the SEAR road proposal indicate that former farms to the southeast of the new road alignment, which have been acquired for the SEAR project and which will contain the diversion route in part, are proposed to be excavated to a 600mm depth to provide for cut/fill balance for the new SEAR proposal. Also other areas to the southeast of the new roadway and to the north of the diversion will similarly be excavated to create cut/fill balance.

With respect to impacts on the Morris Road dyke and channel by the SEAR development, the following is noted. It is proposed by the Town that Morris Road will be abandoned as a travelled road to the north of the SEAR crossing up to Centre Street. To the south, it is proposed that Morris Road be ultimately connected to the SEAR at a location in line with the south limits of the Community Centre lands. It is proposed by SEAR that the currently barricaded crossing on the Morris Road channel at Walker Avenue be reopened to provide access to Morris Road during road (and drain) construction. As the notes from the Consideration of the Preliminary Report indicate, the landowners at the time of the open house and the Preliminary Report Consideration requested that this barricaded crossing of Morris Road at Walker Avenue be retained with or without improvements after completion of the Morris Road Drain and the construction of the SEAR roadway.

It is recognized by this final report that the reconstruction of the Simcoe Road Branch will be attended to by the SEAR development. It is recognized that the Simcoe Road Branch will primarily consist of a two stage channel. The low flow component of it will be 0.5m bottom, 1.5:1 side slopes and 1m depth. The upper stage will be approximately 25m wide, 2:1 side slopes and 1m depth. It is recognized that a maintenance corridor will be provided on the north side of this channel, and that this channel will use the Morris Road channel for its downstream 100m± length. No construction work is anticipated on the new portion of the Simcoe Road Branch as part of the construction of this Final Report's recommendations. However, the 100m± of existing channel serving as the outlet for the new construction is to be cleaned as part of this Report (unless it is cleaned out by the SEAR project).

The SEAR project has been developed on the knowledge that this drain report will ultimately construct the Diversion Branch which will be the ultimate outlet for the 12 x 3m culvert proposed. The SEAR project is aware that flow in the Morris Road channel being reconstructed on the east side of the SEAR embankment will initially be to the south but upon completion of drain construction, flow in it will be to the north.

Although the SEAR project and this Drain Report have been developed on the basis that construction of the SEAR project will commence prior to drain construction and that the 12 x 3 culvert will be constructed as one of the initial phase of road work, the design of this drain report has been prepared such that this report's recommendations could be implemented in advance of SEAR construction if necessary. This drain report has also been prepared on the basis that some but limited usage of SEAR constructed facilities will be required during drain construction to permit access to drain activities. See Page **13** for further references re these items.

## **STATUS OF THE TOWN'S LINE 6 RECONSTRUCTION PROJECT**

At the time of the preparation of this Final Report, the majority of work on the Line 6 road project by the Municipality has been completed. The items addressed by this Engineer during the time of the preparation of plans for the Line 6 project concentrated on drainage proposals. The recommendations of the Preliminary Report were that the culverts across Walker Avenue and Parkwood Avenue be improved to provide for increased drainage. As per tables on Pages **36** and **37** of the Preliminary Report the Town's culvert work on Line 6 would provide for 25 year storm flows across Parkwood and across Line 6 at the Reid Branch.

The listed crossing improvements were undertaken by the Municipality as part of the Line 6 road project, and all that remains is some minor ditching at the Parkwood Avenue culverts as recommended by the Preliminary Report. The Preliminary Report also addressed the fact that the Line 6 channel by itself does not provide a major drainage outlet path. The Preliminary Report suggested that the need for a major flow path be addressed. The recommendations of this Final Report attend to this matter.

Accordingly it is recommended that the Line 6 channel and new culverts be incorporated as a Branch to the Morris Road Drain from its intersection with the Morris Road Channel up to the piped outlet from the storm water management located approximately 50m east of Simcoe Road. At the time of the on-site meeting for the Final Report, the matter of incorporation of the storm water management pond in the northwest quadrant of Simcoe Road and Line 6 was discussed and it was determined there is no request to incorporate the facility.

## **OTHER CONSIDERATIONS GIVEN DURING DEVELOPMENT OF FINAL REPORT RECOMMENDATIONS**

### **a) Soils**

The recommendations of this Final Report recognize that the soils along the diversion route will consist of 300 to 400mm of organic soils overlying 900mm± of sandy silt subsoils and that below the sandy silts, clayey silts will be found to some depth. The recommendations recognize the desirability of salvaging the organic soils and ensuring that such can be used on agricultural lands and also the desirability of using the clayey silt soils as berm/dyke construction as much as possible.

The recommendations do recognize that where a haul route has to be made over native soils for berm construction, that imported drier clays be used in the base of the haul route and that the on-site clays could be used at higher elevation. This report has been prepared on the basis that the sandy silt soils can be used to backfill areas of clay excavation and as the outside facing of berms that are built. Geotechnical input was obtained for those recommendations.

Geotechnical reviews have been made for other aspects of the project also.

### **b) Utilities**

Contact with the affected utility companies occurred during the Preliminary Report stage and identified that no major utility conflicts would occur with implementation of the recommendations of this final report. It is recognized that along the diversion route, no utilities exist other than private drainage tile. Along Morris Road, the utilities are below the road as already partially reconstructed to date by the Town. No further excavation will be necessary and thus no impact on utilities on Morris Road is anticipated.

The work along Line 6 and Reid Branch will not involve excavation in the area of utilities. The work along Edward Street ditch will require the relocation of one overhead utility pole. Contact with Powerstream re the relocation has commenced.

Even though underground utility impacts are not expected, utility prelocates will be undertaken at the time of construction.

### **c) Environmental Matters**

The Preliminary Report recognized the desirability of increasing areas for fish habitat, of providing varied fish habitat, of ensuring that sediment control measures were addressed, and of ensuring excavated sediments are disposed of on-site.

This Final Report, by the construction of the diversion route, will almost double the water surface area offered by the Morris Road Drain from 18,500 square metres to 35,000 square metres. The recommendations of the SEAR project will also result in a small increase of water surface area for fisheries due to the enlargement of the Simcoe Road Branch.

The widened existing channel construction just north of the HMDSCIP by this project will provide for 500m<sup>2</sup> of deep pool area and close to 500m<sup>2</sup>± of littoral shelves. The development of gravel substrate areas and root-bole areas on the littoral shelves as proposed by this Report will further enhance the environmental attributes in the area.

Sediment and turbidity considerations will be addressed at the outlets by the provision of double turbidity curtains in the Holland Marsh canal, both upstream and downstream of the diversion channel and of the existing Morris Road channel.

The construction of the large sediment deposition area with 25m± of surface water width over a combined 380m± of flow length upstream of weir areas will assist substantially in downstream sediment reduction in the Holland Marsh. The sediment collection area is designed that it can be maintained using conventional equipment.

Just downstream of this sediment collection area in the Diversion, a further 45m of deep pool and 45m length of littoral shelves will be constructed.

Other comments pertaining to environmental matters would be:

- It is recommended the depressional areas stripped by the SEAR project on the former Bak and Balon farms be used as stockpile areas to minimize erosion from the stockpiles into drainage courses.
- In the area of bank stabilization to be undertaken in the dry, fish collection/relocation measures will be provided by a qualified biologist prior to work commencing.
- Even where the channel is stabilized with some narrowing, an improvement to habitat will result due to the increase in channel depth and water movement. The channel will remain directly connected to the Holland Marsh canals both by way of the new Diversion channel and by way of the existing channel. Fish movement could progress up one channel and out the other to and from the marsh canal.
- Species at risk are not expected to be encountered but on-site monitoring by qualified personnel will occur during construction in the same fashion as undertaken in the main marsh project.
- Dewatering will be undertaken pursuant to a permit to take water
- Archaeological studies are not anticipated to be necessary unless the Municipality should direct that such be undertaken.
- The work in the Edward Street Branch will marginally improve the length of fish habitat since three small metal arch pipes will be replaced by an open bottom footbridge.
- The Simcoe Road Branch will be lengthened and deepened by the SEAR project and will provide additional and varied fish habitat.
- Work in the Line 6 Branch and Reid Branch is minor (150m of road ditch cleanout and 75m of brushing) and will have no impact on environmental matters. However the work done by the Town on Line 6 at its outlet related to replacing metal pipe culverts with concrete box culverts at the junction with the Morris Road ditch will allow improved fish habitat in the lower reaches of the Line 6 channel.
- Access for hauling in imported clays and topsoils to stockpile areas for ultimate usage on the Diversion Branch and the South Morris Road Branch is recommended to be off of Bridge/Holland Street and following the east edge of the lands acquired for SEAR to the northeast corner of the former Bak and Balon properties in order to minimize environmental affects of hauling.
- It is a recommendation of this Report that the Contractor concentrate the period of hauling in materials to minimize the duration of usage of any haul route.

#### **d) Daily Access and Working Area Considerations**

On-going daily access to the diversion route during construction will be a) from Morris Road across the temporary cul-de-sac and along the 5m wide maintenance berm to be constructed by the SEAR project on the east side of the relocated channel (on the former Raposo property corner) and b) from Municipal lands to the berm on the Small Scheme to the location of the diversion route. Access to the Morris Road channel work will be along Morris Road except for the very south part which will have to be accessed from Line 6. Access to the work required on the Branch Drains will be along the roads fronting the branches where applicable.

It is the recommendation of this Final Report that the reconstructed Walker Avenue and Line 6 only be used for access by rubber tired vehicles and equipment. Walker Avenue is not to be used as a working area.

Working areas along the branches are shown on the aerial drawings. Generally, the working area along Morris Road from Walker Avenue to the location of the new embankment joining Morris Road to the SEAR will be primarily along the west portion of Morris Road and using the new clay stabilization of Morris Road in part. This should reduce both traffic and road impacts from what would occur if work were to occur from the full width of Morris Road.

The working area along Edward Street will be to the south of the channel on what is known as Edward Street. Access will be off of Simcoe Road or from Centre Street through Municipal lands. Temporary access (5± day duration) for hauling excavation from the Edward Drain channel will be necessary at one point in time across the SEAR embankment. This temporary access will also be needed if the existing Morris Road channel is cleaned either north or south of the junction with the Edward Street Branch.

For the minimal amount of work to be done in the ditch on Line 6, the working area will be along Line 6. However, construction equipment is to recognize the recent construction of Line 6 and rubber-tired equipment is recommended. Similarly the minimal amount of work to be done on the Reid Branch will be accessed from Line 6 with equipment methods to recognize that Line 6 has been recently reconstructed.

This Final Report recognizes that the Morris Road diversion channel will be maintained from the berms to be constructed as part of it. The recommendations to construct the berms to a 5m width and to ensure the berms are tied to the existing Small Scheme berms and to the SEAR embankment will provide continuous access. The working area along the diversion will be approximately a 45m to 47m width which will be sufficient to allow for all works to be constructed excluding the temporary stockpiling of stripped organics. Owners will be reimbursed for lost rent if the temporary stockpiling of organics occurs during cropping season.

**e) Staging Areas**

A project such as this requires the provision of staging areas where the contractor may store equipment, fuel equipment, provide for materials storage and transfers. On this project, approximately 35,000 cubic metres of clay and topsoil will have to be hauled in with temporary stockpiling. It is recommended that the primary area for staging and stockpiling would be on the former Bak and Balon properties east of Morris Road and adjacent to the diversion route. This area will be a depressional area after organics are stripped and will thus minimize any downstream surface runoff. This area also can be accessed by a haul route that would minimize impacts on other properties. A secondary and much smaller staging area could be on the Municipal lands to the south of the downstream portion of the Morris Road channel just upstream of the Holland Marsh Canal. Other potential but even more minor areas could be the unopened Line 6 Road Allowance and also parts of the Small Scheme dyke including Peterman Lane.

**f) Disposal Area for On-Site Excavation**

It is recognized by this Final Report that disposal of excavated materials from the existing Morris Road channel, from areas to be enlarged as sediment deposition areas and from any new areas of channels, should be provided for on-site. To address this matter, this Final Report recommends that the primary disposal area be in the area of the Diversion route and sediment deposition channel construction where island and maintenance berm construction is necessary. A secondary disposal area is to be an area that is excavated to salvage organic soils (at the downstream end of the existing Morris Road Drain channel) and that can be backfilled with excavated material.

The Report contains provisions that any organics to be stripped in cultivated fields are to be made available to farm owners.

**g) Construction Phases**

The first phase of construction (Phase 1) will be the Diversion Branch and the Pumping Station. The majority of the balance of the work will be Phase 2. The items that are not to be done until the end work are shown as Phase 3. All phases of work are to be awarded for construction at the same time. It is expected that each phase will continuously follow the previous phase.

**h) Consideration if Recommended Haul Route for Imported Materials Can Not be Used**

As this document indicates, the haul route recommended for imported clays on this project is from Bridge Street / Holland Street / Dissette Street intersection southerly along the east side of the lands that have been acquired for the SEAR project. This project has an "allowances" payment to be made to the Town for use of the lands as a haul route and contains provisions that if necessary a base for the haul route could be constructed and then removed upon completion.

It will be necessary for the Town of Bradford West Gwillimbury to cooperate in the use of this haul route since it is expected that there will be road construction activities occurring along 50 to 60 metres of this route as part of the SEAR Road project.

If for any reason this haul route can not be used, the only other option that could be considered would be to use Peterman Road but at much higher costs and impacts. The use of Peterman Road as an access would mean that materials would have to be stockpiled in a long windrow along the edge of Peterman Road and then hauled either to the stockpile site or to the berm sites by track equipment. A further loading and moving would be involved for some of the materials when actually placed. This haul route would involve longer hauls, would require the filling in of part of the small ditch with a culvert and lane along the Small Scheme dyke where it passes adjacent to the Wickson property and could involve substantial restoration costs of Peterman Road upon completion. In addition, turning movements onto Bridge Street at Canal Road would not be straight-forward.

It is estimated that the increased costs to the project if this haul route were used in lieu of the haul route off of Bridge Street and Holland Street to the Bak and Balon properties, could be in the magnitude of \$150,000.

**PROVISIONS SHOULD THERE BE A DELAY IN CONSTRUCTION OF SEAR PROJECT**

Should this drain project be in a position to be constructed prior to start of SEAR construction, the following items would be addressed:

- The Diversion Branch would still be constructed as the initial drain activity with staging and hauling provisions as indicated.
- However where it would cross the right-of-way for the SEAR, an open channel would have to be constructed, temporarily, in the location of the proposed 12 x 3m culvert
- At Morris Road the 3000mm dia. culvert that is to be used to ultimately replace the barricaded Walker Avenue culvert, would be placed, temporarily, below the road to allow flows on the west side of Morris Road to access the Diversion.
- At a location just south of the outlet of the existing Simcoe Road Branch, a temporary dam would be constructed in the Morris Road channel after the Diversion channel is built and connected and while work to the south is attended to as per the design.
- If the SEAR project remains un-started by the time of the completion of the channel work in the Morris Road Drain. A culvert would then be placed in the temporary dam south of the Simcoe Road Branch.
- Once the SEAR project commences and finishes work, remaining drain work would have to be undertaken to provide for the ultimate tie-in of Morris Road to SEAR, to shift the 3000mm culvert to its ultimate location at the barricaded Walker Road connection and to provide for repaving of Morris Road.

## USE TO BE MADE OF SEAR CONSTRUCTION SITE DURING DRAIN CONSTRUCTION

1. Initially at the start of the drain project a 6m wide haul route will be necessary off of Holland/ Bridge Street at the Dissette intersection, along the east side of the lands acquired for SEAR south to the former Balon/Bak farm lands (noted as Sites D and E on the Ainley SEAR drawings) which are to be used as a stockpile site. This haul route would overlap the actual road construction area over a 50m length but then would be on field areas further to the south. The haul access route would be prepared for hauling and would be restored to existing conditions after the hauling is completed, all as part of the drain project.
2. As soon as stripping operations have occurred in the former Bak and Balon farm sites, and as soon as the relocated Morris Road channel has been completed between the temporary cul-de-sac and the 12 x 3m culvert (all by the SEAR project), drain work will be necessary on the Bak and Balon sites to complete the Diversion channel and sediment channel work proposed including the ultimate connection to the 12 x 3m culvert. It is a recommendation of this Report that any organics separately stripped by the SEAR project on the Bak and Balon farm sites be hauled to an on-site temporary stockpile site to be designated by the Drainage Superintendent, or that the organics be stripped by this drain project in lieu of by the SEAR project.
3. Throughout construction of the Diversion channel and the channel alongside Morris Road to the south of the SEAR, daily construction access will be necessary along the temporary Morris Road cul-de-sac and 5m wide maintenance berm to be built north of it on the east side of the relocated channel, so that access for equipment and on-site hauling equipment is available to and from the Bak farm site.
4. At some point, for a duration of approximately 5 consecutive days, an access will be required from the parking lot north of the Edward Branch, across the channel to the existing Morris Road, and across the SEAR embankment to the Bak farm site, following the route of the 5m wide maintenance berms to the north of the 12 x 3m culvert, to allow excavated materials from the Edward Street Branch and from the existing Morris Road Branch just to the north and south of the Edward Street Branch to be hauled to the disposal area on the Bak farm site. Measures will be taken such as temporary placement of granulars, use of construction mats, etc. to minimize damage to the SEAR roadway features during the brief period of hauling.

## RECOMMENDED WORK

A summary now follows for the recommended work to be done on the Morris Road Branches, the Diversion Branch and the four tributary branch drains (Edward, Simcoe, Line 6, and Reid). The description of the recommendations for the work to be done is done on a branch by branch and owner group by owner group basis:

### i) **Diversion.Branch**

#### a) **From Holland Marsh Canal to former Bak Farm**

Walter Bak Farms Ltd. (Roll No. 005-18301) / Kavama Canada Inc. (Roll No. 005-18200) / Walter Bak Farms Ltd. (Roll No. 005-18100) / Walter Bak Farms Ltd. (Roll No. 005-180-00)

- A 45 to 50m± width of land is to be used for the construction of the Diversion Branch except on the Kavama property where the width is to be 6m wider. This width of land will not be acquired but an allowance will be paid to the owners for the value of the land as though the land were acquired.
- The channel to be constructed within this width will be 14.5m wide at the normal water level, 2m deep with a 4.5m bottom width. With respect to the existing ground levels, the channel will be 1.3m deep.
- Berms on either side of the new channel will be constructed so that the berms have a base area of 13 to 14m at the existing ground levels, a top width of 5m and height of 1.8 to 2.0m above existing ground level.

- Along the east side of the new diversion route, a small channel for local drainage will be constructed from the toe of the berm easterly with a width of 4 to 5m (part of the 45 to 50m width) at ground level, a bottom width of 0.5m and a depth of 1 to 1.2m.
- Any closed drains intercepted will be outletted into this east side channel.
- All organic soils within the 45 to 50m± width of construction will be separately stripped and made available to the owners of the lands on which the diversion route will be constructed (provided the owners do wish such). These organic soils will be left temporarily in windrows adjacent to the east side ditch if work is occurring while crops are on the fields. The windrow will require a width of 10 to 12m. The organics if left in the windrows will ultimately be spread by the project on adjacent fields when the landowners are ready for such. If the materials can be loaded and spread at the time of excavation without windrowing, such will be done. Loss of rent payments will be made if the organics are to be stockpiled.
- Sleeves for irrigation will be constructed across the new berms to serve the following properties on the west side of the diversion: Murillo, Wadsworth, Fox, Raposa, Al-Khatib, Kamali and Raposa; and to serve the following properties on the east side of the diversion: Bak, Kavama, Bak and Bak.
- The sleeves will be 200mm (8") in diameter, will be constructed of HDPE (plastic) Series DR- 17, will have Bauer type fittings and caps at the outlet and 200mm (8") ANSI flange connections at the upstream end for connections of pumps.
- Narrow culverts and lanes will be built in the small ditches to permit access for removing caps and installing in-take line.
- Irrigation sleeves will also be provided to serve owners on Morris Road that back onto the HMDSCIP canal. The sleeve construction will be as described for owners that back onto the Diversion. The location of the sleeves will be at every other property line, meaning that shared usage will be necessary.
- The Diversion channel berms will be constructed primarily of imported clay material. Construction will be in the same fashion that the berms were constructed along the Holland Marsh Drainage System project. Some surplus on-site clays from the sediment deposition channel may be used.
- The sandy silts excavated along the route of the Diversion will form the outside parts of the berms. It is expected that the sandy silts will be spread to a 3.5m width at the base and to a 1.4m width at the top of the berm.
- All berms will be surfaced with topsoil upon completion and will be ultimately seeded.
- Also the channel for local drainage will have some topsoils applied to it and will be similarly seeded.
- The existing local drainage channel on the west side of the diversion will be cleaned as necessary and will be retained for use. Both small channels will be part of the diversion route for future maintenance purposes.
- Where the diversion channel passes through the corner of the Kavama property, a 6m additional width to the east of the small channel will also be part of the lands of the drainage scheme to allow farm access between the Bak properties on either side of this wedge.
- The total land areas required for the diversion on the properties are:
  - Walter Bak Farms Ltd. (Roll No. 005-18301) 4.25 acres
  - Kavama Canada Inc. (Roll No. 005-18200) 0.47 acres
  - Walter Bak Farms Ltd. (Roll No. 005-18100) 1.25 acres
  - Walter Bak Farms Ltd. (Roll No. 005-180-00) 2.00 acres
- Should these areas not be rented out in 2016, loss of rent will be paid based on typical rental payments.
- In lieu of compensating the owners for crop damages for the 12m± width of land to provide for the windrowing of the stripped organics, the project will pay loss of rent, if incurred, and will load and spread the organics once crops are off.

**b) Diversion Branch on former Bak and Balon Farms**

*Town of Bradford-West Gwillimbury (Roll No. 005-169-00 and 005-170-00)*

- On the former Bak and Balon properties, which are lands now owned by the Town, two shallow maintenance berms plus the channel will occupy a central portion of the east portion of these lands but the main dykes for the channel will be along the north and south perimeter of this area
- The east portion of channel will be 25m± wide at average water level compared to 14.5m width on the downstream properties. This width will allow in one portion the construction of a further 40 to 45m long deep pool area, and a littoral shelf type of construction on both sides over a 40 to 45m length for added fisheries enhancement.
- The littoral shelves will be similar to those constructed on the Holland Marsh Canals, and will be approximately 1m below water level and will have a 2.5m width. Two areas of 15m length will be constructed with gravel substrate placed on it and four root-boles will be placed on the shelves.
- The outside/perimeter berms of the diversion in this area will join to the SEAR road embankment to the north and will join to the maintenance berm leading north from the Morris Road/SEAR tie-in location across lands acquired by the Town off of the northwest corner of the Raposa property.
- The lands immediately south and north of the diversion route on the east portions will be left at an elevation of 217.8 to 217.9 as stripped of organics by the SEAR project. The height of these lands will be approximately 0.6m lower than existing ground levels and 1m lower than normal water levels in the diversion.
- The intention is that the Town and/or Board develop plans for ultimate usage of these stripped lands after this drain project is complete, whether it be for recreational uses (ball or soccer fields), dog park areas, additional sediment deposition for uses with further excavation or for occasionally wetted wetland purposes.
- It will have to be recognized that some of these ultimate uses would require the areas to be restored to the elevations existing prior to stripping.
- In the west portion of these lands a substantial sediment deposition area will be constructed involving 380m± of channel encompassing a 135 x 16 to 20m maintenance island. The deposition channel will be 1m deeper than the upstream and downstream channel.
- There will be two submerged stone weirs constructed to elevation 217.1 (1m higher than the channel), one at each end of the island, to assist in access by maintenance equipment to the centre island and also to assist in sediment deposition.
- The upper most part of the Diversion Branch will be the 12 x 3m concrete culvert to be constructed by SEAR across the SEAR embankment. This culvert will be constructed as an initial phase of SEAR work and its initial purpose will be to link both ends of the existing Morris Road channel during SEAR construction and until the Diversion Branch is built.
- Once all Diversion Branch work is completed, the channel work on the Bak/Balon farm sites will link to the new culvert and thus to the upstream parts of the Morris Road Branch. The discharge from the 12 x 3m culvert will then be to the sediment deposition channel and then to the Diversion Channel.
- 200m²± of riprap placed by the SEAR contract to protect the north bank of the channel downstream of the 12 x 3 culvert will be reset on the new realigned north bank and in the channel bottom where the one metre drop occurs.
- The balance of riprap placed by SEAR will remain and form part of the Diversion Branch.
- Approximately 50 cubic metres of riprap will also be placed along the bank of the island opposite the 12 x 3m culvert discharge.
- A new pumping station with an auto-start diesel is to be built to replace the existing station. The existing diesel and pump will be reinstalled as a backup.

**ii) South.Morris.Road.Branch**

*Town of Bradford West Gwillimbury (Roll No. 005-124-18) and Zima Parkway*

- This portion extends from the outlet in the HMDSCIP to a location along Zima Parkway opposite the residence on the Lakatos property.

- The work on this portion is to be done from the Town owned lands and from Zima Parkway.
- As a first item of work the Town lands are to be brushed but such that a 5m width across the south perimeter is not brushed and is left as a buffer.
- Also the channel itself is to be brushed
- Then a cell is to be excavated in the brushed space to accommodate the disposal of the excavated materials from this length.
- The materials excavated from the cell will be organics and such are to be hauled to the staging area for ultimate usage as a portion of the topsoil to new construction. (These organics will be blended with imported topsoils.)
- The existing channel is then to be retained with a cleanout but is to be deepened in its east portion to provide a 90m length of deep pool area and is to be cleaned in its west portion to provide a 100m length of littoral shelf.
- An area of gravel substrate and root bole placement is to occur on the shelf.

Small Scheme Dyke and Morris Road (Town of Bradford West Gwillimbury) (Interval 2)

- The next portion of the South Morris Road Branch is that part on the west side of Morris Road from the Lakatos residence up to the barricaded Walker Avenue culvert location.
- In this portion clearing along both banks of the channel is necessary.
- The bottom of the channel is to be cleaned and excavated materials are to be hauled along Morris Road to the disposal area on the Bak/Balon farm sites.
- Work will be done from the Morris Road side of the channel. Once work is completed, necessary restoration will be attended to.

Walker Avenue Crossing to the Temporary Cul-de-Sac (Town of Bradford West Gwillimbury) (Interval 3)

- The next portion is that length from the barricaded Walker Avenue culvert to the location of the ultimate connection of Morris Road to the SEAR.
- A number of residential lots back onto the channel on the west side. Most of these properties, except for two, have lost property to the channel. Two actually encroach onto the channel. The lost width varies from 1.0 to 2.0m and the encroachment varies from 1.8 to 2.0m. All lots are built on except for two larger lots at the north portion of the interval.
- The east side which is the Morris Road side, is steep and shows evidence of instability.
- The channel is wooded on both sides and scattered building materials, riprap and brush exist on the west side.
- The work in the channel is to be constructed in the dry. The next step will be to ensure both limits of this interval are cofferdammed and dewatering occurs.
- Prior to any dewatering work occurring, fish removal/relocation will be undertaken.
- The work next will be to close cut all brush on the Morris Road embankment, and on the west side.
- The channel will be cleaned of sediments next.
- The work required is to restore the west side top of bank of the channel to the property line location. On the two properties that encroach, excavation may be necessary to ensure the top of the bank is also at the property line.
- On the west side, the work then will be to remove riprap type of materials, collapsed fencing and other debris, and to then place stabilizing materials (clay), to surface such with topsoil and to then seed such, and to add an erosion protection mat. Most hedges, good fences, healthy trees, shrubs will remain and will not be affected.
- On the east side, roots will be left in place by the clearing and new embankment materials will be added to flatten the slope.
- The materials added will be topsoiled and then will be seeded, and will have an erosion protection blanket added.

- All work in this interval will be done from the Morris Road side. Cleanout material will be loaded and hauled along Morris Road north to the disposal site, and then materials for stabilization will be hauled in from the north along Morris Road.
- The work in this portion cannot be attended to until the Diversion Branch is completed and the upstream waters are diverted into the new channel.
- Once the Diversion and the work in this interval is completed, work will be done such that this area is linked both to the Diversion and to the existing canal outlet. The link will occur by construction of a crossing culvert (900mm dia.) in the embankment that will ultimately tie Morris Road to the SEAR. In this fashion the water level in this interval will be the same as canal levels and also low flow will be maintained.
- Three Town storm drains and any private drains that discharge into the channel in this interval will be extended across the width of bank stabilization.
- Any irrigation lines existing below Morris Road will be abandoned and either new shared service into the Holland Marsh canal or individual service into the new Diversion channel will be provided at the back as described in the Diversion work notes.
- The channel that will exist after the work is completed will be approximately 4.5m wide at the normal water level and with a depth (water level to bottom) of 1.5m.
- The bottom is expected to be approximately 400 to 500mm deeper than existing once cleaned.
- Once all work is completed, Morris Road will be restored: any necessary additional gravel will be added and then repaving will occur. The Morris Road tie-in to the SEAR will be completed and paved at the same time.
- The existing barricaded culvert at Walker Avenue will be replaced at the end of construction with a new 3000mm culvert. This culvert is much larger than required for flow purposes but it will offer the same end area above water level as the existing in order to maintain any private navigation in the channel equal to that existing.

**iii) Centre.Morris.Road.Branch**

**Town of Bradford-West Gwillimbury (Roll No. 005-124-18)**

- This is the component of realignment of the Morris Road channel to be constructed by the SEAR project as an initial phase of road construction.
- This channel work will be 195m± in length, will be on the east side of the SEAR and will be constructed of sufficient capacity that it can serve all upstream Morris Road drainage until such time as the connection of the Diversion to the new 12 x 3m crossing.
- The new channel is proposed by SEAR to have a 4m± bottom width and a 16m± top width. It is proposed that a 5m wide maintenance berm be constructed on its east side to an elevation of 220.5.
- The work is proposed to be constructed by the SEAR project prior to the drain construction.
- Once drain construction is completed, much of this channel will be replaced by the sediment deposition channel work to be constructed on the former Bak farm.
- That portion constructed in the wedge of land acquired by the Town from the Raposo farm will remain after Diversion work is completed and will serve to allow low flows to continue to the south to the South Morris Road Branch.
- It is at the south limits of this portion, where Morris Road will be given the ultimate connection to the new SEAR Road. This linkage of Morris Road to SEAR will be undertaken by the drainage project and will consist of an embankment with a 5 to 6m wide paved roadway. It is proposed that a 900mm diameter culvert (as previously stated) be installed below this new connection embankment and at a depth to match the Morris Road Drain. This culvert will be 30m in length. The embankment will be constructed of clay materials. Surface work will involve granular and asphalt construction but will not occur until all road and construction is completed. There is a contingency to place steel beam guide rail along the road where it passes above the channel.

**iv) North.Morris.Road.Branch**

**Town of Bradford-West Gwillimbury (Roll No. 005-124-18)**

- This portion will extend from the junction of the Edward Street Branch and the Diversion northerly to the top end of the existing Morris Road channel which is at the storm outlet/headwall just south of Centre Street.
- This is an existing channel and it will remain in its existing alignment.
- The work intended for this channel was to remove brush and trees along the banks and then to do a bottom cleanout.
- However, in 2015 it was deemed that the work had to be undertaken sooner due to the build-up of sediments from the storm outlet downstream.
- This work was accordingly undertaken in 2015 and occurred over the 200m± length involved.
- No additional widening should be necessary.
- No further work is expected in this interval but should materials redeposit in the channel prior to completion of all other work in this Report, it may be found necessary to repeat the cleanout but to a much reduced extent.
- The excavated materials were hauled to the Bak farm disposal site in 2015 and will be hauled there again if cleanout is necessary.
- The channel itself exists on lands owned by the Town or on lands with a R-O-W in favour of the Town.
- Work will be done in the future from the Morris Road side and hauling away will be required.

**v) Edward.Street.Branch**

**Town of Bradford West Gwillimbury (Roll No. 005-124-18)**

- This branch is the tributary to the Morris Road Branch that runs westerly to an 1800mm diameter Town storm drain outlet approximately 230m upstream of the Morris Road channel.
- This channel exists with approximately a 5m top width, 1 to 1.5m bottom width and 1.3m depth.
- There is a fence along its northern limits, which is the south limits of the residential lots fronting on Back Street.
- The offset from the top of bank to this fence varies from 0 to 3m.
- The channel has three utility poles in or adjacent to it. One is within the channel itself. This particular pole is to be relocated and this report recommends the work to be undertaken by Powerstream.
- Riprap protection was added to the channel recently (2014/2015) but such was not recessed into the channel. The riprap work necessary at this time is to temporarily remove the existing riprap, overdig the channel and then to replace the riprap. Some additional riprap is to be added just downstream of the 1800mm pipe outlet.
- The channel is to be excavated throughout such that the finished dimensions of the channel after replacement of riprap is a 1.5m bottom width with 1.5:1 side slopes.
- Any materials excavated from the channel are to be hauled to the Bak farm disposal site.
- To allow this hauling to occur, it will be necessary that a temporary culvert be placed in the Morris Road channel north of the 12 x 3m culvert and then the haul route is to occur across the new SEAR Road following the 5m wide maintenance berms to be built on the north side of the Diversion.
- The triple pipe crossing existing at the east limits of this branch are to be removed and are to be disposed of by the Contractor. Such are to be replaced with a new 12m span x 3m wide footbridge to be constructed by the Drain project. However, the removal of the pipes and the construction of the footbridge are not to occur until all drain work to the west of the SEAR as required by this Report is completed so that the temporary haul route across the Morris Road channel and SEAR can be accessed from the parking lot just north of the Edward Street Drain.
- All work to be done on the Edward Street Branch is along lands owned by the Town and no allowances will be provided.

**vi) Simcoe.Road.Branch**

**Community Centre Lands (Roll No. 005-16100)**

- This is a channel that exists from the Morris Road Drain westerly to a 1050mm dia. Town storm drain outlet on the east side of Simcoe Road. This branch currently runs along the south limits of the Community Centre lands.
- This branch is proposed to be totally reconstructed as part of the SEAR project. The branch exists with a 4m top of bank, 0.6m bottom width and 2m depth. It is proposed to be reconstructed as a 2 stage channel with a 26m± top width and 1m depth on the upper stage, and 2.5m top width, 0.5m bottom width and 1m depth at the lower stage.
- The reconstruction of the Simcoe Road Branch will intersect the existing Morris Road Branch approximately 100m± downstream of the proposed 12 x 3m crossing of the SEAR (and visually just east of the easterly ball diamond).
- This portion of the existing Simcoe Road Branch from the new channel work north to the 12 x 3m culvert will be cleaned as necessary either as part of the SEAR project and/or by this drain project.
- The Simcoe Road Branch, once reconstructed, is to be incorporated by this report with the dimensions as described. A 5m wide maintenance right-of-way is to be provided by the SEAR project along the north and west limits of the Branch for maintenance by the Municipality.
- The new channel work will be topsoiled and seeded as part of the SEAR project.
- Riprap work is proposed at the top end by SEAR at the outlet of the existing storm sewer.
- It is believed that the existing storm sewer will be retained where it exists as part of the SEAR project. It will not be part of the drain for maintenance purposes.
- All of the Simcoe Road Branch will exist on Municipal lands and no allowances are to be provided.

**vii) Line.6.Branch**

**Line 6 Road Work (Town of Bradford West Gwillimbury)**

- This branch extends from the Morris Road Branch upstream to the existing outlet from the storm water management facility that is located in the northwest quadrant of Line 6 and Simcoe Road.
- The Line 6 Branch is the north side road ditch of Line 6 and it exists with approximately a 1m bottom width, 5m top width and 1m depth.
- The closed drain that exists and that continues up to the storm water management facility is, or is equivalent to, a 1500mm to 1200mm concrete pipe (portions are rectangular concrete sections).
- There are crossings in the Line 6 Branch at Walker Avenue and Parkwood Avenue. These crossings were reconstructed as part of the Line 6/Walker Avenue reconstruction project completed by the Town in 2015.
- These culverts were sized in conjunction with input from the Engineer of this report. The culverts across Walker Avenue now exist as 2 – 1200 x 3000mm concrete culverts and the culverts across Parkwood Avenue exist as twin 1600mm corrugated steel pipe culvert.
- The Walker Avenue culverts have capacity for the 50 year storm event while the Parkwood Avenue culverts can accommodate the runoff from a 25 year storm.
- The channel itself has capacity only for the 2 year storm event.
- The Preliminary Report recommended that the Final Report acknowledge that there should be sufficient lands left undeveloped to the north of the Line 6 Branch to accommodate major flow without damaging adjacent land uses.
- As a result, it is the recommendation of this report that a major flow route be protected as to be identified by hydrology studies of the Town.
- It is also recommended that provisions be left across Parkwood Avenue and Walker Avenue for the major runoff flows.
- The Line 6 Branch exists fully within the lands of the road allowance for Line 6 and no allowances are necessary.

- A discussion occurred at the time of the on-site meeting for this Final Report with respect to incorporation of the storm water management facility at the Line 6/Simcoe Road corner and the decision made was that the facility should not be incorporated at this time as part of the Drain.

**viii) Reid.Branch**

**Town of Bradford-West Gwillimbury (Roll No. 005-102-02)**

- This branch extends from the Line 6 Branch across lands owned by the Town up to Simcoe Road.
- The Reid Branch consists of a Portion A and a Portion B. The main channel is Portion A and the tributary channel is Portion B.
- Town owned lands accommodate the channel, and are 22m± in width downstream of the junction of the two branches and 14m± in width in the portions upstream of the junction.
- The main channel exists with an average top of bank width of 6m, a bottom width of 2.0m± and a depth of 1.2m.
- The crossing of Line 6 by the Reid Branch consists of two 1050mm diameter pipes installed as part of the Line 6/Walker Avenue project in 2015.
- At the upstream end of the A Branch, two crossings exist across Simcoe Road. One is a 1.83m x 1.14m arch culvert and the other is 1.27m x 0.76m arch culvert.
- The tributary branch also has a twin crossing of Simcoe Road. One crossing consists of 1.5m x 0.9m arch culvert and the other is 1.27m x 0.82m arch culvert.
- The only work recommended in the Reid Branch at this time is brushing over a length of 75m south of Line 6. Brushed materials are to be either left on site if power brushed or are to be removed and disposed of by controlled burning or burial if otherwise done.
- The Reid Branch only has capacity for the 25 year storm runoff. Any development adjacent to the channel should ensure a path for the major flow exists that would not damage adjacent land uses.
- The Preliminary Report recognized that the elevation of the crossings installed across Line 6 as part of the Line 6/Walker Avenue work are not sufficiently low to provide complete drainage to the Reid Branch. The crossings were unable to be lowered due to the existence of utility lines within the right-of-way of Line 6.
- The Preliminary Report suggested that if additional depth should ever be required for the Reid Branch at some future time, that a relief drain be constructed to assist the crossing of Line 6 and that the relief drain should run to the east along the south side of Line 6 and any utilities and have a separate outlet in the Morris Road Branch.
- Such work could only be undertaken by a new and a separate appointment pursuant to the Drainage Act.

**ix) Work.on.Unopened.Line.6**

**Town of Bradford-West Gwillimbury (Roll No. 005-102-02)**

- As indicated, the 318m length of unopened Line 6 from Morris Road to the Small Scheme channel and dyke may be required as a haul route.
- The right-of-way is approximately 20m in width but there has already been material placed on the right-of-way, raising it by approximately 1m.
- A gas line exists along the south part of the right-of-way and an overhead utility line exists in the north portion.
- Should the right-of-way be prepared for use as a haul route, clearing and grading will have to occur along it and a temporary culvert will have to be placed to provide access across the Small Scheme ditch to the Small Scheme dyke.
- There would be no allowance provided for this work since all work would be on municipal property.

**x) Haul.Route for.On-Site.Excavation From.Morris.Road.Branch.to.Diversion.Branch**

**Town of Bradford-West Gwillimbury (Roll No. 005-102-02)**

- A haul route can be developed along the existing Small Marsh Scheme dyke that exists from approximately Survey Station 100 of the South Morris Road Branch to the Diversion Branch.
- In this interval, the existing dyke has dimensions varying from 6 to 10m± top width.
- The dyke is to be widened to give a 12m top width and is to be raised by up to 400mm. The approximate amount of clay to be brought in will be 4,500m<sup>3</sup>.
- Once completed, some organic materials are to be placed on the widened dyke and it is to be seeded.
- To give access from the South Morris Road Branch to the dyke, a crossing equivalent to a 3000mm diameter pipe is to be temporarily placed in the South Morris Road Branch to allow for hauling equipment.
- The culvert is to be backfilled with granular material to the top of the pipe and is to have clay material from there to the surface.
- Upon completion of work, the culvert and backfill is to be removed and the channel is to be restored to design specifications.
- A small temporary culvert would be needed in the Small Scheme ditch where the Diversion route intersects.
- All hauling should be done by track mounted rock trucks to minimize load weights on the dyke.

**AGENCY APPROVALS/ENVIRONMENTAL ACTION**

A summary of the agency approvals to be sought on this project is as follows:

With respect to Fisheries and Oceans (DFO), contact with DFO will be made by the Environmental Sub-Consultant re the type of approvals necessary, i.e. either a Letter of Advice or a Fisheries Authorization.

With respect to the Lake Simcoe Region Conservation Authority (LSRCA), it is expected that a Section 28 permit will be required.

With respect to the Ministry of Environment and Climate Change, an application for an Environmental Compliance Approval will be submitted if required. Also a Permit to Take Water will be applied for.

With respect to Species at Risk, contact has been made with Ministry of Natural Resources by the environmental sub-consultant and observations will be made prior to and during construction for Species at Risk.

**DRAWINGS INCLUDED WITH THIS FINAL REPORT**

**a) Plans**

The location of the Morris Road Drain and the affected properties are shown on various drawings as listed in the drawings index included with this report. The heavy solid lines indicate the location of the proposed drain to be incorporated. The numbers adjacent to the lines are station numbers which indicate in meters the distance along the drains. The heavy dashed line indicates the approximate watershed boundaries for the drains. The plans also show other existing drains, property boundaries, Municipal assessment roll numbers, and hectares affected for each parcel and road.

**b) Profiles and other Drawings**

The profile for the Morris Road Drain can be found on various drawings as listed in the drawings index. Each profile shows the depth and grade of the as-built drain. The upper thin solid line represents the existing ground level. The lower heavy solid line (the grade line) indicates the as-built drain grades. Other drawings contain the details and enlargements (see index).

## SPECIFICATIONS

Divisions 3 to 6 of the Specifications are included.

A summary of the Divisions follows:

- Division #1 - Instructions to Tenderers (Not included herein)
- Division #2 - Form of Tender (Not included herein)
  - Schedule of Tender Prices (Not included herein)
  - Standard Form of Agreement (Not included herein)
- Division #3 - Special Provisions
- Division #4 - Contract Plans Listing
  - Specifications Listing
  - Standard Drawings Listed
- Division #5 - General Conditions
- Division #6 - Supplemental General Conditions
- Division #7 - Geotechnical Reports (not included herein)

## COST ESTIMATE

The cost estimate on this project consists of the allowances recommended to be made, if any, to those owners having work on their properties, the construction cost estimate including contingency items, the engineering cost estimate, an estimate of the construction supervision, an estimate of the eligible administrative cost which includes financing, applications and miscellaneous costs and an allowance for rent and unforeseen costs. The cost estimate also includes the Net HST (1.76%).

### A) Allowances

i) Section 29 of the Drainage Act provides for the payment of allowances to landowners for any lands taken to accommodate existing, expanded and new drainage work features on their properties. As well, Section 29 can be used to provide compensation for lands to be used for right-of-way/access (where not already part of a drainage works, e.g. a dyke) to any part of the drainage works including to a pumping station, and for a right-of-way (where not already part of the drainage work) alongside the drainage works for construction and maintenance purposes.

On this project the existing dykes including Morris Road are already part of a drainage works and no further allowance will be made pursuant to Section 29. Similarly Section 29 allowances are not made for drainage works along roads since a right-of-way exists.

Where use must be made of other lands already in a right-of-way for purposes of constructing any part of this drainage works, Section 29 allowances are not made since the right to work on the lands has been acquired.

Where lands have encroached on the right-of-way of any part of the drainage works, and the encroachment is removed, there will be no allowances paid.

On this project, Section 29 allowances will only be made to the owners of those lands that will be used for construction of the Diversion Branch. On the Diversion portion, there will not be separate need for allowances for future access or for right-of-way for maintenance since the berms of the Diversion will be used for access and working area. Access to the berms will be from existing roads and/or existing dykes.

Section 29 allowance rates to be provided for lands taken/needed during construction along the Diversion are:

- Stripped Municipal Land -\$1,000/ac (\$2,500/ha±)
- Agricultural Land - \$40,000/ac (\$100,000/ha±)

ii) Section 30 of the Drainage Act provides for the payment of allowances to landowners where lands and/or crops are damaged/impacted by the construction of the drain. These allowances compensate the owner both for damages caused by the construction equipment and by the drainage work itself. Section 30 allowances can also be made for land and crop damages along existing access and right-of-way routes during construction.

On this project, where the right-of-way/access is along existing earthen dykes which are already part of the drainage works, the allowances for Section 30 will be based on bush lands only. Where the right-of-way is along existing lanes/roads that are used as public roads, no Section 30 allowance will be made since the roadways/lanes will be maintained during construction and will be restored after construction is completed.

Where the Section 30 allowances may be due to lands owned by the Municipality and where the lands are already intended for road or drainage purposes, payment of the Section 30 allowances will be at the lower vacant/bush rate. Where a Section 30 allowance may be due to an owner as a result of damages incurred while stabilizing an existing channel bank, the allowance is based on a lump sum amount to recognize the owner may have some minor clean-up work after the project is done.

Section 30 allowances are therefore provided in this Report using rates of:

- Farm lands to be used for Diversion route - \$700/ac (\$1,750/ha) based on rent lost
- Vacant/bush/scrub lands already part of a drainage work or intended for road or drainage purposes - \$500/ac (\$1,250/ha±)
- Restoration of an unstabilized bank on a residential lot - \$300 lump sum

The Section 30 allowances to be provided to farm lands along the Diversion route are minimal since:

- a) It is expected crops will not be planted on the lands to be used and since the lands are rented, the lost rent will be reimbursed.
- b) If the temporary stockpiling of organics from the Diversion route means loss of rent to the landowners involved, compensation for loss of rent will be made from the allowance created.

Organics that may be stripped by the Town as part of the road job from the Bak and Balon farm sites to be used as a stockpile site in part and in part for the Diversion route may be temporarily stockpiled and then made available to agricultural lands. A loss of rent payment is proposed for the lands where these organics may be temporarily stored and an allowance for such is created.

iii) Section 31 of the Drainage Act can provide for an allowance to owners where an existing drain or any part thereof has been found to be adequate and can be incorporated into the project and thus save expenses to the project. On this project, the Edward Street Branch, the Simcoe Road Branch, the Line 6 Branch, the Reid Branch and part of the South Morris Road Branch being reconstructed by the SEAR project could be considered. The Engineer has elected not to make Section 31 allowances however since these components are primarily on municipal lands and/or serve as outlets for upstream road storm drainage systems and/or will be primarily replaced by other works to be constructed by this Report and since the value is primarily to the Municipality due to ease of future maintenance and the value to the drainage works is minimal.

#### Miscellaneous Matters Considered in Allowances

- On the Diversion Branch, future maintenance will be from the new dykes.
- Excavated materials from maintenance of external ditches beside these diversion dykes will be either
  - a) leveled on the dyke
  - b) hauled away to Town stockpile site and using the dykes as the haul route, or
  - c) provided to owner where organic and if the owner wishes such

- The Morris Road, Edward Street, Simcoe Road, Line 6 and Reid Branches will all be maintained from roadways and/or land owned by the Town of Bradford West Gwillimbury and materials will be hauled away.
- The Peterman Pumping Station will be accessed for maintenance from the berms of the Diversion.

In accordance with Section 62(3) of the Drainage Act RSO 1990, the allowances shown may be deducted from the final assessment levied. Payment to the owner would only be made when the allowance is greater than the final assessment. The allowances are a fixed amount and are not adjusted at the conclusion of construction. Allowances can only be changed if the report is modified prior to its adoption by bylaw or in accordance with the paragraph in this report that deals with changing the scope of work after the bylaw is passed.

The allowances payable to the owners entitled thereto on this project are therefore as follows:

Con	Lot	Roll No. (4312)	Owner	Right-of-Way (Sec 29)		Damages (Sec 30)	Total
				Land Taken	Land Used	Lands & Crops	
<b>Morris Road South Branch</b>							
		010-005-02601	M4 Bradford Inc.			300	300
		010-005-02921	A. & D. Hinds			300	300
		010-005-02922	R. Thrush			300	300
		010-005-02923	D. Boyd			300	300
		010-005-02924	A. & A. McCarney			300	300
		010-005-02925	J. & M. Gonclaves			300	300
		010-005-02926	M. & S. Lock			300	300
		010-005-02927	P. Connor & A. Kuus			300	300
		010-005-02928	G. Martin & D. Gibson			300	300
		010-005-02929	M. Holledge & A. Rezka			300	300
		010-005-02930	G. Feraday			300	300
		010-005-02953	P. Strevez			300	300
		010-005-02954	V. Romano			300	300
		010-005-02955	R. Smith			300	300
		010-005-02956	G. Cottingham			300	300
		010-005-02957	D. Glenney			300	300
		010-005-02958	F. Baxter			300	300
		010-005-02959	M. Cowell			300	300
		010-005-02960	L. Tanaka			300	300
		010-005-02961	R. Raymond			300	300
		010-005-02962	M. Vey			300	300
		010-005-02963	C. Hickey			300	300
		010-005-03000	J. Ward			300	300
		010-005-03100	R. Harrison			300	300
		010-005-03101	J. Terry			300	300
		010-005-03102	J. Medeiros			300	300
		010-005-03200	L. Torres			300	300
		010-005-19400	L. Gaudet			750	750
		020-005-02400	Mattwood Homes Ltd.			300	300
		020-005-12401	J. Lakatos			600	600
		020-005-12418	Town of BWG			500	500
		Unopened Line 6	Town of BWG			750	750
Sub Total:				0	0	11,000	11,000



<b><u>Diversion Branch</u></b>							
010-005-16900, 170 & 171	Town of BWG	7,500	0	3,750	11,250		
010-005-17200	Town of BWG	0	0	200	200		
010-005-18000	Walter Bak Farms Ltd.	80,000		1,400	81,400		
010-005-18100	Walter Bak Farms Ltd.	50,000		875	50,875		
010-005-18200	Kavama Canada Inc.	20,000		350	20,350		
010-005-18301	Walter Bak Farms Ltd.	170,000		3,150	173,150		
Sub Total:		327,500	0	9,725	337,225		
<b><u>Reid Branch</u></b>							
020-005-10202	Town of BWG			100	100		
Sub Total:		0	0	100	100		
<b>TOTAL ALLOWANCES:</b>		327,500	0	20,825	348,325		

### B) Construction Cost Estimate

The estimated cost for Labour, Equipment and Materials to construct the proposed drainage works is outlined in detail in the following section. The final cost of drain construction cannot be established until the construction is completed. The Contractor is to supply all labour, equipment and materials to construct the following:

Item	Description	Unit	Qty.	Estimated Unit Price	Total Estimated Cost
<b><u>Diversion Branch (Phase 1)</u></b>					
1	Construction and maintenance of turbidity curtains	ea	4	1,500.00	6,000
2	Type I work to construct 650m of Diversion on Marsh farms including water control, 9000m <sup>3</sup> of organics stripping and piling or levelling, 7000m <sup>3</sup> of sandy silt excavation and placement, 22,000m <sup>3</sup> of imported clay, for clay berms and external ditch work grading along the 650m of Diversion	L.S.			55,000
3	Type II work to construct 100m± of Diversion on Bak farm site to start of channel around island including 1100m <sup>3</sup> of sandy silt excavation, 600m <sup>3</sup> of clayey silt excavation and grading of ditch and maintenance berms using excavated materials	L.S.			10,000
4	Type III work to construct maintenance island and sediment deposition channel including 9500m <sup>3</sup> of sandy silt excavation, 18,000m <sup>3</sup> of clayey silt excavation, shifting of 2500m <sup>3</sup> of berm built by SEAR and using excavated and shifted materials plus hauled in downstream sediments (5000m <sup>3</sup> ±) to	L.S.			150,000

	fill 9000m <sup>3</sup> of over-excavation areas, to construct 11,500m <sup>3</sup> of external clay berms and 2500m <sup>3</sup> of internal berms, to construct 12,000m <sup>3</sup> of centre island, and including shifting 200m <sup>2</sup> ± riprap at 12 x 3m culvert and 62m of Type VII work to reslope balance of Centre Morris Road Branch				
5	Supply and placing of topsoil to 100 to 150mm thickness along new berms (Types I, II and III) and on island	m <sup>3</sup>	3000	7.00	21,000
6	Seeding of topsoil	m <sup>2</sup>	30000	0.20	6,000
7	Construction of gravel/substrate areas on littoral shelf (each 15m long)	ea	2	3,000.00	6,000
8	Construction of root boles on littoral shelf	ea	4	500.00	2,000
9	Construction of irrigation inlets with each inlet to consist of 20m of 200mm dia. HDPE Series DR-17 piping, fittings, 6m of 600mm culvert pipe and earth lane	ea	15	4,000.00	60,000
10	Shot rock riprap on 150m <sup>2</sup> of area	m <sup>2</sup>	150	100.00	15,000
11	Shot rock to create two access embankments	m <sup>3</sup>	600	25.00	15,000
<b>Sub Total Diversion Branch:</b>					<b>346,000</b>

<b>South Morris Road Branch (Phase 2 Except Where Noted)</b>					
12	Construction and maintenance of turbidity curtains	ea	4	1,500	6,000
13	Brushing of Town lands east of Zima Parkway and south of channel of Interval 1 (Sta. 070 to 415) (approx. 0.35 ha)	L.S.			5,000
14	Excavation of organics to create a cell for disposal of excavation (3000m <sup>3</sup> ) and hauling to stockpile on Bak farm site for mixing with imported topsoils	L.S.			21,000
15	Type IV work to excavate 345 of channel (approx. 3000m <sup>3</sup> of excavation) channel from Interval 7 of Holland Marsh to opposite Lakatos building (Interval 1) including constructing 90m of deep pool and 100m of littoral shelf and disposal of materials in new cell, and including grading some saved organics on cell surface.	L.S.			12,000
16	Construction of gravel substrate areas on littoral shelf.	ea	2	3,000	6,000
17	Construction of root boles on littoral shelf	ea	2	500	1,000
18	Seeding of working area	m <sup>2</sup>	4000	0.20	800
19	Brushing of 300m of channel of Interval 2 (Sta. 415 to 715±)	L.S.			5,000

20	Type V work to clean Interval 2 channel (300m±) and haul to Bak farm disposal site using Morris Road (1200m <sup>3</sup> )	L.S.			8,400
21 (Phase 3)	Ultimate removal and disposal of Walker Avenue culvert (existing is 20m length of 3400 x 2250 arch CSP) and replacement with 20m of 3000mm dia. aluminized corrugated steel pipe (125 x 25mm corrugations, 3.5mm wall) including granular bedding and backfill, then native backfill, then surface granulars and including restoration of barricades. 10m <sup>2</sup> of shot rock riprap on filter fabric is to be placed at each end of the new culvert. This is to be one of the last items of work on the project. This pipe may be used in multiples of 5m lengths (with couplers) as temporary culvert work and as per separate item. Asphalt surfacing to be included with Morris Road repaving.	L.S.			35,000
22	Fish removal in Interval 3 of South Morris Road Branch (Sta. 712 to 1+458±) including barricading culverts at Morris Road tie-in and Walker Avenue. Fish salvage work to be done by others but Contractor to coordinate work with fish relocation. (Contractor may be asked to supply and operate rental equipment to allow fish salvage to be done.)	L.S. for equipment  L.S. for work by others			5,000  5,000
23	Brushing of 750m± of channel of Interval 3 (Sta. 712 to 1+458)	L.S.			12,500
24	Removal and disposal of old building materials, riprap, debris along channel	L.S.			20,000
25	Type VI work in Interval 3 (750m±) including cleaning channel and hauling to Bak farm disposal site (2800m <sup>3</sup> ), importing and placing 6000m <sup>3</sup> of clay (or equivalent) to stabilize banks, grading and cleanup	L.S.			20,000
26	Extending 3 Town storm drain outlets including new concrete headwalls	ea	3	5,000.00	15,000
27	Supply and placement of topsoil on stabilized banks to 100 to 150mm thickness	m <sup>3</sup>	700	7.00	4,900
28	Seeding of topsoiled areas	m <sup>2</sup>	7000	0.20	1,400
29	Supply and placement of Terrafix S100-B erosion control blanket (or equal) on stabilized banks	m <sup>2</sup>	3000	5.00	15,000



30 (Phase 3)	Final granular, grading and paving of Morris Road at end of all construction (400m <sup>3</sup> of Granular A and 850 tonnes of SP12.5 asphalt to 60mm thickness and 5m width (except wider at tie-in)	L.S.			125,000
<b>Sub Total South Morris Road Branch:</b>					<b>324,000</b>

<b>Edward Street Branch (Phase 2)</b>					
31	Relocation of utility pole outside of channel (by others) prior to start of work	L.S.			10,000
32	Type IX work along Edward Street including removal and resetting of 600m <sup>2</sup> of riprap, enlarging channel and hauling to Bak farm disposal site (500m <sup>3</sup> ) and protection of existing drain outlets	L.S.			12,000
33	Provision of temporary haul route across SEAR Road including protection to Road	L.S.			3,000
34 (Could be Phase 3)	Ultimate removal and disposal of three corrugated steel pipe arch culverts and replacement with 12m span by 3m wide footbridge with concrete abutments and pile foundations	L.S.			60,000
<b>Sub Total Edward Street Branch:</b>					<b>85,000</b>

<b>Simcoe Road Branch (Phase 2)</b>					
35	Type X work to clean 99m of channel and to haul to Bak farm disposal site using access created for Edward Street Branch work (approx 300m <sup>3</sup> of work)	L.S.			2,500
<b>Sub Total Simcoe Road Branch:</b>					<b>2,500</b>

<b>Line 6 Branch (Phase 2)</b>					
36	Type XI work to bottom clean 150m of road ditch adjacent to Parkwood Avenue culverts and to haul to Bak farm disposal site (approx. 50m <sup>3</sup> ). All work to be done by rubber tired equipment	L.S.			2,000
<b>Sub Total Line 6 Branch:</b>					<b>2,000</b>

<b>Reid Branch (Phase 2)</b>					
37	Type XII work which is brushing of 75m of channel with all equipment moved by rubber tired equipment	L.S.			2,000
<b>Sub Total Reid Branch:</b>					<b>2,000</b>

<b>Miscellaneous Work</b>					
38 (Phase 1 or 2)	Type XIII work to widen and raise Small Scheme Dyke from Line 6 ROW to Peterman Pumping Station including brush removal, hauling in and placing 4500m <sup>3</sup> of clay and providing for organic surfacing and grading	L.S.			N/C
39 (Phase 1 or 2)	Placing of temporary culverts (10m of 900mm HDPE) at two locations adjacent to Small Scheme Dyke	ea	2	3,000.00	6,000
40 (Phase 1 or 2)	Placing of temporary culverts (10m of 3000mm dia. CSP) at two locations for haul routes (one in Interval 1 South Morris Road Branch and the other at Edward Street in the North Morris Road Branch)	ea	2	5,000.00	10,000
41 (Phase 1 or 2)	Brushing and grading of unopened Line 6 to create an optional haul route including restoration at end of project	L.S.			3,000
42 (Phase 1 & 3)	Construction of embankment for ultimate tie-in of Morris Road to SEAR. Embankment initially to be constructed of clay material only except for granular at culvert. Embankment to have 9m surface width, 2:1 side slopes. 30m of 900mm dia. HDPE culvert to be constructed in embankment with granular bedding and backfill. Shot rock on 5m <sup>2</sup> of area to be placed at each end of new culvert. Culvert to be initially blocked off and then is to be opened up. Final granulars and asphalt are to be paid as part of Morris Road restoration in Phase 3 work	L.S.			15,000
43 (Phase 1 or 2)	Hauling in of imported topsoil to an approved stockpile site	m <sup>3</sup>	2000	10.00	20,000
<b>Sub Total Miscellaneous Work:</b>					<b>54,000</b>

<b>Pumping Station (Phase 1)</b>					
44	Removal and disposal of existing pumping station and replacement with new structure consisting of :  a) - Steel sheet pile wall foundation b) - Concrete well floor c) - Concrete building floor d) - Wood frame, steel siding building with engineering roof trusses, roof hatch and door. e) - One packaged auto start diesel, 1750 gpm (min.) pump and pulsar control panel or equal	L.S.			175,000

f)	- Steel trash rack and access grill				
g)	- Discharge piping				
h)	- Salvage and replacement of existing pump and diesel inside new building				
i)	- Restoration and grading				
<b>Sub Total Pumping Station:</b>					<b>175,000</b>

<b>Contingencies</b>					
45	Lump sum contingency allowance				70,000
46	Contingency to haul stockpiled organic materials from Bak/Balon farm site to rented farmland beside Diversion if necessary. This rate could also be used to haul from rented land and from windrow in Type I work to final location including levelling or to haul organics to or from a screening site.	m <sup>3</sup>	10,000	5.00	50,000
47	Contingency to haul organics off site	m <sup>3</sup>	1,000	10.00	10,000
48	Contingency to extend private drains (up to 300mm in dia.) with equal sized pipe including connections, bedding, backfill and restoration	ea	5	500.00	2,500
49	Contingency to clean out Morris Road North Branch and haul to Bak farm site while haul route is in place (Type VIII work)	m <sup>3</sup>	500	7.00	3,500
50	Contingency to supply and place further shot rock riprap on geotextile	m <sup>2</sup>	100	50.00	5,000
51	Contingency to cap existing irrigation lines	ea	5	500.00	2,500
52	Contingency to supply, place, maintain and remove silt fences	m	100	5.00	500
53	Contingency to screen topsoil	m <sup>3</sup>	100	10.00	1,000
54	Contingency for 40m of steel beam guiderail including 2 end treatments	m	40	250.00	10,000
<b>Sub Total Contingencies:</b>					<b>155,000</b>
<b>TOTAL CONSTRUCTION COST ESTIMATE:</b>					<b>1,145,500</b>

Summary:

Diversion Branch	346,000
South Morris Road Branch	324,000
Edward Street Branch	85,000
Simcoe Road Branch	2,500
Line 6 Branch	2,000
Reid Branch	2,000
Pumping Station	175,000
Miscellaneous Work	54,000
Contingencies	155,000
<b>TOTAL</b>	<b>1,145,500</b>



### C) Engineering Cost Estimate

#### Report Preparation

For work involved with design, meetings, construction and approvals to date, to gather background information, to prepare for and attend on-site meetings, to do field surveys including GPS surveys, to prepare plans, profiles, cross-sections, drawings and details, to do drain design, to conduct discussions with affected landowners and authorities, attending to alternatives, to do cost estimate, to prepare allowances table and assessment schedules, to prepare future maintenance schedules, to prepare specifications, to do report writing and typing and to prepare for and attend public meetings.

i)	Preliminary Report Preparation	\$ 250,000
ii)	Final Report Preparation	110,000
iii)	Meetings re Final Report	<u>10,000</u>

**TOTAL ENGINEERING COST ESTIMATE: \$ 370,000**

The cost for report preparation is usually not altered at the conclusion of a project unless the report is referred back or the report is appealed, both of which would involve additional costs.

### D) Other Consulting Services

-	Environmental sub consultant (Allowance for Work in Addition to Fish Relocation)	\$ 10,000
-	Geotechnical sub consultant (Allowance)	<u>10,000</u>

**TOTAL OTHER CONSULTING SERVICES: \$ 20,000**

### E) Construction Supervision and Eligible Administrative Cost Estimate

#### i) Construction Supervision

For work to prepare tender documents, to review contract award, to attend pre-construction meeting, to do construction inspection, payments, to attend to final inspection and meeting, to do final inspection, to do post construction follow-up, and to assist with preparation of or to prepare grant applications

**Total Construction Supervision (Estimate) \$ 250,000**

The estimate shown for Construction Supervision is based on past experience and assumes good construction conditions and a Contractor who completes the construction in an efficient manner. The final (actual) cost for construction supervision will vary as per the actual time spent during the construction stage.

#### ii) Eligible Administration Costs (Estimate)

Section 73 of the Drainage Act indicates that specific administration costs incurred by the municipality in carrying out the Drainage Act process are eligible as a cost of the drain. Section 73(1) lists the following eligible costs: *cost of any application, reference or appeal and the cost of temporary financing*. Section 73(2) and 73(3) indicates that costs of elected and staff personnel are not eligible.

This administration cost estimate may not be adequate to cover any legal or engineering costs incurred by or assessed to the municipality should the project be appealed beyond the Court of Revision though such costs may form part of the final drain cost.

The OMAFRA Agricultural Drainage Infrastructure Program policies (applicable where the provincial grant is made) indicates that municipal costs for photocopying and mailing required to carry out the required procedures under the Drainage Act can also be included as eligible administrative costs on a drain.

The Harmonized Sales Tax (HST) will apply to most costs on this project (allowances are excluded). However, the Municipality is eligible for a refund of a proportion of the HST paid. Therefore, the administration cost estimate in this report does include a dollar allowance equivalent to a net tax (Net HST) in the amount of 1.76%.

The eligible administration cost estimate including an allowance for HST is:

**TOTAL ELIGIBLE ADMINISTRATION COSTS (ESTIMATE):** \$ **50,000**

An allowance is also included for unforeseen administration and supervision costs.

**Allowance for Unforeseen** **96,500**

An allowance is included for rental payments to lands to temporarily store organics. This is based on 2.0 ha at \$1,750 per hectare

Total Allowance for Temporary Rent **\$ 3,500**

**TOTAL CONSTRUCTION SUPERVISION, ELIGIBLE  
ADMINISTRATIVE COST ESTIMATE, UNFORESEEN ALLOWANCE  
AND TEMPORARY RENTAL** **\$400,000**

**Estimated Cost Summary**

Allowances	\$ 348,325
Construction Cost	1,145,500
Engineering Cost	370,000
Other Consulting Services	20,000
Construction Supervision, Eligible Administrative Cost, Unforeseen Allowance	400,000
<b>TOTAL ESTIMATED COST</b>	<b>\$ 2,283,825</b>

**ASSESSMENTS**

The Drainage Act requires that the total estimated cost of any project constructed pursuant to it, to be assessed to the affected lands and roads under the categories of benefit (Section 22), outlet liability (Section 23), injuring liability (Section 23), special benefit (Section 24) and/or as special assessments (Section 26). Assessments can be separately made to built-up areas as block assessments (Section 25) if directed by Council. On this project assessments for Benefit and Block Assessment only are involved. The project is deemed to create benefit to all the Small Scheme lands and roads, by increasing the flood protection required and is deemed to provide an improved outlet to the upstream built-up area of Bradford which is to be assessed as a Block Assessment.

The assessment made for Benefit to the Small Scheme lands is based on the costs that would be incurred if the Morris Road channel were still in a rural setting and if it could be repaired and maintained without the impacts of adjacent urban development.

The Block Assessment is for the balance of the estimated costs and is to be made to the 434 hectares of upstream built-up watershed. The percentage of roads in the built up area is 16.8%.

However the percentage of the block assessment to be made to roads is 100%. This is to reflect that the built up area has occurred with limited storm water management, prevents lower cost options from being

pursued, and the project avoids the necessity of costly storm water management now that would be funded fully by the Municipality.

The estimated gross assessments against the affected lands and roads are summarized in Schedule A. Schedule A will therefore be used to assess the final cost of the drain. The final cost will vary depending on final construction and engineering costs.

A separate schedule has been prepared to illustrate the estimated net assessments to each owner after available grants and allowances are deducted. This schedule is called the Schedule of Estimated Net Costs. This schedule is not authorized by the Drainage Act and accordingly is not included in the Report but is available for review if desired. It can also be used to bill out costs at the time of Actual Cost Bylaw preparation.

It is understood that the annual levies that are collected from the Small Scheme lands may be applied in part or in full against assessments made to the Small Scheme lands.

In Schedule A, each parcel of land assessed has been identified by the assessment roll applicable in the Town at the time of the preparation of this report. The size of each parcel was established using the assessment roll information. For convenience only, each parcel is further identified by the owners name from the last revised assessment roll. In some cases there it is known that farm and residential properties have been recently acquired by the Town for the SEAR project, property owner names have been changed to reflect such. However not all properties have been updated. It is known that shortly new assessment roll mapping will be available for the SEAR road allowance and properties. Schedules A and B should be updated when such is available.

The final costs will be assessed prorata to the benefit and block assessments in this report.

Final assessments on a Drainage Act project are not levied until after the work is certified complete by the Engineer. The final assessments will thus be to the owner of the identified parcels and to the built-up area at the time the final cost is levied. Those assessed properties considered as agricultural (to date), and taxed as Farm properties, and eligible for the Farm Property Class Tax Rate (F.P.C.T.R.) and thus eligible for the provincial (OMAFRA) one third (33-1/3%) grant as per OMAFRA's ADIP policies are specifically noted. This Provincial grant may also be available to eligible properties for maintenance assessments and is discussed in the following section.

Parcels not so noted do not qualify for the provincial grant unless the status of the property changes prior to levying of assessments.

## **MAINTENANCE**

After adoption of this report, the Morris Road Drain as identified by this report (see Pages **35** to **38** following) shall be maintained by the Town of Bradford West Gwillimbury with the cost of all maintenance to be assessed to the lands prorata with the assessments in Schedule B (Schedule of Assessments for Future Maintenance).

To use Schedule B, the dollar amounts shown will be used to establish the percentage that each owner will bear for maintenance costs. (Schedule B also shows the percentages.)

It is to be noted that the dollar amounts in Schedule B are not amounts to be paid. They are only shown in order to establish the percentages that owners would pay of whatever maintenance costs are incurred in the future.

The components of the drain should be maintained at a minimum of a three year frequency.

The owners listed in Schedule B are the same owners listed in Schedule A.

## GRANTS

In accordance with the provisions of Section 85 of the Drainage Act and OMAFRA's ADIP policies, a grant not exceeding 1/3 (33-1/3%) may be available on the assessments against privately owned parcels of land which are used for agricultural purposes and are eligible for the Farm Property Class Tax Rate (F.P.C.T.R.) and/or if the property is eligible for the Farm Property Class Tax Rate (F.P.C.T.R.) in combination with the Managed Forest Tax Incentive Program or the Conservation Land Tax Incentive Program. Section 88 of the Drainage Act directs the Town to make application for this possible grant upon certification of completion of the drain provided for in this report. The Town will then deduct the grant from the assessments prior to collecting the final assessments.

If an assessed owner not shown as having the Farm Property Class Tax Rate feels that their property should be eligible for the grant, and they can provide proof to the Municipality of this eligibility as noted prior to the final cost levy then the property could have the one-third (33-1/3%) grant deducted from the final cost levy. Please be advised that OMAFRA retains the final right to determine eligibility under the grant program, regardless of designation herein.

In accordance with Section 85 of the Drainage Act, a grant not exceeding one third (33-1/3%) may also be available in the future on the assessments against privately owned parcels of land used for agriculture (again as per OMAFRA's ADIP policies), for maintenance and repair of the Morris Road Drain, if done on the recommendation and supervision of an approved Drainage Superintendent and using the same eligibility requirements as outlined above.

## WHAT CONSTITUTES THE DRAINAGE SCHEME FOR FUTURE MAINTENANCE?

The following is a description of the drainage scheme for future maintenance purposes:

### **a) South Morris Road Drain**

#### ***i) Interval.1 (North.Canal.to Lakatos Buildings - Sta..0+070 to.0+415)***

- 345m of channel
- 90m of deep pool area
- 100m of littoral shelves
- 2 root boles
- 2 gravel substrate areas
- Dyke with 7m± width on north and east sides to elevation 220.00±.
- Clearing as necessary
- Work to be done from south and west sides
- Excavated materials to be either levelled on south side (Sta. 070 to 330) if space allows or to be hauled away

#### ***ii) Interval.2 (Sta..0+415.to.0+712)***

- 285m of channel
- 20m of 3000mm dia. pipe culvert
- 20m<sup>2</sup> of shot rock riprap at 3000mm culvert
- Embankment over culvert
- Clearing as necessary
- Morris Road embankment/dyke with asphalt to 5m width and to elevation of 220.50± on east side.
- Work to be from Morris Road side

- Excavated materials to be hauled away
- Asphalt and gravel road surfaces to be maintained directly by Town

**iii) Interval 3 (Sta..0+712.to.1+458)**

- 746m of channel
- Banks as stabilized on each side
- 3 storm drain outlets including concrete headwalls
- Private drain outlets where reconstructed by this Report.
- Clearing as necessary
- Morris Road embankment/dyke with asphalt to 5m width and to elevation of 220.5± on east side.
- Work to be done from Morris Road side
- Excavated materials to be hauled away
- Asphalt and gravel road surfaces to be maintained directly by Town

**b) Centre Morris.Road.Drain (Sta..1+458 to.1+665)**

- 200m± of channel until Diversion and sediment deposition channel is built.
- 92m± of channel after Diversion and sediment deposition channel is built.
- Tie-in embankment to 9m top width and to elevation of 220.45 and with 6m± of asphalt.
- 30m of 900mm HDPE culvert below tie in embankment
- 5m wide maintenance berm on east side to elevation of 220.3.
- Clearing as necessary
- Excavated materials to be hauled away
- Asphalt and gravel road surfaces to be maintained directly by Town

**c) North Morris.Road.Drain (Sta..1+665.to.1+862)**

- 197m of channel
- Clearing as necessary
- Former Morris Road dyke/embankment on east side and to elevation of 220.3±
- Work to be from east side
- Excavated materials to be hauled away
- Any remaining asphalt and gravel road surfaces to be maintained directly by Town

**d) Diversion.Branch**

**i) Interval.1 (Where.Adjacent.to.Existing.Fields - Sta. -020 to 630±)**

- 638m of channel
- 638m of 5m wide dyke on each side to elevation 220.3 and to a grassed condition.
- 640m of shallow ditch on east side of east dyke
- 565m of shallow ditch on west side of west dyke
- 11 Irrigation lines including ditch culverts and lanes into Diversion channel
- 4 Irrigation lines including ditch culverts and lanes crossing existing Small Scheme dyke into HMDSCIP Interval 8.
- Maintenance to be done from berms/dykes
- Maintenance of channel could also be undertaken by barge equipment

**ii) Interval.2 (On.Former.Bak.and.Balon.Farm.Site and.across.SEAR – Sta. 630± to 875)**

- 97m of channel to the bottom elevation change at the sediment deposition channel
- 45m of deep pool
- 45m of littoral shelf

- 375m of 5m wide maintenance dykes on north and south sides to elevation 219.5
- 575m of 5m wide perimeter dykes to elevation 220.3 and to be in grassed condition
- 380m± of sediment deposition channel to bottom elevation 216.10.
- 2,300m<sup>2</sup>± of maintenance island to elevation 219.5 and to be in a grassed condition with 150m<sup>2</sup> of riprap on west slope
- 37m of 12m x 3m precast concrete culvert
- 500m<sup>2</sup> of shot rock riprap on banks upstream and downstream of 12 x 3m culvert
- 2 shot rock embankments (5m top width at elev. 217.1) to assist in maintenance access
- Maintenance to be done from berms/dykes
- Maintenance of channel could also be undertaken by barge equipment
- 4 root boles on shelf
- 2 gravel substrates on shelf

**e) Pumping Station**

- 260m<sup>2</sup> of sheet pile foundation
- Walers and beams as necessary
- 6m<sup>2</sup> of trash rack
- 14m<sup>2</sup> of walkway/access to trash rack
- 1750 gpm (min.) pump with 115 hp @ 2200 rpm auto start diesel power and control panel
- 18m of 200/250mm discharge pipe
- 4.5m± x 4.5m± wood frame building with steel siding, 0.9m door, engineered truss roof with steel roof and one access hatch
- Access for maintenance to be by west side maintenance berm of Diversion Branch.
- Salvaging and resetting existing diesel engine and pump as backup in new building together with new 18m of 300/375mm discharge pipe.

**f) Edward Street Branch**

- 232m of channel
- 600m<sup>2</sup> of riprap in channel
- 12 x 3m footbridge including pile foundation and concrete abutments with 24m<sup>2</sup> of erosion protection
- Concrete outlet structure at top end
- Clearing as necessary
- Work to be done from south side
- Excavated materials to be hauled away
- Asphalt and gravel road surfaces to be maintained directly by Town

**g) Simcoe Road Branch**

- 99m of channel formerly Morris Road Branch channel
- 360m of new two-stage channel (constructed by SEAR)
- 5m wide maintenance berm on north and west sides
- Work to be done from maintenance berm
- Excavated materials to be hauled away

**h) Line 6 Branch**

- 535m of channel (north side road ditch)
- 23m of twin 3000 x 1200mm concrete culverts across Walker Avenue
- 13m of twin 1600mm corrugated steel pipe culverts across Parkwood
- 15m<sup>2</sup>± riprap at each end of each culvert

- Work to be done from Line 6
- Clearing as necessary
- Excavated materials to be hauled away
- Asphalt and gravel road surfaces to be maintained directly by Town
- Municipality to ensure provision for overflow waters for runoff from up to 100 year storm exists along north side of Line 6 and across Parkwood and Walker Avenues below opening elevations of any affected buildings.

**i) Reid Branch A**

- 535m of open channel
- Clearing as necessary
- 19m of twin 1050mm culvert across Line 6 and 20m of 1.83 x 1.1m arch and 1.27 x 0.76m arch culvert across Simcoe Road
- Work to be done from Town lands
- Materials to be hauled away
- Municipality to ensure provision for overflow waters for runoff from up to 100 year storm exists along channel below opening elevations of affected buildings.

**j) Reid Branch B**

- 114m of open channel
- Clearing as necessary
- 20m of 1.5 x 0.9m arch culvert and 20m of 1.27 x 0.82m arch culvert across Simcoe Road
- Work to be done from Town lands
- Materials to be hauled away
- Municipality to ensure provision for overflow waters for runoff from up to 100 year storm exists along channel below opening elevations of affected buildings.

**BYLAW**

This report, including schedules, appendices, specifications and drawings, when adopted in bylaw form in accordance with the Drainage Act, RSO 1990 will provide the basis for construction and maintenance of the Morris Road Drain.

All of which is respectfully submitted.

~~K. SMART ASSOCIATES LIMITED~~

K. A. Smart, P. Eng.

mw



SCHEDULE A - SCHEDULE OF ASSESSMENTS  
MORRIS ROAD DRAIN  
TOWN OF BRADFORD WEST GWILLIMBURY

FTC	Con	Lot	Roll No.	Owner	Approx ha Affected	Benefit	Outlet	Total
			(4312)	<u>Township of BWG</u>				
			010-005-07700	C. Yesanko	0.065		98	98
			010-005-07800	1920557 Ontario Ltd.	0.09		135	135
			010-005-07900	N. Tupling	0.20		301	301
	6	16	010-005-15000	P. Stasinaki & C. Batingal	1.41		2,121	2,121
*	6	16	010-005-15100	S. & H. Rak	1.42		2,136	2,136
*	6	16	010-005-15200	J. & A. Caivano	1.42		2,136	2,136
*	6	16	010-005-15300	B. Bokor	1.41		2,121	2,121
	6	16	010-005-15400	M. & M. Bednarz	1.44		2,166	2,166
*	6	16	010-005-15500	D. Renaud	2.89		4,348	4,348
*	6	16	010-005-15700	J. Lowry & E. Bortignon	1.42		2,136	2,136
	6	16	010-005-15800	R. & A. Irlini	0.40		602	602
**	6	16	010-005-15900	F. Sarvi	2.93		4,408	4,408
*	6	16	010-005-16000	M. Murillo	2.95		4,438	4,438
	6	16	010-005-16010	L. & J. Stellato	0.23		346	346
*	6	16	010-005-16200	S. & T. Wadsworth	2.87		4,318	4,318
*	6	16	010-005-16400	A. Fox & B. Scott	1.56		2,347	2,347
*	6	16	010-005-16500	T. Ye	2.96		4,453	4,453
	6	16	010-005-16600	A. Al-Khatib & S. Jassim	2.61		3,927	3,927
*	6	16	010-005-16700	S. Kamali & S. Sabet	5.03		7,568	7,568
*	6	16	010-005-16800	M. Raposa	2.80		4,213	4,213
	6	16	010-005-16900	Town of BWG	2.48		3,731	3,731
	6	16	010-005-17000	Town of BWG	1.11		1,670	1,670
	6	16	010-005-17100	Town of BWG	1.26		1,896	1,896
*	6	16	010-005-17200	C. Yesanko	2.44		3,671	3,671
	6	16	010-005-17300	C. Yesanko	0.25		376	376
	6	17	010-005-17400	1514157 Ontario Inc.	0.06		90	90
	6	17	010-005-17401	1400084 Ontario Ltd.	0.54		812	812
	6	17	010-005-17500	Wendy's Restaurants of Canada	0.41		617	617
	6	17	010-005-17600	Philips Construction Inc.	0.93		1,399	1,399
	6	17	010-005-17700	C. Bak	0.05		75	75
	6	17	010-005-17800	C. Bak	0.05		75	75
*	6	17	010-005-17900	C. Bak	0.05		75	75
*	6	17	010-005-18000	Walter Bak Farms Ltd.	4.11		6,183	6,183
	6	17	010-005-18001	C. Bak	0.11		165	165
*	6	17	010-005-18100	Walter Bak Farms Ltd.	2.86		4,333	4,333
	6	17	010-005-18200	Kavama Canada Inc.	5.82		8,756	8,756
*	6	17	010-005-18301	Walter Bak Farms Ltd.	3.98		5,988	5,988
*	6	17	010-005-18400	A. & L. Marques	4.27		6,424	6,424
*	6	17	010-005-18500	1010698 Ontario Ltd.	2.02		3,039	3,039
*	6	17	010-005-18600	A. & M. Caletta	2.62		3,942	3,942
	6	18	010-005-18700	658026 Ontario Ltd.	0.16		271	271
*			010-005-18800	658026 Ontario Ltd.	1.90		2,859	2,859
*			010-005-18900	F. & L. Marques	2.08		3,129	3,129
*			010-005-19000	A. Caletta	5.44		8,184	8,184
			010-005-19001	A. & D. Gulseppa	0.19		286	286
			010-005-19200	D. Wickson	0.12		181	181
			010-005-19301	Town of BWG	0.25		376	376
			010-005-19400	L. Gaudet	0.81		1,219	1,219
			020-005-12401	J. Lakatos	3.78		5,657	5,657
			Block Assessment	Town of BWG	434.00		2,148,825	2,148,825
<b>Total Assessments on Lands:</b>					<b>520.28</b>	<b>0</b>	<b>2,278,622</b>	<b>2,278,622</b>
			Morris Road	Town of BWG	0.05		77	77
			Peterman Street	Town of BWG	1.30		1,959	1,959
			Center Street	Town of BWG	0.30		453	453
			Back Street	Town of BWG	0.40		604	604
			Anne Street	Town of BWG	0.70		1,055	1,055
			5-6 Concession Rd.	Town of BWG	0.70		1,055	1,055
<b>Total Assessments on Roads:</b>					<b>3.45</b>	<b>0</b>	<b>5,203</b>	<b>5,203</b>
<b>TOTAL ON MORRIS ROAD DRAIN</b>					<b>523.73</b>	<b>0</b>	<b>2,283,825</b>	<b>2,283,825</b>

Notes:

- All of the above lands as noted with an asterisk (\*) are classified as agricultural and have the Farm Property Class Tax Rate (F.P.C.T.R.).
- Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected. The affected parcels of land have been identified using the roll number from the last revised assessment roll for the Town. For convenience only, the owners' names as shown by the last revised assessment roll, has also been included.

**SCHEDULE B - SCHEDULE OF ASSESSMENTS FOR FUTURE MAINTENANCE  
MORRIS ROAD DRAIN  
TOWNSHIP OF BRADFORD WEST GWILLIMBURY**

Con	Lot	Roll No. (010-010)	Owner	Total Cost	%
<b>Township of BWG</b>					
0	0	010-005-07700	C. Yesanko	98	0.004
0	0	010-005-07800	1920557 Ontairo Ltd.	135	0.006
0	0	010-005-07900	N. Tupling	301	0.013
6	16	010-005-15000	P. Stasinaki & C. Balingal	2,121	0.093
6	16	010-005-15100	S. & H. Rak	2,136	0.094
6	16	010-005-15200	J. & A. Caivano	2,136	0.094
6	16	010-005-15300	B. Bokor	2,121	0.093
6	16	010-005-15400	M. & M. Bednarz	2,166	0.095
6	16	010-005-15500	D. Renaud	4,348	0.190
6	16	010-005-15700	J. Lowry & E. Bortignon	2,136	0.094
6	16	010-005-15800	R. & A. Irini	602	0.026
6	16	010-005-15900	F. Sarvi	4,408	0.193
6	16	010-005-16000	M. Murillo	4,438	0.194
6	16	010-005-16010	L. & J. Stellato	346	0.015
6	16	010-005-16200	S. & T. Wadsworth	4,318	0.189
6	16	010-005-16400	A. Fox & B. Scott	2,347	0.103
6	16	010-005-16500	T. Ye	4,453	0.195
6	16	010-005-16600	A. Al-Khalib & S. Jassim	3,927	0.172
6	16	010-005-16700	S. Kamali & S. Sabat	7,568	0.331
6	16	010-005-16800	M. Raposa	4,213	0.184
6	16	010-005-16900	Town of BWG	3,731	0.163
6	16	010-005-17000	Town of BWG	1,670	0.073
6	16	010-005-17100	Town of BWG	1,896	0.083
6	16	010-005-17200	C. Yesanko	3,671	0.161
6	16	010-005-17300	C. Yesanko	376	0.016
6	17	010-005-17400	1514157 Ontario Inc.	90	0.004
6	17	010-005-17401	1400084 Ontario Ltd.	812	0.036
6	17	010-005-17500	Wendy's Restaurants of Canada	617	0.027
6	17	010-005-17600	Philips Construction Inc.	1,399	0.061
6	17	010-005-17700	C. Bak	75	0.003
6	17	010-005-17800	C. Bak	75	0.003
6	17	010-005-17900	C. Bak	75	0.003
6	17	010-005-18000	Walter Bak Farms Ltd.	6,183	0.271
6	17	010-005-18001	C. Bak	165	0.007
6	17	010-005-18100	Walter Bak Farms Ltd.	4,333	0.190
6	17	010-005-18200	Kavama Canada Inc.	8,756	0.383
6	17	010-005-18301	Walter Bak Farms Ltd.	5,988	0.262
6	17	010-005-18400	A. & L. Marques	6,424	0.281
6	17	010-005-18500	1010688 Ontario Ltd.	3,039	0.133
6	17	010-005-18600	A. & M. Caietta	3,942	0.173
6	18	010-005-18700	658026 Ontario Ltd.	271	0.012
0	0	010-005-18800	658026 Ontario Ltd.	2,859	0.125
0	0	010-005-18900	F. & L. Marques	3,129	0.137
0	0	010-005-19000	A. Caietta	8,184	0.358
0	0	010-005-19001	A. & D. Guiseppa	286	0.013
0	0	010-005-19200	D. Wickson	181	0.008
0	0	010-005-19301	Town of BWG	376	0.016
0	0	010-005-19400	L. Gaudet	1,219	0.053
0	0	020-005-12401	J. Lakatos	5,657	0.248
0	0	Block Assessment	Town of BWG	2,148,825	94.092
<b>Total Assessments on Lands:</b>				<b>2,278,622</b>	<b>99.773</b>
		Morris Road	Town of BWG	77	0.003
		Peterman Street	Town of BWG	1,959	0.086
		Center Street	Town of BWG	453	0.020
		Back Street	Town of BWG	604	0.026
		Anne Street	Town of BWG	1,055	0.046
		5-6 Concession Rd.	Town of BWG	1,055	0.046
<b>Total Assessments on Roads:</b>				<b>5,203</b>	<b>0.227</b>
<b>TOTAL ON MORRIS ROAD DRAIN</b>				<b>2,283,825</b>	<b>100.000</b>

**Notes:**

- All of the above lands as noted with an asterisk ( \* ) are classified as agricultural and have the Farm Property Class Tax Rate (F.P.C.T.R.).
- Section 21 of the Drainage Act, RSO 1990 requires that assessments be shown opposite each parcel of land and road affected. The affected parcels of land have been identified using the roll number from the last revised assessment roll for the Town. For convenience only, the owners' names as shown by the last revised assessment roll, has also been included.

# DIVISION 3

# DIVISION #3

## SPECIAL PROVISIONS

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## MORRIS ROAD DRAIN

### DIVISION #3 - SPECIAL PROVISIONS

#### 1.0 CONTENTS

##### .1 General

- These Special Provisions consist of:

General Special Provisions (Sections 1 to 35)  
Contract Item Special Provisions (Sections 36 to 61)  
Contingency/Provisional Special Provisions  
Environmental Plan Guidelines (Section **58.0**)  
Best Management Practices (Section **59.0**)  
Contractor Indoctrination re Workplace Safety (Section **60.0**).

- The General Special Provisions are arranged alphabetically and the Contract Item and Contingency Special Provisions will be arranged in order of the Contract Items at the time of tendering.
- These Special Provisions apply to the full project

##### .2 Definitions

- See Instructions to Tenderers Section 1, Supplemental General Conditions Section 1 and General Condition GC1.04 for definitions.
- The duties and authority of the Contract Administrator, Project Manager and Engineer are repeated herein in Special Provision **7.0**.

##### .3 Form of Tender Items

###### a) Contract Items (Tender Items)

The contract items in the Schedule of Tender Prices are intended to cover and include the supplying of all labour, plant and materials (except as noted in the Instructions to Tenderers and Special Provisions) necessary for the completion of the various works called for in this contract and the prices set out in the Schedule of Tender Prices for the said items shall be full compensation for the labour, plant, material and equipment supplied to do all the work covered by the said items.

The quantities shown for each contract item, where applicable, were derived from Drawings 1 to 68 which show and/or list the quantities per Interval of work.

###### b) Contingency/ Provisional Items

Nine (9) provisional/Contingency Items have been identified in this Contract plus one lump sum Contingency Item. Payment would only be made under these items if the work is required, authorized and applicable. However where the work is directed to be done, these prices for payment will apply. Two specific provisional/Contingency Items are discussed by Special Provisions **55.0** and **56.0** that follow. To allow Contingency /provisional unit prices to be tendered, provisional quantities are established herein. These quantities are hypothetical and are not intended to imply the extent of Contingency work that may or may not be necessary. Any part of the lump sum contingency item that is carried in the tender is only to be used when authorized by the Engineer. Approved change orders are examples of where monies in the lump sum contingency item may be applied.

c) General Items

The list of work on this Contract that should be provided for under the General Item include the following:

Attendance at meetings	Site office
Construction yards/Staging Areas	Test digs
Coordinating & cooperating with others	Traffic control
Environmental plans, measures, compliance	Utility work
Fencing (except where contingency work)	Weather related provisions
Layout	Working area and access
Road maintenance	Soils investigation
Moving junk, etc.	Safety and labour certificates
Restoration (except for granular costs)	
Providing and maintaining sanitary facilities for workers	
Providing and maintaining on-site garbage containers	
Collecting and disposing of debris from the site	

The tendered amount for General Items will be payment in full for all of the above items and for any other items that may be encountered of a general nature.

The Contractor shall make his own determination of all other items that should be considered as General Items.

Payment for General Items will be made on each payment certificate and prorata to the amount of the payment as compared to the total tender.

d) Mobilization/Demobilization Items

This item is to apply for the moving in and the moving out of all plant and equipment including necessary moves during construction.

This item will be paid as follows:

60% at first payment certificate

30% at mid point of project (as determined by the Engineer)

10% at time of certificate for substantial completion

e) Project Signs

The Board will, at no cost to the project, fabricate and install project signs if deemed required. Contractor will be liable for costs to move and/or remove signs as directed by the Project Manager.

f) Surety, Insurance

In this item, the Contractor is to provide for his costs to supply and maintain the necessary bonds, letters of credit, certified cheques and insurance that are used as surety and insurance throughout this contract including the maintenance period.

Payment for this item will be made as follows:

60% at first payment certificate

30% at mid point of construction (as determined by the Engineer)

10% at time of certificate of substantial completion

## 2.0 COMMENCEMENT AND COMPLETION

### .1 Progress of the Work and Time for Completion

- The Contractor shall begin work within one week of written instructions to do so and shall diligently prosecute his work on this Contract to completion before \_\_\_\_\_, **20**\_\_\_\_, which is deemed to be the Date of Completion and which is the same as the Contract Time (See Section GC1.04 Definitions).
- Work can not continue with respect to any activities that would impact waters due to the Fisheries requirement of no in-water work between April 1 and May 30 each year unless

specifically permitted by DFO, or work that would involve tree habitat between May 9 and July 31 unless permitted by the Contract Administrator.

- The Contractor may work with additional crews or augmented crews during working hours as may be required, as complying with the considerations of Special Provision **3.0** re Schedules and as approved by the Contract Administrator, to insure that the work will be completed within the time limit specified, and no additional compensation will be allowed therefore.
- It is essential that completion of the work including restoration as required herein, and clean up, be carried out as quickly as possible in order to minimize the inconvenience to all affected properties.

## .2 Liquidated Damages

- The parties to the Contract hereto agree that the Contractor will pay to the Board the sum of \$1,000.00 per day LIQUIDATED DAMAGES in accordance with GC8.02.09 Liquidated Damages for each and every calendar day's delay in finishing the work by the Contract Time but subject to General Condition GC3.06 Extension of Contract Time.

## **3.0 CONSTRUCTION SCHEDULING**

- At the time of the pre-construction meeting, the Contractor must submit his Progress Schedule to show how work will be completed by the Contract Time and how it will implement the considerations listed below. The following considerations are to be reflected in his schedule.
  - a) In water canal work can not occur from April 1 to June 30 unless directed otherwise by the Project Manager or Engineer. For the HMDSCIP permission was given to do in-water canal work provided in migration of fish was prevented by nettings as soon as ice thaw allowed such. This permission will be sought for this project but no guaranteed approval will be received.
  - b) All work is to be done by \_\_\_\_\_, 20\_\_\_\_\_.

## **4.0 CONSTRUCTION YARD/STAGING/STOCKPILE AREAS**

- This contract document is prepared on the basis that the Contractor will be able to use the former Bak farm site, the former Balon farm site, unopened Line 6 and the area south of Interval 1 of the South Morris Road Branch for staging areas. The prime, recommended and largest area is the Bak/Balon farm sites. The ability to easily control off site drainage is available at the Bak/Balon site. The Bak/Balon Farm stiles are also the recommended site for material stockpiling. Allowances to the Town for use of these lands as staging areas have been included.
- It is possible that one or more staging areas will be necessary at any or all times on this project.
- The work necessary in the development of any staging area is to supply and place clay as necessary for a working area base, to keep the area in a graded, drained and sediment controlled condition during construction, and then to clean up and restore upon completion of construction.
- The staging areas may be used for stockpiling of imported or excavated materials, storage of equipment and materials, and as a fueling location.
- Daily construction access to any and all staging areas is to be determined by the Contractor. However only rubber tired equipment is to be taken along existing Town roads, except that track equipment may travel along Zima Parkway south of recent road construction, Edward Street and Morris Road.
- The hauling in of imported clays and topsoils to the stockpiling area is recommended to be from the intersection of Holland / Bridge Streets/Dissette Street down the east portion of the lands

acquired. Allowances to the Town for use of this access have been included. See also Special Provision **28.0** for hauling in of imported materials.

- Other hauling routes for imported materials can only be used if designated by or approved by the Project Administrator. Hauling in of clays and topsoil can not occur on Holland Street west of Dissette and east of Ten Sideroad, or on the side streets of Ann, Centre, Back, Line 6 and Walker Avenue.
- The Contractor may also undertake private negotiations with any other landowner for a construction yard/staging areas.
- Any agreements or understandings for such will be between the Contractor and the landowner.
- The Engineer's responsibility will be only to ensure that environmental and traffic concerns are recognized in any construction yard.
- For any yard used, the Contractor is to ensure that such is maintained and restored to original condition existing at time of tendering or to the condition negotiated between Owner and Contract Administrator upon completion of activities.
- Sanitary and garbage matters are to be provided and attended to on each site.
- The construction yard shall be signed, shall be a minimum of 15m from any watercourse (unless otherwise approved), and shall be constructed so as to maintain drainage. (The Board will attend to any signing.)
- Agricultural activities cannot be impeded by the development and the use of the construction yards/staging areas.
- The Contractor is to provide a trailer (site office) and sufficient parking area and space on the yard for use by the Engineer and Project Manager. Alternatives to an on-site site office will be considered.
- Specifications included in Special Provision **22.0** apply to the services to be provided in the trailer, if provided, for the Engineer and Project Manager.
- The Contractor is to construct, where required, a suitable access (6m minimum width) to each site and with compacted subgrade, 250mm of compacted Granular B and 150mm of compacted Granular A or such other materials (e.g. pulverized asphalt) as approved by the Engineer. Culverts deemed in good condition shall be constructed below the access with a size as provided by the Engineer wherever the access crosses drainage paths. The location of the access is also to be approved by the Engineer. Any granular or culvert work for an access will be paid as additional work.
- There will be no separate measurement for payment for construction yards/staging areas. The lump sum bid for general work areas will be full payment for all staging areas regardless of the number used and is to include all grading, supply, material placement, earth access, drainage, removals of surface materials and restoration of site upon completion. Granular and culverts will be paid as additional work subject to pre-approval.

## 5.0 COORDINATION / COOPERATION WITH OTHERS REQUIRED

### .1 *For Department of Fisheries and Oceans (Fisheries and Oceans Canada) (DFO)*

- The Contractor is advised that he is to co-operate with and allow review of site by DFO staff.
- There will be no separate payment for coordinating work with, and co-operating with, the work of others in this or in the following sections.

.2 For Fish Salvage

- There is one area of the Morris Road channel where bank stabilization is required and the work will be required to be done in the dry.
- As part of the work to prepare the channel for work in the dry, fish salvage will be necessary.
- Fish salvage is a requirement of Fisheries and Oceans Canada in order to collect as many fish as possible. The work area will be isolated with cofferdams and/or marine silt curtains. The Engineer's sub-consultant (RiverStone Environmental) staff will use electro fishing equipment to collect all species and sizes of fish in the drain. Because of the drain substrates, walking for fish removal is not possible, and because of the narrowness and shallowness of the existing channel, an electro fishing boat method is not possible. For this reason, a backpack shocker will be used. A negative lift snorkel boom is to be used to lower the crew to the water surface for shocking. Several passes will be made with the electroshocker to ensure fish are collected.
- All fish that are removed will be identified and counted before being relocated outside the work area. It is expected that the fish community will be similar to that encountered in the Holland Marsh canals, which includes Northern Pike, Largemouth Bass, Yellow Perch and Bowfin, among others. All data will be reported to the DFO, with follow up monitoring to be conducted after construction.
- The Contractor will be required to provide scheduling as to when RiverStone Environmental should be on site to undertake the fish salvage and he is to co-operate with their work when it is occurring.
- The Contractor may be asked to arrange for the rental, delivery, operation and return of the negative lift snorkel boom. Additional payment will be made to the Contractor for the involvement with the rental based on invoices and negotiated payment.

.3 For GPS Surveys by Engineer

- The Contractor is to ensure that the Engineer's staff is notified of all earth cofferdams that are constructed, and the Contractor is to co-operate to allow the Engineer's staff to GPS all such cofferdams. (GPS – Global Positioning System)
- Also the Engineer will be required to GPS all irrigation, drain and well lines and the Contractor is to ensure that the Engineer is advised of, and given the opportunity, to do such prior to backfill and that the Engineer has access to the site to do such.

.4 For Ontario Land Surveyor, Environmental Sub-Consultants, Building Condition Inspectors, Irrigation Specialists

- The Contractor is to be aware that an Ontario Land Surveyor may be on the site from time to time to survey, reference and/or replace survey bars that are known and that will be damaged/removed by the work.
- The Contractor is required to allow the Ontario Land Surveyor to attend to his required work with reasonable un-interruption.
- Special Provision **24.0** herein relates to the issue of survey bars if encountered and not already referenced.
- Similarly the Contractor is to co-ordinate and co-operate with the Environmental Sub-Consultant who will be on site from time to time to take soils, sediment and water samples and to attend to other surveys as required for environmental purposes.
- This coordination and operation also applies to those who could be retained to inspect nearby buildings and those who could be retained to assist in preservation of irrigation work.

.5 For Temporary Irrigation

- Temporary irrigation by others may be required wherever ditch or canal excavation occurs adjacent to irrigation lines and the irrigation inlets are being, or may be, used during the period of canal construction.
- The work of this Contractor will be to cooperate with, and to coordinate his work with, the work of others who may be on site providing this temporary irrigation.

.6 For Utility Work

- The Contractor will be required to coordinate his work with, and cooperate with, the work of others as necessary and as involved with utility work, as described by Special Provision **30.0** herein.

**.7 For Work to be Done by Board**

- The Contractor will be required to coordinate his work with, and cooperate with, the work of others retained by the Board to attend to such work as irrigation, drain and well work, sheet piling work, seeding work and utility work, if indeed the Board does such work.

**6.0 DESIGNATED DUMP/DISPOSAL/STOCKPILE SITES**

**.1 For Excavated Non Earth Materials**

- There are no designated dump sites and the Contractor is to locate his own disposal site for non-earth materials.

**.2 For Surplus Earth Excavated Materials**

- Organic soils where excavated are to be made available to the landowner.
- Organic soils not accepted by landowner and non-organic soils are to be used in berm/embankment construction on the Diversion Branch.

**.3 For Imported Earth Fill**

- The Bak/Balon site is the preferred site, offers the fewest negative impacts and is recommended by this Report. Any of the other listed stockpile sites/staging areas may be used where necessary for limited temporary stockpiling of imported earth materials.
- Special Provisions **4.0** and **28.0** relates to preparation of earth stockpile sites.
- Payment for work to prepare disposal/stockpile sites is to be included as part of the General Work Item.

**7.0 DUTIES AND AUTHORITY OF CONTRACT ADMINISTRATOR, PROJECT MANAGER AND ENGINEER**

- For purposes of this Contract, the Contract Administrator, the Project Manager and the Engineer, will be defined in the Instructions to Tenderers section (still to be completed). Each may have assistants or inspectors or survey staff to assist them.
- In these Special Provisions, the words "Contract Administrator" or "Engineer" and/or "Project Manager" are used randomly, but not incorrectly, due to the incorporation of previously prepared specification/provisions that have referred to one or the other. However, the Contractor shall consider that either the Project Manager or the Engineer may fulfill any of the duties, responsibilities referred to the Contract Administrator.
- Should the Contractor disagree with the instructions, orders, decisions, advice from either the Project Manager or the Engineer, he may request that the two discuss and confirm the instructions, orders, decisions or advice.
- On this project, both the Project Manager and Engineer will be on site at irregular times during construction.

**8.0 EMERGENCY WORK DUE TO FLOODING**

**.1 Due to High Flows/Flooding**

- If high rainfall events are forecast by Environment Canada, the Contractor will be required, if directed by the Engineer, to implement the provisions of the Emergency Work Guidelines which is attached hereto as Special Provision 58.5.
- Separate payment will be made for implementing emergency provisions due to or to avoid flooding.
- All reasonable hours and rates will be paid as change work items (time and materials).
- Payment will not be made for stand-by charges during the event.

**.2 Due to Accidents**

- The Guidelines for Accidents and Malfunctions in Special Provision **58.7** shall be considered and implemented.

- If a traffic accident should occur on a road adjacent to the work activity, all works must temporarily cease.
- The Contractor is to assist in mitigating the immediate situation, is to supply and place pylons that he has available and is to provide traffic control.
- These provisions will apply regardless of whether the accident is due to the Contractor's activities or is unrelated but in the area of the Contractor's work.
- The Contractor is to notify the Engineer and is to notify other contacts on the emergency contact list in the Spills Response and Prevention Guidelines.
- Payment for such measures will only be made when the Engineer feels such are justified and will be made using reasonable hours and rates on a time and materials basis.

## 9.0 ENVIRONMENTAL COMPLIANCE/PERMITS/AGENCIES

### .1 General

The Contractor shall comply with applicable Federal and Provincial and Municipal laws, orders and regulations concerning the control and abatement of water pollution. The Board will obtain any required permits for approvals from the Conservation Authority and from Fisheries and Oceans Canada (DFO) for the work listed herein, for the stockpile sites listed herein and for any access routes listed herein. All other required permits and approvals, if any, shall be the Contractor's responsibility.

The Contractor's construction activities shall be performed by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants and waste into streams, water sources, including but not restricted to, refuse, garbage, industrial waste, oil and other petroleum products, heavily mineralized rock and thermal pollution. Sanitary wastes shall be disposed of at the site to be selected by the Contractor.

De-watering work for earthwork operations or structure foundations shall be conducted in a manner to prevent muddy water and eroded materials from entering the streams or watercourses.

Special Provisions **10.1**, **10.2** and **10.3** following, discusses the Environmental Measures to be considered that are contained in this document in Special Provision **58.0**, and discusses other issues including noise measures, species at risk and artifact/burial grounds.

Both the Lake Simcoe Region Conservation Authority (LSRCA) and Fisheries and Oceans Canada (DFO) may require the installation and maintenance of silt measures. Both agencies may be in attendance at the pre-construction meeting. At the pre-construction meeting, the Contractor will be required to outline his sequence of operations, and his proposed environmental protection measures. Also at the time of the pre-construction meeting, the Contractor shall address his Fuelling proposals and his Spills Response and Prevention proposals.

For general environmental compliances, the Contractor shall:

- a) Confine operations to limits of the site working area shown on drawings.
- b) Provide access roads to the site working area and on the site in locations acceptable to the Contract Administrator.
- c) Make adequate protection for, and take precautions at times of, inclement weather.
- d) Maintain ditches and watercourses for surface water drainage of site and external properties during construction, and bear the responsibility for damage that may result by reason of not doing so.
- e) In general, restore the site to condition equal to or better than existing conditions.
- f) Restore lands outside of the limits of the working area but which are disturbed by the work, to their original condition in addition to complying with any related specific provisions as contained herein.

### .2 Permits to Take Water

At any locations, if the Contractor pumps more than 50,000 litres of water per day, he must ensure the area is within the limits of the General Permit to Take Water that is/will be acquired by

the Board. Should it not be, then he must apply for a "Permit to Take Water" from the Ministry of Environment. The Board shall reimburse the Contractor for the application fee if applicable.

.3 Payment

Payment to comply with environmental considerations required by legislation or statute shall be deemed to be included in the tender item for General Items and/or in the tender items requiring such environmental protection and shall include all costs associated with acquiring permits and approvals not provided by the Board.

**10.0 ENVIRONMENTAL PLANS/MEASURES**

.1 General Environmental Plans

- The Contractor is advised that Guidelines for Environmental Measures are included in this document in Special Provision **58.0**. These are to be considered in the applicable proposals of the Contractor and in all work of the Contract.
  - **58.1** Spills Prevention and Response Guideline
  - **58.2** Fueling Guideline
  - **58.3** Sediment and Erosion Control Guideline
  - **58.4** Site Specific Sampling Guideline
  - **58.5** Emergency Work Guideline
  - **58.6** All-weather Guideline
  - **58.7** Accidents/Malfunctions Guideline
- The Environmental Measures Guidelines are to be considered throughout on this project.
- Some of these may also be referred to in other sections of this Contract Document.

.2 Specific Environmental Proposals

- The following are the Specific Environmental Proposals to be discussed at the pre-construction meeting:
  - a) Fuelling Proposals
    - The Fuelling Guideline (Special Provision **58.2**) of these documents must be considered in the Contractor's Fuelling Proposals. Best Management Practices for fuelling are also available for review by the Contractor.
    - The following provisions shall apply to fuelling stations:
      - a) The area to be used for the fuelling station should provide the greatest offset reasonably possible from any body of water.
      - b) The area selected should also best allow for cleanup if a spill occurs.
      - c) The ground should be desirably relatively impervious
      - d) The area shall have convenient road access
      - e) Spill cleanup kits shall be available at the site
    - Fuelling on any dyke or road shall conform to the requirements herein for a fuelling station and shall be permitted provided the part of the road most remote from the water is used. Protection of any asphalt surface is required and any damage to such must be restored.
  - b) Spill Prevention and Response Proposals
    - The Contractor's proposals re Spills Response and Prevention shall consider the General Spill Prevention and Response Guideline contained in these documents. (Special Provision **58.1**)
    - Spill containment kits are to be on-site and are to be equal to those specified in the General Spill Response Plan.
    - The Contractor is to ensure that his bid prices include the costs to attend to the provision of spill kits and to attend to the Spill Response and Prevention Proposals. He is to provide for such either in his General Item tender or in other unit prices bid.
  - c) Siltation Mitigation Proposals
    - The Contractor shall propose the Siltation Mitigation Measures to implement the requirements of the Environmental Compliance Special Provision **9.0** above and Special Provision **58.3**. The Proposals shall be prepared and reviewed for approval at the pre-construction meeting. The

Proposals shall describe the use (materials, timing, installation) of turbidity curtains, silt fences, dewatering, and any other berming to reduce siltation

- There will be no separate payment for the Siltation Mitigation Plan or its implementation.

**.3 Other Environmental Measures**

**a) Noise Measures**

- The equipment used by the Contractor on this project are required to have sufficient and satisfactory mufflers and other attachments that minimize noise to customary noise levels for such equipment.
- Wherever the Engineer deems that satisfactory noise attenuation devices are not implemented on the equipment, the Engineer may require the Contractor to provide such.
- The guideline will be industry standard and if any debate exists, the Engineer will retain a firm specializing in noise matters to provide the ultimate decision.
- The items in this Contract Document with respect to hours of operation and compliance with municipal noise bylaws are to be observed.

**b) Species at Risk Measures**

- The Contractor is notified that continuous monitoring of the work site will be undertaken by the Engineer and/or his environmental subconsultants with respect to identification and protection of any species at risk.
- Such species at risk may include fisheries, plants, birds and/or wildlife.
- The studies completed to date have not identified any species at risk.
- Should any species at risk be noted during the construction, the Engineer may require the Contractor to suspend his activities in the area of such species at risk until suitable mitigation has been provided.
- Where the Contractor is required to suspend his activities and where he is unable to move to an adjacent area for work immediately, stand-by payments will be made.
- If the Contractor is able to move easily to an adjacent area, no additional payments will be provided.
- If the work must be altered due to the species at risk, the Engineer will negotiate payment for such modifications on a pre-agreed amount or on a time and materials basis.

**c) First Nations Artifacts and Burial Sites and Other Archeological Concerns**

- If any artifact or burial or other archeological site is encountered, similar provisions with respect to encountering a species at risk site will be applied for the construction work.

**d) Applicable Best Management Practices**

- Best Management Practices are included in Section **59.0**.

**11.0 FENCING**

- .1 All existing fences that may be impacted are to be noted prior to work, and are to be pre-discussed with the Contract Administrator.
- .2 Short (30 metre (m) length or less) or transverse cross-fences are to be dealt with as per this item and with no payment.
- .3 The Engineer is not aware of any longitudinal or paralleling fence work in excess of 30m length to be encountered at this time.
  - If any long and unnoted parallel fence should be encountered, it will be paid pursuant to a Contingency Item. A fence would have to be greater than 30m in length to be paid as per the Contingency Item.
- .4 Existing short or transverse fences are to be moved wherever materials are suitable for salvage and reuse and where movement is required/reasonable.
  - Where materials are not suitable, new materials are to be provided and payment will be made as per a Contingency Items for supply of fence materials only.

- Where fences will be removed to allow work, the landowner is to be pre-notified so he can provide temporary fencing where necessary for access or animal control
  - Upon completion of work, fences are to be re-erected to equal or better condition
  - The Contractor may arrange for the landowner to do the work with suitable reimbursement or otherwise the Contractor is to retain a recognized and approved fencing subcontractor to do the work
  - Any new fence is to be comparable in style or type to existing unless landowner agrees to pay the Contractor directly for upgrade
  - Where any transverse fence may terminate at the edge of the work as per the Plans, the Contractor may be required to supply a new end panel with connections in accordance with OPSD 971.101 and with no additional payment.
- .5 Other encountered lengths of transverse fence work if and where greater than 30 metres in length (only the portion in excess of 30 metres would be paid) will be separately measured and paid in accordance with the Contingency Items.
- .6 A sign off letter from the affected landowner re satisfaction is to be requested. Where the landowner refuses to sign off, the Engineer will determine what, if any, further work is necessary.

## 12.0 IN-WATER WORKS

- Where in-water work is requested and/or is permitted using high float excavators or excavators operating from barges the following special provisions shall apply.
- A written proposal to do such must be pre-submitted and approved.
- Fuelling is to be undertaken in designated locations prior to entry into the water
- Biodiesel fuels are to be used
- Biodegradable hydraulic fluids are to be used
- Daily inspection of fuel and fluid lines are required and prior to entry into or onto the water
- Two types of fuel spillage kits are to be on site (35 L oil only spill kits, and sorbent booms and net pillows)
- All in-water work areas for excavation must be delineated with turbidity curtains.
- Double turbidity curtains are required at each end of a section where in-water work occurs.
- Full restoration of all access is required
- A safety and spill response training course must have been previously completed by all operators of in-water equipment
- See also the Fuelling and Spill Response and Prevention Sections of these Special Provisions.

## 13.0 LANDOWNERS/AGENCIES

Telephone numbers of landowners will be provided at the time of project start up. Telephone numbers of other contacts of interest are as follows. Each landowner shall be notified prior to work as required by the Contract Administrator.

<u>Agency</u>		<u>Phone No.</u>
HMDSJMBSB	Sarah Murray	905-778-4321
PowerStream Inc.	Todd Bowman	705-722-7222 ext. 31317
Bell Canada	Colleen Murphy	905-853-4043
Enbridge Gas	ONE CALL	1-800-400-2255
MOECC	Spills Action Centre	1-800-268-6060
RiverStone Environmental	Al Shaw	705-645-9887
DFO	Lisa Wren ( <a href="mailto:lwren@everus.ca">lwren@everus.ca</a> )	519-986-2970
	Tom Hoggarth ( <a href="mailto:hoggartht@dfo-mpo.gc.ca">hoggartht@dfo-mpo.gc.ca</a> )	905-336-4764
MNR Midhurst	Graham Findlay ( <a href="mailto:graham.findlay@ontario.ca">graham.findlay@ontario.ca</a> )	705-725-7530
LSRCA	Tom Hogenbirk	1-800-465-0437

## 14.0 LASER/GPS CONTROL BY CONTRACTOR

- The Contractor will be required to ensure that his construction activities have alignment and vertical controls using laser and/or GPS methods.

## 15.0 MAINTAINING ROADS/DYKES/HAUL ROUTES

### .1 General

- Traffic Control and Road Provisions/ Measures to apply (Special Provision **29.0**)
- Refer also to Weather Related Provisions (Special Provision **31.0**)

### .2 Maintenance of Haul Routes

- Wherever the Contractor is required, or elects, to haul materials, the provisions of this report with respect to traffic control, mud control, dust control, and noise control apply to the haul routes.
- The Contractor is to note and observe any specific requirements of the applicable Municipality with respect to seasonal loading of the road and traffic provisions.
- The work involved with maintenance of haul routes includes but is not limited to removal of mud, flushing and sweeping of roads at the end of use, and/or when directed by the Contract Administrator, provision of construction warning signs, provisions of pylons and flagmen where required, observation of noise control measures, provision for dust control (except materials for dust suppressant will be separately paid or supplied), provisions for snow and ice control, maintenance of local traffic, maintenance of routes for farm traffic, and protection of any temporary irrigation lines, all as required by these Specification and/or the Contract Administrator.
- There will be no separate measurement for payment for these measures.

### .3 Patching Asphalt Cracks

- Where any construction activities occur from a paved road or lane that is permitted to be used by this document, and/or the Project Administrator, and asphalt cracks are created due to loading of the surface, the Board will retain firms experienced in such and have the crack filled with a suitable crack filler once the construction activities on the section of road or lane are completed.
- All road cracks will be repaired prior to the on-set of winter wherever possible.
- The costs of such crack filling will not be charged to the Contractor as long as the Contract Administrator is satisfied the Contractor has used reasonable care when working along the roads.
- If the Contract Administrator determines reasonable care is not being exercised, and if he has advised the Contractor of such, the costs to repair damaged asphalt surfaces shall be a cost to the Contractor and may be deducted from other authorized payments.

## 16.0 MATERIALS

- The Contractor shall supply and arrange for the delivery of all equipment, labour and materials except where noted in these special provisions, to be supplied by the Board.
- Where material is supplied by the Board, the Contractor shall be responsible for acceptance, safe handling and storage. If such material is damaged while under the control of the Contractor, it shall be replaced or repaired by the Contractor and not at the expense to the Board.
- Where the material supplied by the Board arrives in a damaged condition or there are discrepancies between the quantities received and the quantities shown on the bill of lading, the Contractor shall immediately report such damage or discrepancies to the Contract Administrator.
- The Contract Administrator shall arrange for an immediate inspection of the shipment and shall provide the Contractor with a written release from responsibility for such damage or deficiencies. Where damage or deficiencies are not so reported, it will be assumed that the shipment arrived in good order. Any damage or deficiencies subsequently reported shall be made good by the Contractor at no additional cost to the Board.
- Where material is to be paid by the Board but the Contractor is to order, receive and use the materials as noted in other Special Provisions herein, this Special Provision **16.0** and the other Special Provisions shall equally apply as applicable.

## 17.0 MOVING/DISPOSAL OF DEBRIS, JUNK, OLD VEHICLES, ETC.

- Wherever any small structures, appliances, old vehicles or debris piles, etc. or similar exist in an area of work, the landowner will be advised by the Contract Administrator that such structure, vehicle, equipment, etc. is to be removed beyond the work area. If the landowner does not move such, the Contractor is to relocate such outside of the area to be used for work.
- The relocation shall be made to minimize damage to the item(s) being moved but consistent with the type of equipment available on site to move such and as a result if damage should result after reasonable care has been given, such will be tolerated.
- No additional payment will be made.

## 18.0 MUNICIPAL STAFF

- The Holland Marsh Drainage System Joint Municipal Services Board and Town of Bradford West Gwillimbury may have their staff on site at any time. If any requests, orders or directions are received from Municipal Staff, the Contractor is to immediately refer the Municipal Staff to the Project Manager and/or Engineer for their confirmation or decision.

## 19.0 NOTIFICATION OF PROJECT MANAGER, ENGINEER & LANDOWNERS AND RELEASE LETTERS

- The Contractor shall notify Frank Jonkman, Project Manager, 905-778-4321 and Kenn Smart, P.Eng., Engineer, 519-748-1199 at least 48 hours prior to commencement of construction.
- The Contractor shall ensure that any landowner abutting the canal corridor is contacted by the Project Manager prior to starting work to verify the access, working limits, the disposal of spoil, clearing details, leveling, fence work, windrow work, etc. that may extend onto his lands beyond the new ditching and dyke as applicable.
- As well, at the end of construction, the Project Manager will attempt to obtain from each landowner a statement indicating that any such work on the landowner's property has been performed to the landowner's satisfaction.
- If the Project Manager has tried but is unable to get such letter from the landowner, the Project Manager and the Engineer will determine if and what further work is required prior to releasing the Contractor from the work without the landowner's letter. At least two weeks' notice should be given to each landowner re the two times of contact.

## 20.0 PRE-CONSTRUCTION AND POST-CONSTRUCTION MEETINGS

- The Contractor is required to attend a pre- and post- construction site meeting with the Project Manager and Engineer, and applicable landowners (as determined by the Project Manager and Engineer) and agencies before starting and after finishing the work. The data required to be submitted by the Contractor is listed in Item 22 of the Instructions to Tenders.

## 21.0 RESTORATION

### .1 General

- When completing work under this contract, restoration of existing facilities such as roadways, road allowances, dykes, driveways, building areas and green areas not requiring excavation shall be included with other items of work as described in the Special Provisions herein except where it is noted materials and/or work are to be supplied by Board, in which case the balance of the restoration work necessary would be included with the other items of work or with the General Item if the Contractor wishes.
- All restoration work must be carried out simultaneously with the contract progress as directed by the Contract Administrator.

- In the event that the Contractor fails or neglects to make satisfactory progress in the execution of any restoration work within forty-eight (48) hours of the receipt of written notice from the Contract Administrator, the Contract Administrator may remove or cause to be removed any surplus material or to re-grade any area or perform any work which he deems necessary to leave the site in an approved condition and the cost of any such work shall be charged to the Contractor and shall be deducted from any monies due or to become due him.
- Restoration of existing backfilled ditches and newly excavated ditches is specified as part of the applicable work type.
- Roadways, entrance driveways, walkways, or other surfaces subject to vehicle or pedestrian traffic shall be reinstated with a minimum of delay and inconvenience to the general public and shall be maintained in a satisfactory condition until completion and final acceptance of the works by the Contract Administrator.
- Additional surfacing materials may be required to be placed on roadways, laneways, building areas or dykes to maintain the surface in a condition suitable for vehicular traffic, and the cost of placement of any such material and work shall be borne by the Contractor but the material cost for any granular shall be borne by the Board provided the Contractor has been, and is, using reasonable care and construction procedures. (see Special Provision **21.2** below)
- Failure to maintain the roadways, driveways and walkways in an acceptable condition, shall result in the work being undertaken directly by the Contract Administrator with the costs to be deducted from any monies due the Contractor by the Board.
- Where established lawns or other landscaped areas within the working area, or elsewhere if damaged by the Contractor, are excavated or damaged, these areas shall be restored by grading, topsoiling and seeding according to the Contract Administrator's satisfaction. Watering of seed will be necessary.
- Restoration done of green areas within the working area, or elsewhere if damaged, will be at the Contractor's expense, except that the Board will supply any seed.
- Should it be determined that any septic beds are accidentally damaged by this Contract, corrective measures will be attended to by the Board.
- Restoration of asphalt roadway surface is discussed in Special Provision **15.3**, Patching of Road Cracks.

.2 Private Road/Lane Restoration

- Where the construction affects the surface of a private lane/road and where the road/lane does not otherwise have to be raised, widened, or reconstructed, the road/lane shall be restored upon completion of construction.
- The Contractor shall first of all grade out any ruts in the surface and shall then apply new Granular A material as required and as paid by the Board, subject to a following clause, and shall grade such over the roadway.
- Along earth lanes that are or could be used as roadways, non-organic soils shall be used and such are to be supplied by the Contractor.
- Where necessary, compaction (non-vibratory) is also to be applied to the roadway.
- Where a gravel laneway has been used by the Contractor, this resurfacing work shall also be applied to the gravel laneway.
- All gravel shall be applied so that it blends with lawn areas and paved driveways.
- The work shall also be undertaken to recognize any utility lines and to minimize removal of any trees or branches that do not otherwise have to be removed. Where such have to be trimmed to allow the restoration, the work is to avoid breakage and is to involve cutting close to trunks or feed branches and the materials shall be hauled away.
- As long as it is deemed the Contractor is attempting to use any road or lane with a reasonable care, the Board will pay for the supply of Granular A but the Contractor will be required to order, spread, grade and compact (non-vibratory) such. The Contract Administrator will determine the

measurements for payments but the Contractor will be required to provide weigh tickets and records of loads as requested.

- Where the Board deems that the Granular A is required as a result of the Contractor's negligence or poor workmanship along the surface, the cost of the Granular A is to be absorbed by the Contractor.
- There will be no payment for supplying non-organic earth materials since such exist on site, as a result of excavation, and the Contractor will be required to use such excavated materials and with no payment for hauling.
- There will therefore be no separate measurement for payment for this item since any granular materials are paid by the Board. This work is to be included as part of other items.

## **22.0 SITE OFFICE (WHERE TO BE PROVIDED)**

- The Contractor shall as soon as the contract commences provide a field office of eighteen (18) square metres minimum area with adequate lighting, heating, and electrical outlets (2 -15 amp outlets) on the site for the use of the Project Manager, the Engineer and their assistants and inspectors for the duration of the Contract.
- The structure shall be waterproof, lined with common plywood (or better) and painted on the interior and exterior. The following furnishings and equipment shall be supplied. (Used furnishings in good condition will be considered).
  - 1 desk with two drawers and one chair
  - 1 table with 5 chairs
- The Contractor shall arrange for and attend to all utility connects.
- The Board shall bear all utility expenses for lighting and heating in connection with the office but the Contractor is to collect bills for such from the utility and then submit to the Board.
- The Contractor may offer an alternative facility for a site office and such may be accepted at the discretion of the Project Manager and Engineer.

## **23.0 SITE PREPARATION**

- The first item of work is to be the erection of the project signs (by the Board).
- Prior to any construction work, the required on-site meeting shall be implemented and the environmental items shall be addressed.
- Prior to commencement of excavation, existing fences, if any, shall be addressed, any necessary brush and scrub removal is to be attended to and any movement of junk, debris, etc. is to be addressed.
- Also prior to excavation, the Contractor and the Contract Administrator shall inventory any municipal signs located within the contract limits; the Contractor shall remove the signs and posts as they impede his operation all the while remaining cognizant of his responsibility to control traffic; and the Contractor shall deliver the removed signs and posts to a site designated by the Contract Administrator. The Board will reinstall permanent signs once the work is completed.
- To allow the work to then proceed the requirements of the Construction Yards/Staging Areas Special Provision **4.0**, Hauling in of Materials Special Provision **28.0** and Traffic Control/Road Provision Measures Special Provision **29.0** herein shall be implemented.
- All work described herein shall be deemed to be part of the Contract Items.

## 24.0 SURVEY BARS

- If any of the work is anticipated to result in the removal of iron survey bars not already referenced as per Special Provision **5.0**, the Contractor shall notify the Project Manager and/or Engineer that such bars must be removed and the Engineer will reference or reset (or have others do such) these bars.
- The cost of referencing and/or reinstalling the bars will be an additional cost to the project where the removal of such bars is necessary.
- Where such bars do not require removal and are damaged or removed by the Contractor unnecessarily, the cost of replacement of such bars shall be a cost to be absorbed by or charged to the Contractor.
- The Project Manager or Engineer will determine if any work should be suspended or redirected due to the delay while referencing any newly found survey bar and will determine what additional payment if any should be made.
- Where possible drawings of all survey bars already referenced on a property by property basis will be made available to the Contractor and to the Engineer by the Land Surveyor involved.
- It is to be noted the Engineer will provide evidence of existing property lines in the area of Sta. 712 to 1+465 on South Morris Road Branch for purposes of bank stabilization only. If the property line is to be legally established, the work will have to be done by others.

## 25.0 SALVAGING STRUCTURES

- There is a requirement to salvage designated components at the existing pumping station (See Section **53.0** herein).
- There will be no requirement to salvage other structures including any posts and anchors, any metal pipes, etc. The Contractor shall have full rights to all removed materials and must dispose of them.
- The Contractor shall locate his own disposal sites for all removed materials.

## 26.0 SOIL BOREHOLES

- Soil test pits were excavated for the organics disposal cell, diversion route and for a new pumping station and are attached to these documents.
- Any use made of the data from these test pits is entirely at the sole risk of the Contractor.
- Geotechnical reports or test pit data provided to the Contractor by the Contract Administrator does not relieve the Contractor of sole responsibility for determining all necessary information relevant to the construction of the works.

## 27.0 SPECIFICATIONS AND DRAWINGS

### .1 Specifications

- The Standard Specifications on this project are Ontario Provincial Standard Specifications as listed in Division 4 of these Documents and any others referred to which are not included herein.
- These Special Provisions also constitute a substantial component of the Specifications.
- The Extent of Work notes on the Aerial Drawings are also deemed to be Specifications.

- The Supplemental General Conditions and the General Conditions shall also be deemed specifications.

.2 Drawings

- The Contract Drawings are listed in detail in Division 4.
- The Extent of Work notes on the Aerial Drawings indicate the locations of the various work items to which the specifications apply. Should there be a specification attached to the Extent of Work notes that differs from a specification it shall have precedence to any other specification.
- Where conflict exists the Extent of Work notes shall have precedence to the Special Provisions which shall have precedence to the Ontario Provincial Standard Specifications.
- This listing of precedence is in addition to, and supersedes if conflicting with, the order of precedence in General Condition 2.02.

**28.0 HAULING IN AND STOCKPILING EARTH**

- The Contractor is advised that he may be asked to assist in making necessary arrangements for hauling and stockpiling of suitable imported earth soils for later use.
- The stockpile sites listed in Special Provision 4.0 are to be used as directed by the Contract Administrator.
- Any costs of preparing disposal/stockpile sites are to be paid as part of the Item for General Work.
- The recommended stockpile site for imported clays and topsoils is the area of the former Bak and Balon farms acquired by the Town and east of all SEAR construction.
- The recommended haul route to this site is off Holland/Bridge Street at the Dissette intersection and then along the east limits of other lands acquired by the Town south to the Balon and Bak farm site.
- Allowances to the Town are included in this Report for the use of this haul route.
- Use of any other Town of Bradford West Gwillimbury roadways for hauling purposes are to be pre-authorized by the Project Administrator. Special considerations may be given in an emergency event.
- There will be no separate payment for the supply of imported clay or for later hauling of such from any stockpiling site provided the recommended stockpile site is used.
- The Cross Sections and the Work Type notes indicate the locations and approximate quantities of materials that are to be hauled. These are estimates only and the Contractor is to assume all risks or consequences in basing his tender or work scheduling on these items.
- The Contractor may be required to provide evidence that any materials brought in are free of unacceptable pesticides and hydrocarbons and are suitable for use as earth fill on agricultural properties and as fill in waterways where applicable.
- Table1 (Agricultural or Other Use) of MOECC Regulation 153/04 will be used as the compliance standard.
- Where geotechnical reports have been prepared for the soils at the source site, copies of such are to be supplied.
- Samples of materials to be supplied by the Contractor must also have acceptable grain size to verify the fines (silt/clay) content is at least 50% and that the clay content by itself is at least 20%. The Engineer reserves the right to reject any materials with unsuitable quality. If any are placed prior to analyses being completed and if the materials are found to be unacceptable, the Contractor will be required to remove such at his cost. All imported acceptable materials must be compacted to 95% SPMDD.
- The Board will deduct from the Contractor's overall payment the costs of testing imported materials which do not satisfy this section's requirements. Costs of testing which confirm the material is acceptable will be paid by the project.
- If a stockpile site other than the recommended site on the Bak and Balon farms must be used, additional payment will be negotiated.

## 29.0 TRAFFIC CONTROL AND ROAD PROVISIONS/MEASURES

### .1 General

- a) There will be limited use made of existing public roads except as noted and for access by equipment and for hauling of imported clay.
- b) As has been indicated in other locations of these documents, the Contractor will be required to maintain the flow of traffic or to provide detours when such are approved.
- c) All traffic control measures are to be implemented in accordance with Book 7 of the Ontario Traffic Manual. The Engineer will provide data from Book 7 in this matter if requested.
- d) Where two lanes of traffic can be maintained but work is adjacent to the road, sufficient signing to notify the travelling public of construction ahead and then pylons or other delineators along the work area will be necessary in accordance with Book 7 or as designated by the Engineer.
- e) Where the operations are such that one lane of traffic must be closed, sufficient signing must be posted ahead to indicate that such is occurring, and then sufficient delineators are required to protect the lane closed. This work is to be fully done by the Contractor and is to conform to Book 7. The Engineer will provide data from Book 7 in this matter if requested.
  - As well, the Contractor will then be required to supply either traffic lights or flagmen to allow for the passage of the travelling public.
  - Such use of flagmen or signs can only be avoided if the Engineer, after conferring with the Municipality, specifically indicates such is not necessary.
- f) Where a road is to be closed, and sufficient notice is given by the Contractor, the road will be signed in advance of closure by the Board. Notices will also be placed in newspapers by the Board. All emergency agencies will be notified by the Board but then once the road is to be closed, the detour route must be signed and monitored by the Contractor. Sufficient lead time for all closures will be required (a minimum of 4 weeks).
  - The necessary traffic control plan for road closures will be prepared by the Engineer but the Contractor is to implement it.
- g) Wherever a road is closed, access for local traffic must always be available. A landowner must be able to reach his property from one end or the other of any road. The only time that a landowner will not be allowed to use his specific laneway is when excavation equipment is required to be sitting right in front of it. The Contractor is also to co-operate with all landowners and is required to provide his best efforts to ensure that passage of local farm equipment is accommodated.
- h) The provisions of maintaining access to a landowner's property on dykes that are private and not used as public roads must also be observed. The Contractor is required to ensure, before he starts any work on a dyke lane, that access is available from both ends of the dyke lane at travelled roadways so that a landowner may reach his fields or buildings from one end or the other.
- i) Access for emergency equipment/vehicles must also be maintained at all times.
- j) All traffic control plans, permit applications and notices with respect to road restrictions or closures will be prepared either by the Project Manager or Engineer and paid directly by the Board. The Contractor's responsibility will be to supply materials including fabricating the signs in accordance with Book 7, erect, maintain and remove all signs, measures (for all roads) included in the traffic control plan.
- k) The costs of implementing traffic control (in accordance with the plans and permits obtained by the Contract Administrator) are to be a General Item and are to be included in the Contractor's allowance for general work or in with his other tender prices.

.2 Along Private Lanes/Roads

- a) Where Used as a Lane (Earth)
  - In these areas, the lane may be used as the working area (in whole or in part)
  - Contractor is to ensure at all times there is sufficient room for one lane of traffic for domestic, agricultural and emergency use to all buildings and fields on either side of his equipment location.
  - Access is to be provided for all owners from at least one public road prior to start of excavation work
  - Excavation machinery is to allow seeding or harvesting traffic from buildings to fields to pass by if no other adjacent access is provided or available.
  
- b) Where Used as Access Lane/Road
  - Wherever construction occurs from an access lane, traffic control measures are required as per the previous general requirements.
  - Desirably and wherever possible a minimum of one lane of traffic is to be maintained as per the previous general requirements.
  - Maintain access for local traffic
  - Provide continuous dust, mud, snow and ice control as required.
  - Provide final restoration where and as required by this document.

**30.0 UTILITIES**

.1 Overhead Hydro and Bell Crossings (General)

- This special provision applies where overhead utility lines may impact excavation and/or other works of the Contract.
- The drawings attempt to indicate those locations of overhead crossings and also where overhead lines parallel the work. The Contractor shall make his own inspection of such however. Other overhead utility locations are not shown on the drawings if it is felt they will not impact the work.
- The Contractor shall review the site and ensure he is aware of locations of overhead utility lines.
- The work required by the Contractor at overhead utility lines is to protect such during construction and to avoid methods that may cause contact with the utility line.
- Any existing line attached to any pole is to be protected by the Contractor.
- Any underground feeds from a pole are to be determined by the Contractor as part of his utility locates.
- If any pole requires temporary support during the construction as requested and directed by the Utility and as approved by the Engineer, the work shall be attended to by the Contractor and with no additional payment.
- Where it is evident that a utility line remains that, in the Contractor's opinion, requires removal and/or relocation to allow the work, the Contractor shall indicate such to the Contract Administrator and the line will be reviewed to determine if it should be removed or relocated. Any costs to remove or relocate a line, if moved after review by the Contract Administrator, will be paid by the Board and may or may not be assessed to the Utility company depending whether it is a Public Utility.
- The Contractor must make such pre-inspection and can not claim for standby or delay of work should he encounter an overhead utility line which impacts his work.
- The Contractor shall cooperate with, and coordinate his work with, any work by others to relocate or adjust overhead utility lines if such work is occurring simultaneous to the work of this contract.
- There will be no separate measurement or payment for locating, protection and avoidance of overhead utility lines or delays caused by overhead utility lines.

.2 Underground Utility Provisions (General)

- Landowners and utilities companies are to be pre-contacted to determine utility locations
- Contractor is to arrange for all on-site utility locates where his work may possibly affect any underground utility.
- Protection of the utility during work is necessary.
- The Contractor is advised that the existing hydro supply into the Peterman Pumping Station is to be protected and connected up as part of the Peterman Pumping Station work.

- Any buried utilities shall be exposed to the satisfaction of the utility company and Contract Administrator to verify that their elevations will not conflict with the construction of the project at the specified elevations, or that provisions for protection and relocation of such utilities may be undertaken if conflicts should occur.
- If any utility requires support, and in accordance with the requirements of the utility such support shall be provided, maintained and removed when not needed and with no separate payment.
- Raising or lowering underground lines by excavation to obtain slack, where allowed, shall be paid at a pre-negotiated price or at time and materials. Such additional payment will also be allowed for more extensive adjustment to utilities if necessary and such costs will be assessed to the utility or Municipality if and as deemed appropriate by the Engineer and as a special assessment.
- Where utility relocation is necessary, the Board will attend to or arrange such, but with an assessment to the Utility in accordance with Section 26 of the Drainage Act where the utility is deemed to be a public utility.
- Early exposure by the Contractor and coordination with utility companies will be required since there will be no standby payment while waiting for utility work unless agreed to by the Contract Administrator.
- There shall be no separate measurement or payment to the Contractor for dealing with underground utilities except for adjustment or relocation as discussed above.

.3 Pole Line Relocation or Replacement Work (TO BE DONE BY OTHERS)

- At isolated locations on this project, pole line work may be required to either relocate or to provide new service.
- The Contractor is to note that one pole used for hydro supply and located at Sta. 0+175 of the Edward Street Branch is to be relocated out of the channel. The work will be arranged and provided for by the Board prior to work commencing.
- The work will be undertaken by others and the Board will attempt to ensure it is done in advance of the Contractor's entry onto the work site.
- However, the Contractor will be required to cooperate with, and to coordinate his work with, the work of the others involved should such occur during the work of the Contractor.
- Where an existing pole is relocated, it will be replaced in an area designated by the Engineer outside of the location for the new canal work.
- There will be no separate measurement for payment for work to coordinate with and cooperate with pole line relocation.

.4 Private Underground Water Lines (General)

- Where the Contractor is advised he may encounter a continuous underground water line, the Contractor is to locate, identify and protect such water line. No additional payment will be made for such work. If it is found that such should be removed and hauled away, the work will be done by others and this Contractor will have to cooperate with and coordinate his work with the work of such removal.
- The work involved under this special provision is therefore to locate the water line, to carefully work around or to backfill above the water line (if in canal bottom), and to ensure the location of the water line is marked for future reference. The marking will involve the placement of iron stakes or equivalent at ends of the located system with any measured offsets noted on the stake.
- The Contractor is also to make notifications so that the water line is tied to the GPS system by the Engineer prior to backfilling.
- Where the work requires replacement of the water line and including removal of the existing, work and such is not undertaken by others, and this Contractor is requested to do such, separate and negotiated additional or time and materials payment will be made for such.

.5 Adjusting Guy or Anchor Wires

- Where it has been pre-determined necessary to adjust guy wires or anchor wires to fit the new work without adjusting the pole itself, the work will be similarly and desirably undertaken by others in advance.
- The Contractor is to however cooperate with and coordinate his work with, the work to be undertaken by others if occurring simultaneously.
- No separate measurement or payment will be made.
- The Contractor will be required to advise the Contract Administrator at project startup of any guy wires/anchor poles that remain and that are of concern.

- There will also be no separate measurement in payment for delay or change in work due to the additional guy wire/anchor pole adjustment requested, unless the Contract Administrator approves.

.6 Utility Contact Numbers

- The current utility contact information is enclosed in Special Provision **13.0** hereto.

### **31.0 WEATHER RELATED PROVISIONS**

.1 Snow and Ice Control

- Whenever excessive snow or ice occurs, the provisions of the All Weather Plan (Special Provision **58.6**) are to be implemented.
- These provisions include protecting materials that are to be used, removing ice as necessary to allow work, plowing snow and stockpiling such as necessary and to suspend work in significant situations.
- The Contractor's operations are always to ensure that municipal snow plowing and sanding equipment can operate along any public roads.
- No additional payment will be made for snow and ice control.

.2 Dust Control

- Wherever excavation, hauling or other works occur along an earth or granular road, the Contractor will be required to ensure that daily dust suppressant measures are applied, unless in the opinion of the Contract Administrator, due to condition or locations, dust suppressant is not required on the particular day.
- Materials for dust suppressant will be paid from the Contingency Item and is to be payment in full for supply.
- Weigh tickets will be required weekly for supply of dust suppressant.
- The application of dust suppressants will not be separately measured and paid and is to be deemed to be part of the General Items as part of other Tender Items.

.3 Mud Control

- Wherever a Contractor's operations involve work on a road or lane, and as a result of the operations earth, peat or other material creates a mud surface on the road, the Contractor, when requested, is to have a loader or similar equipment on site that is capable of removing the majority of the mud from the road.
- When a particular section along a road or lane is completed, the Contractor may be required to hire a firm that specializes in washing and brushing the road, and is to clean such to the satisfaction of the Contract Administrator.
- Separate payment will not be made for mud control. Such is to be part of the work item involved.
- All operations of mud control must be such that the removed mud is deposited in backfilled ditches or hauled to a stockpile site as opposed to on the inside marsh lands.
- Monitoring of weather will be critical to ensure mud control is attended to prior to freezing conditions or extremely wet or hot conditions.

.4 All Weather Plan

- Special Provision **58.6** shall be considered with respect to provisions for winter work and for the extremes of weather.

### **32.0 WORKING AREA AND ACCESS (Not Necessarily Including Imported Material Haul Routes)**

.1 Working Area General

- The working area on this project is to be as noted on the Aerial Drawings and in these Special Provisions.
- If the Contractor wishes to use any other area on the outside of the working area, the Contractor must make his own pre-arrangements with the landowner(s).

.2 Access General

- Access shall be obtained from the road allowances and from designated access routes on private lands as shown by the drawings.
- Road Allowance Access Provisions are as follows:
  - Attend to utility locates
  - Provide construction signing to Board's satisfaction
  - Provide traffic control during use
  - Provide temporary access ramp and culverts in any ditch
  - Culverts to be a minimum of twin 900mm dia. culverts in any channel.
  - Remove access temporarily during high runoff events to ensure no flooding occurs
  - Remove access at end of project and restore lands, road boulevards or channels by grading and seeding
  - Haul away any vegetation removed
  - Provide mud and dust control on roads or lanes as necessary
  - Provide silt traps or turbidity curtains in channels as directed.
  - Prepare any previous green area ready for seeding
- Designated Private Property Access
  - Use routes designated on aerial drawings unless alternate acceptable access is provided by landowner
  - Maximum width to be 5 metres
  - Restore access to existing condition when finished
  - Time use of access as requested by landowner to minimize disruption
  - Observe maximum speed of 10 km/hr on private routes
  - Close cut clear any scrub/brush areas
  - Attend to mud and dust control as required by Engineer and as per these Special Provisions.
  - Remove and replace all fences to existing condition and as per these Special Provisions.
  - Maintain, close/open and lock gates as required by landowner
  - Restore/replace any damaged drainage feature
  - Prepare any previous green area ready for seeding (seeding will be done by others)
- There will be no separate payment for access provisions except as noted.
  
- There may be some locations where the Contractor may wish to negotiate with a landowner directly for different access for the project. These negotiations will be fully between the Contractor and the landowner. The Contract Administrator will only be involved to ensure that any access routes used do not create problems to the environment, to road traffic, or to the landowner.
- Where any clearing is required along an access route, such will be paid as part of the particular Tender Item.
- The clearing is to involve chipping and mulching and the chips are to be spread on the laneway or taken to off-site disposal. Any trunks not chipped are to be left just off the laneway if the landowner agrees or otherwise are to be hauled away and disposed of. Close cut clearing will be required.
- However, other works to maintain and restore access routes are to be a general cost to the Contractor.
- On access routes, the Engineer will ensure that the requirements for maintenance and restoration are attended to and that the landowner is contacted prior to completion of access route usage.
- Restoration of the lane is to be done at the completion of the project to the satisfaction of the landowner.
- See also Special Provision Item **21.0**.
- There will be no separate payment for access routes, other than any clearing necessary.

**33.0 TURBIDITY CURTAINS**

- .1 Where in-water work occurs, a turbidity curtain is required at a maximum distance of 15 metres from any cofferdam or other location of in-water work.
- Then a further set of turbidity curtains are required 15 metres from the first set.

- These turbidity curtains are to remain in place during construction of the work confined by the cofferdams and are then to be moved as required when the work extends further with new sections.
- The Engineer may alter this spacing at the time of construction and with no additional payment.
- .2 The specification for turbidity curtains is OPSD 219.260 and 219.261 and OPSS 577.05.02.04.
- The Contractor will be required to supply catalogues, brochures, suppliers' information for pre-approval of the turbidity curtains he proposes.
- The curtain must be capable of passing residual base flows in the canal but at a depth below the surface.
- .3 Turbidity curtains shall be replaced whenever it is evident that the curtain has been damaged or that it is clogged by sediments.
- .4 Each time a turbidity curtain is relocated, it is to be inspected by the Engineer to confirm that such may be reused. It shall be cleaned prior to any relocation.
- .5 Where a turbidity curtain remains in place for more than two weeks it is to be inspected for damage and or clogging and any necessary cleaning or repair is to be undertaken.
- .6 Best management practices for turbidity curtains are to be observed.
- .7 The Engineer will direct when removal of turbidity curtains is required at the end of a work season.
- .8 All turbidity curtains are to fully cover the channel/canal being worked on and are to be secured to trees, stakes or other to prevent dislodging with flows.
- .9 There shall be separate measurement or payment for turbidity curtains at required work areas.
- .10 Measurement and payment for turbidity curtains at other approved and required locations will be per curtain installed and will be paid at the same rate.

#### 34.0 CLEARING

- At the start of work, the Contractor, Project Manager and Engineer shall agree on clearing limits and methods.
- On this project, all clearing is to be done by power brushing/grinding/chipping methods and all ground/chipped materials may be left on site.
- The grinding/chipping is to be done such that average particle sizes are 50mm or smaller unless otherwise approved.
- As an alternative to power grinding/chipping methods, all brush may be excavated and disposed of off site.
- In most cases, roots may remain as long as power brushing occurs to ground level. Where roots must be removed to permit excavation, the Contractor shall locate his own disposal site for roots. In some areas on this project where a cell is excavated, the roots could be buried at the bottom of the cell.
- Generally trees may be ground from the top down, may be felled and then ground by either excavator mounted grinders or by grinders that are self propelled or towed. The work is to be undertaken so that the chippings are confined to the working area. Chippings will be allowed to fall in outside canals or outside of the working limits only if use of normal care and operation by equipment, in the Engineer's opinion, has been exercised and pre-approval is given. Any chippings that fall on a roadway must be removed by brushing or sweeping or equivalent.
- Chipped or mulched material may be allowed to drop as resulting from the operation (provided "buildings" are recognized by directing the spray of chips away from buildings).
- Where grounds are too wet for any chipping/mulching operation that is required, the Engineer may allow all trees to be chainsawn and moved to a separate location for chipping.
- The Engineer will attempt to reference/relocate all affected existing survey bars. However, any that are encountered should be discussed with the Engineer to determine if protection is still

required. Where the Engineer has flagged survey bars, such are to be protected and not disturbed. Also any bars outside or inside of the old and new canal routes are to be identified and protected.

- With respect to measurement, no separate measurement will be made for areas of clearing. Each area of clearing will be paid at the lump sum tendered and payment made will be full compensation for all aspects of clearing including any root removal necessary.
- Refer also to OPSS 201.

### **35.0 STRIPPING OF ORGANICS/TOPSOILS**

#### .1 Stripping of Organics/Topsoil by this Contractor

- Separate stripping of existing organic soils is required where such soils are being, or could be, used for agricultural purposes and where such are to be removed to allow for dyke and ditch construction.
- The stripped organics are to be made available to the affected landowner, if he or she wishes such.
- They are to be windrowed, piled or leveled on adjacent lands as shown by these contract drawings or as directed by the Project Administrator. There will be no separate payment for the initial windrowing, piling or adjacent levelling. However, if the Contractor is asked to later load and haul these organics on site, payment at the on-site hauling rate will be made.
- Where the adjacent landowner does not wish these organics, they are to be hauled to an off-site stockpile site on Town lands as designated by these contract drawings (within 10 km of the drain). Additional payment at the contingency rate for hauling stripped organics off site will then be made.
- There will be no separate measurement for stripping. The tendered lump sum item for stripping is to include the full payment for excavation of organics/topsoils and windrowing or adjacent levelling.
- Hauling to either an on-site location or off site will be separately measured and paid using the contingencies for hauling topsoils/organics. Such contingency is to also include the loading of the materials and the rough levelling of such at the site where such are hauled to.
- This Report also contains an allowance for payment(s) to be made to the landowners for temporary stockpiling of these stripped organics. The allowances and actual payment to be made will be based on the amount paid per acre for rental of the lands used for one year.
- If and where the Contract Administrator requires, the stripped organic soils are to be screened first and then either used for construction or returned to an adjacent landowner.
- If screening is ordered and second hauling is necessary, additional payment will be made as per the tendered items for screening topsoil and for hauling topsoils on site. The tender item for screening is to include the initial hauling of the topsoils to the screening site and then the screening. The hauling back to lands would be paid pursuant to the on site hauling item.
- The equipment and methods for screening are to be pre-approved by the Contract Administrator and Engineer.

#### .2 Stripping of Organics/Topsoil by the SEAR Project

- Separate stripping of organics and topsoils on the Bak/Balon construction yards/stockpile sites/staging areas may be done by the Contractor of the SEAR project prior to actual use of the Bak/Balon lands being made by this Contractor.
- If such stripping is done it must be done by such methods that no underlying silts are stripped. It is recommended that the lower 50mm of organics not be stripped.
- If such stripping is undertaken, the SEAR contractor will be asked to haul and stockpile such materials to lands adjacent to the Diversion Branch as designated by the Project Administrator and Engineer. Discussions have already occurred with landowners along the Diversion who may accept the materials and whose land may be impacted by the haul route. (The haul route would be along lands to be used for the Diversion Branch.)
- This Report also contains an allowance for payment(s) to be made to the landowners for temporary stockpiling of these stripped organics. The payment to be made will be based on the amount paid per acre for rental of the lands for one year.
- The Contractor of this drain project may be then asked to haul and rough level these stockpiled organics to other properties adjacent to the Diversion Branch once crops are harvested.

Payment for loading, hauling and rough levelling will be made at the contingency rate for hauling of materials on site. Final levelling of hauled organics is to be by the affected landowner.

- If this Contractor is asked to strip the organics on the Bak and Balon farm sites, separate and pre-approved payment will be made.

### **36.0 CELL CONSTRUCTION**

- On this project, some excavated materials are to be disposed of in excavated cells. At this time, the only area where cells are to be constructed is along the south side of Interval 1 east of Morris Road.
- This area is owned by the Town of Bradford West Gwillimbury.
- The first requirement in cell construction is to clear the area by power brushing. Any roots are to be excavated and will be buried at the bottom of any cells.
- The materials that will be excavated from the cells are to be hauled to the designated area for staging/stockpiling of organics.
- The payment made for cell construction is to include the excavation and initial hauling of the organics to the on-site stockpile.
- Temporary stockpiling of the excavated cell materials may be necessary until the stockpile site is ready. The timing of the hauling of the fill materials to the stockpile site will be up to the Contractor. The organics may have to be screened and if done separate payment for screening will be made.
- The cell to be constructed in Interval 1 will have a varying top width and depth, and is to be as shown by the aerial drawings and cross-sections.
- Some organic materials excavated are to be saved so that they can be used for capping of the cells once filled.
- The haul route for the materials to the stockpile site is anticipated to be along the dyke between the Holland Marsh canal and the interior ditch of the Small Scheme. It is expected track equipped hauling equipment will be necessary.
- A temporary culvert will be necessary in the Morris Road channel to access the Small Scheme dyke. Also a temporary culvert will be necessary between the Small Scheme Dyke and the Diversion route if the materials are hauled prior to Diversion channel completion. Such will be placed temporarily and are to be removed when all cell materials are hauled. The channel is to be restored. The work in placing and removing a temporary culvert will be paid as per the contingency item. The work of preparing the Small Scheme dyke for the hauling is to be paid as per a separate tender item.
- There will be no separate measurement for construction of the cell along Interval 1. Payment will be on a lump sum basis and is based on a volume of approximately 3000m<sup>3</sup> being excavated and hauled to the on-site stockpile site and including the retention and placement of sufficient organics to surface the cell once filled.
- Should the decision be made to haul these organics to the stockpile site using a route along Zima Parkway, up Walker Avenue, across the former barricaded connection to Morris Road and then up Morris Road and across the cul-de-sac, then rubber tired vehicles will be necessary and prior approval of the Project Administrator will be required. The use of the Zima Parkway, Line 6, Walker Avenue intersection haul route would also have to be approved.
- If the haul route for these organics is selected to be using the unopened Line 6 to the small scheme dyke, then clearing and grading will be necessary along the Line 6 R-O-W and a temporary culvert will be necessary between Line 6 and the Small Scheme Dyke.
- Separate payment for culverts would be made but not for other work.

### **37.0 SUPPLY AND PLACEMENT OF TEMPORARY CULVERTS IN CHANNELS**

- It is estimated that up to 4 crossings may have to be constructed for temporary access and/or hauling. In all cases, the pipes for the temporary crossings are to be placed in a final and ultimate location as part of this project.
- During the construction of the Diversion Branch, two crossings may be necessary in the Small Scheme ditch – one to join the unopened Line 6 road allowance with the Small Scheme dyke and then the other to join the Small Scheme dyke to the Diversion path. It is proposed that a 900mm diameter culverts with 10m length be used at each location. The culvert is to be bedded on and

backfilled with compacted granular materials to top of pipe and then clay to the surface. Slopes are to be 2:1 and are to be maintained. The pipe is to be aluminized corrugated steel pipe with a minimum wall thickness of 2.0mm or is to be Series 320 HDPE pipe. The plastic pipe is preferred. Minimum cover of the pipes is to be 600mm.

- Careful removal of pipes is necessary since such are to be reused. The 900mm pipes are ultimately to be coupled and used at the Morris Road tie-in.
- The second set of locations for temporary culverts may be across the South Morris Road Branch to join Zima Parkway to Morris Road or to join Interval 1 to the Small Scheme dyke and also to join lands north of the Edward Street Branch to Morris Road.
- It is proposed that pipes to give a 10m length of 3000mm dia. aluminized CSP with 125 x 25mm corrugations and 3.5mm wall be used at the second set of locations. Careful removal of these pipes for salvage and reuse will also be required.
- The ultimate location of each length of 3000mm pipe culvert will be at the barricaded Walker Avenue connection.
- Each temporary culvert installation will be separately measured and paid and payment is to include the placement costs, the backfill costs and the removal costs.
- The material costs of the culverts and the work to place such at their ultimate location will be separately measured and paid as the required culvert item.

### 38.0 TYPES OF CHANNEL WORK

#### General

- There will be no separate measurement for payment for any of the listed types of work unless separately noted. The lump sum bids will be full payment for all work except where noted.

#### a) Type I Work

- This is the work required along the Diversion Branch from the outlet in the Holland Marsh Canal up to the property that was formerly known as a Bak farm and that is now called the Bak farm site. The length of this channel is approximately 650m. The work necessary will involve stripping of organics and temporary windrowing or adjacent levelling to allow provision to the adjacent owners, the maintaining and cleaning out of the existing ditch on the west side of the route which is along the property line on the west side, the constructing of a new small ditch of similar size on the east side for local drainage, the hauling in of imported clays, once the organics are stripped to construct the berms. Hauling and placing of approximately 22,000 cubic metres of imported clays will be necessary.
- In detail, the work will have to initially be constructed as a pool or as a bathtub area. It is expected that the work will start just upstream of the ditch on the north side of the Small Scheme Dyke. Pumping will be necessary during excavation to remove rainfall water.
- The layout of the Diversion Branch will be undertaken by the Engineer. Stakes will be provided as necessary for the berm locations and for the centre of the channel.
- Daily construction access is to be either off of Morris Road and along the berm of the Centre Morris Road Branch and through the Bak farm site and/or may be from the south along the Small Scheme dyke coming in from unopened Line 6 or from Interval 1 with temporary culverts or by coming in from Peterman Lane with negotiated approvals.
- Access for hauled in materials is to be along the east side of lands acquired by the Town for the SEAR site unless an alternate haul route is designated or agreed to by the Project Administrator.
- The dimension of the components of the Diversion Branch are shown on the attached cross-section. Basically the channel top of bank width at the stripped ground levels will be approximately 9 to 10 metres. The bottom width of the channel will be approximately 4.5m. Each berm will have a base width of approximately 13 to 14m (at bottom of organics) and a top width of 5m. Internal berm slopes and internal channel slopes are to be 2.5:1. External slopes to the berm are to be 2:1. All berms are to be constructed to an elevation of 220.3. The channel bottom is to be constructed to an elevation of approximately 216.77 to 217.22 (as shown by the profile). All berms are to be surfaced with a minimum of 100 to 150mm of organic material and ultimately are to be seeded.
- With respect to the organics to be separately stripped and given to the owners, it is expected that organic depths will vary from 300 to 400mm. It is expected the organics will have to be kept in a separate windrow on the east side of the new east side external ditch until the landowners are

able to receive these and have such spread on their fields after harvest. (See also Special Provision **35.1** re hauling of stripped on site organics)

- The materials to be excavated below the stripped organic level in both the main channel and in the east side external ditch will be sandy silts. These sandy silts are to be disposed of along the outside faces of the new berms to be built prior to topsoiling. Separate on-site management of such will be necessary. Maximum thickness of these silts should be 1.4m at the top of the berm and 3.4m at the bottom of the berm.
- The external channel on the east side will have approximately a 5m top width and a 1m bottom width with 2:1 side slopes. It too is to have some organics placed on it (50 to 100mm) and is to be seeded.
- Should any drainage tile be intercepted, such are to be given an outlet in the new east side external channel. Existing outlet pipes in the west side ditch are to be salvaged and reused if possible. Should any new rodent gate outlets be necessary, additional payment will be provided.
- The berms should be overbuilt to allow for consolidation and settlement initially. The clay to be brought in is to be in accordance with the Special Provisions for imported clay. All clay is to be compacted by track equipment.
- Should there be a need to dispose of small amounts of surplus on-site clay from Type II or III work, such may be used in Type I work but no additional payment will be made except where pre-approved.
- The estimated quantity of stripping of organics and providing to adjacent owners is 9,000m<sup>3</sup>.
- The estimated amount of excavation of underlying sandy silts and placement along the berms is 7,000m<sup>3</sup>.
- The estimated amount of imported clay to be brought in and placed is 16,000m<sup>3</sup>.
- All measurements are in-place measurements and do not recognize any consolidation or loss by placement.
- These quantities include the downstream portion to be constructed after the main bathtub type of construction is completed. The initial construction is to be done in the dry but ultimately the downstream 30m± will have to be constructed in the wet to join up with the Holland Marsh Canal.
- The Peterman Pumping Station will have to be improved and operational as per the Special Provisions prior to the wetting up and connecting of the Diversion Branch to the Holland Marsh canal and to the upstream construction at the SEAR roadway.
- Irrigation work, topsoil and seeding work will be separately measured and paid.

b) Type II Work

- This is the work required on the Diversion Branch over the easterly 100m± of the Bak farm site.
- The majority of the Bak and Balon farms will have been stripped of organics and the organics will have been, preferably, hauled to an on-site stockpile site adjacent to the Diversion Branch.
- In this portion, the Diversion Branch is to be excavated so the channel is 5m wider than in Type I work, thus resulting in berms being 30m± apart (centerline berm to centerline berm). The berms beside the channel are however to be built to elevation 219.5 only since they are not external berms and since they are only to be used for maintenance.
- The channel is to be excavated to elevation 216.1 over the downstream 45 to 50m.
- Channel bottom width in the deep pool will be 11m.
- Littoral shelves are to be created over 45 to 50m of the upstream channel on the inside of each berm. The channel bottom will be 217.1 in the area of the shelves.
- Approximately 1100m<sup>3</sup> of sandy silt and 600m<sup>3</sup> of clayey silts are to be excavated.
- The sandy silts and the clayey silts are to be used to construct the maintenance berms. Some materials will be necessary from Type III work to finish the berms (approximately 800m<sup>3</sup>±).
- Topsoiling and seeding of berms will be required and will be separately paid.
- The exterior berms are to be built as part of the Type III work.

c) Type III Work

- This is the balance of the Diversion Branch and will be located on the west part of the Bak and Balon farm site.
- The majority of this work will be done with the SEAR channel and road work remaining in place and with an ultimate tie-in to the 12 x 3m culvert.

- The majority of the Bak and Balon farms will have been stripped of organics and the organics will have been stockpiled elsewhere on site.
- Type III work primarily involves construction of 380m± of sediment deposition channel (25m± water width at elevation 219), 135m x 16 to 20m maintenance island, 375m of maintenance berms and 575m of perimeter berms.
- An area of the deposition channel and island is to be overdug to elevation 215.1 in order to access more clay.
- This excavation will be then filled to elevation 216.1 with the excavated silts.
- The materials excavated from the Morris Road Branch and Tributary channel work will be hauled to this site and is to be incorporated in the fill for the island and maintenance berms.
- The berm constructed by SEAR on the east side of the relocated Morris Road channel will be removed and also incorporated into island and berm fill.
- The relocated channel as excavated by SEAR will be widened and deepened on the Bak site.
- The total work involved with Type III channel work is:
  - Excavation of 9500m<sup>3</sup>± of sandy silts (centre island and channel)
  - Excavation of 18,000m<sup>3</sup>± of clayey silts (centre island and channel)
  - Shifting of 2500m<sup>3</sup>± of channel berm constructed by SEAR
  - Placing of 5000m<sup>3</sup>± of sediments hauled in from downstream and upstream ditch work
  - Filling 9000m<sup>3</sup> of clay excavation area
  - Construction of 12,000m<sup>3</sup>± centre island using excavated and hauled materials mixture
  - Construction of 11,500m<sup>3</sup>± of external berms using clayey silt materials only
  - Construction of 2500m<sup>3</sup>± of internal maintenance berms using materials mixture
- Elevations of constructed work are:
 

- Bottom of sediment deposition channel by island	216.1
- Top of island	219.5
- Top of internal maintenance berms	219.5
- Top of exterior berms/dykes	220.3
- SEAR Embankment	N/C
- Stripped areas (as per SEAR contract)	217.8 to 217.9 ±
- Riprap (shot rock) work is necessary to:
  - a) Construct 150m<sup>2</sup> of protection on island bank opposite culvert
  - b) Relay 200m<sup>2</sup> of riprap placed by SEAR on realigned north bank
  - c) Construct two submerged maintenance causeways with 600m<sup>3</sup> of material
- Topsoil, seeding, root boles, substrate work and new shot rock materials will be separately measured and paid.

d) Type IV Work

- This is the work involved with the south part of the South Morris Road Branch (Sta. 070 to 415 being what is known as Interval 1 of the South Morris Road Branch). It is the work area where a cell is to be excavated for material disposal. This work would be fully on lands owned by the Town of Bradford West Gwillimbury.
- The approximate lands available for work from the south bank of the existing channel to within 5m of the south limits of the Town would be 15m wide. This area would be previously cleared and grubbed as part of the clearing operation.
- The existing channel is 7 to 8m bottom width, 12 to 15m top and its depth varies from 1.5m to 2.0m to top of sediments with another 0.5m± to hard bottom.
- The work would involve retaining the existing top of bank dimensions but excavating the channel so that approximately 90m of deep pool is constructed and approximately 100m of littoral shelf is constructed (on one side only). The littoral shelf would be 2.5m wide and 1.0m below average water level. The deep pool would be 1m deeper than the existing bottom. Required cross-sections are shown on Drawing 12. Excavated materials are to be placed in the cell excavated to the south of the channel. Once the cell is filled, it is to be graded and then some of the organics left on site are to be used to surface the backfill (with no separate payment).
- There will be no measurement for payment for this ditch type. It will be a lump sum payment based on 3000m<sup>3</sup> of excavation, 90m of deep pool and 100m of littoral shelf, grading of materials in the cell and surfacing with on-site organics. Any enhancements to the littoral shelf, e.g. root boles, will be separately measured and paid. The cell construction will also be separately measured and paid. Clearing and seeding will be separately measured and paid.

e) Type V Work

- This is the channel work in the next portion of the South Morris Road Branch (Interval 2 – Sta. 415 to 700 with Walker Avenue culvert from 700 to 720).
- The channel lies on the east side of the Zima Parkway and Walker Avenue and on the west side of Morris Road up to the location of the barricaded Walker Avenue culvert.
- In this interval, clearing is necessary on both banks in advance.
- Work is to be undertaken from the Morris Road side. There is to be no use made of the reconstructed Walker Avenue other than by rubber-tired equipment. There is to be no hauling on Walker Avenue.
- The channel exists with a 12m± top, 1.5 to 2.0m depth from original ground and 5 to 6m bottom width.
- The work necessary is to clean the bottom and haul the materials to the Bak farm site along Morris Road. Crawler mounted rock trucks to be used.
- Alternatively the materials could be hauled to the Bak farm site using the Line 6 and small scheme dyke haul route again with crawler mounted rock trucks.
- A temporary culvert would be necessary across the Small Scheme channel to join the unopened Line 6 road allowance to the small scheme dyke.
- Any existing pipes in the Morris Road channel for either drain outlets, irrigation, and/or well lines are to be located and protected. Irrigation lines will have to be capped.
- With respect to measurement and payment, there will be no separate measurement for the earth work. The work in this interval of 382m in length will be paid as a lump sum based on 1500m<sup>3</sup> of excavation and disposal.
- Separate payment will be made for the clearing, for the capping of any irrigation lines and for the placement and removal of any temporary culverts necessary.

f) Type VI Work

- This is the work in the upper part of the South Morris Road Branch (Interval 3 – Sta. 720 to 1+458). This is the portion that runs along the back of the existing lots that front on Walker, Buce and Townsend Streets, including the two larger lots held for future development north of the existing residential lots.
- In this interval, the channel has encroached on most lots, although there are two lots that have encroached on the channel. The channel varies from a 7 to 10.5m top width, 1.2m to 1.5m± depth from original ground to top of sediments and with 0.5m of sediments and 3 to 5m bottom width. The existing channel is 1 to 2m wider north of the developed lots. The work proposed is to ensure that the west side top of bank is stabilized and returned to the property line. This will mean placement of approximately 1.5 to 2.0m of clay on the west side. On two lots, approximately 2m width of bank is to be removed. Also in this interval, due to its instability, the Morris Road embankment is to be widened out by 2.0m±.
- To allow the work to be done, the Diversion Branch will have to be in place and connected up. Also the ultimate connection between Morris Road and the SEAR should be in place or an equivalent cofferdam constructed with or without a pipe below the embankment. If there is a pipe, it is to be blocked/sealed. The work is then to be undertaken in the dry and prior fish removal/salvage will be necessary.
- Clearing is to be undertaken and the bottom is to be cleaned of all sediments and such are to be hauled to the Bak farm site for disposal using crawler mounted rock trucks.
- The stabilization work is anticipated to be undertaken by bringing in and placing imported clay from the Morris Road embankment and of sufficient quantity that equipment can work to place the clay on the west side. The work on the west side will initially involve removal of scattered building materials, riprap and scattered brush and equivalent that is in the width of land necessary to restore the bank to the top of the bank. All materials removed are to be disposed of as part of the work item.
- Sufficient topsoils are to be imported to surface all clay with topsoil (100 to 150mm) and is to be seeded.
- Erosion control matting (see Special Provision **47.0**) is to be placed on stabilized banks after seeding is completed. Alternate surfacing of the clay by the landowner may be approved by the Engineer at the time of construction.

- The Engineer will lay out the required top of bank on the west side as the work is progressing.
- The Contractor is to be prepared to cooperate with the sub-consultant undertaking the fish salvage and may be asked (with additional payment) to arrange for the rental, delivery and operation of a negative lift snorkel boom or equivalent.
- The Contractor is to be prepared to contact each owner during the work.
- Street-scape photography and construction notes for each individual lot are included in the drawings.
- There will be no separate measurement for payment of excavation, hauling, hauling in and placement and grading clay. There will be separate measurement for the clearing, the removal of building materials and existing riprap, the extension of drains, the topsoiling of the clay and the seeding and the placement of the erosion control matting.

g) Type VII Work

- This is the work required by the Report in what is called the Centre Morris Road Branch as constructed by the SEAR project.
- The work will be minimal and will be only to ensure the bottom of the channel as constructed by the SEAR project is regraded in a short portion so it drains north from the Morris Road/SEAR Road tie-in embankment to the location of the sediment deposition channel to be constructed on the Bak farm site.
- This length of channel bottom to be resloped will be 62m and the maximum depth of excavation in the bottom will be 200mm. Channel bank slopes are to remain as is. Work is to be done from the 5m maintenance berm on the east side of the channel. Materials are to be loaded into track/crawler mounted rock trucks and are to be hauled to the Bak farm disposal site.
- There will be no separate measurement for payment. The lump sum bid will be full payment for excavation and hauling.

h) Type VIII Work

- This is the work that would normally be required from Edward Street north to Centre Street as the North Morris Road Branch. Here the existing channel is approximately 13 to 15m wide, 2.0m deep from original ground with a 7 to 8m bottom width. Work on this portion would be done from the existing Morris Road side.
- Any irrigation lines, drain pipes, Bell lines, etc. crossing Morris Road would have to be located and protected.
- This 195m length however was recently (2015) improved and no work is expected now in this length.
- However, should it be found necessary to reclean this length near the end of the contract, the bottom is to be cleaned of all sediments and materials are to be hauled to the Bak farm disposal site as described for Type IX or X work.
- There is no item for Type VIII work at this time. Should it be found necessary at the time of construction to reclean this length, a negotiated price shall be executed.

i) Type IX Work

- This is the work required in the Edward Street Branch. The existing channel on the north side of Edward Street is approximately 5m in width and 1.3m± deep. There are three poles within the channel. Two are close to the top of bank but one is close to the bottom. This latter pole is to be relocated by others prior to the start of work.
- A triple pipe installation near the connection with the Edward Street Drain and the Morris Road Branch is to be removed and disposed of. If the Municipality wishes such, the pipes are to be hauled to the Municipal yard. Otherwise, the Contractor is to find a disposal site. The work to replace these removed culverts will be part of the footbridge item which will be a separate item. The removal of these pipes and their replacement with a footbridge is to be left until the end of all drain work on the west side of the new SEAR and is one of the last items of the contract.
- The work to be done is to widen the channel slightly such that a channel with a 1.5m bottom and 1.5:1 side slopes is provided even after existing riprap in the channel is reset. This will involve approximately 500m<sup>3</sup> of excavation. Existing riprap in the channel is to be removed and reset

with recessing. The area of resetting of riprap is estimated to be 600m<sup>2</sup>. The work is to be done from Edward Street.

- Access for excavation and hauling equipment is expected to be across the SEAR Road from the Bak farm staging area site. A temporary 3000mm culvert in the Morris Road channel will be required. The culvert location will be just north of the maintenance berms on the north side of the 12 x 3m culvert and will connect the Town parking lot north of Edward Street to existing Morris Road north of the 12 x 3m culvert.
- Excavated materials are to be hauled cross the new SEAR Road using this access route.
- A very short construction window will be provided for hauling across the SEAR embankment and the Contractor will be required to honour such.
- If mats or temporary granulars are required to protect the new SEAR Road, additional payment for supply and usage of mats and granulars will be provided.
- A temporary clay ramp may be necessary between Morris Road and SEAR Road embankment adjacent to the new 12 x 3m culvert with ultimate disposal of the clay on the Bak farm site.
- There will be no separate measurement for payment except for protection work with the haul route and the footbridge work. The lump sum bid is to provide for the excavation, hauling, access and removal and resetting with recessing of the riprap.
- Any existing drainage pipes coming into the channel are to be located and protected.

j) Type X Work

- This is the bottom cleanout channel work required in the north part of the Simcoe Road Branch from Sta. -099 to 000.
- See cross-section for work required.
- Approximately 300m<sup>3</sup> is to be removed
- The work is to be done from the 5m wide maintenance path to be created on the west side of the channel.
- Access for excavation and hauling equipment is expected to be across the SEAR Road from the Bak farm staging area site as described for Type VIII work. The same temporary 3000mm culvert in the Morris Road channel will be required.
- For future maintenance, the channel shall have profile and cross-section as shown herein.
- Maintenance shall be undertaken from the 5m wide maintenance path on the west side of the channel and all materials shall be hauled off site for disposal.

k) Type XI Work

- This is the work required in the north side ditch of Line 6. The only work required is to clean the bottom of the existing roadside ditch for 100m downstream and 50m upstream of Parkwood Avenue. Approximately 50m<sup>3</sup> of excavation is necessary. The materials are to be loaded and hauled to either the Bak farm disposal site or are to be hauled away and disposed of off site. All work is to be undertaken by rubber-tired equipment to protect the recently reconstructed Line 6.
- There will be no separate measurement for payment. The lump sum bid is to provide for the excavation, disposal and the protection of the road.

l) Type XII Work

- This is the work required on the Reid Branch. The only work to be undertaken is clearing in the channel over a 75m length of channel south of Line 6. The area to be cleared is approximately 1500m<sup>2</sup>. The cleared material is to be either power brushed and left on site or hauled away for disposal. The site is to be cleaned up when work is finished.
- There will be no separate measurement for payment. The lump sum bid will provide for the access, cleanup and the 1500m<sup>2</sup> of clearing.

m) Type XIII Work

- This work type pertains to the widening of the Small Scheme dyke.
- In this work, the existing small scheme dyke over a 550m length from the Diversion Branch southerly is to be cleared by power brushing or by cutting and off-site removal and disposal.

- Then imported or on-site clay is to be brought in/hailed to ensure that the dyke is widened to a width of 12m and to a minimum elevation of 219.8. See cross-sections enclosed.
- The west side slope is to be 1.5:1 and may encroach on the existing channel. Some organics are to be placed on the clay once its grading is acceptable, and then ultimately the topsoil is to be seeded.
- Existing organics may be stripped and reused for the surface organics
- The widened dyke is to be constructed such that it can be used as a haul route. Upon completion of any hauling, the surface slope is to be graded, topsoiled and left ready for seeding.
- There will be no separate payment except for seeding. The tippage fees are expected to cover the costs of the work. The lump sum bid is to be based on approximately 4500m<sup>3</sup> of clay being imported and placed and 650m<sup>3</sup> of organics being placed and left ready for seeding.
- Seeding will be separately measured and paid as part of another seeding item.

### 39.0 IRRIGATION

#### a) Irrigation Pipes on Diversion Branch

- As part of this work, eleven (11) irrigation pipe installations are necessary across the berms of the new Diversion Branch. Each pipe shall be constructed of 200mm dia. HDPE DR17 pipe materials and shall be approximately 18 to 22m in length.
- The grading of the pipe shall be such that the end at the new channel is above the water level of 219 and such that the land side is at elevation 218 to 218.5.
- Each pipe shall be equipped with a Bauer fitting and cap at the water's edge for installation of inlet piping by the owner in the new canal and is to have an 8" ANSI flange on the land side to allow an owner to join the pump to the irrigation pipe.
- To provide for walking access by the landowner to the new canal berm, for removal of end cap and for connection of inlet piping, a 6m long culvert (600mm dia., aluminized CSP, 68 x 13mm corrugations, 2.0mm wall or Series 320 HDPE pipe) with clay bedding, backfill and cover shall be used.
- The 200mm sleeve may be within or on top of this clay access in whole or in part.
- Any work necessary by the owner beyond the fittings at either end is the owner's responsibility.
- The pipe is to be installed by open cut during the clay berm construction.
- The measurement for payment will be per each irrigation line installed and will be payment for materials, installation, fittings, culvert and lane work.

#### b) Irrigation Pipes in Small Scheme Dyke

- In this item of work, 4 new irrigation lines to serve Morris Road properties are to be placed across the Small Scheme dyke and with fittings at each end as per the work for the Diversion Branch irrigation lines. Most other work is also to be the same as required for the irrigation lines into the Diversion channel.
- The crossing of the existing dyke is to be by open cut and careful backfill with compaction to the pipe is required.
- Also an access lane with a 6m length of 600mm dia. pipe and clay backfill is to be provided at each irrigation line.
- The location of each required irrigation line is to be provided by the Engineer at the time of construction.
- The measurement for payment will be per each irrigation line installed and will be full compensation for materials, installation, fittings and culvert and lane work.

### 40.0 DEEP POOLS

- The location of required deep pools are shown on the drawings.
- Sections of the channel bottom are to be overdug by approximately 1m to create a deep pool.
- At these deeper areas of excavation, littoral shelf construction will not be required.
- The purpose of the deep excavation is to provide varied fish habitat and to serve as a sediment collection area
- The excavated materials are to be disposed of in the same manner as other excavated materials.

- Where the Engineer determines soils are not suitable for a deep pool at the location as shown on the drawings, he reserves the right to direct the Contractor to construct such where soils are more suitable. All final locations for deep pools are to be approved or directed by the Engineer.
- The excavation quantities shown in the contract drawings or estimate do include the additional excavation required at deep pools.
- There will be no measurement or payment for the deep pools shown on the drawings even if such are relocated.

#### 41.0 LITTORAL SHELVES

- Where designated channel sections are required to have a littoral shelf, such will also be shown on the cross-sections and extent/scope of work notes. A littoral shelf will be a best efforts approach to fit the soil conditions. Littoral shelves will not be combined with deep pool excavations.
- The littoral shelf is to be used for habitat enhancement. The enhancement items themselves are separate items of work. The Special Provisions applicable discuss the enhancement work.
- The cross-sections for this project indicate that the littoral shelf is to be 2.5m wide. This shelf is to be approximately 1 metre below the average water level and is shown to be at elevation 218±.
- It is recognized that this shelf will be the “best effort” possible by the construction equipment in use and in the soils encountered and the stability of this shelf will be monitored during construction.
- The design of this shelf may be modified depending on soil conditions that are encountered but such modification is only to be done after necessary discussions have occurred with the Engineer and environmental consultant and with DFO.
- Where existing soil conditions do not allow the littoral shelf construction as proposed, after substantial efforts are made to construct such, the Engineer may delete its requirement or may modify the shape or size of the shelf. It is anticipated that in areas of deep peat soils with little solid material or root content, construction of the shelf may not be possible.
- Where the shelf is excavated in silt or clay soils or other non-organic materials, it shall be excavated 50 to 75mm deeper and organic materials shall be backdragged or otherwise placed on it to a depth of 50 to 75mm.

#### 42.0 GRAVEL SUBSTRATE AREAS

- This project requires in designated locations which are generally at close proximity to access points, the construction of 15m long gravel substrate areas on the littoral shelf.
- The drawings indicate the approximate locations where the Contractor is to place the gravel on the littoral shelf. Such are to be done prior to wetting up the excavation area. Generally a gravel substrate area should be constructed close to an access point.
- The substrate area is to consist of graded gravel, 75mm maximum size and is to be placed to a thickness of 300mm, to a width of 2.5m and for a length of 15m. It is anticipated that this gravel is to be brought to the site by excavator type of equipment and unloaded accordingly.
- Measurement for payment will be for each gravel substrate area constructed.
- The payment is to include preparation of the shelf and supply and placement of the gravel.
- The work will be deleted in full or in part from the contract and done by the Board if and where the Engineer directs.

#### 43.0 ROOT MASSES (ROOT BOLES)

- 1 Placement of root masses on an excavated littoral shelf are required as shown on the drawings.
- 2 Full tree placement including the root mass may be done in lieu of just root masses.
- 3 The work re root masses will involve excavating the root mass with an erect 1.2m long trunk and then inverting the root mass in the littoral shelf.

- .4 The root mass is to be placed so the 1.2 metre long trunk is forced into the littoral shelf for anchorage. As little of the root mass as possible is to protrude beyond the edge of the littoral shelf.
- .5 Full trees where used are to be of good health, the root mass is to be attached and is to be anchored into the bank and shelf (at the littoral shelf location) and the root mass is to be upstream and as little as possible of the tree is to protrude over the shelf.
- .6 Measurement for payment of root masses/trees as authorized will be per each constructed.

#### 44.0 EXTENDING DRAIN OUTLETS

##### a) Small Diameter Private Drains

- Any small diameter private drain outletting into a channel that is being reworked is to be extended with a length of equivalent sized pipe. The drawings indicate where known outlets exist.
- The work is to be done such that a careful junction with the existing pipe is made and attention is required to bedding and backfill of the pipe. Granular bedding below and to top of pipe will be required. Type of granular will be dictated by soil type.
- Backfill above granular to be with materials similar to adjacent materials and will in most cases be paid as part of Ditch Work Type VI
- Topsoil and seeding will also be part of other tendered items.
- There will be no separate distinction made between materials and lengths. This item will be paid per drain extended. No drain will be larger than 300mm in diameter.
- The measurement per extension will be full compensation for supplying pipe, joining to existing pipe, wrapping and protection of junction, granular, bedding, and backfill and restoration.

##### b) Extending Town Storm Drain Outlets in Portion Between Walker Avenue Culvert and Centre Morris Road Branch

- In this interval there are three known storm sewer outlets. One or more of these exist with a concrete headwall.
- The work necessary is to extend the storm pipes with equivalent sized pipe. The pipes have been measured to be 200 to 375mm in diameter. It is expected the new outlet will be approximately 2m east of each existing outlet.
- A new concrete headwall is to be constructed at the outlet of the pipes pursuant to OPSD 804.030 or an equivalent cast-in-place outlet wall is to be constructed. The old headwalls are to be removed and disposed of off site.
- Attention is necessary to bedding and backfill for the pipe and the headwall. Bedding and backfill granular shall be suitable for the soils encountered. Backfill above granular to be clay materials with surfacing of organics. In most cases, the trench for the extension will be through the clay embankment that is to be constructed and topsoiled and seeded as part of the Type VI work.
- The measurement for payment for each Town storm outlet extension will be per each outlet extended and is to include payment for the removal and the disposal of the headwall, the pipe materials, bedding and backfill.

#### 45.0 SHOT ROCK RIPRAP

- There are various locations on this project where shot rock stone is required as a riprap material but as part of the item. However additional shot rock may be authorized as contingency work.
- The shot rock is to be graded crushed rock with a minimum stone size of 150mm and a maximum stone size of 500mm. Sufficient fines are to be included with the materials to completely fill voids. Some clay materials (up to 10%) may be mixed in, on site, with the shot rock materials. The materials are to be placed on a 3:1 slope or such other steeper slope if directly approved by the Engineer. Materials are to be placed to a 500mm thickness. The materials are to be placed on a geotextile fabric designed for use under riprap materials. Manufacturer's recommendations are required for any material selected.
- Where the Engineer directs that the shot rock material is to be placed without filter fabric, the Contractor is to exclude the filter fabric. No variation in payment will be made.

- Shot rock is to be placed such that the toe of the material is placed to a minimum width and depth of 1m, and the material is to be placed to a 1m minimum width at the top of the riprap area, again to the 0.5m thickness.
- The Contractor will be required to obtain pre-approval of the sources of the shot rock material.
- The actual amount of shot rock placed as contingency work will be measured per square metre as authorized and will be paid at the applicable tendered contingency rate.

#### **46.0 SURFACING OF NEW DYKES, CLAYS AND THE ISLAND WITH TOPSOILS**

- Under this item, the new external dykes, the maintenance berms, the island area and the stabilized banks are to be surfaced with 100 to 150mm of approved topsoil. Topsoil does not have to be screened but it is to be clean topsoil free of any contaminants. On this project, it is expected to be a combination of approved imported topsoil and excavated organics from the job site. The maximum component of excavated organics is to be 50%.
- There will be separate measurement for hauling in imported topsoil to a stockpile site.
- There will also be separate measurement for hauling excavated on-site organics to the stockpile site.
- The measurement and payment in this item will be for the blending, loading and hauling of the mixed organics and its placement in the required area.
- The topsoil is not to continue into the new ditches. The topsoil is to be spread and graded and left ready for seeding.
- Topsoil work will be measured and paid per cubic metre (m<sup>3</sup>) of material placed.
- The approximate estimated amount is 4,000 to 5,000 cubic metres.

#### **47.0 EROSION CONTROL BLANKETS**

- Erosion control blankets, or approved equal, are to be placed, when directed by the Engineer, along sections of stabilized channel banks in Interval 3 of the South Morris Road Branch.
- The blanket is to be placed while the face is in the dewatered condition.
- Since the slopes are in the range of 1.5:1 to 2:1 and the bank is located in an area with a low flow velocity and in an environmentally sensitive area, a biodegradable single net straw erosion control blanket is acceptable.
- This product must be laid on the bank of the canal and anchored into place using the standard Surelock 15cm wire staples. The staples shall be installed according to the manufacturer's (DOT System) staple pattern. The blankets should overlap each other by 0.10m.
- An acceptable product is SI00B by Terrafix.
- Other approved equivalent products will also be considered by Engineer. Approval must be obtained prior to ordering/construction.
- Work is to be done as per detailed drawings for the Terrafix drawings included on Drawing 70.
- Measurement for payment will be in square metres of blanket supplied and placed as directed by or approved by the Engineer and will be full compensation for supply, placement, and stapling.
- The payment will be at the item unit price tendered.
- Where the Contractor requests, the Board may order the blanket and have such delivered to the site for unloading and use by the Contractor. The costs for such will be pre-discussed and will be deducted from any payment made under the item.

#### **48.0 SEEDING OF TOPSOILED AREAS**

- Under this item, all topsoil work once graded and approved is to be seeded.
- The seed mixture is to be:
  - Terraseed Greenfields
  - 5% White Clover
  - 20% Perennial rye
  - 20% Tall Fescue
  - 15% Creeping Red Fescue
  - 10% Timothy

- 10% Kentucky Bluegrass
- 20% Annual Ryegrass
- The fertilizer is to be 5:20:20.
- The application rate is to be 5 bags of seed plus 3 bags of fertilizer per hectare of area (based on using 60 lb bags).
- Seeding work will be measured and paid per square metre (m<sup>2</sup>) of material placed.
- If, and even where, seeding is authorized at non-topsoil areas, the application, measurement and payment for seeding will be the same.

#### **49.0 REMOVING WALKER AVENUE CULVERT**

- This pertains to the removal and disposal of the barricaded 20m length of 2700mm (3400 x 2250mm) arch CSP pipe. Once all drain and SEAR work is completed, this culvert is to be carefully removed and is either to be hauled to the Municipal yard for salvage or is to be disposed of by the Contractor off site. The Contractor will be advised of the disposal to be done once the culvert is excavated.
- There will be no separate measurement for payment. The lump sum bid for the replacement culvert will provide for its removal and disposal. If the original arch pipe is to be used in 10m lengths temporarily at separate locations, the temporary usage will be paid pursuant to Special Provision **37.0** for 3000mm dia. pipes but at 1.5 times the rate due to the location and age of the existing pipe.

#### **50.0 SUPPLY AND PLACEMENT OF PIPE CULVERTS**

- This item is particularly involved with culverts below the new irrigation access lanes, the culvert to be placed below the Morris Road tie-in and the culvert to replacement at the barricaded Walker Avenue location.
- Under this item, high density polyethylene piping (HDPE) is to be supplied with bell and spigot gasketed joints for all pipe 900mm dia. and smaller.
- For the larger pipe involved, aluminized corrugated steel pipe materials (CSP) are required.
- If approval is given to use aluminized CSP in lieu of 900mm HDPE, these provisions will apply.
- The following notes apply to each type of piping.

*i) High Density Polyethylene Pipe (Smooth Wall Plastic Pipe) for Culverts 900mm (36") dia. or Smaller*

Manufacturer's recommendations regarding bedding and joints to be followed. Use bell and spigot gasketed couplings wrapped with filter fabric. Pipe to be solid, Big O Boss 2000 (Series 320) or approved equal. Joints, if any, with concrete or steel pipe to be tight and to be wrapped with filter fabric. Shaped bedding, non-compacted granular or equal, to be used. Backfill to top of pipe is to be granular or equal material and is to be well compacted.

*ii) Corrugated Steel Pipe (CSP)/ Aluminized Corrugated Steel Pipe*

Corrugated steel pipe may be used for 900mm or less diameters only where specifically approved by the Contract Administrator but is anticipated to be required for all pipe larger than 900mm dia. Where approved, steel pipe is to have wall thickness as specified herein (600 to 1000mm dia. – 2.0mm wall; 1100 and 1200mm – 2.8mm wall) and corrugations of 68 x 13mm for most pipe. Corrugations of 125 x 25mm to be used for pipe 1200mm dia. or larger. Engineer to pre-approve wall thicknesses for 125 x 25mm corrugations but generally wall thicknesses for this type of pipe is to be as follows: 1200mm to 1600mm - 2.0mm wall; 1800mm - 2.8mm wall; larger than 1800mm - 3.5mm wall. All steel pipe (CSP) is to have an aluminized treatment. Standard couplings are to be used. All couplings are to be wrapped with filter. Shaped bedding, non-compacted granular or equal, to be used. Backfill to top of pipe is to be granular or equal material and is to be well compacted.

iii) Placement of New Culverts on Existing Lanes

Any existing culvert(s) is to be removed and hauled away, as directed by the Contract Administrator. Utility locates are required in advance of any work. Careful attention is required to the grade of the new culvert. The drawings may indicate ditch grades and new pipe grades. If at all possible the culvert can be given a slight reverse camber in the centre of the crossing to allow for some settlement but such should be minimal. In all cases, the location of the culvert should be verified with the landowner. Where the culvert is installed across well traveled laneways, careful centering of the culvert is required to ensure that side slopes are uniform on each side. The work in installing a culvert is to include excavating the required ditch up to the section. Ensure the design grade and not the existing grade is used. The work shall include the following: use Granular "B" for bedding and backfill to top of pipe, then imported clay material to subgrade of Granular A. The surface restoration over any new culverts is to be equal to or better than the surface of the existing laneway. Use asphalt surface if asphalt exists and to equal existing asphalt in type and thickness. With or without asphalt, use 300mm minimum of Granular "A" above the clay backfill. The minimum cover is to be 300mm. Details should also be reviewed with the Contract Administrator. The minimum lane width for equipment should be 5.5m. Side slopes would be 2:1 or 3:1. Shot rock stone (graded and quarried stone with sizes varying from 150 to 500mm and including fines) may be required on the side slopes and may be used under the Granular B base. Filter fabric underlay to be used under shot rock. Shot rock if requested is to be measured and paid as part of the contingency item for shot rock. Where surfaces are to be earth only, the clay backfill is to blend with adjacent earth surfaces and is to be graded and levelled with 50mm of topsoil and is to be seeded.

iv) Placement of New Culverts on Irrigation Access Lanes

The location of the access lane for irrigation inlet attaching will be set out by the Engineer. The lane is to be a 3m surface width only to discourage any use made of it by other than pedestrians or four-wheelers. The culvert is to be 600mm dia. HDPE Series 320 or aluminized CSP 2.0mm wall as specified above and is to be set to match existing or new ditch bottom (hard bottom not top of sediment elevation). A shaped native soil bottom and tamped native soil backfill will be sufficient. If the Contractor chooses to use some granular to give a better bottom and some granular for backfill to the pipe, such is encouraged but not necessary. A minimum cover of 300mm is to be provided to the crossing. End riprap treatment is not required. The bid price for each irrigation line is to include the culvert and lane as described.

v) Walker Avenue Replacement Crossing

The existing culvert is to be removed and hauled away, as directed by the Contract Administrator, and the new pipe is to be installed in its existing location. Utility locates are required in advance. Asphalt edges are to be saw cut. Trench bedding, pipe cover, backfill and road restoration is to be as per the trench detail on the drawings. The elevation of Morris Road at the new culvert location will have to be raised to ensure a minimum of 500mm of cover exists to the new pipe. Excavated material between the surface granular and the pipe backfill granular is to be carefully saved and reused, if clay and if deemed acceptable, so that within the frost penetration zone, backfill materials mirror the native materials. If existing materials are not suitable clay, borrow materials that are approved by the Contract Administrator are to be used to simulate existing conditions. Also the culvert replacement may be done in the dry by temporarily blocking off the tie-in culvert and by constructing a small cofferdam downstream of the Walker Avenue culvert. Desirably Morris Road should not be closed and one lane should be open at all times unless approval is obtained from the Town. However, this decision may be made later. After the Walker Avenue culvert is replaced, and provided the tie-in of Morris Road to the SEAR is completed, the road at the former barricaded culvert location may be, or may be kept, closed. Signage and flagging must be provided as required by, and approved with, the Town in advance of construction.

Contact utility companies 7 days minimum before any work. Utilities are to be exposed and protected as necessary. If required, excavate sufficient of each line to obtain slack to lower

or raise such. If relocation of any utility is necessary, the contractor is to advise the Town and Utility Company. Any work is to be either done by or at the expense of the Utility Company.

Compaction of all backfill is required (98% on earth and on granular). Asphalt to be placed when conditions are suitable.

The Contractor will be required to place additional Granular A from granular level to asphalt level if asphalt work is delayed.

Shot rock riprap on filter fabric underlay on 10m<sup>2</sup> of area is to be placed to a 500mm thickness at each end of the new culvert. See previous note re access culverts for shot rock stone work.

This specification would apply to any other culvert installed across an existing road.

If the work involves lowering of a road culvert only, the applicable portions of the above specifications shall apply.

- v) These will be lump sum items and no separate measurement will be made.

## 51.0 MORRIS ROAD MAINTENANCE AND RESTORATION

- During the drain work, Morris Road shall be maintained free of mud and in a well graded granular condition. One lane for traffic shall always be provided.
- Upon completion of full work, the final restoration of Morris Road shall be undertaken and shall involve the supply and placement of additional Granular A materials as necessary (it is assumed an average of 50mm of new Granular A will be necessary), grading of such, and then the asphalt surfacing of the road with SP12.5 asphalt to a 60mm compacted thickness and to a 5m width.
- At the Morris Road tie-in, the asphalt width is expected to vary from 6m at the flare to 5m at the existing road, and is to be included in this item.
- The measurement for payment will be per tonne of Granular A supplied and placed and will be payment for granular supply, placement, compaction and grading. Asphalt work will also be measured per tonne of asphalt supplied and placed and will be payment for preparation, supply, placing, and compacting.
- Estimated quantities are 400m<sup>3</sup> (800 tonnes) of Granular A and 850 tonnes of SP12.5 asphalt.
- All work is to be in accordance with OPSS 1010 for granular and OPSS 310 for asphalt.
- A contingency is also carried to construct 40m of steel beam guide rail with two energy absorbing end treatments on the tie-in embankment in the area of the channel work.

## 52.0 REMOVAL AND DISPOSAL OF EXISTING PUMPING STATION

- This work will involve careful removal of all components of the existing pumping station.
- The existing pump and diesel especially are to be carefully removed for re-use on the project unless specifically directed to be removed and disposed of.
- All discharge piping is to be removed and disposed of.
- Any other piping, concrete, steel, wood materials or other construction that is not required is to be removed and disposed of off-site.
- The area is to be left ready for final construction of the replacement pumphouse.
- The work is to be done with the Drainage Superintendent on-site to review materials as they are removed, to determine if any materials in addition to the pumps, could be salvageable for further use.
- This work will be part of the lump sum item (see Special Provision **53.0**) for the new pumping station, and no separate measurement will be made.

### 53.0 NEW PUMPING STATION

- The new pumping station will be constructed at the location of the existing Peterman Station.
- The design basis of the new pumping station is to remove 25mm (1") minimum of water from the watershed west of the Diversion channel in a 24-hour period.
- A high capacity 150mm (6") mobile pump with discharge piping is to be supplied and available for use after the existing station is dismantled and before the new station is completed.
- The station foundation and wet well is to be constructed with sheet steel piling walls with walers and bracing as necessary. The walls are to extend from the framing level for the new floor elevation (219.7±) to a depth of 215.4m± which will be the base of the wet well for the pumps, and then to a further elevation of 207.7.
- The foundation for the pumping station building will be the sheet steel walls on three sides and part of the fourth.
- A trash rack to prevent large debris from entering the wet well and plugging the pipe intake is required. The trash rack will be sloped to allow manual cleaning of debris. The trash rack is to be accessible from a steel mesh walkway at the top of the trash rack. The walkway will be sloped in part and is to have a railing
- The framing for the trash rack and any access walkway is to be as per the design drawings and may involve additional shallow sheet steel sections plus brackets secured to the sheet steel walls of the main structure.
- The floor of the wet well is to be constructed with poured-in-place reinforced concrete. The steel reinforcement will be welded to the sheet piling. This will prevent the concrete base slab from heaving up due to uplift water and earth pressure in the sump.
- The floor of the wet well will be graded to a sump so that a trash pump or equivalent can be placed to dewater seepage at the time of wet well maintenance.
- Minimum building size is 4.5m± x 4.5m± outside dimensions. The building will be constructed with a concrete floor supported by steel floor deck and steel floor beams. The walls of the building will be insulated 2 x 6 wood frame construction. Exterior finish will be vertical steel siding on the walls, and steel roofing. Roof will be constructed using pre-fabricated trusses. An access hatch for pump removal will be necessary.
- An exchange fan and a louvered air intake grill will be necessary.
- Existing electrical service is to be maintained for lighting and the control system.
- The pump will be powered by an auto-start diesel. Pump control panel will control the start up and shutoff of the diesel. Pump control panel is to be based on sonar principals as opposed to floats.
- New pump to be installed in the pumping station is to be a minimum of 2000 gpm.
- The pump and diesel from existing station are to be salvaged and installed inside the new building as a backup system (unless directed otherwise at the time of construction).
- A new discharge line for the existing pump will be necessary.
- Discharge lines are to be a minimum of 200mm diameter for the new pump and 300mm for the existing pump and are to have flap gates. The pipes are to be PVC Schedule 80 pipe.
- The discharge pipes are to be self draining.
- This contract document sets out the minimal requirements for the pumping station and the selected contractor is to supply design build drawings and shop drawings to show how the requirements of this report are met.
- As an alternate to a package system involving an auto start diesel and pump and control panel, the Contractor may propose a package involving a diesel generator, an electric motor and comparable control system. The Project Administrator will reserve the right to accept or reject the diesel generator approach.
- Access for construction is either to be from the Small Scheme dyke off of Line 6 or Interval 1 of the South Morris Road Branch, or from the Diversion right-of-way.
- Access for maintenance is to be from the west berm of the Diversion Branch.

### 54.0 FOOTBRIDGE CONSTRUCTION

- On the Edward Street Branch, three existing arch metal pipes are to be removed and disposed of as part of the Type IX work proposed on Edward Street.

- To replace the crossing, a 12m x 3m pedestrian footbridge (with design to pass municipal maintenance equipment) is to be constructed as part of this contract.
- Drawing 71 applies to this construction.
- Shop drawings are to be submitted for the footbridge work to show how the following design requirements are implemented:
  - Clear span between panels to be 3m
  - Maintenance vehicle loading (80 kN) to be accommodated
  - Decking to be 2 x 6m ash wood decking
  - Footbridge to be prefabricated steel structure (Pratt style trusses)
  - Reinforced concrete bridge seats (steel seats may be acceptable subject to approved shop drawings)
  - Battered H Pile (12 x 74) foundation, 4 on each side and to 6m depth (alternate foundation may be acceptable subject to approved shop drawings)
  - 24 square metres of precast concrete armour stone riprap on filter
- There will be no measurement for payment. The lump sum bid is the full compensation for shop drawings, excavation, foundation, bridge seats, riprap and structure.

#### 55.0 SILT FENCES (CONTINGENCY ITEM)

- .1 Silt fences or equivalent may be required on the edge of any canal or water surface if and where it is necessary to restrain excavated or backfilled materials (Engineer will direct). The Engineer may direct that erosion control blankets be used in lieu of silt fence.
- .2 The Contractor may prepare for the Engineer's review and approval, if he wishes, alternate means of restraining excavated or backfilled material in lieu of silt fences.
  - The drawings do not indicate specific locations for silt fences.
  - Silt fences shall also be placed at any location where the Engineer deems that the construction methods could cause silts and sediments to enter a watercourse or worked field or lawn area.
  - Silt fences are not required in areas of existing channel cleanout but may be required in areas of backfilling and/or new cut as directed.
- .3 Silt fences are to be maintained, removed and disposed of when directed by the Engineer. The specification for silt fences shall be as follows:  
OPSD 219.110 (light)  
OPSS 182
- .4 Measurement and payment for silt fences at required locations will be paid per lineal metre as part of the Contingency Item.

#### 56.0 SCREENED ORGANICS (TOPSOIL) (CONTINGENCY ITEM)

- This item will involve the hauling to a stockpile site and the screening of on-site organics.
- The method and equipment to be used for the screening is to be pre-approved by the Engineer.
- The screened organics (topsoil) are to be stockpiled until the end use is decided on. Hauling of screened topsoil will be also separately paid.
- The total amount of screened topsoil contingency to be placed on this project is 100m<sup>3</sup>.

#### 57.0 COFFERDAM CONSTRUCTION

- .1 General
  - a) This project may require cofferdams at various locations. At this time, none are specifically called for.
  - b) Cofferdams are to be earth cofferdams unless otherwise authorized.

- c) The cofferdams, if any, are to be located as per the instructions from the Project Manager and/or Engineer.
  - d) The payment for cofferdams will be as per the applicable Work Type item. No difference in payment will be made for any material used even if materials other than earth are approved and used. There is not much likelihood that materials other than “clay” will be acceptable for cofferdams.
  - e) The following provisions apply to construction of cofferdams as required by this Project.
- .2 With respect to earth cofferdams:
- a) Earth materials capable of stability in wetted conditions are to be used.
    - The material is to be placed and tamped in place or compacted by excavator buckets and track equipment (dozer) as much as possible.
  - b) Minimum cross-section for an earth cofferdam is to be 7 metre top width and 3:1 side slopes.
    - Minimum top of cofferdam is to be at the elevation shown on the drawings.
  - c) Earth materials to be supplied by the Contractor are to be pre-approved with the Engineer and are to satisfy Special Provision **28.0**.
  - d) All earth cofferdams are to be constructed to allow passage of excavation equipment for access purposes and/or for emergency purposes should it be necessary to remove such due to high water conditions.
  - e) The Contractor is advised that where earth cofferdams are constructed in sections with substantial sediments (example in old river beds), the earth cofferdam is to be over-constructed sufficiently in width and height to displace underlying sediments.
    - Some of the placed longitudinal materials used for this surcharging will no doubt have to be excavated and disposed of when final restoration occurs.
  - f) Cofferdams are to be removed and disposed of when their use is finished.
- .3 Measurement and Payment:
- There will be no measurement and payment for this item since tipping fees should exceed placement and removal.
  - Erosion control blankets and seeding if required on any cofferdam would be separately paid.

## 58.0 ENVIRONMENTAL MEASURES GUIDELINES

### .1 Spill Prevention and Response Guidelines

#### Purpose

The purpose of this guideline is to provide a procedure to prevent and also to immediately respond to a spill and to minimize impact to the land and/or water environment in the immediate and surrounding area when necessary. The procedure for clean-up, containment, disposal, authority to contract emergency spill contractors, on-site equipment and migration will be covered in the following plan.

#### Criteria

A Spill is defined as a pollutant discharged, from a structure, vehicle or other container that is abnormal in quality or quantity into the natural environment.

#### Potential Contamination

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals
- Fuels
- Lubricants
- Other petroleum distillates

#### General Response

Initial response to any spill on the project site is:

1. Ensure safety in the spill area
2. Stop the flow of hazardous material safely
3. Secure and isolate the affected spill area

The first responders shall safely take actions to prevent additional spillage, utilize on-site resources and notify the person in authority and appropriate regulatory authorities. If the spill is large in nature and can't be controlled with on-site resources call the project engineer (both Kitchener and Site) immediately and the Spill Response Team will be notified. Any spills reaching a watercourse must be reported to the Ministry of Environment immediately by the contractor. The contractor shall also notify the municipality and owner if on private land.

#### Spills on Land

The first action for clean-up of land based spills is to prevent the spread to watercourses and/ or canals by containing or damming the spill. Second limit the saturation of the material deep into the soils by removal of liquid by absorbents or pumping. When the free liquid is contained, steps can then be taken to collect all contaminated soil for later disposal.

#### Spills into Water-courses or Water-bodies

The first action for clean-up should be to immediately stop the spread of the spilled material downstream. This can be accomplished with the use of absorbent booms and absorbent material designed to pick up oil. Spills into watercourses have the potential to cause environmental damage and must be reported to the Ministry of Environment immediately.

#### General Cleanup and Storage Procedures

##### a) Minor Spills

Minor spills typically involve small quantities of oil, gasoline, paint, etc., which can be controlled by the first responder at the discovery of the spill.

- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Remove the absorbent materials promptly and dispose of properly.
- The practice commonly followed for a minor spill is:
- Contain the spread of the spill.

- Recover spilled materials.
  - Clean the contaminated area and/or properly dispose of contaminated materials.
- b) Semi-Significant Spills  
Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.
- Notify the Ministry immediately.
  - Contain the spills immediately:
  - Notify the project inspector immediately. The inspector shall notify the Project Engineer.
  - Contain spread of the spill.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.
- c) Significant/Hazardous Spills  
For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps shall be taken:
- Notify the Ministry immediately.
  - Notify the project engineer immediately.
  - Stop all construction activities within the interval where the spill occurred.
  - Contain the spill immediately.
  - Call emergency spill contractor if not able to reach the project engineer.
  - Call all organizations in emergency contract list.
  - Minimize containment area affected with on-site equipment.

Implementation

To the extent that it doesn't compromise clean-up activities, spills shall be covered and protected from storm water run-on during rainfall.

- Spills shall not be buried or washed with water.
- Used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose shall be stored and disposed of in conformance with the special provisions.
- Water used for cleaning and decontamination shall not be allowed to enter storm drains or watercourses and shall be collected and disposed of in accordance with MOE protocol.
- Water overflow or minor water spillage shall be contained and shall not be allowed to discharge into drainage facilities or watercourses.
- Proper storage, clean-up and spill reporting instruction for hazardous materials stored or used on the project site shall be posted at all times in an open, conspicuous and accessible location.
- Waste storage areas shall be kept clean, well organized and equipped with ample clean-up supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers and liners shall be repaired or replaced as needed to maintain proper function.

On-site Resources (Preliminary Kit Materials)

Total quantity	Item	size	Purchase units	Current amount
1	Steel drum	45 gallon	Drum	
450'	Heavy Absorbent rolls	30" x 150'	Bale, 150' roll	
1	Spill Placard		item	
1	Car shovel		item	
20	Large garage bags	3mm, 147L	Box, 10 bags	
100	Absorbent Pads	15" x 18"	Box, 100 pads	

100'	Absorbent socks	3" dia x 10'	Bale, 10 socks	
160'	Absorbent booms	5" dia x 10'	Bale, 4 socks	
10	Absorbent pillows	18" x 18"	Box, 10 pillows	
1	Utility knife		item	
100	Plastic Tie-wraps	6"	Box, 100 ties	
1	Personal protective equipment	Goggles, gloves, full body suit	Item	
3000 sq. ft.	Polyethylene "Ultra" vapour barrier	8.5' x 175'x6mm	Roll, 1500 sq. ft.	
150'	Containment boom	18" x 50'	Sections, 50'	
1	Containment berm, track mat and ground pad,	15' x 54'	Item	
1	Emergency guidebook		Book	
1	List of items and where to buy more supplies		Book	

#### Guideline Communication

These guidelines are to be made available to all employees and sub-contractors on site.

#### Monitoring of Clean-Up and Restoration

The clean up and restoration of every spill will be monitored by the project engineer site and office. The project inspector will be in contact with the project engineer and appropriate government agencies, as required. The spill response contractor will be responsible for restoring the contaminated site to its previous state.

#### Debriefing

After the clean up of a significant spill is complete, the contractor is to hold a debriefing with all involved personnel. This debriefing will include the following:

- What caused the spill? Review all stages of the incident from first identification to final clean up.
- What can be done to prevent a similar incident from happening again?
- Review with response personnel why the incident went right/wrong.
- What equipment was useful or not useful?
- Was there sufficient equipment?
- Nature of response; could the incident have been avoided?
- How could the response have been improved?

This debriefing will be included in a report to the Provincial and Federal and regulatory authorities, as required.

#### Report Filing

At the end of the clean up, a detailed environmental report will be filed with the province and government regulatory agencies, if required.

#### Emergency Telephone Numbers

Organization	Telephone
Project Engineer Kitchener	519-748-1199 Cell 519-658-7610
Town of Bradford West-Gwillimbury	905-775-0163
MOE Spills Action Centre	1-800-268-6060
Fisheries and Oceans Canada, Fisheries Officer	1-905-336-4764
Lake Simcoe Conservation Authority Officer	1-800-465-0437
Spill Response Firm (Team-1)	(905) 383-5550
Holland Marsh DSJMSB	Sarah Murray- 1-905-788-4321
Drainage Superintendent/Project Manager	Frank Jonkman 1-905-967-5306
Ministry of Natural Resources Officer, Simcoe	1-705-725-7500
Simcoe & Muskoka Health Department	1-877-721-7520
Fire Emergency	911
Police Emergency	911
Ambulance	911

### Prevention Measures

All vehicles must be filled at least 15m from any watercourse or environmental sensitive areas. All vehicles must use an environmental friendly hydraulic fluid. All vehicle maintenance must be done, on an impervious surface at least 15m from any watercourse or environmental sensitive areas. A spill kit must be in all construction vehicles, and be properly stocked. Verify weekly that spill control clean up materials is located near material storage, unloading and use areas.

### .2 Fueling Guidelines

Due to the shallow groundwater and proximity to watercourses, fueling and maintenance of heavy equipment used in the excavation and filling operations will, wherever possible and where access permits, be conducted away from the canals to minimize potential for accidental discharge or spillage of petroleum, oil, lubricants (PO) to the aquatic environment. This can be done by fueling on roadways away from the water body. A POL station will be established for each reach where accidental spillage, if any, can be effectively trapped and cleaned up without direct loss to the canals or tributaries. This can be done by construction an impermeable layer on the ground to refuel the vehicles. There are a number of different techniques that could be used to build an impermeable layer.

- 1) A onetime use Polyethylene plastic sheets with a absorbent sock surrounding the vehicle as a berm. Since the tracks of the vehicles can easily puncture the plastic this would be a onetime use alternative.
  - a. This alternative cost about \$0.6/m<sup>2</sup> per refuel plus time.
- 2) A layer of heavy absorbent matting. One must ensure that the matting does not rip; therefore a heavy absorbent mat should be used. This alternative can be use a number of times until the mat is heavily ripped.
  - a. This alternative cost about \$3/m<sup>2</sup> and must be replaced after ripped or when fabric is used.
- 3) A usable containment berm could be used. This is a reusable prefabricated folder open container that vehicles can drive onto. The container is made of plastic with a hard plastic track bottom to protect the container from the tracks of the vehicles.
  - a. This alternative cost about \$60/m<sup>2</sup>
- 4) A bermed area with a 200mm thick clay base.

### Pollution Prevention

- Use properly maintained off-site fueling stations whenever possible. These businesses are better equipped to handle fuel and spills properly.
- Educate employees about pollution prevention measures and goals.
- Focus pollution prevention activities on containment of spills and leaks, most of which may occur during liquid transfers.
- "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Manage materials and waste to reduce adverse impacts on stormwater quality.
- Post signs to remind employees and customers not to top off the fuel tank when filling and signs that ban customers and employees from changing engine oil or other fluids at that location.
- Report leaking vehicles to fleet maintenance.
- Ensure the following safeguards are in place:
  - Overflow protection devices on tank systems to warn the operator to automatically shutdown transfer pumps when the tank reaches full capacity.
  - Protective guards around tanks and piping to prevent vehicle or forklift damage.
  - Clear tagging or labeling of all valves to reduce human error.

### Fuel Dispensing Areas

- Maintain clean fuel-dispensing areas using dry cleanup methods such as sweeping for removal of litter and debris, or use of rags and absorbents for leaks and spills.
- If you periodically clean by washing, place a temporary plug in the downstream drain and pump out the accumulated water. Properly dispose the water. Note: permission from the local sewerage agency must be obtained before discharging wash water to the sanitary sewer.

- Fit fuel dispensing nozzles with "hold-open latches" (automatic shutoffs) except where prohibited by local fire departments.
- Post signs at the fuel dispenser or fuel island warning vehicle owners/operators against "topping off" of vehicle fuel tanks.
- Design fueling area to prevent stormwater runoff and spills.
- Cover fueling area with an overhanging roof structure or canopy so that precipitation cannot come in contact with the fueling area and use a perimeter drain or slope pavement inward with drainage to sump; pave area with concrete rather than asphalt.
- Install vapor recovery nozzles to help control drips as well as air pollution.
- Use secondary containment when transferring fuel from the tank truck to the fuel tank.
- Post "no littering" signs.

#### Procedure for refueling vehicles and general maintenance

- 1) All vehicles must drive to designated areas, if not at a road or close to a watercourse, a constructed impermeable layer must be constructed before the vehicle is refilled or maintained. The refueling or maintenance areas should be placed on cleared, level ground (less than 2% slope), with no overhanging vegetation and with no visible direct course to a waterway. Refueling in rain or snow should be minimized.
- 2) After the impermeable layer is constructed, the vehicle can be driven on the impermeable surface and then maintenance or refueling can occur. During refueling a person must be at the vehicle at all times. The vehicle tank and gas cap must be in good working order and shape. A large spill kit must be on hand during all maintenance and refueling operations. All vehicles should not be topped off during refueling to minimize over filling the vehicles.
- 3) After the refueling or maintenance is finished, the vehicle is driven off the impermeable surface must be disposed of or cleaned off dry.

#### Remote Site Fueling

- 1) Where remote fueling is necessary, the Contractor shall propose his method to supply fuel to the equipment.
- 2) Remote fueling situations would exist where excavation equipment is working on the outside of an existing canal and cannot be moved to a designated fueling location.
- 3) Where such remote fueling is necessary, containment channels or piping for lines that extend across any open water body are necessary.
- 4) Fuel containment and spillage kits are to be located at the fuelling truck and are also to be on at the equipment being fueled.
- 5) If transportation of fuel occurs across any open waterbody by barge or boat, a containment system is necessary on the barge or boat to confine any spillage that should occur.
- 6) It will be necessary for the Contractor to have pre-approved his method of fueling remote equipment.

#### Emergency Maintenance or Refueling

- 1) All leaks or spills must be immediately contained.
- 2) A berm should be constructed around the vehicle. Absorbent pads should be placed under the vehicle.
- 3) If fuel is needed the fuel should be brought in an airtight plastic container.
- 4) The vehicle should be inspected to ensure no other damage or the vehicle is in working order.
- 5) Once the vehicle is fixed or refueled it can be driven off the containment area. The absorbent pads should be disposed.

#### Hydraulic Fluids

- 1) The use of biodegradable hydraulic fluids is required on this project for any equipment working in water.
- 2) The Contractor shall be required to provide verification at the time of project start up that all equipment working in water to clean or excavate canals or to otherwise work, across or through any canal or water body is operated with biodegradable hydraulic fluids.

- Where designated fuelling stations cannot be provided for due to equipment working in a non-accessible area, the following provisions for remote fuelling shall apply.

- a) The Contractor shall submit and have pre-approved his plan for remote fuelling.
  - b) If fuel lines have to be extended across the canal being backfilled, lines shall be laid in channel iron sections, carried across the watercourse by means of a bridge or pontoons that confines any leakage to the channel or pipe section. As well, absorbent materials shall be available to be placed in the channel section to provide for collection of any spills. Fuel lines shall be specially constructed to provide for lengthy reaches.
  - c) At the equipment location being fuelled, pans shall be placed below the fuelling nozzle and self-absorbent materials shall be in close proximity to provide for any spillage.
  - d) Provisions shall also be in place at the fuelling truck to ensure that pans are available to be used below any lines leaving the vehicle. Also absorbent material shall be in close proximity and shall be used where necessary.
  - e) Consideration will be given to having mobile fuelling tanks in the vicinity in the remote location that are fuelled from fuel trucks and where such fuelling tanks are mobile such that they can be brought to the equipment to be fuelled.
  - f) Fuel containment and spillage kits shall be pre-approved and shall exist on both sides of any waterbody.
- Where fuelling is necessary from, or for equipment working on, barges, the following general notes shall apply:
    - a) The plan for such refueling must be submitted and pre-approved in advance
    - b) Any barges that are to be used for transporting and support of excavation equipment shall have waterproof rails on the perimeter of the barge capable of containing any fuel spillages.
    - c) The barge shall be equipped with absorbent type materials to be used should a spillage occur.
    - d) Equipment shall be filled from the barge while the barge is stationary and secured and at as close of a location as possible to shoreline.
    - e) Where fuel lines must extend across open bodies of water to access the barge and/or equipment on the barge, sections of channel material that is waterproof shall be used as a sleeve on which the fuel line is to be placed. The sleeve material shall be of sufficient strength that it does not sag due to the weight of the fuel line. The sleeve should also be equipped or shall have on it at sufficient locations absorbent material capable of absorbing any spillage that occurs. The sleeve shall be sufficiently supported that it does not rotate or flex during operation.
  - There will be no separate measurement or payment for fuelling provisions.

#### General

- Use properly maintained off-site fueling stations whenever possible. These businesses are better equipped to handle fuel and spills properly.
- Educate employees about pollution prevention measures and goals.
- Focus pollution prevention activities on containment of spills and leaks, most of which may occur during liquid transfers.
- "Spot clean" leaks and drips routinely. Leaks are not cleaned up until the absorbent is picked up and disposed of properly.
- Manage materials and waste to reduce adverse impacts on stormwater quality.
- Post signs to remind employees and customers not to top off the fuel tank when filling and signs that ban customers and employees from changing engine oil or other fluids at that location.
- Report leaking vehicles to fleet maintenance.
- Ensure the following safeguards are in place:
  - Overflow protection devices on tank systems to warn the operator to automatically shutdown transfer pumps when the tank reaches full capacity.
  - Protective guards around tanks and piping to prevent vehicle or forklift damage.
  - Clear tagging or labeling of all valves to reduce human error.

#### Emergency maintenance or refueling

- Ensure the following safeguards are in place:
  - All leaks or spills must be immediately contained.
  - A berm should be constructed around the vehicle. Absorbent pads should be placed under the vehicle.
- If fuel is needed, the fuel should be brought in an airtight plastic container.

- The vehicle should be inspected to ensure there is no other damage and that the vehicle is in working order.
- Once the vehicle is repaired or refueled it can be driven off the containment area. The absorbent pads should be disposed.

### .3 Sediment and Erosion Control Guidelines

#### Purpose

To minimize sediment discharge and erosion is critical to minimize the environmental impact of the works off site. To achieve this objective a number of mitigation measures must be in place on land and in the canal. Silt fencing, turbidity curtains, berm/cofferdams, sediment basins, dewatering, re-vegetation and erosion control mats will be the main devices used to control erosion and sediments.

#### Devices

Silt fencing is to be installed along the edge of any canal or water body where required by the Contract Administrator where excavation or filling could cause sediments to enter water bodies. The silt fence must go to the existing canal edge. The silt fence must be installed as per OPSD 219.130 and OPSS 577.07.04.01.

The silt fence should be checked and maintained twice a week and before anticipated and after major rain storms (1:2 year storm and/or 40mm in a 24 hour period) or melts. Remove fence after vegetation is established and soil stabilized. Deactivate fabric by cutting off the top portion of fabric above ground; the bottom trenched-in portion can be left in-ground to minimize ground disturbance.

Turbidity curtains are to be used 15 to 20m away from either side of any in-channel work. Turbidity curtains that allow for maintenance of low flows are to be used. The turbidity curtain are designed to filter out large suspended particles in the canal around the work site. Double turbidity curtains should be used in case of curtain failure. The curtains should be installed as per OPSD 219.261 and 219.260.

The turbidity curtains should be inspected after storms and twice a week to ensure the curtain is working properly with no gaps. Once the work within the site is complete, the turbidity curtains can be removed the day after completion.

Erosion control blankets are to be installed where directed along new channel slopes to reduce sheet erosion and to facilitate any seeding. The erosion control blankets are to be installed by laying them on the ground and by stapling into the ground as per the manufacturer's instructions. The blankets should be laid perpendicular to the flow of the canal if installed across the water air interface.

Erosion control blankets should be made of biodegradable materials and left in place until the ground surface is vegetated. Erosion control blankets should be supplied to last one year, to allow the vegetation to establish itself.

#### General

All erosion control devices should be installed or constructed when applicable. All erosion control measures should be routinely inspected and repaired. If new areas of concern are found the appropriate erosion control device should be implemented. Turbidity curtains, erosion control blankets, re-vegetation and silt fences should all be considered. All erosion control devices should follow the specification as per OPSS 577.

### .4 Site Specific Sampling Guidelines

#### Purpose

On-going water quality monitoring is to be done to ensure the work is not negatively affecting areas outside the work area. To ensure high results are not just seasonal fluctuations samples will be taken a year before excavation work. Turbidity samples are taken after storms to ensure the sediment control devices are working properly. The soil samples are taken to ensure the soils placed are not contaminated above the soil that it is being placed around. So the soil where material will be placed should be tested, as well as the sediment that will be placed. After the work is completed, a number

of samples should be taken. These samples are taken to monitor the ongoing change in the canals caused by the project and if the canals return to pre-construction conditions.

#### .5 Emergency Work Guidelines

The Contractor is to be aware that the potential exists at any time that a section of dyke that is under construction, or that may become under construction, may have to be finished/worked on immediately if high flow/flood conditions are anticipated and/or occur.

Any work to be done for such events is to be performed as directed by the Contract Administrator.

The emergency plan that may have to be implemented could involve the following:

- a) Immediate reinforcement of dykes with on-site or hauled in clay.
- b) Use of haul routes that have not been designated.
- c) Movement of landowners' materials and equipment.
- d) Driving of steel sheet wall piles.
- e) The provision of high capacity pumps and the means to operate such.
- f) Installation of turbidity curtains and silt fences.
- g) Construction of cofferdams in outside canals.

Upon passage of flows causing the emergency and when and as designated by the engineer, the Contractor may resume the normal work. Work may have to be done to reconstruct works already constructed.

The payment for emergency work would be on a time and material basis using realistic unit prices for the equipment in use and at a payment of realistic invoices for materials at a markup of 10%.

Similarly, realistic hourly labour costs would be paid. The costs would be paid both for the removal of added features and for the reconstruction of any previous work. There would be no payment made for standby time while the flood event occurs.

The allowance for such at this time is in the Contingency Allowance.

#### .6 All Weather Plan Guidelines

- a) Provisions for Winter Work
  - The Contractor is to have a site prepared free of snow and ice for stockpiling of earth brought in for cofferdam construction and is to ensure the materials brought in are dry and are protected from moisture during storage. If the site exists, the soil is to be kept available and dry.
  - Where in-water work is proposed, the Contractor is to ensure that turbidity curtains are placed to prevent most fish from entering the area during freeze up. Such are to remain in place until the work is done.
  - The Engineer will review this work with the Contractor prior to freeze up when in-water work programs are known.
  - The Contractor is to ensure that ice breakup is undertaken to allow any winter excavation.
  - The Contractor is to provide for releveling of all leveled materials in the following construction season.
  - All sites are to be cleared and/or stripped in the summer/fall conditions in preparation for winter activity.
  - Construct longitudinal earth cofferdams before freeze up.
  - Schedule work so that silt fences are constructed prior to winter conditions.
  - Schedule activities so minimal impacts on road work re freeze up is attended to.
  - Provide ice and salt control.
  - Keep leveling/disposal areas free of snow build ups.
  - Have contingencies for increased road maintenance activities.
  - Provide separate stockpile areas for frozen excavated soils.
  - Ensure ice control is provided to reduce safety impacts on construction equipment.
  - Provide for snow removal activities to allow construction.

- Ensure fuel and fluid lines on all equipment are inspected and kept free from damage by ice and snow.
- Monitor weather forecasts and schedule work to prepare for such.
- Build in allowances for lost time.
  
- b) Extreme Rainfall Periods
  - Monitor weather forecasts and schedule work to prepare for such.
  - Stockpile additional materials for dyke or cofferdam construction and protect such from moisture.
  - Keep existing stockpile areas dry.
  - Ensure construction yards are constructed at high elevations.
  - Build in allowances for lost time.
  
- c) Extreme Droughts
  - Build in time allowances and allow for such in construction scheduling.
  - Have contingency equipment and materials and staff to assist landowners if continued and additional irrigation is required where affected by work areas.
  - Reduce lengths of work zones.
  - Ensure paths are unobstructed to canals in non-work areas for landowners.
  
- d) Extreme Heat Conditions
  - Build in allowances to recognize loss of time.
  - Reduce work zones.
  - Monitor weather reports.
  - Provide unobstructed access to canals in non-work areas.
  - Provide education to Contractor staff.
  
- e) Extreme Snowfall
  - Build in time allowances to allow for such.
  - Prepare for increased road maintenance.
  - Provide for additional barricades to safeguard construction staff and the travelling public.
  - Be prepared to have work suspended by the Engineer where he deems conditions are not suitable for continued construction.
  - Have sites available for disposal of snow removal.
  - Monitor weather forecasts
  - Ensure access to private properties is no less restricted
  
- f) Extreme Winds
  - Suspend operations in high wind periods.
  - Monitor weather forecasts
  - Have provisions to remove fallen trees
  - Provide barricades around areas that could be impacted

#### .7 Guidelines For Accidents and Malfunctions

The Contractor is to provide for the following with respect to accidents and malfunctions:

- Monitor as-constructed sections for possible signs of erosion and sloughing.
- Continuously inspect equipment for damaged fuel lines and possible spill occurrences.
- Inspect all sites after any cleanout work
- Inspect all road embankments continuously for signs of failure
- Have ample supply of pylons and signs to cordon off any accident site
- Have on site traffic control signs for traffic movement in accident areas
- Implement all requirements of the Spill Response Guidelines
- Have surplus turbidity curtains and silt fences on site at all times.
- Have surplus erosion control blankets and filter fabric on site
- Have surplus stockpile of earth on site at all times
- Have emergency contact numbers available at all work locations

## 59.0 BEST MANAGEMENT PRACTICES

Not all of these BMP's are applicable to the project and a "best efforts" approach will be followed to apply the applicable BMP's to this project. Where the Special Provisions conflict with these BMP's, the Special Provisions shall apply.

### .1 Fuelling

#### Description and Purpose

- Vehicle and equipment fueling procedures and practices are designed to minimize or eliminate the discharge of fuel spills and leaks into storm drain systems or to watercourses.
- These procedures are applied on all construction sites where vehicle and equipment fueling takes place.

#### Limitations

- Onsite vehicle and equipment fueling shall only be used where it's impractical to send vehicles and equipment off-site for fueling.

#### Implementation

- When fueling must occur onsite, the Contractor shall select and designate an area to be used, subject to approval of the Resident Engineer (RE). Absorbent spill clean-up materials and spill kits shall be available in fueling areas and on fueling trucks and shall be disposed of properly after use.
- Drip pans or absorbent pads shall be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Dedicated fueling areas shall be protected from storm water run-on and runoff, and shall be located at least 15 m (50 ft) from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Nozzles used in vehicle and equipment fueling shall be equipped with an automatic shut-off to control drips. Fueling operations shall not be left unattended.
- Protect fueling areas with berms and/or dikes to prevent run-on, runoff, and to contain spills. Use vapor recovery nozzles to help control drips as well as air pollution where required. Ensure the nozzle is secured upright when not in use.
- Fuel tanks shall not be "topped-off."
- Vehicles and equipment shall be inspected on each day of use for leaks. Leaks shall be repaired immediately or problem vehicles or equipment shall be removed from the project site.
- Absorbent spill clean-up materials shall be available in fueling and maintenance areas and used on small spills instead of hosing down or burying techniques. The spent absorbent material shall be removed promptly and disposed of properly.
- Federal, provincial, and local requirements shall be observed for any stationary above ground storage tanks.
- Mobile fueling of construction equipment throughout the site shall be minimized. Whenever practical, equipment shall be transported to the designated fueling area.

#### Inspection and Maintenance

- Fueling areas and storage tanks shall be inspected regularly.
- Keep an ample supply of spill cleanup material on the site.
- Immediately cleanup spills and properly dispose of contaminated soil and cleanup materials.

## .2 Worker Education

### Description and Purpose

- Employee training and supervision in and around the construction site is important for worker safety and public safety.

### Implementation

- Require an independent Contractor to do inspections
- Not all of these BMP's are applicable to the project and a "best efforts" approach will be followed to apply the applicable BMP's to this project.
- Adequately train employees
- Maintain an adequate number of employees on the job
- Properly supervise employees
- Have emergency number and contact information available to employees
- Protect the work area with proper signage, pylons, detours, closures
- Have designated working hours

## .3 Wood Mulching

### Description and Purpose

- Wood mulching consists of applying a mixture of shredded wood mulch, bark or compost to disturbed soils. The primary function of wood mulching is to reduce erosion by protecting bare soil from rainfall impact, increasing infiltration, and reducing runoff.

### Limitations

- Not suitable for use on slopes steeper than 3:1. Best suited to flat grades or gentle slopes.
- Not suitable for areas exposed to concentrated flows
- May need to be removed prior to further earthwork

### Implementation

- There are many types of mulches. Selection of the appropriate type of mulch should be based on the type of application, site conditions, and compatibility with planned future uses.
- Prior to application, after existing vegetation has been removed, roughen embankment and fill areas by rolling with a device such as a punching type roller or by track walking.
- Avoid mulch placement onto roads, sidewalks, drainage channels, existing vegetation etc.

### Green Material mulch:

- Produced by the recycling of vegetation trimmings such as grass, shredded shrubs and trees.
- Methods of application are generally done by hand although pneumatic methods are available
- Green material can be used as a temporary ground cover with or without seeding
- The green material should be evenly distributed on site to a depth of not more than 2 inches

### Shredded Wood mulch:

- Suitable for ground cover in ornamental or revegetated planting
- Shredded wood/bark is conditionally suitable
- Distribute by hand or use pneumatic methods
- Evenly distribute the mulch across the soil surface to a depth of 2 to 3 inches

### Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible.
- Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.

- Regardless of the mulching technique selected, the key consideration in inspection and maintenance is that the mulch needs to last long enough to achieve erosion control objectives. If the mulch is applied as a standalone erosion control method over disturbed areas (without seed), it should last the length of time the site will remain barren or until final re-grading and re-vegetation.
- Where vegetation is not the ultimate cover, such as ornamental and landscape applications of bark or wood chips, inspection and maintenance should focus on longevity and integrity of the mulch.
- Reapply mulch when bare earth becomes visible.

#### .4 Wind Erosion Control

##### Description and Purpose

- Wind erosion or dust control consists of applying water or other dust palliatives as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

##### Limitations

- Watering prevents dust only for a short period and should be applied daily (or more often) to be effective
- Over watering may cause erosion
- Oil or oil-treated sub grade should not be used for dust control because the oil may migrate into drainage ways and/or seep into the soil
- Effectiveness depends on soil, temperature, humidity and wind velocity
- Chemically treated sub grades may make the soil water repellent, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly
- Asphalt, as a mulch tack or chemical, requires a 24 hour curing time to avoid adherence to equipment, worker shoes etc. Applications should be limited because asphalt surfacing may eventually migrate into the drainage system
- In compact areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system

##### Implementation

- For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications
- Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic
- Preventive measures would include minimizing surface areas to be disturbed, limiting onsite vehicle traffic 15 mph, and controlling the number and activity of vehicles on a site at any given time
- Schedule construction activities to minimize exposed areas
- Quickly stabilize exposed soils using vegetation, mulching, spray-on adhesives, calcium chloride, sprinkling and stone/gravel layering
- Identify and stabilize key access points prior to commencement of construction
- Minimize the impact of dust by anticipating the direction of prevailing winds
- Direct most construction traffic to stabilize roadways within the project site
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure distribution
- All distribution equipment should be equipped with a positive means of shutoff
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project
- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads
- Provide covers for haul trucks transporting materials that contribute to dust
- Provide wet suppression or chemical stabilization of exposed soils

- Provide for rapid cleanup of sediments deposited on paved roads. Furnish stabilized construction road entrances and vehicle wash down areas.
- Stabilize inactive construction sites using vegetation or chemical stabilization methods
- Limit the amount of areas disturbed by clearing and earth moving operations by scheduling these activities in phases

#### Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Check areas protected to ensure coverage.

### .5 Streambank Stabilization

#### Description and Purpose

- Stream channels, streambanks, and associated riparian areas are dynamic and sensitive ecosystems that respond to changes in land use activity. Streambank and channel disturbance resulting from construction activities can increase the stream's sediment load, which can cause channel erosion or sedimentation and have adverse effects on the biotic system. BMPs can reduce the discharge of sediment and other pollutants to minimize the impact of construction activities on watercourses.

#### Planning

- Proper planning, design, and construction techniques can minimize impacts normally associated with in stream construction activities. Poor planning can adversely affect soil, fish, wildlife resources, land uses, or land users. Planning should take into account: scheduling; avoidance of in-stream construction; minimizing disturbance area and construction time period; using pre-disturbed areas; selecting crossing location; and selecting equipment.

#### Scheduling

- Construction activities should be scheduled according to the relative sensitivity of the environmental concerns and in accordance with Scheduling BMP.

#### Minimize Disturbance

- Minimize disturbance through: selection of the narrowest crossing location; limiting the number of equipment trips across a stream during construction; and, minimizing the number and size of work areas (equipment staging areas and spoil storage areas). Place work areas at least 50 ft from stream channel. Field reconnaissance should be conducted during the planning stage to identify work areas.

#### Use of Pre-Disturbed Areas

- Locate project sites and work areas in areas disturbed by prior construction or other activity when possible.

#### Selection of Project Site

- Avoid steep and unstable banks, highly erodible or saturated soils, or highly fractured rock.
- Select project site that minimizes disturbance to aquatic species or habitat.

#### Equipment Selection

- Select equipment that reduces the amount of pressure exerted on the ground surface, and therefore, reduces erosion potential and/or use overhead or aerial access for transporting equipment across drainage channels. Use equipment that exerts ground pressures of less than 5 or 6 lb/in<sup>2</sup>, where possible. Low ground pressure equipment includes: wide or high flotation tires (34 to 72 in. wide); dual tires; bogie axle systems; tracked machines; lightweight equipment; and, central tire inflation systems.

Types of Streambank Stabilization Techniques

- Preservation of Existing Vegetation
- Hydraulic Mulch
- Hydroseeding
- Soil Binders
- Straw Mulch
- Geotextiles and Mats
- Earth Dikes, Drainage Swales, and Lined Ditches
- Velocity Dissipation Devices
- Slope Drains
- Silt Fences
- Fiber Rolls
- Gravel Bag Berm
- Straw Bale Barrier
- Rock Filter
- K-rail
- Sediment/Turbidity Curtains

.6 Straw Mulch

Description and Purpose

- Straw mulch consists of placing a uniform layer of straw and incorporating it into the soil with a studded roller or anchoring it with a tackifier stabilizing emulsion. Straw mulch protects the soil surface from the impact of rain drops, preventing soil particles from becoming dislodged.

Application

- Apply straw at a minimum rate of 4000 lb/acre, either by machine or by hand distribution
- Roughen embankments and fill rills before placing the straw mulch by rolling with a crimping or punching type roller or by track walking
- Evenly distribute straw mulch on the soil surface
- Anchor for holding the straw mulch in place depend upon the slope steepness, accessibility, soil conditions and longevity on small areas, a spade or shovel can be used to punch in straw mulch on slopes with soils that are stable enough and of sufficient gradient to safely support construction equipment without contributing to compaction and instability problems, straw can be punched into the ground using a knife blade roller or a straight bladed coulter, known commercially as a crimper on small areas and/or steep slopes, straw can also be held in place using plastic netting or jute. The netting shall be held in place using 11 gauge wire staples, geotextiles pins or wooden stakes a tackifier acts to glue the straw fibers together and to soil surface. The tackifier shall be selected based on longevity and ability to hold in fibers in place. A tackifier is typically applied at a rate of 125 lb/acre. In windy conditions the rate are typically 180 lb/acre

Inspection and Maintenance

- Inspect BMPs prior to forecast of rain, daily during extended rain events, after rain events, weekly during the rainy season and at two week intervals during on rainy season
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- The key consideration in inspection and maintenance is that the straw needs to last long enough to achieve erosion control objectives
- Maintain an unbroken, temporary mulched ground cover while disturbed soil areas are inactive. Repair any damaged ground cover and re-mulch exposed areas
- Reapplication of straw mulch and tackifier may be required to maintain effective soil stabilization over disturbed areas and slopes.

.7 Straw Bale Barriers

Description and Purpose

- A straw bale barrier is a series of straw bales placed on a level contour to intercept sheet flows. Straw bale barriers pond sheet-flow runoff, allowing sediment to settle out.

Limitations

Straw bale barriers:

- Are not to be used for extended periods of time because they tend to rot and fall apart
- Are suitable only for sheet flow on slopes of 10 % or flatter
- Are not appropriate for large drainage areas, limit to one acre or less
- May require constant maintenance due to rotting
- Are not recommended for concentrated flow, inlet protection, channel flow, and live streams
- Cannot be made of bale bindings of jute or cotton
- Require labor-intensive installation and maintenance
- Cannot be used on paved surfaces
- Should not be used for drain inlet protection
- Should not be used on lined ditches
- May introduce undesirable non-native plants to the area

### Implementation

#### General

- A straw bale barrier consists of a row of straw bales placed on a level contour. When appropriately placed, a straw bale barrier intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding provides quiescent conditions allowing sediment to settle. Straw bale barriers also interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets, which erode rills, and ultimately gullies, into disturbed, sloped soils.
- Straw bale barriers have not been as effective as expected due to improper use. These barriers have been placed in streams and drainage ways where runoff volumes and velocities have caused the barriers to wash out. In addition, failure to stake and entrench the straw bale has allowed undercutting and end flow. Use of straw bale barriers in accordance with this BMP should produce acceptable results.

#### Design and Layout

- Locate straw bale barriers on a level contour.
  - Slopes up to 10:1 (H:V): Straw bales should be placed at a maximum interval of 50 ft (a closer spacing is more effective), with the first row near the toe of slope.
  - Slopes greater than 10:1 (H:V): Not recommended.
- Turn the ends of the straw bale barrier up slope to prevent runoff from going around the barrier.
- Allow sufficient space up slope from the barrier to allow ponding, and to provide room for sediment storage.
- For installation near the toe of the slope, consider moving the barrier away from the slope toe to facilitate cleaning. To prevent flow behind the barrier, sand bags can be placed perpendicular to the barrier to serve as cross barriers.
- Drainage area should not exceed 1 acre, or 0.25 acre per 100 ft of barrier.
- Maximum flow path to the barrier should be limited to 100 ft.
- Straw bale barriers should consist of two parallel rows.
  - Butt ends of bales tightly
  - Stagger butt joints between front and back row
  - Each row of bales must be trenched in and firmly staked
- Straw bale barriers are limited in height to one bale laid on its side.
- Anchor bales with either two wood stakes or four bars driven through the bale and into the soil. Drive the first stake towards the butt joint with the adjacent bale to force the bales together.

#### Materials

- Straw Bale Size: Each straw bale should be a minimum of 14 in. wide, 18 in. in height, 36 in. in length and should have a minimum mass of 50 lbs. The straw bale should be composed entirely of vegetative matter, except for the binding material.
- Bale Bindings: Bales should be bound by steel wire, nylon or polypropylene string placed horizontally. Jute and cotton binding should not be used. Baling wire should be a minimum diameter of 14 gauge. Nylon or polypropylene string should be approximately 12 gauge in diameter with a breaking strength of 80 lbs force.

- Stakes: Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake, or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable. Steel bar reinforcement should be equal to a #4 designation or greater. End protection should be provided for any exposed bar reinforcement.

#### Inspection and Maintenance

##### Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Straw bales degrade, especially when exposed to moisture. Rotting bales will need to be replaced on a regular basis.
- Replace or repair damaged bales as needed.
- Repair washouts or other damages as needed.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.
- Remove straw bales when no longer needed. Remove sediment accumulation, and clean, regrade, and stabilize the area. Removed sediment should be incorporated in the project or disposed of.

#### .8 Establish Buffer Strips

- Vegetated areas between watercourses or other water bodies and alternate land uses have a number of benefits including filtration of runoff, reduced erosion, delayed snowmelt rates, and provision of terrestrial and aquatic habitat. Existing naturally vegetated buffer zones are protected from urban development through legislation. Areas where the vegetation has been removed should be reestablished using a mix of natural species blending grasses, shrubs and trees.

#### .9 Dust Suppressant Options

##### Description and Purpose

- Water and various chemical dust suppressants can be applied to reduce emissions at construction sites. For instance, water/dust suppressants can be applied to mitigate fugitive dust from site preparation, storage piles, materials handling and transfer, unpaved roads, etc.
- The application of water is typically the most common dust control method that is employed. Practically all construction companies that are implementing options to reduce dust are applying water to mitigate dust generation from at least one emission source on their construction site. Water can be applied by a variety of methods, for instance trucks, water pulls, water canons, hoses, fire hydrants, sprinklers, etc.
- A variety of chemical dust suppressants are available to suppress fugitive dust emissions from construction sites. While being more expensive than water, they are also more effective in suppressing dust and have to be applied much less frequently. Examples of dust suppressants include the following: (i) liquid polymer emulsions (ii) agglomerating chemicals (e.g., lignosulfonates, polyacrylamides); (iii) cementitious products (e.g., lime-based products, calcium sulphate); (iv) petroleum based products (e.g., petroleum emulsions); and (v) chloride salts (e.g., calcium chloride and magnesium chloride).

##### Limitations

- While the application of water and chemical dust suppressants are proven and effective options for mitigating dust, they have to be applied judiciously. Their usage, while mitigating dust, can trigger other (just as serious) environmental consequences. It is important to keep these environmental consequences in mind when deciding on the extent to which water and chemical dust suppressants are to be utilized.

- The following potential environmental impacts of applying chemical dust suppressants must be taken into consideration before application:
  - The hazardous, biodegradable and water soluble properties of the substance;
  - The effect their application could have on the surrounding environment, including water-bodies (e.g., surface water pollution from runoff, contaminated ground water, pH) and wildlife (e.g., fisheries); and
  - Whether the use of chemicals has been limited due to nearby watershed considerations for protection of fish and fish habitat from surface runoff.
- There are potential environmental consequences resulting from the over-application of water that must be considered. These include: runoff problems; soil instability; spreading of contaminants in the environment (e.g., oil or coolant from engines), and erosion. In addition, consideration should be given to water conservation or water allocation limitations in areas where construction occurs. The over-application of water can also lead to equipment mobility problems and reduce the ability of earth-moving equipment to efficiently move saturated soils. If the moisture contents of soils used in construction are sufficient, water may not always need to be added prior to handling, crushing, etc.

#### Implementation

##### Applying Water at Construction Sites

##### Site Preparation

- Water may be applied prior to earthmoving activities to increase the moisture content of the soils thereby increasing their stability. The pre-application of water may be to the depth of the proposed cuts or equipment penetration. The area should continue to be pre-wetted if it is not moist to the depth of the cut.
- After grading the construction site, water should be applied within active earth-moving areas at sufficient frequency and quantity to prevent visible emissions from extending more than 30 meters from the point of origin. Schedule thorough and consistent watering that does not run off the site throughout the duration of the construction project. At the end of each workday, water trucks may treat all exposed areas to create a stabilizing crust on the soil. Water may also be applied at the end of the day to soak the next day's work area. Water may be applied into the backfill material until the optimum moisture level is reached.
- Water may be applied continuously in front of earthmoving equipment by means of water truck/water pull. If the soil is dry, the earthmoving equipment should cease further disturbance when the water truck/water pull runs out of water and should not resume until the water truck/water pull is operational again. Optimally, one water truck may work for every 1-3 pieces of heavy earthmoving equipment that are in operation, depending on soil and weather conditions (if practical).
- Water may be applied on a daily basis to all inactive disturbed surface areas, where there has been no activity for seven days or more days. Water may be applied with sufficient frequency to prevent visible emissions (at least every 2 hours). Automatic sprinkler or spray bar systems are optimal in these areas.
- Construction sites should employ a sufficient number of water trucks and have back-up water trucks available if the site experiences dust control problems.
- Perimeter watering system or fence line misting consisting of portable irrigation equipment may be applied to mitigate dust impacting surrounding residences and businesses.

##### Storage Piles

- For some materials, hard crusts can be built-up on storage piles by application of water. Crusts reduce the dust blown off the storage piles. Care is required to avoid application of water to a degree that may erode or settle the fines to the bottom of the pile.
- Water may be applied to at least 80% of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust.

- Storage piles that are greater than 2.5m (8 feet) in height and not covered may have a road bladed to the top to allow water truck access or should have an operational water irrigation system that is capable of complete stockpile coverage (water truck access on large volume aggregate storage piles is unrealistic).

#### Material Handling and Transfer Systems

- Material to be transported may be mixed with water prior to loading and/or the entire surface area of material may be watered after loading. Water should be available while loading and unloading in order to prevent visible dust plumes.
- Material may be tested to determine moisture content and silt loading. Only materials that have optimum moisture content should be crushed or screened.
- Materials may be sprayed with water 15 minutes prior to handling and/or at points of transfer.
- Water may be applied at the feed and/or intermediate points in the conveyor system as needed.
- Washing separated or screened materials are effective in controlling fugitive dust emissions from chutes and conveyors.
- Hollow cone nozzles are believed to produce the greatest control while minimizing clogging when using wet suppression systems. Optimal droplet size for surface impaction and fine particle agglomeration is about 500 mm - finer droplets are affected by drift and surface tension and appear to be less effective.
- Application of water sprays to the underside of a conveyor belt improves the performance of wet suppression systems at belt-to-belt transfer points.

#### Road Surfaces

- Water may be applied to all unpaved roads used for vehicular traffic at least once per every two hours of active operations (i.e., 3 times per normal 8 hour working day). If the area is inaccessible to water trucks due to slope conditions or other safety factors, watering may be conducted with hoses or sprinkler systems. Runoff should be controlled so it does not saturate the surface of the unpaved haul road, therefore increasing the potential of track out.
- Control efficiency of water depends on: (i) amount (per unit road surface area) of water added during each application; (ii) period of time between applications; (iii) weight, speed and number of vehicles traveling over the watered road during the period between applications; and (iv) metrological conditions that affect evaporation.

#### Demolition and Deconstruction

- Water may be applied at the following times/locations in order to minimize dust generation: (i) the exterior of building surfaces prior to initiating demolition activities as well as continuously during the knock down phase. It has been suggested that all exterior surfaces of the building, up to six stories in height (where feasible), may be wetted before and during the use of the wrecking ball; (ii) debris pile immediately following blasting and as needed afterwards; (iii) debris during handling and haulage operations; (iv) the surrounding surface area following demolition; (v) unpaved road surfaces within 30 meters of the demolition site, 1 hour prior to the actual demolition; and (vi) unpaved surface areas where equipment will operate.

#### Applying Dust Suppressant/Chemical Stabilizers

##### Site Preparation

- Chemical stabilizers may be applied to graded areas within 5 working days of grading completion. In addition, if an area having 0.2 hectares or more of disturbed surface area remains unused for 7 or more days, the surface area should be stabilized. Chemical stabilizers are generally only effective in areas that are not subject to daily disturbances. Vehicle traffic and disturbance of stabilized soils should be limited through the use of fencing, ditches, barriers, barricades and/or wind barriers.

- Chemical stabilizers should be applied according to the manufacturer's specifications.
- The effectiveness and longevity of chemical stabilizers can be affected by the rate of application, soil pH, moisture levels in the air or soil, amount of sunlight, plant growth and traffic.
- Construction operators may consider the addition of water-soluble surfactants to water. These surfactants increase the wetting power of water by breaking down the initial resistance of dry soils to water. Surfactants are relatively inexpensive and greatly decrease the amount of water necessary during dust control operations.

#### Storage Piles

- Disturbed areas of a construction site, including storage piles of fill dirt and other bulk materials that are not being actively utilized for construction purposes for a period of 7 calendar days or more, should be stabilized with a chemical dust stabilizer or suppressant.
- A much more effective technique (than applying water to the storage pile) is to apply chemical agents (such as surfactants) directly to the storage pile, which permit more extensive wetting. Surfactants allow particles to more easily penetrate the water droplet and increase the total number of droplets, thus increasing total surface area and contact potential.
- Foam can be used instead of chemical surfactants to reduce fugitive dust emissions from storage piles (as well as material handling operations). Foam is generated by adding a chemical (i.e., detergent-like substance) to a relatively small quantity of water that is then vigorously mixed to produce small bubbles, high-energy foam.

#### Material Handling & Transfer

- Dust suppressants should be applied and maintained prior to and after to stabilize screened materials and surrounding area after screening.
- Material being transported in a vehicle should be sprayed with a dust suppressant.

#### Road Surfaces

- The control effectiveness of chemical dust suppressants depends on: (i) the dilution rate used in the mixture; (ii) the application rate (volume of solution per unit road surfaced area); (iii) the time between applications; (iv) the size, speed and amount of traffic during the period between applications; and (v) meteorological conditions (rainfall, freeze/thaw cycles, etc.) during the period.
- Chemical dust suppressants have much less frequent reapplication requirements as compared to water.
- Dust suppressants are generally applied to the road surface as a water solution and should be uniformly applied to all areas disturbed by vehicles. When used to stabilize heavily trafficked areas, dust suppressants typically require ground preparation prior to application and reapplication 1-4 times a year to remain effective.
- Because most chemical products need to soak into the soil, they generally require above-freezing temperatures to work (exceptions include magnesium chloride and calcium chloride). Calcium chloride and magnesium chloride are the most commonly used dust suppressants for unpaved roads. Proper road surface preparation, grading and scarification is required before applying calcium chloride or magnesium chloride. It should be noted that calcium chloride and magnesium chloride use may be restricted in certain areas by municipal or provincial authorities. Environment Canada's Best Practices For The Use And Storage Of Chloride-Based Dust Suppressants, (March 2004) provides guidance on the application of chloride-based dust suppressants.
- For greatest effectiveness and lowest cost it is important to follow the manufacturer's instructions for mixing and applying these chemicals.

- PVA polymers, acrylic copolymers, and water-emulsified petroleum resins, etc. can also be used to mitigate dust generation on unpaved roads.
- Surfactants can be added to the watering operation to increase fugitive dust control. Surfactants are agents that break the surface tension of the water that allows for better penetration and saturation of the soil particles.

#### Demolition and Deconstruction

- Dust suppressants/chemical stabilizers may be applied during the following situations: (i) unpaved surface areas within 30 meters (100 feet) where materials from demolition will fall; (ii) debris piles immediately following blasting and periodically afterwards; (iii) the surrounding area following demolition; and (iv) unpaved surface areas where equipment will operate.

#### .10 Slope Drains

##### Description and Purpose

- Heavy duty, flexible pipe that carries water from top to bottom of fill or cut slope to prevent concentrated water flowing downslope and eroding face of slope

##### Applications

- Temporary or permanent measure
- Used on cut or fill slopes where there is a high potential for upslope runoff waters to flow over the face of the slope causing erosion, especially at areas where runoff converges resulting in concentrated runoff flows
- Used in conjunction with some form of water containment or diversion structures, such as diversion channels, berms, or barriers, to convey upslope runoff water and direct water towards slope drain

##### Limitations

- Pipes must be sized correctly to accommodate anticipated flow volumes
- Water can erode around inlet if inlet protection is not properly constructed
- Erosion can occur at base if outlet protection or energy dissipater is not constructed
- Slope drain must be anchored securely to face of slope

##### Construction

- (Note: The following method is provided for guidance only. A site-specific design by a qualified designer is required.)
- Construct diversion or intercept channel, ditch block, barrier, or other inflow apron structure at crest of slope to channel flow toward the slope drain inlet
- Install slope drain through inlet berm or barrier with a minimum of 0.45 m of soil cover above top of drain pipe to secure the inlet
- Install scour inlet protection (such as riprap, sand bags)
- Install energy dissipater (such as rip rap, gravel, concrete) at downslope outlet end of slope drain; the outlet must not discharge directly onto unprotected soil
- Secure the pipe from movement by tying to steel anchor stakes, hold-down grommets, or other approved anchor method
- Space anchors on each side of drain pipe at maximum 3 m intervals along entire length of drain pipe

##### Construction Considerations (For guidance only)

- Use coiled drain pipe for low flows only
- If constructing inflow apron at crest of slope out of sandbags, only fill each sandbag  $\frac{3}{4}$  full, this will allow sandbag to be flexible enough to mould around drain pipe and remain in continuous contact with the ground
- Several slope drains may be required if upslope drainage areas are too large for one drain pipe

##### Inspection and Maintenance

- Inspect slope drains at least once per week, or after significant storm events (1:2 year storm and/or 40 mm precipitation in 24 hours)

- Repair any damaged section of pipe immediately
- If evidence exists of pipe movement, install additional anchor stakes to secure and anchor at zones of movement
- Remove sediment from upslope inflow apron area after each storm event otherwise either downslope sediment transport will occur or cause the drainpipe to be plugged which could result in overtopping of inflow apron structure and sheet flow over slope face

#### Similar Measures

Rock lined channel  
Storm sewer  
MTO Developed/Adopted References for Contract  
O.P.S.S.: 577  
O.P.S.D.: 219.230

#### .11 Stabilize Construction Roadways

##### Description and Purpose

- Access roads, subdivision roads, parking areas, and other onsite vehicle transportation routes should be stabilized immediately after grading, and frequently maintained to prevent erosion and control dust.
- This BMP should be applied for the following conditions:
- Temporary Construction Traffic:
  - Phased construction projects and offsite road access
  - Construction during wet weather
- Construction roadways and detour roads:
  - Where mud tracking is a problem during wet weather
  - Where dust is a problem during dry weather
  - Adjacent to water bodies
  - Where poor soils are encountered

##### Limitations

- The roadway must be removed or paved when construction is complete.
- Certain chemical stabilization methods may cause stormwater or soil pollution and should not be used. See Wind Erosion Control BMP.
- Management of construction traffic is subject to air quality control measures. Contact the local air quality management agency.
- Materials will likely need to be removed prior to final project grading and stabilization.
- Use of this BMP may not be applicable to very short duration projects.

##### Implementation

###### General

- Areas that are graded for construction vehicle transport and parking purposes are especially susceptible to erosion and dust. The exposed soil surface is continually disturbed, leaving no opportunity for vegetative stabilization. Such areas also tend to collect and transport runoff waters along their surfaces. During wet weather, they often become muddy quagmires that generate significant quantities of sediment that may pollute nearby streams or be transported offsite on the wheels of construction vehicles. Dirt roads can become so unstable during wet weather that they are virtually unusable.
- Efficient construction road stabilization not only reduces onsite erosion but also can significantly speed onsite work, avoid instances of immobilized machinery and delivery vehicles, and generally improve site efficiency and working conditions during adverse weather

##### Installation/Application Criteria

- Permanent roads and parking areas should be paved as soon as possible after grading. As an alternative where construction will be phased, the early application of gravel or chemical

stabilization may solve potential erosion and stability problems. Temporary gravel roadway should be considered during the rainy season and on slopes greater than 5%.

- Temporary roads should follow the contour of the natural terrain to the maximum extent possible. Slope should not exceed 15%. Roadways should be carefully graded to drain transversely. Provide drainage swales on each side of the roadway in the case of a crowned section or one side in the case of a super elevated section. Simple gravel berms without a trench can also be used.
- Installed inlets should be protected to prevent sediment laden water from entering the storm sewer system. In addition, the following criteria should be considered.
- Road should follow topographic contours to reduce erosion of the roadway.
- The roadway slope should not exceed 15%.
- Chemical stabilizers or water are usually required on gravel or dirt roads to prevent dust (see Wind Erosion Control BMP).
- Properly grade roadway to prevent runoff from leaving the construction site.
- Design stabilized access to support heaviest vehicles and equipment that will use it.
- Stabilize roadway using aggregate, asphalt concrete, or concrete based on longevity, required performance, and site conditions. The use of cold mix asphalt or asphalt concrete (AC) grindings for stabilized construction roadway is not allowed.
- Coordinate materials with those used for stabilized construction entrance/exit points.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.

#### Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Keep all temporary roadway ditches clear.
- When no longer required, remove stabilized construction roadway and re-grade and repair slopes.
- Periodically apply additional aggregate on gravel roads.
- Active dirt construction roads are commonly watered three or more times per day during the dry season.

#### .12 Stabilization of Construction Entrances/Exits

##### Description and Purpose

- A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

##### Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

##### Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

##### Implementation

###### General

- A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing

tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

- Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. Appropriate measures should be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.
- Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

#### Design and Layout

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils Engineer.
- Construct length of 50 ft minimum, and 30 ft minimum width.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.
- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical Engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement street sweeping and vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

#### Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

### .13 Soil Binders

#### Description and Purpose

- Soil binders consist of applying and maintaining a soil stabilizer to exposed soil surface to temporarily prevent water induced erosion of exposed soils on construction sites. Soil binders also prevent wind erosion.
- Soil binders are applied to disturbed areas requiring short term temporary protection. They are good alternatives to mulches in areas where grading activities will soon resume. Soil binders are also suitable for use on stockpiles.

#### Limitations

- Soil binders are temporary in nature and may need reapplication
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will experience spot failures during heavy rainfall events.
- Soil binders do not hold up well to pedestrian or vehicular traffic across treated areas.
- Soil binders may not penetrate soil surfaces made up primarily of silt and clay, particularly when compacted
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil
- Soil binders may not cure if low temperatures occur within 24 hours of application
- The water quality impacts of soil binders are relatively unknown and some may have water quality impacts due to their chemical makeup

#### Implementation

- Regional soil types will dictate the appropriate soil binders to be used
- A soil binder must be environmentally benign, easy to apply, easy to maintain, economical and should not stain paved or painted surface. Soil binders should not pollute storm water.
- Some soil binders may not be compatible with existing vegetation
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation etc.
- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 47 F during the curing period.

#### Inspection and Maintenance

- Inspect BMP prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and two week intervals during the non-rainy season
- Areas where erosion is evident shall be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs
- Reapply the selected soil binder as needed to maintain effectiveness

### .14 Silt Fences

#### Description and Purpose

- Permeable fabric barriers installed vertically on support posts along contours to collect and/or filter sediment laden sheet flow runoff
- Causes water to pond and sediment to settle out as fabric impounds water
- Decreases flow velocity in channels with low to moderate flows (<0.03 m<sup>3</sup>/s)
- Entraps and minimizes coarse sediment from sheet flow or overland flow from entering waterbodies
- Perimeter control for sediment transport and deposition

#### Applications

- Temporary measure
- Used at bottom of cut or fill slopes to collect sediment laden runoff
- Used along streams or watercourse banks
- Used around stockpiles
- Mid-slope grade-break (using "J-hook" or "smile" pattern to cause ponding and sedimentation)

### Advantages

- Low permeability silt fences have high ponding and settling capabilities for fine sand to coarse silt

### Limitations

- Successful performance is highly dependent on proper installation; silt fence is commonly installed incorrectly and failures can cause erosion
- Applicable for sheet flow, normally cannot handle concentrated channel flow volumes
- May fail under high runoff events or due to damage caused during sediment removal
- Limited to locations suitable for temporary ponding of sediment laden runoff
- Low permeability silt fences may not be strong enough to support weight of water retained behind it and may require reinforcement (i.e. wire mesh and stronger support posts)
- Sediment build up needs to be removed at 1/2 height and on a regular basis
- Has a useable life of approximately one year, depending on maintenance and sediment requirement

### Construction

(Note: The following method is provided for guidance only. A site-specific design by a qualified designer is required.)

- Two methods of installation are commonly used:
  - Trench method
  - Mechanical (slicing) installation method (e.g. Tommy Silt Fence Machine or equivalent)
- The mechanical installation method is recommended because it results in less disturbance to native ground and in general provides a stronger end product

### Trench Method

- Select the location of the silt fence (usually along contours)
- Excavate a trench 0.30 m deep by 0.15 m wide for the entire length of fence
- Drive the support posts a minimum of 0.6 m into the ground along the downstream side of the trench, spaced a maximum of 2 m apart; use a spacing of 1 m for critical water-retaining areas
- Attach the wire mesh or snow fencing, if used as reinforcement to fence fabric, to the upstream side of each post with staples
- Extend the filter fabric to the base of the trench and attach it over the wire mesh or snow fence, if used, on the upstream side of posts
- Backfill and compact the soil in the trench, being careful not to damage the fence

### Mechanical Installation Method

- Select the location of the silt fence (usually along contours)
- Use a mechanical installation machine to embed the fabric a minimum of 0.2 m to 0.3 m into the ground. One mechanical installation method involves slicing (with special equipment) the geotextile fabric to embed it into the ground without excavation or backfill. This results in only minor disturbance of the ground and only minor tamping of the ground is required for compaction.
- Drive the support posts a minimum of 0.6 m into the ground, spaced a maximum of 2 m apart; use a spacing of 1 m for critical water-retaining areas
- Attach the wire mesh or snow fencing, if used as reinforcement, to the silt fence fabric and to the upstream side of posts with staples
- Note on Type 2 Silt Fence
  - Heavy grade silt fence may be required by regulatory agencies for installation near watercourses
  - Type 2 silt fence uses steel posts, with filter fabric supported by wire fencing material and a compacted gravel toe anchorage

### Construction Considerations

- Site Selection
  - Size of drainage area to a silt fence should be no greater than 0.4 ha
  - Maximum flow path length above silt fence should be no greater than 30 m
  - Maximum slope gradient above the silt fence should be no greater than 2H:1V

- Fence should be placed on the contour to produce proper ponding
- Fence should be placed far enough away from the toe of slope to provide an adequate ponding area (minimum of 1.8 m away from toe of slope is recommended)
- Ends of the fence should be angled upslope to collect runoff
- Fence should not extend more than 0.6 m above grade
- Posts can be wood or metal, depending on design and ground conditions
- Posts should be placed on the downstream side of the fence
- Posts should be driven at least 0.6 m into the ground
- Posts should not be spaced greater than 2 m apart
- Wire mesh or snow fencing may be placed between the posts and the filter fabric to provide additional strength and support reinforcement
- Filter fabric should be cut from a continuous roll to avoid joints. If joints are necessary, filter fabric should be wrapped around the fence post with a minimum overlap of 0.2 m, and staples should be used to attach the fabric to the post
- Fence (and wire mesh or snow fence, if used) should be attached to the posts with heavy duty staples, tie wires, or hog rings
- Fence (and wire mesh or snow fence, if used) should be dug into a trench at least 0.30 m deep to prevent undercutting of fence by runoff
- Trench backfill should be compacted
- Long runs of silt fence are more prone to failure than short runs
  - The maximum length of each section of silt fence should be 40 m
  - Silt fence should be installed in 'J' hook or 'smile' configuration, with maximum length of 40 m, along contours allowing an escape path for ponded water (minimizes overtopping of silt fence structure)

#### Inspection and Maintenance

- Inspections should occur twice per week and after significant storm events (1:2 year storm event and/or >40 mm rainfall over 24 hours duration)
- Repair undercut fences and repair or replace split, torn, slumping or weathered fabric immediately
- Sediment build up should be removed once it accumulates to a depth of 0.2 m or at 1/2 height of fence
- Remove fence after vegetation is established
- Deactivate fabric by cutting off the top portion of fabric above ground; the bottom trenched-in portion can be left in-ground to minimize ground disturbance
- Similar Measures
- Check Dams
- Permeable synthetic barriers

#### .15 Sediment Basins and Sediment Traps

##### Description and Purpose

- Low height dam enclosure for impoundment of sediment laden storm water, sedimentation and release of treated runoff
- Used to trap sediment laden run off and promote settlement of sediment prior release
- Constructed by excavating a pond or building embankments above the original ground surface
- Sediment traps and basins can be divided by size of pond impoundment enclosure
  - Basin (Type I) for pond area  $\geq 500$  m<sup>2</sup>
  - Trap (Type II) for pond area  $\leq 500$  m<sup>2</sup>

##### Applications

- Temporary (for construction period) or permanent measure
- Used at terminal or selected intermediate points of concentrated runoff for impoundment of runoff and sedimentation of silt prior to release of treated runoff
- Used as a sediment control measure at outlets from construction sites where runoff may enter watercourses, storm drains, or other sensitive areas
- Used where there is a need to impound a significant amount of sediment from significant areas of land disturbance
- Removal of small diameter particles may require use of flocculants. This should be done with caution to prevent adverse effects on aquatic life

- Sediment basins (Type I) used for disturbed drainage areas greater than 2.0 ha
- Sediment traps (Type II) used for disturbed drainage areas of 2.0 ha or less
- Where practical, contributing drainage areas should be subdivided into smaller areas and multiple sedimentation impoundment installed

#### Advantages

- High capacity of runoff impoundment and more efficient means of sedimentation necessary along perimeters of construction sites with high risk sensitive environmental areas and watercourses
- Sediment can be cleaned out easily
- Robust
- Can be deactivated easily by breaching the enclosure dyke

#### Limitations

- Requires specialized design by qualified personnel
- Sediment traps and basins do not remove 100% of the sediment; net efficiency for sedimentation of silt may be around 50% dependent on design
- Anticipated service life of 3 years or longer due to possible clogging of outlets in the long-term
- Sedimentation traps and basins with a riser outlet should have an auxiliary spillway with adequate erosion protection to permit overflow in the event that the riser pipe outlet clogs during a storm event
- For drainage areas greater than 40 ha, multiple basins may be required
- Efficiency of sedimentation is very dependent on surface area; sediment basins require large surface areas to permit settling of sediment
- Fences and signage may be required to reduce danger to the public
- May provide breeding habitat for mosquitoes and other pests
- Sediment traps only remove medium and large diameter silt particles and upstream erosion or sediment control measures are required to reduce the amount of sediment laden to the runoff at downstream sensitive areas
- Periodic removal of accumulated sediment is required

#### Construction

(Note: The following method is provided for guidance only. A site-specific design by a qualified designer is required.)

- The consequences of failure for any water retaining structure will determine the level of effort in the design and construction phases. The construction guidelines presented herein are minimum requirements. A geotechnical Engineer should design water retaining structures if warranted by the consequences of failure
- All footprint areas for embankment dykes should be stripped of vegetation, topsoil, and roots to expose a mineral soil subgrade
- Embankment fill material should be clean mineral soil with sufficient moisture to allow proper compaction
- Fill should be placed in lifts not exceeding 150 mm in compacted thickness and should be compacted to a minimum of 95% Standard Proctor maximum dry density (SPD)
- The main outlet structure should be installed at farthest possible point from inlet
  - The outlet should be placed on firm, smooth ground and should be backfilled to 95% SPD
  - Proper inlet and outlet protection should be installed to protect from scour
  - The outlet pipe should consist of corrugated steel pipe to protect against pinching and blockage
- The embankment should be topsoiled, seeded or protected with gravel or riprap immediately after construction
- Construct an emergency spillway to convey flows not carried by the principal outlet
  - The emergency spillway should consist of an open channel (earth or vegetated) over native undisturbed soil (not fill)
  - If the spillway is elevated, it should be constructed of rip rap
  - The spillway crest should be depressed at least 0.15 m below embankment

#### Construction Considerations

- It is preferable to strip to mineral soil only along the footprint area required for dyke construction; the pond floor centre area can be left cleared but unstripped

- The pond can be constructed by excavating, constructing embankments, or a combination of the two methods
- Baffles should be provided to prevent short-circuiting of flow from inlet to outlet. The optimum ratio of flow length to flow width is 5:1
- Construct sediment ponds and basins at the construction site perimeter prior to wet season and construction activities
- Sediment pond/basin bottom should be flat or gently sloping towards outlet
- Dyke slopes should not be steeper than 2H:1V and should be well-compacted
- Basins should be located where:
  - Low embankment can be constructed across a swale or low natural terrain
  - It is accessible for maintenance work, including sediment removal

#### Inspection and Maintenance

- Regular inspection is required to identify seepage, structural soundness, outlet damage or obstruction and amount of sediment accumulation
- Inspections should be performed weekly and after significant storm events (1:2 yr storm and/or 40 mm rainfall in 24 hours)
- Sediment should be removed upon reaching 1/2 height of the containment berm or within 0.4 m of crest of embankment
- Sediment traps may be deactivated or removed after vegetation of previously disturbed upstream areas has been established

#### Design Considerations

- The design can use a riser outlet option or a permeable rock berm outlet option. The permeable rock berm outlet option is recommended for most applications
- Minimum particle size for rock riprap shall be 200 mm
- If the design of a riser outlet is utilized
  - Main outlet pipe shall be fabricated from corrugated steel pipe conforming to CSA standard CAN 5-G401-M81 or the latest revision thereof
  - Outlet pipe shall consist of a horizontal pipe welded to a similar vertical riser at a 45° mitre joint
- Close to the base of the riser pipe, a 100 mm diameter hole shall be fabricated and a mesh with 12mm square openings tack welded over the hole as a screen
  - A similar hole shall be provided along the riser pipe immediately above the elevation of the maximum sediment buildup (usually 0.4 m below crest of embankment)

#### .16 Sediment/Filter Bags

##### Description and Purpose

- Filter bags can be used as an effective filter medium to contain sand, silt and sediment when dewatering a proposed work area. In situations where there is not sufficient available space to construct a sediment retention basin, filter bags can be used effectively. They may also be used in conjunction with a sediment retention basin when discharge is particularly turbid.
- Implementation
- Filter bags shall meet the following specifications and adhere to the following guidelines:
  - They are constructed of a non-woven geotextile fabric.
  - Only one six-inch discharge hose will be allowed per filter bag.
  - Bag capacity will be exceeded beyond 2,000 gallons per minute.
  - Typical, recommended bag dimensions are 15 feet by 13.25 feet.
  - To help prevent punctures, geotextile fabric shall be placed beneath the filter bag when used in wooded locations.
  - Hose clamps shall be used to secure the discharge hose to the filter bag.

##### Inspection and Maintenance

- When maintaining filter bags to ensure proper function, the following conditions shall apply:
  - Prior to removing the bag from the hose, the bag will be tied off below the end of the hose, allowing the bag to drain.
  - To avoid rupture, the bags will be attended and pumping rates monitored.
  - Once the bag is inflated to a height of four (4) feet, pumping shall stop to avoid rupture.

- Filter bags used during construction shall be bundled and removed for proper disposal.

#### .17 Scheduling

##### Description and Purpose

- Proper sequence of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season.

##### Limitations

- Environmental constraints such as nesting season, fish habitat timing etc.

##### Implementation

- Avoid rainy seasons. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPP.
- Include on the schedule, details on the rainy season implementations and deployment of:
  - Erosion Control BMP
  - Sediment Control BMP
  - Tracking Control BMP
  - Wind Erosion Control BMP
- Include dates or activities such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, mortar mixing, pavement cleaning etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring, utilities installation etc to minimize the active construction area during the rainy season
- Sequence trenching activities so that most open portions are closed before new trenching begins
- Incorporate staged seeding and re-vegetation of graded slopes as work progresses
- Schedule establishment or permanent vegetation during appropriate planting time for specified vegetations
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation
- Monitor the weather forecast for rainfall
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry season by un-seasonal rainfall, wind and vehicle tracing. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition
- Apply permanent erosion control to areas deemed substantially complete during the projects defined seeding window

##### Inspection and Maintenance

- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

#### .18 Sand Bag Barriers

##### Description and Purpose

- A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept sheet flows. Sandbag barriers pond sheet flow runoff, allowing sediment to settle out.

##### Limitations

- It is necessary to limit the drainage area upstream of the barrier to 5 acres

- Degraded sandbags may rupture when removed, spilling sand
- Installation can be labour intensive
- Barriers may have limited durability for long-term projects
- When used to detain concentrated flows, maintenance requirements increase
- Burlap should not be used for sandbags

#### Implementation

- Sandbags may be suitable as a linear sediment control measure;
- Below the toe of a slope, as sediment traps at culvert/pipe outlets, below other small cleared areas, along the perimeter of a site, down slope of exposed soil areas, around temporary stockpiles and spoil areas, parallel to a roadway to keep sediment off paved areas, along streams and channels
- As linear erosion control measure;
  - Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow, at the top of slopes to divert runoff away from disturbed slopes, as check dams across mildly sloped construction roads
- A sandbag generally consists of a row of sand-filled bags placed on a level contour. When appropriately placed, a sandbag barrier intercepts and slows sheet flow runoff, causing temporary ponding. The temporary ponding provides conditions for sediment to settle. While the sand-filled bags are porous, the fine sand tends to quickly plug with sediment, limiting the rate of flow through the barrier. Sandbag barriers interrupt the slope length and thereby reduce erosion by reducing the tendency of sheet flows to concentrate into rivulets which erode rills, and ultimately gullies, into disturbed slopes soils. Sandbag barriers are similar to ground bag berms but are less porous.
- Locate sandbag barriers on a level contour
- Turn ends of the sand bag barrier up slope to prevent runoff from going around the barrier
- Allow sufficient space up slope from the barrier to allow ponding, and to provide room for sediment storage
- For installation near the toe of the slope, consider moving the barrier away from the slope toe to facilitate cleaning. To prevent flow behind the barrier, sandbags can be placed perpendicular to the barrier to serve as cross barriers
- Drainage should not exceed 5 acres
- Stack sandbags at least three bags high
- Butt ends of bags tightly
- Overlap butt joints of row beneath with each successive row
- Use a pyramid approach when stacking bags
- Non-traffic areas
  - Height 18 in., top width 24 in. for three or more layer construction, side slopes 2:1 or flatter
- Construction traffic areas
  - Height 12 in maximum, top width 24 in. for three or more layer construction, side slopes 2:1 or flatter
- Materials
  - Sandbag Material
  - Sandbag Size
  - Fill Material

#### Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Sandbags exposed to sunlight will need to be replaced every two to three months due to degradation of the bags.
- Reshape or replace sandbags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.

- Remove sandbags when no longer needed. Remove sediment accumulation, and clean, regrade, and stabilize the area.

#### .19 Rock Filter

##### Description and Purpose

- Rock filters are temporary erosion control barriers composed of rock that is anchored in place. Rock filters detain the sediment laden runoff, retain the sediment, and release the water as sheet flow at a reduced velocity. Typical rock filter installations are illustrated at the end of this BMP.

##### Applications

- Near the toe of slopes that may be subject to flow and rill erosion.

##### Limitations

- Inappropriate for contributing drainage areas greater than 5 acres.
- Requires sufficient space for ponded water.
- Ineffective for diverting runoff because filters allow water to slowly seep through.
- Rock filter berms are difficult to remove when construction is complete.
- Unsuitable in developed areas or locations where aesthetics is a concern.

##### Specifications

- Rock: open graded rock, 0.75 to 5 in. for concentrated flow applications.
- Woven wire sheathing: 1 in. diameter, hexagonal mesh, galvanized 20gauge (used with rock filters in areas of concentrated flow).
- In construction traffic areas, maximum rock berm heights should be 12 in. Berms should be constructed every 300 ft on slopes less than 5%, every 200 ft on slopes between 5% and 10%, and every 100 ft on slopes greater than 10%.

##### Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and at two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Reshape berms as needed and replace lost or dislodged rock, and filter fabric.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.

#### .20 Reforestation and Woodlot Management Protection

##### Description and Purpose

- This specification describes the measures required to protect trees not designated for removal. It has been developed for use in provincial- and municipal-oriented Contracts. .

##### Implementation

- For the purpose of this specification, the following definitions apply:
- Barrier means a fence placed around a single tree or group of trees to protect them from removal and injury.
- Dripline means the location on the ground surface directly beneath the theoretical vertical line from the tips of the outermost branches of the trees.

##### Operational Constraints

- Trees not designated for removal shall not be damaged and shall be protected from flooding and sediment deposits from construction operations.
- Equipment and vehicles shall not be operated within the dripline of trees not designated for removal unless specified in the Contract Documents. In such cases, operation of equipment shall

be kept to the minimum necessary to perform the work required.

- Equipment or vehicles shall not be parked, repaired, or fuelled within the dripline of any tree not designated for removal.
- Construction materials and earth shall not be stockpiled within the dripline of any tree not designated for removal.

#### Barrier for Tree Protection

- Barriers for tree protection shall be a minimum height of 1.2 m consisting of material approved by the Contract Administrator, supported by steel posts. The number of steel posts shall be enough to keep the material from sagging and the fence erect.
- The barriers shall be erected at the dripline of trees or woodlot edges within the Working Area, prior to commencement of construction operations at locations specified in the Contract Documents. Where a clearance zone of 1.5m cannot be established between the barrier at the dripline and the limit of grading, the barrier may be placed within the dripline, subject to the approval of the Contract Administrator. When the barrier is placed within the dripline,
  - a) a minimum distance of 0.75m shall be maintained between the trunk of the tree and the barrier, and
  - b) a distance of 1.5m shall be maintained between the barrier and the limit of grading.
- When the trunks of trees are less than 4.5m apart, the trees shall be considered a woodlot and the barrier shall be placed so it forms a continuous barricade around the woodlot as specified in the Contract Documents.
- A barrier is not required where an existing fence serves the same purpose. At such locations, the barrier shall terminate at the existing fence so that a continuous barricade is provided between the trees and the area of work.
- The barriers shall be maintained erect and in good repair throughout the duration of construction operations without breaks and unsupported sections and shall be removed upon completion of the work.

#### Tree Repair

- Trees not designated for removal that are damaged by construction operations shall be repaired as follows, within 5 Days of the damage:
  - a) Branches 25mm or greater in diameter that are broken shall be cut back cleanly on the tree side of the break or to within 10 mm of their base, if a substantial portion of the branch is damaged.
  - b) Roots 25mm or larger in diameter that are exposed shall be cut back cleanly to the soil surface.
  - c) Bark that is damaged shall be neatly trimmed back to uninjured bark without causing further injury to the tree.

#### .21 Preservation of Existing Vegetation

##### Description and Purpose

- Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

##### Limitations

- Requires forward planning
- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development

##### Implementation

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other disturbing activities in areas where no construction activity is planned or will occur at a later date
- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots

- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass
- Consider the impact of grade changes to existing vegetation and the root zone
- Maintain existing irrigation systems where feasible. Temporary irrigation will be required
- Instruct employees and subcontractors to honour protective devices. Prohibit heavy equipment, vehicular traffic, or storage construction materials within the protected areas

#### Inspection and Maintenance

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist
- Damage to the crown, trunk or root system of a retained tree shall be repaired immediately
- Trench as far from tree trunks as possible, usually outside the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentration. If any roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18in below the ground surface and not below the tree centre to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill
- Cleanly remove the ends of damaged roots with a smooth cut
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged areas as much as possible
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in apart throughout the area of compacted soil under the tree crown
- Fertilization

#### .22 Limiting of Construction within Floodplains

##### Description and Purpose

- Construction within the floodplain area should be discouraged because of the risk of damage/destruction from flooding. The local conservation authority requires a permit for any development in these areas. Through the permit process, development in these areas can be prevented or restricted to areas of minimal impact.

#### .23 Hydraulic Mulch

##### Description and Purpose

- The spraying-on of a slurry to a slope or channel surface to provide a layer of seed and growth bedding medium
- The slurry consists of seed, fertilizer, mulch, tackifiers, and water which are mixed together in a tank
- Enables quick re-vegetation of very steep or rocky/gravelly slopes where revegetation by any other method would be very difficult or unsafe; frequent reseeding and special mix design may be required
- When sprayed on the soil, the slurry forms a continuous blanket with seeds and protects the soil from wind and water erosion and raindrop impact by aggregating (or adhering) them in place
- The slurry conserves moisture, reduces soil moisture evaporation, and decreases soil surface crusting due to evaporation/drying of soil

##### Applications

- Can be used to provide temporary and permanent erosion control prior to establishment of vegetation
- Slurry is held in suspension through consistent agitation and is sprayed onto disturbed areas using high pressure pumps

- Can be used for spray-on seeding covering large areas efficiently after placement of topsoil
- May be used to provide soil stabilization for seeding disturbed soil areas
- Can also be used with higher efficiency and large area coverage with advantages over conventional methods (broadcast seeders, drill seeders)
- Can be used in areas where little topsoil is available

#### Advantages

- Relatively cheap and efficient spraying method of seeding and promoting plant growth as well as erosion protection
- Allows spray-on re-vegetation of steep slopes where conventional re-vegetation methods are very difficult
- Minimizes effort required to re-vegetate disturbed areas as hydroseeding hydromulching usually only requires one spray-on operation in comparison with planting and farrow method
- Relatively efficient operation with high coverage rates
- Provides dust control and protection from wind erosion

#### Limitations

- Site must be accessible to hydroseeding-hydromulching equipment
  - Usually mounted on trucks
  - Maximum hose range of approximately 150 m
- May require subsequent spraying to reseed bare spots or areas with low growth

#### Construction

(Note: The following method is provided for guidance only. A site-specific design by a qualified designer is required.)

- Prepare soil surface by removing large rocks or other deleterious materials
- Apply topsoil if available
- Spray on hydroseed-hydromulch as per supplier's recommendations

#### Construction Considerations

- Seed
  - Selected seed mixes must be appropriate for site specific conditions
  - Some jurisdictions have developed recommended seed mixes for specific regions based on historic performance results
  - Qualified agronomists or agrologists should be consulted if a suitable seed mix is not identified
- Hydraulic Mulches
  - Cellulose
  - Comprised of recycled paper from newspapers, magazines, or other paper sources
  - Rapid method for applying seed, fertilizer, mulch, and water in almost any disturbed areas
  - Usually installed without tackifier in slurry
  - Short fibre lengths and lack of tackifier limits erosion control effectiveness and does little to moderate moisture content and temperature within the soil
  - Residual inks within the recycled paper may leach into soil, which may present a problem in environmentally sensitive areas
  - Longevity significantly shorter than for wood fibre mulches or bonded fibre matrices (BFM)
  - Cheaper than wood fibre mulches and BFM
  - Wood Fibre
  - Comprised of whole wood chips
  - Industry standard, provides quick and uniform method and medium for revegetating large areas quickly and economically
  - Longer fibre lengths than for cellulose mulches
  - Longer lasting and has better wet-dry characteristics than cellulose mulches
  - Provides limited erosion control even when sprayed on with tackifiers
  - Provides limited moderation of soil moisture content and temperature when applied at higher rates
  - Cheaper, but less effective than, BFM
  - More expensive, and more effective than, cellulose mulches

- Bonded Fibre Matrices (BFM)
  - Slurry comprised of either cellulose mulch, wood fibre mulch, or a combination of the two
  - Mulches are bound together using chemical bond, mechanical bond, or a combination of the two
  - All fibres and binding agents are premixed by the manufacturer, ensuring uniformity and consistency throughout the application
  - Well suited for sites with existing desirable vegetation and where worker safety and minimal ground disturbance are desired
  - Degree of protection is similar to that obtained from rolled erosion control products (RECP)
  - Quicker installation than for RECP
  - Chemically bonded BFM may require a 'set-up' or curing/drying period
  - Application must be limited to periods where there is no threat of rain during curing period
  - Mechanically bonded BFM have no curing time and are effective immediately after application
  - Application on dry soils is not recommended
  - More expensive, and more effective, than cellulose and wood fibre mulches
- Tackifiers
    - May include vinyl compounds, asphalt, rubber, or other water-mixed substances

#### Inspection and Maintenance

- Inspect hydroseeded-hydromulched areas at least once per year after initial application or after significant storm events (1:2 year storm and/or 40 mm rainfall in 24 hours)
- Areas damaged by runoff may need to be repaired and protected
- Small bare spots may need to be reseeded
- Similar Measures
  - Seeding
  - Mulching
  - Rolled erosion control products (RECP)

#### .24 Heavy Equipment Maintenance

##### Definition and Purpose

- Procedures and practices to minimize or eliminate the discharge of pollutants to the storm drain systems or to watercourses from vehicle and equipment maintenance procedures.
- These procedures are applied on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

##### Limitations

- None identified

##### Implementation

- Drip pans or absorbent pads shall be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- All maintenance areas are required to have spill kits and/or use other spill protection devices.
- Dedicated maintenance areas shall be protected from storm water run-on and runoff, and shall be located at least 15 m (50 ft) from downstream drainage facilities and watercourses.
- Drip Pans or plastic sheeting shall be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than one hour.
- Absorbent spill clean-up materials shall be available in maintenance areas and shall be disposed of properly after use. Substances used to coat asphalt transport trucks and asphalt-spreading equipment shall be non-toxic.
- Use off-site maintenance facilities whenever practical. For long-term projects, consider constructing roofs or using portable tents over maintenance areas.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not dump fuels and lubricants onto the ground.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.

- Properly dispose or recycle used batteries.
- Do not bury used tires.
- Repair of fluid and oil leaks immediately.
- Provide spill containment dikes or secondary containment around stored oil and chemical drums.

#### Maintenance and Inspection

- Maintain waste fluid containers in leak proof condition.
- Vehicle and equipment maintenance areas shall be inspected regularly.
- Vehicles and equipment shall be inspected on each day of use. Leaks shall be repaired immediately or the problem vehicle(s) or equipment shall be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

#### .25 Gravel Bag Berm

##### Description and Purpose

- A gravel bag berm is a series of gravel-filled bags placed on a level contour to intercept sheet flows. Gravel bags pond sheet flow runoff, allowing sediment to settle out, and release runoff slowly as sheet flows, preventing erosion.

##### Limitations

- Gravel bags may be difficult to remove
- Removal problems limit their usefulness in landscaped areas
- Gravel bag berm may not be appropriate for drainage areas greater than 5 acres
- Runoff will pond upstream of the filter, possibly causing flooding if sufficient space does not exist
- Degraded gravel bags may rupture when removed, spilling contents
- Installation can be labour intensive
- Berms may have limited durability for long-term projects
- When used to detain concentrated flows, maintenance requirements increase

##### Implementation

- Gravel bag berms may be used as a linear sediment control measure;
- Below the toe of a slope, as sediment traps at culvert/pipe outlets, below other small cleared areas, along the perimeter of a site, down slope of exposed soil areas, around temporary stockpiles and spoil areas, parallel to a roadway to keep sediment off paved areas, along streams and channels
- As linear erosion control measure;
- Along the face and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow, at the top of slopes to divert runoff away from disturbed slopes, as check dams across mildly sloped construction roads
- For installation near the toe of the slope, consider moving the gravel bag barriers away from the slope toe to facilitate cleaning. To prevent flows behind the barrier, bags can be placed perpendicular to a berm to serve as cross barriers
- Drainage area should not exceed 5 acres
- Non-traffic areas
  - Height 18 in., top width 24 in. for three or more layer construction, top width 12 in. maximum for one or two layer construction, side slopes 2:1 or flatter
- Construction traffic areas
  - Height 12 in maximum, top width 24 in. for three or more layer construction, top width 12 in. maximum for one or two layer construction, side slopes 2:1 or flatter
- Butt ends of bags tightly
- On multiple row, or multiple layer construction, overlap butt joints adjacent row and row beneath
- Use a pyramid approach when stacking bags
- Materials
  - Bag Material
  - Bag Size
  - Fill Material

### Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Gravel bags exposed to sunlight will need to be replaced every two to three months due to degrading of the bags.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damage as needed.
- Sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.
- Remove gravel bag berms when no longer needed. Remove sediment accumulation and clean, re-grade, and stabilize the area. Removed sediment should be incorporated in the project or disposed of.

### .26 Fuel Oil and Chemical Storage

#### Description and Procedures

- Procedures and practices for the proper handling and storage of materials in a manner that minimizes or eliminates the discharge of these materials to the storm drain system or to watercourses.
- These procedures are implemented at all construction sites with delivery and storage of the following:
- Hazardous chemicals such as:
  - Acids,
    - lime,
    - glues,
    - adhesives,
    - paints,
    - solvents, and
    - curing compounds.
  - Soil stabilizers and binders.
  - Fertilizers.
  - Detergents.
  - Plaster.
  - Petroleum products such as fuel, oil, and grease.
  - Asphalt and concrete components.
  - Pesticides and herbicides.
  - Other materials that may be detrimental if released to the environment.

#### Limitations

- Space limitation may preclude indoor storage.
- Storage sheds must meet building & fire code requirements.

#### Implementation

##### General

- Train employees and subcontractors on the proper material delivery and storage practices.
- Temporary storage area shall be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) shall be supplied to the Resident Engineer (RE) for all materials stored. Material Storage Areas and Practices
- Liquids, petroleum products, and substances shall be stored in approved containers and drums and shall be placed in temporary containment facilities for storage.
- Throughout the rainy season, each temporary containment facility shall have a permanent cover and side wind protection or be covered during nonworking days and prior to and during rain events.
- A temporary containment facility shall provide for a spill containment volume able to contain 100mm precipitation from a 24-hour, 25-year storm event, plus the greater of 58% of the aggregate volume of all containers or 75% of the capacity of the largest container within its boundary, whichever is greater.

- A temporary containment facility shall be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility shall be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills shall be collected and placed into drums. These liquids shall be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids shall be sent to an approved disposal site.
- Sufficient separation shall be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, shall not be stored in the same temporary containment facility.
- Materials shall be stored in their original containers and the original product labels shall be maintained in place in a legible condition. Damaged or otherwise illegible labels shall be replaced immediately.
- Bagged and boxed materials shall be stored on pallets and shall not be allowed to accumulate on the ground. To provide protection from wind and rain, throughout the rainy season, bagged and boxed materials shall be covered during non-working days and prior to rain events.
- Stockpiles shall be protected in accordance with Stockpile Management BMP.
- Minimize the material inventory stored on-site (e.g., only a few days supply).
- Have proper storage instructions posted at all times in an open and conspicuous location.
- Do not store hazardous chemicals, drums, or bagged materials directly on the ground. Place these items on a pallet and when possible, under cover in secondary containment.
- Keep hazardous chemicals well labeled and in their original containers.
- Keep ample supply of appropriate spill clean up material near storage areas.
- Also see Hazardous Waste Management BMP for storing of hazardous materials.

#### Material Delivery Practices

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Employees trained in emergency spill clean-up procedures shall be present when dangerous materials or liquid chemicals are unloaded.

#### Spill Clean-up

- Contain and clean up any spill immediately.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose any hazardous materials or contaminated soil.
- See Spill Prevention and Control BMP, for spills of chemicals and/or hazardous materials.

#### Inspection and Maintenance

- Storage areas shall be kept clean, well organized, and equipped with ample clean-up supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners shall be repaired or replaced as needed to maintain proper function.
- Inspect storage areas before and after rainfall events, and at least weekly during other times. Collect and place into drums any spills or accumulated rainwater.

#### .27 Fiber Rolls

##### Description and Purpose

- Straw rolls consist of bundled straw or natural fibre, wrapped in photo-degradable open-weave plastic netting, and staked into the soil along slope contours as a grade break to reduce erosion potential
- Fibre rolls are installed across slope contours as a grade break to reduce erosion potential by reducing overland flow velocities and encouraging ponding and sediment deposition
- Live stakes can be installed to anchor the fibre rolls and wattles to provide deep root vegetation with potential favourable moisture retention provided by the fibre roll
- Fibre rolls and wattles capture sediment, organic matter and seeds carried by runoff

##### Applications

- Temporary measure

- May be used on slopes stable enough to support vegetation (steep, confined, slopes and channel banks with gradients greater than 1H:1V may have low success)
- May be used on slopes and channel banks with adequate sunlight, moisture, and wind protection to support vegetation
- May be used along long slopes as a grade break to shorten slope length between lines of fibre rolls at different contour elevations
- May be used as grade breaks, where slopes transition from flatter to steep gradients
- May be used on lake shores as wave breaks to assist in revegetation and stabilization of banks
- Can be used in conjunction with live staking as bioengineering measure

#### Advantages

- Function as a grade break measure to lower sheet and rill erosion potential
- Can be used on slopes too steep for silt fences
- In time, plastic netting will degrade due to the sunlight and straw will degrade and be incorporated into the soil
- Primary purpose is erosion control, but fibre rolls also provide some sediment control

#### Limitations

- Designed for low sheet flow velocities
- Designed for short slopes with a maximum gradient of 1H:1V
- May be labour intensive to install
- Straw rolls have short life span due to natural degradation; usually only functional for two seasons
- Susceptible to undermining and failure if not properly keyed into the soil
- Labour intensive maintenance may be required to ensure rolls are in continuous contact with the soil, especially when used on steep slopes or sandy soils

#### Construction

(Note: The following method is provided for guidance only. A site-specific design by a qualified designer is required.)

- Prepare slope face and remove large rocks or other deleterious materials
- Excavate small trenches approximately one-half roll diameter deep and wide across the width of the slope, perpendicular to slope direction, starting at the toe of the slope and working upwards towards crest of slope
- Space trenches a maximum of 3 to 8m apart along the slope incline, with steeper slopes having trenches spaced closer together
- Place fibre rolls into trench, ensuring continuous contact with soil surface
- Butt-joint adjacent fibre roll segments tightly against one another
- Use a metal bar to make pilot hole through middle of the fibre roll a minimum depth of 0.3m into underlying soil
- Pilot holes should be spaced a maximum of 1.2m apart
- Secure fibre roll to soil using wooden stake or other appropriate anchor; live stake may be used as alternate anchor
- Place soil excavated from trench on upslope side of fibre roll and compact to minimize undermining of fibre roll by runoff
- Seed the soil along the upslope and downslope sides of the fibre roll

#### Construction Considerations

- Use live stakes instead of wooden stakes
- If the slope soil is loose and uncompacted, excavate trench to a minimum depth of 2/3 of the diameter of the fibre roll
- On steep slopes, anchors may be required on the downslope side of the fibre roll

#### Inspection and Maintenance

- Inspect structures at biweekly intervals or after significant storm events (1:2 year storm and/or 40 mm rainfall in 24 hours)
- Areas damaged by washout or rutting should be repaired immediately
- Additional erosion control measures should be considered for rilling areas damaged by runoff
- permeable barriers

### Similar Measures

- Synthetic

### .28 Entrance/Outlet Tire Washes

#### Description and Purpose

- A tire wash is an area located at stabilized construction access points to remove sediment from tires and undercarriages and to prevent sediment from being transported onto public roadways.
- Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.

#### Limitations

- The tire wash requires a supply of wash water.
- A turnout or doublewide exit is required to avoid having entering vehicles drive through the wash area.
- Do not use where wet tire trucks leaving the site leave the road dangerously slick.

#### Implementation

- Incorporate with a stabilized construction entrance/exit. See Stabilized Construction Entrance/Exit BMP.
- Construct on level ground when possible, on a pad of coarse aggregate greater than 3 in. but smaller than 6 in. A geotextile fabric should be placed below the aggregate.
- Wash rack should be designed and constructed/manufactured for anticipated traffic loads.
- Provide a drainage ditch that will convey the runoff from the wash area to a sediment trapping device. The drainage ditch should be of sufficient grade, width, and depth to carry the wash runoff.
- Use hoses with automatic shutoff nozzles to prevent hoses from being left on.
- Require that all employees, subcontractors, and others that leave the site with mud caked tires and undercarriages to use the wash facility.
- Implement street sweeping and vacuuming, as needed.

#### Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Remove accumulated sediment in wash rack and/or sediment trap to maintain system performance.
- Inspect routinely for damage and repair as needed.

### .29 Earth Dykes and Drainage Swales

#### Description and Purpose

- An earth dyke is a temporary berm or ridge of compacted soil used to divert runoff or channel water to a desired location. A drainage swale is a shaped and sloped depression in the soil surface used to convey runoff to a desired location. Earth dykes and drainage swales are used to divert offsite runoff around the construction site, divert runoff from stabilized areas and disturbed areas, and direct runoff into sediment basins or traps.

#### Limitations

- Dykes should not be used for drainage areas greater than 10 acres or along slopes greater than 10 percent. For larger areas more permanent drainage structures should be built.
- Earth dykes may create more disturbed area on site and become barriers to construction equipment
- Earth dykes must be stabilized immediately, which adds cost and maintenance concerns
- Diverted stormwater may cause downstream flood damage
- Dykes should not be constructed of soils that may be easily eroded
- Regrading the site to remove the dyke may add additional cost

- Temporary drains and swales or any other diversion of runoff should not adversely impact upstream or downstream properties
- Temporary drains and swales must conform to local floodplain management requirements
- Earth dykes/drainage swales are not suitable as sediment trapping devices
- It may be necessary to use other soil stabilization and sediment controls such as check dams, plastics, and blankets, to prevent scour and erosion in newly graded dykes, swales and ditches

#### Implementation

- The temporary earth dyke is a berm or ridge of compacted soil, located in such a manner as to divert stormwater to a sediment trapping device or a stabilized outlet, thereby reducing the potential for erosion and offsite sedimentation. Earth dykes can also be used to divert runoff from offsite and from undisturbed areas away from disturbed areas to divert sheet flows away from unprotected slopes.
- An earth dyke does not itself control erosion or remove sediment from runoff. A dyke prevents erosion by directing runoff to an erosion control device such as a sediment trap or directing runoff away from an erodible area. Temporary diversion dykes should not adversely impact adjacent properties and must conform to local floodplain management regulations, and should not be used in areas with slopes steeper than 10%.
- Slopes that are formed during cut and fill operations should be protected from erosion by runoff. A combination of a temporary drainage swale and an earth dyke at the top of a slope can divert runoff to a location where it can be brought to the bottom of the slope. A combination dyke and swale is easily constructed by a single pass of a bulldozer or grader and compacted by a second pass of the tracks or wheels over the ridge. Diversion structures should be installed when the site is initially graded and remain in place until post construction BMPs are installed and the slopes are stabilized.
- Diversion practices concentrate surface runoff, increasing its velocity and erosive force. Thus, the flow out of the drain or swale must be directed onto a stabilized area or into a grade stabilization structure. If significant erosion will occur, a swale should be stabilized using vegetation, chemical treatment, rock rip-rap, matting, or other physical means of stabilization. Any drain or swale that conveys sediment laden runoff must be diverted into a sediment basin or trap before it is discharged from the site.

#### Earth Dykes

- Temporary earth dykes are a practical, inexpensive BMP used to divert stormwater runoff. Temporary diversion dykes should be installed in the following manner:
- All dykes should be compacted by earth moving equipment.
- All dykes should have positive drainage to an outlet.
- All dykes should have 2:1 or flatter side slopes, 18 in. minimum height, and a minimum top width of 24 in. wide top widths and flat slopes are usually needed at crossings for construction traffic.
- The outlet from the earth dyke must function with a minimum of erosion. Runoff should be conveyed to a sediment trapping device such as a Sediment Trap or Sediment Basin when either the dyke channel or the drainage area above the dyke are not adequately stabilized.
- Temporary stabilization may be achieved using seed and mulching for slopes less than 5% and either rip-rap or sod for slopes in excess of 5%. In either case, stabilization of the earth dyke should be completed immediately after construction or prior to the first rain.
- If riprap is used to stabilize the channel formed along the toe of the dyke, the following typical specifications apply:
  - Channel Grade Riprap Stabilization
  - 0.5-1.0% 4 in. Rock
  - 1.1-2.0% 6 in. Rock
  - 2.1-4.0% 8 in. Rock
  - 4.1-5.0% 8 in. -12 in. Riprap
- The stone riprap, recycled concrete, etc. used for stabilization should be pressed into the soil with construction equipment.
- Filter cloth may be used to cover dykes in use for long periods.
- Construction activity on the earth dyke should be kept to a minimum.

### Drainage Swales

- Drainage swales are only effective if they are properly installed. Swales are more effective than dykes because they tend to be more stable. The combination of a swale with a dyke on the downhill side is the most cost effective diversion.
- Standard engineering design criteria for small open channel and closed conveyance systems should be used (see the local drainage design manual). Unless local drainage design criteria state otherwise, drainage swales should be designed as follows:
  - No more than 5 acres may drain to a temporary drainage swale.
  - Place drainage swales above or below, not on, a cut or fill slope.
  - Swale bottom width should be at least 2 ft
  - Depth of the swale should be at least 18 in.
  - Side slopes should be 2:1 or flatter.
  - Drainage or swales should be laid at a grade of at least 1 percent, but not more than 15 percent.
  - The swale must not be overtopped by the peak discharge from a 10-year storm, irrespective of the design criteria stated above.
  - Remove all trees, stumps, obstructions, and other objectionable material from the swale when it is built.
  - Compact any fill material along the path of the swale.
  - Stabilize all swales immediately. Seed and mulch swales at a slope of less than 5 percent, and use riprap or sod for swales with a slope between 5 and 15 percent. For temporary swales, geotextiles and mats may provide immediate stabilization.
  - Irrigation may be required to establish sufficient vegetation to prevent erosion.
  - Do not operate construction vehicles across a swale unless a stabilized crossing is provided.
  - Permanent drainage facilities must be designed by a professional Engineer (see the local drainage design criteria for proper design).
  - At a minimum, the drainage swale should conform to predevelopment drainage patterns and capacities.
  - Construct the drainage swale with a positive grade to a stabilized outlet.
  - Provide erosion protection or energy dissipation measures if the flow out of the drainage swale can reach an erosive velocity.

### Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspect ditches and berms for washouts. Replace lost riprap, damaged linings or soil stabilizers as needed.
- Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment and repair linings and embankments as needed.
- Temporary conveyances should be completely removed as soon as the surrounding drainage area has been stabilized or at the completion of construction.

### .30 Tracking

#### Description and Purpose

- A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

#### Implementation

- Use at construction sites;
  - Where dirt or mud can be tracked onto public roads
  - Adjacent to water bodies
  - Where poor soils are encountered
  - Where dust is a problem during dry weather conditions
- Limit points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.

- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment-trapping device before discharge.
- Design stabilized entrances/exit to support the heaviest vehicles and equipment that will use it.
- Select construction access stabilization based on longevity, required performance and site conditions.
- Designate combination or single purpose entrances and exits to the construction site.
- Incorporate with Entrance/Outlet Tire Wash BMP.

#### Inspection and Maintenance

- Inspect routinely for damage and assess effectiveness of the BMP.
- Keep all temporary roadway ditches clear.
- Inspect damage and repair as needed.

### .31 Definitions of Recreational Routes

#### Description and Purpose

- During construction recreational areas and routes will have to be designated. Fishing activities, hiking and biking will be impacted.

#### Implementation

- Provide publication in advance notice to reduce impacts on construction.
- Provide barricades around working areas.
- Limit areas affected by constructing at any one time.

#### Fishing Activities

- Post “no fishing” signs and police such (temporary in some areas, permanent in others with the appropriate by-laws in place).
- Designate and improve acceptable fishing areas.
- Explore possible locations for new and acceptable fishing areas.
- Implement coffer dams and silt curtains to reduce downstream sedimentation in areas that are not being constructed so as not to impact fishing.

### .32 Agricultural Cropland Erosion

#### Description and Purpose

- Agricultural cropland erosion can decrease crop returns for farmers and impact the environment particularly water quality. Soil conservation practices need to be practiced on the farm to reduce these effects. There are a number of practices that can reduce soil loss including mulch tillage, no-till/ridge tillage, soil management, residue management, crop rotation, cover crops, nutrient management and pest management.
- See OMAFRA website to order Best Management Practices: Field Crop Production information

### .33 Cropland Field Management

- A wide variety of techniques are available to reduce runoff, wind and water erosion, and nutrient loss from cultivated lands. In addition to reducing contamination of water systems, the adoption of many of these techniques will result in cost savings or improved efficiencies for the operator:
  - Grassed waterways involve shaping and seeding an overland drainage route to convey runoff away from a field without causing gully erosion.
  - Filter strips are vegetated buffers located between cultivated areas and agricultural drains, ditches, and watercourses.
  - Contour farming reduces runoff and soil loss by simply plowing and seeding cross the slope following the topography.
  - Low till / no till farming improves long-term soil viability and reduces soil loss by leaving at least 30% of previous year’s crop residue on the field.
  - Strip cropping increases infiltration and reduces runoff by alternating a ground cover crop and a row crop changing effectively the amount of surface cover.

- Crop rotation involves alternating crops year to year thereby improving soil structure, infiltration and reducing erosion while improving crop yield.
- Windbreaks or fence rows reduce soil erosion by reducing wind velocity and the loss of soil moisture which binds soil particles together.

#### .34 Check Dams

##### Description and Purpose

- A check dam is a small barrier constructed of rock, gravel bags, sandbags, fiber rolls, or reusable products, placed across a constructed swale or drainage ditch. Check dams reduce the effective slope of the channel, thereby reducing the velocity of flowing water, allowing sediment to settle and reducing erosion.

##### Limitations

- Not to be used in live streams or in channels with extended base flows.
- Not appropriate in channels that drain areas greater than 10 acres.
- Not appropriate in channels that are already grass-lined unless erosion is expected, as installation may damage vegetation.
- Require extensive maintenance following high velocity flows.
- Promotes sediment trapping which can be re-suspended during subsequent storms or removal of the check dam.

##### Implementation

###### General

- Check dams reduce the effective slope and create small pools in swales and ditches that drain 10 acres or less. Reduced slopes reduce the velocity of stormwater flows, thus reducing erosion of the swale or ditch and promoting sedimentation. Use of check dams for sedimentation will likely result in little net removal of sediment because of the small detention time and probable scour during longer storms. Using a series of check dams will generally increase their effectiveness. A sediment trap (Sediment Trap BMP) may be placed immediately upstream of the check dam to increase sediment removal efficiency.

###### Design and Layout

- Check dams work by decreasing the effective slope in ditches and swales. An important consequence of the reduced slope is a reduction in capacity of the ditch or swale. This reduction in capacity must be considered when using this BMP, as reduced capacity can result in overtopping of the ditch or swale and resultant consequences. In some cases, such as a “permanent” ditch or swale being constructed early and used as a “temporary” conveyance for construction flows, the ditch or swale may have sufficient capacity such that the temporary reduction in capacity due to check dams is acceptable. When check dams reduce capacities beyond acceptable limits, there are several options:
  - Don't use check dams. Consider alternative BMPs.
  - Increase the size of the ditch or swale to restore capacity.
  - Maximum slope and velocity reduction is achieved when the toe of the upstream dam is at the same elevation as the top of the downstream dam. The center section of the dam should be lower than the edge sections so that the check dam will direct flows to the center of the ditch or swale.
- Check dams are usually constructed of rock, gravel bags, sandbags, and fiber rolls. A number of products manufactured specifically for use as check dams are also being used, and some of these products can be removed and reused. Check dams can also be constructed of logs or lumber, and have the advantage of a longer lifespan when compared to gravel bags, sandbags, and fiber rolls. Straw bales can also be used for check dams and can work if correctly installed; but in practice, straw bale check dams have a high failure rate. Check dams should not be constructed from straw bales or silt fences, since concentrated flows quickly wash out these materials.
- Rock check dams are usually constructed of 8 to 12 in. rock. The rock is placed either by hand or mechanically, but never just dumped into the channel. The dam must completely span the ditch or swale to prevent washout. The rock used must be large enough to stay in place given the expected design flow through the channel.

- Log check dams are usually constructed of 4 to 6 in. diameter logs. The logs should be embedded into the soil at least 18 in. Logs can be bolted or wired to vertical support logs that have been driven or buried into the soil.
- Gravel bag and sandbag check dams are constructed by stacking bags across the ditch or swale, shaped as shown in the drawings at the end of this fact sheet.
- Manufactured products should be installed in accordance with the manufacturer's instructions.
- If grass is planted to stabilize the ditch or swale, the check dam should be removed when the grass has matured (unless the slope of the swales is greater than 4%).
- The following guidance should be followed for the design and layout of check dams:
- Install the first check dam approximately 16 ft from the outfall device and at regular intervals based on slope gradient and soil type.
- Check dams should be placed at a distance and height to allow small pools to form between each check dam.
- Backwater from a downstream check dam should reach the toes of the upstream check dam.
- A sediment trap provided immediately upstream of the check dam will help capture sediment. Due to the potential for this sediment to be re-suspended in subsequent storms, the sediment trap must be cleaned following each storm event.
- High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding or damage to the check dam.
- Where grass is used to line ditches, check dams should be removed when grass has matured sufficiently to protect the ditch or swale.
- Gravel bags may be used as check dams with the following specifications:

#### Materials

- Gravel bags used for check dams should conform to the requirements of Gravel Bag Berms BMP. Sandbags used for check dams should conform to Sandbag Barrier BMP. Fiber rolls used for check dams should conform to Fiber Rolls BMP. Straw bales used for check dams should conform to Straw Bale Barrier BMP.

#### Installation

- Rock should be placed individually by hand or by mechanical methods (no dumping of rock) to achieve complete ditch or swale coverage.
- Tightly abut bags and stack according to detail shown in the figure at the end of this section. Gravel bags and sandbags should not be stacked any higher than 3 ft.
- Fiber rolls and straw bales must be trenched in and firmly staked in place.

#### Inspection and Maintenance

- Inspect BMPs prior to forecast rain, daily during extended rain events, after rain events, weekly during the rainy season, and at two-week intervals during the non-rainy season.
- Replace missing rock, bags, bales, etc. Replace bags or bales that have degraded or have become damaged.
- If the check dam is used as a sediment capture device, sediment that accumulates in the BMP must be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height. Sediment removed during maintenance may be incorporated into earthwork on the site or disposed at an appropriate location.
- If the check dam is used as a grade control structure, sediment removal is not required as long as the system continues to control the grade.
- Remove accumulated sediment prior to permanent seeding or soil stabilization.
- Remove check dam and accumulated sediment when check dams are no longer needed.

#### .35 Fish Shocking

##### Description and Purpose

- Given the size of the canals and complexity of habitat, the most effective means of collecting fish for relocation is by boat electroshocking. Essentially an electric current is passed through the water from a generator on the boat, to stun fish for capture. The electric current used is capable of harming both fish and people if proper care and procedures are not followed.

## Implementation

### Human Safety

- At least three personnel will be on the boat when electrofishing, one supervisor and two netters.
- At a minimum, the supervisor will have taken an electrofishing certification course and have a Pleasure Craft Operators Card.
- All staff will be trained in CPR.
- All crew members will wear chest or hip waders to insulate the wearer from electrical shock.
- All crew members will wear an approved personal floatation device while on the boat.
- Net handles will be constructed of a nonconductive material and will be of sufficient length to avoid hand contact with the water.
- All team members will wear rubber gloves of sufficient length to isolate hands from external surfaces.
- Gloves will be visually inspected for punctures before each use and will be replaced if tears or punctures are evident.
- General boat housekeeping must provide adequate working space to conduct safe operations.
- The boat and equipment will be visually inspected for safety by the supervisor or operator in charge, prior to each use.
- The boat operator must have ready access to an on/off, emergency stop, or deadman switch to cut the power in case of an accident.
- The phone number and direction to the closest hospital will be identified and clearly displayed.

### Fish Health

- Polarized sunglasses will be worn to increase visibility.
- Two netters will be on the boat when in operation.
- Bubblers or an appropriate alternative will be used to ensure better than ambient dissolved oxygen in the onboard storage tanks.
- The length of time fish are contained will be monitored as not to induce unnecessary stress.
- Current strength will be continually monitored to ensure operation within safe levels.
- Fish handling will be kept to a minimum to reduce fish stress.
- Fish condition will be continually monitored, in terms of spinal injuries and rate of recovery.
- A permit to collect fish will be obtained from the Ministry of Natural Resources for each construction interval.

## .36 Winter Work

### Description and Purpose

- Use of vehicles and working in the cold call for special attention in winter.
- Operation of vehicles must be performed according to all vehicle codes, traffic laws, company procedures and manufacturer's recommended operating guidelines. When using vehicles drive defensively, back in when practical, ensure vehicle has an emergency road kit, ensure to clear snow from all windows, lights and mirrors, accelerate and brake gently to reduce skids or spinouts and monitor weather reports. Beware of ground conditions when parking equipment overnight. Wherever possible avoid mud where equipment may be frozen in place and difficult to dislodge in the morning. Check propane cab heaters for leaks and proper venting. When setting up signs and barricade control, allow extra distance so that motorists can spot warning signs and slow down or stop in time.
- Dress properly for cold weather. Protective clothing is needed for work at or below 4°C. Multiple layering of clothing provides better protection and in wet conditions the outer layer of clothing should be waterproof. Ensure winter clothing does not restrict movement, vision or hearing. Proper footwear, gloves and headwear are required and in extremely cold conditions face and eye protection from sunlight, glare, blowing snow/ice crystals and high winds at cold temperatures will be needed.

## .37 Ice Control on Roads

### Description and Purpose

- In sufficient concentrations, road salts pose a risk to plants, animals and the aquatic environment. It is therefore important to both control ice on roads and reduce salt impacts to the environment. Salt should be managed to ensure safe, efficient and cost-effective use on roadway systems. As

part of a salt management plan, best management practices should be implemented for winter maintenance of vehicles, use of road salt, sand and salt storage and disposal of snow.

**60.0 CONTRACTOR INDOCTRINATION RE WORKPLACE SAFETY**

The Contractor is hereby advised that each member of the Contractor's workforce including sub-contractors shall be required to:

- a) Comply with the Board's (Town's) Health and Safety Policy
- b) Comply with existing Provincial laws. Attention to be paid to the Occupational Safety Act and Regulations.

**"S A M P L E"**

**HOLLAND MARSH DRAINAGE SYSTEM  
JOINT MUNICIPAL SERVICES BOARD**

**RESTORATION RELEASE FORM**

**TO WHOM IT MAY CONCERN**

**CONTRACT NO.:** \_\_\_\_\_

**DESCRIPTION** \_\_\_\_\_  
\_\_\_\_\_

This is to certify that the restoration work required on my property under this contract has been carried out as previously agreed to with the Board.

**Signed:** \_\_\_\_\_

**Dated:** \_\_\_\_\_

**PLEASE PRINT:**

\_\_\_\_\_  
**NAME**

\_\_\_\_\_  
**ADDRESS**

**WITNESSED:** \_\_\_\_\_

- 1. Blank forms are available from the Board Office.**
- 2. Please submit completed forms to the Board Office.**

**"S A M P L E"**

**HOLLAND MARSH DRAINAGE SYSTEM  
JOINT MUNICIPAL SERVICES BOARD**

**ADVISORY NOTICE  
DISRUPTION OF MUNICIPAL SERVICES**

**TO WHOM IT MAY CONCERN**

There will be a disruption of municipal servicing to your property for a period of approximately \_\_\_\_\_ hours beginning at \_\_\_\_\_ a.m. / p.m., on \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, 20\_\_\_\_.  
**(Day) (Date) (Month)**

This is to certify that I have been notified accordingly.

**SIGNED:** \_\_\_\_\_

**DATED:** \_\_\_\_\_

**PLEASE PRINT:**

\_\_\_\_\_  
**NAME**

\_\_\_\_\_  
(Property Owner / Occupant / other)

\_\_\_\_\_  
**ADDRESS**

**WITNESSED:** \_\_\_\_\_

- 1. Blank forms are available from the Board Office.**
- 2. Please submit completed forms to the Board Office.**

# DIVISION 4

**HOLLAND MARSH DRAINAGE SYSTEM  
JOINT MUNICIPAL SERVICES BOARD**

**TENDER FOR  
CONTRACT \_\_\_\_\_  
Morris Road Drain**

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**HOLLAND MARSH DRAINAGE SYSTEM  
JOINT MUNICIPAL SERVICES BOARD**

**TENDER FOR  
CONTRACT \_\_\_\_\_  
Morris Road Drain**

**APPLICABLE ONTARIO PROVINCIAL STANDARD  
SPECIFICATIONS LISTING**

<b>OPSS DATE</b>	<b>SPEC NO.</b>	<b>TITLE</b>
Jan. 1994	180	Management and Disposal of Excess Material
Nov. 2000	182	Environmental Protection for Construction in Waterbodies and on Waterbody Banks
Feb 1996	201	Clearing, Close Cut Clearing, Grubbing, Removal of Boulders and Mechanical Stump Cutting
Nov. 2000	206	Grading
Nov. 2008	212	Construction Specifications for Borrow
Nov. 2008	310	Hot Mix Asphalt
Nov. 2004	314	Untreated Granular, Subbase, Base, Surface Shoulder and Stockpiling
Nov. 2008	416	Pipeline and Utility Installation by Jacking and Boring
April 2008	421	Pipe Culvert Installation in Open Cut
Nov. 2005	501	Compacting
Nov. 2005	503	Site Preparation for Pipelines, Utilities, and Associated Structures
Nov. 2005	504	Preservation, Protection, and Reconstruction of Existing Facilities
Nov. 2005	506	Construction Specifications for Dust Suppressants
Apr. 1999	507	Site Restoration Following Installation of Pipelines, Utilities, and Associated Structures in Open Cut
Nov. 2005	510	Removal
Nov. 2001	511	Riprap, Rock Protection, and Gravel Sheeting
April 2008	514	Trenching, Backfilling, and Compacting
Apr. 1999	517	Dewatering of Pipeline, Utility and Associated Structures in Open Cut
Apr. 1999	518	Control of Water from Dewatering Operations
Apr. 1999	538	Support Systems
Apr. 2007	540	Standard Highway Fence
Dec. 1990	543	Traffic Control Signing
Nov. 2007	570	Topsoil
Nov. 2003	572	Seed and Cover
Nov. 2009	903	Construction Specification for Deep Foundations
Feb. 1996	577	Temporary Erosion and Sediment Control Measures
Nov. 2008	1350 (munic)	Material Specification for Concrete – Materials and Production
Mar. 1998	1860	Geotextiles

**“See also the Instructions to Tenderers and Schedule of Tender Prices for additional Specifications that may not be included here.”**

*OPSS - Ontario Provincial Standard Specifications*

*OPSD - Ontario Provincial Standard Drawings*

**HOLLAND MARSH DRAINAGE SYSTEM  
JOINT MUNICIPAL SERVICES BOARD**

**TENDER FOR  
CONTRACT \_\_\_\_\_  
Morris Road Drain**

**ONTARIO PROVINCIAL STANDARD DRAWINGS LISTED**

<b>OPSD DATE</b>	<b>SPEC NO.</b>	<b>TITLE</b>
Nov. 2009	OPSD 209.01	Rural Pavement Widening
Nov. 2006	OPSD 219.110	Light Duty Silt Fence Barrier
Nov. 2006	OPSD 219.130	Heavy Duty Silt Fence Barrier
Nov. 2006	OPSD 219.180	Straw Bale Flow Check Dam
Nov. 2006	OPSD 219.220	Excavated Sediment Trap in Ditch
Nov. 2006	OPSD 219.260	Turbidity Curtain
Nov. 2006	OPSD 219.261	Turbidity Curtain, Seam Detail
Nov. 2008	OPSD 913.130	Guide Rail System, Cable, Installation - Shoulder
Nov. 2008	OPSD 971.101	Fence, Highway, in Earth, Shale, Loose Rock, or Friable Rock Installation
Dec. 1983	OPSD 1007.01	Utility Supports up to 300mm dia. (cancelled)

**“See also the Schedule of Tender Prices and Contract Plans for additional Standard Drawings that may not be included here.”**

*OPSS - Ontario Provincial Standard Specifications*

*OPSD - Ontario Provincial Standard Drawings*

# DIVISION 5

# **HOLLAND MARSH DRAINAGE SYSTEM JOINT MUNICIPAL SERVICES BOARD**

## **GENERAL CONDITIONS**

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The HMDSJMSB (the Board) has adopted the Ontario Provincial Standards General Conditions.



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## OPS GENERAL CONDITIONS OF CONTRACT

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## SECTION GC 1.0 - INTERPRETATION

### GC 1.01 Captions

.01 The captions appearing in these General Conditions have been inserted as a matter of convenience and for ease of reference only and in no way define, limit, or enlarge the scope or meaning of the General Conditions or any provision hereof.

### GC 1.02 Abbreviations

.01 The abbreviations on the left below are commonly found in the Contract Documents and represent the organizations and phrases listed on the right:

"AASHTO" - American Association of State Highway Transportation Officials  
"ACI" - American Concrete Institute  
"ANSI" - American National Standards Institute  
"ASTM" - American Society for Testing and Materials  
"AWG" - American Wire Gauge  
"AWWA" - American Water Works Association  
"CCIL" - Canadian Council of Independent Laboratories  
"CESA" - Canadian Engineering Standards Association  
"CGSB" - Canadian General Standards Board  
"CSA" - Canadian Standards Association  
"CWB" - Canadian Welding Bureau  
"GC" - General Conditions  
"ISO" - International Organization for Standardization  
"MOE" - Ontario Ministry of the Environment  
"MTO" - Ontario Ministry of Transportation  
"MUTCD" - Manual of Uniform Traffic Control Devices (Replaced by OTM)  
"OPS" - Ontario Provincial Standard  
"OPSD" - Ontario Provincial Standard Drawing  
"OPSS" - Ontario Provincial Standard Specification  
"OTM" - Ontario Traffic Manual  
"PEO" - Professional Engineers Ontario  
"SAE" - Society of Automotive Engineers  
"SCC" - Standards Council of Canada  
"SSPC" - Structural Steel Painting Council  
"UL" - Underwriters Laboratories  
"ULC" - Underwriters Laboratories Canada

### GC 1.03 Gender and Singular References

.01 References to the masculine or singular throughout the Contract Documents shall be considered to include the feminine and the plural and vice versa, as the context requires.

### GC 1.04 Definitions

.01 For the purposes of this Contract the following definitions apply:

**Actual Measurement** means the field measurement of that quantity within the approved limits of the Work.

**Addendum** means an addition or change in the tender documents issued by the Owner prior to tender closing.

**Additional Work** means work not provided for in the Contract and not considered by the Contract

Administrator to be essential to the satisfactory completion of the Contract within its intended scope.

**Agreement** means the agreement between the Owner and the Contractor for the performance of the Work that is included in the Contract Documents.

**Base** means a layer of material of specified type and thickness placed immediately below the pavement wearing surface layers, curb and gutter, or sidewalk.

**Business Day** means any Day except Saturdays, Sundays, and statutory holidays.

**Certificate of Subcontract Completion** means the certificate issued by the Contract Administrator in accordance with clause GC 8.02.03.02, Certification of Subcontract Completion.

**Certificate of Substantial Performance** means the certificate issued by the Contract Administrator at Substantial Performance.

**Change Directive** means any written instruction signed by the Owner, or by the Contract Administrator where so authorized, directing that a Change in the Work or Extra Work be performed.

**Change in the Work** means the deletion, extension, increase, decrease, or alteration of lines; grades; dimensions; quantities; methods; drawings; substantial changes in geotechnical, subsurface, surface, or other conditions; changes in the character of the Work to be done; or materials of the Work or part thereof, within the intended scope of the Contract.

**Change Order** means a written amendment to the Contract signed by the Contractor and the Owner, or the Contract Administrator where so authorized, covering contingencies, a Change in the Work, Extra Work, Additional Work, and changed subsurface conditions; and establishing the basis for payment and the time allowed for the adjustment of the Contract Time.

**Completion Certificate** means the certificate issued by the Contract Administrator at completion.

**Constructor** means, for the purposes of, and within the meaning of the *Occupational Health and Safety Act*, R.S.O. 1990, c.O.1, as amended and amendments thereto, the Contractor who executes the Contract.

**Contract** means the undertaking by the Owner and the Contractor to perform their respective duties, responsibilities, and obligations as prescribed in the Contract Documents.

**Contract Administrator** means the person, partnership, or corporation designated by the Owner to be the Owner's representative for the purposes of the Contract.

**Contract Documents** mean the executed Agreement between the Owner and the Contractor, Tender, General Conditions of Contract, Supplemental General Conditions of Contract, Standard Specifications, Special Provisions, Contract Drawings, addenda incorporated in a Contract Document before the execution of the Agreement, such other documents as may be listed in the Agreement, and subsequent amendments to the Contract Documents made pursuant to the provisions of the Agreement.

**Contract Drawings** or **Contract Plans** mean drawings or plans, any Geotechnical Report, any Subsurface Report, and any other reports and information provided by the Owner for the Work, and without limiting the generality thereof, may include soil profiles, foundation investigation reports, reinforcing steel schedules, aggregate sources lists, Quantity Sheets, and cross-sections.

**Contract Time** means the time stipulated in the Contract Documents for Substantial Performance of the Work, including any extension of Contract Time made pursuant to the Contract Documents.

**Contractor** means the person, partnership, or corporation undertaking the Work as identified in the Agreement.

**Controlling Operation** means any component of the Work that, if delayed, may delay the completion of

the Work.

**Cost Plus** has the same meaning as "Time and Material."

**Cut-Off Date** means the date up to which payment shall be made for work performed.

**Daily Work Records** mean daily Records detailing the number and categories of workers and hours worked or on standby, types and quantities of Equipment and number of hours in use or on standby, and description and quantities of Material utilized.

**Day** means a calendar day.

**Drawings or Plans** mean any Contract Drawings or Contract Plans, or any Working Drawings or Working Plans, or any reproductions of drawings or plans pertaining to the Work.

**End Result Specification** means specifications that require the Contractor to be responsible for supplying a product or part of the Work. The Owner accepts or rejects the final product or applies a price adjustment that is commensurate with the degree of compliance with the specification.

**Equipment** means all machinery and equipment used for preparing, fabricating, conveying or erecting the Work and normally referred to as construction machinery and equipment.

**Estimate** means a calculation of the quantity or cost of the Work or part of it depending on the context.

**Extra Work** means work not provided for in the Contract as awarded but considered by the Contract Administrator to be essential to the satisfactory completion of the Contract within its intended scope, including unanticipated work required to comply with legislation and regulations that affect the Work.

**Final Acceptance Certificate** means the certificate issued by the Contract Administrator at Final Acceptance of the Work.

**Final Detailed Statement** means a complete evaluation prepared by the Contract Administrator showing the quantities, unit prices, and final dollar amounts of all items of work completed under the Contract, including variations in tender items and Extra Work, all as set out in the same general form as the monthly estimates.

**Force Account** has the same meaning as "Time and Material."

**Geotechnical Report** means a report or other information identifying soil, rock, and ground water conditions in the area of any proposed Work.

**Grade** means the required elevation of that part of the Work.

**Hand Tools** means tools that are commonly called tools or implements of the trade and include small power tools.

**Highway** means a common and public highway any part of that is intended for or used by the general public for the passage of vehicles and includes the area between the lateral property lines thereof.

**Lot** means a specific quantity of material or a specific amount of construction normally from a single source and produced by the same process.

**Lump Sum Item** means a tender item indicating a portion of the Work for which payment will be made at a single tendered price. Payment is not based on a measured quantity, although a quantity may be given in the Contract Documents.

**Major Item** means any tender item that has a value, calculated on the basis of its actual or estimated tender quantity, whichever is the larger, multiplied by its tender unit price, which is equal or greater than the lesser of,

- a) \$100,000, or
- b) 5% of the total tender value calculated on the basis of the total of all the estimated tender quantities and the tender unit prices.

**Material** means material, machinery, equipment and fixtures forming part of the Work.

**Owner** means the party to the Contract for whom the Work is being performed, as identified in the Agreement, and includes, with the same meaning and import, "Authority."

**Pavement** means a wearing course or courses placed on the Roadway and consisting of asphaltic concrete, hydraulic cement concrete, Portland cement concrete, or plant or road mixed mulch.

**Performance Bond** means the type of security furnished to the Owner to guarantee completion of the Work in accordance with the Contract and to the extent provided in the bond.

**Plan Quantity** means that quantity as computed from within the boundary lines of the Work as shown in the Contract Documents.

**Project** means the construction of the Work as contemplated by this Contract.

**Quantity Sheet** means a list of the quantities of Work to be done.

**Quarried Rock** means material removed from an open excavation made in a solid mass of rock that, prior to removal, was integral with the parent mass.

**Quarry** means a place where Aggregate has been or is being removed from an open excavation made in a solid mass of igneous, sedimentary, or metamorphic rock or any combination of these that, prior to removal, was integral with the parent areas.

**Rate of Interest** means the rate of interest as determined under the *Financial Administration Act* by the Minister of Finance of Ontario and issued by, and available from, the Owner.

**Records** mean any books, payrolls, accounts, or other information that relate to the Work or any Change in the Work or claims arising therefrom.

**Roadway** means that part of the Highway designed or intended for use by vehicular traffic and includes the Shoulders.

**Shoulder** means that portion of the Roadway between the edge of the travelled portion of the wearing surface and the top inside edge of the ditch or fill slope.

**Special Provisions** mean directions containing requirements specific to the Work.

**Standard Drawing or Standard Specification** means a standard practice required and stipulated by the Owner for performance of the Work.

**Subbase** means a layer of material of specified type and thickness between the Subgrade and the Base.

**Subcontractor** means a person, partnership or corporation undertaking the execution of a part of the Work by virtue of an agreement with the Contractor.

**Subgrade** means the earth or rock surface, whether in cut or fill, as prepared to support the pavement structure, consisting of Base, Subbase, and Pavement.

**Subsurface Report** means a report or other information identifying the location of Utilities, concealed and adjacent structures, and physical obstructions that fall within the influence of the Work.

**Superintendent** means the Contractor's authorized representative in responsible charge of the Work.

**Surety** means the person, partnership or corporation, other than the Contractor, licensed in Ontario to transact business under the *Insurance Act*, R.S.O. 1990, c.I.8, as amended, executing a bond provided by the Contractor.

**Tender** means an offer in writing from the Contractor, submitted in the format prescribed by the Owner, to complete the Work.

**Time and Material** means costs calculated according to clause GC 8.02.04, Payment on a Time and Material Basis. Where "Cost Plus" and "Force Account" are used they shall have the same meaning.

**Utility** means an aboveground or underground facility maintained by a municipality, public utility authority or regulated authority and includes services such as sanitary sewer, storm sewer, water, electric, gas, oil, steam, data transmission, telephone, and cable television.

**Warranty Period** means the period of 12 months from the date of Substantial Performance or such longer period as may be specified in the Contract Documents for certain Materials or some or all of the Work. Where a date of Substantial Performance is not established, the Warranty Period shall commence on the date of Completion.

**Work** means the total construction and related services required by the Contract Documents.

**Working Area** means all the lands and easements owned or acquired by the Owner for the construction of the Work.

**Working Day** means any Day,

- a) except Saturdays, Sundays and statutory holidays;
- b) except a Day as determined by the Contract Administrator, on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom, from proceeding with a Controlling Operation. For the purposes of this definition, this shall be a Day during which the Contractor cannot proceed with at least 60% of the normal labour and Equipment force effectively engaged on the Controlling Operation for at least 5 hours;
- c) except a Day on which the Contractor is prevented from proceeding with a Controlling Operation, as determined by the Contract Administrator by reason of,
  - i. any breach of the Contract by the Owner or if such prevention is due to the Owner, another contractor hired by the Owner, or an employee of any one of them, or by anyone else acting on behalf of the Owner.
  - ii. non-delivery of Owner supplied Materials.
  - iii. any cause beyond the reasonable control of the Contractor that can be substantiated by the Contractor to the satisfaction of the Contract Administrator.

**Working Drawings** or **Working Plans** means any Drawings or Plans prepared by the Contractor for the execution of the Work and may, without limiting the generality thereof, include formwork, falsework, and shoring plans; Roadway protection plans; shop drawings; shop plans; or erection diagrams.

### **GC 1.05 Substantial Performance**

.01 The Work is substantially performed,

- a) when the Work to be performed under the Contract or a substantial part thereof is ready for use or is being used for the purpose intended; and

b) when the Work to be performed under the Contract is capable of completion or, where there is a known defect, the cost of correction, is not more than

- i. 3% of the first \$500,000 of the Contract price,
- ii. 2% of the next \$500,000 of the Contract price, and
- iii. 1% of the balance of the Contract price.

.02 For the purposes of this Contract, where the Work or a substantial part thereof is ready for use or is being used for the purposes intended and the remainder of the Work cannot be completed expeditiously for reasons beyond the control of the Contractor or, where the Owner and the Contractor agree not to complete the Work expeditiously, the price of the services or materials remaining to be supplied and required to complete the Work shall be deducted from the Contract price in determining Substantial Performance.

#### **GC 1.06 Completion**

.01 The Work shall be deemed to be completed and services or Materials shall be deemed to be last supplied to the Work when the price of completion, correction of a known defect, or last supply is not more than the lesser of,

- a) 1% of the Contract price; or
- b) \$1,000.

#### **GC 1.07 Final Acceptance**

.01 Final Acceptance shall be deemed to occur when the Contract Administrator is satisfied that, to the best of the Contract Administrator's knowledge at that time, the Contractor has rectified all imperfect work and has discharged all of the Contractor's obligations under the Contract.

#### **GC 1.08 Interpretation of Certain Words**

.01 The words "acceptable," "approval," "authorized," "considered necessary," "directed," "required," "satisfactory," or words of like import, shall mean approval of, directed, required, considered necessary, or authorized by and acceptable or satisfactory to the Contract Administrator, unless the context clearly indicates otherwise.

### **SECTION GC 2.0 - CONTRACT DOCUMENTS**

#### **GC 2.01 Reliance on Contract Documents**

.01 The Owner warrants that the information furnished in the Contract Documents can be relied upon with the following limitations or exceptions:

a) The location of all mainline underground Utilities that may affect the Work shall be shown to a tolerance of:

- i. 1 m horizontal, and
- ii. 0.3 m vertical

.02 The Owner does not warrant or make any representation with respect to:

- a) interpretations of data or opinions expressed in any Subsurface Report available for the perusal of the Contractor, whether or not such report is included as part of the Contract Documents, and
- b) other information specifically excluded from this warranty.

**GC 2.02 Order of Precedence**

.01 In the event of any inconsistency or conflict in the contents of the following documents, such documents shall take precedence and govern in the following descending order:

- a) Agreement
- b) Addenda
- c) Special Provisions
- d) Contract Drawings
- e) Standard Specifications
- f) Standard Drawings
- g) Instructions to Tenderers
- h) Tender
- i) Supplemental General Conditions
- j) General Conditions
- k) Working Drawings

Later dates shall govern within each of the above categories of documents.

.02 In the event of any conflict among or inconsistency in the information shown on Drawings, the following rules shall apply:

- a) Dimensions shown in figures on a Drawing shall govern where they differ from dimensions scaled from the same drawing;
- b) Drawings of larger scale shall govern over those of smaller scale;
- c) Detailed Drawings shall govern over general Drawings; and
- d) Drawings of a later date shall govern over those of an earlier date in the same series.

.03 In the event of any inconsistency or conflict in the contents of Standard Specifications the following descending order of precedence shall govern:

- a) Owner's Standard Specifications
- b) Ontario Provincial Standard Specifications
- c) Other Standard Specifications, such as those produced by CSA, CGSB, ASTM, and ANSI and referenced in the Ontario Provincial Standard Specifications

.04 The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all.

## SECTION GC 3.0 - ADMINISTRATION OF THE CONTRACT

### GC 3.01 Contract Administrator's Authority

- .01 The Contract Administrator shall be the Owner's representative during construction and until the issuance of the Completion Certificate or the issuance of the Final Acceptance Certificate, whichever is later. All instructions to the Contractor, including instructions from the Owner, shall be issued by the Contract Administrator. The Contract Administrator shall have the authority to act on behalf of the Owner only to the extent provided in the Contract Documents.
- .02 All claims, disputes and other matters in question relating to the performance and the quality of the Work or the interpretation of the Contract Documents shall be referred to the Contract Administrator in writing by the Contractor.
- .03 The Contract Administrator may inspect the Work for its conformity with the Plans and Standard Specifications, and to record the necessary data to establish payment quantities under the schedule of tender quantities and unit prices or to make an assessment of the value of the work completed in the case of a lump sum price Contract.
- .04 The Contract Administrator shall determine the amounts owing to the Contractor under the Contract and shall issue certificates for payment in such amounts as provided for in Section GC 8.0, Measurement and Payment.
- .05 The Contract Administrator shall, with reasonable promptness, review and take appropriate action upon the Contractor's submissions such as shop drawings, product data, and samples in accordance with the Contract Documents.
- .06 The Contract Administrator shall investigate all allegations of a Change in the Work made by the Contractor and issue appropriate instructions.
- .07 The Contract Administrator shall prepare Change Directives and Change Orders for the Owner's approval.
- .08 Upon written application by the Contractor, the Contract Administrator and the Contractor shall jointly conduct an inspection of the Work to establish the date of Substantial Performance of the Work or the date of Completion of the Work or both.
- .09 The Contract Administrator shall be, in the first instance, the interpreter of the Contract Documents and the judge of the performance thereunder by both parties to the Contract. Interpretations and decisions of the Contract Administrator shall be consistent with the intent of the Contract Documents and, in making these decisions, the Contract Administrator shall not show partiality to either party.
- .10 The Contract Administrator shall have the authority to reject part of the Work or Material that does not conform to the Contract Documents.
- .11 In the event that the Contract Administrator determines that any part of the Work performed by the Contractor is defective, whether the result of poor workmanship; the use of defective material; or damage through carelessness or other act or omission of the Contractor and whether or not incorporated in the Work; or otherwise fails to conform to the Contract Documents, then the Contractor shall if directed by the Contract Administrator promptly remove the Work and replace, make good, or re-execute the Work at no additional cost to the Owner.
- .12 Any part of the Work destroyed or damaged by such removals, replacements, or re-executions shall be made good, promptly, at no additional cost to the Owner.
- .13 If, in the opinion of the Contract Administrator, it is not expedient to correct defective work or work not performed in accordance with the Contract Documents, the Owner may deduct from monies

otherwise due to the Contractor the difference in value between the work as performed and that called for by the Contract Documents, the amount that will be determined in the first instance by the Contract Administrator.

- .14 Notwithstanding any inspections made by the Contract Administrator or the issuance of any certificates or the making of any payment by the Owner, the failure of the Contract Administrator to reject any defective work or Material shall not constitute acceptance of defective work or Material.
- .15 The Contract Administrator shall have the authority to temporarily suspend the Work for such reasonable time as may be necessary:
  - a) to facilitate the checking of any portion of the Contractor's construction layout;
  - b) to facilitate the inspection of any portion of the Work; or
  - c) for the Contractor to remedy non-compliance in the case of such non-compliance with the provisions of the Contract by the Contractor.

The Contractor shall not be entitled to any compensation for suspension of the Work in these circumstances.

- .16 The Owner has the right to terminate the Contract for wilful or persistent violation by the Contractor or its workers of the Occupational Health and Safety Act legislation and regulations, Workplace Safety and Insurance Board Act, and Regulation 309 of the Environmental Protection Act.
- .17 If the Contract Administrator determines that any worker employed on the Work is incompetent, as defined by the Occupational Health and Safety Act, or is disorderly, then the Contract Administrator shall provide written notice to the Contractor and the Contractor shall immediately remove the worker from the Working Area. Such worker shall not return to the Working Area without the prior written consent of the Contract Administrator.

### **GC 3.02 Working Drawings**

- .01 The Contractor shall arrange for the preparation of clearly identified and dated Working Drawings as called for by the Contract Documents.
- .02 The Contractor shall submit Working Drawings to the Contract Administrator with reasonable promptness and in orderly sequence so as to not cause delay in the Work. If either the Contractor or the Contract Administrator so requests, they shall jointly prepare a schedule fixing the dates for submission and return of Working Drawings. Working Drawings shall be submitted in printed form. At the time of submission the Contractor shall notify the Contract Administrator in writing of any deviations from the Contract requirements that exist in the Working Drawings.
- .03 The Contract Administrator shall review and return Working Drawings in accordance with an agreed upon schedule, or otherwise, with reasonable promptness so as not to cause delay.
- .04 The Contract Administrator's review shall be to check for conformity to the design concept and for general arrangement only and such review shall not relieve the Contractor of responsibility for errors or omissions in the Working Drawings or of responsibility for meeting all requirements of the Contract Documents, unless a deviation on the Working Drawings has been approved in writing by the Contract Administrator.
- .05 The Contractor shall make any changes in Working Drawings that the Contract Administrator may require to make the Working Drawings consistent with the Contract Documents and resubmit, unless otherwise directed by the Contract Administrator. When resubmitting, the Contractor shall notify the Contract Administrator in writing of any revisions other than those requested by the Contract Administrator.

- .06 Work related to the Working Drawings shall not proceed until the Working Drawings have been signed and dated by the Contract Administrator and marked with the words "Reviewed. Permission to construct granted."
- .07 The Contractor shall keep one set of the reviewed Working Drawings, marked as above, at the site at all times.

### **GC 3.03 Right of the Contract Administrator to Modify Methods and Equipment**

- .01 The Contractor shall, when requested in writing, make alterations in the method, Equipment, or work force at any time the Contract Administrator considers the Contractor's actions to be unsafe, or damaging to either the Work or existing facilities or the environment.
- .02 The Contractor shall, when requested in writing, alter the sequence of its operations on the Contract so as to avoid interference with work being performed by others.
- .03 Notwithstanding the foregoing, the Contractor shall ensure that all necessary safety precautions and protection are maintained throughout the Work.

### **GC 3.04 Emergency Situations**

- .01 The Contract Administrator has the right to determine the existence of an emergency situation and, when such an emergency situation is deemed to exist, the Contract Administrator may instruct the Contractor to take action to remedy the situation. If the Contractor does not take timely action or, if the Contractor is not available, the Contract Administrator may direct others to remedy the situation.
- .02 If the emergency situation was the fault of the Contractor, the remedial work shall be done at the Contractor's expense. If the emergency situation was not the fault of the Contractor, the Owner shall pay for the remedial work.

### **GC 3.05 Layout**

- .01 The Contract Administrator shall provide baseline and benchmark information for the general location, alignment, and elevation of the Work. The Owner shall be responsible only for the correctness of the information provided by the Contract Administrator.

### **GC 3.06 Extension of Contract Time**

- .01 An application for an extension of Contract Time shall be made in writing by the Contractor to the Contract Administrator as soon as the need for such extension becomes evident and at least 15 Days prior to the expiration of the Contract Time. The application for an extension of Contract Time shall enumerate the reasons, and state the length of extension required.
- .02 Circumstances suitable for consideration of an extension of Contract Time include the following:
- a) Delays, subsection GC 3.07.
  - b) Changes in the Work, clause GC 3.10.01.
  - c) Extra Work, clause GC 3.10.02.
  - d) Additional Work, clause GC 3.10.03.
- .03 The Contract Administrator shall, in considering an application for an extension to the Contract Time, take into account whether the delays, Changes in the Work, Extra Work, or Additional Work involve a Controlling Operation.
- .04 The Contract Time shall be extended for such additional time as may be recommended by the Contract

Administrator and deemed fair and reasonable by the Owner.

.05 The terms and conditions of the Contract shall continue for such extension of Contract Time.

### **GC 3.07 Delays**

.01 If the Contractor is delayed in the performance of the Work by,

- a) war, blockades, and civil commotions, errors in the Contract Documents;
- b) an act or omission of the Owner or Contract Administrator, or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the Contract Documents;
- c) a stop work order issued by a court or public authority, provided that such order was not issued as the result of an act or omission of the Contractor or anyone employed or engaged by the Contractor directly or indirectly;
- d) the Contract Administrator giving notice under subsection GC 7.10, Suspension of Work;
- e) abnormal inclement weather; or
- f) archaeological finds in accordance with subsection GC 3.15, Archaeological Finds, then the Contractor shall be reimbursed by the Owner for reasonable costs incurred by the Contractor as the result of such delay, provided that in the case of an application for an extension of Contract Time due to abnormal inclement weather, the Contractor shall, with the Contractor's application, submit evidence from Environment Canada in support of such application. Extension of Contract Time may be granted in accordance with subsection GC 3.06, Extension of Contract Time.

.02 If the Work is delayed by labour disputes, strikes or lock-outs, including lock-outs decreed or recommended to its members by a recognized contractor's association, of which the Contractor is a member or to which the Contractor is otherwise bound, are beyond the Contractor's control, which then the Contract Time shall be extended in accordance with subsection GC 3.06, Extension of Contract Time. In no case shall the extension of Contract Time be less than the time lost as the result of the event causing the delay, unless a shorter extension is agreed to by the Contractor. The Contractor shall not be entitled to payment for costs incurred as the result of such delays unless such delays are the result of actions by the Owner.

.03 The Contractor shall not be entitled to payment for the cost of delays incurred as a result of a dispute between the Contractor and Owner. The Contractor shall execute the Work and may pursue resolution of the dispute in accordance with subsection GC 3.13, Claims, Negotiations, Mediations.

### **GC 3.08 Assignment of Contract**

.01 The Contractor shall not assign the Contract, either in whole or in part, without the prior written consent of the Owner.

### **GC 3.09 Subcontracting by the Contractor**

.01 The Contractor may subcontract any part of the Work, subject to these General Conditions and any limitations specified in the Contract Documents.

.02 The Contractor shall notify the Contract Administrator 10 Days prior to the start of construction, in writing, of the intention to subcontract. Such notification shall identify the part of the Work, and the Subcontractor with whom it is intended.

.03 The Contract Administrator shall, within 5 Days of receipt of such notification, accept or reject the intended Subcontractor. The rejection shall be in writing and shall include the reasons for the rejection.

- .04 The Contractor shall not, without the written consent of the Owner, change a Subcontractor who has been engaged in accordance with this subsection.
- .05 The Contractor shall preserve and protect the rights of the parties under the Contract with respect to that part of the Work to be performed under subcontract and shall,
  - a) enter into agreements with the intended Subcontractors to require them to perform their work in accordance with the Contract Documents; and
  - b) be as fully responsible to the Owner for acts and omissions of the Contractor's Subcontractors and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the Contractor.
- .06 The Owner's consent to subcontracting by the Contractor shall not be construed to relieve the Contractor from any obligation under the Contract and shall not impose any liability upon the Owner. Nothing contained in the Contract Documents shall create a contractual relationship between a Subcontractor and the Owner.

### **GC 3.10 Changes**

#### **GC 3.10.01 Changes in the Work**

- .01 The Owner, or the Contract Administrator where so authorized, may, by order in writing, make a Change in the Work without invalidating the Contract. The Contractor shall not be required to proceed with a Change in the Work until in receipt of a Change Order or Change Directive. Upon the receipt of such Change Order or Change Directive the Contractor shall proceed with the Change in the Work.
- .02 The Contractor may apply for an extension of Contract Time according to the terms of subsection GC 3.06, Extension of Contract Time.
- .03 If the Change in the Work relates solely to quantities, payment for that part of the Work shall be made according to the conditions specified in clause GC 8.01.02, Variations in Tender Quantities. If the Change in the Work does not solely relate to quantities, then either the Owner or the Contractor may initiate negotiations upwards or downwards for the adjustment of the Contract price in respect of the Change in the Work pursuant to subsection GC 3.13, Claims, Negotiations, Mediation or payment may be made according to the conditions contained in clause GC 8.02.04, Payment on a Time and Material Basis.

#### **GC 3.10.02 Extra Work**

- .01 The Owner, or Contract Administrator where so authorized, may instruct the Contractor to perform Extra Work without invalidating the Contract. The Contractor shall not be required to proceed with the Extra Work until in receipt of a Change Order or Change Directive. Upon receipt of such Change Order or Change Directive the Contractor shall proceed with the Extra Work.
- .02 The Contractor may apply for an extension of Contract Time according to the terms of subsection GC 3.06, Extension of Contract Time.
- .03 Either the Owner or Contractor may initiate negotiations upwards or downwards for the payment for the Extra Work pursuant to subsection GC 3.13, Claims, Negotiations, Mediation, or payment may be made according to the conditions contained in clause GC 8.02.04, Payment on a Time and Material Basis.

#### **GC 3.10.03 Additional Work**

- .01 The Owner, or Contract Administrator where so authorized, may request the Contractor to perform

Additional Work without invalidating the Contract. If the Contractor agrees to perform Additional Work, the Contractor shall proceed with such Additional Work upon receipt of a Change Order.

- .02 The Contractor may apply for an extension of Contract Time according to the terms of subsection GC 3.06, Extension of Contract Time.
- .03 Payment for the Additional Work may be negotiated pursuant to subsection GC 3.13, Claims, Negotiations, Mediation, or payment may be made according to the conditions contained in clause GC 8.02.04, Payment on a Time and Material Basis.

### **GC 3.11 Notices**

- .01 Any notice permitted or required to be given to the Contract Administrator or the Superintendent in respect of the Work shall be deemed to have been given to and received by the addressee on the date of delivery if delivered by hand, email, or by facsimile transmission and on the fifth Day after the date of mailing, if sent by mail.
- .02 The Contractor and the Owner shall provide each other with the mail and email addresses; pager, cell phone, and telephone numbers; and facsimile terminal numbers for the Contract Administrator and the Superintendent at the commencement of the Work, and update as necessary.
- .03 In the event of an emergency situation or other urgent matter the Contract Administrator or the Superintendent may give a verbal notice, provided that such notice is confirmed in writing within 2 Days.
- .04 Any notice permitted or required to be given to the Owner or the Contractor shall be given in accordance with the notice provision of the Contract.

### **GC 3.12 Use and Occupancy of the Work Prior to Substantial Performance**

- .01 Where it is not contemplated elsewhere in the Contract Documents, the Owner may use or occupy the Work or any part thereof prior to Substantial Performance, provided that at least 30 Days written notice has been given to the Contractor.
- .02 The use or occupancy of the Work or any part thereof by the Owner prior to Substantial Performance shall not constitute an acceptance of the Work or parts so occupied. In addition, the use or occupancy of the Work shall not relieve the Contractor or the Contractor's Surety from any liability that has arisen, or may arise, from the performance of the Work in accordance with the Contract Documents. The Owner shall be responsible for any damage that occurs because of the Owner's use or occupancy. Such use or occupancy of any part of the Work by the Owner does not waive the Owner's right to charge the Contractor liquidated damages in accordance with the terms of the Contract.

### **GC 3.13 Claims, Negotiations, Mediation**

#### **GC 3.13.01 Continuance of the Work**

- .01 Unless the Contract has been terminated or completed, the Contractor shall in every case, after serving or receiving any notification of a claim or dispute, verbal or written, continue to proceed with the Work with due diligence and expedition. It is understood by the parties that such action shall not jeopardize any claim it may have.

#### **GC 3.13.02 Record Keeping**

- .01 Immediately upon commencing work that may result in a claim, the Contractor shall keep Daily Work Records during the course of the Work, sufficient to substantiate the Contractor's claim, and the Contract Administrator shall keep Daily Work Records to be used in assessing the Contractor's claim, all in accordance with clause GC 8.02.07, Records.

- .02 The Contractor and the Contract Administrator shall attempt to reconcile their respective Daily Work Records on a daily basis, to simplify review of the claim, when submitted. If the Contractor and the Contract Administrator fail to reconcile their respective Daily Work Records, then the Contractor shall submit its Daily Work Records as part of its claim, whereby the resolution of the dispute about the Daily Work Records shall not be resolved until there is a resolution of the claim.
- .03 The keeping of Daily Work Records by the Contract Administrator or the reconciling of such Daily Work Records with those of the Contractor shall not be construed to be acceptance of the claim.

#### **GC 3.13.03 Claims Procedure**

- .01 The Contractor shall give verbal notice of any situation that may lead to a claim for additional payment immediately upon becoming aware of the situation.
- .02 The Contractor shall provide written notice in the standard form "Notice of Intent to Claim" within 7 Days of the commencement of any part of the Work that may be affected by the situation.
- .03 The Contractor shall submit detailed claims as soon as reasonably possible and in any event no later than 30 Days after completion of the work affected by the situation. The detailed claim shall:
  - a) identify the item or items in respect of which the claim arises;
  - b) state the grounds, contractual or otherwise, upon which the claim is made; and
  - c) include the Records maintained by the Contractor supporting such claim.

In exceptional cases, the 30 Days may be increased to a maximum of 90 Days with approval in writing from the Contract Administrator.

- .04 Within 30 Days of the receipt of the Contractor's detailed claim, the Contract Administrator may request the Contractor to submit any further and other particulars as the Contract Administrator considers necessary to assess the claim. The Contractor shall submit the requested information within 30 Days of receipt of such request.
- .05 Within 90 Days of receipt of the detailed claim, the Contract Administrator shall advise the Contractor, in writing, of the Contract Administrator's opinion with regard to the validity of the claim.

#### **GC 3.13.04 Negotiations**

- .01 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, open and timely disclosure of relevant facts, information, and documents to facilitate these negotiations.
- .02 Should the Contractor disagree with the opinion given in paragraph GC 3.13.03.05, with respect to any part of the claim, the Contract Administrator shall enter into negotiations with the Contractor to resolve the matters in dispute. Where a negotiated settlement cannot be reached and it is agreed that payment cannot be made on a Time and Material basis in accordance with clause GC 8.02.04, Payment on a Time and Material Basis, the parties shall proceed in accordance with clause GC 3.13.05, Mediation, or subsection GC 3.14, Arbitration.

#### **GC 3.13.05 Mediation**

- .01 If a claim is not resolved satisfactorily through the negotiation stage noted in clause GC 3.13.04, Negotiations, within a period of 30 Days following the opinion given in paragraph GC 3.13.03.05, and the Contractor wishes to pursue the issue further, the parties may, upon mutual agreement, utilize the services of an independent third party mediator.
- .02 The mediator shall be mutually agreed upon by the Owner and Contractor.

- .03 The mediator shall be knowledgeable regarding the area of the disputed issue. The mediator shall meet with the parties together or separately, as necessary, to review all aspects of the issue. In a final attempt to assist the parties in resolving the issue themselves prior to proceeding to arbitration the mediator shall provide, without prejudice, a non-binding recommendation for settlement.
- .04 The review by the mediator shall be completed within 90 Days following the opinion given in paragraph GC 3.13.03.05.
- .05 Each party is responsible for its own costs related to the use of the third party mediator process. The cost of the third party mediator shall be equally shared by the Owner and Contractor.

#### **GC 3.13.06 Payment**

- .01 Payment of the claim shall be made no later than 30 Days after the date of resolution of the claim or dispute. Such payment shall be made according to the terms of Section GC 8.0, Measurement and Payment.

#### **GC 3.13.07 Rights of Both Parties**

- .01 It is agreed that no action taken under subsection GC 3.13, Claims, Negotiations, Mediation, by either party shall be construed as a renunciation or waiver of any of the rights or recourse available to the parties, provided that the requirements set out in this subsection are fulfilled.

#### **GC 3.14 Arbitration**

##### **GC 3.14.01 Conditions of Arbitration**

- .01 If a claim is not resolved satisfactorily through the negotiation stage noted in clause GC 3.13.04, Negotiations, or the mediation stage noted in clause GC 3.13.05, Mediation, either party may invoke the provisions of subsection GC 3.14, Arbitration, by giving written notice to the other party.
- .02 Notification that arbitration shall be implemented to resolve the issue shall be communicated in writing as soon as possible and no later than 60 Days following the opinion given in paragraph GC 3.13.03.05. Where the use of a third party mediator was implemented, notification shall be within 120 Days of the opinion given in paragraph GC 3.13.03.05.
- .03 The parties shall be bound by the decision of the arbitrator.
- .04 The rules and procedures of the *Arbitration Act*, 1991, S.O. 1991, c.17, as amended, shall apply to any arbitration conducted hereunder except to the extent that they are modified by the express provisions of subsection GC 3.14, Arbitration.

##### **GC 3.14.02 Arbitration Procedure**

- .01 The following provisions are to be included in the agreement to arbitrate and are subject only to such right of appeal as exist where the arbitrator has exceeded his or her jurisdiction or have otherwise disqualified him or herself:
- a) All existing actions in respect of the matters under arbitration shall be stayed pending arbitration;
  - b) All outstanding claims and matters to be settled are to be set out in a schedule to the agreement. Only such claims and matters as are in the schedule shall be arbitrated; and
  - c) Before proceeding with the arbitration, the Contractor shall confirm that all matters in dispute are set out in the schedule.

### **GC 3.14.03 Appointment of Arbitrator**

- .01 The arbitrator shall be mutually agreed upon by the Owner and Contractor to adjudicate the dispute.
- .02 Where the Owner and Contractor cannot agree on a sole arbitrator within 30 Days of the notification of arbitration noted in paragraph GC 3.14.01.02, the Owner and the Contractor shall each choose an appointee within 37 Days of the notice of arbitration.
- .03 The appointees shall mutually agree upon an arbitrator to adjudicate the dispute within 15 Days after the last appointee was chosen or they shall refer the matter to the Arbitration and Mediation Institute of Ontario Inc., which may select an arbitrator to adjudicate the dispute within 7 Days of being requested to do so.
- .04 The arbitrator shall not be interested financially in the Contract nor in either party's business and shall not be employed by either party.
- .05 The arbitrator may appoint independent experts and any other persons to assist him or her.
- .06 The arbitrator is not bound by the rules of evidence that govern the trial of cases in court but may hear and consider any evidence that the arbitrator considers relevant.
- .07 The hearing shall commence within 90 Days of the appointment of the arbitrator.

### **GC 3.14.04 Costs**

- .01 The arbitrator's fee shall be equally shared by the Owner and the Contractor.
- .02 The fees of any independent experts and any other persons appointed to assist the arbitrator shall be shared equally by the Owner and the Contractor.
- .03 The arbitration hearing shall be held in a place mutually agreed upon by both parties or in the event the parties do not agree, a site shall be chosen by the arbitrator. The cost of obtaining appropriate facilities shall be shared equally by the Owner and the Contractor.
- .04 The arbitrator may, in his or her discretion, award reasonable costs, related to the arbitration.

### **GC 3.14.05 The Decision**

- .01 The reasoned decision shall be made in writing within 90 Days of the conclusion of the hearing. An extension of time to make a decision may be granted with consent of both parties. Payment shall be made in accordance with clause GC 3.13.06, Payment.

### **GC 3.15 Archaeological Finds**

- .01 If the Contractor's operations expose any items that may indicate an archaeological find, such as building remains, hardware, accumulations of bones, pottery, or arrowheads, the Contractor shall immediately notify the Contract Administrator and suspend operations within the area identified by the Contract Administrator. Notification may be verbal provided that such notice is confirmed in writing within 2 Days. Work shall remain suspended within that area until otherwise directed by the Contract Administrator in writing, in accordance with subsection GC 7.10, Suspension of Work.
- .02 Any delay in the completion of the Contract that is caused by such a suspension of Work shall be considered to be beyond the Contractor's control in accordance with paragraph GC 3.07.01.
- .03 Any work directed or authorized in connection with an archaeological find shall be considered as Extra Work in accordance with clause GC 3.10.02, Extra Work.

- .04 The Contractor shall take all reasonable action to minimize additional costs that may accrue as a result of any work stoppage.

## **SECTION GC 4.0 - OWNER'S RESPONSIBILITIES AND RIGHTS**

### **GC 4.01 Working Area**

- .01 The Owner shall acquire all property rights that are deemed necessary by the Owner for the construction of the Work, including temporary working easements, and shall indicate the full extent of the Working Area on the Contract Drawings.
- .02 The Geotechnical Report and Subsurface Report that may be provided by the Owner as part of the tender documents shall form part of the Contract Drawings.

### **GC 4.02 Approvals and Permits**

- .01 The Owner shall pay for all plumbing and building permits.
- .02 The Owner shall obtain and pay for all permits, licences, and certificates solely required for the design of the Work.

### **GC 4.03 Management and Disposition of Materials**

- .01 The Owner shall identify in the Contract Documents the materials to be moved within or removed from the Working Area and any characteristics of those materials that necessitates special materials management and disposition.
- .02 In accordance with regulations under the *Occupational Health and Safety Act*, R.S.O. 1990, c.O.1, as amended, the Owner advises that,
- a) the designated substances silica, lead, and arsenic are generally present throughout the Working Area occurring naturally or as a result of vehicle emissions;
  - b) the designated substance asbestos may be present in cement products, asphalt, and conduits for Utilities;
  - c) the following hazardous materials are ordinarily present in construction activities: limestone, gypsum, marble, mica, and Portland cement; and
  - d) exposure to these substances may occur as a result of activities by the Contractor such as sweeping, grinding, crushing, drilling, blasting, cutting, and abrasive blasting.
- .03 The Owner shall identify in the Contract Documents any designated substances or hazardous materials other than those identified above and their location in the Working Area.
- .04 If the Owner or Contractor discovers or is advised of the presence of designated substances or hazardous materials that are in addition to those listed in paragraph GC 4.03.02, or not clearly identified in the Contract Documents according to paragraph GC 4.03.03, then verbal notice shall be provided to the other party immediately with written confirmation within 2 Days. The Contractor shall stop work in the area immediately and shall determine the necessary steps required to complete the work in accordance with applicable legislation and regulation.
- .05 The Owner shall be responsible for any reasonable additional costs of removing, managing and disposing of any material not identified in the Contract Documents, or where conditions exist that could not have been reasonably foreseen at the time of tendering. All work under this paragraph shall be deemed to be Extra Work.

- .06 Prior to commencement of the Work, the Owner shall provide to the Contractor a list of those products controlled under the Workplace Hazardous Materials Information System (WHMIS), that the Owner may supply or use on the Contract, together with copies of the Materials Safety Data Sheets for these products. All containers used in the application of products controlled under WHMIS shall be labelled. The Owner shall notify the Contractor in writing of changes to the list and provide relevant Material Safety Data Sheets.

#### **GC 4.04 Construction Affecting Railway Property**

- .01 The Owner shall pay the costs of all flagging and other traffic control measures required and provided by the railway company unless such costs are solely a function of the Contractor's chosen method of completing the Work.
- .02 Every precaution shall be taken by the Contractor to protect all railway property at track crossings; or otherwise, on which construction operations are to take place in accordance with the terms of this Contract.
- .03 The Contractor shall be required to conduct the construction operations in such a manner as to avoid a possibility of damaging any railway property in the vicinity of the works. Every reasonable precaution shall be taken by the Contractor to ensure the safety of the workers, Subcontractors, and Equipment, as well as railway property throughout the duration of the Contract.

#### **GC 4.05 Default by the Contractor**

- .01 If the Contractor fails to commence the Work within 14 Days of a formal order to commence work signed by the Contract Administrator or, upon commencement of the Work, should neglect to prosecute the Work properly or otherwise fails to comply with the requirements of the Contract and, if the Contract Administrator has given a written statement to the Owner and Contractor that sufficient cause exists to justify such action, the Owner may, without prejudice to any other right or remedy the Owner may have, notify the Contractor in writing that the Contractor is in default of the Contractor's contractual obligations and instruct the Contractor to correct the default in the 5 Working Days immediately following the receipt of such notice.
- .02 If the Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the Contractor's insolvency or if a receiver is appointed because of the Contractor's insolvency, the Owner may, without prejudice to any other right or remedy the Owner may have, by giving the Contractor or receiver or trustee in bankruptcy notice in writing, terminate the Contract.

#### **GC 4.06 Contractor's Right to Correct a Default**

- .01 The Contractor shall have the right within the 5 full Working Days following the receipt of a notice of default to correct the default and provide the Owner with satisfactory proof that appropriate corrective measures have been taken.
- .02 If the correction of the default cannot be completed within the 5 full Working Days following receipt of the notice, the Contractor shall not be in default if the Contractor,
- a) commences the correction of the default within the 5 full Working Days following receipt of the notice;
  - b) provides the Owner with an acceptable schedule for the progress of such correction; and
  - c) completes the correction in accordance with such schedule.

#### **GC 4.07 Owner's Right to Correct Default**

- .01 If the Contractor fails to correct the default within the time specified in subsection GC 4.06, Contractor's Right to Correct a Default, or subsequently agreed upon, the Owner, without prejudice to any other

right or remedy the Owner may have, may correct such default and deduct the cost thereof, as certified by the Contract Administrator, from any payment then or thereafter due to the Contractor.

#### **GC 4.08 Termination of Contractor's Right to Continue the Work**

- .01 Where the Contractor fails to correct a default within the time specified in subsection GC 4.06, Contractor's Right to Correct a Default, or subsequently agreed upon, the Owner, without prejudice to any other right or remedy the Owner may have, may terminate the Contractor's right to continue the Work in whole or in part by giving written notice to the Contractor.
- .02 If the Owner terminates the Contractor's right to continue with the Work in whole or in part, the Owner shall be entitled to,
- a) take possession of the Working Area or that portion of the Working Area devoted to that part of the Work terminated;
  - b) use the Equipment of the Contractor and any Material within the Working Area that is intended to be incorporated into the Work, the whole subject to the right of third parties;
  - c) withhold further payments to the Contractor with respect to the Work or the portion of the Work withdrawn from the Contractor until the Work or portion thereof withdrawn is completed;
  - d) charge the Contractor the additional cost over the Contract price of completing the Work or portion thereof withdrawn from the Contractor, as certified by the Contract Administrator and any additional compensation paid to the Contract administrator for such additional service arising from the correction of the default;
  - e) charge the Contractor a reasonable allowance, as determined by the Contract Administrator, to cover correction to the Work performed by the Contractor that may be required under subsection GC 7.16, Warranty;
  - f) charge the Contractor for any damages the Owner sustained as a result of the default; and
  - g) charge the Contractor the amount by which the cost of corrections to the Work under subsection GC 7.16, Warranty, exceeds the allowance provided for such corrections.

#### **GC 4.09 Final Payment to Contractor**

- .01 If the Owner's cost to correct and complete the Work in whole or in part is less than the amount withheld from the Contractor under subsection GC 4.08, Termination of Contractor's Right to Continue the Work, the Owner shall pay the balance to the Contractor as soon as the final accounting for the Contract is complete.

#### **GC 4.10 Termination of the Contract**

- .01 Where the Contractor is in default of the Contract the Owner may, without prejudice to any other right or remedy the Owner may have, terminate the Contract by giving written notice of termination to the Contractor, the Surety, and any trustee or receiver acting on behalf of the Contractor's estate or creditors.
- .02 If the Owner elects to terminate the Contract, the Owner may provide the Contractor and the trustee or receiver with a complete accounting to the date of termination.

#### **GC 4.11 Continuation of Contractor's Obligations**

- .01 The Contractor's obligation under the Contract as to quality, correction, and warranty of the Work performed prior to the time of termination of the Contract or termination of the Contractor's right to continue with the Work in whole or in part shall continue to be in force after such termination.

#### **GC 4.12 Use of Performance Bond**

- .01 If the Contractor is in default of the Contract and the Contractor has provided a Performance Bond, the provisions of Section GC 4.0, Owner's Responsibilities and Rights, shall be exercised in accordance with the conditions of the Performance Bond.

#### **GC 4.13 Payment Adjustment**

- .01 If any situation should occur in the performance of the Work that would result in a Change in the Work, the Owner shall be entitled to an adjustment and those adjustments shall be managed in accordance with subsection GC 3.10.01, Changes in the Work.

### **SECTION GC 5.0 - MATERIAL**

#### **GC 5.01 Supply of Material**

- .01 All Material necessary for the proper completion of the Work, except that listed as being supplied by the Owner, shall be supplied by the Contractor. The Contract price for the appropriate tender items shall be deemed to include full compensation for the supply of such Material.

#### **GC 5.02 Quality of Material**

- .01 All Material supplied by the Contractor shall be new, unless otherwise specified in the Contract Documents.
- .02 Material supplied by the Contractor shall conform to the requirements of the Contract.
- .03 As specified in the Contract Documents or as requested by the Contract Administrator, the Contractor shall make available, for inspection or testing, a sample of any Material to be supplied by the Contractor.
- .04 The Contractor shall obtain for the Contract Administrator the right to enter onto the premises of the Material manufacturer or supplier to carry out such inspection, sampling, and testing as specified in the Contract Documents or as requested by the Contract Administrator.
- .05 The Contractor shall notify the Contract Administrator of the sources of supply sufficiently in advance of the Material shipping dates to enable the Contract Administrator to perform the required inspection, sampling, and testing.
- .06 The Owner shall not be responsible for any delays to the Contractor's operations where the Contractor fails to give sufficient advance notice to the Contract Administrator to enable the Contract Administrator to carry out the required inspection, sampling, and testing before the scheduled shipping date.
- .07 The Contractor shall not change the source of supply of any Material without the written authorization of the Contract Administrator.
- .08 Material that is not specified shall be of a quality best suited to the purpose required, and the use of such Material shall be subject to the approval of the Contract Administrator.
- .09 All Material inspection, sampling, and testing shall be carried out on random basis in accordance with the standard inspection or testing methods required for the Material. Any approval given by the Contract Administrator for the Materials to be used in the Work based upon the random method shall not relieve the Contractor from the responsibility of incorporating Material that conforms to the Contract Documents into the Work or properly performing the Contract and of any liability arising from the failure to properly perform as specified in the Contract Documents.

### **GC 5.03 Rejected Material**

- .01 Rejected Material shall be removed from the Working Area expeditiously after the notification to that effect from the Contract Administrator. Where the Contractor fails to comply with such notice, the Contract Administrator may cause the rejected Material to be removed from the Working Area and disposed of, in what the Contract Administrator considers to be the most appropriate manner, and the Contractor shall pay the costs of disposal and the appropriate overhead charges.

### **GC 5.04 Substitutions**

- .01 Where the Contract Documents require the Contractor to supply a Material designated by a trade or other name, the Tender shall be based only upon supply of the Material so designated, that shall be regarded as the standard of quality required by the Contract Documents. After the acceptance of the Tender, the Contractor may apply to the Contract Administrator to substitute another Material identified by a different trade or other name for the Material designated as aforesaid. The application shall be in writing and shall state the price for the proposed substitute Material designated as aforesaid, and such other information as the Contract Administrator may require.
- .02 Rulings on a proposed substitution shall not be made prior to the acceptance of the Tender. Substitutions shall not be made without the prior approval of the Contract Administrator. The approval or rejection of a proposed substitution shall be at the discretion of the Contract Administrator.
- .03 If the proposed substitution is approved by the Contract Administrator, the Contractor shall be entitled to the first \$1,000 of the aggregate saving in cost by reason of such substitution and to 50% of any additional saving in cost in excess of such \$1,000. Each such approval shall be conveyed to the Contractor in writing or by issuance of a Certificate of Equality on the Owner's standard form of "Certification of Equality" and, if any adjustment to the Contract price is made by reason of such substitution, a Change Order shall be issued as well.

### **GC 5.05 Owner Supplied Material**

#### **GC 5.05.01 Ordering of Excess Material**

- .01 Where Material is supplied by the Owner and where this Material is ordered by the Contractor in excess of the amount specified to complete the Work, such excess Material shall become the property of the Contractor on completion of the Work and shall be charged to the Contractor at cost plus applicable overheads.

#### **GC 5.05.02 Care of Material**

- .01 The Contractor shall, in advance of receipt of shipments of Material supplied by the Owner, provide adequate and proper storage facilities acceptable to the Contract Administrator, and on the receipt of such Material shall promptly place it in storage, except where it is to be incorporated forthwith into the Work.
- .02 The Contractor shall be responsible for acceptance of Material supplied by the Owner, at the specified delivery point and for its safe handling and storage. If such Material is damaged while under the control of the Contractor, it shall be replaced or repaired by the Contractor at no expense to the Owner, and to the satisfaction of the Contract Administrator. If such Material is rejected by the Contract Administrator for reasons that are not the fault of the Contractor, it shall remain in the care and at the risk of the Contractor until its disposition has been determined by the Contract Administrator.
- .03 Where Material supplied by the Owner arrives at the delivery point in a damaged condition or where there are discrepancies between the quantities received and the quantities shown on the bills of lading, the Contractor shall immediately report such damage or discrepancies to the Contract

Administrator who shall arrange for an immediate inspection of the shipment and provide the Contractor with a written release from responsibility for such damage or deficiencies. Where damage or deficiencies are not so reported, it shall be assumed that the shipment arrived in good condition and order, and any damage or deficiencies reported thereafter shall be made good by the Contractor at no extra cost to the Owner.

- .04 The full amount of Material supplied by the Owner in each shipment shall be accounted for by the Contractor and such Material shall be at the risk of the Contractor after taking delivery. Such Material shall not, except with the written permission of the Contract Administrator, be used by the Contractor for purposes other than the performance of the Work under the Contract.
- .05 Empty reels, crates, containers, and other type of packaging from Material supplied by the Owner shall become the property of the Contractor when they are no longer required for their original purpose and shall be disposed of by the Contractor, unless otherwise specified in the Contract Documents.
- .06 Immediately upon receipt of each shipment, the Contractor shall provide the Contract Administrator copies of bills of lading, or such other documentation the Contract Administrator may require to substantiate and reconcile the quantities of Material received.
- .07 Where Material supplied by the Owner is ordered and stockpiled prior to the award of the Contract, the Contractor shall, at no extra cost to the Owner, immediately upon commencement of operations, check the Material, report any damage or deficiencies to the Contract Administrator and take charge of the Material at the stockpile site. Where damage or deficiencies are not so recorded by the Contractor, it shall be assumed that the stockpile was in good condition and order when the Contractor took charge of it, and any damage or deficiencies reported thereafter shall be made good by the Contractor at no extra cost to the Owner.

## **SECTION GC 6.0 - INSURANCE, PROTECTION AND DAMAGE**

### **GC 6.01 Protection of Work, Persons and Property**

- .01 The Contractor, the Contractor's agents, and all workers employed by or under the control of the Contractor, including Subcontractors, shall protect the Work, persons, and property from damage or injury. The Contractor shall be responsible for all losses and damage that may arise as the result of the Contractor's operations under the Contract, unless indicated to the contrary below.
- .02 The Contractor is responsible for the full cost of any necessary temporary protective work or works and the restoration of all damage where the Contractor damages the Work or property in the performance of the Contract. If the Contractor is not responsible for the damage that occurs to the Work or property, the Contractor shall restore such damage, and such work and payment shall be administered according to these General Conditions.
- .03 The Contractor shall immediately inform the Contract Administrator of all damage and injuries that occur during the term of the Contract. The Contractor shall then investigate and report back to the Contract Administrator within 15 Days of occurrence of incident, or as soon as possible.
- .04 The Contractor shall not be responsible for loss and damage that occurs as a result of,
  - a) war;
  - b) blockades and civil commotions;
  - c) errors in the Contract Documents; or
  - d) acts or omissions of the Owner, the Contract Administrator, their agents and employees, or others not under the control of the Contractor, but within the Working Area with the Owner's permission.

.05 The Contractor and the Contractor's Surety shall not be released from any term or provision of any responsibility, obligation, or liability under the Contract or waive or impair any of the rights of the Owner, except by a release duly executed by the Owner.

### **GC 6.02 Indemnification**

.01 The Contractor shall indemnify and hold harmless the Owner and the Contract Administrator, their elected officials, agents, officers, and employees from and against all claims, demands, losses, expenses, costs, damages, actions, suits, or proceedings by third parties, hereinafter called "claims", directly or indirectly arising or alleged to arise out of the performance of or the failure to perform the Work, provided such claims are,

- a) attributable to bodily injury, sickness, disease, or death or to damage to or destruction of tangible property;
- b) caused by negligent acts or omissions of the Contractor or anyone for whose acts the Contractor may be liable; and
- c) made in writing within a period of 6 years from the date of Substantial Performance of the Work as set out in the Certificate of Substantial Performance of the Work or, where so specified in the Contract Documents, from the date of certification of Final Acceptance.

.02 The Contractor shall indemnify and hold harmless the Owner from all and every claim for damages, royalties or fees for the infringement of any patented invention or copyright occasioned by the Contractor in connection with the Work performed or Material furnished by the Contractor under the Contract.

.03 The Owner expressly waives the right to indemnity for claims other than those stated in paragraphs GC 6.02.01 and GC 6.02.02.

.04 The Owner shall indemnify and hold harmless the Contractor, their elected officials, agents, officers, and employees from and against all claims, demands, losses, expenses, costs, damages, actions, suits, or proceedings arising out of the Contractor's performance of the Contract that are attributable to a lack of or defect in title or an alleged lack of or defect in title to the Working Area.

.05 The Contractor expressly waives the right to indemnity for claims other than those stated in paragraph GC 6.02.04.

### **GC 6.03 Contractor's Insurance**

#### **GC 6.03.01 General**

.01 Without restricting the generality of subsection GC 6.02, Indemnification, the Contractor shall provide, maintain, and pay for the insurance coverages listed under clauses GC 6.03.02 and GC 6.03.03. Insurance coverage in clauses GC 6.03.04, GC 6.03.05, and GC 6.03.06 shall only apply when so specified in the Contract Documents.

.02 The Contractor shall provide the Contract Administrator with an original Certificate of Insurance for each type of insurance coverage that is required by the Contract Documents. The Contractor shall ensure that the Contract Administrator is, at all times in receipt of a valid Certificate of Insurance for each type of insurance coverage, in such amounts as specified in the Contract Documents. The Contractor will not be permitted to commence work until the Contract Administrator is in receipt of such proof of insurance. The Contract Administrator may withhold payments of monies due to the Contractor until the Contractor has provided the Contract Administrator with original valid Certificates of Insurance as required by the provisions of the Contract Documents.

### **GC 6.03.02 General Liability Insurance**

- .01 General liability insurance shall be in the name of the Contractor, with the Owner and the Contract Administrator named as additional insureds, with limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof, with a property damage deductible of not more than \$5,000. The form of this insurance shall be the Insurance Bureau of Canada Form IBC 2100.
- .02 Another form of insurance equal to or better than that required in IBC Form 2100 may be used, provided all the requirements listed in the Contract are included. Approval of this insurance shall be conditional upon the Contractor obtaining the services of an insurer licensed to underwrite insurance in the Province of Ontario and obtaining the insurer's certificate of equivalency to the required insurance.
- .03 The Contractor shall maintain in force such policies of insurance specified by the Contract Documents at all times from the commencement of the Work until the end of any Warranty Period or as otherwise required by the Contract Documents.
- .04 The Contractor shall submit annually to the Owner, proof of continuation of the completed operations coverage and, if the Contractor fails to do so, the limitation period for claiming indemnity described in paragraph GC 6.02.01 c), shall not be binding on the Owner.
- .05 Should the Contractor decide not to employ Subcontractors for operations requiring the use of explosives for blasting, pile driving or caisson work, removal or weakening of support of property building or land, IBC Form 2100 as required shall include the appropriate endorsements.
- .06 The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change or amendment restricting coverage.
- .07 "Claims Made" insurance policies shall not be permitted.

### **GC 6.03.03 Automobile Liability Insurance**

- .01 Automobile liability insurance in respect of licensed vehicles shall have limits of not less than five million dollars inclusive per occurrence for bodily injury, death and damage to property, in the following forms endorsed to provide the Owner with not less than 30 Days written notice in advance of any cancellation, change, or amendment restricting coverage:
  - a) standard non-owned automobile policy including standard contractual liability endorsement, and
  - b) standard owner's form automobile policy providing third party liability and accident benefits insurance and covering licensed vehicles owned or operated by the Contractor.

### **GC 6.03.04 Aircraft and Watercraft Liability Insurance**

#### **GC 6.03.04.01 Aircraft Liability Insurance**

- .01 Aircraft liability insurance with respect to owned or non-owned aircraft used directly or indirectly in the performance of the Work, including use of additional premises, shall be subject to limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof, and limits of not less than five million dollars for aircraft passenger hazard. Such insurance shall be in a form acceptable to the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage.

#### **6.03.04.02 Watercraft Liability Insurance**

- .01 Watercraft liability insurance with respect to owned or non-owned watercraft used directly or indirectly in the performance of the Work, including use of additional premises, shall be subject to limits of not less than five million dollars inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof. Such insurance shall be in a form acceptable to the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage.

#### **GC 6.03.05 Property and Boiler Insurance**

##### **GC 6.03.05.01 Property Insurance**

- .01 All risks property insurance shall be in the name of the Contractor, with the Owner and the Contract Administrator named as additional insureds, insuring not less than the sum of the amount of the Contract price and the full value, as may be stated in the Contract Documents, of Material that is specified to be provided by the Owner for incorporation into the Work, with a deductible not exceeding 1% of the amount insured at the site of the Work. This insurance shall be in a form acceptable to the Owner and shall be maintained continuously until 10 Days after the date of Final Acceptance of the Work, as set out in the Final Acceptance Certificate.

##### **GC 6.03.05.02 Boiler Insurance**

- .01 Boiler insurance insuring the interests of the Contractor, the Owner and the Contract Administrator for not less than the replacement value of boilers and pressure vessels forming part of the Work, shall be in a form acceptable to the Owner. This insurance shall be maintained continuously from commencement of use or operation of the property insured until 10 Days after the date of Final Acceptance of the Work, as set out in the Final Acceptance Certificate.

##### **GC 6.03.05.03 Use and Occupancy of the Work Prior to Completion**

- .01 Should the Owner wish to use or occupy part or all of the Work prior to Substantial Performance, the Owner shall give 30 Days written notice to the Contractor of the intended purpose and extent of such use or occupancy. Prior to such use or occupancy, the Contractor shall notify the Owner in writing of the additional premium cost, if any, to maintain property and boiler insurance, which shall be at the Owner's expense. If because of such use or occupancy the Contractor is unable to provide coverage, the Owner upon written notice from the Contractor and prior to such use or occupancy shall provide, maintain, and pay for property and boiler insurance insuring the full value of the Work, including coverage for such use or occupancy, and shall provide the Contractor with proof of such insurance. The Contractor shall refund to the Owner the unearned premiums applicable to the Contractor's policies upon termination of coverage.
- .02 The policies shall provide that, in the event of a loss or damage, payment shall be made to the Owner and the Contractor as their respective interests may appear. The Contractor shall act on behalf of both the Owner and the Contractor for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the Work. Loss or damage shall not affect the rights and obligations of either party under the Contract, except that the Contractor shall be entitled to such reasonable extension of Contract Time relative to the extent of the loss or damage as the Contract Administrator may decide in consultation with the Contractor.

##### **GC 6.03.05.04 Payment for Loss or Damage**

- .01 The Contractor shall be entitled to receive from the Owner, in addition to the amount due under the Contract, the amount at which the Owner's interest in restoration of the Work has been appraised, such amount to be paid as the restoration of the Work proceeds, and in accordance with the requirements of Section GC 8.0, Measurement and Payment. In addition, the Contractor shall be

entitled to receive from the payments made by the insurers the amount of the Contractor's interest in the restoration of the Work.

- .02 The Contractor shall be responsible for deductible amounts under the policies, except where such amounts may be excluded from the Contractor's responsibility by the terms of this Contract.
- .03 In the event of a loss or damage to the Work arising from the action or omission of the Owner or others, the Owner shall pay the Contractor the cost of restoring the Work as the restoration of the Work proceeds and in accordance with the requirements of Section GC 8.0, Measurement and Payment.

#### **GC 6.03.06 Contractor's Equipment Insurance**

- .01 All risks Contractor's equipment insurance covering construction machinery and equipment used by the Contractor for the performance of the Work, including boiler insurance on temporary boilers and pressure vessels, shall be in a form acceptable to the Owner and shall not allow subrogation claims by the insurer against the Owner. The policies shall be endorsed to provide the Owner with not less than 30 Days written notice in advance of cancellation, change, or amendment restricting coverage. Subject to satisfactory proof of financial capability by the Contractor for self-insurance of the Contractor's Equipment, the Owner agrees to waive the equipment insurance requirement, and for the purpose of this Contract, the Contractor shall be deemed to be insured. This policy shall be amended to provide permission for the Contractor to grant prior releases with respect to damage to the Contractor's Equipment.

#### **GC 6.03.07 Insurance Requirements and Duration**

- .01 Unless specified otherwise, the duration of each insurance policy shall be from the date of commencement of the Work until 10 Days after the date of Final Acceptance of the Work, as set out in the Final Acceptance Certificate.
- .02 The Contractor shall provide the Owner, on a form acceptable to the Owner, proof of insurance prior to commencement of the Work and signed by an officer of the Contractor and either the underwriter or the broker.
- .03 The Contractor shall, on request, promptly provide the Owner with a certified true copy of each insurance policy exclusive of information pertaining to premium or premium bases used by the insurer to determine the cost of the insurance. The certified true copy shall include a signature by an officer of the Contractor and, in addition, a signature by an officer of the insurer or the underwriter or the broker.
- .04 Where a policy is renewed, the Contractor shall provide the Owner, on a form acceptable to the Owner, renewed proof of insurance immediately following completion of renewal.
- .05 Unless specified otherwise, the Contractor shall be responsible for the payment of deductible amounts under the policies.
- .06 If the Contractor fails to provide or maintain insurance as required in subsection GC 6.03, Contractor's Insurance, or elsewhere in the Contract Documents, then the Owner shall have the right to provide and maintain such insurance and give evidence thereof to the Contractor. The Owner's cost thereof shall be payable by the Contractor to the Owner on demand.
- .07 If the Contractor fails to pay the cost of the insurance placed by the Owner within 30 Days of the date on which the Owner made a formal demand for reimbursement of such costs, the Owner may deduct the costs thereof from monies which are due or may become due to the Contractor.

#### **GC 6.04 Bonding**

- .01 The Contractor shall provide the Owner with the surety bonds in the amount required by the tender

documents.

- .02 Such bonds shall be issued by a duly licensed surety company authorized to transact a business of suretyship in the Province of Ontario and shall be to the satisfaction of the Owner. The bonds shall be maintained in good standing until the fulfilment of the Contract.

#### **GC 6.05 Workplace Safety and Insurance Board**

- .01 The Contractor shall provide the Contract Administrator with a copy of a Certificate of Clearance indicating the Contractor's good standing with the Workplace Safety and Insurance Board, as follows:
- a) Immediately prior to the Contract Administrator authorizing the Contractor to commence Work.
  - b) Prior to issue of the Certificate of Substantial Performance.
  - c) Prior to expiration of the Warranty Period.
  - d) At any other time when requested by the Contract Administrator.

### **SECTION GC 7.0 - CONTRACTOR'S RESPONSIBILITIES AND CONTROL OF THE WORK**

#### **GC 7.01 General**

- .01 The Contractor warrants that the site of the Work has been visited during the preparation of the Tender and the character of the Work and all local conditions that may affect the performance of the Work are known.
- .02 The Contractor shall not commence the Work nor deliver anything to the Working Area until the Contractor has received a written order to commence the Work, signed by the Contract Administrator.
- .03 The Contractor shall have complete control of the Work and shall effectively direct and supervise the Work so as to ensure conformity with the Contract Documents. The Contractor shall be responsible for construction means, methods, techniques, sequences, and procedures and for coordinating the various parts of the Work.
- .04 The Contractor shall provide adequate labour, Equipment, and Material to ensure the completion of the Contract in accordance with the Contract Documents. The Work shall be performed as vigorously and as continuously as weather conditions or other interferences may permit.
- .05 The Contractor shall have the sole responsibility for the design, erection, operation, maintenance, and removal of temporary structures and other temporary facilities and the design and execution of construction methods required in their use.
- .06 Notwithstanding paragraph GC 7.01.05, where the Contract Documents include designs for temporary structures and other temporary facilities or specify a method of construction in whole or part, such facilities and methods shall be considered to be part of the design of the Work, and the Contractor shall not be held responsible for that part of the design or the specified method of construction. The Contractor shall, however, be responsible for the execution of such design or specified method of construction in the same manner that the Contractor is responsible for the execution of the Work.
- .07 The Contractor shall execute the terms of the Contract in strict compliance with the requirements of the *Occupational Health and Safety Act*, R.S.O. 1990, c.O.1, as amended, (the "Act") and Ontario Regulation 213/91, as amended, (that regulates Construction Projects) and any other regulations as amended under the Act (the "Regulations") that may affect the performance of the Work, as the "Constructor" or "employer," as defined by the Act, as the case may be. The Contractor shall ensure that:

- a) worker safety is given first priority in planning, pricing, and performing the Work;
  - b) its officers and supervisory employees have a working knowledge of the duties of a "Constructor" and "employer" as defined by the Act and the provisions of the Regulations applicable to the Work, and a personal commitment to comply with them;
  - c) a copy of the most current version of the Act and the Regulations are available at the Contractor's office within the Working Area, or, in the absence of an office, in the possession of the supervisor responsible for the performance of the Work;
  - d) workers employed to carry out the Work possess the knowledge, skills, and protective devices required by law or recommended for use by a recognized industry association to allow them to work in safety;
  - e) its supervisory employees carry out their duties in a diligent and responsible manner with due consideration for the health and safety of the workers; and
  - f) all Subcontractors and their workers are properly protected from injury while they are at the Work Area.
- .08 The Contractor, when requested, shall provide the Owner with a copy of its health and safety policy and program at the pre-start meeting and shall respond promptly to requests from the Owner for confirmation that its methods and procedures for carrying out the Work comply with the Act and Regulations. The Contractor shall cooperate with representatives of the Owner and the inspectors appointed to enforce the Act and the Regulations in any investigations of worker health and safety in the performance of the Work. The Contractor shall indemnify and save the Owner harmless from any additional expense that the Owner may incur to have the Work performed as a result of the Contractor's failure to comply with the requirements of the Act and the Regulations.
- .09 Prior to commencement of the Work, the Contractor shall provide to the Contract Administrator a list of those products controlled under the Workplace Hazardous Materials Information System or WHMIS, which the Contractor expects to use on the Contract. Related Materials Safety Data Sheets shall accompany the submission. All containers used in the application of products controlled under WHMIS shall be labelled. The Contractor shall notify the Contractor Administrator in writing of changes in the products to be used and provide relevant Material Safety Data Sheets.
- .10 The Contractor shall have an authorized representative on the site while any Work is being performed, to supervise the Work and act for or on the Contractor's behalf. Prior to commencement of construction, the Contractor shall notify the Contract Administrator of the names; addresses; positions; and cell phone, pager, and telephone numbers of the Contractor's representatives who can be contacted at any time to deal with matters relating to the Contract, and update as necessary.
- .11 The Contractor shall designate a person to be responsible for traffic control and work zone safety. The designated person shall be a competent worker who is qualified because of knowledge, training, and experience to perform the duties; is familiar with Book 7 of the Ontario Traffic Manual; and has knowledge of all potential or actual danger to workers and motorists. Prior to the commencement of construction, the Contractor shall notify the Contract Administrator of the name; address; position; cell phone, pager, and telephone numbers of the designated person, and update as necessary. The designated person may have other responsibilities, including other construction sites, and need not be present in the Working Area at all times.
- .12 The Contractor shall, at no additional cost to the Owner, furnish all reasonable aid, facilities, and assistance required by the Contract Administrator for the proper inspection and examination of the Work or the taking of measurements for the purpose of payment.
- .13 The Contractor shall prepare and update, as required, a construction schedule of operations, indicating the proposed methods of construction and sequence of work and the time the Contractor proposes to complete the various items of work within the time specified in the Contract Documents.

The schedule shall be submitted to the Contract Administrator within 14 Days from the Contract award. If the Contractor's schedule is materially affected by changes, the Contractor shall submit an updated construction schedule, if requested by the Contract Administrator, within 7 Days of the request. This updated schedule shall show how the Contractor proposes to perform the balance of the Work, so as to complete the Work within the time specified in the Contract Documents.

- .14 Where the Contractor finds any error, inconsistency, or omission relating to the Contract, the Contractor shall promptly report it to the Contract Administrator and shall not proceed with the activity affected until receiving direction from the Contract Administrator.
- .15 The Contractor shall promptly notify the Contract Administrator in writing if the subsurface conditions observed in the Working Area differ materially from those indicated in the Contract Documents.
- .16 The Contractor shall arrange with the appropriate Utility authorities for the stake out of all underground Utilities and service connections that may be affected by the Work. The Contractor shall observe the location of the stake outs prior to commencing the Work and in the event that there is a discrepancy between the location of the stake outs and the locations shown on the Contract Documents, that may affect the Work, the Contractor shall immediately notify the Contract Administrator and the affected Utility companies, in order to resolve the discrepancy. The Contractor shall be responsible for any damage done to the underground Utilities and service connections by the Contractor's forces during construction if the stake out locations are within the tolerances given in paragraph GC 2.01.01 a).

#### **GC 7.02 Layout**

- .01 Prior to commencement of construction, the Contract Administrator and the Contractor shall locate on site those property bars, baselines, and benchmarks that are necessary to delineate the Working Area and to lay out the Work, all as shown on the Contract Drawings.
- .02 The Contractor shall be responsible for the preservation of all property bars while the Work is in progress, except those property bars that must be removed to facilitate the Work. Any other property bars disturbed, damaged, or removed by the Contractor's operations shall be replaced under the supervision of an Ontario Land Surveyor, at the Contractor's expense.
- .03 At no extra cost to the Owner, the Contractor shall provide the Contract Administrator with such materials and devices as may be necessary to lay out the baseline and benchmarks, and as may be necessary for the inspection of the Work.
- .04 The Contractor shall provide qualified personnel to lay out and establish all lines and grades necessary for construction. The Contractor shall notify the Contract Administrator of any layout work carried out, so that the same may be checked by the Contract Administrator.
- .05 The Contractor shall install and maintain substantial alignment markers and secondary benchmarks as may be required for the proper execution of the Work. The Contractor shall supply one copy of all alignment and grade sheets to the Contract Administrator.
- .06 The Contractor shall assume full responsibility for alignment, elevations, and dimensions of each and all parts of the Work, regardless of whether the Contractor's layout work has been checked by the Contract Administrator.
- .07 All stakes, marks, and reference points shall be carefully preserved by the Contractor. In the case of their destruction or removal, such stakes, marks, and reference points shall be replaced at the Contractor's expense.
- .08 Benchmarks and survey monuments identified in the Contract Documents shall be protected by the Contractor. In the case of their destruction or removal, such benchmarks and survey monuments shall be replaced by the Owner at the Contractor's expense.

### **GC 7.03 Working Area**

- .01 The Contractor's sheds, site offices, toilets, other temporary structures, and storage areas for Material and Equipment shall be grouped in a compact manner and maintained in a neat and orderly condition at all times.
- .02 The Contractor shall confine the construction operations to the Working Area. Should the Contractor require more space than that shown on the Contract Drawings, the Contractor shall obtain such space at no additional cost to the Owner.
- .03 The Contractor shall not enter upon or occupy any private property for any purpose, unless the Contractor has received prior written permission from the property owner.

### **GC 7.04 Damage by Vehicles or Other Equipment**

- .01 If at any time, in the opinion of the Contract Administrator, damage is being done or is likely to be done to any Roadway or any improvement thereon, outside the Working Area, by the Contractor's vehicles or other Equipment, whether licensed or unlicensed Equipment, the Contractor shall, on the direction of the Contract Administrator, and at no extra cost to the Owner, make changes or substitutions for such vehicles or Equipment, and shall alter loadings, or in some other manner, remove the cause of such damage to the satisfaction of the Contract Administrator.

### **GC 7.05 Excess Loading of Motor Vehicles**

- .01 Where a vehicle is hauling Material for use on the Work, in whole or in part; upon a Highway; and where motor vehicle registration is required for such vehicle, the Contractor shall not cause or permit such vehicle to be loaded beyond the legal limit specified in the *Highway Traffic Act*, R.S.O. 1990, c.H.8, as amended, whether such vehicle is registered in the name of the Contractor or otherwise, except where there are designated areas within the Working Area where overloading is permitted. The Contractor shall bear the onus of weighing disputed loads.

### **GC 7.06 Condition of the Working Area**

- .01 The Contractor shall maintain the Working Area in a tidy condition and free from the accumulation of debris and prevent dust nuisance, mud, and ponding water, other than that caused by the Owner or others.

### **GC 7.07 Maintaining Roads and Detours**

- .01 Unless otherwise specified in the Contract Documents, if an existing Roadway is affected by construction, it shall be kept open to both vehicular and pedestrian traffic.
- .02 Subject to the approval of the Contract Administrator, the Contractor shall, at no additional cost to the Owner, be responsible for providing and maintaining for the duration of the Work an alternative route for both pedestrian and vehicular traffic through the Working Area in accordance with the OTM, whether along the existing Highway under construction or on a detour road beside or adjacent to the Highway under construction.
- .03 Subject to the approval of the Contract Administrator, the Contractor may block traffic for short periods of time to facilitate construction of the Work in accordance with the OTM. Any temporary lane closures shall be kept to a minimum.
- .04 The Contractor shall not be required to maintain a road through the Working Area until such time as the Contractor has commenced operations or during seasonal shut down or on any part of the Contract that has been accepted in accordance with these General Conditions. The Contractor shall not be required to apply de-icing chemicals or abrasives or carry out snowplowing.
- .05 Where localized and separated sections of the Highway are affected by the Contractor's operations,

the Contractor shall not be required to maintain intervening sections of the Highway until such times as these sections are located within the limits of the Highway affected by the Contractor's general operations under the Contract.

- .06 Where the Contract Documents provide for or the Contract Administrator requires detours at specific locations, payment for the construction of the detours and, if required, for the subsequent removal of the detours, shall be made at the Contract prices appropriate to such work.
- .07 Compensation for all labour, Equipment, and Materials to do this Work shall be at the Contract prices appropriate to the Work and, where there are no such prices, at negotiated prices. Notwithstanding the foregoing, the cost of blading required to maintain the surface of such roads and detours shall be deemed to be included in the prices bid for the various tender items and no additional payment shall be made.
- .08 Where work under the Contract is discontinued for any extended period, including seasonal shutdown, the Contractor shall, when directed by the Contract Administrator, open and place the Roadway and detours in a passable, safe, and satisfactory condition for public travel.
- .09 Where the Contractor constructs a detour that is not specifically provided for in the Contract Documents or required by the Contract Administrator, the construction of the detour and, if required, the subsequent removal shall be performed at the Contractor's expense. The detour shall be constructed and maintained to structural and geometric standards approved by the Contract Administrator. Removal and site restoration shall be performed as directed by the Contract Administrator.
- .10 Where, with the prior written approval of the Contract Administrator, the Highway is closed and the traffic diverted entirely off the Highway to any other Highway, the Contractor shall, at no extra cost to the Owner, supply, erect, and maintain traffic control devices in accordance with the OTM.
- .11 Compliance with the foregoing provisions shall in no way relieve the Contractor of obligations under subsection GC 6.01, Protection of Work, Persons, and Property, dealing with the Contractor's responsibility for damage claims, except for claims arising on sections of Highway within the Working Area that are being maintained by others.

#### **GC 7.08 Access to Properties Adjoining the Work and Interruption of Utility Services**

- .01 The Contractor shall provide at all times and at no extra cost to the Owner,
  - a) adequate pedestrian and vehicular access; and
  - b) continuity of Utility services to properties adjoining the Working Area.
- .02 The Contractor shall provide at all times and at no extra cost to the Owner access to fire hydrants, water and gas valves, and all other Utilities located in the Working Area.
- .03 Where any interruptions in the supply of Utility services are required and are authorized by the Contract Administrator, the Contractor shall give the affected property owners notice in accordance with subsection GC 7.12, Notices by the Contractor, and shall arrange such interruptions so as to create a minimum of interference to those affected.

#### **GC 7.09 Approvals and Permits**

- .01 Except as specified in subsection GC 4.02, Approval and Permits, the Contractor shall obtain and pay for any permits, licences, and certificates, which at the date of tender closing, are required for the performance of the Work.
- .02 The Contractor shall arrange for all necessary inspections required by the approvals and permits specified in paragraph GC 7.09.01.

### **GC 7.10 Suspension of Work**

- .01 The Contractor shall, upon written notice from the Contract Administrator, discontinue or delay any or all of the Work and work shall not be resumed until the Contract Administrator so directs in writing. Delays, in these circumstances, shall be administered according to subsection GC 3.07, Delays.

### **GC 7.11 Contractor's Right to Stop the Work or Terminate the Contract**

- .01 If the Owner is adjudged bankrupt or makes a general assignment for the benefit of creditors because of insolvency or if a receiver is appointed because of insolvency, the Contractor may, without prejudice to any other right or remedy the Contractor may have, by giving the Owner or receiver or trustee in bankruptcy written notice, terminate the Contract.
- .02 If the Work is stopped or otherwise delayed for a period of 30 Days or more under an order of a court or other public authority and provided that such order was not issued as the result of an act or fault of the Contractor or of anyone directly employed or engaged by the Contractor, the Contractor may, without prejudice to any other right or remedy the Contractor may have, by giving the Owner written notice, terminate the Contract.
- .03 The Contractor may notify the Owner in writing, with a copy to the Contract Administrator, that the Owner is in default of contractual obligations if,
- a) the Contract Administrator fails to issue certificates in accordance with the provisions of Section GC 8.0, Measurement and Payment;
  - b) the Owner fails to pay the Contractor, within 30 Days of the due dates identified in clause GC 8.02.03, Certification and Payment, the amounts certified by the Contract Administrator or within 30 Days of an award by an arbitrator or court; or
  - c) the Owner violates the requirements of the Contract.
- .04 The Contractor's written notice to the Owner shall advise that if the default is not corrected in the 7 Days immediately following receipt of the written notice, the Contractor may, without prejudice to any other right or remedy the Contractor may have, stop the Work or terminate the Contract.
- .05 If the Contractor terminates the Contract under the conditions set out in subsection GC 7.11, the Contractor shall be entitled to be paid for all work performed according to the Contract Documents and for any losses or damage as the Contractor may sustain as a result of the termination of the Contract.

### **GC 7.12 Notices by the Contractor**

- .01 Before work is carried out that may affect the property or operations of any Ministry or agency of government or any person; company; partnership; or corporation, including a municipal corporation or any board or commission thereof, and in addition to such notices of the commencement of specified operations as are prescribed elsewhere in the Contract Documents, the Contractor shall give at least 48 hours advance written notice of the date of commencement of such work to the person, company, partnership, corporation, board, or commission so affected.
- .02 In the case of damage to or interference with any Utilities, pole lines, pipe lines, conduits, farm tiles, or other public or privately owned works or property, the Contractor shall immediately notify the Owner, Contract Administrator, and the owner of the works of the location and details of such damage or interference.

### **GC 7.13 Obstructions**

- .01 Except as otherwise noted in these General Conditions, the Contractor assumes all the risks and

responsibilities arising out of any obstruction encountered in the performance of the Work and any traffic conditions, including traffic conditions on any Highway or road giving access to the Working Area caused by such obstructions, and the Contractor shall not make any claim against the Owner for any loss, damage, or expense occasioned thereby.

- .02 Where the obstruction is an underground Utility or other man-made object, the Contractor shall not be required to assume the risks and responsibilities arising out of such obstruction, unless the location of the obstruction is shown on the Plans or described in the Contract Documents and the location so shown is within the tolerance specified in paragraph GC 2.01.01 a), or unless the presence and location of the obstruction has otherwise been made known to the Contractor or could have been determined by the visual site investigation made by the Contractor in accordance with these General Conditions.
- .03 During the course of the Contract, it is the Contractor's responsibility to consult with Utility companies or other appropriate authorities for further information in regard to the exact location of these Utilities, to exercise the necessary care in construction operations, and to take such other precautions as are necessary to safeguard the Utilities from damage.

#### **GC 7.14 Limitations of Operations**

- .01 Except for such work as may be required by the Contract Administrator to maintain the Work in a safe and satisfactory condition, the Contractor shall not carry out operations under the Contract on Saturdays, Sundays, and Statutory Holidays without permission in writing from the Contract Administrator.
- .02 The Contractor shall cooperate and coordinate the Work with other Contractors, Utility companies, and the Owner and they shall be allowed access to their work or plant at all reasonable times.

#### **GC 7.15 Cleaning Up Before Acceptance**

- .01 Upon attaining Substantial Performance of the Work, the Contractor shall remove surplus materials, tools, construction machinery and equipment not required for the performance of the remaining Work. The Contractor shall also remove all temporary works and debris other than that caused by the Owner or others and leave the Work and Working Area clean and suitable for occupancy by the Owner, unless otherwise specified.
- .02 The Work shall not be deemed to have reached Completion until the Contractor has removed surplus materials, tools, construction machinery, and equipment. The Contractor shall also have removed debris, other than that caused by the Owner, or others.

#### **GC 7.16 Warranty**

- .01 Unless otherwise specified in the Contract Documents for certain Materials or components of the Work, the Contractor shall be responsible for the proper performance of the Work only to the extent that the design and standards permit such performance.
- .02 Subject to the previous paragraph the Contractor shall correct promptly, at no additional cost to the Owner, defects or deficiencies in the Work that appear,
  - a) prior to and during the period of 12 months from the date of Substantial Performance of the Work, as set out in the Certificate of Substantial Performance of the Work,
  - b) where the work is completed after the date of Substantial Performance, 12 months after Completion of the Work,
  - c) where there is no Certificate of Substantial Performance, 12 months from the date of Completion of the Work as set out in the Completion Certificate, or

- d) such longer periods as may be specified in the Contract Documents for certain Materials or some of the Work.

The Contract Administrator shall promptly give the Contractor written notice of observed defects or deficiencies.

- .03 The Contractor shall correct or pay for damage resulting from corrections made under the requirements of paragraph GC 7.16.02.

#### **GC 7.17 Contractor's Workers**

- .01 The Contractor shall only employ orderly, competent, and skillful workers to do the Work and whenever the Contract Administrator shall inform the Contractor in writing that any worker or workers involved in the Work are, in the opinion of the Contract Administrator, incompetent, or disorderly such worker or workers shall be removed from the work and shall not be employed on the work again without the consent in writing of the Contract Administrator.

#### **GC 7.18 Drainage**

- .01 During construction and until the Work is completed, the Contractor shall make all reasonable efforts to keep all portions of the Work properly and efficiently drained, to at least the same degree as that of the existing drainage conditions.

### **SECTION GC 8.0 - MEASUREMENT AND PAYMENT**

#### **GC 8.01 Measurement**

##### **GC 8.01.01 Quantities**

- .01 The Contract Administrator shall make an Estimate once a month, in writing, of the quantity of Work performed. The first Estimate shall be the quantity of Work performed since the Contractor commenced the Contract, and every subsequent Estimate, except the final one, shall be of the quantity of Work performed since the preceding Estimate was made. The Contract Administrator shall provide the copy of each Estimate to the Contractor within 10 Days of the Cut-Off Date.
- .02 Such quantities for progress payments shall be construed and held to approximate. The final quantities for the issuance of the Completion Payment Certificate shall be based on the measurement of Work completed.
- .03 Measurement of the quantities of the Work performed may be either by Actual Measurement or by Plan Quantity principles as indicated in the Contract. Adjustments to Plan Quantity measurements shall normally be made using Plan Quantity principles but may, where appropriate, be made using Actual Measurements. Those items identified on the Tender by the notation (P) in the unit column shall be paid according to the Plan Quantity. Items where the notation (P) does not occur shall be paid according to Actual Measurement or lump sum.

##### **GC 8.01.02 Variations in Tender Quantities**

- .01 Where it appears that the quantity of Work to be done or Material to be supplied or both by the Contractor under a unit price tender item may exceed or be less than the tender quantity, the Contractor shall proceed to do the Work or supply the Material or both required to complete the tender item and payment shall be made for the actual amount of Work done or Material supplied or both at the unit prices stated in the Tender except as provided below:
  - a) In the case of a Major Item where the quantity of Work performed or Material supplied or both by the Contractor exceeds the tender quantity by more than 15%, either party to the Contract may make a written request to the other party to negotiate a revised unit price for that portion of the Work performed or Material supplied or both which exceeds 115% of the tender quantity. The

negotiation shall be carried out as soon as reasonably possible. Any revision of the unit price shall be based on the actual cost of doing the Work or supplying the Material or both under the tender item plus a reasonable allowance for profit and applicable overhead.

- b) In the case of a Major Item where the quantity of Work performed or Material supplied or both by the Contractor is less than 85% of the tender quantity, the Contractor may make a written request to negotiate for the portion of the actual overheads and fixed costs applicable to the amount of the underrun in excess of 15% of the tender quantity. For purposes of the negotiation, the overheads and fixed costs applicable to the item are deemed to have been prorated uniformly over 100% of the tender quantity for the item. Overhead costs shall be confirmed by a statement certified by the Contractor's senior financial officer or auditor and may be audited by the Owner. Alternatively, where both parties agree, an allowance equal to 10% of the unit price on the amount of the underrun in excess of 15% of the tender quantity shall be paid.

Written requests for compensation must be received no later than 60 Days after the issuance of the Completion Payment Certificate.

## **GC 8.02 Payment**

### **GC 8.02.01 Price for Work**

- .01 Prices for the Work shall be full compensation for all labour, Equipment and Material required in its performance. The term "all labour, Equipment, and Material" shall include Hand Tools, supplies, and other incidentals.
- .02 Payment for work not specifically detailed as part of any one item and without specified details of payment shall be deemed to be included in the items with which it is associated.

### **GC 8.02.02 Advance Payments for Material**

- .01 The Owner shall make advance payments for Material intended for incorporation in the Work upon the written request of the Contractor and according to the following terms and conditions:
- a) The Contractor shall deliver the Material to a site approved by the Contract Administrator and the Contractor shall, in advance of receipt of the shipment of the Material, arrange for adequate and proper storage facilities.
- b) The value of aggregates, processed and stockpiled, shall be assessed by the following procedure:
- i. Sources Other Than Commercial
    - (1) Granular A, B, BI, BII, BIII, M, and O shall be assessed at the rate of 60% of the Contract price.
    - (2) Coarse and fine aggregates for hot mix asphaltic concrete, surface treatment and Portland cement concrete shall be assessed at the rate of 25% of the Contract price for each aggregate stockpiled.
  - ii. Commercial Sources  
Payment for separated coarse and fine aggregates shall be considered at the above rate when such materials are stockpiled at a commercial source where further processing is to be carried out before incorporating such materials into a final product. Advance payments for other materials located at a commercial source shall not be made.
- c) Payment for all other materials, unless otherwise specified elsewhere in the Contract Documents, shall be based on the invoice price, and the Contractor shall submit proof of cost to the Contract Administrator before payment can be made by the Owner.
- d) The payment for all Materials shall be prorated against the appropriate tender item by paying for

sufficient units of the item to cover the value of the material. Such payment shall not exceed 80% of the Contract price for the item.

- e) All Materials for which the Contractor wishes to receive advance payment shall be placed in the designated storage location immediately upon receipt of the material and shall thenceforth be held by the Contractor in trust for the Owner as collateral security for any monies advanced by the Owner and for the due completion of the Work. The Contractor shall not exercise any act of ownership inconsistent with such security, or remove any Material from the storage locations, except for inclusion in the Work, without the consent, in writing, of the Contract Administrator.
- f) Such materials shall remain at the risk of the Contractor who shall be responsible for any loss, damage, theft, improper use, or destruction of the material however caused.

.02 Where the Owner makes advance payments subject to the conditions listed in paragraph GC 8.02.02.01, such payment shall not constitute acceptance of the Material by the Owner. Acceptance shall only be determined when the material meets the requirements of the appropriate specification.

### **GC 8.02.03 Certification and Payment**

#### **GC 8.02.03.01 Progress Payment Certificate**

.01 The value of the Work performed and Material supplied shall be calculated once a month by the Contract Administrator in accordance with the Contract Documents and clause GC 8.01.01, Quantities.

.02 The progress Payment Certificate shall show,

- a) the quantities of Work performed;
- b) the value of Work performed;
- c) any advanced payment for Material;
- d) the amount of statutory holdback, liens, Owner's set-off;
- e) the amount of HST, as applicable; and
- f) the amount due to the Contractor.

.03 One copy of the progress Payment Certificate shall be sent to the Contractor.

.04 Payment shall be made within 30 Days of the Cut-Off Date.

#### **GC 8.02.03.02 Certification of Subcontract Completion**

.01 Before the Work has reached the stage of Substantial Performance, the Contractor may notify the Contract Administrator, in writing that a subcontract is completed satisfactorily and ask that the Contract Administrator certify the completion of such subcontract.

.02 The Contract Administrator shall issue a Certificate of Subcontract Completion, if the subcontract has been completed satisfactorily, and all required inspection and testing of the works covered by the subcontract have been carried out and the results are satisfactory.

.03 The Contract Administrator shall set out in the Certificate of Subcontract Completion the date on which the subcontract was completed and, within 7 Days of the date the subcontract is certified complete, the Contract Administrator shall give a copy of the certificate to the Contractor and to the

Subcontractor concerned.

**GC 8.02.03.03 Subcontract Statutory Holdback Release Certificate and Payment**

- .01 Following receipt of the Certificate of Subcontract Completion, the Owner shall release and pay the Contractor the statutory holdback retained in respect of the subcontract. Such release shall be made 46 Days after the date the subcontract was certified complete and providing the Contractor submits the following to the Contract Administrator:
- a) a document satisfactory to the Contract Administrator that shall release the Owner from all further claims relating to the subcontract, qualified by stated exceptions such as holdback monies;
  - b) evidence satisfactory to the Contract Administrator that the Subcontractor has discharged all liabilities incurred in carrying out the subcontract;
  - c) a satisfactory clearance certificate or letter from the Workplace Safety and Insurance Board relating to the subcontract; and
  - d) a copy of the contract between the Contractor and the Subcontractor and a satisfactory statement showing the total amount due the Subcontractor from the Contractor.
- .02 Paragraph GC 8.02.03.03.01 d), shall only apply to Lump Sum Items and then only when the Contract Administrator specifically requests it.
- .03 Upon receipt of the statutory holdback, the Contractor shall forthwith give the Subcontractor the payment due under the subcontract.
- .04 Release of statutory holdback by the Owner in respect of a subcontract shall not relieve the Contractor, or the Contractor's Surety, of any of their responsibilities.

**GC 8.02.03.04 Certification of Substantial Performance**

- .01 Upon application by the Contractor and when the Contract Administrator has verified that the Contract has been substantially performed, the Contract Administrator shall issue a Certificate of Substantial Performance.
- .02 Upon verifying that the Contract has been substantially performed, the Contract Administrator shall issue a certificate of Substantial Performance and shall set out in the Certificate of Substantial Performance the date on which the Contract was substantially performed and, within 7 Days after signing the said certificate, the Contract Administrator shall provide a copy to the Contractor.
- .03 Upon receipt of a copy of the Certificate of Substantial Performance, the Contractor shall forthwith, as required by Section 32(1) Paragraph 5 of the *Construction Lien Act*, R.S.O. 1990, c.C.30, as amended, publish a copy of the certificate in a construction trade newspaper. Such publication shall include placement in the Daily Commercial News.
- .04 Where the Contractor fails to publish a copy of the Certificate of Substantial Performance as required above within 7 Days after receiving a copy of the certificate signed by the Contract Administrator, the Owner may publish a copy of the certificate at the Contractor's expense.
- .05 Except as otherwise provided for in Section 31 of the *Construction Lien Act*, the 45 Day lien period prior to the release of holdback as referred to in clause GC 8.02.03.05, Substantial Performance Payment and Statutory Holdback Release Payment Certificates, shall commence from the date of publication of the Certificate of Substantial Performance as provided for above.

**GC 8.02.03.05 Substantial Performance Payment and Substantial Performance Statutory Holdback Release Payment Certificates**

- .01 When the Contract Administrator issues the Certificate of Substantial Performance, the Contract Administrator shall also issue the Substantial Performance Payment Certificate and the Substantial Performance Statutory Holdback Release Payment Certificate or where appropriate, a combined payment certificate.
- .02 The Substantial Performance Payment Certificate shall show,
- a) the value of Work performed to the date of Substantial Performance;
  - b) the value of outstanding or incomplete Work;
  - c) the amount of the statutory holdback, allowing for any previous releases of statutory holdback to the Contractor in respect of completed subcontracts and deliveries of pre-selected equipment;
  - d) the amount of maintenance security required; and
  - e) the amount due the Contractor.
- .03 Payment of the amount certified shall be made within 30 Days of the date of issuance of the payment certificate.
- .04 The Substantial Performance Statutory Holdback Release Payment Certificate shall be a payment certificate releasing to the Contractor the statutory holdback due in respect of Work performed up to the date of Substantial Performance. Payment of such statutory holdback shall be due 46 Days after the date of publication of the Certificate of Substantial Performance but subject to the provisions of the *Construction Lien Act* and the submission by the Contractor of the following documents:
- a) a release by the Contractor in a form satisfactory to the Contract Administrator releasing the Owner from all further claims relating to the Contract, qualified by stated exceptions such as outstanding work or matters arising out of subsection GC 3.13, Claims, Negotiations, Mediation;
  - b) a statutory declaration in a form satisfactory to the Contract Administrator that all liabilities incurred by the Contractor and the Contractor's Subcontractors in carrying out the Contract have been discharged except for statutory holdbacks properly retained;
  - c) a satisfactory Certificate of Clearance from the Workplace Safety and Insurance Board; and
  - d) proof of publication of the Certificate of Substantial Performance.

**GC 8.02.03.06 Certification of Completion**

- .01 Upon application by the Contractor and when the Contract Administrator has verified that the Contract has reached Completion, the Contract Administrator shall issue a Completion Certificate.
- .02 The Contract Administrator shall set out in the Completion Certificate the date on which the Work was completed and, within 7 Days of signing the said certificate, the Contract Administrator shall provide a copy to the Contractor.

**GC 8.02.03.07 Completion Payment and Completion Statutory Holdback Release Payment Certificates**

- .01 When the Contract Administrator issues the Completion Certificate, the Contract Administrator shall also issue the Completion Payment Certificate and the Completion Statutory Holdback Release

Payment Certificate or where appropriate, a combined payment certificate.

.02 The Completion Payment Certificate shall show,

- a) measurement and value of Work at Completion;
- b) the amount of the further statutory holdback based on the value of further work completed over and above the value of work completed shown in the Substantial Performance Payment Certificate referred to above; and
- c) the amount due the Contractor.

.03 The Completion Statutory Holdback Release Payment Certificate shall be a payment certificate releasing to the Contractor the further statutory holdback. Payment of such statutory holdback shall be due 46 Days after the date of Completion of the Work as established by the Completion Certificate but subject to the provisions of the *Construction Lien Act* and the submission by the Contractor of the following documents:

- a) a release by the Contractor in a form satisfactory to the Contract Administrator releasing the Owner from all further claims relating to the Contract, qualified by stated exceptions where appropriate;
- b) a statutory declaration in a form satisfactory to the Contract Administrator that all liabilities incurred by the Contractor and the Contractor's Subcontractors in carrying out the Contract have been discharged, qualified by stated exceptions where appropriate; and
- c) a satisfactory Certificate of Clearance from the Workplace Safety and Insurance Board.

#### **GC 8.02.03.08 Interest**

.01 Interest due the Contractor is based on simple interest and is calculated using the applicable Rate of Interest.

#### **GC 8.02.03.09 Interest for Late Payment**

.01 Provided the Contractor has complied with the requirements of the Contract, including all documentation requirements, when payment by the Owner to the Contractor for Work performed, or for release of statutory holdback, is delayed by the Owner, then the Contractor shall be entitled to receive interest on the outstanding payment at the Rate of Interest, if payment is not received on the dates set out below:

- a) Progress Payment Certificates: 30 Days after the Cut-Off Date;
- b) Certificate of Subcontract Completion: 30 Days after the date certified as the date on which the subcontract was completed;
- c) Subcontract Statutory Holdback Release Payment Certificate: 76 Days after the date on which the subcontract was completed;
- d) Substantial Performance Payment Certificate: 30 Days after the date of issuance of the certificate;
- e) Substantial Performance Statutory Holdback Release Payment Certificate: 76 Days after publication of the Payment Certificate of Substantial Performance;
- f) Completion Payment Certificate: 30 Days after the date certified as the date on which the Contract reached Completion; and
- g) Completion Statutory Holdback Release Payment Certificate: 76 Days after the date certified as the date that the Work was completed.

.02 If the Contractor has not complied with the requirements of the Contract, including all documentation requirements, prior to expiration of the time periods described in paragraph GC 8.02.03.09.01, interest shall only begin to accrue when the Contractor has completed those requirements.

#### **GC 8.02.03.10 Interest for Negotiations and Claims**

.01 Except as hereinafter provided, where a notice of negotiation, notice of intent to claim and the subsequent claims are submitted in accordance with the time limits or procedure or both described by subsection GC 3.13, Claims, Negotiations, Mediation, the Owner shall pay the Contractor the Rate of Interest on the amount of the negotiated price for that part of the Work or on the amount of the settled claim. Such interest shall not commence until 30 Days after the satisfactory completion of that part of the Work.

.02 Where the Contractor does not attempt to resolve the negotiation or the claim in an expeditious manner, interest shall be negotiable.

.03 Where the Contractor fails to give notice of a claim within the time limit prescribed by subsection GC 3.13, Claims, Negotiations, Mediation, interest shall not be paid.

.04 Where a Contractor fails to comply with the 30 Day time limit and the procedures prescribed in paragraph GC 3.13.03.03 for submission of claims, interest shall not be paid for the delay period.

#### **GC 8.02.03.11 Owner's Set-Off**

.01 Pursuant to Section 12 of the *Construction Lien Act*, the Owner may retain from monies owing to the Contractor under this Contract an amount sufficient to cover any outstanding or disputed liabilities, including the cost to remedy deficiencies, the reduction in value of substandard portions of the Work, claims for damages by third parties that have not been determined in writing by the Contractor's insurer, undetermined claims by the Owner under paragraph GC 8.01.02.01 a), any assessment due the Workplace Safety and Insurance Board, and any monies to be paid to the workers in accordance with clause GC 8.02.06, Payment of Workers.

.02 Under these circumstances the Owner will give the Contractor appropriate notice of such action.

#### **GC 8.02.03.12 Delay in Payment**

.01 The Owner shall not be deemed to be in default of the Contract provided any delay in payment does not exceed 30 Days from the due dates as defined in paragraph GC 8.02.03.09.01.

#### **GC 8.02.04 Payment on a Time and Material Basis**

##### **GC 8.02.04.01 Definitions**

.01 For the purpose of clause GC 8.02.04 the following definitions apply:

**Cost of Labour** means the amount of wages, salary, travel, travel time, food, lodging, or similar items and Payroll Burden paid or incurred directly by the Contractor to or in respect of labour and supervision actively and necessarily engaged on the Work based on the recorded time and hourly rates of pay for such labour and supervision but shall not include any payment or costs incurred for general supervision, administration, and management time spent on the entire Work or any wages, salary, or Payroll Burden for which the Contractor is compensated by any payment made by the Owner for Equipment.

**Cost of Material** means the cost of Material purchased or supplied from stock and valued at current market prices for the purpose of carrying out Extra Work by the Contractor or by others, when such arrangements have been made by the Contractor for completing the Work, as shown by itemized invoices.

**Operated Rented Equipment** means Rented Equipment for which an operator is provided by the supplier of the equipment and for which the rent or lease includes the cost of the operator.

**Payroll Burden** means the payments in respect of workplace insurance, vacation pay, employment insurance, public liability and property damage insurance, sickness and accident insurance, pension fund, and such other welfare and benefit payments forming part of the Contractor's normal labour costs.

**Rented Equipment** means equipment that is rented or leased for the special purpose of Work on a Time and Material Basis from a person, firm, or corporation that is not an associate of the lessee as the word "associate" is defined by the *Securities Act*, R.S.O. 1990, c.S.5, as amended, and is approved by the Contract Administrator.

**Road Work** means the preparation, construction, finishing, and construction maintenance of roads, streets, Highways, and parking lots and includes all work incidentals thereto other than work on structures.

**Sewer and Watermain Work** means the preparation, construction, finishing, and construction maintenance of sewer systems and watermain systems, and includes all work incidental thereto other than work on structures.

**Standby Time** means any period of time that is not considered Working Time and which together with the Working Time does not exceed 10 hours in any one Working Day and during which time a unit of equipment cannot practically be used on other work but must remain on the site in order to continue with its assigned task and during which time the unit is in fully operable condition.

**Structure Work** means the construction, reconstruction, repair, alteration, remodelling, renovation, or demolition of any bridge, building, tunnel, or retaining wall and includes the preparation for and the laying of the foundation of any bridge, building, tunnel, or retaining wall and the installation of equipment and appurtenances incidental thereto.

**The 127 Rate** means the rate for a unit of Equipment as listed in OPSS 127, Schedule of Rental Rates for Construction Equipment, Including Model and Specification Reference, that is current at the time the work is carried out or for Equipment that is not so listed, the rate that has been calculated by the Owner, using the same principles as used in determining The 127 Rates.

**Work on a Time and Material Basis** means Changes in the Work, Extra Work, and Additional Work approved by the Contract Administrator for payment on a Time and Material basis. The Work on a Time and Material Basis shall be subject to all the terms, conditions, Standard Specifications and provisions of the Contract.

**Working Time** means each period of time during which a unit of Equipment is actively and of necessity engaged on a specific operation and the first 2 hours of each immediately following period during which the unit is not so engaged but during which the operation is otherwise proceeding and during which time the unit cannot practically be transferred to other work but must remain on the site in order to continue with its assigned tasks and during which time the unit is in a fully operable condition.

#### **GC 8.02.04.02 Daily Work Records**

.01 Daily Work Records, prepared as the case may be by either the Contractor's representative or the Contract Administrator reporting the labour and Equipment employed and the Material used on each Time and Material project, should be reconciled and signed each Day by both the Contractor's representative and the Contract Administrator. If it is not possible to reconcile the Daily Work Records, then the Contractor shall submit the un-reconciled Daily Work Records with its claim, whereby the resolution of the dispute about the Daily Work Records shall not be resolved until there is a resolution of the claim.

#### **GC 8.02.04.03 Payment for Work**

.01 Payment as herein provided shall be full compensation for all labour, Equipment, and Material to do the Work on a Time and Material Basis except where there is agreement to the contrary prior to the

commencement of the Work on a Time and Material Basis. The payment adjustments on a Time and Material basis shall apply to each individual Change Order authorized by the Contract Administrator.

**GC 8.02.04.04 Payment for Labour**

- .01 The Owner shall pay the Contractor for labour employed on each Time and Material project at 135% of the Cost of Labour up to \$3,000, then at 120% of any portion of the Cost of Labour in excess of \$3,000.
- .02 The Owner shall make payment in respect of Payroll Burden for Work on a Time and Material Basis at the Contractor's actual cost of Payroll Burden.
- .03 At the Owner's discretion, an audit may be conducted in which case the actual Payroll Burden so determined shall be applied to all Time and Material work on the Contract.

**GC 8.02.04.05 Payment for Material**

- .01 The Owner shall pay the Contractor for Material used on each Time and Material project at 120% of the Cost of the Material up to \$3,000, then at 115% of any portion of the Cost of Material in excess of \$3,000.

**GC 8.02.04.06 Payment for Equipment**

**GC 8.02.04.06.01 Working Time**

- .01 The Owner shall pay the Contractor for the Working Time of all Equipment, other than Rented Equipment and Operated Rented Equipment, used on the Work on a Time and Material basis at The 127 Rates with a cost adjustment as follows:
  - a) Cost \$10,000 or less - no adjustment;
  - b) Cost greater than \$10,000 but not exceeding \$20,000 - payment \$10,000 plus 90% of the portion in excess of \$10,000; and
  - c) Cost greater than \$ 20,000 - \$19,000 plus 80% of the portion in excess of \$20,000.
- .02 The Owner shall pay the Contractor for the Working Time of Rented Equipment used on the Work on a Time and Material Basis at 110% of the invoice price approved by the Contract Administrator up to a maximum of 110% of The 127 Rate. This constraint shall be waived when the Contract Administrator approves the invoice price prior to the use of the Rented Equipment.
- .03 The Owner shall pay the Contractor for the Working Time of Operated Rented Equipment used on the Work on a Time and Material Basis at 110% of the Operated Rented Equipment invoice price approved by the Contract Administrator prior to the use of the Equipment on the Work on a Time and Material Basis.

**GC 8.02.04.06.02 Standby Time**

- .01 The Owner shall pay the Contractor for Standby Time of Equipment at 35% of The 127 Rate or 35% of the invoice price whichever is appropriate. The Owner shall pay reasonable costs for Rented Equipment where this is necessarily retained in the Working Area for extended periods agreed to by the Contract Administrator. This shall include Rented Equipment intended for use on other work, but has been idled due to the circumstances giving rise to the Work on a Time and Material Basis.
- .02 In addition, the Owner shall include the Cost of Labour of operators or associated labourers who cannot be otherwise employed during the standby period or during the period of idleness caused by the circumstances giving rise to the Work on a Time and Material Basis.

- .03 The Contract Administrator may require Rented Equipment idled by the circumstances giving rise to the Work on Time and Material Basis to be returned to the lessor until the work requiring the equipment can be resumed. The Owner shall pay such costs as a result from such return.
- .04 When Equipment is transported, solely for the purpose of the Work on a Time and Material Basis, to or from the Working Area on a Time and Material basis, payment shall be made by the Owner only in respect of the transporting units. When Equipment is moved under its own power it shall be deemed to be working. The method of moving Equipment and the rates shall be subject to the approval of the Contract Administrator.

**GC 8.02.04.07 Payment for Hand Tools**

- .01 Notwithstanding any other provision of this Section, no payment shall be made to the Contractor for or in respect of Hand Tools or equipment that are tools of the trade.

**GC 8.02.04.08 Payment for Work By Subcontractors**

- .01 Where the Contractor arranges for Work on a Time and Material Basis, or a part of it, to be performed by Subcontractors on a Time and Material basis and has received approval prior to the commencement of such work, in accordance with the requirements of subsection GC 3.09, Subcontracting by the Contractor, the Owner shall pay the cost of Work on a Time and Material Basis by the Subcontractor calculated as if the Contractor had done the Work on a Time and Material Basis, plus a markup calculated on the following basis:
  - a) 20% of the first \$3,000; plus
  - b) 15% of the amount from \$3,000 to \$10,000; plus
  - c) 5% of the amount in excess of \$10,000.
- .02 No further markup shall be applied regardless of the extent to which the work is assigned or sublet to others. If work is assigned or sublet to an associate, as defined by the *Securities Act*, no markup whatsoever shall be applied.

**GC 8.02.04.09 Submission of Invoices**

- .01 At the start of the Work on a Time and Material Basis, the Contractor shall provide the applicable labour and Equipment rates not already submitted to the Contract Administrator during the course of such work.
- .02 Separate summaries shall be completed by the Contractor according to the standard form "Summary for Payment of Accounts on a Time and Material Basis." Each summary shall include the Change Directive or Change Order number and covering dates of the work and shall itemize separately the labour, Materials, and Equipment. Invoices for Materials, Rented Equipment, and other charges incurred by the Contractor on the Work on a Time and Material Basis shall be included with each summary.
- .03 Each month the Contract Administrator shall include with the monthly progress payment certificate, the costs of the Work on a Time and Material Basis incurred during the preceding month all in accordance with the contract administrative procedures and the Contractor's invoice of the Work on a Time and Material Basis.
- .04 The final "Summary for Payment of Accounts on a Time and Material Basis" shall be submitted by the Contractor within 60 Days after the completion of the Work on a Time and Material Basis.

#### **GC 8.02.04.10 Payment Other Than on a Time and Material Basis**

- .01 Clause GC 8.02.04 does not preclude the option of the Contract Administrator and the Contractor negotiating a Lump Sum Item or unit price payment for Change in the Work, Extra Work, and Additional Work.

#### **GC 8.02.04.11 Payment Inclusions**

- .01 Except where there is agreement in writing to the contrary, the compensation, as herein provided, shall be accepted by the Contractor as compensation in full for profit and all costs and expenses arising out of the work, including all cost of general supervision, administration, and management time spent on the work, and no other payment or allowance shall be made in respect of such work.

#### **GC 8.02.05 Final Acceptance Certificate**

- .01 After the acceptance of the Work, the Contract Administrator shall issue the Final Acceptance Certificate, or, where applicable, after the Warranty Period has expired. The Final Acceptance Certificate shall not be issued until all known deficiencies have been adjusted or corrected, as the case may be, and the Contractor has discharged all obligations under the Contract.

#### **GC 8.02.06 Payment of Workers**

- .01 The Contractor shall, in addition to any fringe benefits, pay the workers employed on the Work in accordance with the labour conditions set out in the Contract and at intervals of not less than twice a month.
- .02 The Contractor shall require each Subcontractor doing any part of the Work to pay the workers employed by the Subcontractor on the Work in accordance with paragraph GC 8.02.06.01.
- .03 Where any person employed by the Contractor or any Subcontractor or other person on the Work is paid less than the amount required to be paid under the Contract, the Owner may set off monies in accordance with clause GC 8.02.03.11, Owner's Set-Off.

#### **GC 8.02.07 Records**

- .01 The Contractor shall maintain and keep accurate Records relating to the Work, Changes in the Work, Extra Work, and claims arising therefrom. Such Records shall be of sufficient detail to support the total cost of the Work, Changes in the Work, and Extra Work. The Contractor shall preserve all such original Records until 12 months after the Final Acceptance Certificate is issued or until all claims have been settled, whichever is longer. The Contractor shall require that Subcontractors employed by the Contractor preserve all original Records pertaining to the Work, Changes in the Work, Extra Work, and claims arising therefrom for a similar period of time.
- .02 The Owner may inspect and audit the Contractor's Records relating to the Work, Extra Work, and Changes in the Work at any time during the period of the Contract. The Contractor shall supply certified copies of any part of its Records required, whenever requested by the Owner.

#### **GC 8.02.08 Taxes**

- .01 Where a change in Canadian Federal or Provincial taxes occurs after the date of tender closing for this Contract, and this change could not have been anticipated at the time of bidding, the Owner shall increase or decrease Contract payments to account for the exact amount of tax change involved.
- .02 Claims for compensation for additional tax cost shall be submitted by the Contractor to the Contract Administrator on forms provided by the Contract Administrator to the Contractor. Such claims for additional tax costs shall be submitted not less than 30 Days after the date of Final Acceptance.

- .03 Where the Contractor benefits from a change in Canadian Federal or Provincial taxes, the Contractor shall submit to the Contract Administrator, on forms provided by the Contract Administrator, a statement of such benefits. This statement shall be submitted not later than 30 Days after Final Acceptance.
- .04 Changes in Canadian Federal or Provincial taxes that impact upon commodities, which when left in place form part of the finished Work, or the provision of services, where such services form part of the Work and where the manufacture or supply of such commodities or the provision of such services is carried out by the Contractor or a Subcontractor, are subject to a claim or benefit as detailed above. Services in the latter context means the supply and operation of equipment, the provision of labour, and the supply of commodities that do not form part of the Work.

**GC 8.02.09 Liquidated Damages**

- .01 When liquidated damages are specified in the Contract and the Contractor fails to complete the Work in accordance with the Contract, the Contractor shall pay such amounts as are specified in the Contract Documents.

# DIVISION 6

**HOLLAND MARSH DRAINAGE SYSTEM  
JOINT MUNICIPAL SERVICES BOARD  
SUPPLEMENTAL GENERAL CONDITIONS**

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## DIVISION 6

### SUPPLEMENTAL GENERAL CONDITIONS

1. Further to GC1.04 Definitions:

1.1 For purposes of this contract, the following definitions shall be amended to read as follows:

- a) Contract Administrator means the Engineer or the Project Manager as designated by the Owner, or by the Holland Marsh Drainage System Joint Municipal Services Board, acting on behalf of the Owner, to be its representative for the purposes of the Contract, and the words "Contract Administrator" may apply to the Engineer and/or the Project Manager.
- b) Drawings or Plans: the terms plans and drawings are used interchangeably and mean any contract plans or contract drawings or any approved working plans or approved working drawings or any reproduction of plans or drawings pertaining to the work.
- c) Highway means a common and public highway and part that is intended for, or used by, the general public for the passage of vehicles and includes the area between the lateral property lines thereof, which area may be called herein the Road Allowance, and the word "Highway" is deemed to include any Highway under the jurisdiction of and/or maintained by any local, county or regional municipality. The words "highway" and "roadway" mean one and the same.
- d) Major Item means any individually bid Tender item that has an actual value, calculated on the basis of its actual or estimated tender price, equal to or greater than 50% of the total tender value, calculated on the basis of the total of all the estimated tender quantities and the tender unit prices.
- e) Owner means the Holland Marsh Drainage System Joint Municipal Services Board (the Board) that is acting on behalf of the Corporation of the Town of Bradford-West Gwillimbury and the words "Owner" or "Board" are used interchangeably and mean and the same.
- f) Working Day is to be amended to include Saturdays as working days.

1.2 The following definitions shall be added to the list of definitions in Section GC1.04:

"Document" means the combination of the Plans and Specifications.

"Engineer" means the Engineer responsible both for the Engineering Report entitled the Morris Road Drain dated April 14, 2016 and for its implementation/construction in this Contract and in accordance with the Drainage Act, RSO 1990.

"Gallon" means Imperial Gallon

"Inside" means the side closest to the Small Scheme Farms (the low prime farm lands bounded by both canals) when referring to work alongside the dykes and canals.

"Inspector" means any person that the Project Manager or Engineer may appoint for the purpose of inspection of the work and of the materials to be used in the work.

“Interval” when referenced to the portion of the work means a part of a Branch.

“Longitudinal” means a description generally, or more, parallel to the dykes and canals of the Drainage System.

“Municipal” means staff, equipment, property, materials, roads, rules, regulations, policies of the Corporate Municipalities affected, being the Town of Bradford-West Gwillimbury.

“Municipality” means the Town of Bradford West Gwillimbury.

“Outside” means the side most removed from the Small Scheme Farms, as defined above, when referring to work alongside the dykes and canals.

“Person” includes an individual, corporation, partnership and the heirs, executors, administrators, or other legal representatives of whom the context can apply according to law.

“Plans or Drawings”: the terms plans and drawings are used interchangeably and mean any contract plans or contract drawings or any approved working plans or approved working drawings or any reproduction of plans or drawings pertaining to the work.

“Statutory Holdback” means the hold back required for this contract in addition to any other holdback required by law or for deficient or uncompleted work.

“Specifications” means all written descriptions or instructions pertaining to the method and manner of performing the work, or to the quantities of the materials to be furnished under the contract, and includes the Tender, General Conditions, Ontario Provincial Standard Specifications, Supplemental General Conditions, Extent of Work notes on the Plans and Special Provisions, together with all written agreements made or to be made pertaining to the method or manner of performing the work, or to the quantities or qualities of materials to be furnished under the contract.

“Ton” means two thousand pounds.

“Tonne” means one thousand kilograms.

“Transverse” means a direction generally, or more, at right angles to the dykes and canals.

2. Further to Section GC1.0 Interpretation, a new clause GC1.09 shall be added and shall read as follows:

- 1.09 Conformity of Work with Plans & Specifications

- The Contractor shall perform all work and shall furnish all materials, plant, equipment and labour and complete the whole of the work in conformance with the plans and specifications.

3. Further to GC1.05 Substantial Performance, GC1.06 Completion and GC1.07 Final Acceptance, on this project, Certificates of Substantial Performance may be issued at the end of March each year for all the work in any Branch if the Branch is deemed complete. If done separate Completion Certificates and Final Acceptance Certificates will also be issued.

4. Further to GC2.01 Reliance on Contract Documents, for purposes of this contract, Section 2.01.01 shall be amended to read as following:

The position of pole lines, conduits, watermains, and other underground and overground utilities and structures is not necessarily shown on the Contract drawings, and, where shown, the accuracy of the position of such utilities and structures is not guaranteed.

Before starting work, the Contractor shall inform himself of the exact location of all such utilities and structures, and shall assume all liability for damage to them. Unless otherwise specified, the Contractor shall support all such utilities and structures, or temporarily remove them, and restore them to the satisfaction of the owners of the utilities and structures.

The Contractor must exercise necessary care in construction operations to safeguard existing and relocated overhead and underground utilities from damage and the Contractor will be liable for all damages to same and must pay all cost of repairs and/or replacement.

The Board will be responsible for any necessary permanent relocation of utilities but the Contractor will be responsible for any temporary relocation of utilities that may be required. The Contractor shall notify the Engineer when and where any necessary permanent relocations of utilities are required.

In the event that all necessary permanent relocations of utilities have not been completed prior to the time when the Contractor commences the work, the Contractor will be required to cooperate with the utilities companies and work around the utilities so that the existing services are protected until such time as such relocations are completed. No claims for extra payment will be allowed for this requirement.

5. Further to GC3.0 Administration of the Contract, a new clause GC3.16 Engineer's Authority shall be added to read as follows:

The Engineer may fulfill any or all of the Contract Administrator's duties and/or responsibilities on this Contract.

6. Further to GC3.02 Working Drawings, on this project the words "working drawings" shall mean "shop drawings".

7. Further to GC3.03 Right of the Contract Administrator to Modify Methods and Equipment, the following clauses are to be added to GC3.03:

.04 Where the Contract Administrator determines that any methods undertaken or proposed to be undertaken by the Contractor are unacceptable from an environmental, stability, traffic, safety or drainage concern, the Contract Administrator may require the Contractor to modify his methods.

.05 No payment will be made for work that has been determined to be done following unacceptable methods, after the Contract Administrator has indicated that such are unacceptable.

.06 The Contract Administrator may also require the correction of any work constructed by unacceptable methods.

.07 Where such requirement is made after notice has been given that such is unacceptable, there will be no payment for such correction. If such should occur prior to notice being given, consideration will be given to payment as negotiated.

.08 The Contract Administrator may retain others to correct such unacceptable work at the full cost of the Contractor and/or may provide deadlines by which time any unacceptable work is to be attended to with the efficiency necessary.

8. Further to GC3.04 Emergency Situations, reference should also be made to Special Provisions **58.5**.

9. Further to GC3.06, Extension of Contract Times. If any extension of contract time is granted, the following shall apply:
- a) Such extensions shall be for such time as the Contractor Administrator may prescribe, and the Contract Administrator shall fix the terms on which the said extension may be granted.
  - b) The date of expiry of all bonds or other surety furnished to the Board by the Contractor shall be extended at the expense of the Contractor, to at least two (2) months beyond the extended date of completion, and the Contractor shall furnish the Board with evidence of such extension of the bond or other surety.
  - c) Any extension of time that may be granted to the Contractor shall be so granted and accepted without prejudice to any rights of the Board whatsoever under this contract, and all such right shall continue in full force and effect after the time limit in this contract for the completion of the work whenever in this contract power or authority is given to the Board or to the Contract Administrator or any person to take any action consequent upon the act, default, neglect, delay, breach, non-observance or non-performance by the Contractor, in respect of the work or contract, or any portion thereof, such powers or authorities may be exercised from time to time, and not only in the event of the happening of such contingencies before the time limited in this contract for the completion of the work but also in the event of the same happening after the time so limited in the case of the Contractor being permitted to proceed with the execution of the work under an extension of time granted by the Board. In the event of the Board granting an extension of time, time shall continue to be deemed of the essence of this contract.
10. Further to GC3.06, Extension of Contract Times, and GC3.07, Delays, and further to GC8.02.09 Liquidated Damages, the following is added as Section GC 3.16 Failure to Complete Work on Time:
- a) It is agreed by the parties to the contract that in case all the work called for under the contract is not finished or completed by the stipulated time as set forth in Special Provision 2.1, damage will be sustained by the Board, and that it is and will be impractical and extremely difficult to ascertain and determine the actual damage which the Board will sustain in the event of and by any reason of such delay and the parties hereto agree that the Contractor will pay the Board the Liquidated Damages as specified in the Special Provisions for each and every calendar day's delay in finishing the work in excess of the completion date prescribed and it is agreed that this amount is an estimate of the actual damage to the Board which will accrue during the period beyond the prescribed completion date.
  - b) The Board may deduct any amount due as Liquidated Damages from any monies that may be due or payable to the Contractor on any account whatsoever. The Liquidated Damages payable under this paragraph are in addition to and without prejudice to any other remedy, action or other alternative that may be available to the Board.
  - c) The Contractor shall not be assessed with Liquidated Damages for any delay caused by Acts of God, or of the Public Enemy, Acts of the Province or of any Foreign State, or by fire, flood, epidemics, quarantining restrictions, embargoes or delays of sub-contractors due to such causes.
  - d) If the time available for the completion of the work should be increased or decreased because of extra, additional or changed work, the Contract Administrator may increase or decrease the expiration date by adding or subtracting therefrom, as the case may be, a number of days calculated on average daily production of the most similar work with any adjustments as necessary, provided that this basis for calculation may not be used in full or in part, where in the opinion of the Contract Administrator all or any of the relevant additional or changed work was carried out concurrently with other required work.

11. Further to GC3.09 Subcontracting by the Contractor, the following shall be deemed to be added as GC3.09.07:
- a) The Contractor shall not assign, transfer or sublet the whole or any portion of the contract, or the whole or any portion of the work to be performed under the contract, without the consent in writing of the Contract Administrator, and the Contractor shall not transfer or assign any monies which may be due or which may become payable under the contract without the consent in writing of the Contract Administrator, provided that any consent so given shall not under any circumstances relieve the Contractor of liabilities and obligations assumed by him under the contract.
  - b) Where a bidder has withdrawn his bid on the contract after the closing of tenders or, having been offered the contract by the Board has for any reason failed to enter into it, the Contractor shall not assign, transfer or sublet any part of the contract, nor shall he rent any equipment required for the contract if such assignment, transfer, subletting or rental will result in such bidder or any person, firm or Board having an interest in such bidder, directly or indirectly receiving any benefit. The Contractor shall not purchase from such bidder or from any firm or Board having an interest in such bidder, material required for the contract, without the consent of the Contract Administrator in writing.
  - c) Except as provided in this subsection, the Contractor in renting equipment for the contract shall give preference to competent, qualified and available resident dealers and operators in the general area of the contract.
12. Further to GC3.10 Changes, a new subsection GC3.10.04 shall be added:
- 3.10.04     Work Attended to But Not Required  
The Owner shall not be liable for the cost of additional, changed or extra work or materials which are supplied by the Contractor but which are not provided for in the Contract Documents, and which were not required by the written instructions of the Contract Administrator.
13. Further to GC3.11 Notices, the following sections re Notice shall be added and shall also apply:
- .05           Notice to the Contractor  
Any notice in writing to be given to the Contractor in relation to any matter arising under the contract or in respect of the work to be done hereunder may be given by delivering same to the Contractor, or to the Contractor's representative, or by mailing, e-mailing or faxing to the Contractor at such addresses as he may have specified in his tender, or in default of any such address being so specified, by sending the notice by prepaid registered mail to the last address known personally to the Contract Administrator. Any such notice shall be conclusively deemed to have been received 72 hours after sending by prepaid registered mail.
- .06           Notice to the Board / Contract Administrator  
Any notice to the Board shall be in writing and hand delivered personally to the Contract Administrator, or his representative, or may be sent by prepaid registered mail to:
- Holland Marsh Drainage System Joint Municipal Services Board  
100 Dissette Street  
P.O. Box 100  
Bradford ON L3Z 2A7
- .07           Detail in Notices to the Contractor  
In any notice to the Contractor with respect to work and repairs of any nature required to be done under the Contract (or with respect to any other matter), it shall not be

obligatory for the Project Manager or Engineer, acting as the Contract Administrator, to specify minutely and in detail everything required, nor to specify by measurement the exact extent or place where the work and repairs are to be carried out. Reference may be made in such a notice to the clauses in the Contract bearing upon the matter, the general location, and the general description of the work and repair to be done.

.08 Emergency and Maintenance Measures Contact Person

To provide for the situation where the construction site is unattended by the Contractor's superintendent, the name, address, telephone number, fax number and e-mail address of a responsible official of the contracting firm shall be given to, and kept updated with, the Project Manager and Engineer. This official shall be available at all times and have the necessary authority to mobilize workmen and machinery and to take any action directed by the Project Manager or Engineer in case emergency or maintenance measures are required regardless whether the emergency or requirement for maintenance was caused by the Contractor's negligence, Act of God, or any cause whatsoever. The onus is the Contractor to provide this data.

14. Further to GC3.12 Use and Occupancy of the Work Prior to Substantial Performance, the following shall be added:

GC3.12.04: The use of the Morris Road Drain Canals and Dykes by, or by others approved by the Board, for drainage or irrigation purposes may occur at any time and without prior notice.

15. Further to GC3.15 Archeological Finds, Special Provision 10.3 re payments for altered work, if any, involving Species at Risk or First Nations Artifacts or Burial Sites shall also apply to, and guide, the payments to be made if other archeological finds should be encountered.

16. Further to GC4.02 Approvals and Permits, the following is to be added:

GC4.02.03: The Owner shall obtain and pay for all permits required by any environmental agency or road authority if the application is related to the intended design and construction of the project.

17. Further to GC4.03 Management and Disposal of Materials, the following is to be added:

GC4.03.06: The Contractor is advised that if any excavated sediments are found (in cleanout work (Type III)), as a result of the on-going sampling to be undertaken, to be contaminated and unacceptable for leveling on adjacent lands, the Contractor will be asked to haul and dispose of such as Extra Work on a negotiated or time and materials basis.

18. Further to Section GC4.12 Use of Performance Bond, this section shall equally apply to, and if, the Contractor has provided a Letter of Credit or Certified Cheque as the contract surety in accordance with Instructions to Tenderers Section 11.

19. Further to Section GC5.02, Quality of Material, the following shall be added;

GC5.02.10: The provisions of Special Provision **57.0** re Cofferdams shall apply to any materials supplied by the Contractor for cofferdam construction.

20. Further to Section GC6.03 Insurance, please remove GC6.03.01 to GC6.03.06 and replace with the following:

6.03.01 Insurance Requirements

The Contractor shall provide, maintain, and pay for the insurance coverages specified hereunder. Unless otherwise stipulated, the duration of each insurance policy shall be from the date of commencement of the work until the date of the final certificate. Prior to commencement of the work, and upon the placement, renewal, amendment or extension of

all (or) any part of the insurance, the Contractor shall promptly provide the Board with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements.

(a) General Liability Insurance

Commercial General Liability Insurance with respect to contracting operations shall be subject to limits of not less than **\$5,000,000** inclusive for any one occurrence and shall include the following:

- property damage deductible of not more than \$5,000
- occurrence form
- occurrence property damage
- personal injury
- employees as additional insureds
- broad form equipment
- blanket contractual liability
- protective liability for all contracted/subcontracted operations
- contingent employers' liability (for employees covered by WSIB)
- employers liability (for employees not covered by WSIB)
- medical payments
- broad form property damage
- broad form completed operations
- incidental medical malpractice
- intentional acts to protect persons and property
- non-owned automobile
- deletion of exclusions related to use of explosives, pile driving or caissons, collapse of buildings, underpinning, or underground work (where the project involves such risks)
- forest and prairie protection acts liability (where the project involves such risks)
- Board, its agents, servants, employees and volunteers added as additional insureds with respect to the operations of the Contractor

All liability coverage shall be maintained for completed operations hazards from the date of Substantial Performance of the Work, as set out in the certificate of Substantial Performance of the Work, on an ongoing basis until the expiration of the Warranty Period. Where the Contractor maintains a single, blanket policy, the addition of the Board, the Engineer and the Town of Bradford-West Gwillimbury (the Town) is limited to liability arising out of the project and all operations necessary or incidental thereto. The policy shall be endorsed to provide the Board with not less than 30 days' notice in writing in advance of any cancellation, change or amendment restricting coverage.

(b) Automobile Liability Insurance

Automobile liability insurance in respect of licensed vehicles shall be subject to limits of not less than **\$2,000,000** inclusive per occurrence for bodily injury, death, and damage to property, covering all licensed vehicles owned or leased by the Contractor and endorsed to provide the Board with not less than 30 days' notice in writing, in advance, of any cancellation, change or amendment restricting coverage.

(c) Aircraft and Water Craft Liability Insurance

Aircraft and water craft liability insurance with respect to owned or non-owned aircraft and water craft if used directly or indirectly in the performance of the Contract, including the use of additional premises, shall be subject to limits of not less than **\$5,000,000** inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof and limits of not less than (than) **\$5,000,000** for aircraft passenger hazard. Such insurance shall be in a form acceptable to the Board. The policies shall be endorsed to provide the Board with not less than 30 days' notice in writing in advance of any cancellation, change or amendment restricting coverage.

(d) Property and Boiler and Machinery Insurance

"All Risks" property insurance shall be in the joint names of the Contractor, the Engineer, the Board and the Town, if any, insuring not less than the sum of the amount of the contract price and the full value of products that are specified to be provided by the Board for incorporation into the Work, with a deductible not exceeding \$2,500. The insurance provided shall not be less than that provided by the "Comprehensive Builders Risk Form" and shall be maintained continuously until ten days after the date of the final certificate.

Boiler and Machinery insurance shall be in the joint names of the Contractor, the Board, and the Town of Bradford-West Gwillimbury (the Town), if any, for not less than the amount of the "All Risks" property insurance. The insurance provided shall not be less than the insurance provided by the "Comprehensive Boiler and Machinery Form" and shall be maintained continuously until ten days after the date of the final certificate.

The policies shall allow for partial or total use or occupancy of the work. If, because of such use or occupancy, the Contractor is unable to provide coverage, the Contractor shall notify the Board in writing.

The policies shall provide that, in the case of loss or damage, payment shall be made to the Board and the Contractor as their respective interests may appear. The Contractor shall act on behalf of the Board for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the Contractor shall proceed to restore the work. Loss or damage shall not affect the rights and obligations of either party under the Contract except that the Contractor shall be entitled to such extension of contract time relative to the extent of the loss or damage as the Contract Administrator may allow.

The Contractor shall be entitled to receive from the Board, in addition to the amount due under the Contract, the amount at which the Board's interest in restoration of the work has been appraised, such amount to be paid as the restoration of the work proceeds. In addition, the Contractor shall be entitled to receive, from payments made by the insurer, the amount of the Contractor's interest in the restoration of the work.

Where the full insurable value of the work is substantially less than the contract price, the Board may reduce the amount of insurance required or waive the requirement for Property and Boiler and Machinery Insurance.

(e) Contractors' Equipment Insurance

"All Risk" contractors' equipment insurance covering construction machinery and equipment used by the Contractor for the performance of the work, including boiler insurance and temporary boilers and pressure vessels, shall be in a form acceptable to the Board and shall not allow subrogations against the Board. The policies shall be endorsed to provide the Board with not less than 30 days' notice in writing in advance of any cancellation, change or amendment restricting coverage. Subject to satisfactory proof of financial capability by the Contractor for self-insurance, the Board may agree to waive the requirement for Contractors' equipment insurance.

(f) General

Liability policies may consist of one policy or a combination of primary and excess or umbrella liability policies.

The Contractor shall be responsible for deductible amounts under the policies.

All required insurance policies shall be placed with insurers licensed to underwrite insurance in the jurisdiction of the work.

“Claims made” insurance policies will not be permitted.

All insurance policies shall provide that the Contractor’s insurance is the primary insurance.

The Board has the right to approve the form of certificate(s) of insurance.

Failure to provide and maintain insurance and proof of same in a satisfactory form to the Board prior to the commencement of the work or as may be required from time to time thereafter shall entitle the Board to terminate the Contract or obtain the required insurance and charge the Contractor the cost.

21. Further to Section GC6.04, Bonding, the Instructions to Tenderers will indicate the Surety options and amounts on this project.

22. Further to Section GC7.01, General re Contractor’s Responsibilities and Control of the Work, the following shall be added:

GC7.01.17: The Contractor shall have an authorized representative on site at all times who is capable of reading and thoroughly understanding the plans and specifications and of adequately communicating with the Contract Administrator and Engineer and who is thoroughly experienced in the type of work being performed.

23. Further to Section GC7.07, Maintaining Roads and Detours, and GC7.08 Access to Project Adjoining the Work and Interruption of Utility Service, where Special Provisions **15.0**, **32.0** and **51.0** re Traffic and Road Provisions/Measures conflicts with GC7.07, the Special Provision will apply.

24. Further to Section GC7.14, Limitation of Operations, Section 7.14.01 shall be replaced with the following:

7.14.01 Except for such work as may be required by the Contract Administrator to maintain the works in a safe and satisfactory condition in an emergency situation, the Contractor shall not carry on his operations under the contract on Sundays. The Contractor shall limit his working hours to conform with the applicable municipality's by-law and in no case will the Contractor work prior to, or after daylight hours unless approved in writing by the Contract Administrator or his representative.

The Contract Administrator may, in writing, require the Contractor to cease or limit his operations under the contract, on any day or days if the operations are of such a nature or if the work is so located or if the traffic is of such a volume that the Contract Administrator deems it necessary or expedient so to do.

Construction operations adversely affecting public traffic on and the loading or unloading of materials and construction equipment onto and from the travelled portion of the roadway shall not be carried out during the following periods:

SATURDAY - All Day - Holiday Weekends Only.

SUNDAYS

HOLIDAYS - All Statutory Canadian Holidays.

The Contract Administrator may prohibit the Contractor from carrying on operations during any hour or hours of any permitted work day in which the Contract Administrator in his judgment, deems such operations to be a disturbance or nuisance to the public. Such prohibition may be made notwithstanding any prior consent, order, agreement or requirement in the Contract that stipulates maximum or minimum hours or work.

The Contractor shall be required to give 48 hours’ notice in writing of his wish to work on Statutory Holidays and the Contract Administrator may consider this request.

Work shall take place on any working day only between 7 a.m. and 7 p.m. unless extended hours for specific dates are expressly authorized in writing by the Contract Administrator.

25. Further to Section GC7.16, Warranty, Section 7.16 is to be replaced with the following section:

7.16 Warranty

The Contractor warrants to the Board that all of the work will be in conformance with the contract documents.

The Contractor agrees to correct, at his own expense, any defects or deficiencies in the work which appear during the period **of one year** from the date of any substantial performance or such longer period as may be specified for certain products or work provided (the "**maintenance period**"). Where a date of substantial performance is not established, the maintenance period shall commence on the date of completion as indicated by the Completion Certificate.

Where the Contractor performs work or supplies materials, equipment, or machinery subsequent to the date of any substantial performance, or where the Contractor corrects deficiencies subsequent to the date of any substantial performance, then in any such case the warranty for such work, supply of materials, equipment, machinery, or correction of deficiencies shall commence and run from the date that the same was completed.

The Board shall promptly give the Contractor written notice in accordance with Section GC3.11.05 of observed defects and deficiencies. The Board may specify a time within which the corrections are to be completed in which case the Contractor shall complete the corrections within the period of time set out.

The Contractor acknowledges and agrees that he shall be responsible to correct or pay for any damage to other works resulting from any correction required under the conditions of this clause.

Neither the Contract Administrator's final certificate nor payment thereunder shall relieve the Contractor from his responsibility hereunder.

Nothing in these general conditions is intended to, or shall restrict or modify any liability of the Contractor for damages arising out of any law in force in the Province and in particular any liability for damages arising from defects or deficiencies in the work which were not apparent prior to the expiration of the maintenance period.

26. Further to Section GC8.02.03, Certification and Payment:

Clauses 8.02.03.01 to 8.02.03.09 shall be deleted and the following shall apply.

8.02.03.01 Monthly Progress Payment Certificate

An estimate in writing will be made by the Contract Administrator once a month of the amount of work done and material furnished by the Contractor and under the terms of the Contract, less prescribed Construction Lien Act holdback of ten percent (10%) and less statutory holdback of five percent (5%) and less all stipulated forfeitures and deductions.

These payments will be made on Progress Certificates, which shall be approximate estimates only and must not be taken or construed as an acceptance of the works so estimated or as an admission that the Board is in any way liable to the Contractor in respect thereof.

The first estimate will be of the amount or quantity and value of the work done since the Contractor commenced the performance of the contract, and every subsequent estimate, except the final one, will be the amount or quantity of work done since the last estimate was made. Three copies of each estimate will be delivered to the Contractor by the Contract Administrator. The Contractor shall present to the Contract Administrator three copies of the estimate certified by him to be correct in the manner prescribed by the Contract Administrator. Upon receipt of three copies of the estimate, certified as aforesaid, the Board shall pay to the Contractor on the stipulated date an amount determined in accordance with the terms of the contract.

In addition, each month the Board may hold up to 2½% of the total value of work completed to date, for restoration as defined in Special Provision 21.0. This holdback will be released as the defined restoration work is completed to the satisfaction of the Contract Administrator.

In addition, the Board shall be entitled to retain from the amounts otherwise due to the Contractor such amounts as it sees fit to retain for deficiencies in the work (the "deficiency holdback"). The Board shall retain the deficiency holdback until the deficiencies have been corrected to its satisfaction. All deficiencies must be corrected before the Board will issue a Completion Certificate.

#### 8.02.03.02 Substantial Performance Certificate

When the work to be carried out under the contract has been substantially performed as defined by the Construction Lien Act, the Contract Administrator shall certify substantial performance of the contract and the Contractor shall forthwith publish a copy of the certificate in the Daily Commercial News at his own expense and provide a copy of the publication to the Contract Administrator. The Contract Administrator will release the ten percent (10%) construction lien holdback after the expiry of forty-five (45) days following the date of such publication, assuming no construction liens have been preserved or perfected and after the Contractor has submitted the following documents:

- (i) A Statutory Declaration in a form acceptable to the Board that all liabilities incurred by him in carrying out this contract have been paid.
- (ii) A Clearance Certificate from the Workers' Compensation Board.

#### 8.02.03.03 Completion Certificate

When the work to be carried out under the contract has been completed, the Contract Administrator will issue a Completion Certificate and make final payment, after the Contractor has submitted the following documents:

- (i) A Statutory Declaration in a form acceptable to the Board that all liabilities incurred by him in carrying out this contract including amounts owing to subcontractors and material suppliers have been paid.
- (ii) A Clearance Certificate from the Workers' Compensation Board.
- (iii) A Declaration of last supply pursuant to Section 31(5) of the Construction Lien Act.
- (iv) one copy of the final payment certificate on which the Contractor has signified approval of the quantities and values contained therein.
- (v) signed releases from landowners of all private property used by the Contractor during construction of the work

- (vi) proof of insurance for the term of the guarantee period.
- (vii) proof of publication of certificate of substantial completion
- (viii) Where the project surety consists of a 100% Performance Bond as per Section 10, Division 1 of this Contract Document, the holdback will be reduced to the value shown in the following table during the warranty period.

Contract Price		Value of Maintenance Security
From \$	To \$	
Less than 0.1 M		4% of Final Contract Price
0.1 M	0.5 M	4,000 on first 0.1 M + 3% on next 0.4 M
0.5 M	1.0 M	16,000 on first 0.5 M + 2.4% on next 0.5 M
1.0 M	2.0 M	28,000 on first 1.0 M + 2.2% on next 1.0 M
2.0 M	4.0 M	50,000 on first 2.0 M + 2.0% on next 2.0 M
4.0 M	6.0 M	90,000 on first 4.0 M + 1.8% on next 2.0 M
6.0 M	10.0 M	126,000 on first 6.0 M + 1.5% on next 4.0 M
Over 10.0 M		186,000 on first 10.0 M + 1.0% of balance

- (ix) Where the project surety as per Division 1 Section 11 is a Letter of Credit or Certified Cheque, the provision of Division 1, Section 11 will be sufficient for security during the Warranty Period.

The holdbacks shall remain in effect until 12 months after the acceptance of the completed work by the Board.

**8.02.03.04 Construction Lien Holdback**

A separate construction lien holdback equal to ten percent (10%) of the value of the work performed or services supplied (the "finishing work holdback") shall apply for work performed after the date of substantial performance. This holdback will be retained by the Board for forty-five (45) days after the issue of a Completion Certificate and shall thereafter be paid to the Contractor assuming that no liens have been claimed.

**8.02.03.05 Final Certificate**

Upon application by the Contractor, at the end of the warranty/maintenance period and provided all of the provisions of the contract have been fully met, and upon receipt of a contract release releasing the Board from all further claims relative to the contract, the Contract Administrator will issue a Final Certificate signifying the acceptance of the entire work by the Contract Administrator. No certificate other than the Final Certificate shall be deemed to imply approval of any part of the works. The Contract Administrator will also issue a Final Payment Certificate which will entitle the Contractor to receive the full amount then remaining unpaid under the contract.

**8.02.03.06 Delay**

Delay by the Board in making any payment due to the Contractor following the acceptance of the entire work by the Contract Administrator for work done or material furnished under the contract and listed on the final detailed statement, shall be deemed not to be a breach of the contract by the Board but the Board shall, in respect of any such payment made more than seven months after the date of acceptance of the entire work by the Contract Administrator, pay the Contractor interest at the rate of three percent (3%) per annum for the period from the day following the expiration of the said seven month period to the date of payment.

Except as provided in this section, the Board shall not pay interest on any amount which may at any time become payable to the Contractor under this contract.

27. Further to Section GC8.02.04, Payment on a Time and Material Basis, Section 8.02.04 shall be replaced by the following:

8.02.04 Payment for Changes in Work, Extra Work or Additional Work on a Time and Material Basis

Where it is impractical to use the Schedule of Tender Prices to negotiate a price or where agreement cannot be reached on a price for approved extra, changed or additional work, payment for such work may be made on a Force Account/Time and Material basis as provided herein. The Contract Administrator will expect the Contractor to use his best efforts and cooperation to use the Schedule of Tender Prices or negotiated payment rather than Force Account/Time and Materials basis.

For the purpose of this section, "Cost of Labour" means the amount of wages, salary and payroll burden paid or incurred directly by the Contractor to or in respect of labour and by foremen actively and necessarily engaged on the extra work based on the recorded time and hourly rates of pay for such labour and supervision, but shall not include any payment or costs incurred for general supervision, administration or management time spent on the extra work or any wages, salary or payroll burden for which the Contractor is compensated by any other payment made by the Board.

"Payroll Burden" means the payments in respect to Workmen's Compensation, vacation pay, unemployment insurance, sickness and accident insurance, pension fund and such other welfare and benefit payments as from part of the Contractor's normal labour costs and shall include any cost or expense as the Contract Administrator may approve, which has been incurred by the Contractor for food, lodging or similar items.

"Cost of Material" means the cost of material purchased by the Contractor for the extra work as shown by itemized invoices and the cost of material from the Contractor's stock used on the extra work, valued at current prices.

"The 127 Rate" means the rate for a unit of equipment as listed in Ontario Provincial Standard Specifications O.P.S.S. 127 (Schedule of Rental Rates for Construction Equipment) which is current at the time the extra work is carried out or for equipment which is not so listed, the rate which has been calculated by the Board, using the same principles as used in determining the 127 rates.

"Rented Equipment" means equipment that is rented from a person, firm or the Board that is not an associate or affiliate of the lessee as defined by the Securities Act R.S.O. 1980, Chapter 466 and does not include equipment that is being paid for under a rental purchase agreement or under a lease purchase agreement.

"Working Time" means each period of time during which a unit of equipment is actively and of necessity engaged on a specific operation and the first two hours of each immediately following period during which the unit is not so engaged but during which the operation is otherwise proceeding and during which time the unit cannot practically be transferred to other work but must remain on the site in order to continue with its assigned task.

"Standby Time" means any period of time which is not considered working time and which together with the working time does not exceed 10 hours in any one working day and during which time a unit of equipment cannot practically be used on other work but must remain on the site in order to continue with its assigned task and during which time the unit is in fully operable condition.

"Work" means Extra, Changed or Additional Work approved by the Contract Administrator pursuant to Section 3.10 and paid for on a time and material basis. Such work shall be carried out by an equipment and labour force and in such a manner as the Contract Administrator may approve and, subject to such exceptions as the Contract Administrator may permit in writing, the work shall be subject to all the terms, conditions, specifications, and provisions of the contract.

Daily work records prepared by the Contract Administrator and reporting the labour and equipment employed and the material used on each extra work, shall be reconciled and signed by the Contractor's representative each day.

The Board will pay the Contractor for labour and supervision employed on each extra work project, at the rate of one hundred and fifteen percent (115%) of the cost of labour.

The Board will pay the Contractor for material used on each work project one hundred and fifteen percent (115%) of the cost material.

The Board will pay the Contractor for the working time of equipment other than rented equipment on the basis of 127 Rates.

The Board will pay the Contractor for the working time of rented equipment used on the extra work at one hundred and five percent (105%) of the 127 Rates.

The Board will pay the Contractor for the standby time of equipment other than rented equipment at one third (1/3) the 127 Rate. In addition, the Board will include in the cost of labour, the wages, salary and payroll burden of the operator or operating crew who cannot be otherwise employed during the standby period.

The Board will pay the Contractor for the standby time of rented equipment which has been idled by the circumstances giving rise to the extra work, at thirty five percent (35%) of the 127 Rate. In addition, the Board will include in the cost of labour, the wages, salary and payroll burden of the operator or operating crew who cannot be otherwise employed during the standby period or during the period of enforced idleness. Alternatively, however, the circumstances giving rise to the extra work, to be returned to the lessor until the work requiring the equipment can be resumed, in which case, the Board will pay such costs as result directly from the enforced return of the equipment.

When equipment is transported to or from the Working Area, payment will be made by the Board only in respect to the transporting units. When equipment is moved under its own power it shall be deemed to be working. The method of, and the reason for, moving the equipment and the rates shall be subject to the approval of the Contract Administrator.

Where the Contractor arranges for the extra, changed or additional work to be carried out by others, the Board will pay the Contractor one hundred and five percent (105%) of the compensation as hereinbefore provided. However, such percentage allowance over the prescribed compensation shall apply only once, regardless of the number of times the work has been assigned or sublet and no percentage allowance over the prescribed compensation will be paid to any associate or affiliate as defined by the Securities Act, R.S.O. 1980, Chapter 466 or in respect of any compensation for rented equipment.

Except where there is agreement to the contrary, the compensation as herein provided shall be accepted by the Contractor as compensation in full for all costs and expenses arising out of the extra work and no other payment or allowance will be made in respect of such work. Notwithstanding any other provision of this section, no payment shall be made to the Contractor for or in respect of hand tools or equipment that are tools of the trade.

Each month, the Contractor shall submit an invoice to the Contract Administrator covering work performed on the extra, changed or additional work during the preceding month and to the extent that the work covered by the invoices can be verified by the Contract Administrator, the invoice will be processed by the Board for payment.

The final invoice shall be submitted by the Contractor within 30 days after the completion of the extra work.

Separate invoices shall be submitted in triplicate for each extra work project. Each invoice shall include the order number and covering dates of the work and shall itemize separately, labour, materials and equipment and submitted with the invoice, shall be invoices for materials, rented equipment and other charges incurred by the Contractor on the extra work.



# DIVISION 7

## **APPENDIX A**

### **LETTERS TO LANDOWNERS TO FACILITATE WORK ON FINAL REPORT**





# K. SMART ASSOCIATES LIMITED

CONSULTING ENGINEERS AND PLANNERS

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Kitchener, ON N2R 1H8

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Fax: 519-748-6100

October 27, 2015

File No. 12-267

To: All Landowners on Walker, Buce and Townsend Avenue Who Back Onto the Morris Road Drain

RE: PROPOSED MORRIS ROAD DRAIN IMPROVEMENT

Dear Sir or Madam:

This new letter is a follow up to earlier letters and notices sent to all landowners to be directly affected by the proposed Morris Road Drain. As prepared here, it is only being sent to those landowners on Walker, Buce and Townsend whose backyards are adjacent to the Morris Road Drain channel.

The recent correspondence sent to all affected landowners on the Morris Road Drain consists of a) a notice sent in July 7<sup>th</sup>, b) the Preliminary Report sent on August 10, 2015 and c) the notice of the Open House to be held September 1<sup>st</sup> sent on August 7, 2015.

A copy of the notice sent to all landowners on July 7, 2015 is enclosed with this letter since it, in one spot, narrows down on the topic to be discussed further now.

This letter is now necessary since the Preliminary Report and its recommended work was adopted by Council on September 1, 2015 and the Engineer needs to ensure all landowners in the area have a further chance to offer comments before the Engineer makes his Final Report.

The Final Drainage Report will recommend (as did the Preliminary Report) that much of the water that presently comes south in the existing Morris Road channel be diverted into a new channel to run easterly and then southerly to a new outlet in the Holland Marsh. This new channel will start opposite of Edward Avenue and follow the perimeter of farm lands primarily owned by W. Bak to a canal outlet near what is called the Peterman Pumping Station.

The Report will recommend that flow in the existing channel be diverted north to the new diversion channel starting opposite the existing soccer fields on the Town lands. The existing channel to the south will be recommended to remain but with at least a cleanout and brushing throughout.

Where it passes to the rear of the residential lots that front on Walker Avenue, Buce Avenue and Townsend Avenue additional options were presented in the Preliminary Report. The Final Report has to provide in detail for only one option -- and thus the reason for this letter.

A number of landowners of the residential lots in the area discussed their preference with the Engineer at the Open House on September 1<sup>st</sup> but many were not in attendance. This letter is therefore being sent to see if those landowners who haven't spoken to the Engineer or Town have a preference to the work to be done different from those already spoken to or have other specific requests.

A drawing is enclosed to list all the landowners in the Buce, Townsend and Walker Avenue area. The drawing lists the landowners already spoken to and those not yet spoken to. It is primarily the landowners not yet spoken to that we are addressing this letter to but all owners can comment.

The Option that was preferred by owners that came to the meeting on September 1, 2015 would involve rebuilding the channel bank across their rear property line so that the top of bank would be at the property line. For the majority of the lots this would mean that the top of bank would be shifted between one (1) to two and a half (2.5) metres easterly. For a few lots where the lots encroach on the channel, the top of bank would be shifted a few metres to the west. To allow the work to be done throughout, trees and brush and scattered concrete blocks etc. existing along the bank would have to be removed. The new bank would be then constructed using imported clay (as used in the Holland Marsh and Horlings Drain projects), would be topsoiled and then would be seeded. This is also the Option the Engineer prefers.

To allow the work to be done, one option is where a five (5) metre± wide clay platform would temporarily be built in the channel to allow construction equipment to access and work. Then the platform would be reduced in size to give the required final slope. The materials removed would then be placed along the slope of Morris Road (the east bank of the channel). The same work could possibly also be done in the bottom and in the dry (flow temporarily diverted away at each end of a short work area) without building a working platform. One short area would be done and then another etc. Clearing would be necessary throughout on the slope of Morris Road. Clay, once placed on the Morris Road slope, would allow the Morris Road embankment to be widened by two (2) metres±. This would mean that in most cases the channel to the rear of the residential lots would be narrowed by four (4) metres±. The channel width remaining would be five and a half (5.5) metres±.

This 5.5 metre± of channel remaining would be bottom cleaned as part of the work. The three or four pipes and private drain pipes that presently outlet into the channel on the west side would be extended easterly by a couple of metres to outlet at the new bank.

The drawings and text in the Preliminary Report, as sent on August 10, 2015, talk in detail of all the work.

With respect to costs of the work, the Engineer will make what is called a Block assessment. This Block Assessment will be levied only to the roads of the Town so there will be no direct assessment to any of the urban lands.

The Final Report has to be submitted to, and be adopted by, Council. Any objections or concerns have to be resolved before it is adopted. Once it is adopted, it will be put out for tender. It is hoped that construction would start in mid 2016 and be finished in 2017.

Accordingly, this letter is being sent out primarily to allow any landowner in the area who didn't speak to the Engineer at the meeting on September 1, 2015 to advise the Engineer of any concerns they have re the proposed bank work and/or to request an on-site visit or telephone or e-mail communication with the Engineer and applicable Town staff.

Also, anyone in the area who did already speak to the Engineer can still respond further once this letter is received.

If indeed any one would like to communicate with the Engineer and/or would like to discuss the proposed bank work on-site, please send an e-mail to Kenn Smart at [ksmart@ksmart.ca](mailto:ksmart@ksmart.ca) or Ray Roscovich at [roscovich@ksmart.ca](mailto:roscovich@ksmart.ca) or Frank Jonkman at [fjonkman@townofbwg.com](mailto:fjonkman@townofbwg.com).

If an e-mail is not possible, you can telephone Kenn Smart at 519-748-199 ext 224 or Ray Roscovich at 519-748-119 ext 248 or Frank Jonkman at 905-778-4321.

If we do not hear from you by November 10th we will assume you have no questions or comments re the bank work proposed. You will eventually receive a copy of the Final Report when it is prepared and you will be notified of the meeting to consider the Report by Council before it goes to tender.

Please contact us prior to November 10th if you would like to discuss any part of the proposed work.

All of which is respectfully submitted.

A handwritten signature in cursive script, appearing to read 'K. A. Smart', written in black ink.

K. A. Smart, P. Eng.  
kp  
encl.





## K. SMART ASSOCIATES LIMITED

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July 7, 2015

File No. 12-267

To: All Landowners (Plus Some Additional) Invited to Meeting Held on June 25, 2013 at the  
Community Centre

RE: PROPOSED MORRIS ROAD DRAIN IMPROVEMENT

Dear Sir or Madam:

This is a brief report to give an update on the studies that have occurred to date with respect to the preparation of a Preliminary Report through the Drainage Act for improvements to what is/is to be called the Morris Road Drain.

The Morris Road Drain is the open channel that was originally constructed in 1930 as part of the Bradford Marsh Small Drainage Scheme Municipal Drain along the west side of Morris Road from Centre Street south to an outlet into the Holland Marsh Drainage Scheme.

An on-site meeting was conducted on June 25, 2013 in accordance with the Drainage Act. Only the owners generally within the area of the existing Morris Road channel were invited to the meeting. Since it was anticipated there could be work on tributary drains that discharge into the Morris Road channel, those owners along the tributary drains were also notified. The properties shown with roll numbers on the enclosed map are the majority of owners who were notified of the meeting. There are eleven owners on the northeast/east side of the diversion (see later paragraphs re this diversion) who were not notified of the first meeting but who are being notified now.

At the 2013 landowners meeting, it became evident that the problems with the existing Morris Road channel were multi-fold. A meeting was also conducted at the same approximate time with the various agencies that might be impacted by any work on the Morris Road channel.

The attached Appendix A gives a list of the problems/concerns that were identified at the on-site and agency meetings.

Since the time of the 2013 meetings, the engineer has conducted a survey along the Morris Road channel and along the tributary channels and has explored various options for improvement. The options for improvement of the Morris Road component extend from doing just a cleanout of the existing channel, to a widening of the channel where possible, to the installation of sheet steel retaining walls along the channel where it is narrow to provide more capacity, to the possibility of constructing storm water management on upstream municipal lands/community centre lands, to the option to divert much of the water that presently comes down the Morris Road channel into a new channel with a separate outlet into the Holland Marsh Drainage System.

The last mentioned option is the option that offers the only opportunity to create a drainage works that will give sufficient capacity that when flood waters for up to a 100 year storm event occur, the residential properties in the vicinity of the Morris Road Drain and its tributaries, including the Edward Street Branch, are protected.

This diversion option would primarily involve the construction of a new channel from the area where the drain on Edward Street joins to the existing Morris Road Drain and then easterly and then southerly across the Marsh farms to the main canal. The route would follow existing property lines and existing small drainage ditches over most of its route. In addition to the diversion work, the recommended option would also provide minor improvements to the existing channel and tributaries.

A 12m span culvert/bridge would be built below the proposed South East Arterial Road (SEAR) to allow the drainage to cross the proposed roadway route. The SEAR will join Simcoe Road and Bridge Street and will parallel/replace Morris Road on part of its route. It shows on the attached drawing.

If the diversion option is adopted, the existing Morris Road channel where it passes along the rear of the lots fronting on Buce/Townsend Avenues could be improved/partially filled in.

All owners in the Buce/Townsend area including those adjacent along Morris Road are asked for their input. Imported clay materials surfaced with topsoils could be placed to the rear of the existing lots and also adjacent to the Morris Road embankment. In this fashion, the Morris Road embankment would be stabilized and the property lost from the Buce/Townsend Ave. properties could be recovered plus some additional back yard depth could actually be created east of the property lines. If there is a preference to retain the channel close to its existing width rather than narrowing it, such will be considered. If it is narrowed, a minimum of 4m of water would remain.

Also there may be a preference to narrow it only on the Morris Road side and with just a cleanup of fallen trees and materials at the back of the lots but with perhaps some added clay to give a better slope to the channel. Some stone riprap could be added where pipes discharge.

With the diversion, the flow in the existing Morris Road Drain would be split at the south edge of the Town's park lands. All drainage from the northern portion of the watershed would go to, and out, the new diversion route. The drainage from the southern portion would continue to flow through the existing channel/route which would remain but with brushing and a cleanout. Any of the drainage on Line 6 would continue to drain to the south. The drainage that comes in from Simcoe Road along the SEAR Road and along Edward Street would all drain into the new diversion.

At the split, an earth embankment would be built in the channel between the existing Morris Road and the new SEAR. A small opening (36"± diameter culvert) to allow fish passage and to allow for water movement would be installed through the embankment. The embankment would prohibit high flow waters from going to the south.

The studies for the Morris Road Drain options have been synchronized with the ongoing design work for the SEAR, and the final recommendation for the Morris Road channel and SEAR complement each other. The SEAR will relocate some of the Morris Road Drain (on the Bak farm) south of the diversion route. In this short area, the old Morris Road channel on the west side of the new SEAR will become the outlet for the Simcoe Road Branch. The SEAR plans are shown on the drawing accompanying this handout. The SEAR project is expected to be tendered sometime in 2015/2016.

Also the work with respect to the Morris Road Drain study has been coordinated with the design work for improvements to Line 6/Walker Avenue. This project is under construction now.

The cost for the Morris Road Drain includes an allowance to resurface Morris Road after drain construction is complete.

Since design of both SEAR and Line 6 are completed, the preliminary engineering report for the Morris Road Drain can be now issued and submitted to Council. Council will send a copy of the Report to most owners receiving this notice. There then will be a meeting by Council and affected owners to consider the recommendations. The recommendations, as we say, will be based on the diversion route with just minor improvements to the balance of the Morris Road Drain. This is

called Option 6 in the Preliminary Report study. Indeed this update letter gives all owners notice of the Report that will be sent out.

Option 6 as described and recommended will allow flood waters (for up to the 100yr storm) to be controlled below the window sill or basement elevations of those low lying properties along the Morris Road and Edward Street channels. However, none of the options including Option 6 will attend to improved road drainage along individual streets such as Centre, Bingham, etc. The work in the Morris Road Drain Report will, however, provide a much improved outlet for any work that might be constructed in the future by the Town along such streets.

As noted, we have enclosed a drawing with this update. It indicates the lots and roads, the location of the existing drain, the recommended work as per Option 6, and the proposed SEAR road. The owners that are being notified are shown by legend on the plan as well.

The cost to attend to the work (to do the diversion route itself, to partially fill and/or just cleanup the channel behind the Buce/Townsend lots, to improve the balance of the Morris Road channel, to clean the Edward Street channel with pole moves, to incorporate the channel that will be constructed along the north side of the SEAR alignment which is a replacement of the existing tributary channel from Simcoe Road, to incorporate the work on Line 6 and to incorporate the Reid Branch) is estimated at \$1.85 million.

The recommendation that will be presented in the Preliminary Report is that the majority of this cost be assessed as a block assessment to the 1075 ± acres of built-up area that drains to the Morris Road channel but with the Block Assessment to be paid 100% by the roads. It will thus be an assessment to the Town.

The 214 acres of small marsh lands, however, will have separate individual assessments. These separate marsh farm assessments will be based on what cost would be involved if the Morris Road channel were improved in a fully rural area/setting similar to conditions that existed in the 1930's when the channel was first built. This cost to the small marsh lands would thus be in the magnitude of \$600 per acre. Those marsh farm properties classified as agricultural would be eligible for the one-third provincial grant.

Once the Preliminary Report has been considered by Council and direction has been given to prepare a final report, another community centre type of meeting will be convened similar to what was

undertaken in 2013. All agencies and all owners being notified now will be notified of that meeting. This meeting could be in September 2015.

The final report will require 10 months ± to complete. It is hoped that the final report will be submitted to Council in the summer of 2016. More meetings with owners will then be conducted. It is hoped that construction could commence in the fall of 2016 but with completion in 2017.

There were 4 or 5 owners who asked at the June 25, 2013 meeting that the Engineer meet with them. The Engineer will do this once, and if direction is given to prepare a final report. Perhaps this will be near the time of the September 2015 meeting.

We would welcome questions, comments/input from any owner now, or at any time prior to, or at the consideration meeting.

If you wish to respond, please submit an email to Kena Smart ([ksmart@ksmart.ca](mailto:ksmart@ksmart.ca)) and/or to Frank Jonkman ([fjonkman@townofbwg.com](mailto:fjonkman@townofbwg.com)).

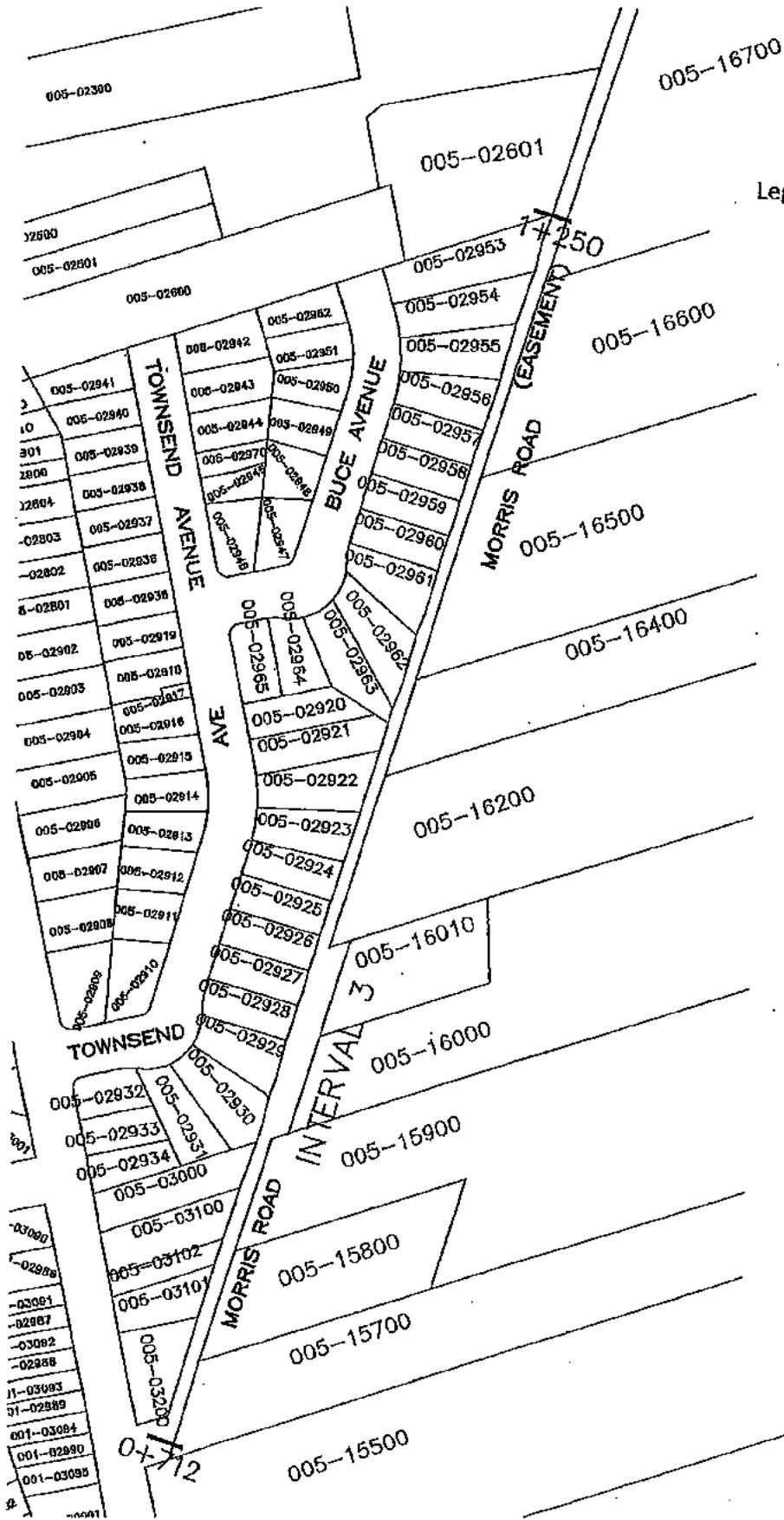
All of which is respectfully submitted.



K. A. Smart, P. Eng.

mw  
encl.





Legend of Landowners Who Back  
Onto Morris Road Channel

- landowners spoken to
- 005-02922 R. Thrush
  - 005-02923 D. Boyd
  - 005-02927 P. Connor
  - 005-02953 P. Strevez
  - 005-02954 V. Romano
  - 005-02955 R. Smith
  - 005-02956 G. Cottingham
  - 005-02957 D. Glenney
  - 005-02958 F. Baxter
  - 005-02959 M. Cowell
  - 005-02960 L. Tanaka
  - 005-02961 R. Raymond
  - 005-02962 M. Vey
  - 005-02963 C. Hickey
  - 005-03102 J. Medeiros

- landowners not spoken to
- 005-02921 A. Hinds
  - 005-02924 A. McCarney
  - 005-02925 J. Gonclaves
  - 005-02926 M. Lock
  - 005-02928 G. Martin
  - 005-02929 M. Holledge
  - 005-02930 G. Feraday
  - 005-03000 J. Ward
  - 005-03100 R. Harrison
  - 005-03101 J. Terry
  - 005-03200 L. Torres





## **K. SMART ASSOCIATES LIMITED**

CONSULTING ENGINEERS AND PLANNERS

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**Tel: 519-748-1199  
Fax: 519-748-6100**

October 27, 2015

File No. 12-267

To: Landowners on the East Side of Morris Road and South of SEAR

**RE: PROPOSED MORRIS ROAD DRAIN IMPROVEMENT**

Dear Sir or Madam:

This new letter is a follow up to earlier letters and notices sent to all landowners to be directly affected by the proposed Morris Road Drain. As prepared here, it is only being sent to those owners inside the marsh who are adjacent to the existing Morris Road channel south of the new SEAR. Many will also be adjacent to the new diversion channel. The purpose is to primarily advise of intended recommendations in the Final Report re irrigation and to request feedback in that regard. Also, other items pertaining to marsh farms are set out.

The recent correspondence sent to all affected owners on the Morris Road Drain consists of a) a notice sent in July 7<sup>th</sup>, b) the Preliminary Report data and c) notice of an Open House to be held September 1<sup>st</sup>.

A copy of the notice sent to all landowners on July 7, 2015 is enclosed with this letter since it discusses much of the overall work to be done.

This letter is now necessary since the Preliminary Report and its recommended work was adopted by Council on September 1, 2015 and the Engineer needs to ensure all landowners in the area have a further chance to offer comments re irrigation before the Engineer makes his Final Report.

A drawing is enclosed to list all the landowners inside the marsh on the east side of Morris Road south of the SEAR. The drawing lists the landowners in the area already spoken to and those not yet spoken to.

The Final Drainage Report will recommend (as did the Preliminary Report) that much of the water that presently comes south in the existing Morris Road channel be diverted into a new channel to run easterly and then southerly to a new outlet in the Holland Marsh. This new channel will start opposite of Edward Avenue and follow the perimeter of farm lands primarily owned by W. Bak to a canal outlet near what is called the Peterman Pumping Station. The drawings and text in the Preliminary Report, as sent on August 10, 2015, talk in detail of all the diversion channel work.

With respect to the impact of the proposed drainage work on the farms east of Morris Road the biggest improvement for many of the properties between Line 6 road allowance and the new SEAR route is that a new and large channel that is available for irrigation is provided at the rear of the properties. The project work will include one irrigation sleeve per property into this new canal. (There will also be one sleeve for each marsh farm on the east side of the new diversion channel.) The existing small ditches along the rear of the properties will remain and the sleeves will be through the berm to be created between these small ditches and the new channel.

The new sleeve will be like those installed as part of the Holland Marsh project where an 8" pipe is drilled across Morris Road. A Bauer fitting is provided on the canal side that can be used to cap the sleeve off when not being used for irrigation to prevent backflow flooding. Also an 8" ANSI flange will be provided on the farm side that can be used by the landowner to connect existing irrigation piping.

There will be no charge to the landowners for these new irrigation sleeves going into the new channel.

Any owner on the east side of Morris Road that presently irrigates from the existing Morris Road channel will also be allowed to continue to use the Morris Road channel for irrigation but a new sleeve (as described above) will have to be installed here too but here at the cost of the owner.

It is estimated that the out of pocket cost to those farmers who have the Farm Tax Class tax rate and who want a sleeve put through Morris Road into the existing channel will be approximately \$4,000±.

We thus want to know how many landowners will want to irrigate from the Morris Road channel even though, for some, they can irrigate from the rear.

As far as other project impacts on Morris Road landowners, and although not a drainage improvement, the properties on the east side of Morris Road will have a slightly safer roadway since the platform will be widened. There is no plan to widen the travelled asphalt surface, but paving will occur when the drainage project is completed.

Many of the landowners on the east side of Morris Road who attended the September 1, 2015 meeting a) requested than an access at least for pedestrians to and from Morris Road should remain always at Walker Avenue, b) preferred the long term vehicle connection of Morris Road to the new SEAR at the north end, c) stated that a second access for emergency vehicle equipment should be considered and be similar to the present type of crossing at Walker Avenue, and d) requested grading and calcium maintenance on Morris Road until paving occurs. These items are being/will be discussed with Town staff. A few landowners requested ability to irrigate from both front and rear of their farms but not all names were recorded. This is discussed herein.

The Final Report is being prepared by the Engineer in order to be submitted to, and be adopted by, Council. Any objections or concerns have to be resolved before it is adopted. Once it is adopted, it will be put out for tender. It is hoped that construction would start in mid 2016 and be finished in 2017.

To summarize, this letter is being sent out to the landowners on the east side of Morris Road to determine primarily which landowners would like to be able to irrigate from the Morris Road channel. Specifically the Engineer wants to know which landowners wish to be able to irrigate from the existing channel so the new sleeve can be included.

One new irrigation sleeve will be provided for each farm that abuts the new diversion channel unless the landowner advises such is not necessary. The Engineer therefore also wishes to know if any landowner adjacent to the new channel does not intend to irrigate from the new channel.

If indeed any one would like to communicate with the Engineer and/or would like to discuss the proposed work on-site, please send an e-mail to Kenn Smart at [ksmart@ksmart.ca](mailto:ksmart@ksmart.ca) or Ray Roscovich at [roscovich@ksmart.ca](mailto:roscovich@ksmart.ca) or Frank Jonkman at [fjonkman@townofbwg.com](mailto:fjonkman@townofbwg.com).

If an e-mail is not possible, you can telephone Kenn Smart at 519-748-199 ext 224 or Ray Roscovich at 519-748-119 ext 248 or Frank Jonkman at 905-778-4321.

If we do not hear from you by November 10th we will assume you have no questions or comments. You will eventually receive a copy of the Final Report when it is prepared and you will be notified of the meeting to consider the Report by Council before it goes to tender.

Please contact us prior to November 10th if you would like to discuss any part of the proposed work.

All of which is respectfully submitted.

A handwritten signature in cursive script, appearing to read 'K. A. Smart', written in black ink.

K. A. Smart, P. Eng.

kp

encl.





## **K. SMART ASSOCIATES LIMITED**

CONSULTING ENGINEERS AND PLANNERS

85 McIntyre Drive  
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Fax: (519) 748-6100  
E-mail: [ksmart@ksmart.ca](mailto:ksmart@ksmart.ca)

July 7, 2015

File No. 12-267

To: All Landowners (Plus Some Additional) Invited to Meeting Held on June 25, 2013 at the Community Centre

**RE: PROPOSED MORRIS ROAD DRAIN IMPROVEMENT**

Dear Sir or Madam:

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The Morris Road Drain is the open channel that was originally constructed in 1930 as part of the Bradford Marsh Small Drainage Scheme Municipal Drain along the west side of Morris Road from Centre Street south to an outlet into the Holland Marsh Drainage Scheme.

An on-site meeting was conducted on June 25, 2013 in accordance with the Drainage Act. Only the owners generally within the area of the existing Morris Road channel were invited to the meeting. Since it was anticipated there could be work on tributary drains that discharge into the Morris Road channel, those owners along the tributary drains were also notified. The properties shown with roll numbers on the enclosed map are the majority of owners who were notified of the meeting. There are eleven owners on the northeast/east side of the diversion (see later paragraphs re this diversion) who were not notified of the first meeting but who are being notified now.

At the 2013 landowners meeting, it became evident that the problems with the existing Morris Road channel were multi-fold. A meeting was also conducted at the same approximate time with the various agencies that might be impacted by any work on the Morris Road channel.

The attached Appendix A gives a list of the problems/concerns that were identified at the on-site and agency meetings.

Since the time of the 2013 meetings, the engineer has conducted a survey along the Morris Road channel and along the tributary channels and has explored various options for improvement. The options for improvement of the Morris Road component extend from doing just a cleanout of the existing channel, to a widening of the channel where possible, to the installation of sheet steel retaining walls along the channel where it is narrow to provide more capacity, to the possibility of constructing storm water management on upstream municipal lands/community centre lands, to the option to divert much of the water that presently comes down the Morris Road channel into a new channel with a separate outlet into the Holland Marsh Drainage System.

The last mentioned option is the option that offers the only opportunity to create a drainage works that will give sufficient capacity that when flood waters for up to a 100 year storm event occur, the residential properties in the vicinity of the Morris Road Drain and its tributaries, including the Edward Street Branch, are protected.

This diversion option would primarily involve the construction of a new channel from the area where the drain on Edward Street joins to the existing Morris Road Drain and then easterly and then southerly across the Marsh farms to the main canal. The route would follow existing property lines and existing small drainage ditches over most of its route. In addition to the diversion work, the recommended option would also provide minor improvements to the existing channel and tributaries.

A 12m span culvert/bridge would be built below the proposed South East Arterial Road (SEAR) to allow the drainage to cross the proposed roadway route. The SEAR will join Simcoe Road and Bridge Street and will parallel/replace Morris Road on part of its route. It shows on the attached drawing.

If the diversion option is adopted, the existing Morris Road channel where it passes along the rear of the lots fronting on Buce/Townsend Avenues could be improved/partially filled in.

All owners in the Buce/Townsend area including those adjacent along Morris Road are asked for their input. Imported clay materials surfaced with topsoils could be placed to the rear of the existing lots and also adjacent to the Morris Road embankment. In this fashion, the Morris Road embankment would be stabilized and the property lost from the Buce/Townsend Ave. properties could be recovered plus some additional back yard depth could actually be created east of the property lines. If there is a preference to retain the channel close to its existing width rather than narrowing it, such will be considered. If it is narrowed, a minimum of 4m of water would remain.

Also there may be a preference to narrow it only on the Morris Road side and with just a cleanup of fallen trees and materials at the back of the lots but with perhaps some added clay to give a better slope to the channel. Some stone riprap could be added where pipes discharge.

With the diversion, the flow in the existing Morris Road Drain would be split at the south edge of the Town's park lands. All drainage from the northern portion of the watershed would go to, and out, the new diversion route. The drainage from the southern portion would continue to flow through the existing channel/route which would remain but with brushing and a cleanout. Any of the drainage on Line 6 would continue to drain to the south. The drainage that comes in from Simcoe Road along the SEAR Road and along Edward Street would all drain into the new diversion.

At the split, an earth embankment would be built in the channel between the existing Morris Road and the new SEAR. A small opening (36"± diameter culvert) to allow fish passage and to allow for water movement would be installed through the embankment. The embankment would prohibit high flow waters from going to the south.

The studies for the Morris Road Drain options have been synchronized with the ongoing design work for the SEAR, and the final recommendation for the Morris Road channel and SEAR complement each other. The SEAR will relocate some of the Morris Road Drain (on the Bak farm) south of the diversion route. In this short area, the old Morris Road channel on the west side of the new SEAR will become the outlet for the Simcoe Road Branch. The SEAR plans are shown on the drawing accompanying this handout. The SEAR project is expected to be tendered sometime in 2015/2016.

Also the work with respect to the Morris Road Drain study has been coordinated with the design work for improvements to Line 6/Walker Avenue. This project is under construction now.

The cost for the Morris Road Drain includes an allowance to resurface Morris Road after drain construction is complete.

Since design of both SEAR and Line 6 are completed, the preliminary engineering report for the Morris Road Drain can be now issued and submitted to Council. Council will send a copy of the Report to most owners receiving this notice. There then will be a meeting by Council and affected owners to consider the recommendations. The recommendations, as we say, will be based on the diversion route with just minor improvements to the balance of the Morris Road Drain. This is

called Option 6 in the Preliminary Report study. Indeed this update letter gives all owners notice of the Report that will be sent out.

Option 6 as described and recommended will allow flood waters (for up to the 100yr storm) to be controlled below the window sill or basement elevations of those low lying properties along the Morris Road and Edward Street channels. However, none of the options including Option 6 will attend to improved road drainage along individual streets such as Centre, Bingham, etc. The work in the Morris Road Drain Report will, however, provide a much improved outlet for any work that might be constructed in the future by the Town along such streets.

As noted, we have enclosed a drawing with this update. It indicates the lots and roads, the location of the existing drain, the recommended work as per Option 6, and the proposed SEAR road. The owners that are being notified are shown by legend on the plan as well.

The cost to attend to the work (to do the diversion route itself, to partially fill and/or just cleanup the channel behind the Buice/Townsend lots, to improve the balance of the Morris Road channel, to clean the Edward Street channel with pole moves, to incorporate the channel that will be constructed along the north side of the SEAR alignment which is a replacement of the existing tributary channel from Simcoe Road, to incorporate the work on Line 6 and to incorporate the Reid Branch) is estimated at \$1.85 million.

The recommendation that will be presented in the Preliminary Report is that the majority of this cost be assessed as a block assessment to the 1075 ± acres of built-up area that drains to the Morris Road channel but with the Block Assessment to be paid 100% by the roads. It will thus be an assessment to the Town.

The 214 acres of small marsh lands, however, will have separate individual assessments. These separate marsh farm assessments will be based on what cost would be involved if the Morris Road channel were improved in a fully rural area/setting similar to conditions that existed in the 1930's when the channel was first built. This cost to the small marsh lands would thus be in the magnitude of \$600 per acre. Those marsh farm properties classified as agricultural would be eligible for the one-third provincial grant.

Once the Preliminary Report has been considered by Council and direction has been given to prepare a final report, another community centre type of meeting will be convened similar to what was

undertaken in 2013. All agencies and all owners being notified now will be notified of that meeting. This meeting could be in September 2015.

The final report will require 10 months ± to complete. It is hoped that the final report will be submitted to Council in the summer of 2016. More meetings with owners will then be conducted. It is hoped that construction could commence in the fall of 2016 but with completion in 2017.

There were 4 or 5 owners who asked at the June 25, 2013 meeting that the Engineer meet with them. The Engineer will do this once, and if, direction is given to prepare a final report. Perhaps this will be near the time of the September 2015 meeting.

We would welcome questions, comments/input from any owner now, or at any time prior to, or at the consideration meeting.

If you wish to respond, please submit an email to Kenn Smart ([ksmart@ksmart.ca](mailto:ksmart@ksmart.ca)) and/or to Frank Jonkman ([fjonkman@townofbwg.com](mailto:fjonkman@townofbwg.com)).

All of which is respectfully submitted.



K. A. Smart, P. Eng.

mw  
encl.







**APPENDIX B**

**SIGN-IN SHEET**

**FEBRUARY 17, 2016 MEETING**





## PUBLIC MEETING FOR THE MORRIS ROAD DRAIN PRELIMINARY REPORT

### ATTENDANCE RECORD

**DATE:** 17 February 2016

**TIME:** 2:30 p.m.

**LOCATION:** 2<sup>nd</sup> Floor, Bradford & District Memorial C.C., 125 Simcoe Rd.

**PURPOSE:** Morris Road Drain

Name	Contact Info (address/phone/email)
ANDY M'CARNEY	SIMCOE RD. AVE. - 905-717-0623 ANDY.M'CARNEY@SIMCOE.CA
STAN RAK	270 WALKER AVE.
P. STASINAKI	407 MORRIS RD.
<del>W. B. ...</del>	55 TOWNSEND
<del>DR ...</del>	361 MORRIS RD.
ANGELA SCOTT (FOX)	271 MORRIS RD.
SHARON SMITH	32 BUCE AVE
PAUL STREVER	38 BUCE AVE
BABAK KAMALI	201 MORRIS Rd.
CHRISTINE COTTINGHAM	30 BUCE AVE. gcottingham@rogers.com
Raymond Rectel	16 BUCE AVE reitel@kolma.it.com
Tie Gong Ye	251 MORRIS RD. E
Trebbie Gibson	31 Townsend Avenue.
S. MARTIN	31 Townsend Ave
GARY COTTINGHAM	30 BUCE AVE
Don + Stella Wadsworth	291 Morris Rd

## **APPENDIX C**

# **HIGHLIGHTS OF THE PRELIMINARY REPORT**





# K. SMART ASSOCIATES LIMITED

CONSULTING ENGINEERS AND PLANNERS

85 McIntyre Drive  
Kitchener ON N2R 1H6

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Original Prel. Report date: July 24, 2015

File No. 12-267

## APPENDIX C

### HIGHLIGHTS OF THE PRELIMINARY REPORT

#### MORRIS ROAD DRAIN BRADFORD WEST GWILLIMBURY

#### CONCLUSIONS/SUMMARIES OF PROJECT SCOPING AND ON-SITE MEETINGS

Appendices D and E include the minutes of these two meetings

The conclusions, comments/questions of the project scoping and on-site meeting were to the effect that:

- The channel work where it is along the rear yards of the properties along Buce/Townsend Ave. has to be addressed to reduce flooding and future property loss.
- Past property loss also has to be addressed.
- The stability of the Morris Road embankment needs to be addressed.
- The subdivisions proposed along Line 6 have to be considered.
- The proposed subdivision on the east side of Simcoe Street is imminent while the subdivision proposed to the west is not as far advanced.
- The total watershed should be recognized.
- Road drainage on Bingham Street and Back Street should be reviewed.
- The past flooding of two properties on Bingham Street should be considered.
- Loss of land near the top end of the channel at Centre Street is to be considered.
- Can storm water management allow pipe drains to replace open drains?
- What is the Town's liability in allowing the past developments along Buce and Townsend Streets?
- The project should consider that road and drainage improvements are being proposed along Line 6.
- The proposed South East Arterial Road (SEAR) route has to be considered by the drainage proposed.
- There is no likelihood that Line 6 will be ever connected to Morris Road.
- The Morris Road embankment will not likely be able to support any substantial construction equipment on it.
- The culvert in the channel at the Walker Avenue intersection should be removed but it may be needed temporarily during the SEAR work.
- The culverts in the Edward Street Branch where it joins Morris Road Branch may be restricting flow.
- Standing water in the Reid Branch is an issue.
- Hydro poles in the Edward Street Branch are an issue.
- The existing and future storm water management (SWM) facilities should be reviewed for incorporation at the request of the Town.
- Capacity in some of the tributary branches may be an issue.
- Back up from Lake Simcoe should be considered.
- The fisheries impact overall is not expected to be significant.



- On-site cells may be a means of disposal of excavation
- MNR concerns would be similar to those on the main canal project (i.e. Species at Risk, etc.)
- MOE issues would be to ensure disposal of excavation meets Ministry guidelines if off-site disposal occurred, to provide, if possible, some means of containing fuel spills if such occurred, to ensure permits to take water were acquired if dewatering during construction were proposed, to determine if the work is subject to the Ontario Water Resources Act, to reconsider if existing storm water management facilities should be incorporated as part of the project, to encourage sediment/pooling areas along the channel, to encourage containment options using dams and pumping stations provided fish passage were considered.
- OMAFRA concerns included what could be done for the Marsh farmers if the project did not proceed, and what, if any, development may occur on the Marsh lands.
- LSRCA concerns included that any work on the Branch drains may require approval but maintenance only on the main channel may not require such, that the work provide for fisheries habitat enhancement, that any existing wetlands be identified and addressed, that any dams at the outlets would require provisions for fish passage, that no net loss of fish habitat should occur, that clear span crossings vs. pipe culverts be used, that sediment and erosion control be addressed, that a constructed wetland would be very desirable.
- With respect to utilities, most agencies will supply data re existing locations once proposals for work become better known, there is no imminent utility work in the area of the proposed drainage being considered, overhead lines on Morris Road likely could not be altered but poles in the Edward Street Branch channel will be reviewed, and that utilities require as much lead time as possible if there will be any impacts.

## OVERALL SUMMARIES OF COMPONENTS

### A) *Morris Road Branch Component*

This channel when initially constructed is believed to have served as an outlet for approximately 40 ha (100 acres) of urban lands and 340 ha (850 acres) of rural lands.

Today, the watershed is almost entirely urbanized and those components that are not yet urbanized are currently being studied for development. The area of the watershed made up of existing urban lands and future development is now approximately 483 ha (1194 acres). Only 39 ha (96 acres) in the watershed are not developed or not presently proposed to be developed.

The channel plus its adjacent flood plain must try not only to remove low flows but also major flows from the watershed.

Since the channel was originally constructed, approximately 550m of its overall 1860m length has had residential development occur immediately adjacent to its west bank. This residential development in some areas has developed overly close to the bank, is prohibiting access to the channel from the west plus has resulted in residential landscaping and structures being within its floodplain. Portions of this development are/could be flooded by medium to high runoff into channel.

The original earth dyke on its easterly boundary is now developed as a paved road and numerous farm properties have developed adjacent to the road. This dyke road is called Morris Road. At one time it was a through road and had a connection to Walker Avenue to the south (by means of a culvert over the canal) and to Centre Street at the north. However, in recent years the access from Walker Avenue has been closed (barricades at the culvert crossing) and Morris Road is now a dead-end road. The



road (dyke) has a small diameter water line below it and has an overhead pole line alongside it. Numerous trees exist on its westerly bank.

The canal itself is deemed to be on municipally owned lands from the Walker Avenue and Morris Road junction northerly to almost Centre Street. The balance to Centre Street of approximately 48m (160') is on an easement. From the Walker/Morris junction south to Line 6, the canal is mostly on private lands with a right-of-way. The remaining portion from Line 6 to the outlet is on private lands. The Town is a private landowner along much of this downstream length. The dyke itself is on private lands throughout except for a short portion deeded to the Town. South of Line 6 the dyke is not on a right-of-way but is within a right-of-way from Line 6 to close to Centre Street. The drawings enclosed show the property lines involved. The report, when prepared, will clarify that both the canal and dyke have right-of-ways as provided for by the Drainage Act, if not already on municipal owned lands.

Scattered trees also exist along both banks throughout.

The canal has not had any improvements since its original construction in 1930 other than scattered bottom cleanouts. A 200m± length of the canal (adjacent to the Community Centre lands) was cleaned in 2012 by the contractor undertaking the Holland Marsh Drainage System Canal Improvement Project. Access was obtained by clearing a route along the south and west sides of the canal leading up from the Holland Marsh North Canal project area to Zima Parkway/Morris Road.

The residential development referred to along Buce and Townsend Avenue that has occurred immediately adjacent to the canal in the interval extending from approximately 700m to 1250m upstream from its outlet has resulted in:

- The construction of 1 house foundation within 4 to 5m of the top of bank;
- Two low foundations only 0.7 to 0.9m higher than the normal water level of the canal;
- The construction of sheds along the bank of the canal;
- The existence of newer trees, other landscaping and material features in the backyards of the properties butting up against the canal;
- The channels west top of bank encroaching 0.5 to 2.5m on many lots over this length; and
- Same lots encroaching on the channel by 2 to 3m in this length

In the area of the residential development, approximately 4 storm drains discharge into the canal. These storm drains vary from 100 to 400mm in diameter.

Scattered trees also exist along the banks both to the north and south of the residential area.

The Edward Street Branch which discharges to the channel near its top end serves as the outlet for an 1800mm (72") diameter storm drain from Simcoe Road and a 600mm (24") diameter storm drain coming down Bingham Street. Its watershed is 102ha.

At the top end, at Centre Street, one further 900mm diameter storm drain discharges into the channel.

The Simcoe Road Branch is an open channel that serves as an outlet for a 1050mm diameter storm drain. Its watershed is 30 ha.

The Line 6 Branch serves as the outlet for a 1.1 ha (2.7 ac) storm water management facility plus as an outlet for the Reid Branch. The discharge from the storm water management facility is by means



of 1200mm concrete pipe and equivalent arch pipe. The total watershed served by the Line 6 Branch is 250 ha.

The Town is proposing to reconstruct much of Line 6 roadway and Walker Ave to the north.

The Reid Branch empties into the Line 6 Branch by means of a 950 x 1450mm arch culvert across Line 6.

The outlet for the Morris Road Channel is the North Canal of the Holland Marsh Drainage System (HMDS). This canal has been improved as part of the 2009 report on the HMDSCIP. The report provides for a new bottom elevation of 216.1 for the north canal. This is approximately 1.8m deeper than the existing elevation of the Morris Road canal. All HMDSCIP canal excavation is now completed.

The HMDSCIP has been designed for the 100-Year rainfall event.

In 2012, a significant localized heavy rainfall event occurred that caused waters to enter into the garages and basements of two properties along Bingham Street immediately north of the Edward Street Branch. The full cause of the flooding of the basements has not been determined since the extent of discharge along Bingham Street or in the Edward Street Branch were not known. As well, the water levels in the outlet Morris Road channel were not known. It is believed that the flooded basements are at the same elevation as the garage floors at the ends of the driveways which are depressed/lower than Bingham Street. Two catchbasins exist in front of the garage floor entrances and these catchbasins have discharge pipes into the Edward Street Branch. Survey data indicated that the catchbasin/floor elevations are approximately 1.0m above the normal water levels in the Edward Street Branch but would be below high water levels associated with medium to high runoff events in the existing main component and in the Edward Street Branch itself.

The Town of Bradford West Gwillimbury is currently developing a road construction project known as the “South East Arterial Road” (SEAR). This road improvement is shown on drawings enclosed and will involve new road construction to join Simcoe Road to Bridge Street. The route of the new road work will cross over the Morris Road channel approximately in the area of the Edward Street Branch outlet.

The route of the roadway will follow the existing Morris Road location north of the Simcoe Road Branch for approximately 200m before angling northeast to meet Bridge Street.

The new Arterial will require a culvert/bridge at the Morris Road channel either in its existing location or where it may exist after any diversion or at both locations. As well, the Southeast Arterial will intercept the Simcoe Road Branch and will require realignment of this branch so flow stays to the north of the new road. As a result, a new junction will be created for this Simcoe Road Branch and the Morris Road channel. It will be necessary to ensure that if the split marsh/diversion scheme is adopted, and in addition to the crossing of the arterial road for the new channel route, that a further crossing is constructed to bring the Morris Road channel waters from the existing residential development north and across the Arterial Road to the route of the diversion or that the channel affected be realigned to be on the east side of the new Arterial Road. The latter is the work proposed by the SEAR project. This realignment and culvert work would also have to ensure, in the interim, all flow is to the south if the SEAR project proceeds ahead of this drainage project.



If this drain project proceeds ahead of the SEAR, the realigned channel work plus the diversion route and necessary berm work would blend to the existing channel temporarily. The 12m culvert work and a temporary rerouting of Morris Road over this culvert would be necessary.

If the SEAR proceeds and any option other than Option 6 is implemented for the drain, the 12m culvert should desirably be shifted 150m± southerly.

This Morris Road Branch channel requires significant work and various options are proposed to address the needs and the constraints.

**B) Overview of Back Street Branch**

This is a 30m± long channel in line with the south edge of Back Street that outlets drainage from the curb & gutters of the road. The channel appears stable.

The channel is V shaped with a 5m top width at its lower end. It is 1m± deep at its outlet and tapers up to the road elevation.

A 450mm (18"±) storm pipe was found in the Morris Road Branch in line with the Back Street centreline but no evidence exists that it serves a piped storm drainage system along Back Street.

This short channel probably doesn't require incorporation. However there may be a need for a future storm drain along Back Street by the Town and the channel if improved could serve as the outlet. Alternatively, any new storm drain could be carried to the main channel.

**C) Edward Street Branch**

The Edward Street Branch is a 210m long channel that serves as the outlet for an 1800mm (72") diameter storm drain. Its watershed is approximately 102 ha (250 ac) of almost fully developed urban development. There is no known storm water management in the watershed.

Edward Street itself is not in a road allowance but is a roadway on municipal property.

The 1800mm (72") pipe appears to have capacity for the 100-Year event and the channel should have minor improvements to offer similar capacity.

The ditch is 1m deep from Bingham St. to its outlet and increases in depth to 1.5m and then to 2m as it proceeds west to the storm sewer outlet. However canal water sits in it to a 0.5m depth at outlet.

The ditch grade is 0.4% east of Bingham and 1% west to the 1800mm pipe.

The ditch bottom is 2.5m wide over the lower 50m of length, 2.0m wide over the mid 120m and is 1.2m wide over the top 20m (balance of the lengths are transition sections). Side slopes are 1:1 to 1.5:1.

Three 1450 x 950mm arch pipes that exist side by side in the channel at its outlet are 50% submerged most of the time.

A hydro line exists along channel and has 2 poles at the south bank top and one in the channel. These poles should be moved away from the channel. The one transformer pole at the outlet could remain if necessary but desirably should also be relocated.

The proposed South East Arterial Road work will have no direct impact on this channel.



The Bingham Street properties that have had past flooding problems are located just north of this channel and a design goal is to provide that the expected 100-Year flood level in the main channel and in the Edward Street Branch is below the elevation of the floor levels for the buildings on these lots.

**D) Simcoe Road Branch**

This is an open channel that commences just east of Simcoe Road along the south limits of the Town's Community Centre lands. It runs east to the Morris Road Branch over a length of 290m. It serves as the outlet for a 1050mm (42") diameter storm drain. The storm drain's watershed is approximately 30 ha (75 ac) of urban development upstream of Simcoe Road. There is no storm water management in this watershed.

The route along the south side of the community centre parcel is immediately north of possible future subdivision lands/South East Arterial route.

The South East Arterial will cut through the channel approximately 80m west of its outlet into Morris Road Branch.

As indicated previously herein, the downstream 80m portion of this channel as a minimum will be required to be intercepted and re-routed to accommodate the road work.

Original design drawings for the channel showed it to be a trapezoidal channel with a 0.6m bottom, a depth of 1.8 to 2.5m, 1.5:1 side slopes and grade of 0.2%.

The channel has close to these geometrics in much of its length but is almost filled in over a 100m length midway in its length.

It has brush and trees fully along it.

This Report recognizes that the SEAR project will relocate and improve this channel throughout to be adjacent to the SEAR road and with the development of environmental enhancement features within it.

**E) Line 6 Branch**

This is a 590m long open channel that exists along the north side of Line 6 from the Morris Road channel upstream in a westerly direction to the pipe outlet serving the 1.1 ha (2.7 ac) storm water management facility. The total watershed to Line 6 is 250 ha, of which 87 ha drains to the facility.

The pond can be described to be a wet pond that provides quantity control of storm events up to and including the 100-Year storm. (Some overflow in a 100-year event may occur.) It also provides quality control.

The current Line 6 channel crosses under Walker Avenue by means of twin 900mm (36") CSP culverts before outletting 20m downstream into the Morris Road Branch channel.

At a distance of 274m± upstream of the outlet, an 1800 x 1200mm (72" x 44") arch CSP carries the channel below Parkwood Avenue.

At a distance of 35m± west of Parkwood Avenue, the Reid Drain Branch outlets from the south into the Line 6 Branch. This branch is carried across Line 6 by means of a 1450 x 950mm (60" x 36")



CSP culvert. The Reid Branch channel itself is approximately 0.4m deeper than the culvert across Line 6.

The Line 6 channel bottom width is 1.5m± near its outlet and is 1m± wide over the balance of the length.

The channel bottom gradient is 0.2% on the downstream 350m± and then 0.75% over the upper 250m±. The storm pipe gradients at its upper end are 0.5% approximately.

There is an overhead hydro line along the north bank and an underground Bell exists adjacent to the south bank.

The Line 6 culverts described above are proposed to be reconstructed by the Town as part of the Line 6-Walker Avenue Improvement Project. It is not believed that the road ditch itself will be improved.

As a result, if the channel is to provide for a 100-Year event, either an overflow route will have to be retained to the north of the channel, or additional capacity in the channel itself will have to be developed by this drainage project.

The proposed culvert work by the Town once constructed should be incorporated as part of the Line 6 Branch.

The Municipality has also requested that the Engineer investigate the incorporation of the storm water management facility and its discharge piping as part of the Line 6 Branch. At the Project Scoping Meeting, a concern was expressed by the MOE re such incorporation. A separate section in this Preliminary Report discusses this possible incorporation.

#### **F) Reid Branch**

The Reid Branch is open channel construction between existing and proposed residential lands from Line 6 up to Simcoe Road.

The Reid Branch channel was originally proposed to be constructed as a drainage works (a Municipal drain) and a draft report pursuant to the Drainage Act was prepared years ago. However, the report was not proceeded with. Regardless, the recommendations of the report appear to have been implemented when the channel construction did occur.

The main channel is 574m in length and extends downstream from Simcoe Road to Line 6. This is called the Reid Branch A. It crosses Line 6 by means of a 1450 x 950mm (60" x 36") arch pipe. At Simcoe Road, the crossing consists of a 1270 x 760mm arch pipe with both ends in poor condition and also an 1830 x 1140mm arch pipe in better condition.

Approximately 200m east of Simcoe Road, a branch channel from the west enters. This is to be called the Reid Branch B. Branch B culverts at Simcoe Road consist of a 1500 x 900mm arch pipe and a 1270 x 820mm arch pipe.

The Reid Branch serves as the outlet for approximately 122 ha of watershed. Of this approximately 50 ha is existing urban development. An additional 56 ha (138 ac) is proposed to be developed as the Bradford Capital and Bradford East Developments Residential Subdivisions. Storm water management (SWM) facilities are proposed as part of both developments to confine peak subdivision flow rates to existing condition peak flow rates. The discharge lines from the SWM facilities will outlet into the Reid Branch.



The Municipality has requested that the Engineer discuss the procedure to have these two proposed SWM facilities incorporated as part of the Drainage Works when they are constructed.

As part of the proposed subdivision work west of Simcoe Road, the two culverts on Simcoe Road on Branch A are proposed to be replaced with a 3.0m x 1.2m concrete box culvert. The hydrology and hydraulics of this subdivision however are not believed to be yet finalized.

The Reid Branches exist on parcels of land owned by the Town. The land widths are 22m± on Branch A downstream of Branch B and 14m± on the upper part of Branch A plus on Branch B.

The corridors owned by the Town provide sufficient width for maintenance.

The Reid Branch channel by itself has sufficient capacity to serve as an outlet both for existing conditions plus the developed conditions provided storm water management techniques are incorporated in any development. The channel should be deepened immediately south of Line 6 and a lower crossing of Line 6 should be installed to eliminate minor ponding. However, it is understood that utilities along Line 6 are prohibiting culverts across Line 6 to be built as low as required.

The Reid Branch should be made part of the Morris Road Drain.

The culverts across Simcoe Road on Branch A plus across Line 6 require improvements. Branch B ditch and culverts do not require work but should also be incorporated for future maintenance purposes.

### **MORRIS ROAD BRANCH OPTIONS**

The following options were developed for the Morris Road Branch. The Morris Road Branch was subdivided into five intervals/components for study.

Option 1 which is the option for no work, describes the existing conditions in each interval and describes the flows and water levels that could be experienced in each interval by the various design storm events plus lists the capacity of the channel in the interval.

The primary design storm is the 100-year rainfall event but flows and water levels associated with lesser rainfall events are also listed as per the Town's engineering standards. Most rainfall events are based on the 24-hour SCS design rainfall distribution and intensity as per Town standards. However to give consideration to climate change impacts which may result in greater rainfall intensity, other design storms and durations were evaluated for the 100 year event. It was found that either the 12 hour SCS storm or the 24-hour Chicago storm generates the greatest 100-year return period runoffs. The Chicago storm distribution has a higher peak intensity than the SCS storm distribution. In all 100 year storm calculations, the canal outlet elevation is assumed at 219.4. Should the canal elevation fluctuate by 0.1 to 0.2m, a corresponding fluctuation in Morris Road Branch elevations could be expected.

The text for each option for improvement, on an interval by interval basis, then discusses the work to be done, the improved ability of the channel to carry increased flows, the allowances and construction costs involved with the option and then offers a brief summary of the option. Note that the engineering and administration costs are somewhat similar for any option that involves construction. These two items of cost are discussed in a separate section (see Page 44) and would have to be added to any allowances and construction estimate.



Table A on Page 46 summarizes all the Morris Road Branch options, provides the estimates of total costs including allowances, construction, engineering and administration and summarizes comments.

The impacts of doing dam and pumping station work at the outlet(s) for the Morris Road Branch are discussed in a separate section (see Pages 38 to 44).

**b) Existing Conditions and Hydrology/Hydraulic Impacts**

**Interval 1 - North Canal to the Bend At Zima Parkway (Sta. 0+000 to 0+330)**

- Channel is/has:
  - 12 to 15m wide at water level
  - 14 to 15m± wide top
  - 5 to 6m± wide bottom width
  - 220.0 bank elevation on north side
  - 219.5 ground elevation on south side
  - 219.1 elevation of water level
  - 217.8 to 218.2 sediment elevation
  - 217.3 to 217.5 hard bottom elevation
  - Grade is 0.04%±
- Property line is down centre of channel
- Town owns lands on south side
- Has in-channel capacity for more than 23 cms
- Scattered trees on top of banks
- Existing flows and associated water levels are:
  - 2-Yr - 5.5 cms, 219.17 water level with an assumed water level in north canal of 219.15
  - 5-Yr - 9.7 cms, 219.26 water level with an assumed water level in north canal of 219.20
  - 10 Yr - 12.7 cms, 219.34 water level with an assumed water level in north canal of 219.25
  - 25-Yr - 17.1 cms, 219.44 water level with an assumed water level in north canal of 219.30
  - 100-Yr - 23 cms, 219.59 water level with an assumed water level in north canal of 219.40
  - 100-Yr (24-Hour Chicago Distribution) – 35.9 cms, 219.79 water level with an assumed water level in north canal of 219.40
  - 100-Yr (12-Hour SCS Distribution) – 35.4 cms, 219.79 water level with an assumed water level in north canal of 219.40
  - 100-Yr (4-Hour Chicago Distribution) – 27.7 cms, 219.66 water level with an assumed water level in north canal of 219.40
- Comments
  - Channel is okay even with no cleanout (but a cleanout will be recommended)
  - The assumed water levels in the north canal for each storm event are applicable for all options discussed hereafter.
  - Note the highest level recorded in Lake Simcoe is close to 219.4. Lake Simcoe water levels are controlled by Parks Canada. If north winds are strong at the time of 219.4 levels in Simcoe, backup in the Holland Marsh canal could be to elevation 219.6±. The probability of such situation of wind backup during a 100 year storm runoff from the Morris Road watershed should be remote.
  - The Town-owned land offers ability to do on-site environmental enhancements such as a constructed wetland or to do on-site material disposal.

**Interval 2 - Channel Bend to Closed Walker Avenue Culvert (Sta. 0+330 to 0+712)**

- Channel is narrower and is/has
  - 11m width at water level



- 12m width at top bank
- 6 to 9m± bottom width
- 220.0 to 220.5 bank elevation on east side
- 219.5 to 220.0 ground elevation on west side
- 219.1 water level elevation
- 217.8 to 218.3 sediment elevation
- 217.5 original bottom
- More sediment exists at Line 6 as there is only 0.75m depth of water
- Grade is 0.04%±
- Can do work from Zima Parkway but not from Walker Avenue. Morris Road is on most of east side and would have to be used from the Line 6 road allowance northerly
- In-channel capacity is 6 to 9 cms
- Overall capacity to top of Walker Avenue and to top of dyke (Morris Road) is 10 cms
- Scattered trees exist on both banks
- Existing flows and associated water levels upstream of Line 6 are:
  - 2-Yr - 2.9 cms, 219.32 water level
  - 5-Yr - 5.1 cms, 219.54 water level
  - 10 Yr - 6.5 cms, 219.69 water level
  - 25-Yr - 8.5 cms, 219.88 water level
  - 100-Yr - 11.4 cms, 220.12 water level
  - 100-Yr (24-Hour Chicago Distribution) – 17.9 cms, 220.56 water level with an assumed water level in north canal of 219.40
  - 100-Yr (12-Hour SCS Distribution) – 17.8 cms, 220.54 water level with an assumed water level in north canal of 219.40
  - 100-Yr (4-Hour Chicago Distribution) – 13.9 cms, 220.3 water level with an assumed water level in north canal of 219.40
- Comments
  - Waters could go over the road in the 100 year storm event. Any improvement option would address this.

**Interval 3 - Walker Avenue Culvert to North Limits of Buce-Townsend Lots (Sta. 712 to 1+250)**

- Channel is/has:
  - 7.5m to 10m top of channel width
  - 6 to 9m water level width
  - 3 to 6m± bottom width
  - 220.5 bank elevation on east side (Morris Road)
  - 219.5 ground elevation on west side
  - 219.2 water level elevation (0.1m higher upstream of Wallace Avenue culvert)
  - 218.0 sediment elevation
  - 217.5 hard bottom elevation
- Corner of one house is only 4 to 5m from channel top
- On average, buildings are 10 to 15m off top of bank
- Would have to work from the Morris Road side or in the channel itself.
- If work were to be done from the west side, considerable property disturbance would occur or a temporary working platform in the channel would be necessary.
- One low top of foundation is 219.83 (near south end of interval) and another is 220.07 near north end of interval
- One low sill is 220.18 and another is 220.01 near top end; a third is at elev. 220.14.
- 4 properties have sheds on bank. One shed is a substantial garage.
- A number of properties have various materials and landscaping close to channel

- Channel top of bank capacity is 2.5 cms
- Capacity before affecting low houses is 5.0± cms at lower end and 6.0± cms at upper end
- Existing flows and associated water levels are:
  - 2-Yr - 2.6 cms, 219.42 water level
  - 5-Yr - 4.7 cms, 219.73 water level
  - 10 Yr - 5.8 cms, 219.93 water level
  - 25-Yr - 7.6 cms, 220.21 water level
  - 100-Yr - 10.3 cms, 220.61 water level
  - 100-Yr (24-Hour Chicago Distribution) – 15.3 cms, 220.95 water level with an assumed water level in north canal of 219.40
  - 100-Yr (12-Hour SCS Distribution) – 15.4 cms, 220.96 water level with an assumed water level in north canal of 219.40
  - 100-Yr (4-Hour Chicago Distribution) – 11.9 cms, 220.77 water level with an assumed water level in north canal of 219.40
- Top of bank is 1 to 2m average inside (west) of property line; at the north end it is 3m inside property line.
- At the 3<sup>rd</sup> and 4<sup>th</sup> lots north of the Walker culvert, top of bank is 2m outside (east) of property line
- Scattered trees exist on both banks throughout
- Comments
  - Channel and backyard flood plain is only good for 5 year flow at lower (south) end before causing building flooding and for the 10 year flow at the upper (north) end

**Interval 4 - North Limits of Buce/Townsend Lots to Back Street (Sta. 1+250 to 1+736)**

- Channel is/has:
  - 10 to 12m top of channel width
  - 8.5 to 11m water level width
  - 5 to 8m bottom width
  - 220.0 bank elevation on east side
  - 219.5 ground elevation on west side
  - 218.1 sediment elevation
  - 217.5 hard bottom elevation
- Some trees exist on both sides throughout
- Considerable sized trees exist on west side by park
- One significant utility pole exists on bank by Edward Street
- Top of west bank is inside (west) of property line on future subdivision lands, on the outside (east) of property line on south part of Town lands and is to west of property line to the north.
- Work could be done from either side but clearing in advance and fence removal on west side would be necessary. It is expected most work would be done from the east side.
- Morris Road will be closed/abandoned along much of this length once the SEAR is built.
- Critical elevation at Bingham Street properties may be 220.17 (garage sill) and could be affected by back up in pipe drain leading from catchbasin at garage entrance. Waters at elevation 220.5± could overflow surface grounds to the depressed driveways of low properties on Bingham Street.
- Channel top of bank capacity is 2 to 2.5 cms
- Capacity before reaching elevation 220.17 is 6 cms±
- Existing flows and associated water levels are:
  - 2-Yr - 2.4 cms, 219.46 water level
  - 5-Yr - 4.2 cms, 219.78 water level
  - 10 Yr - 5.4 cms, 219.98 water level

- 25-Yr - 7 cms, 220.26 water level
- 100-Yr - 9.5 cms, 220.65 water level (higher than Morris Rd.)
- 100-Yr (24-Hour Chicago Distribution) – 13.9 cms, 220.98 water level with an assumed water level in north canal of 219.40
- 100-Yr (12-Hour SCS Distribution) – 14.0 cms, 221.00 water level with an assumed water level in north canal of 219.40
- 100-Yr (4-Hour Chicago Distribution) – 10.7 cms, 220.81 water level with an assumed water level in north canal of 219.40
- Comments:
  - A storm between a 10 and 25 year frequency could cause flooding at low Bingham Street properties if backup occurs through catchbasin drains.
  - A storm between 25 and 100 year frequency could cause flood waters to access the low areas on Bingham Street directly from the surface and could overtop the Morris Road dyke and flood Marsh lands.

**Interval 5 - Back Street to Top End (Sta. 1+736 to 1+862)**

- Channel is/has:
  - 10m± top of channel width
  - 9 to 10m width at water level
  - 7 to 9m bottom width
  - 218.5 to 219 sediment level (in north part)
  - 217.5 bottom in south part
  - 220.0 bank elevation on east side
  - 219.5 ground elevation on west side
- Top of west bank follows property line in part
- All but the north part of the channel is on Town lands.
- Has to be cleaned from Morris Road side
- Scattered trees exist on both sides
- Critical elevation at adjacent houses is 220.0
- Morris Road may be closed along much of this interval after South East Arterial Road construction
- In-channel capacity is 0.5 cms
- Capacity to stay below critical elevation at 220.0 is 0.6 cms±
- Existing flows and associated water levels are:
  - 2-Yr - 0.3 cms, 219.47 water level
  - 5-Yr - 0.5 cms, 219.88 water level
  - 10 Yr - 0.64 cms, 220.0 water level
  - 25-Yr - 0.8 cms, 220.28 water level
  - 100-Yr - 1.14 cms, 220.66 water level (higher than Morris Rd.)
  - 100-Yr (24-Hour Chicago Distribution) – 2.0 cms, 221.00 water level with an assumed water level in north canal of 219.40
  - 100-Yr (12-Hour SCS Distribution) – 2.0 cms, 221.02 water level with an assumed water level in north canal of 219.40
  - 100-Yr (4-Hour Chicago Distribution) – 1.6 cms, 220.82 water level with an assumed water level in north canal of 219.40
- Comments
  - Any flow approaching a 10 year storm could flood critical properties.
  - 100-Yr flows or less could flood marsh lands

**c) Costs**

- Engineering and administration costs are discussed in general on Page 44.



- Only costs to be billed out for Option 1 would be the Engineering and Administration
- The Engineering would provide a report to discuss the existing conditions, the work done and describe the specifications to just maintain the channel in its existing condition. The Report would also provide a new maintenance schedule to bill out future maintenance costs.
- The total costs involved with Option 1 could be \$300,000. This would include the costs for both the preliminary and the final report for the Morris Road Branch and costs as listed for the tributaries would have to be added.
- If Option 1 were implemented whereby no construction work was done but where new specifications for maintenance are prepared, recommendations would be offered as to frequencies of maintenance of the channel to ensure small marsh farms are given the most protection possible.



**MORRIS ROAD BRANCH OPTION COMPARISON RE WORK, COSTS AND FLOODING (TRIBUTARY COSTS AS ON TABLE B NOT INCLUDED)**

	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6 †	Option 7 ++	Option 8 ++	Option 9 ++	Option 10 ++
Description	-No work but file new report with assessments & specs	Clean only -Use cells for temp/per. disposal -Use Morris Rd for doing most of the excavation. -Pave Morris Rd	-Most work will be like Opt 2 except in Int. 3 where the work will involve widening, riprap and work in backyards (7m) -Some widening to be also done in Int. 4 & 5.	-Do Opt 2 but in Int. 3, do sheet piling to elev. 220.0 & clean out -Work from Morris Road & backyards -2 opts looked at: either wall at prop. line or 5m west of prop line. Needs 2 small pump stns.	-Do SWM on Town lands plus cleanout as per Option 2 -This option developed before SEAR considered -Not likely a possibility once SEAR is built	Do Option 2 in Int. 1, 2, 4 & 5 and partially fill in or neaten in Int. 3 plus do split marsh project. (all work in Int 3 has to be similar)	This is Opt 3 with a small modification in Interval 3 plus a pumping station and high dam plus provision for fisheries at outlet (200,000 gpm± pumping minimum)	This is Opt 6 with two high dams and two pumping stations (100,000 gpm± pumping minimum at each station)	This is Opt 3 with a stop log type of dam and no permanent pumping station. Temporary pumping would be required when logs are in place.	This is Opt 6 with a stop log type of dam at each outlet and with no permanent pumping station. Temporary pumping would be required when logs in.
Interval 1	0	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500	67,500
Interval 2	0	52,500	52,500	52,500	52,500	52,500	52,500	52,500	52,500	52,500
Interval 3	0	305,000	250,000 Allces 360,000 New 305,000 Opt 2	1,700,000 *	305,000 Allces	347,500	250,000 360,000 305,000	347,500	250,000 360,000 305,000	347,500
Interval 4	0	52,500	81,500	52,500	52,500	52,500	81,500	52,500	81,500	52,500
Interval 5	0	17,500	22,000	17,500	17,500	17,500	22,000	17,500	22,000	17,500
In Addition:					120,000 Addnl Allces For SWMM	260,000 Split Marsh Const.	-70,000 Reduce Allces Dam 1,500,000 100,000 Pump stn. incl. 100,000 operation & fisheries	2,500,000 Dams 150,000 Fisheries 150,000 Pump stn & operation	300,000 Dam & Eng.	550,000 2 stop log dams incl temp. pumping 750,000 260,000 Split marsh Plus Allow (Capitalized)
<b>Sub Total</b>	0	495,000	1,138,500	1,890,000	1,315,000	1,097,500	2,768,500	3,897,500	1,938,500	2,397,500
Eng. Admin Incl. Superv. Plus Unfore. Allowance	300,000	450,000	500,000	500,000	550,000	550,000	500,000	550,000	500,000	550,000
		100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
<b>TOTAL:</b>	300,000	1,045,000 +	1,738,500 + **	2,490,000 + **	1,965,000 + **	1,747,500 +	3,368,500 + **	4,547,500 +	2,538,500 + **	3,047,500 +
Comments Re Flooding	Even with a 24 Hr SCS type of storm 5 to 10 Yr runoff causes flooding of low buildings and backyards. For 12 Hr SCS or 24 Hr Chicago storm intensity, flooding occurs for a much more often return storm.	For 24 Hr SCS storm, between a 50-yr & 25-yr protection to buildings & backyards is given. For 12 Hr SCS or 24 Hr Chicago storm intensity, flooding occurs for a much more often return storm.	For the lesser storm, between 50 & 100-Yr protection to low buildings on Buca & Townsend. Low Bingham properties get 100-Yr protection. Many backyards still flooded in 50-Yr storm. For the greater storm, low buildings could be flooded by anything greater than a 25-Yr storm.	For the lesser storm, close to 100-yr if piles are 5m off prop. line. If piles are at prop. line, 50-yr protection given. For the greater storm, wall would not work even for 50-yr storm. Two small pump stations required for each option. Pile costs could be greater causing this option to be more costly.	Gives close to 100-yr protection for lesser storm and 50-yr for greater storm. If we spend \$640,000± more and widen as in Opt 3, we get a bit more than 100-Yr lesser storm protection but less than 100-Yr for other storms. This option may not work, as shown, if SEAR is built since there would be less land available.	Gives 100-Yr ++ protection throughout for all storms studied and is preferred optn. A channel of some size would remain for drain outlets in Int. 3. Owners could, if they wish, recover lost property plus new top of channel could be 1 to 3m east of prop. line. Minimum of 3m would be necessary from owners for maint. & const if narrowed. Only minimal waters would rise into backyards even in any 100-yr event.	Gives 100-yr lesser storm protection with only minor flooding of backyards. 50-yr protection with the greater storm. It is very costly & depends on consistent functioning of pumps and fish passage. Pumping station design not completed in detail since costs rule out this option. Pump station costs are minimums.	Could give 100-yr (all Storms) protection throughout. Backyards are not flooded. It is very costly and depends on consistent functioning of pumps and fish passage. Is possibly top option if it functions well, is approved and can be financed. Pumping station design not completed in detail since costs rule out this option. Pump station costs are minimums. Like all dam options, may need LIRA approval.	Prevents some sediment movement, requires temporary pumping, requires careful monitoring & only protects to 50-yr 24 hr SCS storm and to 25-yr± event for other storms. Costs would increase for greater storms but there would still be flooding due to narrow channel.	All the comments as in Option 9 apply for costing shown. Here costs and obligations are even higher. Could make this work with no flooding for all storms but costs would be even greater.

‡ Two other considerations for Option 6 are: a) If only the work in Option 6 plus in Interval 3 of Option 3 is done for a cost of 560,000 + 347,500 + 650,000 (engineering) = \$1,557,500 with no other cleanout work, the 100-yr levels in Intervals 1, 2 & 3 would be 219.47, 219.75 & 219.77 respectively for the 24 hr SCS storm (critical is 219.80) and the 100-yr level in Intervals 4 & 5 would be 219.58 & 219.60 (critical is 220.0) for the 24 hr SCS storm. If 24-Hr Chicago or 12-Hr SCS storms are used, flooding would occur in Interval 3 unless work in Intervals 1 and 2 were done. b) If two low earthen dams (to normal water level) with fish passage were done (1.8m x 0.9m box in each, 0.6m above bottom) for full Option 6 work, the minimal added costs would be \$100,000 and the impact on flood levels would be a predicted increase of 0.2m± but such should still be below critical elevations for the 24 hr SCS storm. However, since 12-hr SCS storm would be greater and to recognize north winds, this should not be done. LIRA approval necessary? All costings assume that crossings and channel relocation by the SEAR project will be done to accommodate any of Options 2 to 6 and at the cost of the SEAR project. ++ LIRA approval may be required for any dam and pumping scheme (Costs for such approval are not included). \* If pile wall is kept at property line, costs reduce by \$250,000. + Guiderail along Morris Road would cost up to \$200,000 additional. \*\* Shot rock on Morris Rd. embankment would be \$100,000 additional. NOTE: Wetlands creation in Interval 1 could add \$50,000 in any option.

**TABLE B**  
**TRIBUTARY CHANNEL WORK, COSTS AND FLOODING REDUCTION ASSUMING**  
**RECOMMENDED CONSTRUCTION WORK AS LISTED IS DONE IN MAIN MORRIS ROAD BRANCH**

	Const.	Eng. & Admin	Total	Comments Re Capacity	Comments Re Work
Back Street Branch	0	10,000	10,000	100-yr plus (assuming Opt 2 is done)	No work required. Not sure if it even should be incorporated.
Edward Street Branch	15,000	25,000	40,000	100-yr (all storms) assuming Opt 3 or 6 is done.	Clean & widen to give 1.5m bottom & 1.5:1 side slopes. Remove culverts. Poles to be removed by others. Petition to make a Branch Drain.
Simcoe Road Branch	0 *	20,000	20,000	100-yr once rebuilt by SEAR (all storms)	Petition to incorporate as a Branch Drain once rebuilt.
Line 6 Branch (exc. SWM)	2,500 *	25,000	27,500	100-yr for proposed Walker culverts and 25-yr for Parkwood culverts, 2-yr for ditch assuming no enlargement work is done and assuming Opt 2 in Table A is done. (Based on 24 hr SCS storm only. See text for other storms)	Channel should be incorporated to ensure maintenance occurs. Will need as-builts from Town once work is done. Floodplain to be protected.
Reid Branch	2,500 **	20,000	22,500	The Branch A ditch offers a 25-yr capacity so a flood plain should be protected for the 100-yr event. The existing crossings at Simcoe Road are adequate to handle the 100-yr event. The Line 6 crossing will be redone and should provide close to a 100-yr capacity. Branch B is good for the 100-yr capacity and assuming Opt 2 in Table A is done. (Based on 24 hr SCS storm but other storms should be similar here)	Minimal costing is done on Reid Branch since the Town will redo the crossing of Line 6 to give twin 1050mm pipes. As-built data is to be secured to confirm new culvert inverts. Also the ditch upstream should be brushed over 75m. Subdivision developer plans to replace the two arch culverts on main Reid channel at Simcoe Road. New sizing need not be greater than existing. This culvert replacement work should be further reviewed in the future. Further review still to be made of subdivision SWM reports.
SWM Work on Line 6	0	15,000	15,000	SWM pond just barely overflows in a 100-yr event and assuming Opt 2 in Table A is done. (Based on 24 hr SCS storm. See text for other storms) Downstream pipes function for this 100-yr flood only when sufficient head exists (due to water levels in the pond).	Decision to incorporate SWM pond to be discussed prior to final report.
<b>TOTALS:</b>	20,000 +	115,000	135,000 +		

\* This assumes all work to be done as part of Town projects is completed.

\*\* This assumes the road crossings on this branch will also be done by Town project and by the developer respectively.

+ Budget \$200,000 instead of \$135,000 to provide for situation where drain is built prior to SEAR due to temporary work on Simcoe Road Branch.

## “ASSESSMENT” CONSIDERATIONS

The Drainage Act in Section 8.1.c requires the Engineer to include in a Final Report an assessment schedule to show how the costs of the project are to be levied to every affected parcel of land and road in the watershed. Sections 22 to 26 provide for six categories of assessment and the Engineer is to assess using one or more of these categories. A Preliminary Report (Section 10) is not to include an assessment schedule but most preliminary reports include data or recommendations to generally indicate how the costs would be levied or assessed by a Final Report that implements the Preliminary Report.

In the past, the costs of original construction and then maintaining the channel herein called the Morris Road Branch have been assessed only to the 214± acres of marsh lands within the scheme. The schedule used for one of the more recent billings is attached as part of Appendix C to this Report. It was the 1925 Report that provided maintenance costs to be assessed only to the marsh farms.

Certainly since 1925 the purpose and use of the Morris Road Branch has substantially changed. At the time of construction, the Morris Road component/branch was constructed to collect and divert all drainage from the west and to allow dyke construction along what is now Morris Road. In 1925 most of the lands that drained to the branch were rural. Only 40 ha in the watershed then were developed compared to 340 ha now either developed or proposed to be developed. A 1946 aerial was obtained to estimate what would have existed in 1925.

Also the channel must now serve as an outlet for multiple urban storm drains and is no doubt expected, at least by the adjacent properties, to carry away the runoff from most storm events without damaging structures and contents.

As urban development occurred in the watershed from 1925 to the present, there should have been recognition for the need for more capacity in the channel (or for upstream flow management), for improved means of maintaining the channel and for revised schedules to collect costs of maintenance from all lands and roads in the watershed. The intended goal of this preliminary report, and of a follow up final report, to address these issues, is long overdue.

Some of the considerations that could be given in assessing out the costs of any project (Morris Road Branch and any tributary) would include:

1. There is justification of assessing the 214± acres of marsh lands for the costs of doing just a cleanout of the branch if the branch were in a setting comparable to original conditions. By analyzing Option 2 which is a cleanout only, the construction cost is \$495,000. However, costs related to Morris Road restoration of \$200,000 should be assessed as a municipal cost due to the Municipality's paving and maintaining of the road. Also costs related to environmental issues including cell creation, hauling, deep pools, littoral shelves with root masses and gravel substrata are more attributable to the urban usage and discharge to the channel. These costs could add to approximately \$165,000. There should not be any assessment for engineering or allowances to the marsh lands since the need for engineering is as a result of the urban use of the channel and the need for this report. Thus of the \$495,000 somewhere in the area of \$130,000 could be justified as an assessment to the 210 acres of the marsh lands and roads.
2. Any project that allows the Morris Road Branch and any branch to serve major runoff events replaces the need for the Town to implement storm water management in those areas not now managed. The cost to acquire lands and to do storm water management for the 250 hectares

of unmanaged Town lands could be \$5,000,000 minimum including costs for 4 hectares of land. This would indicate that a substantial assessment to the Town could be justified to avoid storm water management costs.

3. If an option is implemented that increases the value of the 25± properties on Buce and Townsend Avenues there is justification in assessing these lots a benefit assessment. The Drainage Act defines “benefit assessment” as:

*“‘Benefit’ means the advantages to any lands, roads, buildings or other structures from the construction, improvement, repair or maintenance of a drainage works such as will result in a higher market value or increased crop production or improved appearance or better control of surface or subsurface water, or any other advantages relating to the betterment of lands, roads, buildings or other structures;”*

If benefit assessments were to be considered to these lots by a final report, the opinion of a licensed land appraiser should be sought in advance.

4. In reality, any costs not assessed to the marsh lands or to the Buce and Townsend Avenue properties should be assessed to the full urban watershed of Bradford draining to the channel.
5. A recommendation should be offered now as to how the costs of a report for the Morris Road Drain should be assessed. This recommendations would then be considered like all recommendations of this Preliminary Report at the time of the Report Consideration.
6. The assessment methods evaluated include:

a) Method 1 – Individual Assessments to All 3,000± Properties

There could be separate assessments to each lot and to each road in the watershed. If such were done, each lot should be separately evaluated. The assessments would have to recognize the volume and rate of flow from each property and road and this work could be an onerous and costly exercise. If as an example, \$1,000,000 were to be assessed to the urban watershed for Option 6 work (excluding the tributaries and less assessments to marsh lands and Buce/Townsend properties) with 2,500± existing and potential lots, and with 70 ha (180 acres) of roads, the amount per lot on average could be \$150 and the average amount per hectare of road could be \$6,000. Each type of lot and road would however have a separate assessment. The amount for roads would be substantially greater since it is the roads that collect and pipe the waters to the channel and since the roads are more impervious. It could be anticipated that there would be numerous objections by the urban properties to pay a Drainage Act assessment for this watershed since properties in other watersheds in the community do not have to separately pay for storm drainage. An engineering fee of \$50,000 or more would have to be added to the base engineering fee shown to prepare this type of schedule.

b) Method 2 – Block Assessments with Individual Billings

There could be a block assessment to the “built-up area” which would include almost all of Bradford within the watershed. The Drainage Act, in Section 1, defines a “built-up area” as:

- *“‘built-up area’ means an area of land where,*
  - (a) *not less than 50 per cent of the frontage upon one side of a road for a distance of not less than 200 metres is occupied by dwellings, buildings used for business purposes, schools or churches, or*

- (b) *not less than 50 per cent of the frontage upon both sides of a road for a distance of not less than 100 metres is occupied by dwellings, buildings used for business purposes, schools or churches, or*
- (c) *not more than 200 metres of a road separates any land described in clause (a) or (b) from any other land described in clause (a) or (b), or*
- (d) *a plan of subdivision has been registered.”*

Section 25 indicates how block assessments are made:

- 25. (1) *The council of the local municipality may direct the engineer to assess as a block, a built-up area designated by the council, and the sum assessed therefor may be levied against all the rateable properties in the designated area proportionately on the basis of the assessed value of the land and buildings. R.S.O. 1990, c. D.17, s. 25 (1).*
- 25.(2) *Where the engineer makes a block assessment under subsection (1), the engineer shall designate the proportion of the assessment to be charged against the public roads in the designated area. R.S.O. 1990, c. D.17, s. 25 (2).*

- Thus, in a block assessment the Engineer can show how much of the total amount assessed to the Block is to be assessed to the Municipality for the roads and then the balance would be apportioned by the Municipality to all the properties on the basis of their assessed values as established by Municipal assessment roll data. Parcels of land not yet developed would have to be separately assessed but their assessments would be comparable to the assessment as if developed and included in a block assessment/built up area.

c) Method 3 – Block Assessment with 100% of the Block Amount to the Roads

There could be a block assessment as described above but where the Engineer states that 100% of the block assessment is to be to the roads. This would avoid having to make individual assessments to individual properties and would thus reduce engineering costs. This approach was used in a recent project in Southwestern Ontario for a project with a cost of \$4 million and where \$3 million was to be assessed to 1,200 ha (3,000 ac) of urban lands as a block assessment. The full block assessment was levied 100% to roads.

7. Example of Applying Methods 1 to 3 to Assess out Option 6 Plus Tributary Costs of \$1,850,000 to \$1,950,000

Method 1

- Cost (\$1,850,000 plus \$100,000 to do individ. assess. & to do contacts)	\$ 1,950,000
- Groupings of individual assessments would be:	
- Marsh properties (214 acres±) @ \$600/acre±	\$ 130,000
- Benefit to 25 lots (subject to an appraiser’s input) @ \$2000 each	50,000
- Town for Morris Road Reconstruction	210,000
- Existing Lots (2914± / 539 ac ±), say 3,000 lots @ \$200±	665,000
- Future Lots (741± / 138 ac ±), say 750 lots @ \$150±	125,000
- Open Space (121± acres) @ \$600/acre±	75,000
- Roads (152± acres) @ \$2,500/acre±	375,000
- Commercial/industrial/institutional (125± acres) @ \$2,500/acre	320,000
<b>TOTAL</b>	<b>\$ 1,950,000</b>

Method 2

- Cost	\$ 1,900,000
( \$1,850,000 plus \$50,000 to do detailed lot fabric for	



block areas and notices)	
- Individual to marsh lands (214± acres) as above	130,000
- Individual to open space (121± acres) as above	75,000
- Individual to future development (138 acres), say 750 lots @ \$150 each	125,000
- Block assessment to balance (35% to roads)	<u>1,570,000</u>
<b>TOTAL</b>	<b>\$ 1,900,000</b>

Method 3

- Cost \$ 1,850,000 (No need to do most contacts or detailed lot fabric)	
- Individual to marsh lands (\$600/acre) (Can not be in the Block and would need continuous contact) as above	\$ 130,000
- Block assessment to balance (100% to roads)	<u>1,720,000</u>
<b>TOTAL</b>	<b>\$ 1,850,000</b>

8. Pros and Costs of the Methods

- Method 1 would probably result in many appeals since other Town drainage costs are paid out of general tax levy. Much time would be involved by the Engineer to create assessment schedule. All owners should be contacted prior to preliminary report submission and would have to be notified of all further meetings.
- In Method 2, Town staff would have to proportion the amount of the Block Assessment to all property assessments within the block area here. Could still be appeals also. Much work would be involved by the Engineer to establish correct lot fabric and to list all property assessment rolls. Decisions would be necessary re pre- and continuous contact of owners in block area. Continuous contact for sure would be necessary to open space and future development owners.
- Method 3 would remove the likelihood of most appeals and would eliminate proportioning of costs by Town staff. This method eliminates all individual assessments shown by Method 1 except for the individual assessments to the 214 acres of marsh lands. Engineering costs would be reduced. No detailed lot fabric, no list of properties and minimal contacts would be necessary. Only owners with work on their lands and marsh farmers would need continuous contact.

9. Recommendation

- Method 3 is recommended. This method has been already reviewed with the HMDSJMSB and Council.

**ENVIRONMENTAL CONSIDERATIONS**

**a) Morris Road Branch**

The Morris Road Branch as a minimum will be cleaned and excavated materials will be hauled and/or will be disposed of on site. One portion (approximately 30% of length) may be widened by 1 to 2m if certain options are implemented (not the recommended option however). Two proposed deep pool locations may create localized widening. Otherwise no widening of the existing channel will occur.

The portion that may be widened in one option may be narrowed if the recommended diversion option with a further new channel is implemented. The impacts of the diversion option, which will provide an overall increase in water area, are separately discussed.



Considerations are:

*i) Fisheries*

The Morris Road channel is a tributary to the Holland Marsh Drainage Scheme Canal Improvement Project (HMDSCIP) North Canal. Fisheries in the Morris Road channel would be similar but to a reduced extent due to shallowness, higher water temperatures, the existence of substantial sediments and due to the culverts in the channels.

With respect to fisheries habitat, the environmental sub-consultant has indicated that the channel alignment and property ownership offer the opportunities to create a) a littoral shelf over 300m± of the 1830m length, b) deep pools of additional 1 metre depth over 200m of the 1800m length and c) gravel substrates and root masses on the littoral shelves.

Even if the existing channel is cleaned only with some widening, the average channel water cross-section width for fisheries is increased.

If the diversion option is selected where significant bank improvement work could be included in the portion adjacent to the Buce/Townsend lots, the affected interval could be cofferdammed, fish could be electro-shocked and relocated and then dewatering would occur to allow the bank work.

It would not be proposed to cofferdam and dewater the channel elsewhere.

If Option 6 with the diversion is implemented, approximately 13,500m<sup>2</sup> of new channel water area would be created. Even if the channel in Interval 3 is narrowed as part of Option 6, a net increase of 11,000m<sup>2</sup>± of water area would result.

*ii) Sediment Issues*

Sediment that is excavated will be sampled prior to disposal. Disposal of sediments will be carried out in accordance to the *Environmental Protection Act*, administered by the MOECC. Material may be taken offsite or kept on site.

On a temporary basis, holding cells will be created on site to which excavated materials will be hauled and allowed to dry.

The decision will then be made to either allow the materials to remain permanently in the cells with capping or to haul such to landfill sites licensed to receive such or to haul elsewhere with burial on this site.

The recommendation of this Preliminary Report is that Option 6 be implemented and that as part of this option, materials excavated from the existing channel be placed in trenches below ground level and below the berms alongside the new diversion channel.

*iii) Species at Risk*

As confirmed by the MNRF, species at risk were not a concern in and around the Holland Marsh, until the American Eel and Butternut were found as part of the monitoring required for the HMDSCIP. Drainage works as defined under the Drainage Act are now activities that can be registered through the ESA. This Morris Road Drain has been recently registered for American Eel. A mitigation plan has been developed as part of the activity registration and will be followed when carrying out the Morris Road Drain project.

Any tree that will be removed as part of the project will be inventoried, along with those within 25 m of drainage works, to determine if Butternut trees will need to be removed or harmed. The ESA

process to remove a Butternut trees will be followed if any such trees are identified. Essentially, Butternut trees will be confirmed through DNA analysis and if found to be true Butternut, they will be evaluated for health, classified, and a replanting plan will be completed and registered with the MNRF, prior to removal.

*iv) Dewatering*

Wherever construction procedures for dewatering involve pumping of water in excess of 50,000 litres per day, a permit to take water will be applied for. Pumping records will be retained and will be submitted to MOE monthly.

*v) Archaeological Concerns*

The project will primarily involve cleanout and minor widening of existing channels and possibly the construction of one new channel on cleared and drained farm lands.

Should the project involve the works of diversion/new channel construction, lands not previously impacted except by agricultural and internal drainage activities will be affected. However, the diversion route if pursued would be across original swamp lands that were cleared, tile drained and cultivated after the original dyke and canal scheme was developed in the 1930's. As such, any archaeological work should be unnecessary.

During the federal environmental assessment study on the HMDSCIP, neither the Department of Indian Affairs nor the local First Nations band council were concerned that an archaeological assessment would be necessary for that project even though it did involve channel work on previously undisturbed lands. The comment was made by the Chief of the band that the aboriginal forefathers would not have been active in marsh lands such as those that exist in the Holland Marsh area.

Also, there is no known requirement by local planning documents to have an archaeological assessment for a project such as this.

The need to do any archaeology will be discussed with Town staff. At this time, there is no allowance in the estimates to do archaeology.

**b) Back Street Branch (Not Recommended to be part of this Project)**

This branch is 30m± in length and has 1m± of fall in the length. It is actually a steeply sloping V-shaped channel outlet for surface water from a short length of curbed roadway.

It requires no work at this time.

Fisheries and fish habitat would exist only at the outlet in the Morris Road Branch. Minimal work is recommended to occur in the Branch at this location.

This Report recommends that what has been called herein the Back Street Branch remain just as a road drain.

**c) Edward Street Branch**

The Edward Street Branch is a manmade 210m± long road ditch/channel that outlets Town storm pipe drains. The only construction work recommended in this branch would be a cleanout with top of bank widening of up to 1 to 2m over a 100m± length plus the removal of three pipe culverts in the channel. The pipe culverts are anticipated to be replaced with a clear span footbridge but at a later time as a town project. One utility pole in the channel is to be relocated.

Fisheries and fish habitat existence would be minimal and would only be disturbed on the short term. Opportunities for enhancement do not exist due to the restricted area available for this road ditch.

Excavated material will be hauled to holding cells in the same fashion done for materials on the main channel and will be disposed of similar to the protocol developed for the main branch.

Species at risk, dewatering and archaeological issues are not anticipated to be a factor.

**d) Simcoe Road Branch**

This is a constructed channel also outletting a Town piped storm drain.

This branch is 290m± in length. If the channel requires work prior to implementation of the SEAR project, in its existing location, then approximately 150m± requires minimal to no work and 150m± requires a cleanout to the section initially constructed. The actual end area for fisheries will be increased.

The SEAR project will ultimately realign and expand the Simcoe Road Branch. The channel will be reconstructed as a two-stage ditch and will be landscaped. The SEAR drawings have/will be submitted for separate environmental approval.

Fisheries, sediment, species at risk, dewatering and archaeological issues are not expected to differ from the main branch.

The recommendation of this Report is that the Simcoe Road Branch be incorporated once realigned and improved by the SEAR project.

**e) Line 6 Branch**

This branch also is primarily a road ditch that outlets Town storm drains. It is 590m in length.

The only work necessary by this Report in Line 6 Branch is anticipated to involve a cleanout only of a short length of the existing channel and after work is completed by the Town as part of the Line 6 Road Reconstruction. Two metal pipe road crossings existing in the branch previously are now being replaced by the Town's reconstruction of Line 6 with open box culverts which will improve fisheries issues. Environmental approvals have already been received.

Should the 1.1 ha storm water management facility and its pipe outlet at the upper end of this road ditch be incorporated as part of the branch, there would be no added environmental concerns since no construction work would result.

Should the SWM facility be incorporated, future maintenance of the facility would be expected to be undertaken in the same fashion as existing. This work would involve removal of sediments and disposal and would be undertaken in accordance with MOE requirements.

If the facility is incorporated by a final report, the report will set out the MOE requirements to be observed by any maintenance.

Fisheries, sediment, species at risk, dewatering and archaeological issues are not expected to differ from the main branch.



**f) Reid Branch**

The Reid Branch consists of two components both of which are open channels. The main component is 575m± in length and the only work recommended is brushing over its lower portions. The outlet for the main component is a pipe culvert across Line 6 which will be enlarged and lowered by the Town's work on Line 6. The branch component is 135m length and requires no work. The lower 100m of the Reid Branch should really be deepened but such work can not be done due to fixed elevations of culverts on Line 6 as controlled by utility lines.

Should future storm water management facilities in the watershed of the Reid Branch be incorporated as part of this branch by future engineering reports, the reports at the time would identify the MOE criteria to be implemented for any maintenance.

Fisheries, sediment, species at risk, dewatering and archaeological issues are not expected to differ from the main branch.

**g) Diversion Option on Morris Road Branch**

Should this option be implemented a new channel with 13,500m<sup>2</sup> of water surface area will be constructed. As part of this option a section of the existing Morris Road Branch (2,500m<sup>2</sup> surface area) could be narrowed in. However, this option even with some narrowing would overall increase the overall water surface area available for fisheries by 11,000m<sup>2</sup>±.

Fisheries, sediment, species at risk, dewatering and archaeological issues are not expected to differ from the main branch.

The option to construct somewhere along the diversion channel route a deep pool section with littoral shelves and varied strata on the shelves will be explored during final design. Land acquisition for the SEAR road once finalized by the Town will identify the opportunity to pursue such channel widening for environmental purposes.

**h) Table to Summarize Environmental Works**

The environmental sub-consultant developed a table (Table C) to summarize environmental legislation impacts on this project and the protocol to be followed. The protocol to be followed would only be initiated once the appointment was made to prepare a Final Report. This table follows:

<p>Environmental Policies /legislation</p>	<p><b>Option 1</b> No work but file new report with assessments and specs</p>	<p><b>Option 2</b> - Clean only - Use cells on Town or private lands for sediment disposal - Redo Morris Rd - Travel along Morris Rd in part for excavation purposes</p>	<p><b>Option 3</b> - Clean as in Option 2, &amp; widen in one interval - Place shot rock riprap on backyard channel slopes. - To be 3m average width of widening - Machinery will travel along Morris Rd in part for excavation plus will work in back yards on 7m width</p>	<p><b>Option 4</b> - Clean channel throughout as in Option 2 - Do sheet piling in 1 interval to elev 220.0 and widen channel - Work from Morris Road &amp; backyards - 2 opts for piling looked at; Either wall at property line or 5m west of prop line - Needs two small pumping stations if piling is placed</p>	<p><b>Option 5</b> - Do SWM on Town lands plus Cleanout as per Option 2 in all intervals. -This option developed before SEAR considered - May not be possible now due to Town land being used for SEAR project.</p>	<p><b>Option 6</b> Do option 2 in Intervals 1, 2, 4 &amp; 5 and partially fill m Interval 3 plus do new split marsh/diversion channel</p>	<p><b>Option 7</b> This is Opt 3 with a small modification in Interval 3 plus a pumping station and high dam at outlet plus provision for fisheries passage at dam location (200,000 gpm minimum of pumping)</p>	<p><b>Option 8</b> This is Opt 6 with two high dams and two pumping stations at outlet (100,000 gpm minimum at each station)</p>	<p><b>Option 9</b> This is Opt 3 with a stop log type of dam at outlet and no permanent pumping station. Temporary pumping would be required when logs are in place.</p>	<p><b>Option 10</b> This is Opt 6 with a stop log type of dam at each outlet and with no permanent pumping station. Temporary pumping would be required when logs in.</p>
<p><b>Fisheries Act - Serious harm to fish contributing to commercial, recreational or Aboriginal fisheries</b></p>	<p>Nothing required</p>	<p>Self assessment would likely result in the need for an authorization. Should be allowed with habitat improvements. Removal of Walker culvert considered positive  <i>Note – clarification to application of new FA to agricultural drains is being reviewed and may change comments on all options</i></p>	<p>Self assessment would likely result in the need for an authorization. Should be allowed with habitat improvements. Widened channel will add habitat, shot rock adds diversity of habitats Removal of Walker culvert considered positive</p>	<p>Self assessment would likely result in the need for an authorization. Should be allowed with habitat improvements. Sheet pile will limit possible habitat enhancements. Will need to provide more features outside area of sheet pile. Fish salvage req'd when dewatering occurs Removal of Walker culvert considered positive</p>	<p>Self assessment would likely result in the need for an authorization. Should be allowed with habitat improvements. Removal of Walker culvert considered positive</p>	<p>Self assessment would likely result in the need for an authorization. Habitat creation in new channel will be more than enough to offset area of channel lost if narrowing occurs in 1 interval. Fish salvage req'd when dewatering occurs to allow filling. New channel will need to have enhanced fish habitat features, shot rock adds diversity of habitats. Removal of Walker culvert considered positive.</p>	<p>Self assessment would likely result in the need for an authorization. Should be allowed with habitat improvements. Widened channel will add habitat, shot rock adds diversity of habitats. Fish passage at dam will need to be included to get approval Removal of Walker culvert considered positive</p>	<p>Self assessment would likely result in the need for an authorization. Habitat creation in new channel will be more than enough to offset area of channel lost. Fish salvage req'd when dewatering occurs to allow filling. New channel will need to have enhanced fish habitat features. Fish passage at dam will need to be included to get approval Removal of Walker culvert considered positive</p>	<p>Self assessment would likely result in the need for an authorization. Should be allowed with habitat improvements. Widened channel will add habitat, shot rock adds diversity of habitats. Fish passage at time of log placement will need to be addressed to get approval Removal of Walker culvert considered positive</p>	<p>Self assessment would likely result in the need for an authorization. Habitat creation in new channel will be more than enough to offset area of channel lost. Fish salvage req'd when dewatering occurs to allow filling. New channel will need to have enhanced fish habitat features. Fish passage at time of log placement will need to be addressed to get approval Removal of Walker culvert considered positive</p>

<b>Environmental Policies /legislation</b>	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>	<b>Option 4</b>	<b>Option 5</b>	<b>Option 6</b>	<b>Option 7</b>	<b>Option 8</b>	<b>Option 9</b>	<b>Option 10</b>
<b>Species at Risk Act - American Eel - Butternut</b>	Nothing required	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP. Rock at back of properties can be Eel specific. Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures
<b>Endangered Species Act - American Eel - Butternut</b>	Nothing required	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP. Rock at back of properties can be Eel specific. Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures	Although Eel was found in north canal of HMDSCIP, we are not expecting any here. If found MNRF would be notified and would proceed as in HMDSCIP Butternut will be identified prior to starting, if found we will follow new ESA procedures

Environmental Policies /legislation	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8	Option 9	Option 10
<b>Conservation Authorities Act - Interference with Wetlands and Alteration to Shorelines and Watercourses Regulation (Ontario Regulation 179/06)</b>	Nothing required	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.	Ont Reg 179 permit would likely be required. Not reviewed for DFO anymore – watercourses, wetlands.
<b>Environmental Protection Act Ontario Regulation 153/04 Ontario Water Resources Act</b>	Nothing required	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list.	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list.	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list. ECA required for any dewatering	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list.	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list. ECA required for any dewatering	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list.	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list.	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list.	Material will be hauled away after drying or will be buried in on-site trenches and capped. Material to be tested against Reg 153 based on the proposed end use. Material will initially be tested against entire list.
<b>Study requirements</b>	Nothing required	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. <b>Butternut</b> site review & health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. <b>Butternut</b> site review & health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. Fish collection permit may be req'd. <b>Butternut</b> site review & health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. <b>Butternut</b> site review and health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. Fish collection permit may be req'd. <b>Butternut</b> site review & health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. Fish collection permit may be req'd. <b>Butternut</b> site review & health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. Fish collection permit may be req'd. <b>Butternut</b> site review & health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. Fish collection permit may be req'd. <b>Butternut</b> site review and health assessment if found. <b>Soil testing</b> of dried material that is to be moved	Detailed assessment of <b>fish habitat</b> (depths, substrates, aquatic vegetation, etc). Assuming same species composition as canals. Partially complete. Fish collection permit may be req'd. <b>Butternut</b> site review and health assessment if found. <b>Soil testing</b> of dried material that is to be moved

## **POSSIBLE UTILITY IMPACTS**

### **Morris Road Branch**

#### **a) Line 6 to Closed Culvert at Walker Avenue**

- 100mm (4") gas line crosses under channel at Line 6 (Its depth will have to be confirmed at time of final design)
- Bell boxes and hydro poles exist on east side of Morris Road (14m east of centerline of ditch)
- A curb stop exists on east side of Morris Road opposite Line 6
- Bell (underground) exists on west side of canal (east side Walker Road on shoulder)
- No impact expected subject to gas line confirmation.

#### **b) At the Closed Walker Avenue Culvert**

- 100mm watermain crosses the existing 3300 x 2080mm CSP culvert and then connects to watermain (100mm) going along Morris Road (north and south of bend)
- North of the culvert, underground Bell crosses the ditch and runs up east bank of ditch on the west side of the road
- Only impacts will be to watermain when culvert is removed and possibly to Bell line when ditch is cleaned.

#### **c) From Closed Walker Avenue Culvert North to Edward Street**

- From the culvert to approximately 100m south of Edward Street, hydro poles, Bell and curb stops exist on east side of Morris Road.
- One hydro pole has a transformer. Guys do not cross canal but are parallel to road.
- Watermain below the centerline Morris Road must run at least this far from bend.
- Not sure how far from the bend the underground Bell runs in east bank of Canal/west side of road before it crosses to the east side. The survey identified Bell boxes on east side.
- It does not appear any utilities exist on west side of the ditch.
- Existing asphalt surface of Morris Road has already been pulverized and surfaced with granular. Final work on the road by this project will involve grading and hot mix paving.
- No substantial impacts to utilities are expected.

#### **d) From Edward Street North**

- On the east side of the ditch along Morris Road – no utilities were picked up
- On the west side of the ditch, one hydro pole and guy exists between Edward and Back Streets
- Should be no impacts.

#### **e) Back Street Branch**

- No utilities were noted or expected.

#### **f) Edward Street Branch**

- Hydro poles exist on south bank and in ditch
- No other utilities were picked up
- Study recommends hydro poles be moved.

#### **g) Simcoe Road Branch**

- No utilities were found by surveyor or are on old plan of drain.
- Utility issues will be addressed by SEAR project.

#### **h) Line 6 Branch**

- Gas line exists on south side of road



- Overhead hydro line exists along north top of bank of north side ditch
- Guys to poles do cross ditch
- Underground Bell is between top of north ditch and north edge of pavement.
- Proposed watermain is just south of underground Bell.
- Is to be a new sanitary pumping station and forcemain along Line 6 as part of Town project.
- At the Reid Branch culvert, gas line and a proposed watermain and forcemain are shown below the new culverts.
- The Town's project will address all culvert work impacts on utilities.
- Ditch cleanout by this project should have no impacts.

***i) Reid Branch***

- No utilities are known of except at Line 6 (see above) and at Simcoe Road.
- Simcoe Road crossing may be done in future by developer/Town.
- Only limited brushing is proposed by this project.

***j) Split Marsh/Diversion Route***

- No underground utilities are expected but more research is necessary to confirm this.
- Overhead hydro exists from Canal Road across the canal to the existing pumping station at the outlet of the proposed diversion into the canal.

**IMPACTS OF A REGIONAL STORM EVENT**

- The practice for a project like this Morris Road Drain is to design dykes and channels to the 100 year design level and to allow overtopping in the Regional event. This is done on the basis that more severe flooding could occur to properties outside of a dyked area should the dykes be elevated to or above the Regional level.
- The Regional Storm event in the Bradford area would be Hurricane Hazel. This storm would be associated with a rainfall of 211 mm± over a 12 hour period. By comparison, the 100 year event that is used for maximum sizing of the components costed herein is associated with a rainfall of 121 mm± over a 24 hour period. (24hr SCS Rainfall Taken from the Town's Engineering Design Manual). The 100yr 24hr Chicago Storm has a rainfall depth of 122mm± over 24 hours. The 12hr SCS Storm has 104mm± over 12 hours. The 4hr Chicago Storm has 80mm± over 4 hours.
- Accurate predictions of a Regional event runoff are not easily made without substantial additional modeling. The levels in the HMDSCIP north canal during a Regional event would also be a factor and are equally difficult to predict. Analyses previously completed for the HMDSCIP predicted a Regional flood level of 220.65 masl in the area of the Bradford Marsh Small Drainage Scheme. This is approximately 1 metre higher than predicted 100 year water levels. The HMDSCIP peaks would produce higher levels in the Morris Road Drain watershed.

- Initial estimates of Regional Flood levels in Morris Road Drain watershed itself (before HMDSCIP peaks impact such) would be:

Interval	With Existing Morris Road Channel Conditions	After Bottom Cleanout Throughout	Critical Elevation
Interval 3	221.08	220.48	220.01, 219.83
Interval 5	221.15	220.63	220.02

- A detailed analysis would be necessary to more accurately predict the Regional levels in the upper part of Morris Road. It would be necessary to consider timing of Holland Marsh levels with respect to Morris Road Drain levels.
- What is presented here is to be considered as a preliminary estimation of the impacts of a Regional storm should such occur again.
- Should a Regional event occur in the existing conditions, the preliminary estimate would be that water levels would overtop the Morris Road dyke and would be higher than many of the house openings along the west side of the Morris Road Branch and would be higher than the low properties along Bingham Street and south of Centre Street and perhaps higher than many others that were not investigated.
- With a cleaned and widened, and even partially diverted Morris Road Branch versus just a cleaned channel, the Regional level would not be lowered significantly. Marsh land and residential properties would be still impacted.
- What the benefit would be in a Regional event if an improvement were constructed, whether it be a cleanout or cleanout with widening, steel piling or a SWM facility or a split marsh option, is that marginally substantially more conveyance would be provided by the channel allowing for more rapid removal of flood waters. The split marsh concept would add another benefit as a result of increased lengths of channel to pump flood waters into.

### **COST BENEFITS**

The Drainage Act only requires that a cost benefit analysis be prepared if a specific request to do such is made at the engineering appointment stage. However on any project, it is incumbent upon the Engineer to be satisfied that the works recommended are cost beneficial.

The cost for the Town to implement stormwater management (\$5,000,000) in lieu of doing channel work greatly exceeds the projected costs. The benefits by avoiding future damage claims associated with flooding can be significant. Overall this project is deemed very cost beneficial.

### **AGENCY APPROVALS**

It is recognized that any final report prepared on this project will have to be submitted to the Lake Simcoe Region Conservation Authority (LSRCA), Fisheries and Oceans Canada (DFO), the Ministry



of the Environment and Climate Change (for an Environmental Compliance Approval) and to the Ministry of Natural Resources and Forestry (MNR) with respect to Species at Risk. Reviews may also be necessary with respect to the Ontario Heritage Act.

The LSRCA are aware of the project and have participated to date in it. The recommended option was presented at the second agency meeting, and was favourably received by LSRCA. Approval will be applied for re Section 28 of the Conservation Authorities Act.

As stated at the project scoping meeting, LSRCA once had a Level 3 working relationship with DFO. However, LSRCA and DFO act separately now. DFO alone addresses fisheries issues. Once a self-assessment has been completed, a Request for Review form will be submitted to the DFO on this project.

With respect to the Ministry of the Environment and Climate Change, since this project is on the border line of being an urban or rural drain, and since urban drains are not exempt from the provisions of the Ontario Water Resources Act, it is therefore recommended that an Environmental Compliance Approval from MOECC be sought during the final report consideration stages.

Species at Risk associated with the Morris Road Drain project are the American Eel and Butternut tree. A mitigation plan has been developed for the American Eel as part of the activity registration for the Morris Road Drain project, and the ESA process to remove Butternut trees will be followed if any such trees are identified.

With respect to OMAFRA's concerns that urban development on the Small Marsh lands be discouraged, it will be the responsibility of the Town of Bradford West Gwillimbury to address this issue in their land use planning documents.

With respect to the Ontario Heritage Act, during the final report stage, consultation may be made with the Town and with the Ministry of Tourism, Culture and Sport to determine if any approval or work is necessary pursuant to the Ontario Heritage Act.

## **SUMMARY OF THIS REPORT'S RECOMMENDATIONS**

### **Morris Road Branch**

This is the existing West channel component of the Bradford Marsh Small Drainage Scheme. This is the channel that requires work and is the primary reason the Preliminary Report has been requested. This channel was intended to serve primarily a rural watershed but now serves primarily an urban watershed. There is limited storm water management facility in the watershed and urban development has actually occurred tight to the channel. The existing land use development does not readily permit the required improvements that should be made to the channel throughout and the study for this report concluded early that if possible, an alternate outlet for much of the Morris Road Branch waters should be sought.

The work has led to discussions with landowners and the Town and with the consultants involved with the South East Arterial Road, and it has been determined that the desirable improvement for the Morris Road Branch is to implement Option 6 and to, in effect, create two outlets for the Morris Road channel. This would mean that the north part of this watershed would be diverted along a new canal route to a new outlet in the Holland Marsh Drainage System, and the south portion of the existing



channel would remain, with improvements, to serve the south part of the watershed. The area where the residential lots are tight to the channel, which is the area most affected by the lack of capacity in the channel, would be at the break point between the two channels. As a result, the channel, in the break point area, could be partially filled if desired, which would improve the rear lots of those properties backing onto it, plus would allow the possibility of stabilizing the Morris Road dyke on the opposite side. Alternatively the rear of the lots could be just neatened up and any narrowing could be done along Morris Road only. Only one type of work would be done throughout at the rear of the Buce/Townsend lots. The decision would be made after input from the owners is received.

The split marsh/two outlet option creates a better opportunity for on-site disposal of materials that are removed from the existing channel, since there would be less existing channel material to remove and since more of what is removed could be kept on-site in capped trenches. The creation of two outlets allows for the greater reduction in 100-year flood levels and thus allows for the greatest protection to low lying properties. Only this option keeps 100-year floods associated with a 24-Hour Chicago Storm or 12-hour SCS distribution below the critical elevation. It creates a system that is more easily maintained since less work would have to be done from the remainder of Morris Road and near the landscaped portions of the rear yards of the residential properties.

It is the only low cost option that addresses all the hydrology/hydraulic concerns.

Option 6 provides maximum opportunity for environmental enhancements. This option best provides opportunities to enhance fish habitat with root wads, littoral shelves, and substrate areas. It also avoids significant construction adjacent to residential rear yards, reduces the extent of flooding, and stabilizes existing areas of erosion.

Option 6 is the recommended option for the Morris Road Branch. However, none of the sub-options to Option 6 re dam and pumping are recommended.

### **Back Street Branch**

As indicated by this report, the Back Street Branch is more just a shallow “V” shaped surface outlet for road waters. Whether it initiates from an eroded route or if it was man-made is not clear. There is no evidence of any pipes outletting into it and it is too shallow for such. However, it could be deepened in the future to serve as an outlet for pipe drainage. There has been an expressed desire from some residents on Back Street to have piped storm drainage. Whether this branch is incorporated will ultimately be the decision of the Town. This report’s position is that it does not require incorporation at this time. If however there is any thought that it could be a component of a future storm drain, then it may be desirable to incorporate such.

This report does recommend that the Town review the Back and Bingham Street areas with respect to the need for new and/or improved road drainage systems as part of the Town’s capital work projects.

### **Edward Street Branch**

It is recommended that the Edward Street Branch be petitioned to be part of the Morris Road system. It is an outlet for a substantial amount of water from the Town. It is a channel that should be continuously reviewed and maintained due to low lying properties adjacent to it. The channel itself does not require substantial work. As this report has suggested it should be cleaned, slightly widened, poles in it should be shifted and the three steel pipe culverts in it should be removed. A clear span crossing constructed for pedestrian access could be considered as a replacement, if the Town elects to request such or to attend to such independently.

### **Simcoe Road Branch**

This report recommends that the Simcoe Road Branch once improved by the SEAR project be petitioned to be part of the Morris Road Drain. This report recognizes that the South East Arterial Road (SEAR) work will proceed and will realign and improve the branch to run along the north side of the right-of-way for the SEAR. SEAR will reconstruct the Simcoe Road Branch channel as a two-stage channel and will introduce environmental enhancements into this part of the watershed.

It is also recommended that the maintenance corridor to be provided along the channel be incorporated.

### **Line 6 Branch**

This branch also is an open channel that serves a significant watershed and would benefit from being part of the drain in order to facilitate its reviews and maintenance. No substantial construction in it is required at this time other than perhaps ditch improvements to fit culverts that are to be constructed as part of the Town project. It is recommended that the channel be petitioned to be brought under the Drainage Act.

This report has recognized that the ditch on the Line 6 Branch only provides capacity for the runoff from a low storm event. It is recommended that the final report establish the minimum flood plain that should be available adjacent to the ditch for a large storm event and ensure that the ability exists for heavy flow waters to cross Parkwood Avenue.

### **Line 6 Storm Water Management Facility**

This Preliminary Report has discussed the pros and cons of incorporating the existing storm water management facility as part of the system. The benefits are listed and the “pros” of incorporating it exceed the “cons”. But it is known that the Ministry of Environment may not support this incorporation. This Preliminary Report has taken the position that it will be a decision of the Town as to whether this facility should be incorporated. The further comments and concerns of the Ministry of Environment should be obtained and considered. This report suggests that it would be a benefit to have the facility incorporated as part of the project, should both the Town and MOE agree to do such.

### **Reid Branch**

This Preliminary Report recommends that the Reid Branch be petitioned to be part of the Morris Road Drain. The Reid Branch was intended to be a municipal drain and since it is an outlet channel that serves a substantial watershed, and a watershed that may alter with the proposed subdivisions, there are advantages to ensure that its maintenance is provided for in the future. The work required on the Reid Branch at this time is minimal. As previous sections of this Report indicate, the desirable work would be to lower the culvert to be installed across Line 6 as part of the Town’s project. However, it is understood utilities prevent this lowering from occurring.

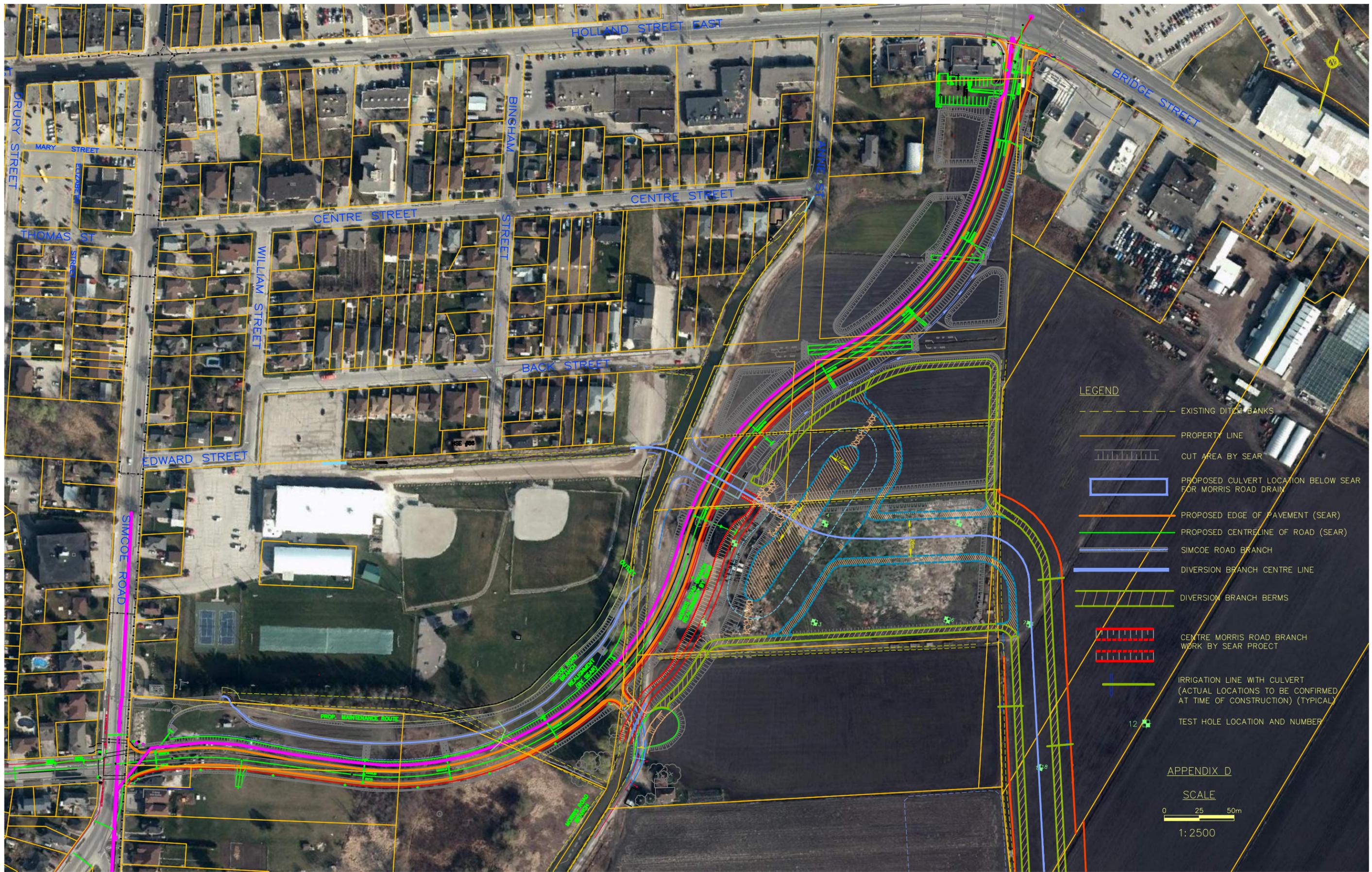
As a result, only limited brushing is proposed as part of this report.

In the future, and if a lower outlet for the Reid Branch is still desired, some type of piped low level outlet to the south of, but parallel to, Line 6 should be explored.

If the Reid Branch is indeed incorporated and if the discussions are favorable with respect to incorporating the existing SWM facility on Line 6 at Simcoe Road, there would be merit to consider future incorporations of the storm water management facilities, once constructed, that will serve the future subdivisions. Such would better provide for the required maintenance of such future facilities.

## **APPENDIX D**

# **AERIAL PHOTOGRAPH OF WORK PROPOSED BY SEAR**

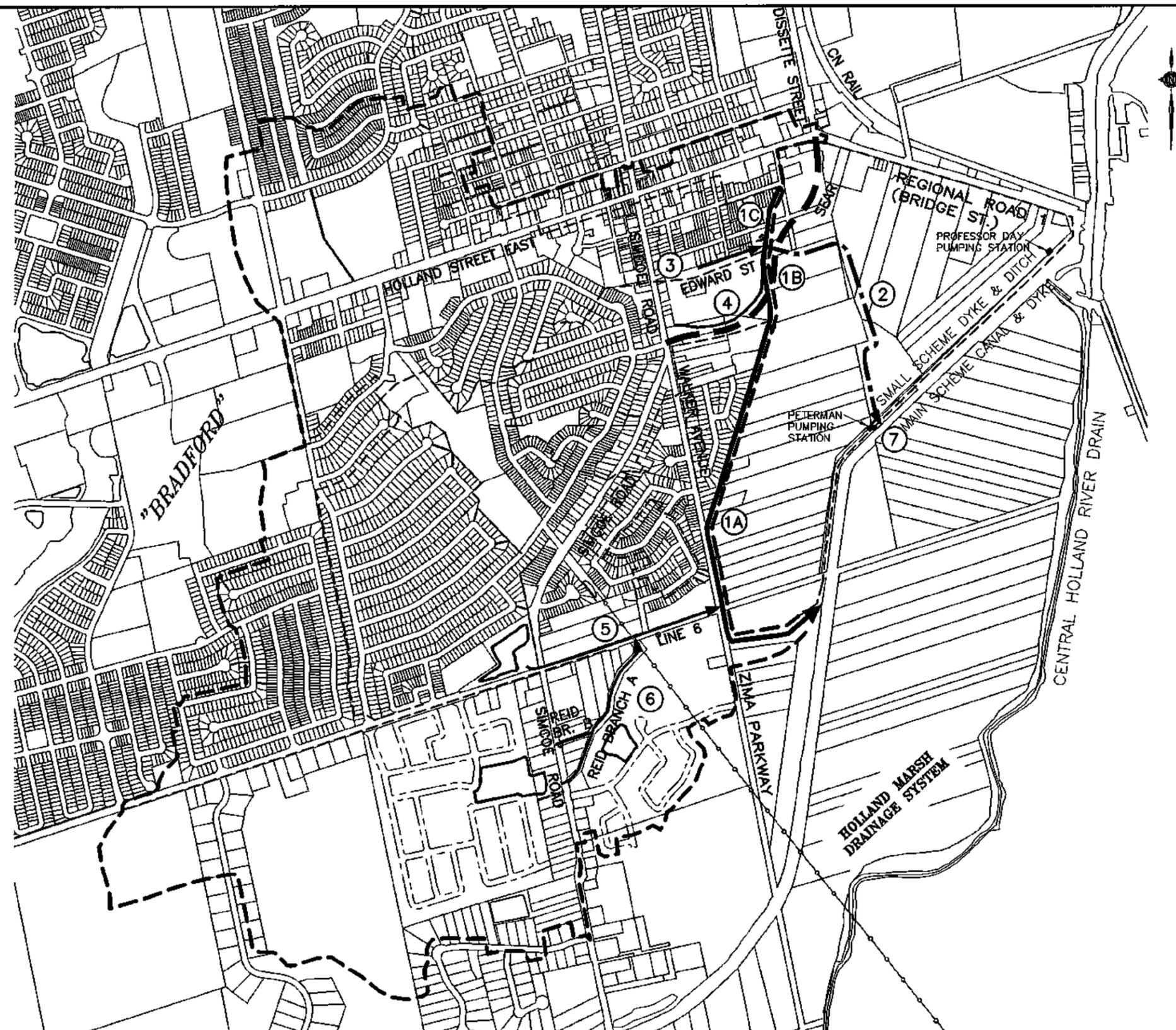


- LEGEND**
- EXISTING DITCH BANKS
  - PROPERTY LINE
  - ||||| CUT AREA BY SEAR
  - PROPOSED CULVERT LOCATION BELOW SEAR FOR MORRIS ROAD DRAIN
  - PROPOSED EDGE OF PAVEMENT (SEAR)
  - PROPOSED CENTRELINE OF ROAD (SEAR)
  - SIMCOE ROAD BRANCH
  - DIVERSION BRANCH CENTRE LINE
  - ||||| DIVERSION BRANCH BERMS
  - ||||| CENTRE MORRIS ROAD BRANCH WORK BY SEAR PROJECT
  - IRRIGATION LINE WITH CULVERT (ACTUAL LOCATIONS TO BE CONFIRMED AT TIME OF CONSTRUCTION) (TYPICAL)
  - 12 TEST HOLE LOCATION AND NUMBER

**APPENDIX D**

**SCALE**  
 0 25 50m  
 1: 2500

WATERSHED PLAN AND DRAWING LIST		Dwg. 1
SMALL SCHEME LANDS		Dwg. 2
<b>① MORRIS ROAD BRANCH</b>		
<b>①A SOUTH MORRIS ROAD BRANCH</b>	ENLARGEMENT AERIALS	Dwg. 3 to 8
	PROFILES	Dwg. 9 to 10
	CROSS SECTIONS	Dwg. 11 to 22
<b>①B CENTRE MORRIS ROAD BRANCH</b>	ENLARGEMENT AERIAL	Dwg. 23
	PROFILE	Dwg. 10
	CROSS SECTIONS	Dwg. 22
<b>①C NORTH MORRIS ROAD BRANCH</b>	ENLARGEMENT AERIAL	Dwg. 24
	PROFILE	Dwg. 10
	CROSS SECTIONS	Dwg. 25
<b>② DIVERSION BRANCH</b>		
	ENLARGEMENT AERIAL	Dwg. 26 to 29
	PROFILE	Dwg. 30
	CROSS SECTIONS	Dwg. 31 to 35
<b>③ EDWARD STREET BRANCH</b>		
	ENLARGEMENT AERIAL	Dwg. 36
	PROFILE	Dwg. 37
	CROSS SECTIONS	Dwg. 38
<b>④ SIMCOE ROAD BRANCH</b>		
	ENLARGEMENT AERIAL	Dwg. 39 and 40
	PROFILE	Dwg. 41
	CROSS SECTIONS	Dwg. 42
<b>⑤ LINE 6 BRANCH</b>		
	ENLARGEMENT AERIAL	Dwg. 43 and 44
	PROFILE	Dwg. 45
	CROSS SECTIONS	Dwg. 46
<b>⑥ REID BRANCHES (A AND B)</b>		
	ENLARGEMENT AERIAL	Dwg. 47 and 48
	PROFILE	Dwg. 49
	CROSS SECTIONS	Dwg. 50
<b>SMALL SCHEME DYKE AND DITCH</b>		
	ENLARGEMENT AERIALS	Dwg. 51 to 56
	PROFILE	Dwg. 57
	CROSS SECTIONS	Dwg. 58 to 63
<b>LINE 6 POSSIBLE ACCESS AND HAUL ROUTE</b>		
	ENLARGEMENT AERIALS	Dwg. 64
	PROFILE	Dwg. 65
	CROSS SECTIONS	Dwg. 66
<b>WALKER AVE CULVERT</b>		
	PROFILE AND CROSS SECTIONS	Dwg. 67
<b>CENTRE MORRIS ROAD BRANCH TIE-IN</b>		
	PROFILE AND TIE-IN DETAIL	Dwg. 68
	CROSS SECTION AND DETAIL	Dwg. 69
<b>IRRIGATION DETAIL AND EROSION CONTROL BLANKET DETAILS</b>		
		Dwg. 70
<b>EDWARD STREET FOOTBRIDGE</b>		
		Dwg. 71
<b>⑦ PETERMAN PUMPHOUSE</b>		
	EXISTING CONDITIONS	Dwg. 72
	PROPOSED FLOOR PLAN	Dwg. 73
	PROPOSED SECTIONS	Dwg. 74
	DETAILS	Dwg. 75 to 77
<b>GOOGLE STREET VIEW IMAGES</b>		
		Dwg. 78 to 86



**PLAN LEGEND**

- EXTERNAL WATERSHED
- - - SCHEME WATERSHED
- MORRIS ROAD BRANCH
- - - DIVERSION BRANCH
- BRANCH LOCATIONS
- ARTERIAL (SEAR) CORRIDOR
- ③ LOCATIONS OF SIGNIFICANT FEATURES

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.

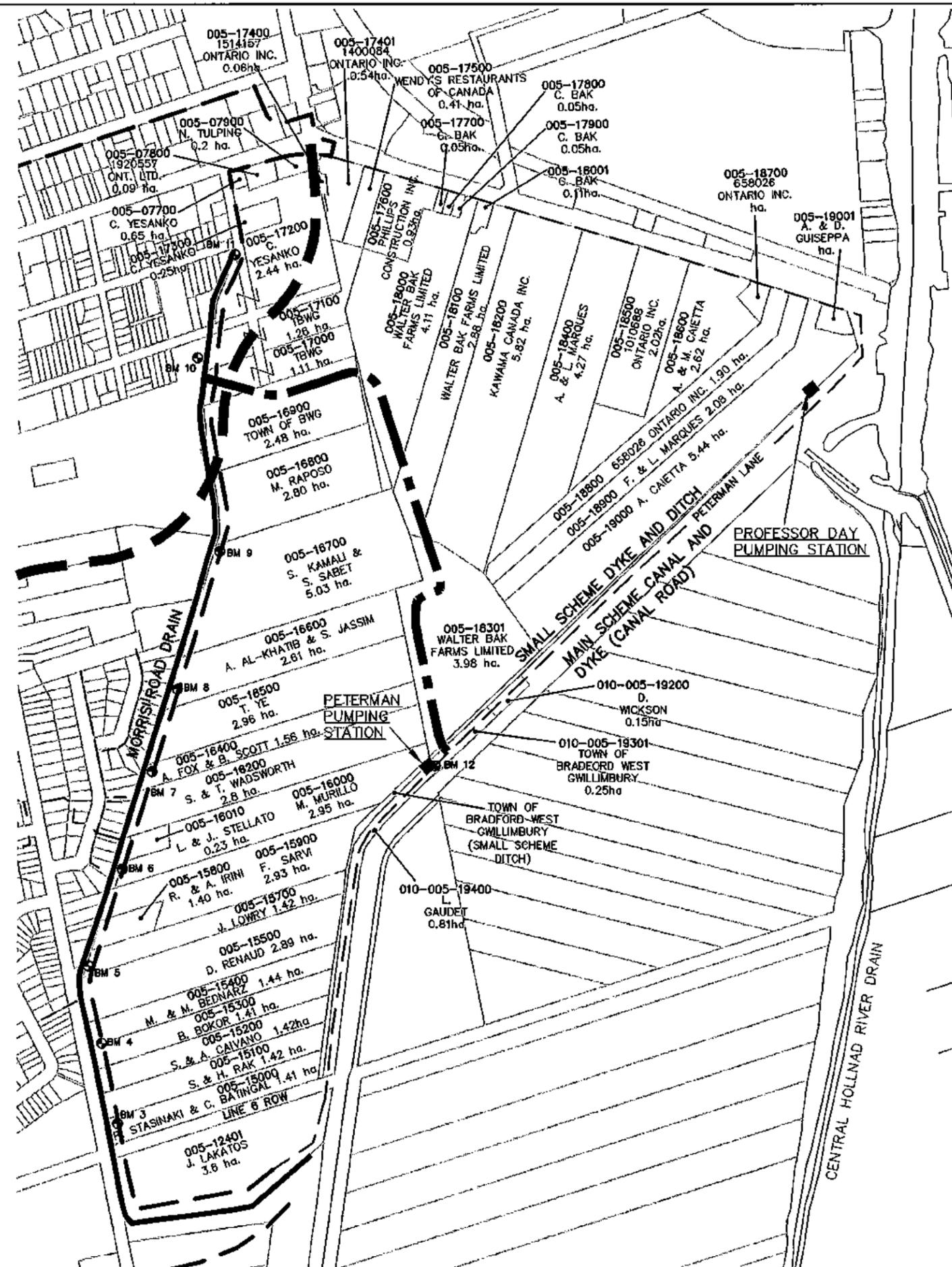


SCALE  
 0 150 300  
 1:15,000  
 (ON 11"x17")

<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>WATERSHED PLAN AND DRAWING LIST</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS RITCHENER SUBURBY	REVISED:	
	JOB NUMBER: 12-267	
	DRAWING 1	

## BENCHMARK LIST

- BM3**  
NAIL IN SW SIDE OF HP#P10619,  
IN FRONT OF HSE#407 MORRIS ROAD  
ELEV=220.686m
- BM4**  
NAIL IN WEST SIDE OF HP#P10616,  
IN FRONT OF HSE#399 MORRIS ROAD  
ELEV=220.700m
- BM5**  
NAIL IN SOUTH SIDE OF HP#P10613, WEST SIDE MORRIS ROAD,  
15m APPROXIMATELY NORTH OF CULVERT AT INTERSECTION OF  
WALKER ROAD AND MORRIS ROAD.  
ELEV=220.579m
- BM6**  
NAIL IN W SIDE OF HP#P10608, IN FRONT OF HSE#315 MORRIS RD.  
ELEV=220.810m
- BM7**  
NAIL IN WEST SIDE OF HP#P10604,  
IN FRONT OF HSE#271 MORRIS ROAD.  
ELEV=220.841m
- BM8**  
NAIL IN W SIDE OF HP#P10601,  
IN FRONT OF ABANDONED STEEL BUILDING.  
ELEV=220.604m
- BM9**  
NAIL IN WEST SIDE OF HP#P10596, EAST SIDE OF MORRIS ROAD,  
40m South OF LANEWAY.  
ELEV=220.349m
- BM10**  
NAIL IN SE SIDE OF HP#P12724, E SIDE OF MUNICIPAL PARKING LOT  
ACROSS FROM ROYAL CANADIAN LEGION BUILDING.  
ELEV=220.247m
- BM11**  
CUT X, TOP NE CORNER OF CONCRETE HEADWALL @ OUTLET,  
WEST SIDE MORRIS RD, TOP END OF DRAIN.  
ELEV=219.648m
- BM12**  
NAIL IN E SIDE OF HP W/METER BOX, 10m E OF PETERMAN PUMP  
HOUSE.  
ELEV= 220.129m
- BM13**  
NAIL IN SE SIDE OF HP#B7FBH, EAST SIDE OF SIMCOE ROAD,  
NW CORNER OF PROPERTY HSE#589  
ELEV=221.576m
- BM14**  
CUT X, TOP NW CORNER CONCRETE PAD FOR GREEN HYDRO VAULT  
#T20541 IN FRONT OF NEW LINE 6 PUMP STATION,  
140m± WEST OF ZMA PARKWAY  
ELEV=220.745m



**PLAN LEGEND**

- EXTERNAL WATERSHED
- SCHEME LANDS WATERSHED
- MORRIS ROAD BRANCH
- ARTERIAL (SEAR) CORRIDOR
- DIVERSION BRANCH
- BM 6 BENCHMARK NUMBER

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		0 75 150
DRAWN BY: N.M.B.		1:7,500 (ON 11"x17")
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		
<b>LANDS IN SMALL SCHEME WATERSHED AND BENCHMARK LIST</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER ONTARIO		REVISED:
		JOB NUMBER: 12-267 DRAWING: 2



**SCOPE OF WORK (STA. 070 TO 415) (PHASE 2 WORK)**

**STA. 070 TO 0+330**

-CLEAR AND GRUB ALL BUSH IN CHANNEL AND ON SOUTH SIDE TO WITHIN 5m OF PROPERTY LINE. ROOTS IN CHANNEL BANKS TO REMAIN EXCEPT WHERE WIDENING IS TO BE DONE.

**STA. 330 TO 415**

-CLEAR CHANNEL AND TOPS OF BANKS OF ALL BRUSH AND TREES  
-ROOT STRUCTURES TO REMAIN IN BANKS BUT TO BE REMOVED IN BOTTOM

**NOTE:**  
THESE AERIALS PRE-DATE THE RELOCATION OF HMDS NORTH CANAL TO THE SOUTH OF THE MORRIS ROAD BRANCH  
INTERVAL 1 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 070 TO 0+415

**STA. 070 TO 415**

- TYPE IV WORK
- EXCAVATE 3000m<sup>3</sup> ORGANICS TO CREATE A 3000m<sup>3</sup> DISPOSAL CELL ON SOUTH SIDE AND HAUL TO FORMER BAK FARM (SEE DRAWINGS FOR DETAILS).
- CHANNEL TO BE CLEANED TO PROFILE GRADE AND AS PER TYPICAL SECTIONS
- CONSTRUCT 90m OF DEEP POOL AND 100m OF LITTORAL SHELF IN CHANNEL
- WORK TO BE DONE FROM SOUTH AND WEST SIDE
- MATERIALS TO BE DISPOSED OF IN THE CELL
- SAVE SOME ORGANICS TO RESTORE CELL
- ANY TRAVEL NORTH ON ZIMA TO WALKER TO BE ONLY BY RUBBER TIERED EQUIPMENT
- MUD CLEAN-UP CONTINUALLY REQUIRED ON TRAVELLED ROADS
- SEE SEPARATE SPECIAL PROVISION RE HAULING OF EXCAVATED ORGANICS FROM THE CELL AREA.

**STA. 365**

-PROTECT EXISTING STORM DRAIN OUTLET

INTERVAL 1 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 070 TO 415  
INTERVAL 2 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 415 TO 712  
INTERVAL 3 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 712 TO 1+458

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- NEW CURBS
- TEST HOLE LOCATION AND NUMBER

**WORKING AREA**

PARCEL 12418, ZIMA PARKWAY AND SMALL SCHEME DYKE

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



**SCALE**  
0 10 20  
1:1000  
(ON 11"x17")

**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

**SOUTH MORRIS ROAD BRANCH ENLARGEMENT AERIAL 1**

APR. 14, 2016

**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

REVISED:  
JOB NUMBER: 12-267  
DRAWING 3



THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND, WHERE SHOWN, THE ACCURACY IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

**SCOPE OF WORK (STA. 415 TO 600)**  
(PHASE 2 WORK EXCEPT WHERE SPECIFIED)

- STA. 415 TO 600**
- ALL WORK TO BE DONE FROM EAST SIDE
  - CLEAR CHANNEL AND TOPS OF BANKS OF ALL BRUSH AND TREES
  - ROOT STRUCTURES TO REMAIN IN BANKS BUT TO BE REMOVED IN BOTTOM
  - NEW STORM OUTLETS ON WEST SIDE TO BE PROTECTED
  - TYPE V WORK
  - CHANNEL TO BE BOTTOM CLEANED THROUGHOUT TO DESIGN GRADES AND SECTIONS
  - MATERIALS TO BE LOADED AND HAULLED ALONG MORRIS ROAD TO DISPOSAL AREA ON FORMER BAK FARM SITE UNLESS A DECISION IS MADE, AND APPROVAL IS GIVEN, TO HAUL ALONG THE UNOPENED LINE 6 AND SMALL SCHEME DYKE (A TEMPORARY CULVERT ACROSS THE SMALL SCHEME DITCH WOULD BE NECESSARY).
  - ANY IRRIGATION LINES CROSSING MORRIS ROAD ARE TO BE CAPPED
  - ONCE ALL WORK IS COMPLETED, MORRIS ROAD TO BE REPAVED (PHASE 3 WORK)
  - ANY TRAFFIC ALONG LINE 6 AND/OR WALKER AVENUE TO BE BY RUBBER TIERED VEHICLES/EQUIPMENT ONLY.

**STA. 445 AND 545**

- PROTECT EXISTING STORM DRAIN OUTLETS

INTERVAL 1 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 070 TO 415  
 INTERVAL 2 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 415 TO 712  
 INTERVAL 3 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 712 TO 1+458

**WORKING AREA**  
MORRIS ROAD EMBANKMENT

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- EXISTING STORM MAIN
- NEW CURBS
- 18 TEST HOLE LOCATION AND NUMBER

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



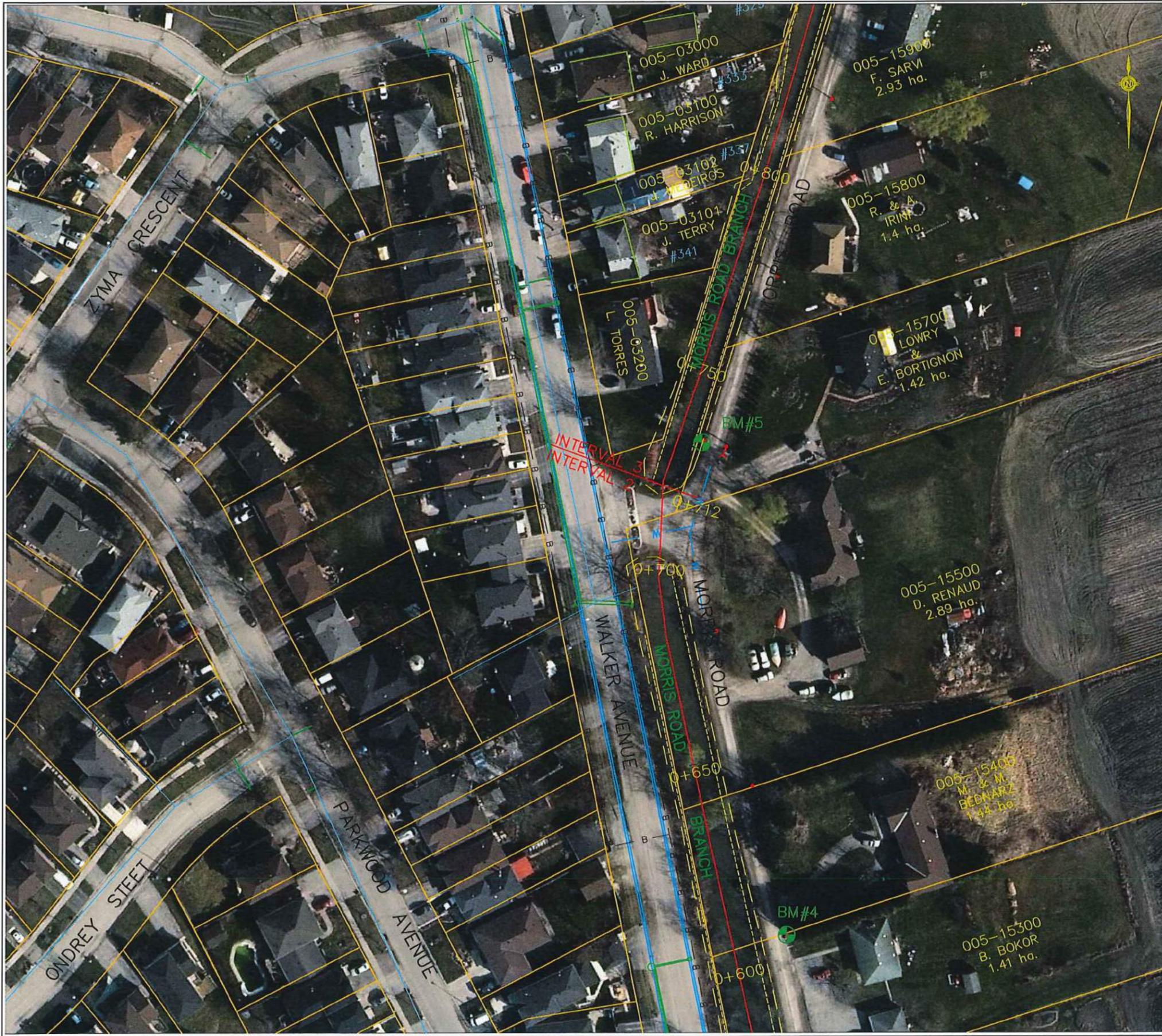
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 1:1000  
 (ON 11"x17")

**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

**SOUTH MORRIS ROAD BRANCH ENLARGEMENT AERIAL 2** APR. 14, 2016

**K. SMART ASSOCIATES LIMITED**  
 CONSULTING ENGINEERS AND PLANNERS  
 KITCHENER SUDBURY

REVISED:  
 JOB NUMBER: 12-267  
 DRAWING: 4



**SCOPE OF WORK (STA. 600 TO 790) (PHASE 2 WORK EXCEPT WHERE SPECIFIED)**

- STA. 600 TO 700**  
 -CLEARING IS TO BE DONE AS SPECIFIED ON DRAWING 4  
 -TYPE V WORK (SEE DRAWING 4 FOR DETAILS)
- STA. 690**  
 -PROTECT EXISTING STORM DRAIN OUTLET
- STA. 700 TO 720**  
 -EXISTING CULVERT TO REMAIN IN PLACE DURING CONSTRUCTION  
 -UPON COMPLETION OF ALL CONSTRUCTION IT IS TO BE REMOVED AND BE REPLACED WITH 20 OF 3000mm DIA. CSP (125x25mm CORRUGATIONS, 3.5mm WALL, ALUMINIZED) \* WITH 40m<sup>2</sup> OF RIPRAP ON FILTER AT EACH END (PHASE 3 WORK)  
 -EXISTING EMBANKMENT MATERIALS TO BE SALVAGED AND REPLACED. (PHASE 3)  
 -SURFACE ASPHALT TO BE REPLACED WHEN MORRIS ROAD IS REPAVED. (PHASE 3)  
 -BARRICADES TO BE RESET. (PHASE 3)

- STA. 720 TO 790±**  
 -CLEARING IS TO BE DONE AS SPECIFIED ON DRAWING 4.  
 -TYPE VI WORK  
 -FULL INTERVAL 3 FROM STA. 712 TO 1+458 IS TO BE COFFERDAMMED, FISH SHOCKED AND DEWATERED  
 -CLEAN BOTTOM OF ALL SEDIMENTS AND HAUL NORTH TO FORMER BAK FARM SITE  
 -THEN REMOVE AND DISPOSE OF MATERIALS AND BRUSH, ETC. ON WEST SIDE THAT WILL AFFECT NEW WEST SIDE BANK STABILIZATION WORK.  
 -THEN CONSTRUCT NEW WEST SIDE BANK STABILIZATION FROM PROPERTY LINE TO CHANNEL BOTTOM AND CONSTRUCT NEW EAST SIDE BANK STABILIZATION (SEE CROSS-SECTIONS)  
 -ENGINEER WILL IDENTIFY PROPERTY LINE ON WEST SIDE DURING MATERIALS PLACEMENT TO CONFIRM REQUIRED TOP OF BANK  
 -ANY SMALL PRIVATE DRAINS THAT DISCHARGE INTO THE CHANNEL ARE TO BE EXTENDED TO FACE OF NEW BANKS USING SIMILAR PIPING  
 -SEE SPECIAL PROVISION 44  
 -PAYMENT WILL BE MADE ON LUMP SUM CONTINGENCY PRICE FOR PRIVATE DRAIN EXTENSIONS.  
 -TOPSOIL AND SEED ALL STABILIZATION MATERIALS ABOVE NORMAL WATER LEVELS ONCE DONE  
 -PLACE EROSION CONTROL MAT ON ALL STABILIZED SURFACES AFTER TOPSOIL PLACEMENT AND AS PART OF SEEDING.  
 -DESCRIPTION OF WORK ON A PROPERTY BY PROPERTY BASIS IS EVIDENT AND LISTED ON DRAWINGS 74 TO 82 WHICH INCLUDE STREET-SCAPE PHOTOGRAPHY.

INTERVAL 2 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 415 TO 712  
 INTERVAL 3 OF SOUTH MORRIS ROAD BRANCH IS FROM STA. 712 TO 1+465

\* SECTIONS OF THIS PIPE MAY BE REQUIRED FOR USE IN A TEMPORARY CROSSING OF THE MORRIS ROAD BRANCH.

**WORKING AREA**  
 MORRIS ROAD EMBANKMENT, THE CHANNEL AND THE EASTERY 2m± OF LOTS BACKING ONTO CHANNEL

**LEGEND**

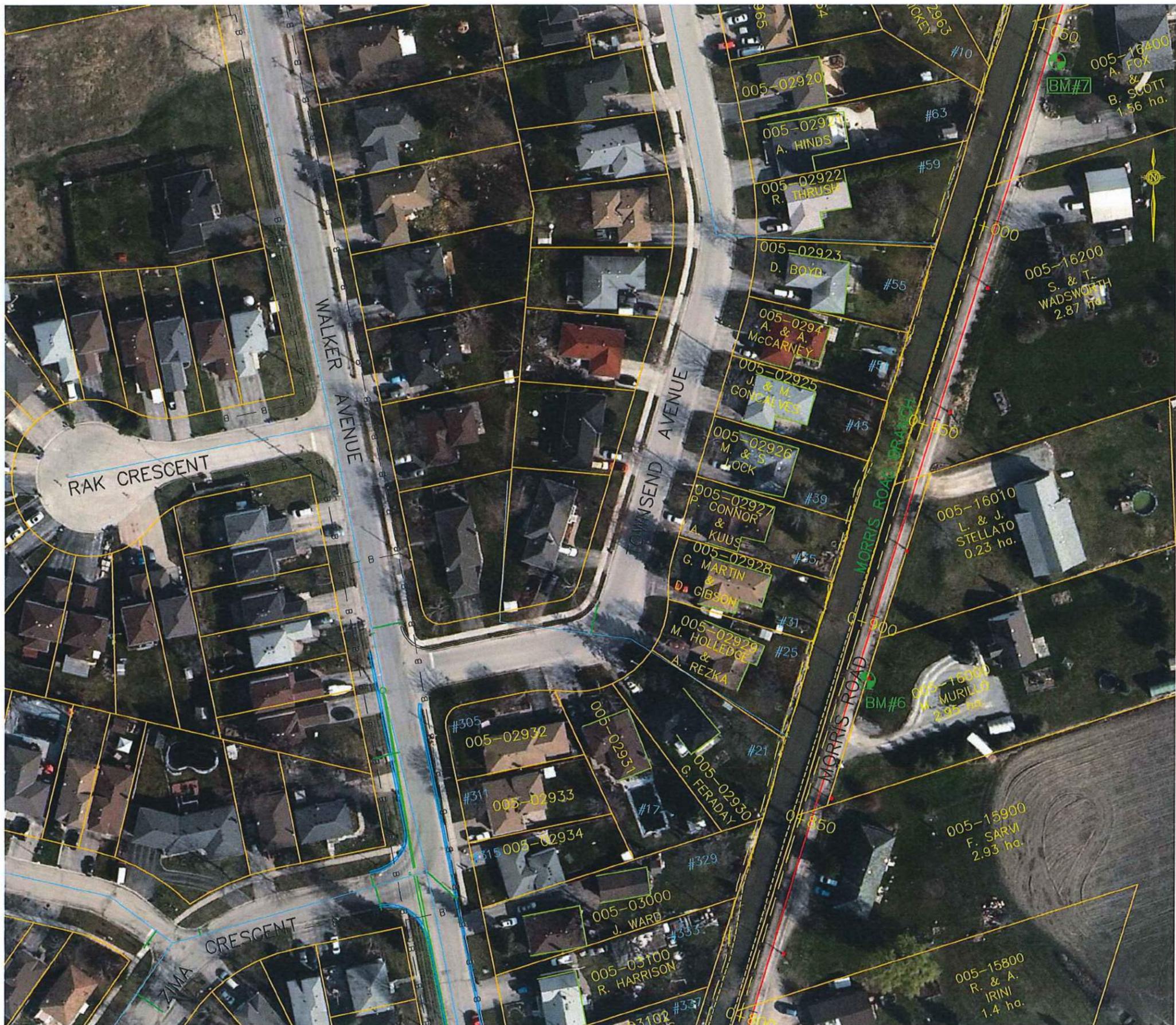
	EXISTING DITCH BANKS
	EXISTING TOE
	PROPERTY LINE
	EXISTING STORM MAIN
	NEW CURBS

DESIGNED BY: K.A.S.		<p>SCALE</p> <p>1:1000 (ON 11"x17")</p>
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		
CHECKED BY: K.A.S.		

**MORRIS ROAD DRAIN**  
 TOWN OF BRADFORD WEST GWILLIMBURY

**SOUTH MORRIS ROAD BRANCH ENLARGEMENT AERIAL 3** APR. 14, 2016

<p><b>K. SMART ASSOCIATES LIMITED</b>        CONSULTING ENGINEERS AND PLANNERS        KITCHENER SUDBURY</p>	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 5



**SCOPE OF WORK (790 TO 1+050) (PHASE 2 WORK)**

**STA. 790 TO 840±**  
 -CLEARING IS TO BE DONE AS SPECIFIED ON DRAWING 4  
 -THEN CONSTRUCT TYPE VI WORK AS DESCRIBED ON DRAWING 5 EXCEPT FOR MODIFICATIONS DESCRIBED HEREIN WHICH THEN CONSTITUTE TYPE VI-M WORK.  
 -IN THIS TYPE VI-M WORK, THE PROPERTY LINE IS 2±m WEST OF EXISTING TOP OF BANK AND THUS BANK EXCAVATION IS REQUIRED ON WEST SIDE. MATERIALS TO BE LOADED AND HAULED TO BAK FARM DISPOSAL SITE.  
 -TOPSOIL AND SEED AND USE EROSION CONTROL BLANKET.  
 -IF EXCAVATED NEW BANK IS UNSTABLE, DECISION MAY BE MADE TO EXCAVATE ADDITIONAL NATIVE SOILS AND REPLACE WITH NEW STABILIZATION MATERIAL FOR A THICKNESS OF 500mm.

**STA. 840 TO 1+050**  
 -CLEARING IS TO BE DONE AS SPECIFIED ON DRAWING 4  
 -THEN CONSTRUCT TYPE VI WORK AS DESCRIBED ON DRAWING 5

**STA. 870 AND 980**  
 -TOWN STORM DRAINS TO BE EXTENDED TO NEW BANK.  
 -REMOVE AND REPLACE EXISTING CONCRETE HEADWALLS IF ANY WITH NEW HEADWALLS AND EXTEND EACH DRAIN WITH 2.5m± OF 375 TO 400mm± HDPE PIPING  
 -NEW HEADWALL TO BE AS PER OPSD 804.030

**WORKING AREA**  
 MORRIS ROAD EMBANKMENT, THE CHANNEL AND THE EASTERY 2m± OF LOTS BACKING ONTO CHANNEL

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- EXISTING STORM MAIN
- NEW CURBS

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.

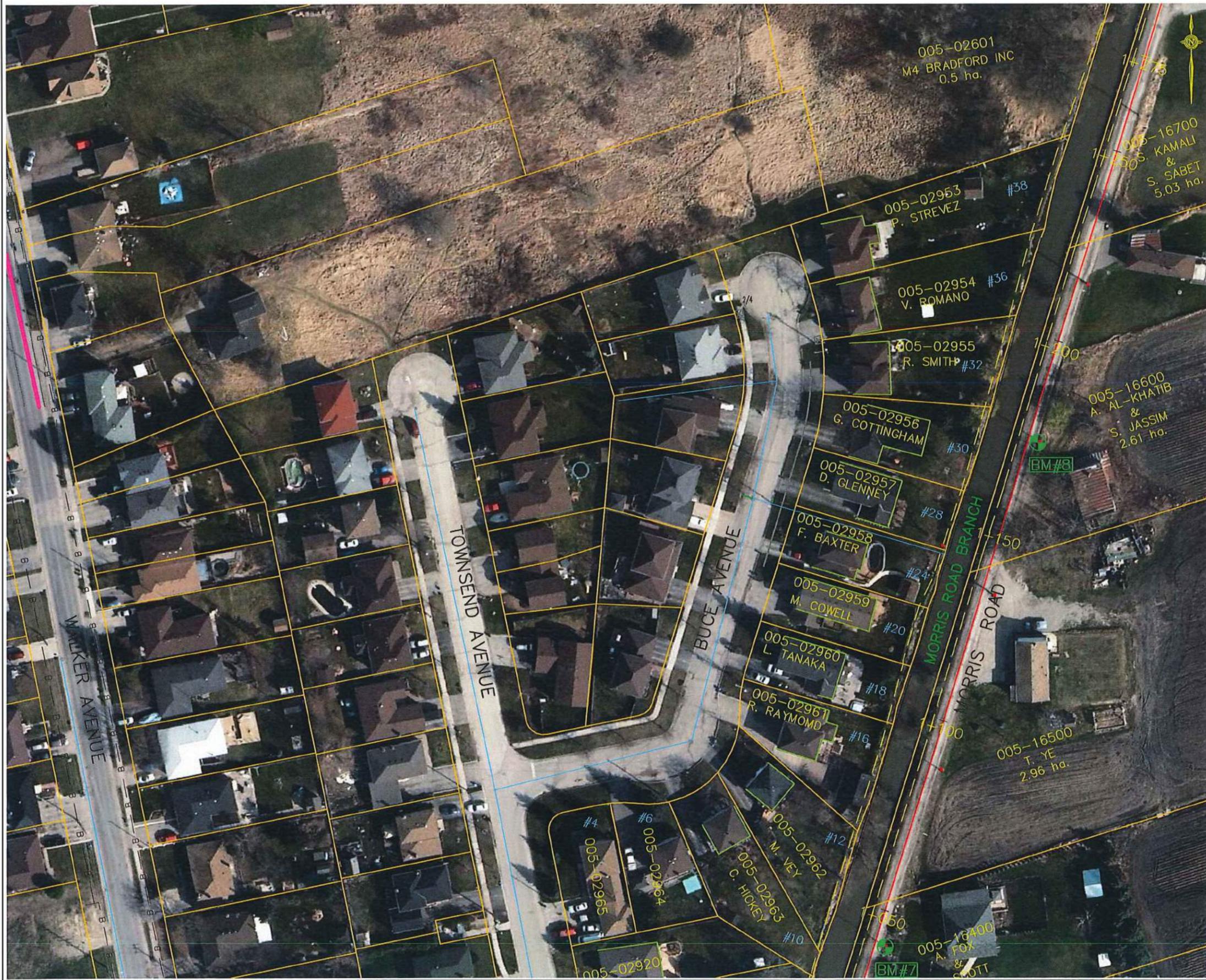


**SCALE**  
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 1:1000  
 (ON 11"x17")

**MORRIS ROAD DRAIN**  
 TOWN OF BRADFORD WEST GWILLIMBURY

**SOUTH MORRIS ROAD BRANCH ENLARGEMENT AERIAL 4** APR. 14, 2016

<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 6



**SCOPE OF WORK (1+050 TO 1+275) (PHASE 2 WORK)**

**STA. 1+050 TO 1+275**  
 -CLEARING IS TO BE DONE AS SPECIFIED ON DRAWING 3  
 -THEN CONSTRUCT TYPE VI WORK AS DESCRIBED ON DRAWING 4

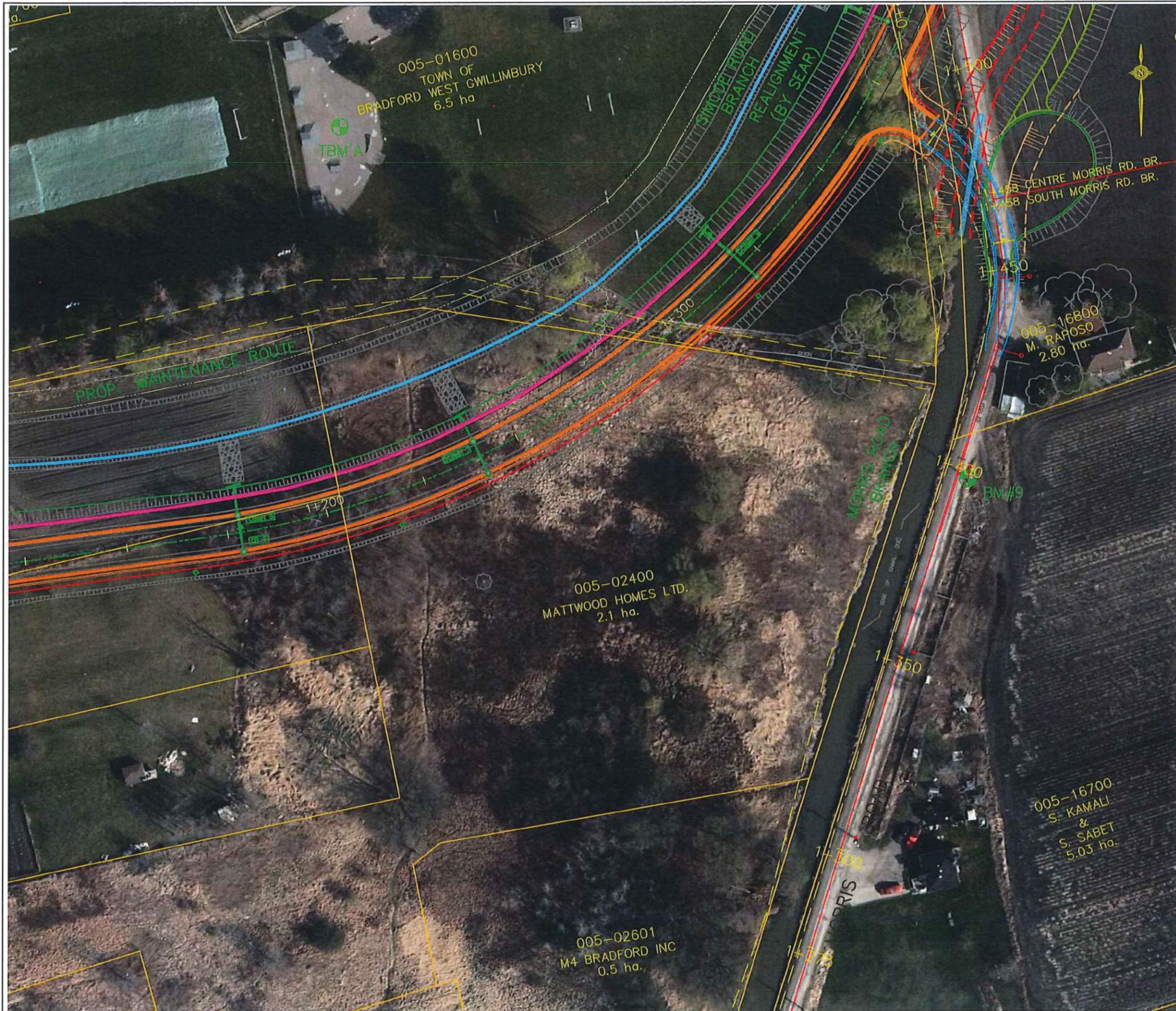
**STA. 1+145**  
 -TOWN STORM DRAIN TO BE EXTENDED TO NEW BANK (IF ANY)  
 -REMOVE AND REPLACE EXISTING CONCRETE HEADWALL (IF ANY)  
 WITH NEW HEADWALL AND EXTEND DRAIN WITH 2.5m± OF  
 200mm± HDPE PIPING

**WORKING AREA**  
 MORRIS ROAD EMBANKMENT, THE CHANNEL AND THE EASTERY  
 2m± OF LOTS BACKING ONTO CHANNEL

**LEGEND**

- EXISTING DITCH BANKS
- PROPERTY LINE
- EXISTING STORM MAIN

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		1:1000
CHECKED BY: K.A.S.		(ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SOUTH MORRIS ROAD BRANCH ENLARGEMENT AERIAL 5</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING 7



**SCOPE OF WORK (1+275 TO 1+458) (PHASE 2 WORK EXCEPT WHERE NOTED)**

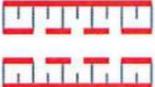
**STA. 1+275 TO 1+458**  
 -CLEARING IS TO BE DONE AS SPECIFIED ON DRAWING 4  
 -THEN CONSTRUCT TYPE VI WORK AS DESCRIBED ON DRAWING 5

**STA. 1+425**  
 -EXISTING SIMCOE BRANCH OUTLET TO REMAIN BUT MOST FLOW IN IT WILL BE DIVERTED BY SEAR PROJECT TO A NEW CHANNEL TO BE EXCAVATED ON WEST SIDE OF SEAR. THE OUTLET IS TO REMAIN AS EXISTING AND IS TO CONTINUE THROUGH NEW STABILIZED BANKS.

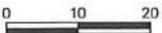
**STA. 1+490**  
 -CONSTRUCT NEW EMBANKMENT BETWEEN NEW CUL-DE-SAC AND NEW SEAR ROAD AS SOON AS DIVERSION BRANCH IS BUILT AND CONNECTED UP, AND PRIOR TO ANY WORK STARTING ON ANY OF MORRIS ROAD BRANCHES. EMBANKMENT TO BE 9m WIDE AT TOP AND TO HAVE 2:1 SIDE SLOPES. SEE DRAWINGS 68 AND 69 FOR PROFILE.  
 -30m OF 900mm DIA. HDPE PIPE TO BE CONSTRUCTED THROUGH EMBANKMENT. REQUIRED CULVERT INVERT ELEVATION IS TO BE MET. CULVERT BEDDING AND BACKFILL IS CRITICAL TO REDUCE EXTENT OF FUTURE SETTLEMENT. SEE TRENCH REQUIRED.  
 -CULVERT IS TO BE SEALED OFF DURING DOWNSTREAM WORK ON SOUTH MORRIS ROAD BRANCH INVOLVING DEWATERING AND WORKING IN DRY  
 -ROAD WORK AND PAVING ON THIS EMBANKMENT TO BE DONE AT COMPLETION OF PROJECT (PHASE 3 WORK).

**WORKING AREA**  
 MORRIS ROAD EMBANKMENT, THE CHANNEL AND THE EASTERY 2m± OF LOTS BACKING ONTO CHANNEL

**LEGEND**

-  PROPOSED EDGE OF PAVEMENT (SEAR)
-  PROPOSED CENTRELINE OF ROAD (SEAR)
-  TEMPORARY MORRIS ROAD CUL DE SAC TO BE BUILT BY SEAR BUT TO BE REMOVED BY THIS PROJECT
-  PERMANENT MORRIS ROAD TIE IN TO SEAR
-  CENTRE MORRIS ROAD BRANCH WORK BY SEAR PROJECT

**NOTE:**  
 COMPONENTS OF SEAR PROJECT BY AINLEY GROUP

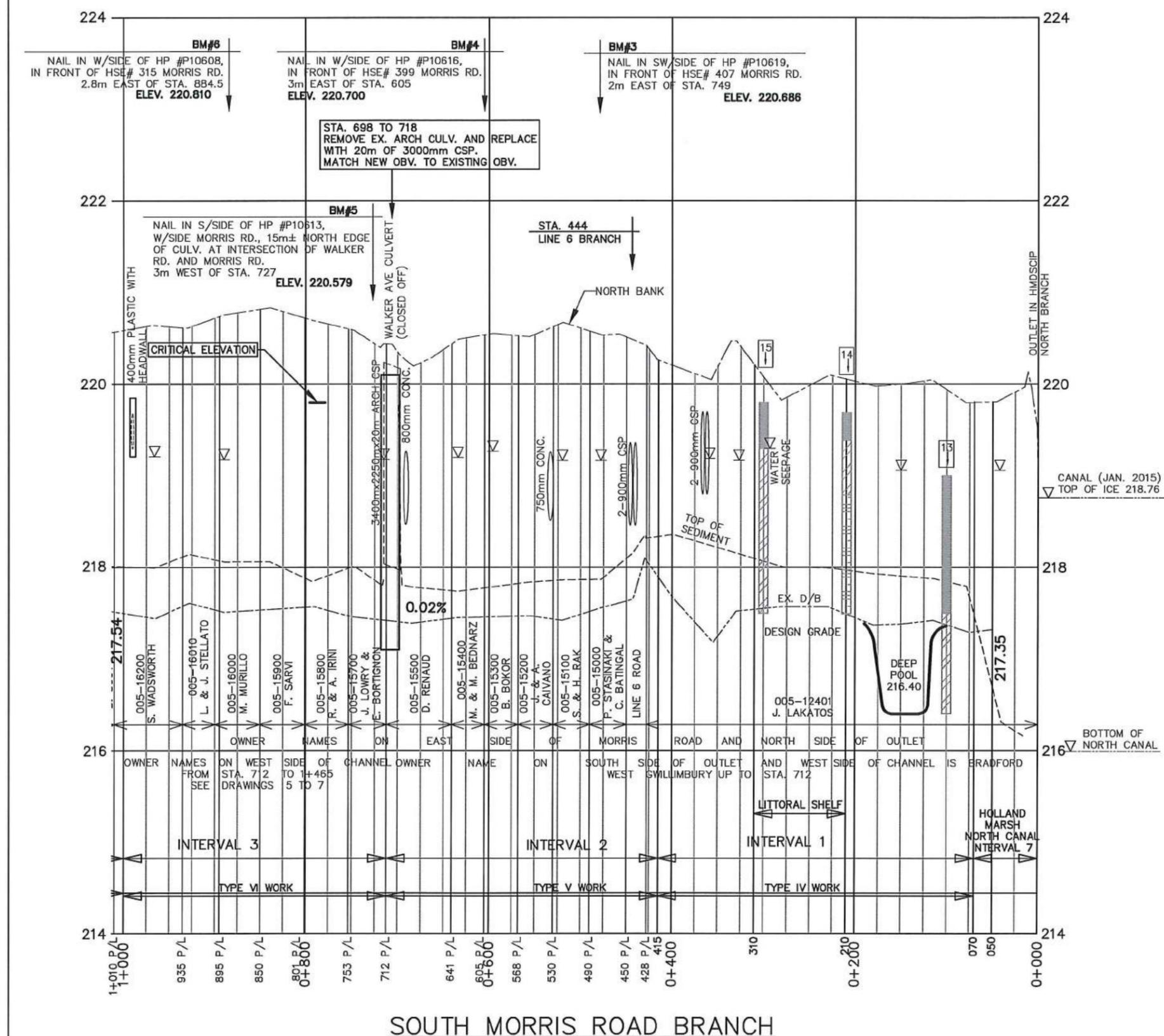
DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		1:1000
CHECKED BY: K.A.S.		(ON 11"x17")

**MORRIS ROAD DRAIN**  
 TOWN OF BRADFORD WEST GWILLIMBURY

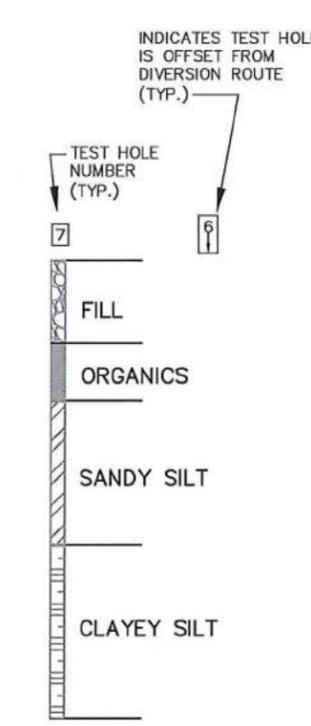
**SOUTH MORRIS ROAD BRANCH ENLARGEMENT AERIAL 6**

APR. 14, 2016

	<b>K. SMART ASSOCIATES LIMITED</b>	REVISED:
	CONSULTING ENGINEERS AND PLANNERS	JOB NUMBER: 12-267
	KITCHENER SUDBURY	DRAWING 8



**TEST HOLE LEGEND**

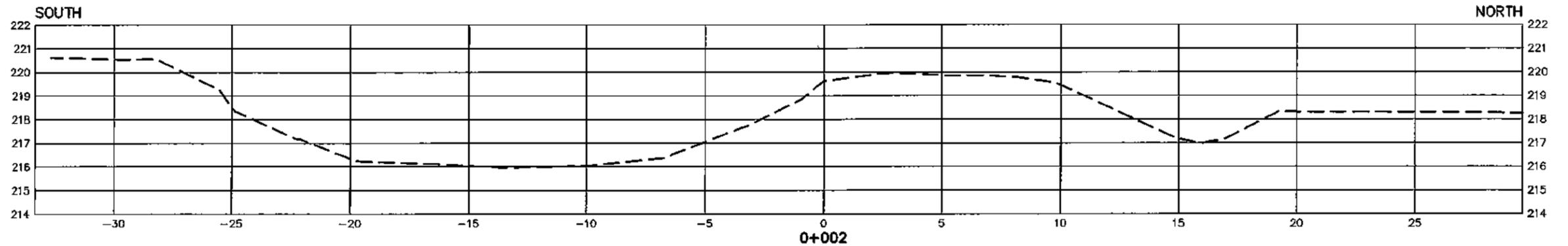
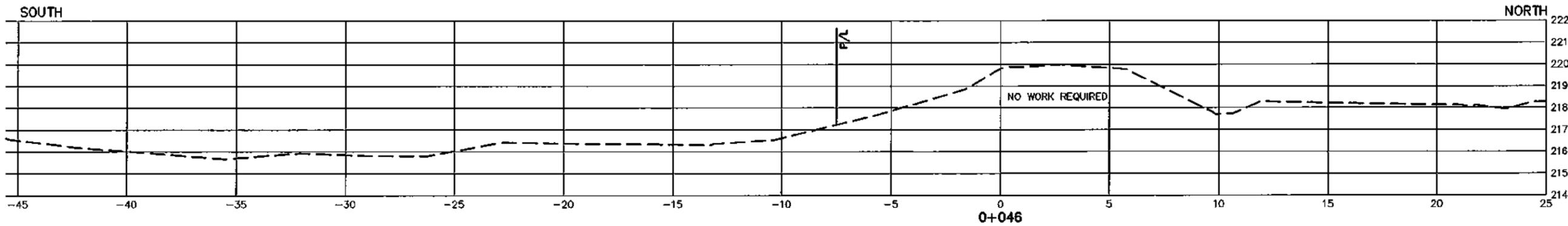
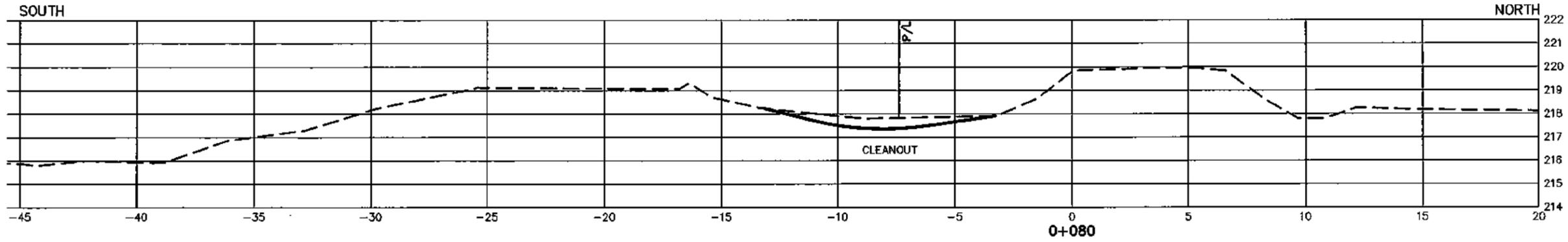


**LEGEND**

- TOP OF SEDIMENT
- EXISTING BANK
- EXISTING HARD DITCH BOTTOM (AS PROBED)
- DESIGN GRADE LINE

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		0 50 100m
DRAWN BY: N.M.B.		HORZ. 1:5000
CHECKED BY: K.A.S.		0 0.5 1m
		VERT. 1:50 (ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SOUTH MORRIS ROAD BRANCH PROFILE</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 9





**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

**SOUTH MORRIS ROAD BRANCH**  
**CROSS SECTIONS 1**

APR. 14, 2016

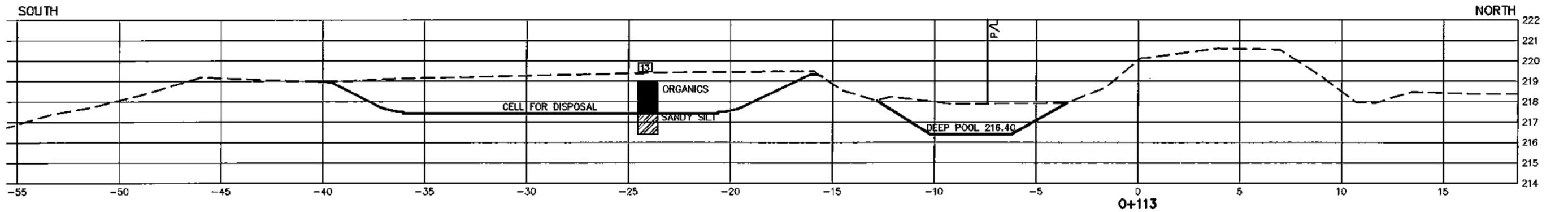
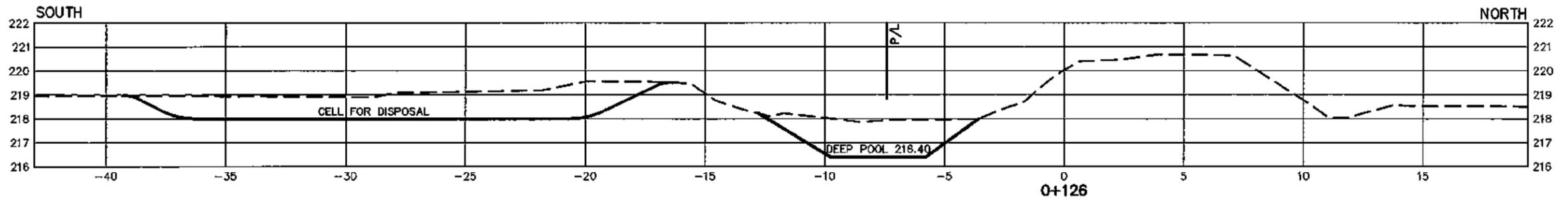
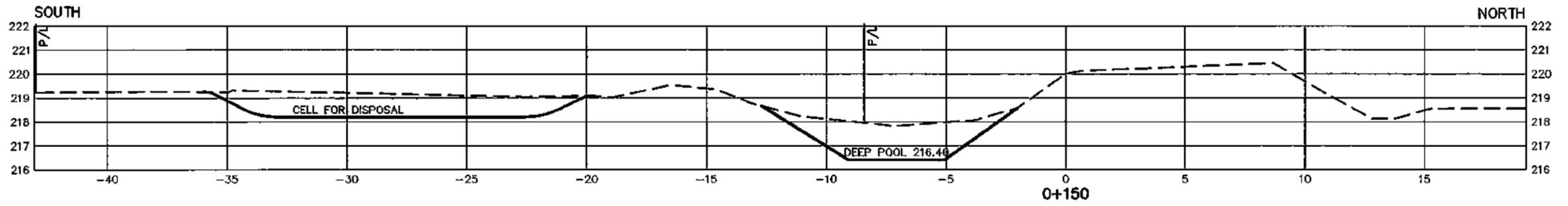
REVISD:  
JOB NUMBER: 12-267  
DRAWING: 11

**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



SCALE  
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HOR. 1:200  
0 4m  
VER. 1:200  
(ON 11"x17")

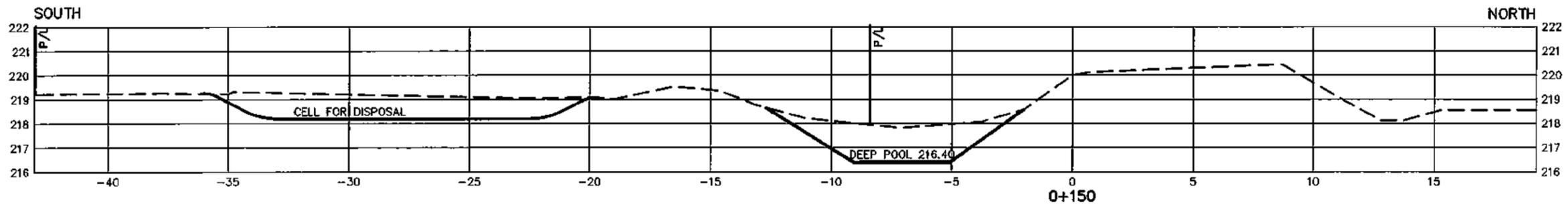
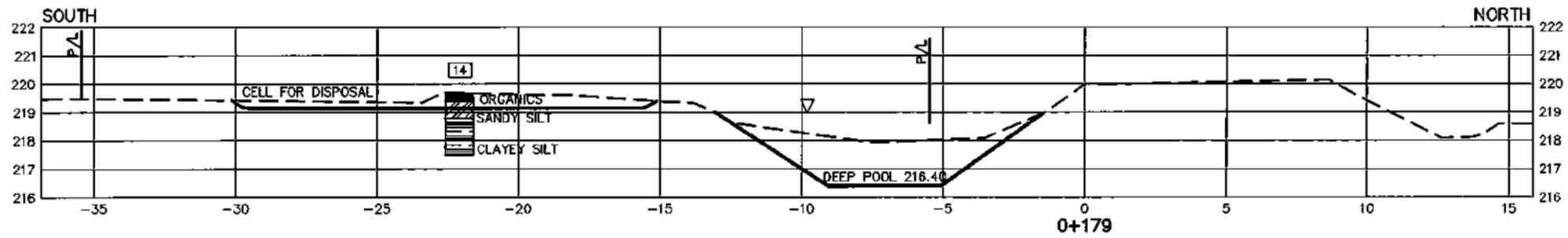
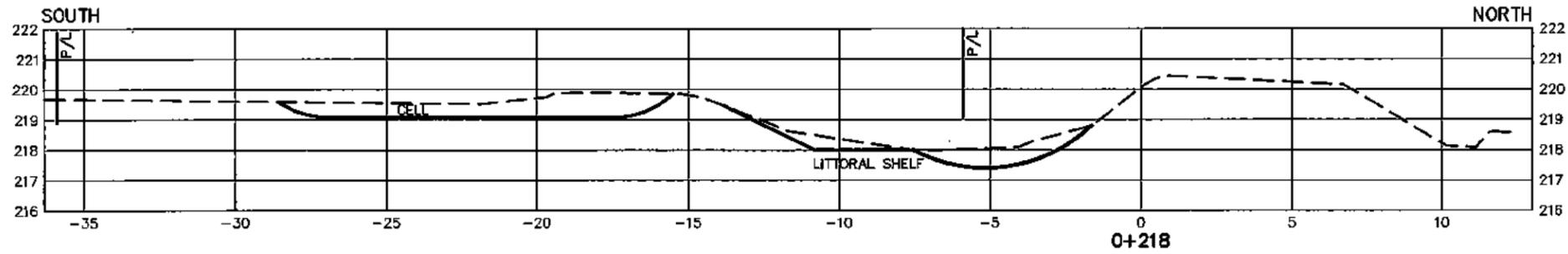
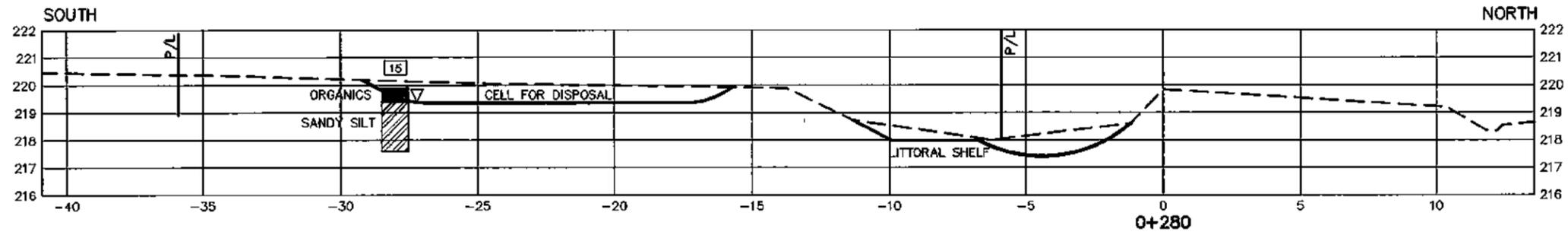


<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SOUTH MORRIS ROAD BRANCH CROSS SECTIONS 2</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS RITCHENER SUDBURY	REVISED: _____ JOB NUMBER: <b>12-207</b> DRAWING: <b>12</b>

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
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 HOR. 1:200  
 0 4m  
 VER. 1:200  
 (ON 11"x17")



### MORRIS ROAD DRAIN

TOWN OF BRADFORD WEST GWILLIMBURY

### SOUTH MORRIS ROAD BRANCH CROSS SECTIONS 3

APR, 14, 2016

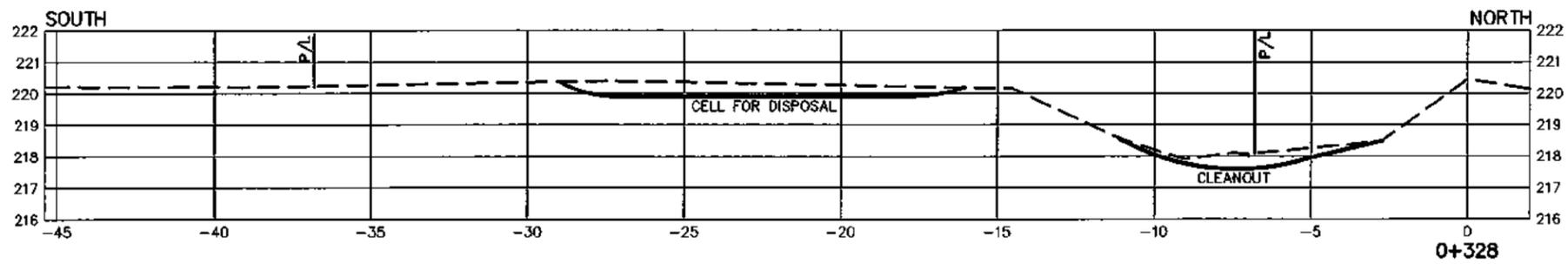
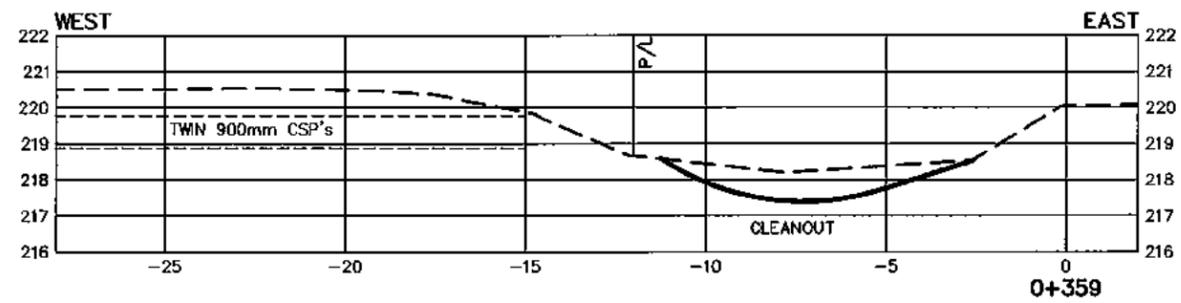
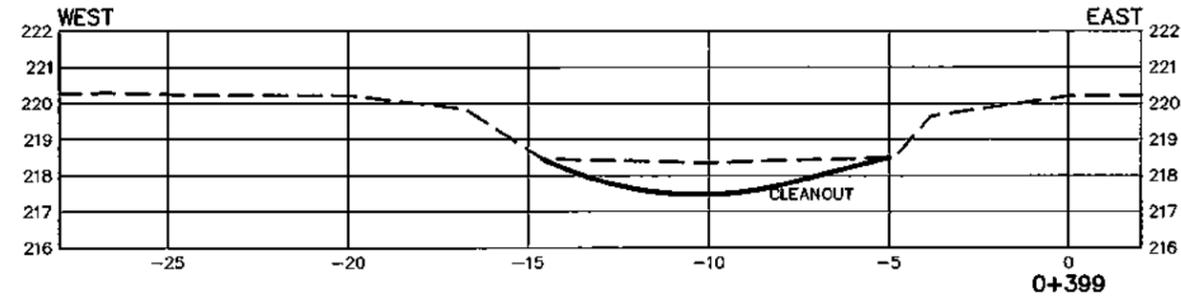
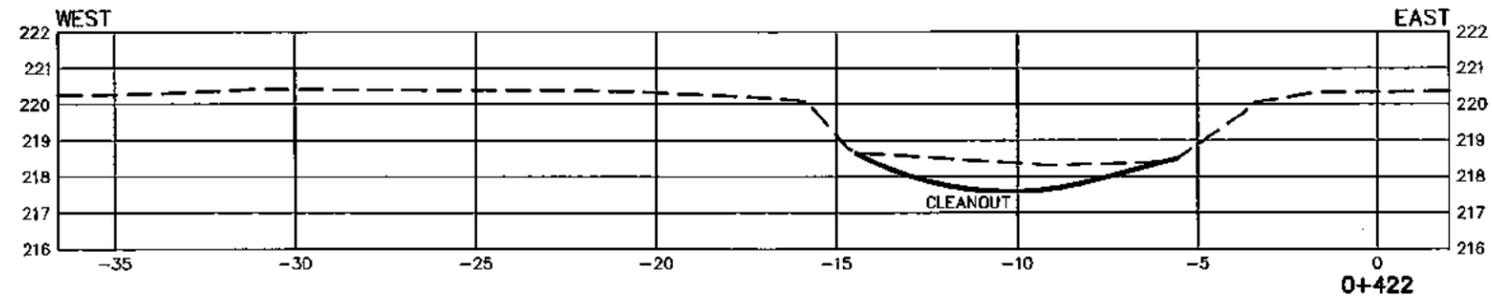
DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



SCALE  
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HOR. 1:200  
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VER. 1:200  
(ON 11"x17")

**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
RITCHENER SUDBURY

REVISED:  
JOB NUMBER: 12-267  
DRAWING  
**13**



**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

**SOUTH MORRIS ROAD BRANCH**  
**CROSS SECTIONS 4**

APR. 14, 2016

**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

REVISED:  
JOB NUMBER: 12-267  
DRAWING: **14**

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



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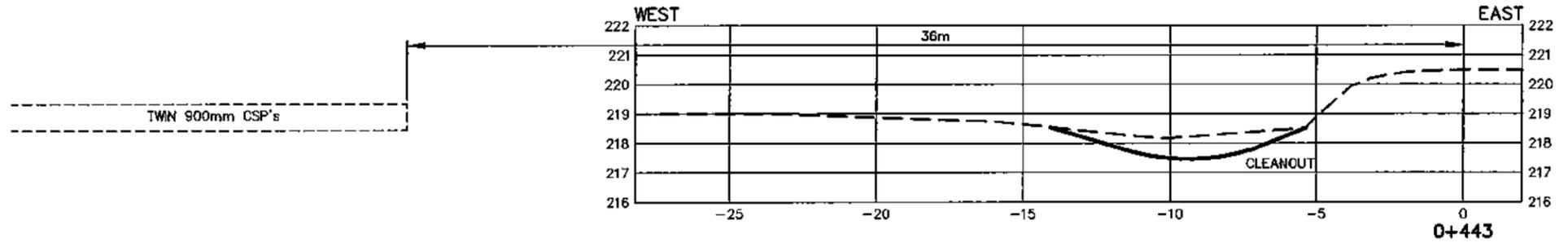
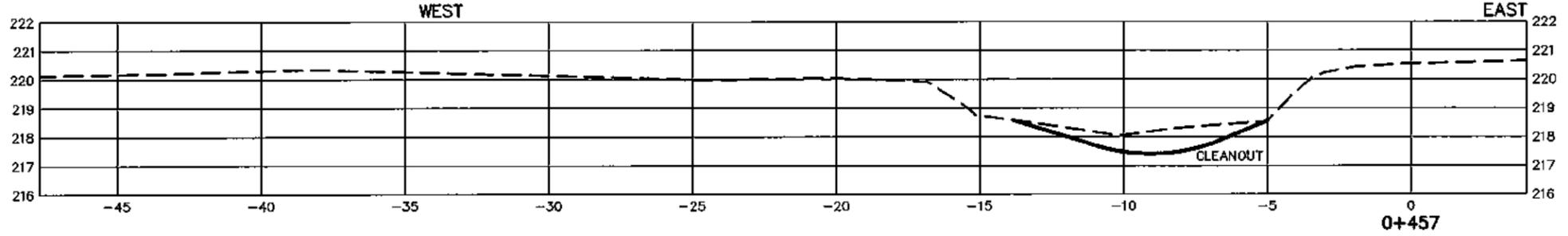
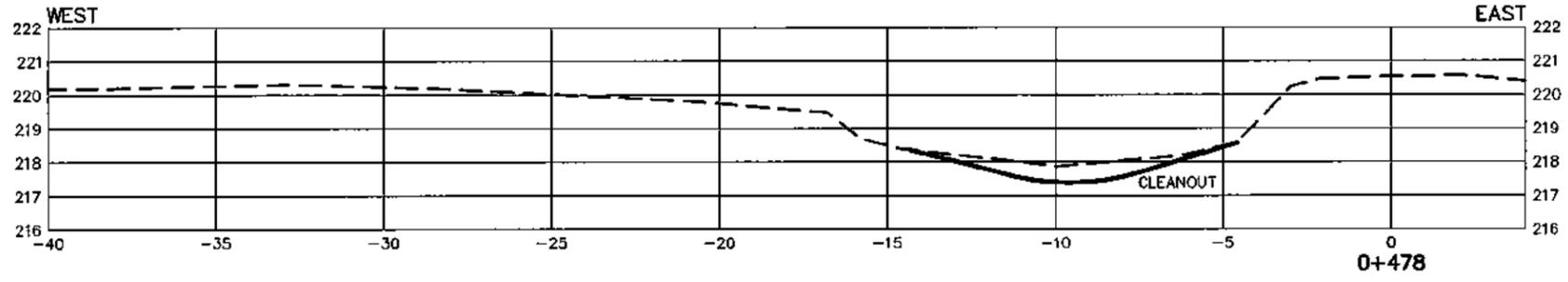
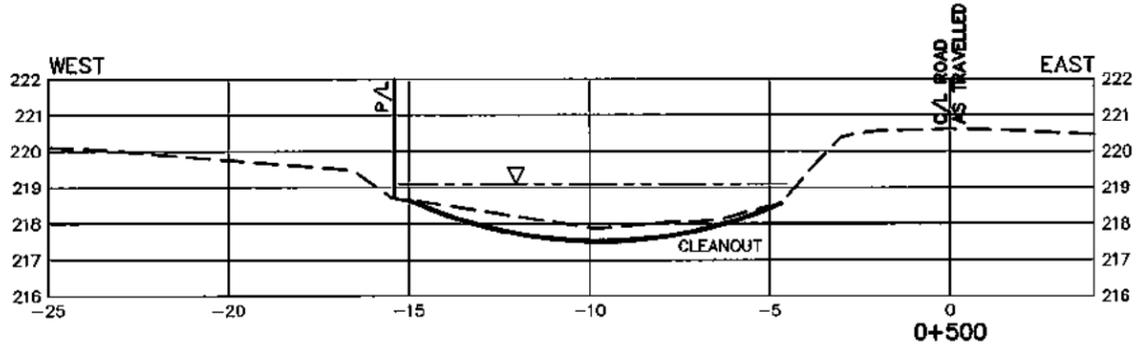
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(ON 11"x17")



**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

**SOUTH MORRIS ROAD BRANCH**  
**CROSS SECTIONS 5**

APR. 14, 2016

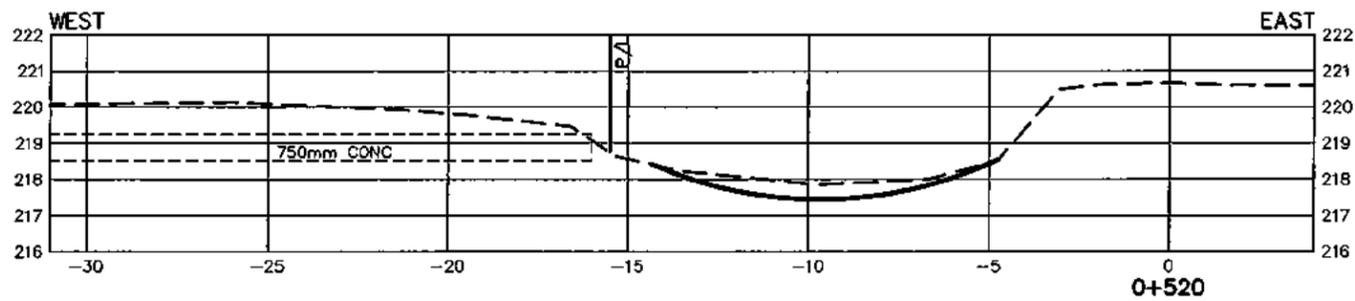
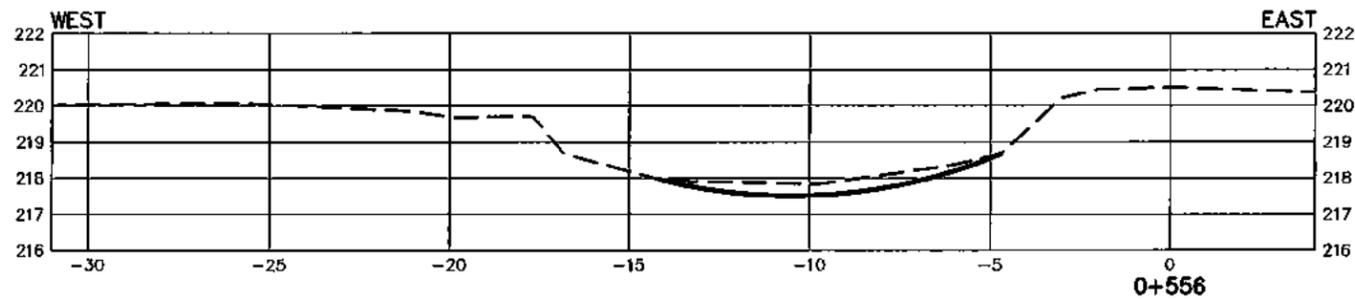
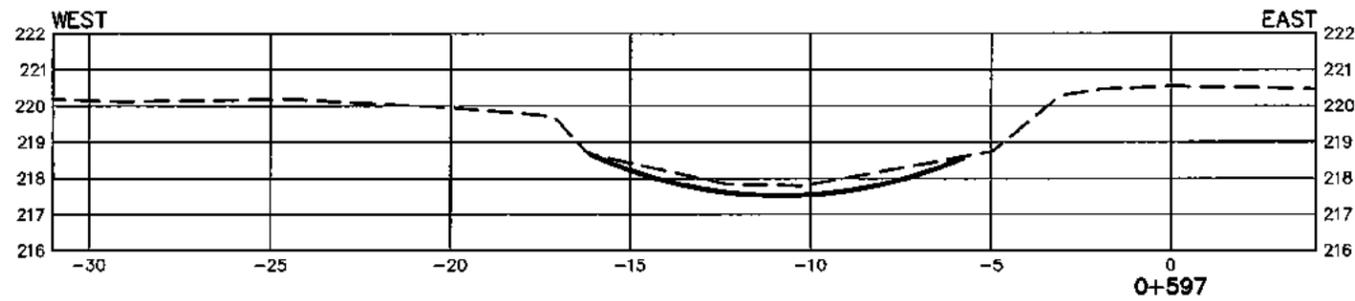
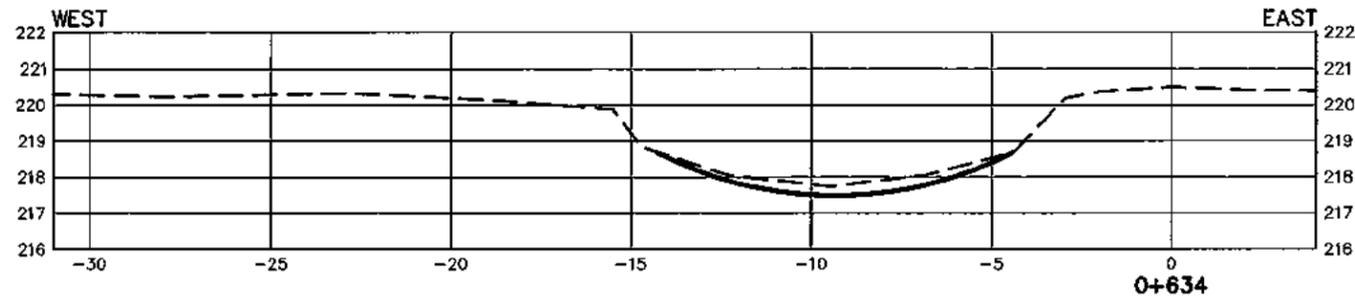
**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

REVISED:  
JOB NUMBER: 12-267  
DRAWING  
**15**

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.

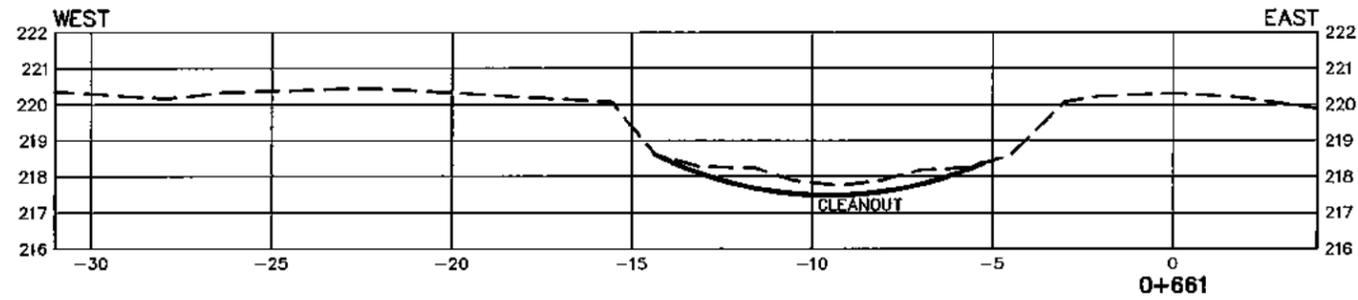
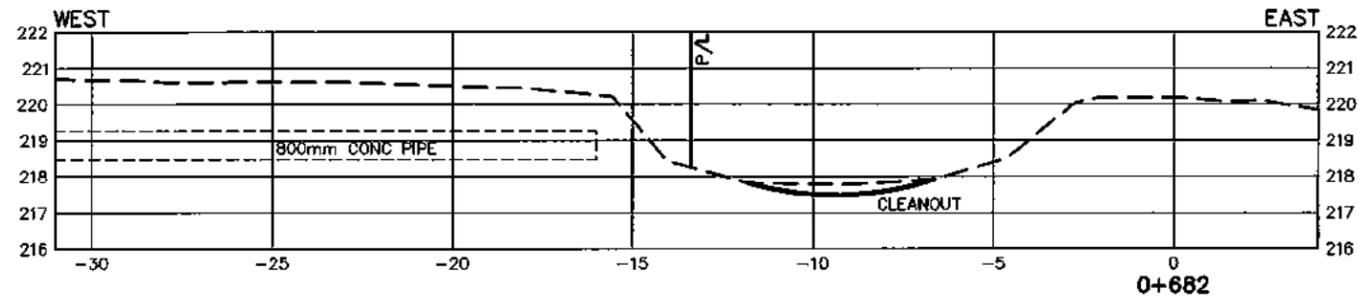
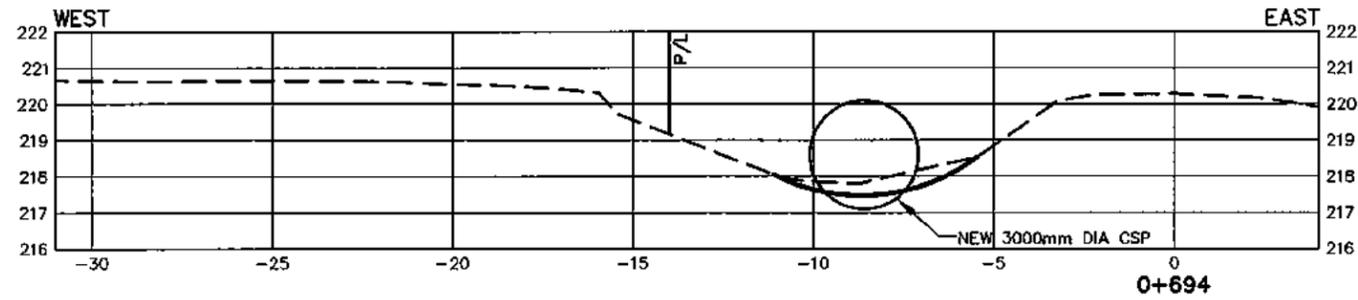
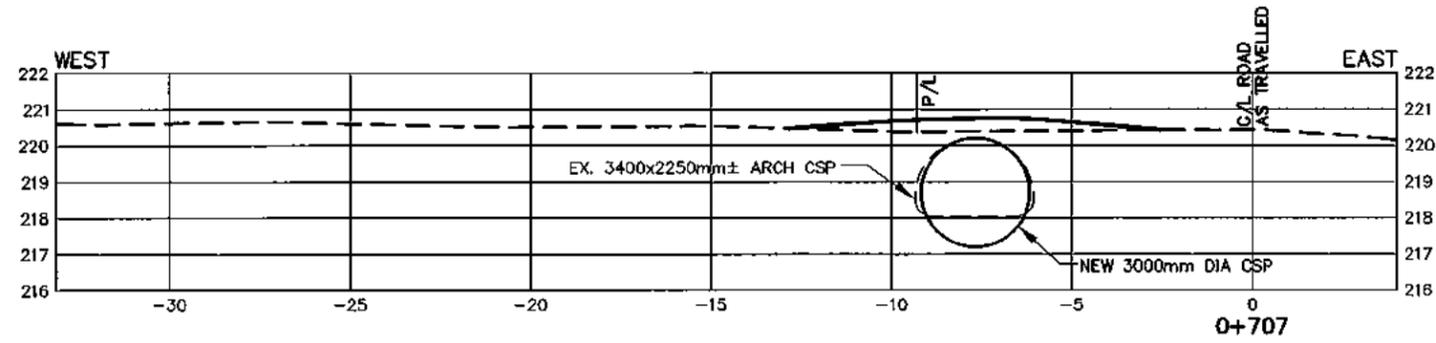


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HOR. 1:200  
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VER. 1:200  
(ON 11"x17")



DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		 HOR. 1:200
DRAWN BY: N.M.B.		 VER. 1:200
CHECKED BY: K.A.S.		(ON 11"x17")

<b>MORRIS ROAD DRAIN</b>	
TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SOUTH MORRIS ROAD BRANCH CROSS SECTIONS 6</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISION:
	JOB NUMBER: 12-267
	DRAWING: 16

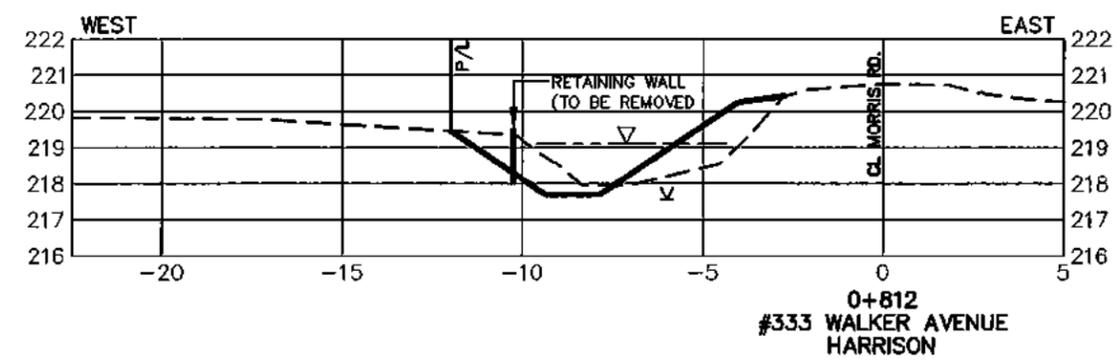
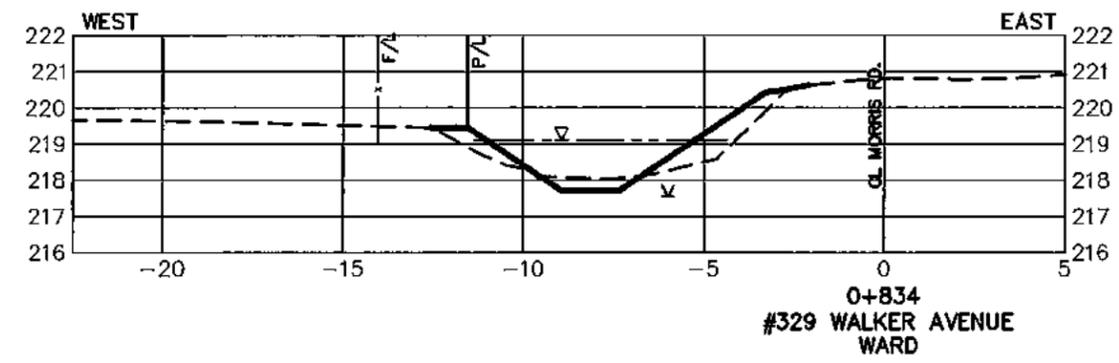
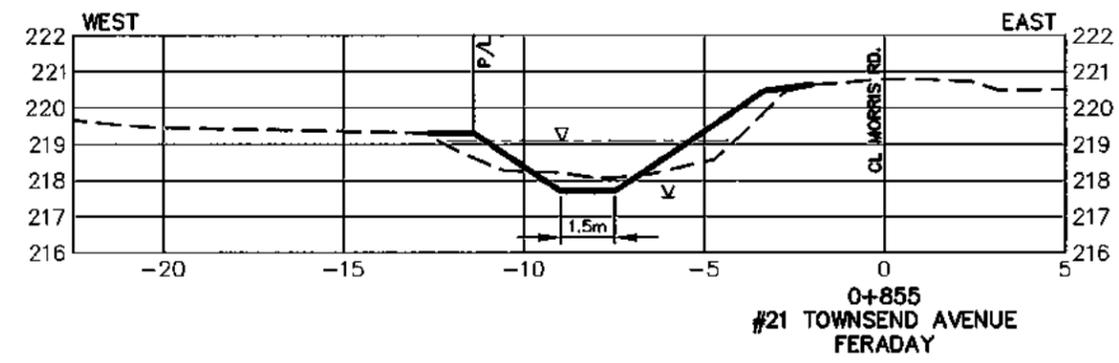
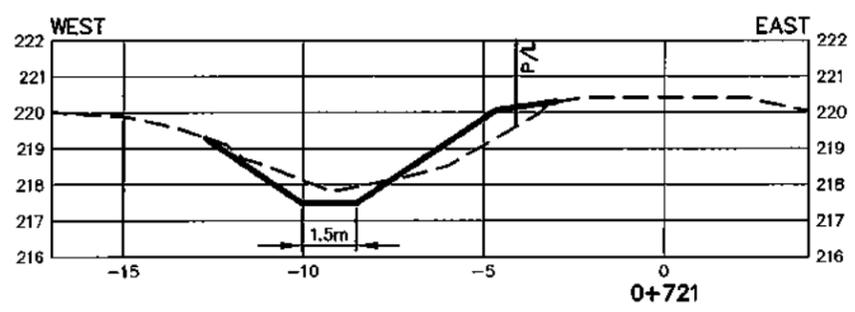
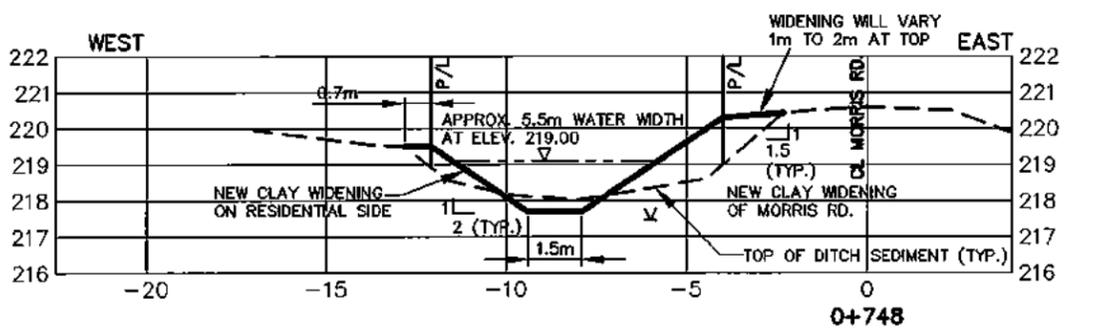
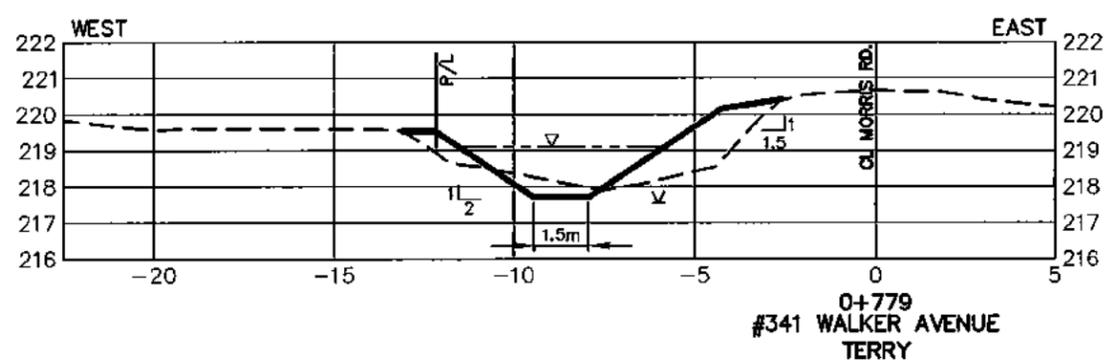
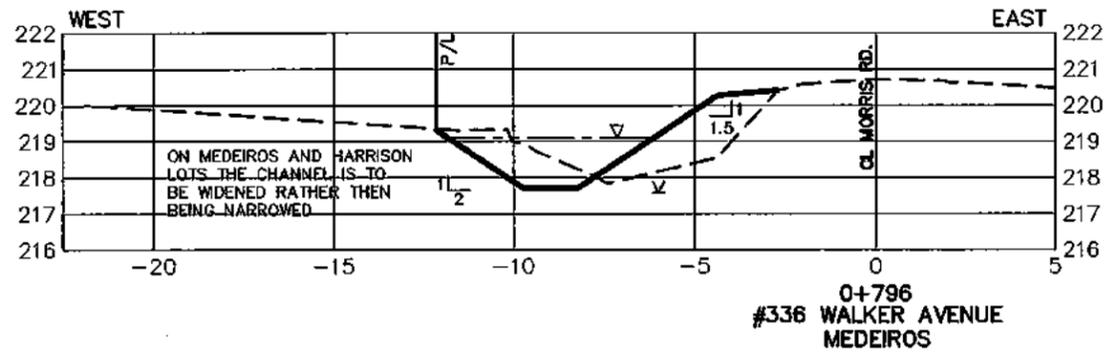


<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SOUTH MORRIS ROAD BRANCH</b> <b>CROSS SECTIONS 7</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REWISED: JOB NUMBER: 12-267 DRAWING: 17

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
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 0 4m  
 VER. 1:200  
 (ON 11"x17")



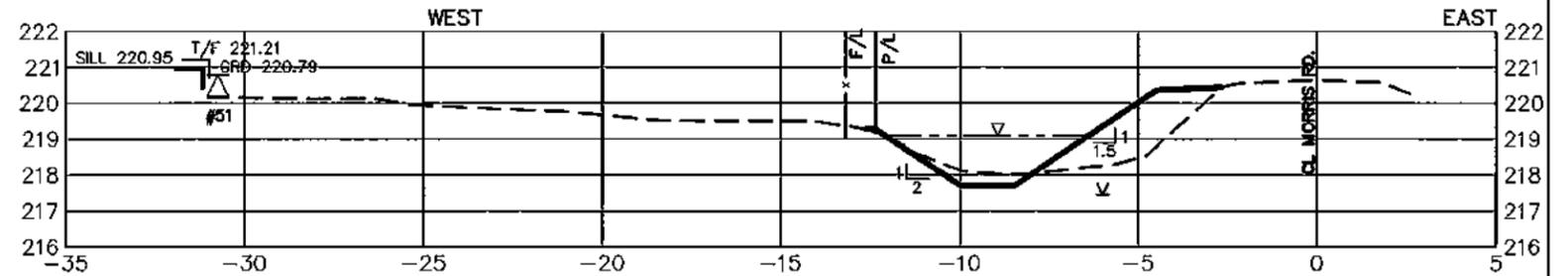
- LEGEND**
- EXISTING GROUND
  - PROPOSED CHANNEL
  - ▽ EXISTING WATER LEVEL
  - ▽ EXISTING DITCH (PROBED HARD BOTTOM)

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.

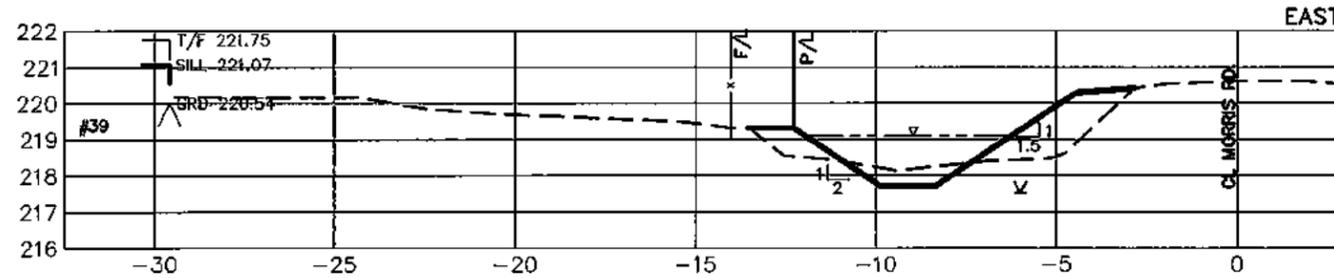


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(ON 11"x17")

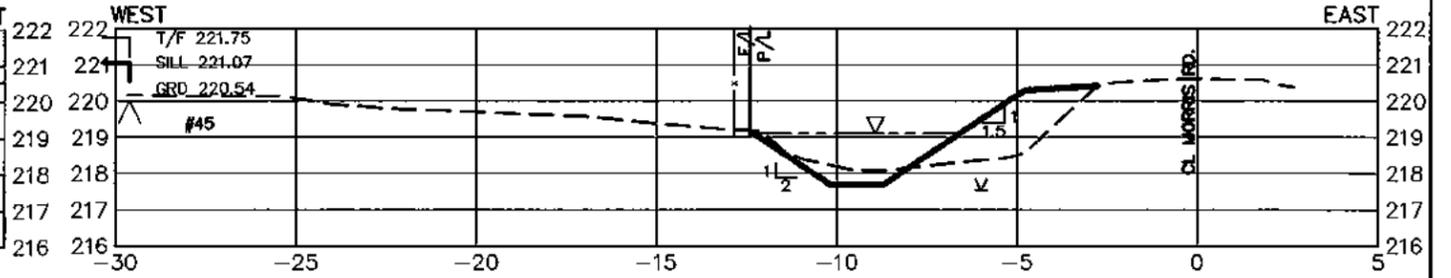
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SOUTH MORRIS ROAD BRANCH</b> CROSS SECTIONS 8	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISION:
	JOB NUMBER: 12-267
	DRAWING: 18



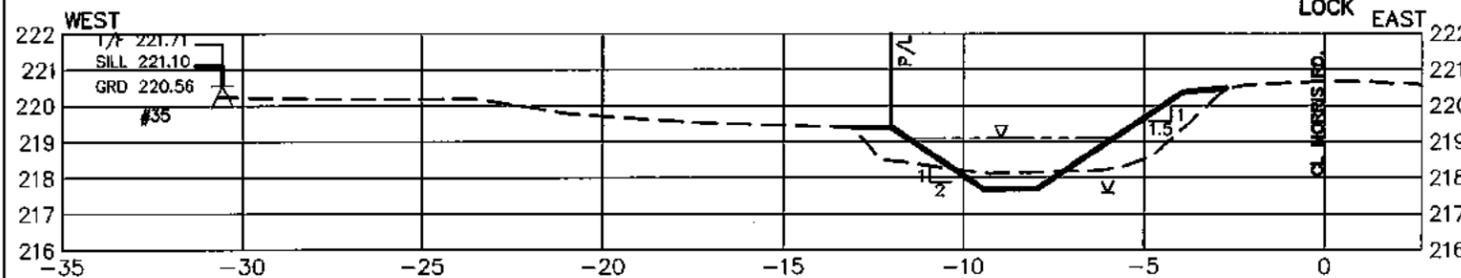
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MCCARNEY



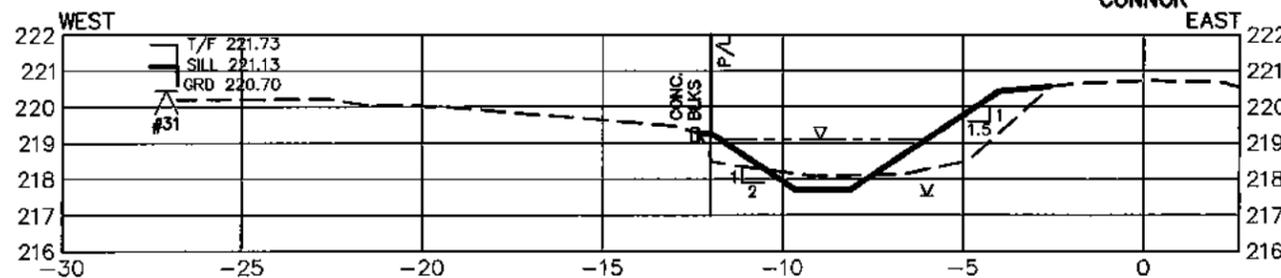
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#39 TOWNSEND AVENUE  
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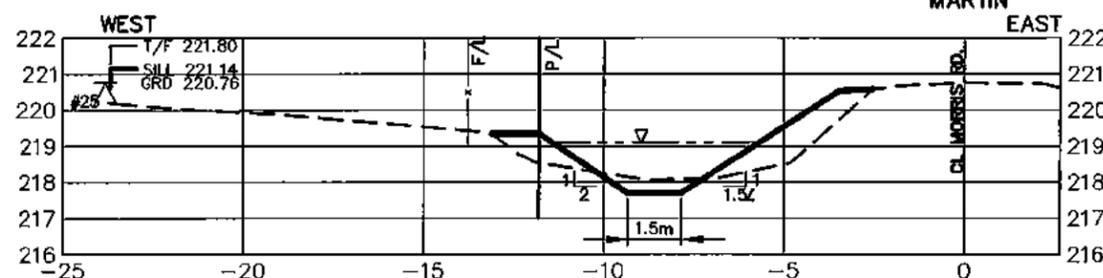
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#45 TOWNSEND AVENUE  
GONCALVES



0+915  
#35 TOWNSEND AVENUE  
CONNOR



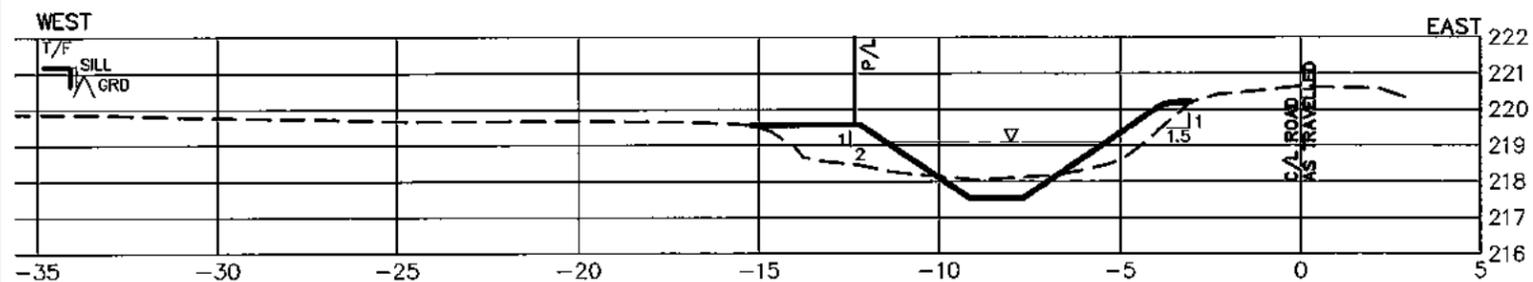
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#31 TOWNSEND AVENUE  
MARTIN



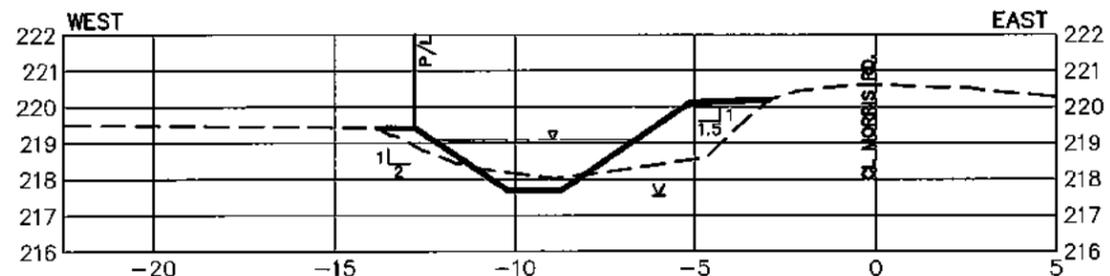
0+882  
#25 TOWNSEND AVENUE  
HOLLEDGE

- LEGEND**
- EXISTING GROUND
  - PROPOSED CHANNEL
  - ∇ --- EXISTING WATER LEVEL
  - ∇ EXISTING DITCH (PROBED HARD BOTTOM)

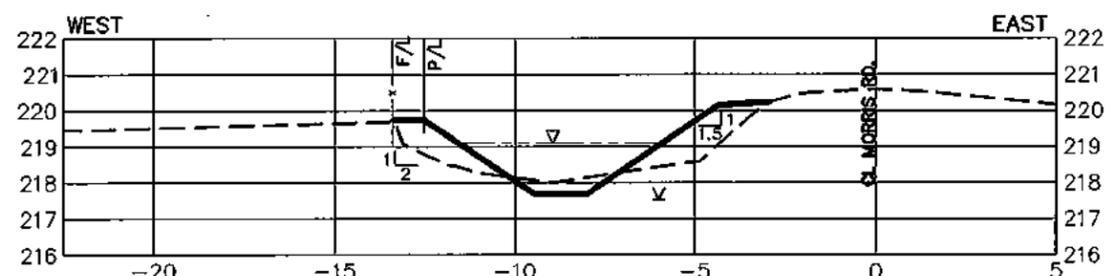
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CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SOUTH MORRIS ROAD BRANCH CROSS SECTIONS 9</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED:
		JOB NUMBER: 12-267 DRAWING <b>19</b>



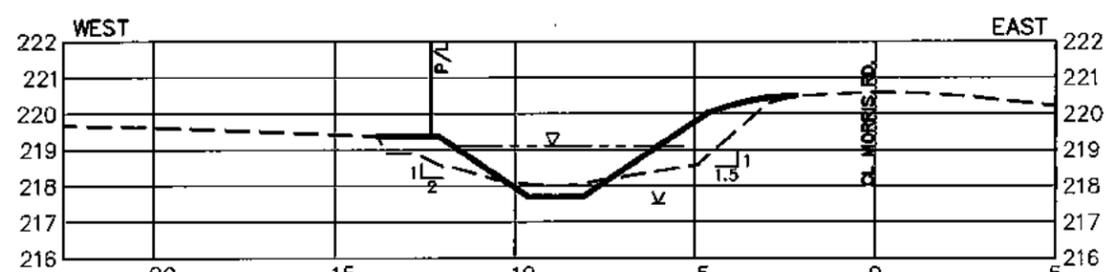
1+055  
#12 BUCE AVENUE  
VEY



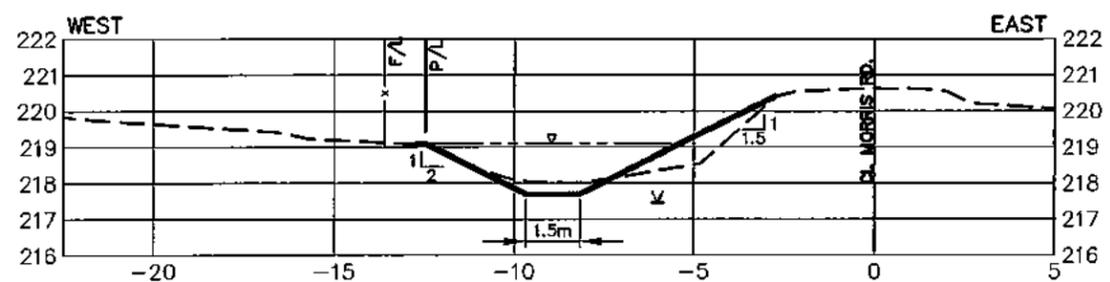
1+032  
#10 BUCE AVENUE  
HICKEY



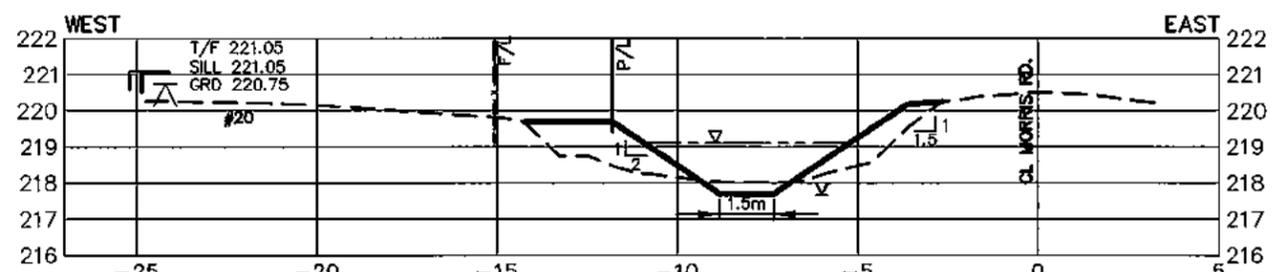
1+021  
#63 TOWNSEND AVENUE  
HINDS



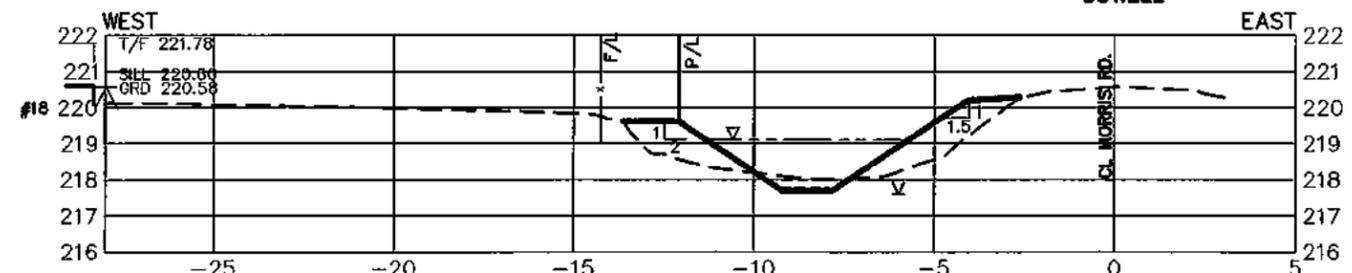
1+000  
#59 TOWNSEND AVENUE  
THRUSH



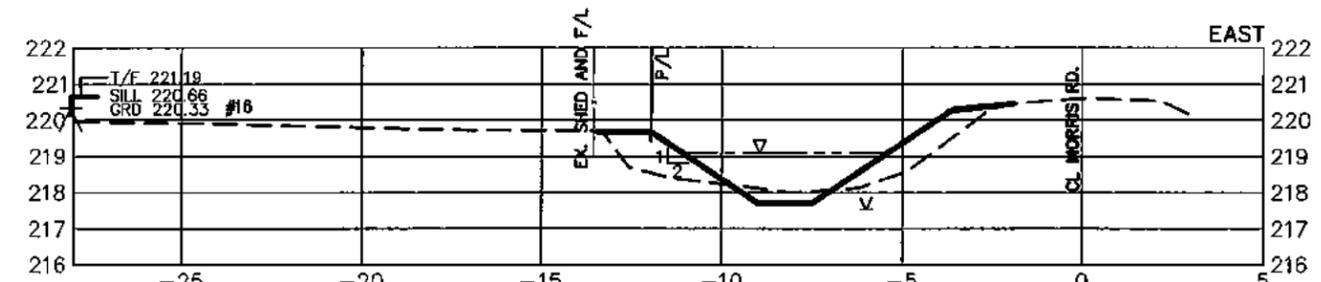
0+978  
#55 TOWNSEND AVENUE  
BOYD



1+121  
#20 BUCE AVENUE  
COWELL



1+102  
#18 BUCE AVENUE  
TANAKA



1+085  
#16 BUCE AVENUE  
REITZEL

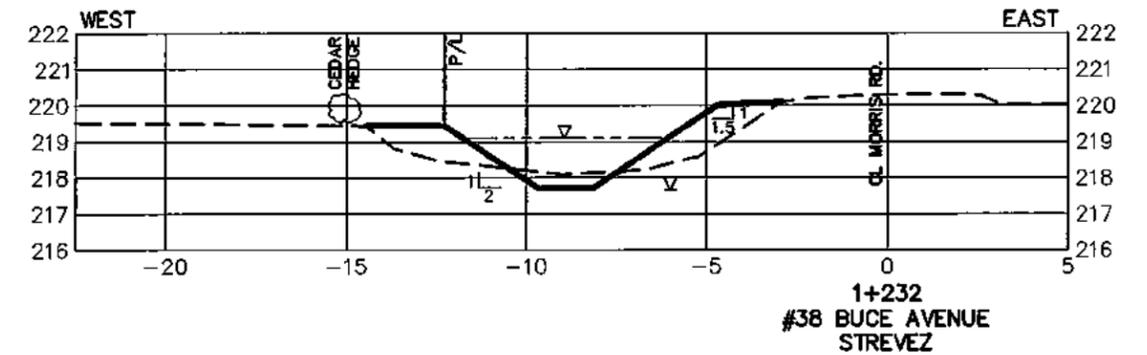
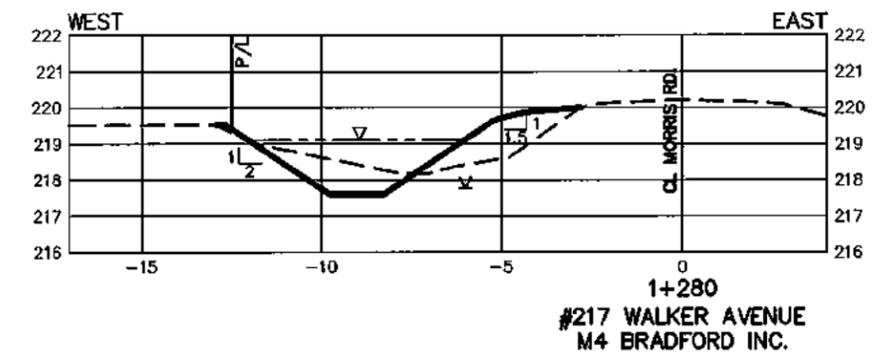
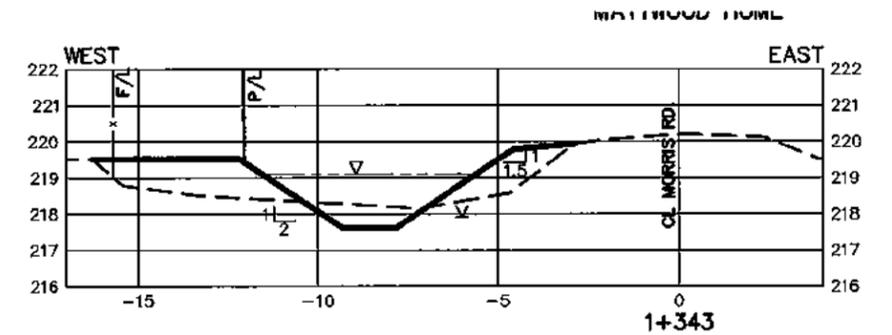
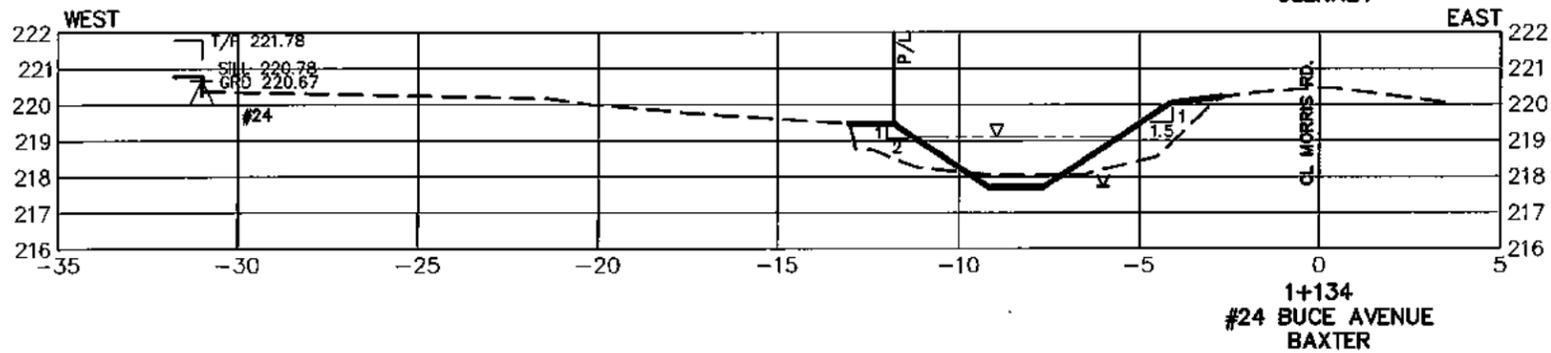
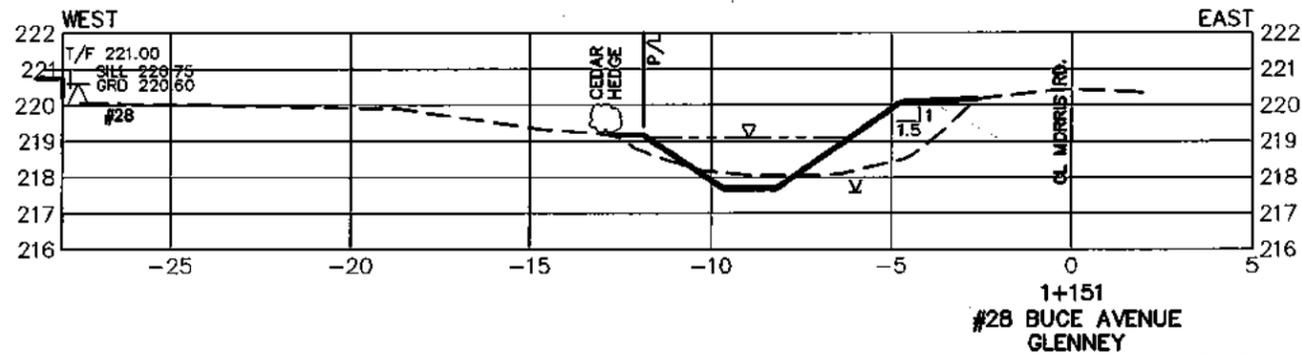
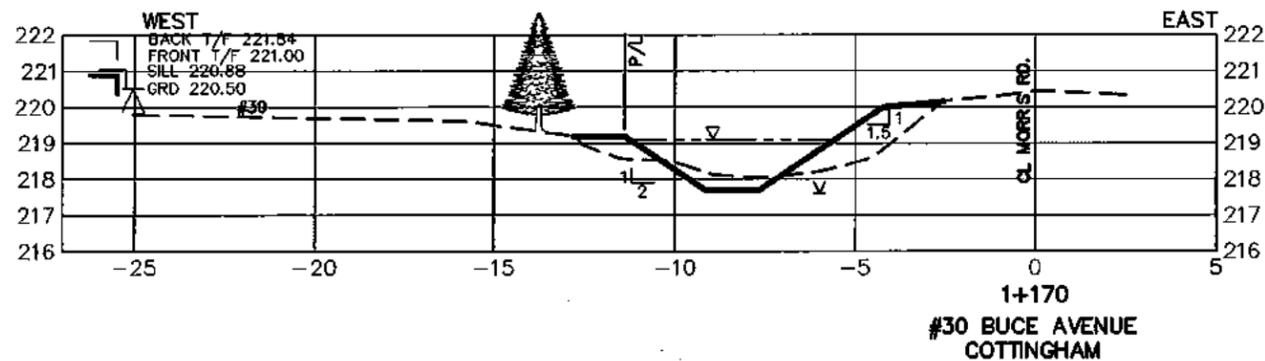
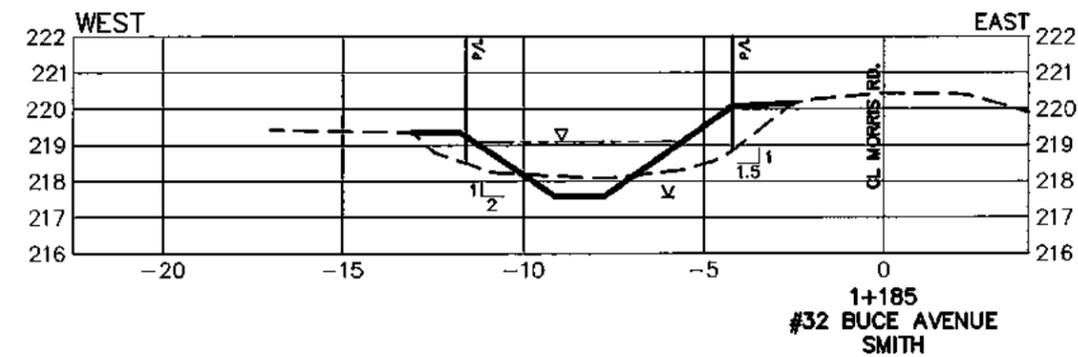
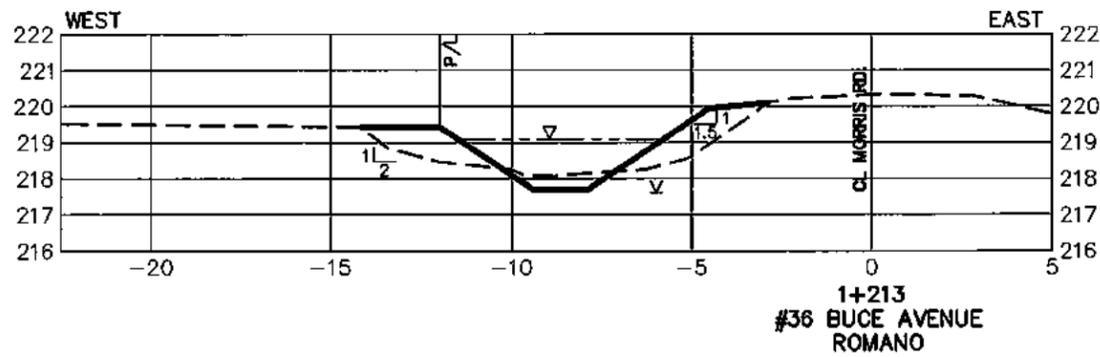
- LEGEND**
- EXISTING GROUND
  - PROPOSED CHANNEL
  - ▽--- EXISTING WATER LEVEL
  - ▽— EXISTING DITCH (PROBED HARD BOTTOM)

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



SCALE  
0 2 4m  
HOR. 1:200  
0 4m  
VER. 1:200  
(ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SOUTH MORRIS ROAD BRANCH</b> CROSS SECTIONS 10	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISION: JOB NUMBER: 12-267 DRAWING: <b>20</b>



**LEGEND**

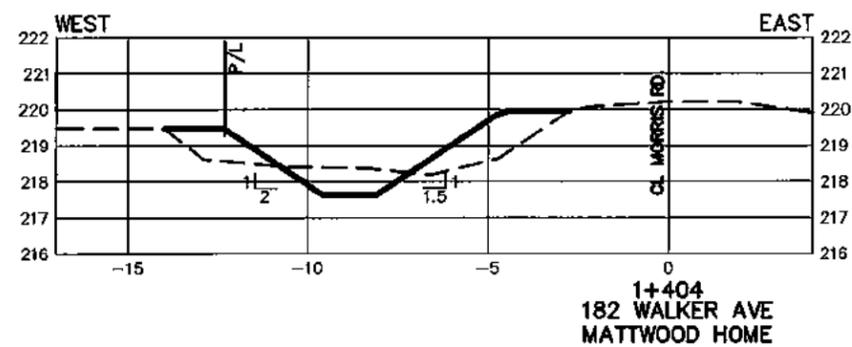
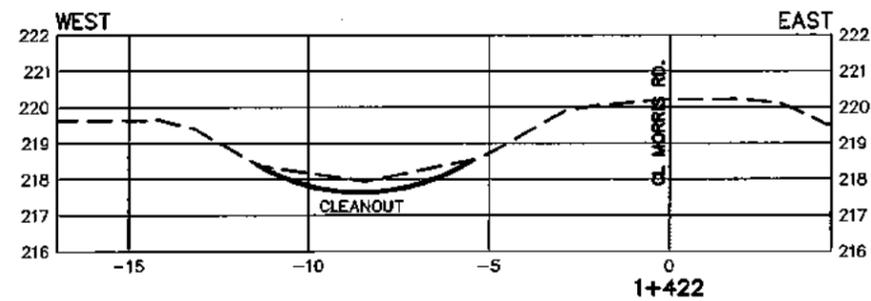
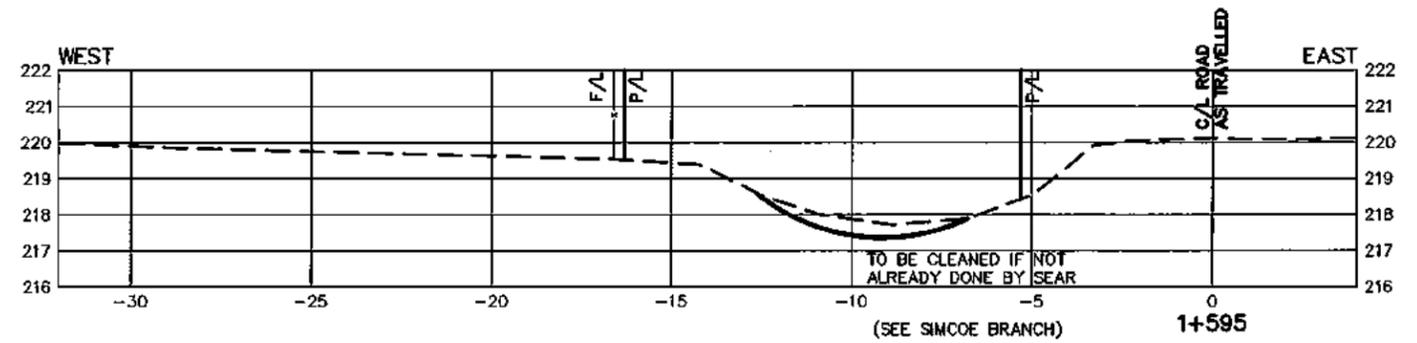
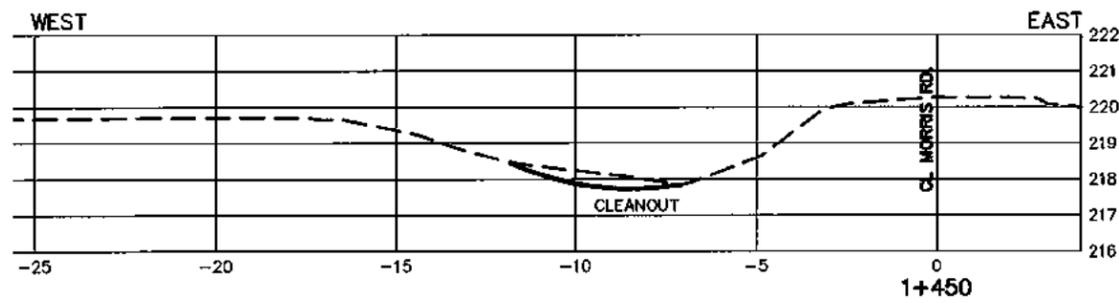
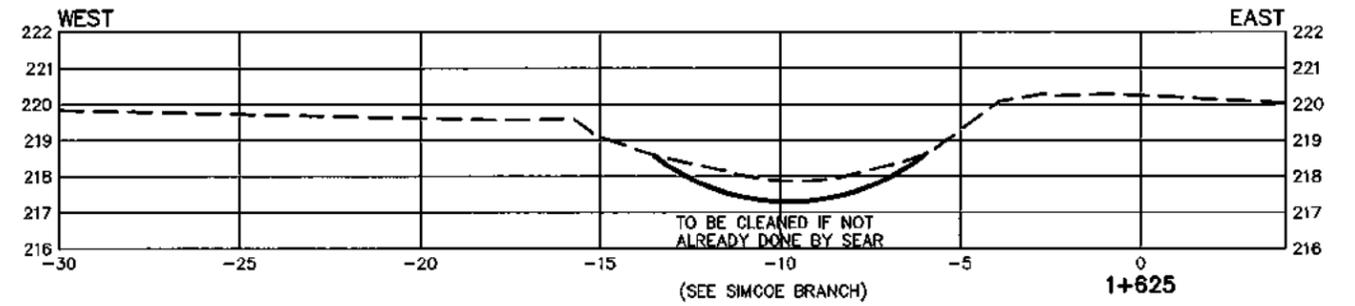
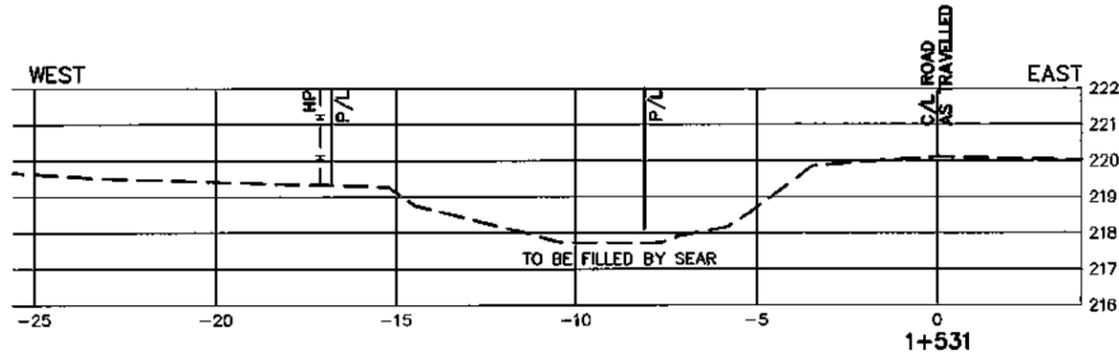
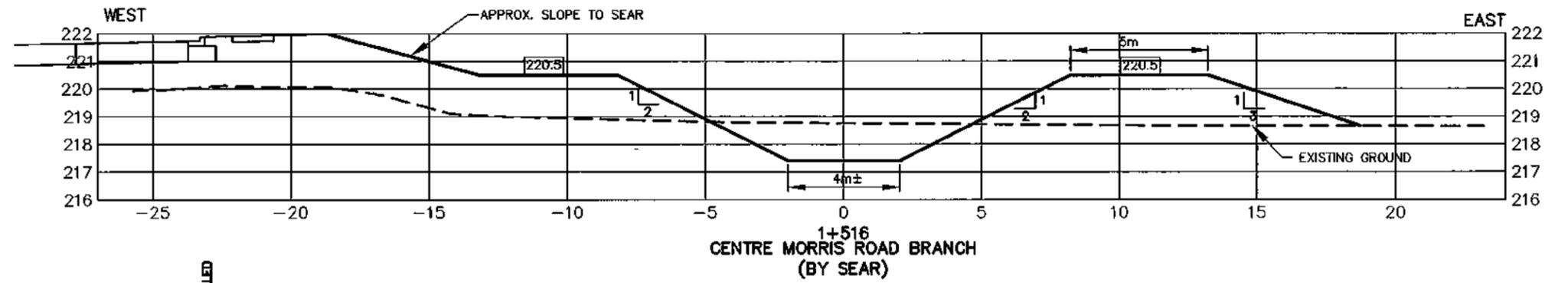
- EXISTING GROUND
- PROPOSED CHANNEL
- EXISTING WATER LEVEL
- EXISTING DITCH (PROBED HARD BOTTOM)

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



SCALE  
0 2 4m  
HOR. 1:200  
0 4m  
VER. 1:200  
(ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SOUTH MORRIS ROAD BRANCH</b> CROSS SECTIONS 11	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUBURBY	
REVISED:	JOB NUMBER: 12-267
DRAWING	<b>21</b>



**LEGEND**

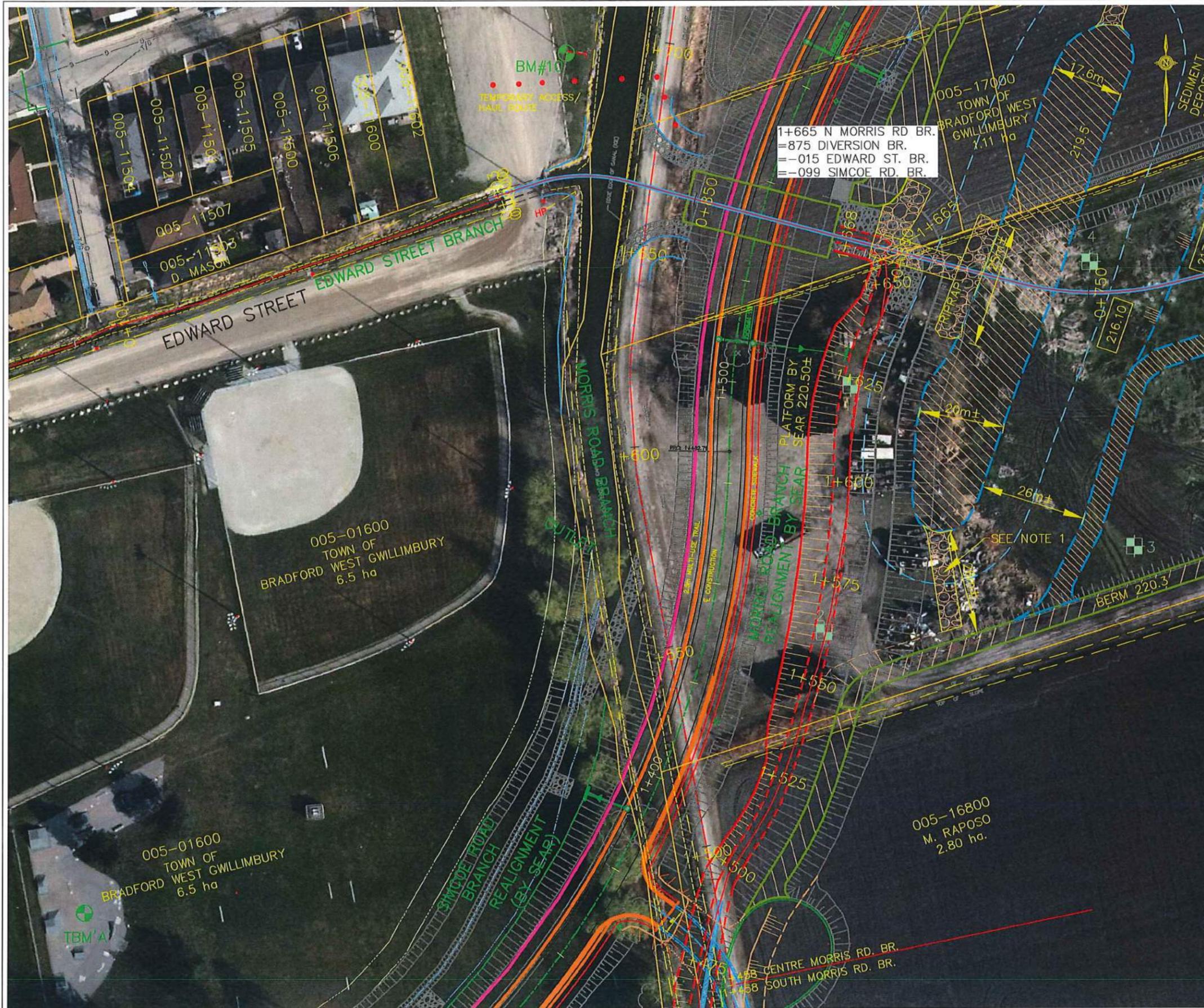
- EXISTING GROUND
- PROPOSED CHANNEL
- ▽ EXISTING WATER LEVEL
- ▽ EXISTING DITCH (PROBED HARD BOTTOM)

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
 0 2 4m  
 HOR. 1:200  
 0 4m  
 VER. 1:200  
 (ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		APR. 14, 2016
<b>SOUTH MORRIS ROAD BRANCH</b> CROSS SECTIONS 12		
<b>CENTRE MORRIS ROAD BRANCH</b> CROSS SECTION		REVISED:
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		JOB NUMBER: 12-267
		DRAWING <b>22</b>



1+665 N MORRIS RD BR.  
 =875 DIVERSION BR.  
 =015 EDWARD ST. BR.  
 =099 SIMCOE RD. BR.

**SCOPE OF WORK (STA. 1+465 TO 1+670±)**

- STA. 1+465 TO 1+670±**
- EXISTING MORRIS ROAD BRANCH TO BE RELOCATED BY SEAR PROJECT AND SUCH WILL BE MODIFIED IN PHASE 1 WORK OF THIS CONTRACT. (SEE DRAWING 28 FOR PHASE 1 MODIFICATIONS)
  - CHANNEL TO BE CONSTRUCTED BY SEAR PROJECT WILL BE 4m± BOTTOM, WITH 2:1 SIDE SLOPES UNTIL MODIFIED.
  - UNTIL PHASE 1 OF THIS DRAIN PROJECT IS CONSTRUCTED, MORRIS ROAD DRAINAGE WILL FLOW SOUTH IN THIS CHANNEL.
  - THIS CHANNEL WILL INITIALLY BE CALLED CENTRE MORRIS ROAD BRANCH IN THIS INTERVAL.
  - ONCE THE DIVERSION WORK IS CONSTRUCTED (PHASE 1) AND THE SEDIMENT DEPOSITION AREA IS CONSTRUCTED ON THE FORMER BAK FARM SITE (SEE DRAWING 28), THEN CENTRE MORRIS BRANCH WILL ONLY EXIST FROM STA. 1+458 TO 1+550.
  - 62m OF CENTRE BRANCH TO BE REALIGNED BY THIS PROJECT (TYPE VII WORK)
  - SEAR PROJECT WILL CONSTRUCT TEMPORARY CUL-DE-SAC AT STA. 1+480.
  - AT END OF CONSTRUCTION, THIS PROJECT IS TO REMOVE THE CUL-DE-SAC AND CONSTRUCT ULTIMATE TIE-IN OF MORRIS ROAD TO SEAR (PHASE 3 WORK).
  - THE EMBANKMENT FOR THIS TIE-IN IS TO BE CONSTRUCTED AS SOON AS THE DIVERSION BRANCH IS CONSTRUCTED (PHASE 1 WORK) AND PRIOR TO DOING ANY WORK IN ANY OF THE MORRIS ROAD BRANCH (THE PHASE 2 WORK).

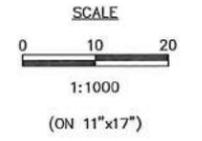
**WORKING AREA**  
 LANDS ACQUIRED BY TOWN FOR SEAR TO EAST OF SEAR ROAD EMBANKMENT

**LEGEND**

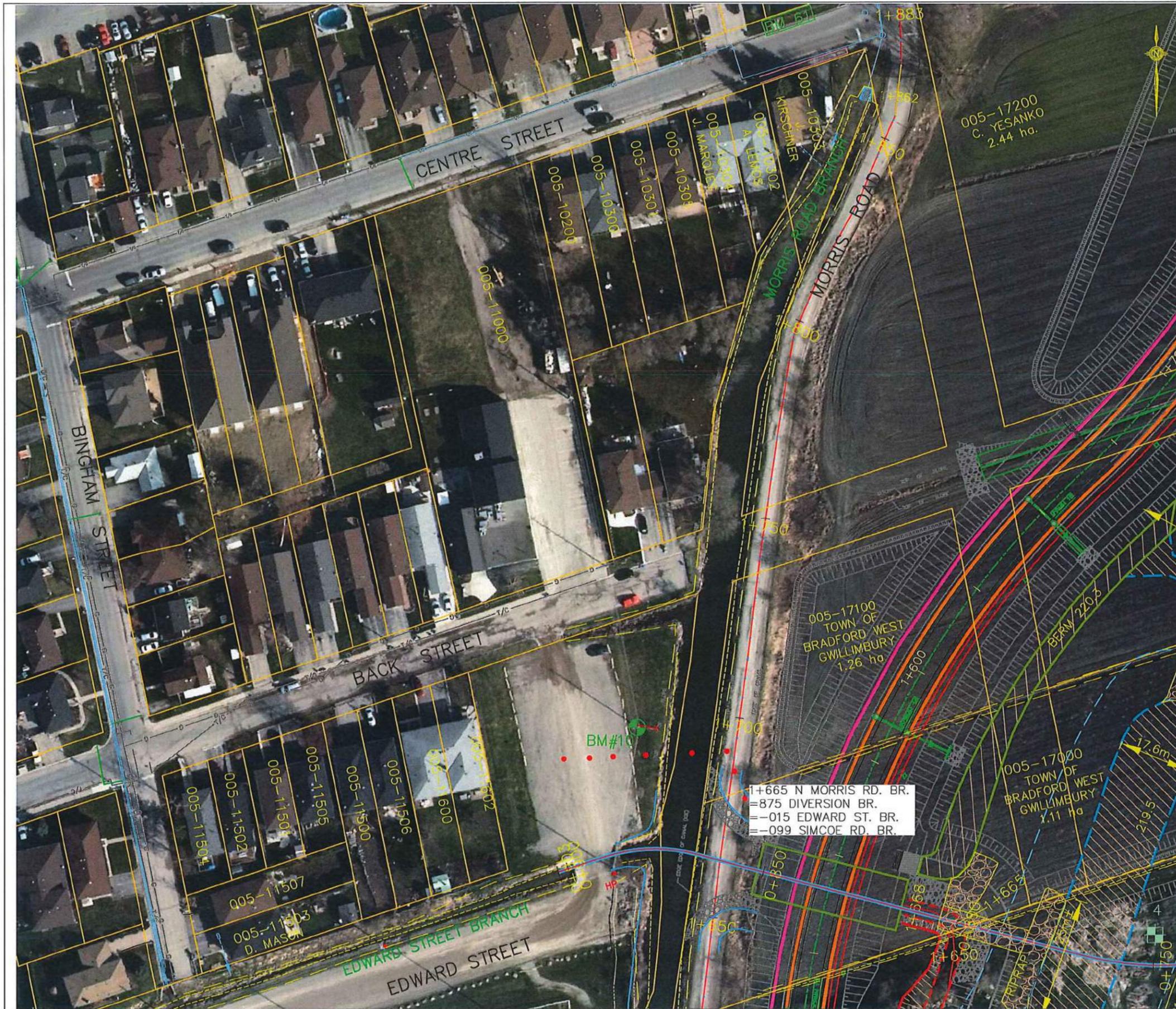
- PROPOSED EDGE OF PAVEMENT (SEAR)
- PROPOSED CENTRELINE OF ROAD (SEAR)
- TEMPORARY MORRIS ROAD CUL DE SAC TO BE BUILT BY SEAR BUT TO BE REMOVED BY THIS PROJECT
- PERMANENT MORRIS ROAD TIE IN TO SEAR
- CENTRE MORRIS ROAD BRANCH WORK BY SEAR PROJECT
- TEMPORARY ACCESS/HAUL ROUTE FOR WORK ON EDWARD STREET BRANCH

**NOTE:**  
 COMPONENTS OF SEAR PROJECT BY AINLEY GROUP

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



<b>MORRIS ROAD DRAIN</b>	
TOWN OF BRADFORD WEST GWILLIMBURY	
<b>CENTRE MORRIS ROAD BRANCH ENLARGEMENT AERIAL</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 23



**SCOPE OF WORK**

**STA. (1+665 TO 1+862)**  
 -NORTH MORRIS ROAD BRANCH (NO WORK REQUIRED AT THIS TIME)  
 -STA. 1+665 TO 1+862  
 -CHANNEL WAS BRUSHED AND CLEANED IN 2015.  
 -NO FURTHER WORK REQUIRED.  
 -FOR FUTURE MAINTENANCE, PROFILE GRADE ON DRAWING 10 APPLIES AND TYPICAL CROSS-SECTIONS ON DRAWING 25 APPLY.  
 -FUTURE MAINTENANCE IS TO BE DONE FROM EAST SIDE EMBANKMENT WHICH WAS FORMER MORRIS ROAD AND ALL MATERIALS ARE TO BE HAULED AND DISPOSED OF OFF SITE.

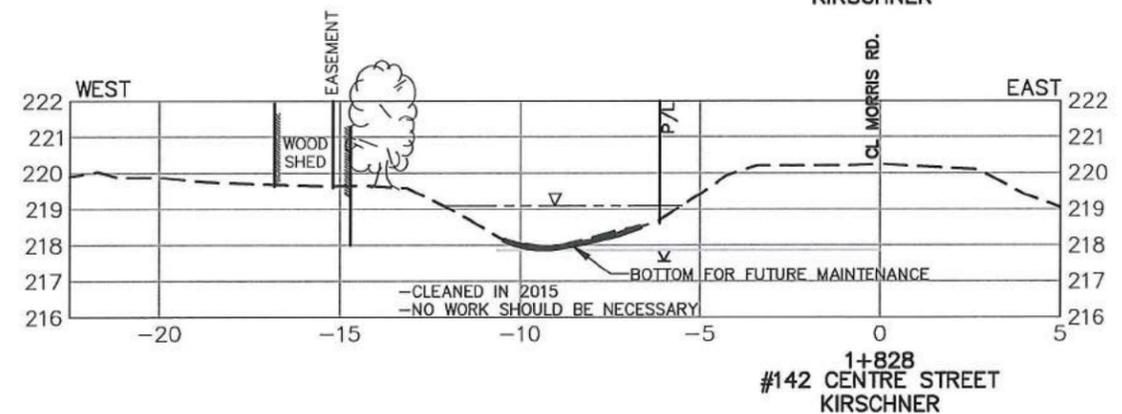
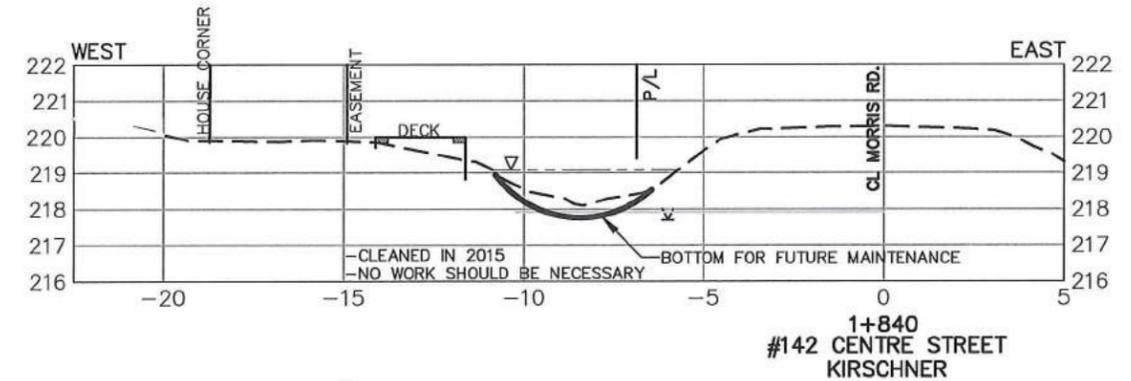
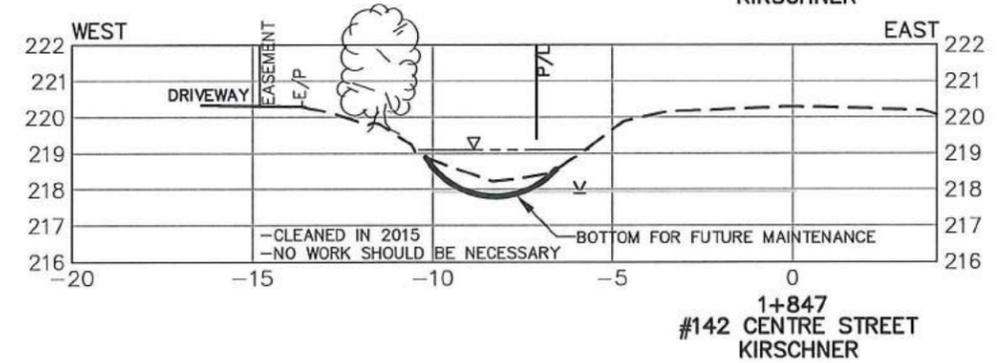
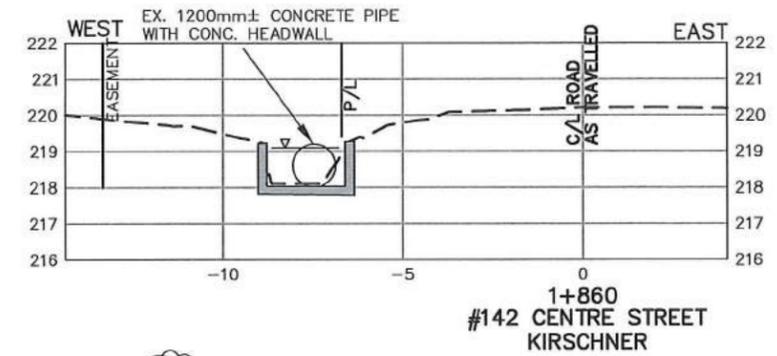
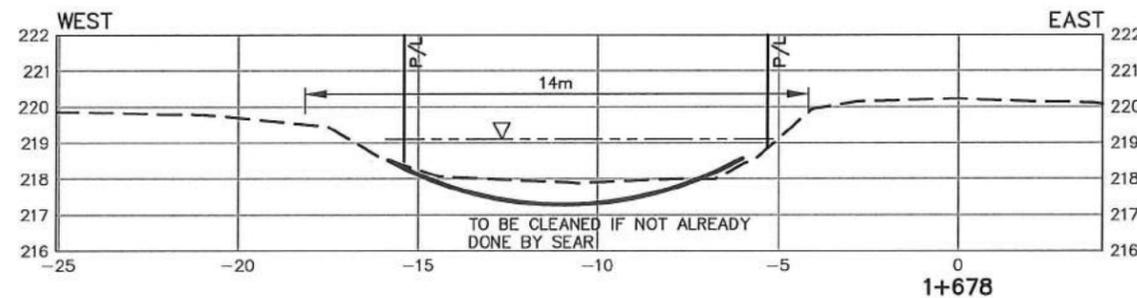
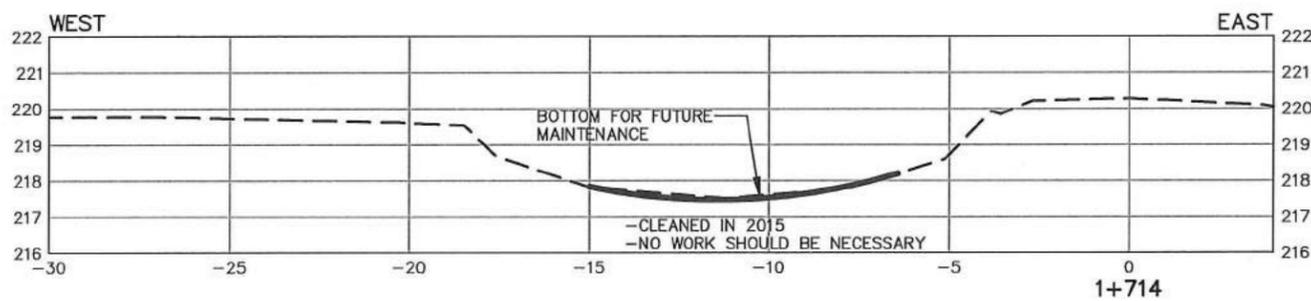
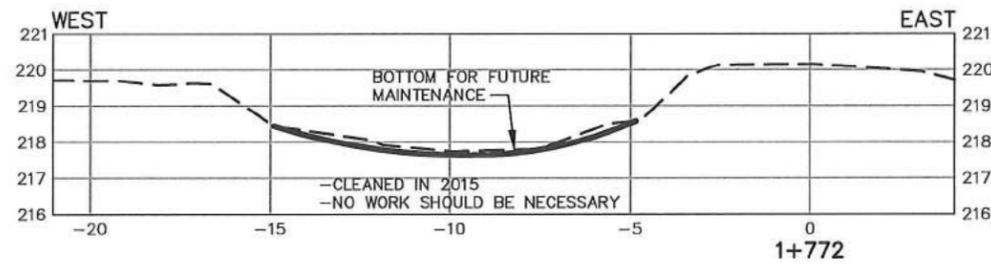
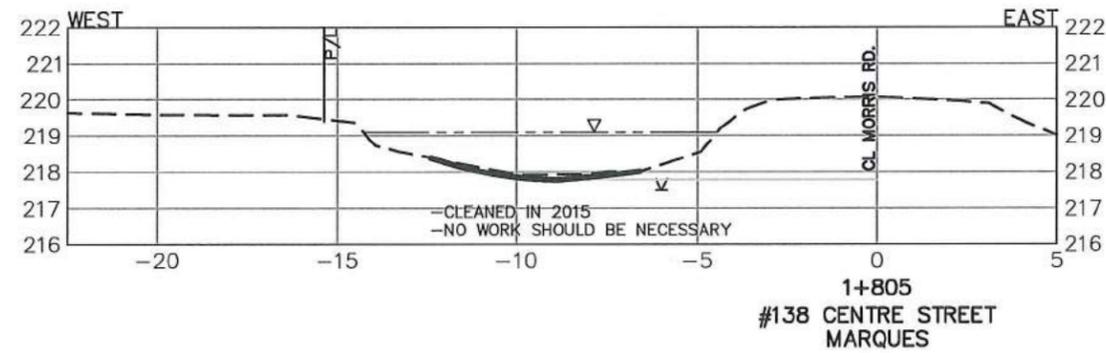
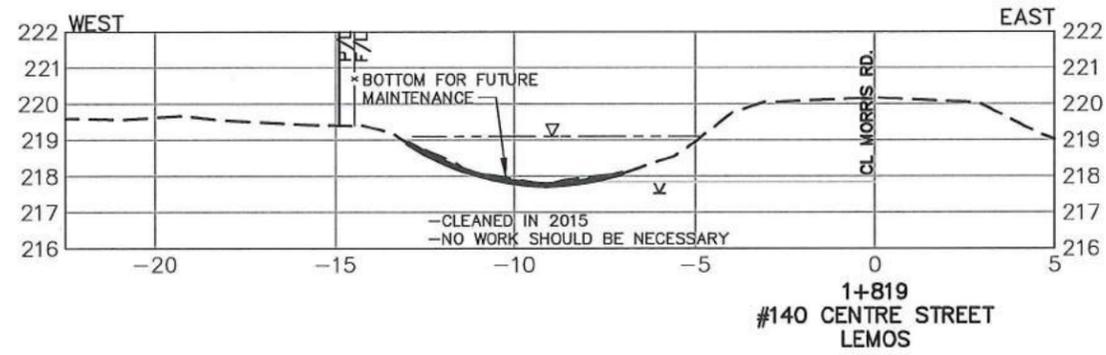
**WORK AREA**  
 MORRIS ROAD EMBANKMENT, ACROSS CHANNEL AND FOR 3m WEST OF CHANNEL

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- EXISTING STM MAIN
- PROPOSED EDGE OF PAVEMENT (SEAR)
- PROPOSED CENTRELINE OF ROAD (SEAR)
- DIVERSION BRANCH PERIMETER
- PROPOSED CULVERT LOCATION BELOW SEAR FOR MORRIS ROAD DRAIN
- TEMPORARY ACCESS/HAUL ROUTE FOR WORK ON EDWARD STREET BRANCH

**NOTE:**  
 SEAR DATA BASED ON DRAWINGS BY AINLEY GROUP

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		1:1000
CHECKED BY: K.A.S.		(ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>NORTH MORRIS ROAD BRANCH ENLARGEMENT AERIAL</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 24



<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		<b>NORTH MORRIS ROAD BRANCH</b> CROSS SECTIONS 13	APR. 14, 2016
DESIGNED BY: K.A.S.			REVISED:
CHECKED BY: K.A.S.		JOB NUMBER: 12-267	
DRAWN BY: N.M.B.		DRAWING	
CHECKED BY: K.A.S.		<b>25</b>	

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



SCALE  
0 2 4m  
HOR. 1:200  
0 4m  
VER. 1:200  
(ON 11"x17")

**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUBURBY



**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- DIVERSION BRANCH PERIMETER
- DIVERSION BRANCH CENTRELINE
- DIVERSION BRANCH BERMS

- IRRIGATION LINE WITH CULVERT  
(ACTUAL LOCATIONS TO BE CONFIRMED AT TIME OF CONSTRUCTION) (TYPICAL)
- TEST HOLE LOCATION AND NUMBER

**SCOPE OF WORK (STA. -020 TO 150)**

**GENERAL**

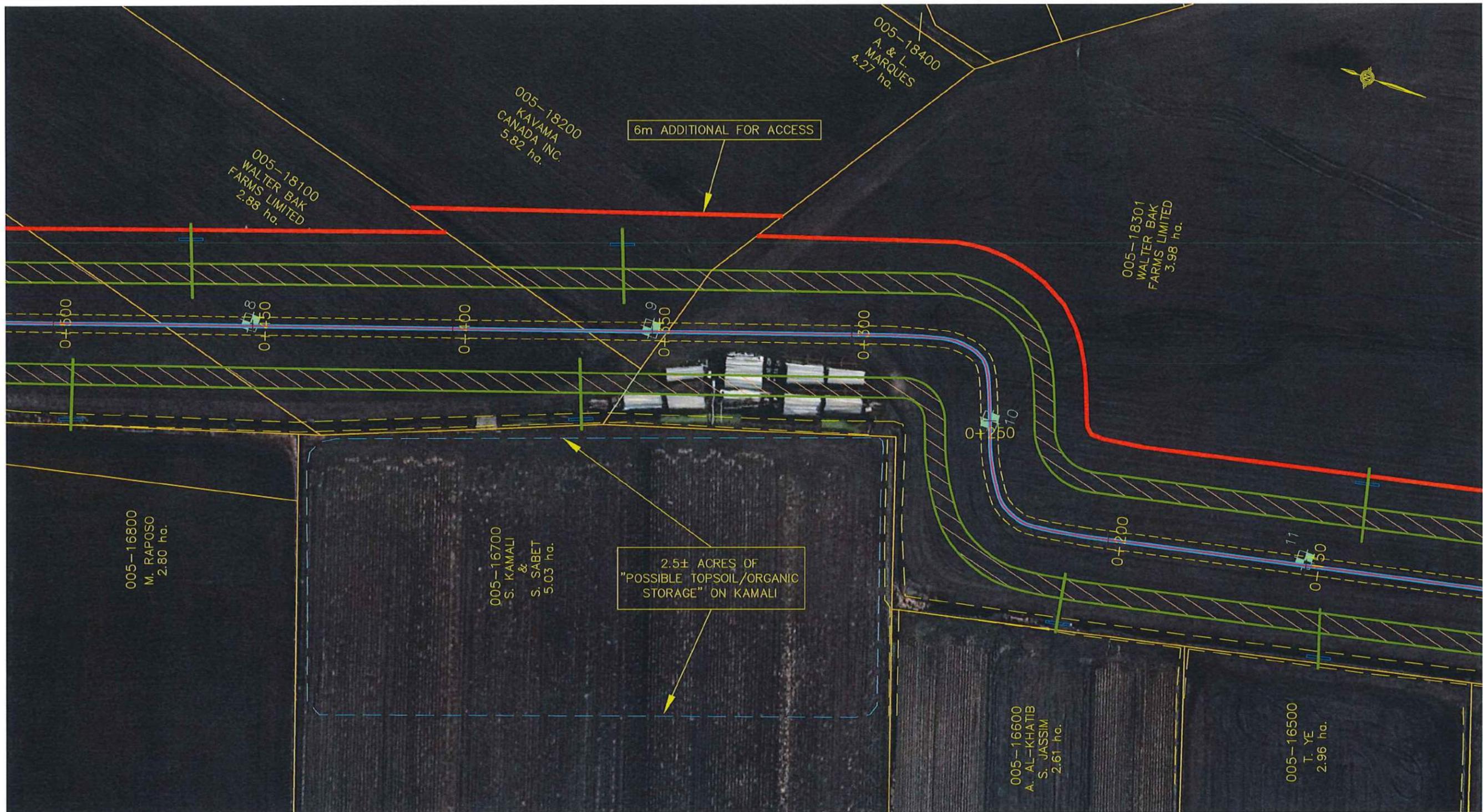
- THE DIVERSION BRANCH FROM STA. -020 TO 640 IS TYPE I WORK.
- THE DIVERSION BRANCH IS TO BE CONSTRUCTED IN THE DRY FROM STA. 0+015 TO 780±.
- ONCE FULLY CONSTRUCTED FROM STA. 0+015 TO 0+780, THEN NOTES BELOW RE CONNECTING TO EXISTING CHANNELS APPLY.
- THE DITCHES ON THE OUTSIDE OF THE NEW BERMS ARE TO BE CONSTRUCTED AND/OR BE IMPROVED AS THE FIRST PART OF TYPE 1 WORK TO PROVIDE FOR EXTERNAL DRAINAGE DURING CONSTRUCTION AND TO PROVIDE FOR AN OUTLET FOR RAINFALL WATERS THAT NEED TO BE REMOVED DURING DIVERSION CONSTRUCTION.
- ANY MATERIALS/EQUIPMENT PREVIOUSLY STORED BY LANDOWNERS IN THE WORKING AREA ARE TO BE REMOVED BY THE LANDOWNERS. IF HOWEVER SUCH ARE NOT REMOVED UPON REASONABLE NOTICE BEING GIVEN, THE ENGINEER OR PROJECT MANAGER MAY DIRECT THE CONTRACTOR TO REMOVE AND DISPOSE OF SUCH.
- EXISTING CULVERTS IN EXTERNAL DITCHES ARE TO BE REMOVED AND DISPOSED OF/SALVAGED AS REQUIRED EXCEPT WHERE CONTRACTOR IS INSTRUCTED TO LEAVE SUCH IN PLACE IN CHANNEL.
- THE ORGANICS ARE THEN TO BE STRIPPED AND ARE TO BE WINDROWED ADJACENT TO THE NEW EAST SIDE EXTERNAL DITCH (UNLESS DIRECTED OTHERWISE).
- THEN IMPORTED CLAY IS TO BE USED TO REPLACE THE AREA OF THE STRIPPED ORGANICS BELOW THE NEW BERMS AND TO BUILD THE BERMS.
- SANDY SILTS BELOW THE STRIPPED ORGANICS THAT ARE EXCAVATED OUT FOR THE DIVERSION DITCH AND THE PERIMETER DITCH(ES) ARE TO BE PLACED ON THE OUTSIDE OF THE NEW BERMS (ONCE CONSTRUCTED) TO A THICKNESS NO GREATER THAN 1.7m WIDE AT THE TOP AND 3.7m WIDE AT THE BOTTOM.
- CLAYS ARE TO BE HAULED USING CRAWLER MOUNTED ROCK TRUCKS AND ARE TO BE COMPACTED BY TRACK EQUIPMENT TO GIVE THE CROSS-SECTION REQUIRED.
- ALL FINISHED SURFACES NOT TO BE WETTED ARE TO BE TOPSOILED TO 0.15m DEPTH USING A COMBINATION OF ON-SITE EXCAVATED ORGANICS AND IMPORTED TOPSOIL.
- ONCE GRADES ARE APPROVED, THE TOPSOILED SURFACES ARE TO BE SEEDED.
- ONCE THE DIVERSION FROM STA. 015 TO 780 IS CONSTRUCTED AND AS SOON AS THE PETERMAN PUMPING STATION IMPROVEMENTS ARE COMPLETED, THEN THE TWO TIE-IN PORTIONS FROM STA. 015 TO -020 AND FROM STA. 780 TO 815 (THE 12x3m CULVERT) ARE TO BE FINISHED. AS MUCH OF THE WORK AS POSSIBLE RE THE TWO TIE-IN AREAS IS TO BE DONE PRIOR TO EXCAVATING THE REMAINING SEPARATING GROUND TO ALLOW WATERS IN. REMOVAL OF THE FINAL SEPARATING GROUNDS IS TO BE DONE GRADUALLY AND OVER AS WIDE AN AREA AS POSSIBLE TO MINIMIZE EROSION. USE OF HIGH CAPACITY PUMPS TO WATER UP THE EXCAVATED DIVERSION CHANNEL IS ENCOURAGED.
- IRRIGATION SLEEVES WITH ACCESS CULVERTS ACROSS THE EXTERNAL DITCH ARE TO BE DONE AT ELEVEN (11) LOCATIONS SO EACH PROPERTY ON EACH SIDE HAS AN IRRIGATION CONNECTION. \*
- IRRIGATION WORK TO BE DONE AS PER DETAIL ON DRAWING 70.

\* IT IS POSSIBLE THE IRRIGATION SLEEVE AT STA. 005 MAY BE ABLE TO USE EXISTING CULVERT. DECISION WILL BE MADE AT TIME OF CONSTRUCTION.

**WORKING AREA**

BETWEEN RED PERIMETER LINE AND PROPERTY LINE TO WEST PLUS LANDS FOR WINDROWING ORGANICS

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		1:1000
CHECKED BY: K.A.S.		(ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>DIVERSION BRANCH ENLARGEMENT AERIAL 1</b>		APR. 14, 2016
		REVISED:
		JOB NUMBER: 12-267
		DRAWING: 26



**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- DIVERSION BRANCH PERIMETER
- DIVERSION BRANCH CENTRELINE

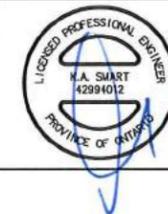
- IRRIGATION LINE WITH CULVERT
- TEST HOLE LOCATION AND NUMBER

**SCOPE OF WORK (STA. 150 TO STA. 500)**

-NOTES ON DRAWING 26 APPLY.

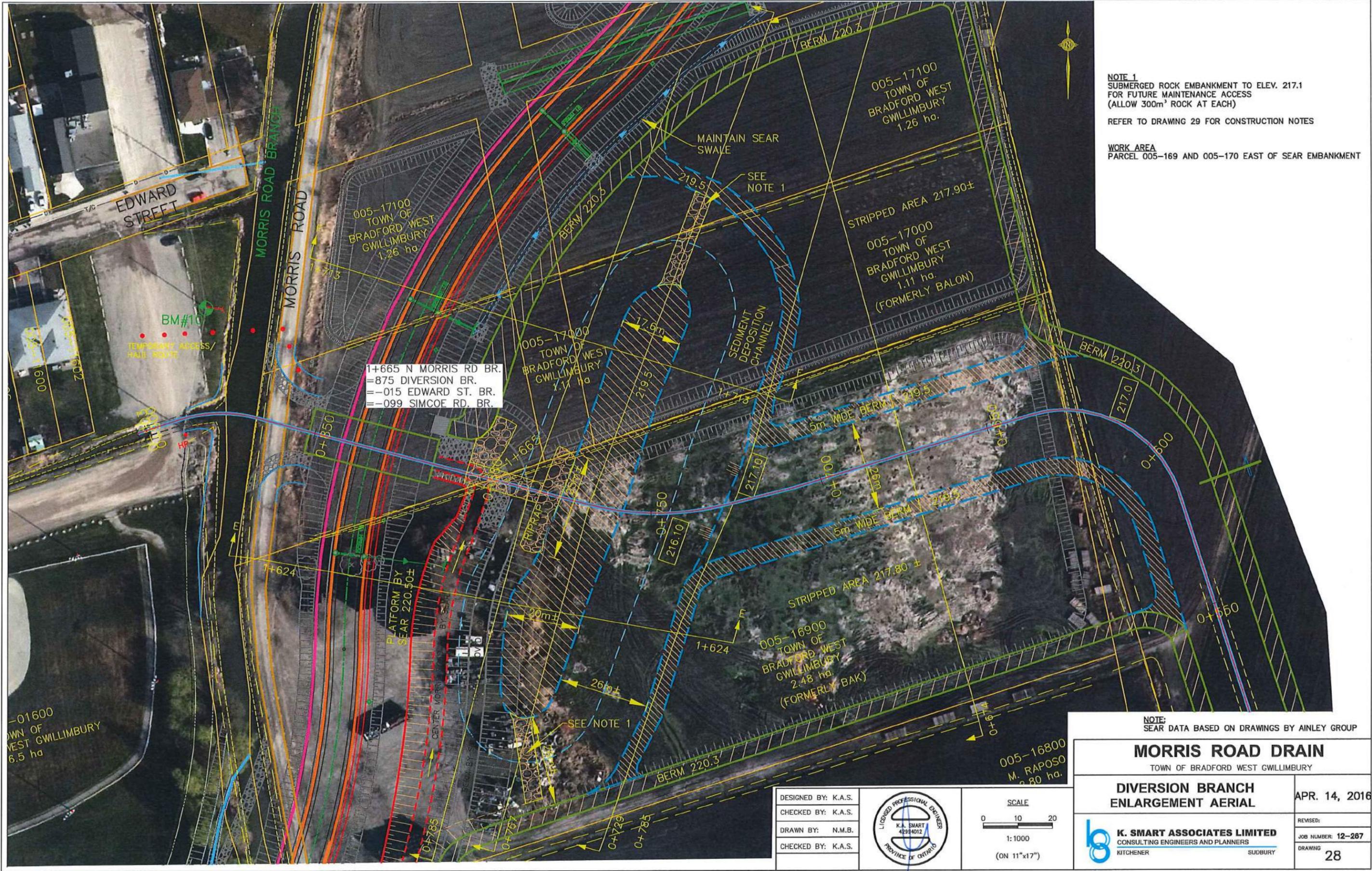
**WORK AREA**  
BETWEEN RED PERIMETER LINE AND PROPERTY LINE TO WEST PLUS LANDS FOR WINDROWING ORGANICS

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



SCALE  
0 10 20  
1:1000  
(ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>DIVERSION BRANCH ENLARGEMENT AERIAL 2</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: <b>12-267</b> DRAWING: <b>27</b>



**NOTE 1**  
 SUBMERGED ROCK EMBANKMENT TO ELEV. 217.1  
 FOR FUTURE MAINTENANCE ACCESS  
 (ALLOW 300m<sup>3</sup> ROCK AT EACH)

REFER TO DRAWING 29 FOR CONSTRUCTION NOTES

**WORK AREA**  
 PARCEL 005-169 AND 005-170 EAST OF SEAR EMBANKMENT

1+665 N MORRIS RD BR.  
 =875 DIVERSION BR.  
 =-015 EDWARD ST. BR.  
 =-099 SIMCOE RD. BR.

NOTE:  
 SEAR DATA BASED ON DRAWINGS BY AINLEY GROUP

**MORRIS ROAD DRAIN**  
 TOWN OF BRADFORD WEST GWILLIMBURY

<b>DIVERSION BRANCH ENLARGEMENT AERIAL</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 28

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
 0 10 20  
 1:1000  
 (ON 11"x17")

SCOPE OF WORK (STA. 500 TO 815)

STA. 500 TO 550

-NOTES ON DRAWING 26 APPLY RE TYPE I WORK

STA. 550 TO 815

-NOTES BELOW APPLY RE TYPE II AND TYPE III WORK.

STA. 550 TO 640±

-WORK IS TO TRANSITION FROM THE STANDARD DIVERSION CHANNEL CONSTRUCTED FROM STA. 550 DOWNSTREAM (TYPE I) TO THE WIDER DIVERSION CHANNEL AREA TO BE CONSTRUCTED UPSTREAM OF STA. 640± (TYPE II WORK).

STA. 640 TO 740

-THE TYPE II WORK IS TO PROVIDE FOR A SLIGHTLY WIDER DIVERSION CHANNEL (19m VS. 15.5m AT ELEVATION 219) WITH TWO SHALLOWER 5m WIDE ADJACENT BERMS (TOELEV. 219.5) ON EITHER SIDE FOR MAINTENANCE AND WITH THE HIGHER FLOOD PROTECTION BERMS (5m WIDE, 220.3 ELEVATION) TO THE NORTH AND SOUTH ALONG THE PERIMETER OF THE FORMER BAK AND BALON FARMS.

-A DEEP POOL IS TO BE CONSTRUCTED AS PART OF TYPE II WORK FROM STA. 640 TO 685± (TO ELEV. 216.1).

-ALSO LITTORAL SHELVES ON BOTH SIDES ARE TO BE CONSTRUCTED AS PART OF TYPE II WORK FROM STA. 685± TO 730±.

-THE TYPE II BOTTOM ELEVATION OF 217.1 AT STA. 730 IS TO GRADUALLY DEEPEN TO 216.1 AT STA. 740.

-TYPE III WORK EXTENDS FROM STA. 740 TO 815

-FROM STA. 740 TO 800 A SEDIMENT DEPOSITION CHANNEL IS TO BE CONSTRUCTED AROUND A 130m± LONGx17.5 TO 20m± WIDE MAINTENANCE ISLAND AREA.

-THE CHANNEL IS TO HAVE A WATER SURFACE WIDTH OF 26m±, A 7 TO 8m WIDE BOTTOM AND A BOTTOM ELEVATION OF 216.1.

-THE ISLAND IS TO HAVE A SURFACE WIDTH OF 17.6 TO 20m AND AN ELEVATION OF 219.5.

-THE ISLAND IS TO BE ACCESSIBLE FOR MAINTENANCE BY CONSTRUCTING TWO SUBMERGED CAUSEWAYS USING SHOT ROCK TO TOP ELEVATION OF 217.1 WITH A 5m WIDTH.

-THE MAINTENANCE BERMS AROUND THE EAST AND NORTH SIDES OF THE ISLAND ARE TO HAVE TOP SURFACE WIDTH OF 5m AND ARE TO BE AT ELEVATION 219.5.

-PRIOR TO THE TYPE II AND III WORK OF THIS CONTACT, MUCH OF THE AREA WILL HAVE BEEN STRIPPED OF ORGANICS BY OTHERS. THE ORGANICS ARE TO BE DESIRABLY STOCKPILED ON A FARM TO THE WEST OF THE DIVERSION AS SHOWN ON DRAWING 27.

-THE TYPE III WORK IS TO INVOLVE THE SEPARATE EXCAVATION AND TEMPORARY STOCKPILING OF THE SANDY SILTS (WHICH EXIST TO A THICKNESS OF APPROXIMATELY 1.0m) FROM THE WHOLE AREA TO BE USED FOR THE CHANNEL AND THE ISLAND.

-THEN CLAYS ARE TO BE EXCAVATED TO AN ELEVATION OF 215± (APPROX. A 2m DEPTH OF EXCAVATION). THESE CLAYS ARE TO BE FIRST USED FOR THE CONSTRUCTION OF THE OUTSIDE BERMS TO THE DIVERSION CHANNEL ON THE BAK AND BALON PROPERTIES AND THEN CAN BE BLENDED WITH SURPLUS SEDIMENTS AND SILT EXCAVATION FOR ISLAND AND MAINTENANCE BERM CONSTRUCTION.

-THE MAJORITY OF THE EXCAVATED SILTS ARE TO BE PUSHED BACK IN THE LOWER HALF OF THE CLAY EXCAVATION AREA TO GIVE A FINAL BOTTOM ELEVATION OF 216.1.

-THE BALANCE OF THE SANDY SILTS ARE TO BE MIXED WITH SURPLUS CLAYS FOR USE IN THE ISLAND AND MAINTENANCE BERMS.

-APPROXIMATELY 75% OF THE ISLAND AND SEDIMENT DEPOSITION CHANNEL (TO STA. 780±) ARE TO BE CONSTRUCTED WHILE THE SEAR CHANNEL AND BERM FROM THE 12x3m CULVERT SOUTHERLY REMAINS IN PLACE.

-ELEVATION OF THE ISLAND WILL BE LEFT LOW INITIALLY TO ALLOW FOR RAISING WITH EXCAVATED MATERIAL FROM TIE-IN WORK.

- ONCE THE TYPE III WORK FROM STA. 015 TO 780 IS CONSTRUCTED AND AS SOON AS THE PETERMAN PUMPING STATION IMPROVEMENTS ARE COMPLETED, THEN THE TWO TIE-IN PORTIONS FROM STA. 015 TO -020 AND FROM STA. 780 TO 815 ARE TO BE FINISHED. AS MUCH OF THE WORK AS POSSIBLE RE THE TWO TIE-IN AREAS IS TO BE DONE PRIOR TO EXCAVATING THE REMAINING SEPARATING GROUND TO ALLOW WATERS IN. REMOVAL OF THE FINAL SEPARATING GROUNDS IS TO BE DONE GRADUALLY AND OVER AS WIDE AN AREA AS POSSIBLE TO MINIMIZE EROSION. USE OF HIGH CAPACITY PUMPS TO WATER UP THE EXCAVATED DIVERSION AND SEDIMENT DEPOSITION CHANNELS IS ENCOURAGED. CONTRACTOR TO PROPOSE METHOD OF TYING FROM STA. 780 TO 815 FOR ENGINEER'S APPROVAL.

- FROM STA. 780 TO 790 SHOT ROCK RIPRAP ON FILTER TO BE PLACED ON 100m² OF ISLAND BANK IN LINE WITH FLOWS FROM 12x3m CULVERT.

- RIPRAP PLACED BY SEAR ON NORTH BANK OF CHANNEL FROM STA. 800± TO 810± TO BE REMOVED AND RESET ON NEW BANK AND IN CHANNEL BOTTOM WHERE GRADE DROPS. (APPROX. 200m² TO BE RESET).

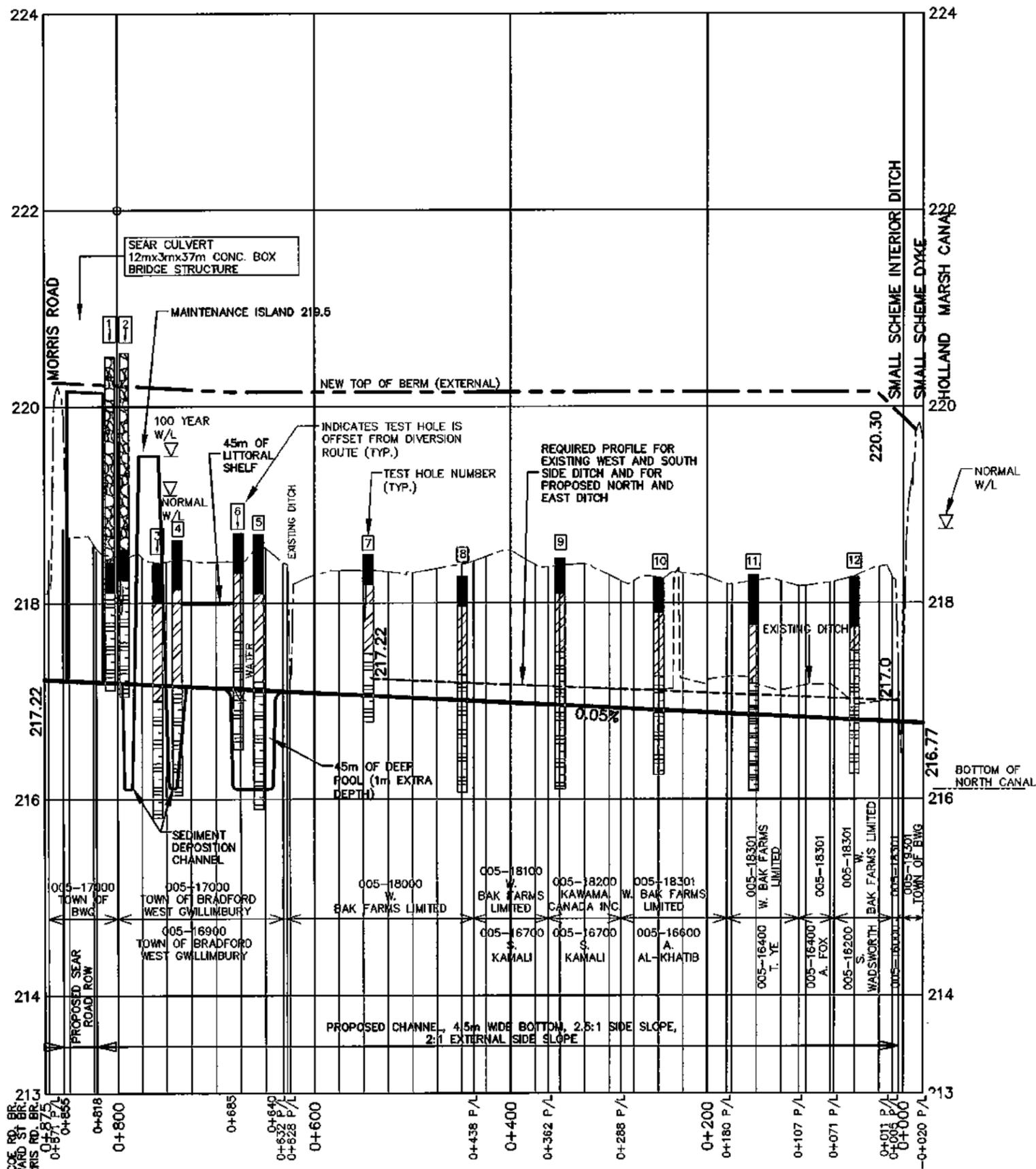
- THE MATERIALS EXCAVATED FROM THE SEAR CONSTRUCTED BERM WILL PRIMARILY BE CLAYS AND ARE TO BE MIXED WITH THE BALANCE OF THE EXCAVATED SILTS PLUS THE SEDIMENTS HAULED FROM EXCAVATION AREAS TO FINISH THE ISLAND AREA AND TO FINISH THE MAINTENANCE BERMS.

- THEN ALL SURFACES ABOVE WATER ARE TO BE TOPSOILED AND SEEDED.

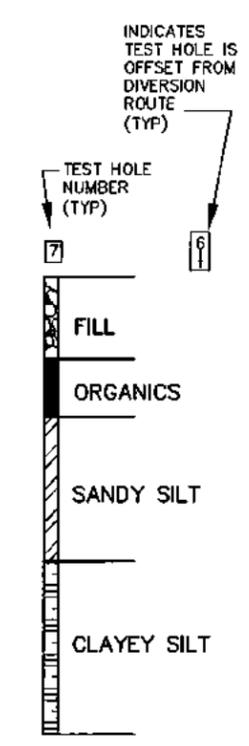
- ONCE THE FULL DEPOSITION CHANNEL/ISLAND WORK IS CONSTRUCTED AND TIED IN, THEN THE REQUIRED TIE-IN EMBANKMENT BETWEEN THE MORRIS ROAD CUL-DE-SAC AS BUILT BY THE SEAR PROJECT AND THE SEAR ROAD EMBANKMENT IS TO BE CONSTRUCTED. THE CULVERT IN THIS TIE-IN EMBANKMENT IS TO BE SEALED/BLOCKED TEMPORARILY TO ALLOW DEWATERING DOWNSTREAM SO THE WORK TO THE SOUTH IS DONE IN THE DRY. (SEE ALSO NOTES ON DRAWINGS 68 AND 69).

- ORGANICS WILL HAVE BEEN PREVIOUSLY STRIPPED FROM THE SITE OF TYPE II AND III WORK BY THE SEAR PROJECT, TO AN ELEVATION OF 217.8 TO 217.9. THE AREA BETWEEN THE SHALLOW MAINTENANCE BERMS BESIDE THE DIVERSION AND THE OUTSIDE HIGHER BERMS IS TO BE LEFT IN THE STRIPPED CONDITION UNTIL SUCH TIME THAT A DECISION IS MADE AS TO ULTIMATE USAGE. ULTIMATE USAGE COULD INCLUDE RAISING THE AREA BY 1m± TO CREATE RECREATIONAL LANDS, DOG PARKS, ETC. OR EXCAVATING THE AREA BY 1 TO 2m MORE TO CREATE LAKE/WATER MANAGEMENT FACILITIES OR RAISING THE AREA BY 0.5m TO CREATE A WETLANDS AREA.

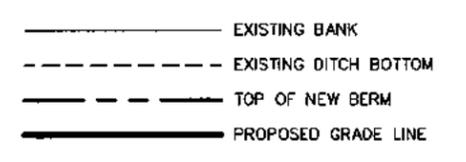
DESIGNED BY: K.A.S.		
CHECKED BY: K.A.S.		
DRAWN BY:		
CHECKED BY:		
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>DIVERSION BRANCH SCOPE OF WORK</b>		APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISER:	
	JOB NUMBER: 12-267	
	DRAWING	<b>29</b>



**TEST HOLE LEGEND**



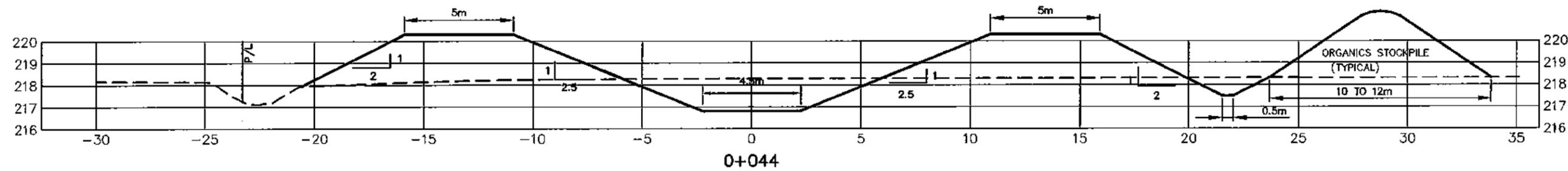
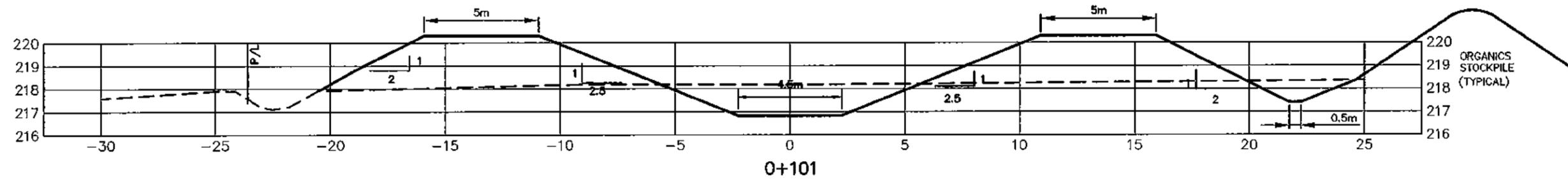
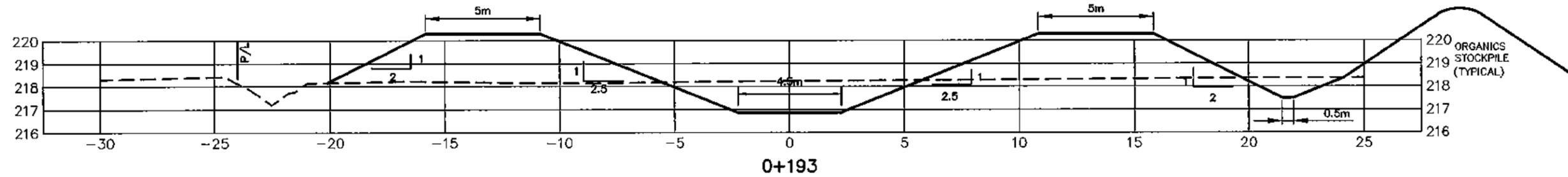
**LEGEND**



-089 SIMCOE RD. BR. 21  
 -015 EDWARD ST. BR. 21  
 -1665 N MORRIS RD. BR. 21  
 0+875 P/L  
 0+865 P/L  
 0+818 P/L  
 0+800 P/L  
 0+685 P/L  
 0+640 P/L  
 0+622 P/L  
 0+628 P/L  
 0+600 P/L  
 0+438 P/L  
 0+400 P/L  
 0+362 P/L  
 0+288 P/L  
 0+200 P/L  
 0+180 P/L  
 0+107 P/L  
 0+071 P/L  
 0+011 P/L  
 0+006 P/L  
 0+020 P/L

**DIVERSION BRANCH**

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		0 50 100m
DRAWN BY: N.M.B.		HORZ. 1:5000
CHECKED BY: K.A.S.		0 0.5 1m
		VERT. 1:50 (ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>DIVERSION BRANCH PROFILE</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 30



**LEGEND**

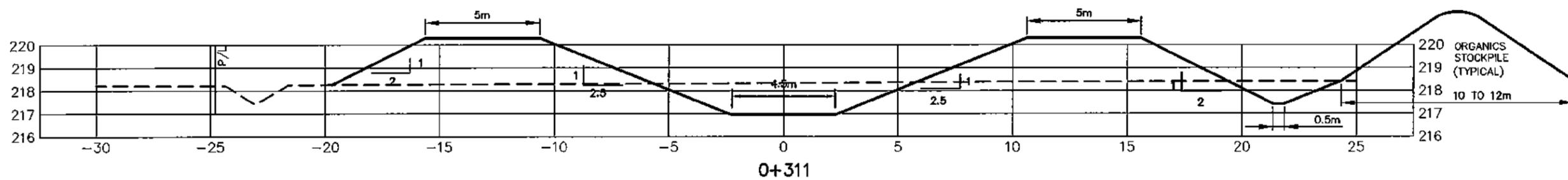
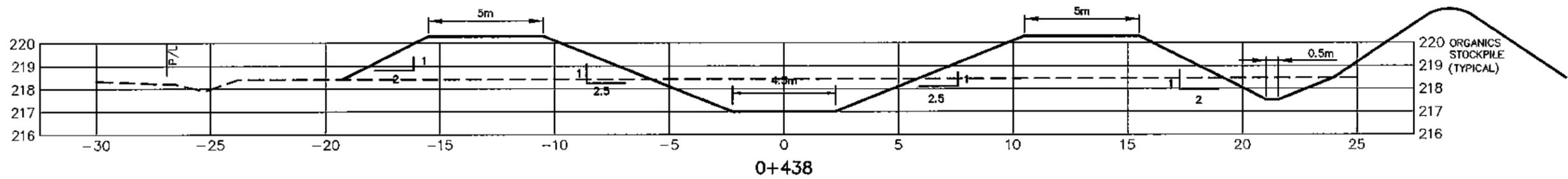
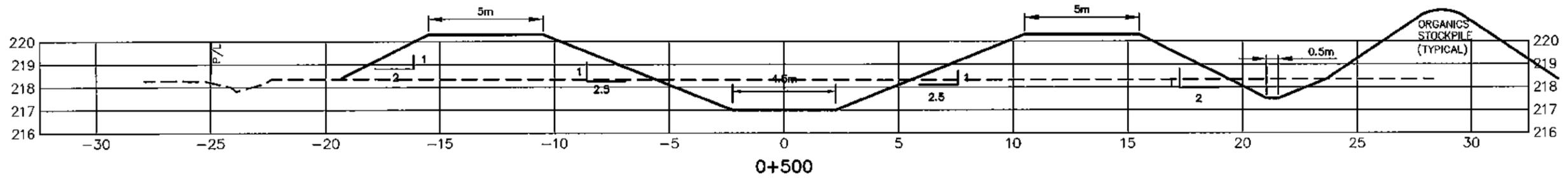
- EXISTING GROUND
- DIVERSION GRADING

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
 0 4 8m  
 HOR. 1:200  
 0 4 8m  
 VER. 1:200  
 (ON 11"x17")

<b>MORRIS ROAD DRAIN</b>	
TOWN OF BRADFORD WEST GWILLIMBURY	
<b>BAK PROPERTY CROSS SECTIONS 1</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING <b>31</b>



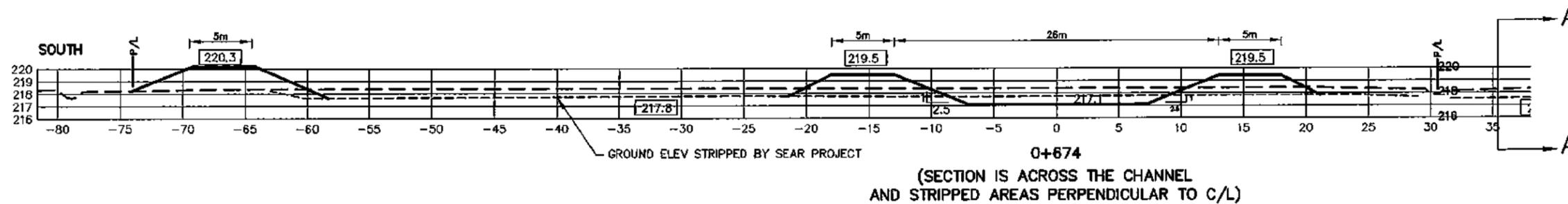
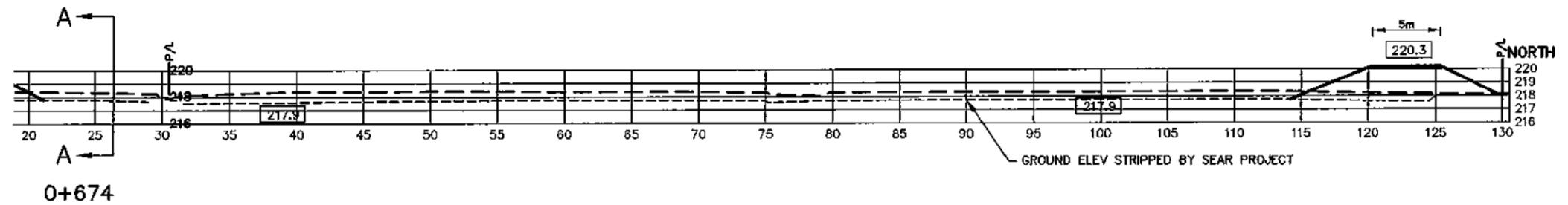
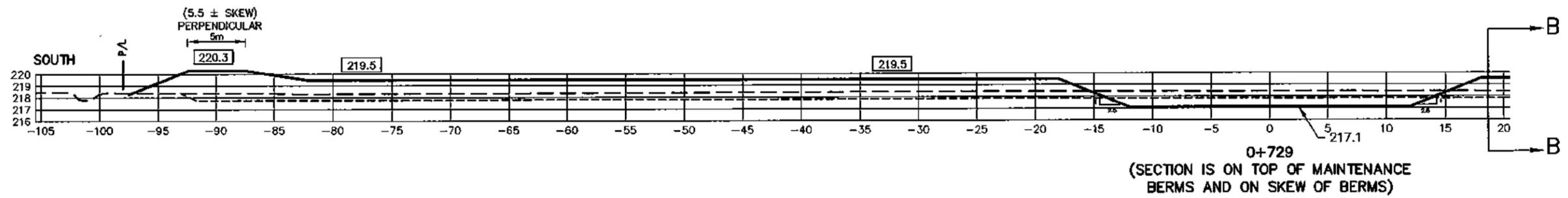
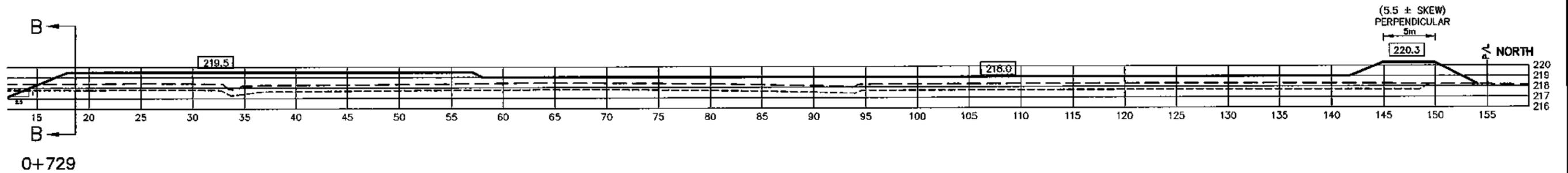
**LEGEND**  
 - - - - - EXISTING GROUND  
 \_\_\_\_\_ DIVERSION GRADING

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
 0 4 8m  
 HOR. 1:200  
 0 4 8m  
 VER. 1:200  
 (ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>BAK PROPERTY CROSS SECTIONS 2</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267 DRAWING: 32



NOTE:  
PROPERTY LINES WILL BE ESTABLISHED FOR CONTRACTOR  
AT TIME OF CONSTRUCTION

**LEGEND**

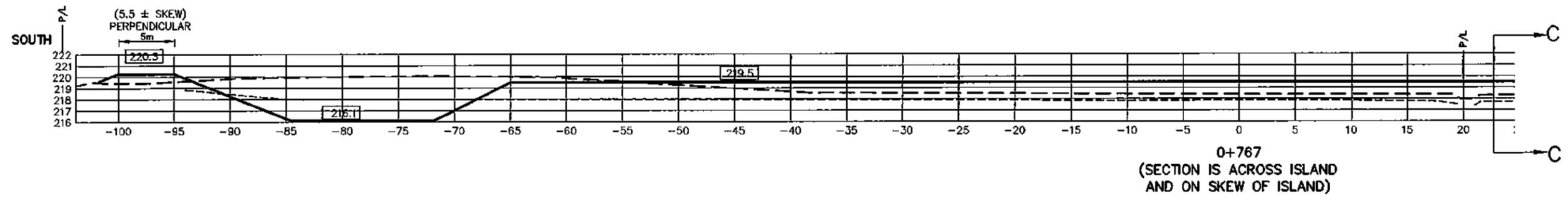
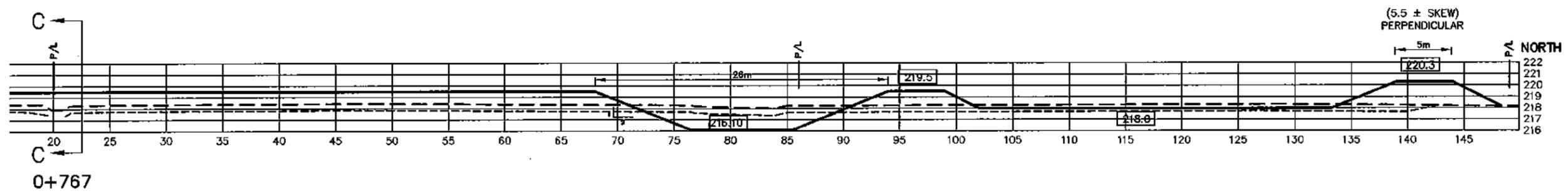
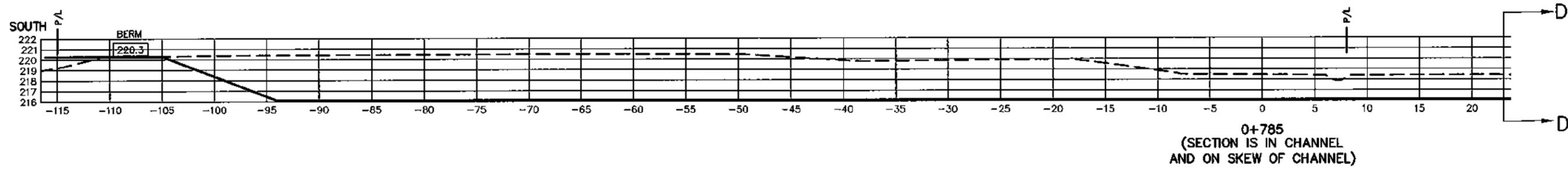
- EXISTING GROUND
- STRIPPING BY SEAR
- DIVERSION GRADING

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



SCALE  
0 4 8m  
HOR. 1:400  
0 4 8m  
VER. 1:400  
(ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>BAK PROPERTY CROSS SECTIONS 3</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUBURBY	REVISED:
	JOB NUMBER: 12-287 DRAWING: <b>33</b>



- LEGEND**
- EXISTING GROUND
  - - - STRIPPING BY SEAR
  - DIVERSION GRADING

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



**SCALE**

0 4 8m

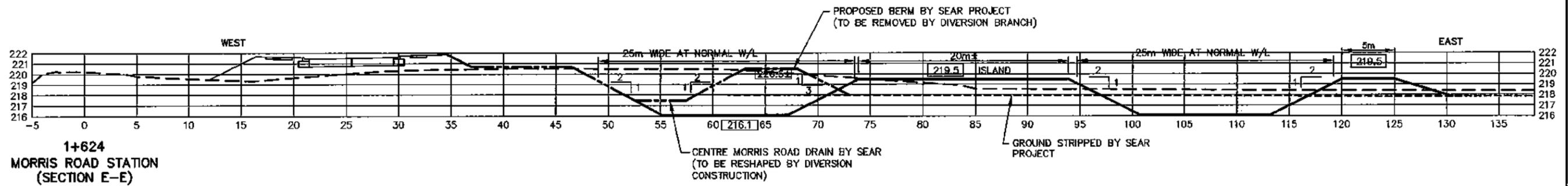
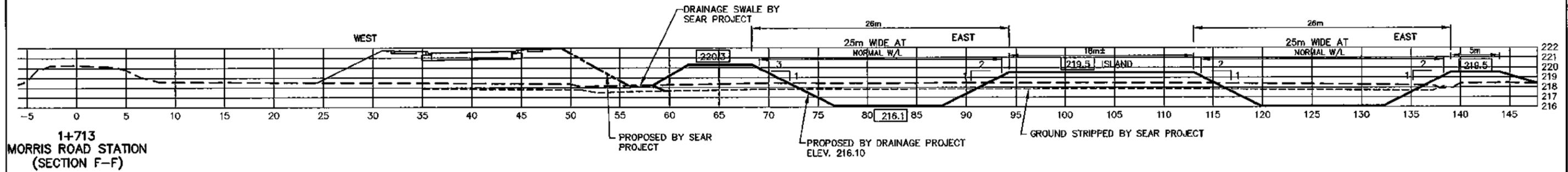
HOR. 1:400

0 4 8m

VER. 1:400

(ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>BAK PROPERTY</b> CROSS SECTIONS 4	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REWSED: JOB NUMBER: 12-267 DRAWING: 34



**LEGEND**

- EXISTING GROUND
- - - STRIPPING BY SEAR
- DIVERSION GRADING

**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

**BAK PROPERTY  
CROSS SECTIONS 5**

APR. 14, 2016

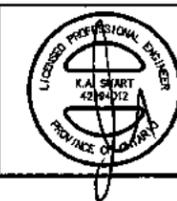
**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

REVISED:

JOB NUMBER: 12-267

DRAWING  
**35**

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



**SCALE**  
D 4 8m  
HOR. 1:400  
V. 1:400  
(ON 11"x17")



**SCOPE OF WORK (STA. -015 TO 217) (EDWARD STREET BRANCH)**

**STA. -015 TO 217**  
 -TYPE IX WORK REQUIRED TO PROVIDE A CHANNEL WITH A 1.5m BOTTOM AND 1.5:1 SIDE SLOPES AS PER SECTIONS  
 -THIS WORK ALSO INVOLVES TEMPORARILY REMOVING CHANNEL RIPRAP WHERE SUCH EXISTS, ENLARGING CHANNEL AND REPLACING THE RIPRAP, SO FINISHED CHANNEL SECTION WHEN RIPRAP IS RESET WITH RECESSING PROVIDES THE REQUIRED CROSS-SECTION.  
 -ALL NEW BANKS NOT PROTECTED BY RIPRAP ARE TO BE GIVEN A THIN LIFT OF TOPSOIL (50 TO 75mm) AND ARE THEN TO BE SEEDED.  
 -ALL EXCAVATED MATERIALS (APPROX. 500m<sup>3</sup>) ARE TO BE LOADED AND HAULED TO THE BAK FARM DISPOSAL SITE.  
 -THE PROVISIONS DESCRIBED FOR TYPE X WORK IN THE SCOPE OF WORK NOTES FOR SIMCOE ROAD BRANCH ALSO APPLY TO THE CROSSING OF THE SEAR EMBANKMENT IN ORDER TO HAUL TO THE BAK FARM SITE.  
 -UTILITY POLE AT STA. 173± IN CHANNEL TO BE MOVED BY OTHERS IN ORDER TO BE OUT OF CHANNEL.  
 -MAINTAIN EXISTING BOTTOM ELEV. FROM STA. 069 TO 217

**STA. 005**  
 -THREE EXISTING 1400x900mm± ARCH PIPES TO BE REMOVED AND DISPOSED OF.  
 -NEW 12m LONG BY 3m WIDE FOOTBRIDGE TO BE SUPPLIED AND INSTALLED AS PER SPECIAL PROVISION 55  
 -STEEL H PILES TO BE DRIVEN AND CONCRETE PIER CAP TO BE CONSTRUCTED AS FOOTBRIDGE ABUTMENTS (OR EQUAL) (SEE DETAIL DRAWING 7#)  
 -24m± OF ARMOUR STONE TO BE PROVIDED WITH RECESSING TO PROTECT CONCRETE ABUTMENTS FROM EROSION

**STA. 200 TO 217**  
 -ADDITIONAL RIPRAP ON FILTER TO BE SUPPLIED AND INSTALLED WITH RECESSING AS NECESSARY SO CHANNEL IS FULLY RIPRAPPED FOR 15m, INCLUDING THE GABION BASKET LENGTH, DOWNSTREAM OF THE STORM OUTLET.

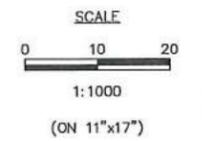
**WORKING AREA**  
 PARCEL 005-016 AND ACROSS SEAR NORTH OF NEW CULVERT FOR HAULING.

**LEGEND**

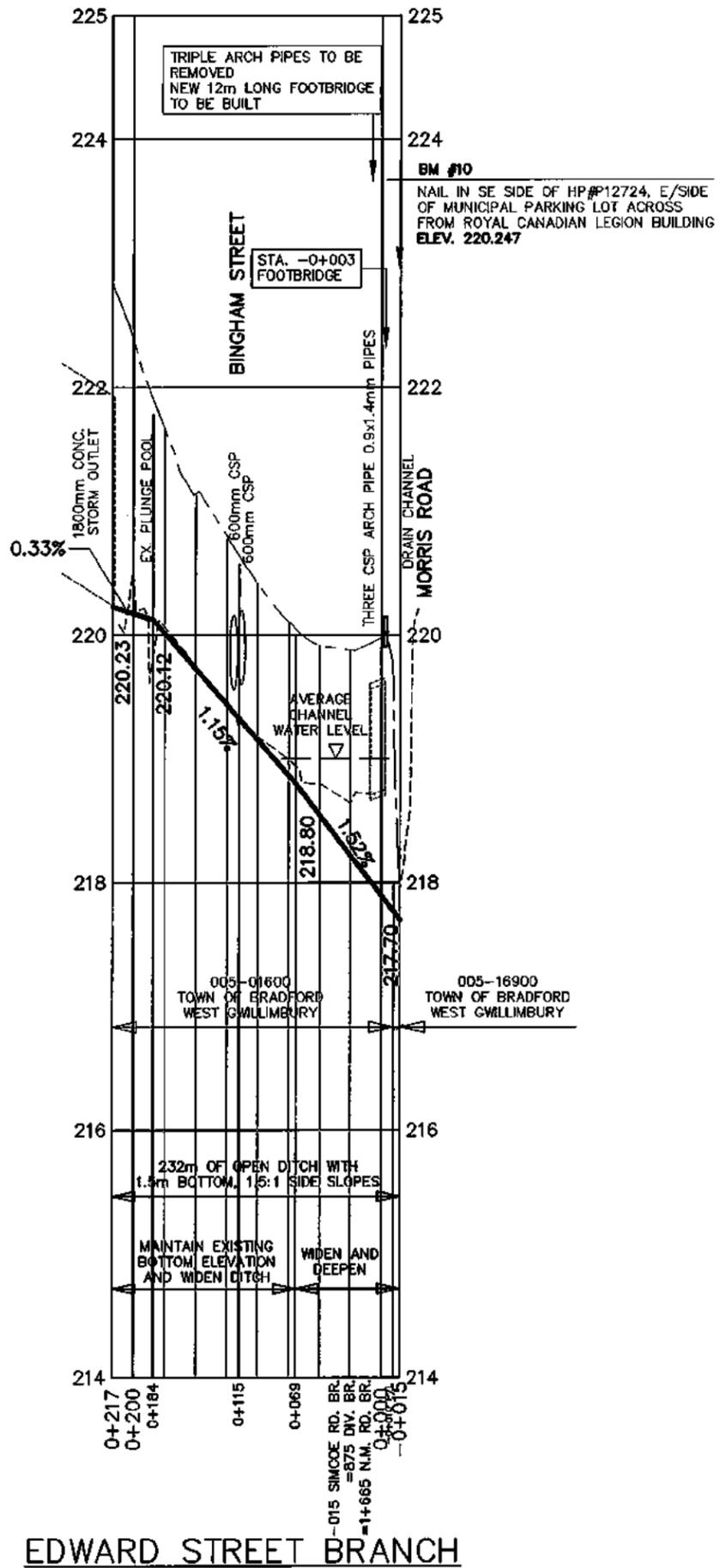
- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- EXISTING STM MAIN
- PROPOSED EDGE OF PAVEMENT (BY OTHERS)
- PROPOSED CENTRELINE OF ROAD (BY OTHERS)
- DIVERSION BRANCH
- PROPOSED CULVERT LOCATION BELOW SEAR FOR MORRIS ROAD DRAIN
- TEST HOLE LOCATION AND NUMBER
- TEMPORARY ACCESS/HAUL ROUTE

**NOTE:**  
 SEAR DATA BASED ON DRAWINGS BY AINLEY GROUP

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



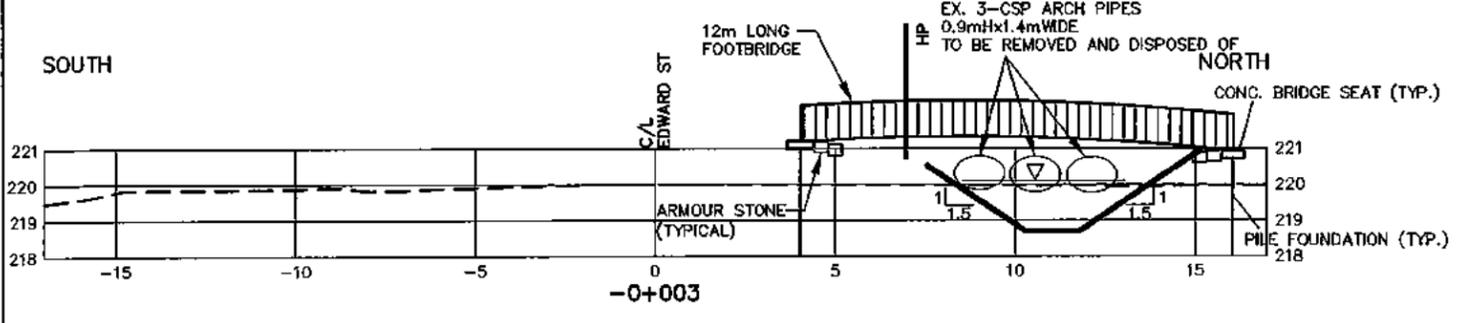
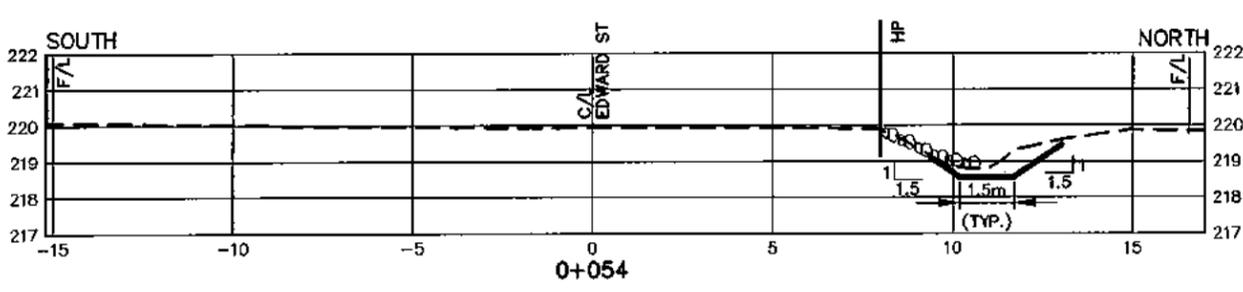
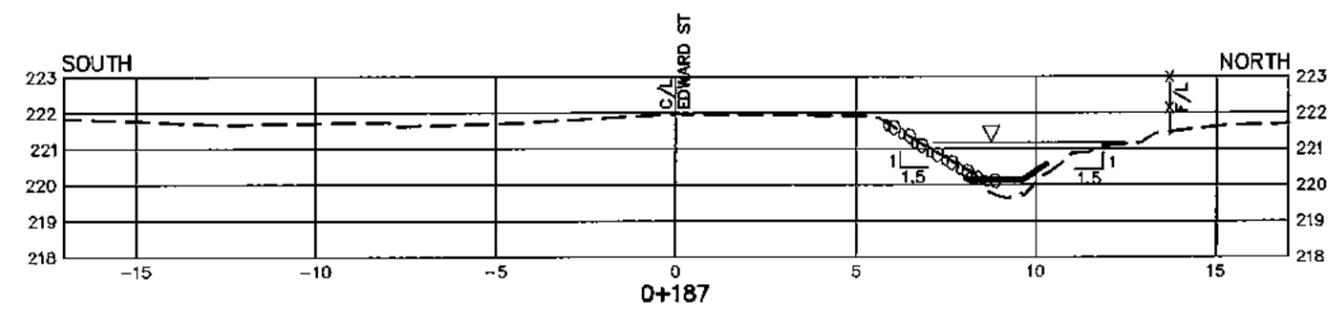
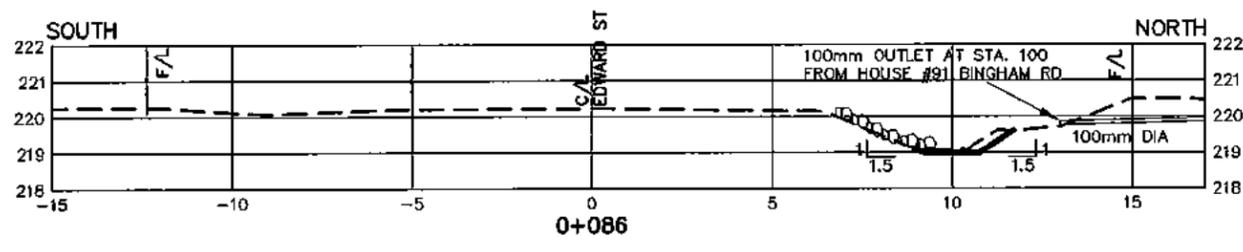
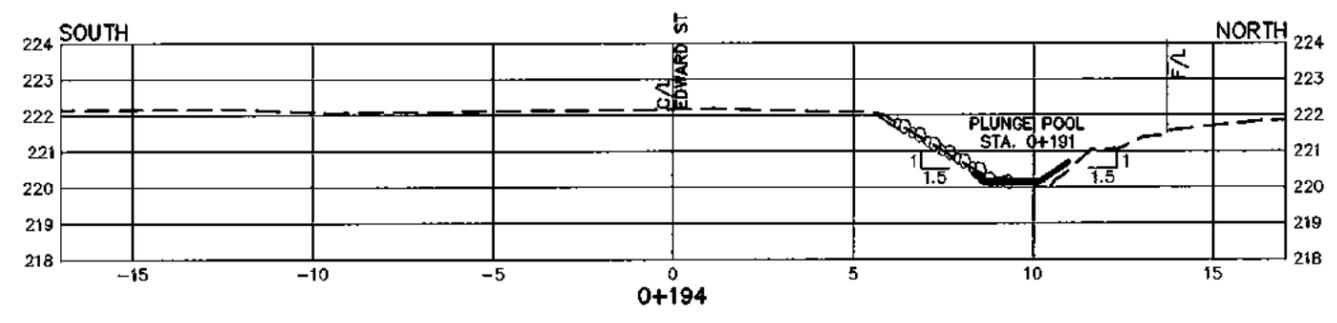
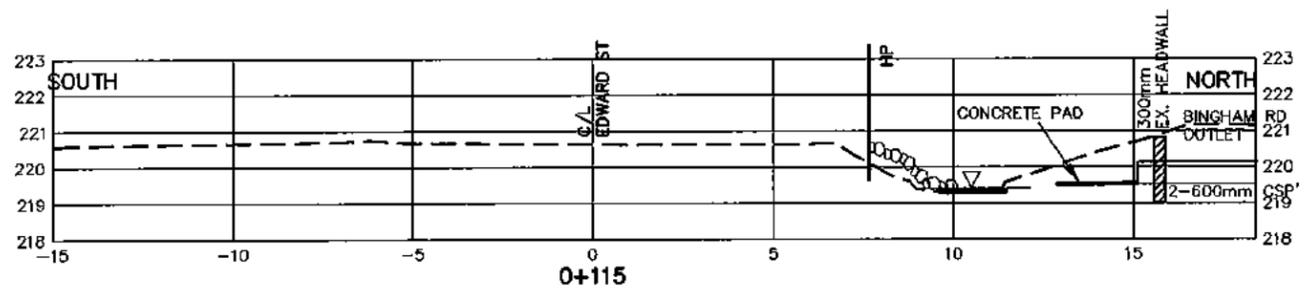
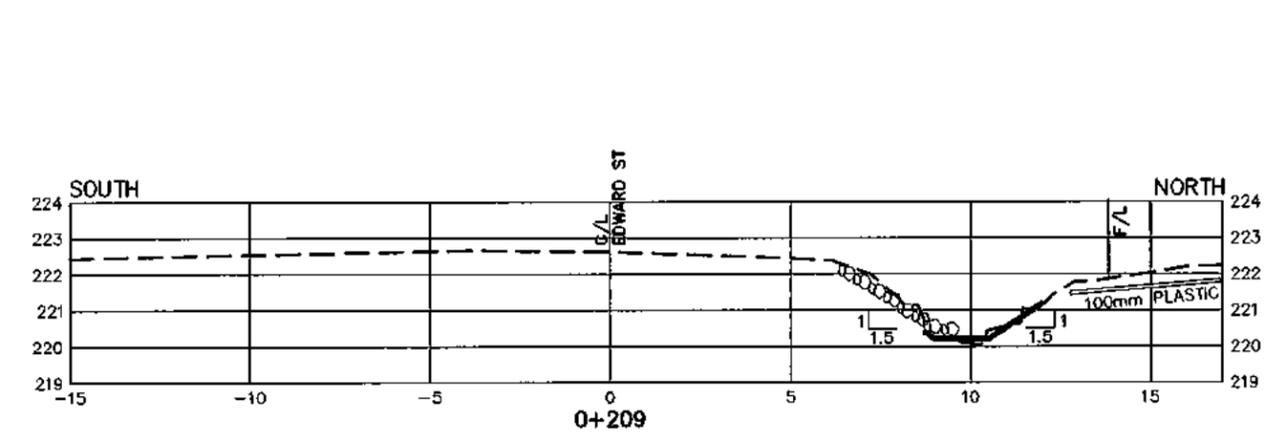
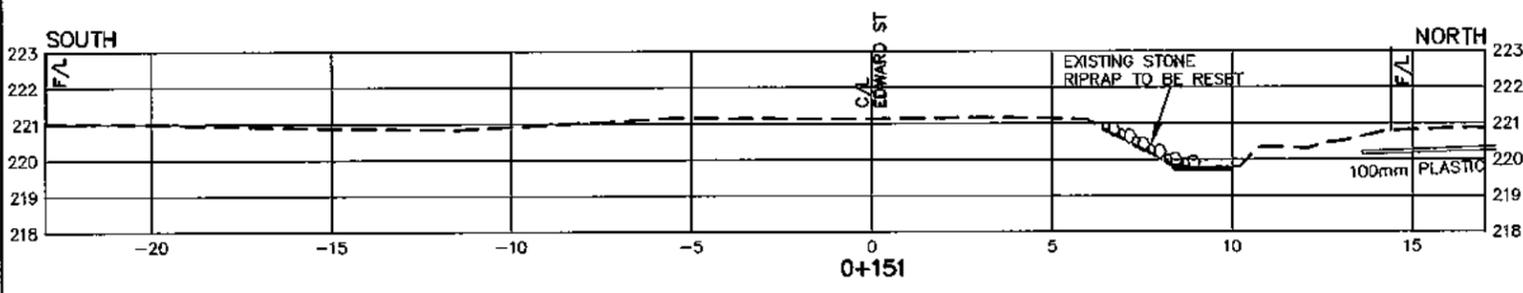
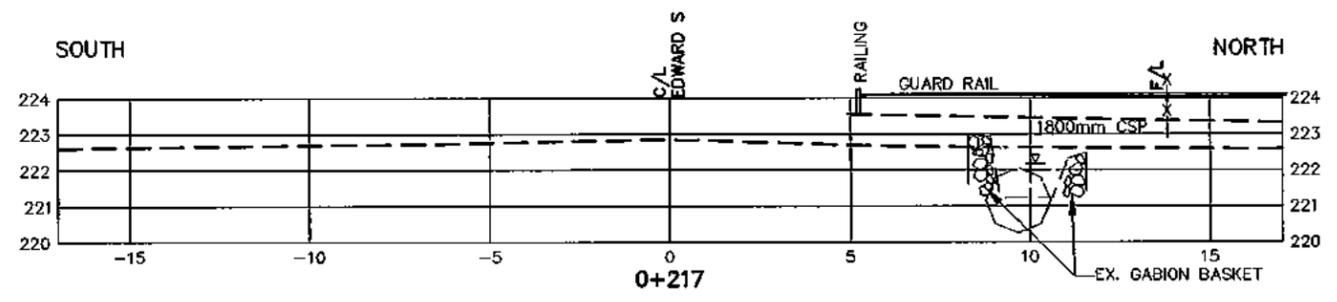
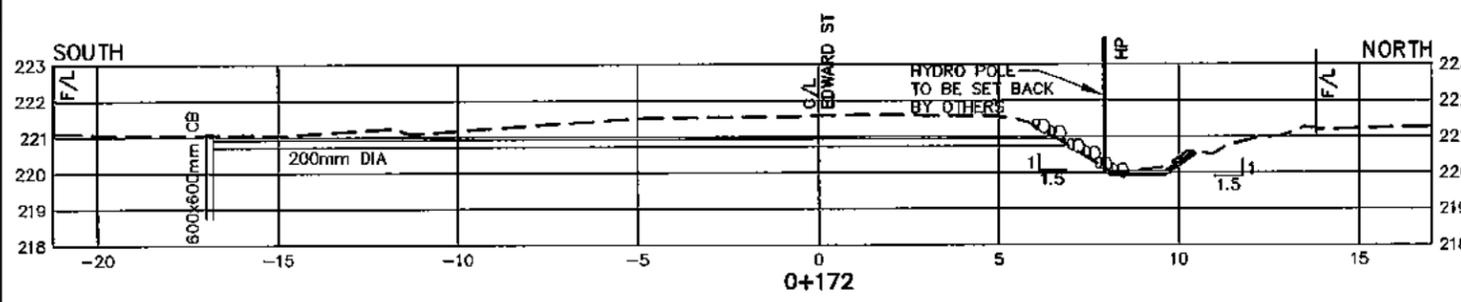
<b>MORRIS ROAD DRAIN</b>	
TOWN OF BRADFORD WEST GWILLIMBURY	
<b>EDWARD STREET BRANCH ENLARGEMENT AERIAL</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUBURBY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 36



**LEGEND**

- - - - - EXISTING DITCH BOTTOM  
 - - - - - EXISTING CENTRELINE OF ROAD  
 ———— PROPOSED GRADE LINE

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		 HOR. 1:5000
DRAWN BY: N.M.B.		 VERT. 1:50
CHECKED BY: K.A.S.		(ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>EDWARD STREET BRANCH PROFILE</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SLIDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 37



**LEGEND**

--- EXISTING GROUND  
— PROPOSED GRADE LINE

DESIGNED BY: K.A.S.  
CHECKED BY: K.A.S.  
DRAWN BY: N.M.B.  
CHECKED BY: K.A.S.



**SCALE**

HOR. 1:200  
VER. 1:200  
(ON 11"x17")

<b>MORRIS ROAD DRAIN</b>		APR. 14, 2016
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>EDWARD STREET BRANCH CROSS SECTIONS</b>		REVISED:
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		JOB NUMBER: 12-267
		DRAWING: 38

**SCOPE OF WORK (-099 TO 200) SIMCOE ROAD BRANCH**

**STA. -099 TO 000**

- EXISTING MORRIS ROAD DRAIN CHANNEL TO BECOME PART OF SIMCOE ROAD 000 AH'D BRANCH.
- THE BOTTOM OF THIS CHANNEL IS TO BE CLEANED AS PART OF THIS DRAIN WORK AND IS TO BE TYPE X WORK.
- SEE CROSS-SECTION OF REQUIRED WORK.
- APPROXIMATELY 150m<sup>2</sup> IS TO BE REMOVED
- THE WORK IS TO BE DONE FROM THE 5M WIDE MAINTENANCE PATH CREATED BY SEAR ON WEST SIDE OF CHANNEL AND MATERIALS ARE TO BE HAULED TO BAK FARM SITE FOR DISPOSAL.
- ACCESS FROM AND TO THE BAK STAGING AREA FOR CONSTRUCTION EQUIPMENT AND FOR HAULING EQUIPMENT IS TO BE ALONG THE ROUTE OF THE MAINTENANCE BERMS ON THE NORTH SIDE OF THE 12x3m CULVERT, ACROSS A TEMPORARY 3000mm DIA. CULVERT IN THE MORRIS ROAD CHANNEL, AND OVER THE TRIPLE ARCH PIPE EXISTING IN THE MORRIS ROAD CHANNEL PRIOR TO THEIR REMOVAL.
- A VERY SHORT CONSTRUCTION WINDOW WILL BE PROVIDED FOR HAULING ACROSS THE SEAR EMBANKMENTS AND THE CONTRACTOR WILL BE REQUIRED TO ATTEND TO SUCH.
- IF MATS OR TEMPORARY GRANULARS ARE REQUIRED TO CROSS THE NEW SEAR ROAD, ADDITIONAL PAYMENT FOR SUPPLY, USAGE AND REMOVAL OF MATS AND/OR GRANULARS WILL BE PROVIDED.
- A TEMPORARY CLAY RAMP MAY BE NECESSARY BETWEEN MORRIS ROAD AND SEAR ROAD EMBANKMENT ADJACENT TO THE NEW 12x3m CULVERT. IT WILL HAVE TO BE ULTIMATELY REMOVED AND DISPOSED OF ON THE BAK FARM SITE.
- FOR FUTURE MAINTENANCE, THE CHANNEL SHALL HAVE PROFILE AND CROSS-SECTION AS SHOWN HEREIN.
- FUTURE MAINTENANCE SHALL BE UNDERTAKEN FROM THE 5m MAINTENANCE PATH AND ALL MATERIALS SHALL BE HAULED OFF SITE FOR DISPOSAL.

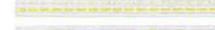
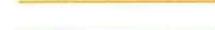
**STA. 000 AH'D TO 200 BRANCH**

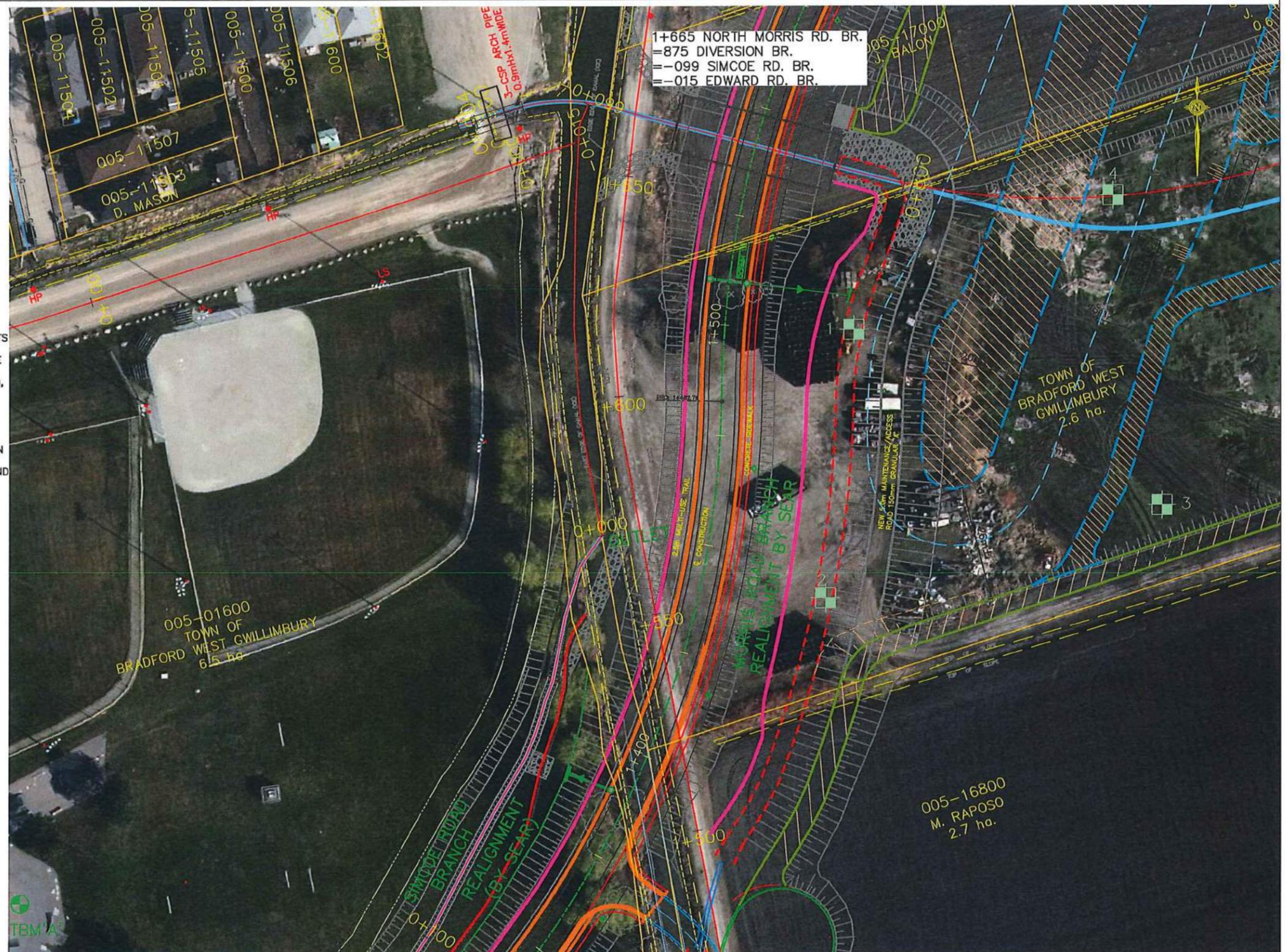
- NEW CHANNEL AS CONSTRUCTED BY SEAR PROJECT TO FORM BALANCE OF SIMCOE ROAD BRANCH
- PROFILE AND CROSS-SECTIONS ENCLOSED HEREIN SHALL APPLY.
- MAINTENANCE SHALL BE DONE FROM 5m MAINTENANCE PATH
- MATERIALS TO BE LOADED AND HAULED AWAY.

**WORKING AREA**

PARCEL 005-016 AND ACROSS SEAR NORTH OF NEW CULVERT FOR HAULING.

**LEGEND**

-  EXISTING SIMCOE ROAD BRANCH
-  PROPERTY LINE
-  EXISTING STM MAIN
-  PROPOSED EDGE OF PAVEMENT (SEAR)
-  PROPOSED CENTRELINE OF ROAD (SEAR)
-  HIGH FLOW BANK
-  LOW FLOW CHANNEL RECONSTRUCTED SIMCOE ROAD BRANCH
-  HIGH FLOW BANK



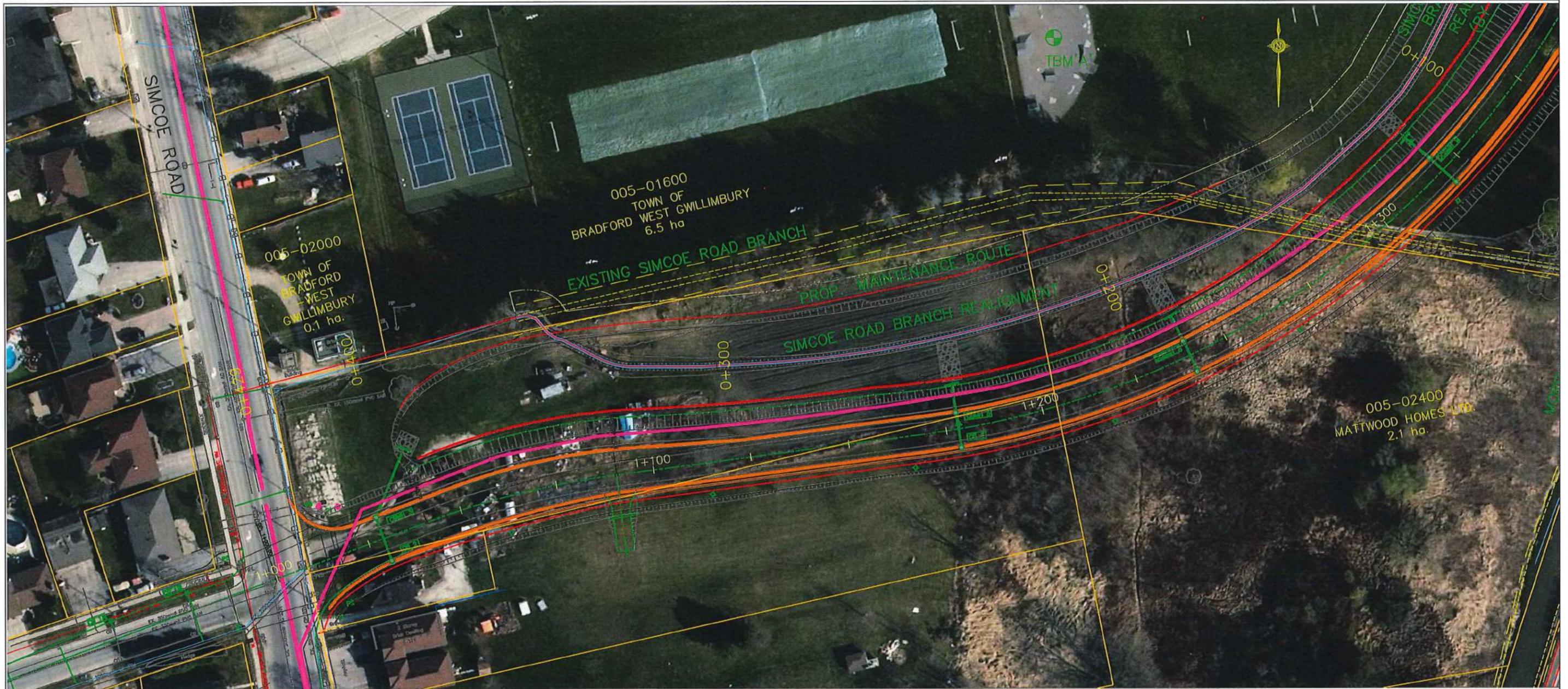
1+665 NORTH MORRIS RD. BR.  
 =875 DIVERSION BR.  
 =-099 SIMCOE RD. BR.  
 =-015 EDWARD RD. BR.

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SIMCOE ROAD BRANCH ENLARGEMENT AERIAL 1</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUBURBY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 39

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
 0 10 20  
 1:1000  
 (ON 11"x17")



**LEGEND**

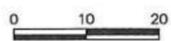
- EXISTING SIMCOE ROAD BRANCH
- PROPERTY LINE
- EXISTING STM MAIN
- PROPOSED EDGE OF PAVEMENT (SEAR)
- PROPOSED CENTRELINE OF ROAD (SEAR)
- HIGH FLOW BANK
- LOW FLOW CHANNEL RECONSTRUCTED SIMCOE ROAD BRANCH
- HIGH FLOW BANK

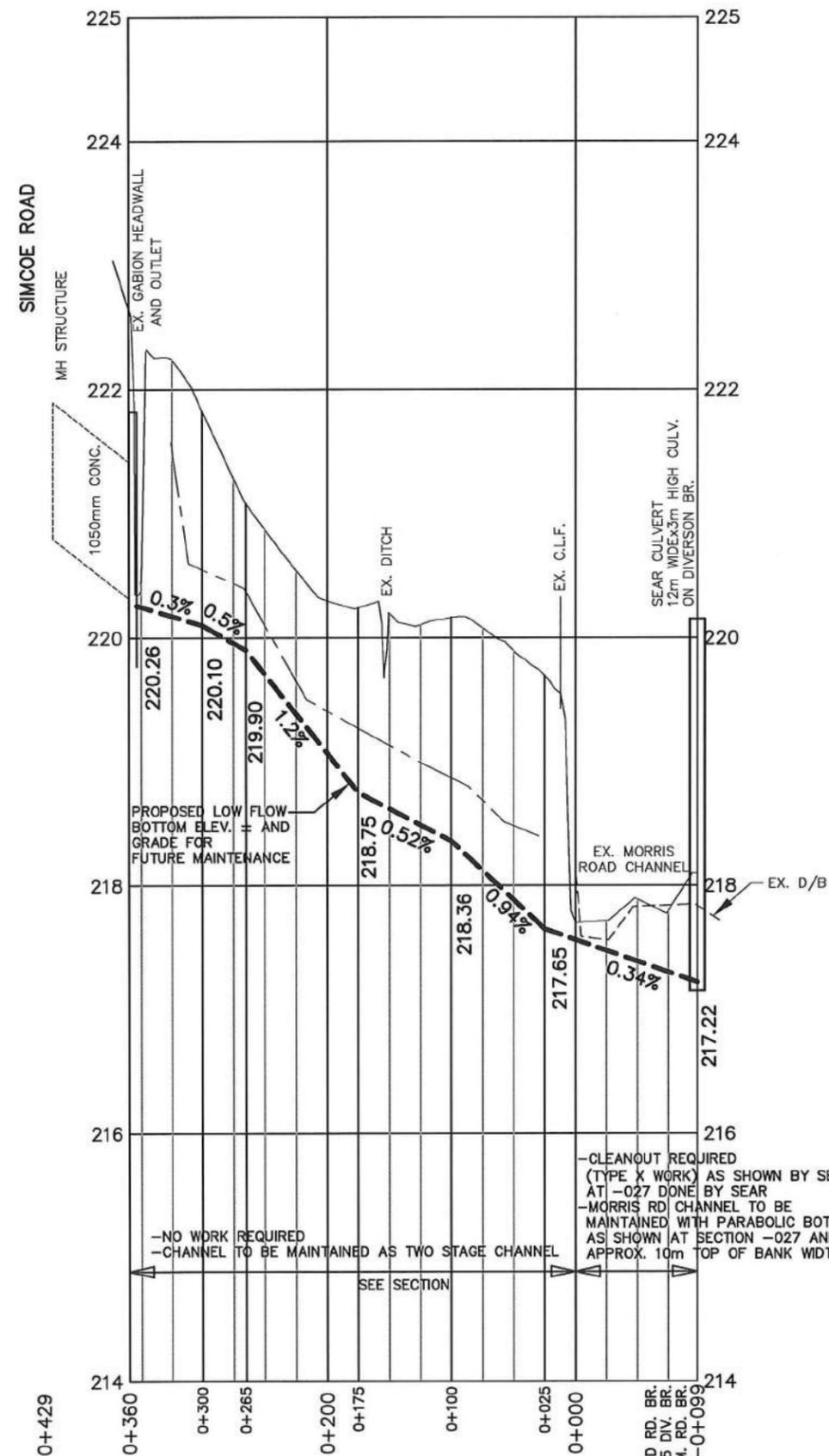
**SCOPE OF WORK (0+200 TO 0+360)**

**STA. 200 TO 360**  
 -NEW CHANNEL AS CONSTRUCTED BY SEAR PROJECT TO FORM BALANCE OF SIMCOE ROAD BRANCH  
 -PROFILE AND CROSS-SECTIONS ENCLOSED HEREIN SHALL APPLY  
 -MAINTENANCE SHALL BE DONE FROM 5m MAINTENANCE PATH  
 -MATERIALS TO BE HAULED OFF SITE FOR DISPOSAL

**WORKING AREA**  
 PARCEL 005-016 AND LANDS ACQUIRED FOR SEAR

**NOTE:**  
 DRAWINGS OF SEAR PROJECT WERE BY AINLEY GROUP

DESIGNED BY: K.A.S.		SCALE	 1:1000 (ON 11"x17")	
CHECKED BY: K.A.S.				
DRAWN BY: N.M.B.				
CHECKED BY: K.A.S.				
<b>MORRIS ROAD DRAIN</b>				
TOWN OF BRADFORD WEST GWILLIMBURY				
<b>SIMCOE ROAD BRANCH ENLARGEMENT AERIAL 2</b>		APR. 14, 2016		
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED:		
		JOB NUMBER: 12-267		
		DRAWING 40		



REALIGNED SIMCOE ROAD BRANCH

LEGEND

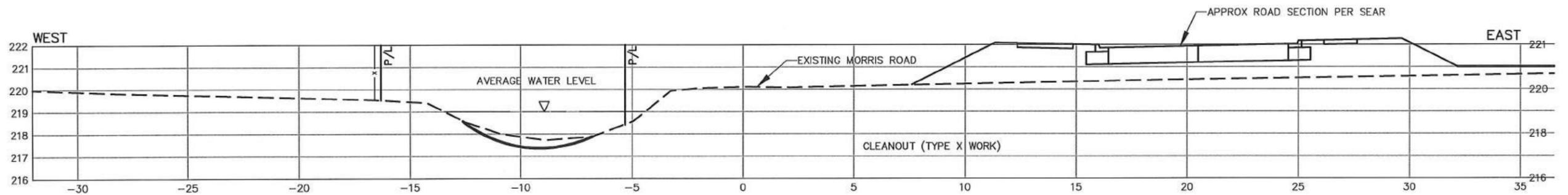
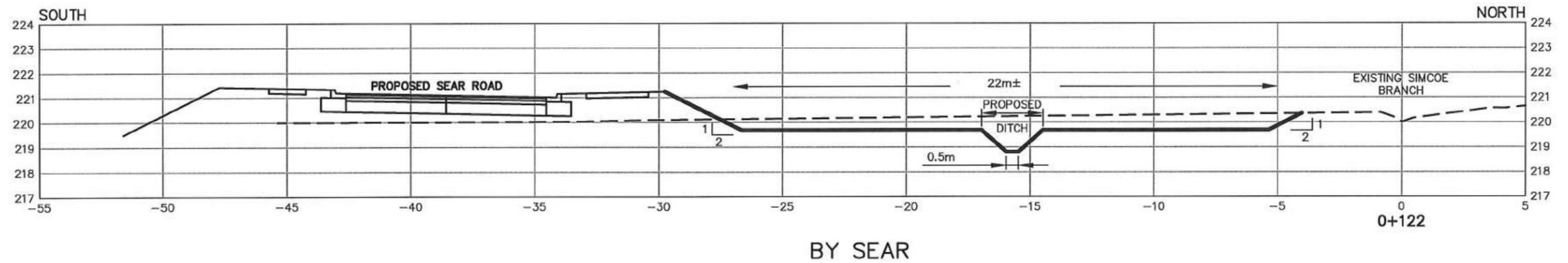
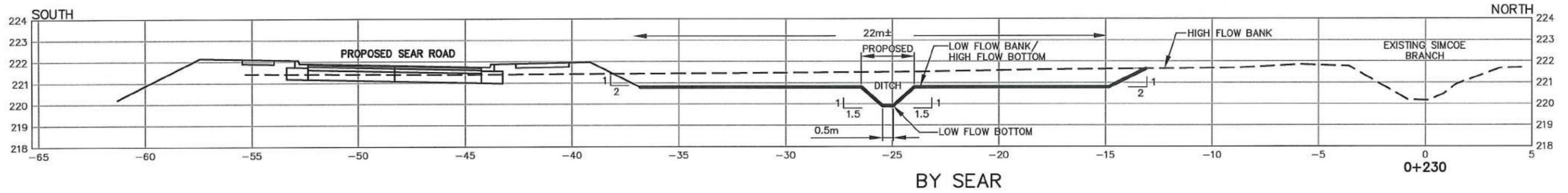
- EXISTING GROUND
- - - - - EXISTING DITCH BOTTOM
- · - · - PROPOSED LOW FLOW BOTTOM
- PROPOSED LOW FLOW BANK

-NO WORK REQUIRED  
-CHANNEL TO BE MAINTAINED AS TWO STAGE CHANNEL

SEE SECTION

-CLEANOUT REQUIRED (TYPE X WORK) AS SHOWN BY SECTION AT -027 DONE BY SEAR  
-MORRIS RD CHANNEL TO BE MAINTAINED WITH PARABOLIC BOTTOM AS SHOWN AT SECTION -027 AND WITH APPROX. 10m TOP OF BANK WIDTH

DESIGNED BY: K.A.S.		SCALE 0 50 100m HORZ. 1:5000 0 0.5 1m VERT. 1:50 (ON 11"x17")
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SIMCOE ROAD BRANCH PROFILE</b>		APR. 14., 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:	JOB NUMBER: 12-267
	DRAWING	41



STA. -0+027  
=STA. 1+595 SOUTH MORRIS ROAD BRANCH

**NOTE:**  
CLEANOUT TO BE DONE THIS CONTRACT IF NOT DONE BY SEAR

**LEGEND**

- EXISTING GROUND
- PROPOSED SEAR EMBANKMENT
- PROPOSED LOW FLOW CHANNEL PART OF SIMCOE ROAD BRANCH

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		0 2 4m
DRAWN BY: N.M.B.		HOR. 1:200
CHECKED BY: K.A.S.		0 2 4m
		VER. 1:200
		(ON 11"x17")

<b>MORRIS ROAD DRAIN</b>	
TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SIMCOE ROAD BRANCH</b>	APR. 14, 2016
<b>CROSS SECTIONS</b>	
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 42



**LEGEND**

- EXISTING DITCH BANKS
- EXISTING DITCH CENTRE LINE
- EXISTING TOE
- PROPERTY LINE
- CURB
- STORM DRAIN
- EXISTING CULVERT
- EXISTING HYDRO CORRIDOR
- EXISTING GAS LINE APPROX. LOCATION
- EXISTING POLE LINE
- TEST HOLE LOCATION AND NUMBER

**SCOPE OF WORK (STA. 000 TO 350)**

- STA. 000 TO 350**  
 -EXISTING DITCH ON NORTH SIDE OF LINE 6 TO BE INCORPORATED AS LINE 6 BRANCH. REFER TO PROFILE AND SECTIONS FOR CHANNEL TO MAINTAIN  
 -ALL MATERIALS EXCAVATED TO BE LOADED AND HAULED OFF SITE FOR DISPOSAL
- STA. 006 TO 028.8**  
 -EXISTING TWIN 1200x3000mm CULVERTS TO BE INCORPORATED.
- STA. 266 TO 279**  
 -EXISTING TWIN 1600mm DIA CULVERTS BELOW PARKWOOD AVENUE TO BE INCORPORATED.
- STA. 200 TO 266**  
 -CLEAN EXISTING CHANNEL FOR 66m DOWNSTREAM OF PARKWOOD CULVERTS AND DISPOSE OF OFF SITE (TYPE XI WORK)
- STA. 0+279 TO 0+350**  
 -CLEAN EXISTING CHANNEL FOR 77m UPSTREAM OF PARKWOOD CULVERTS AND DISPOSE OF OFF SITE (TYPE XI WORK)

**WORKING AREA**  
LINE 6 RIGHT-OF-WAY

**NOTE:**  
LINE 6 RECONSTRUCTION DATA BASED ON DRAWINGS BY MTE

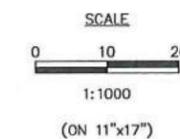
**MORRIS ROAD DRAIN**

TOWN OF BRADFORD WEST GWILLIMBURY

**LINE 6 BRANCH ENLARGEMENT AERIAL 1**

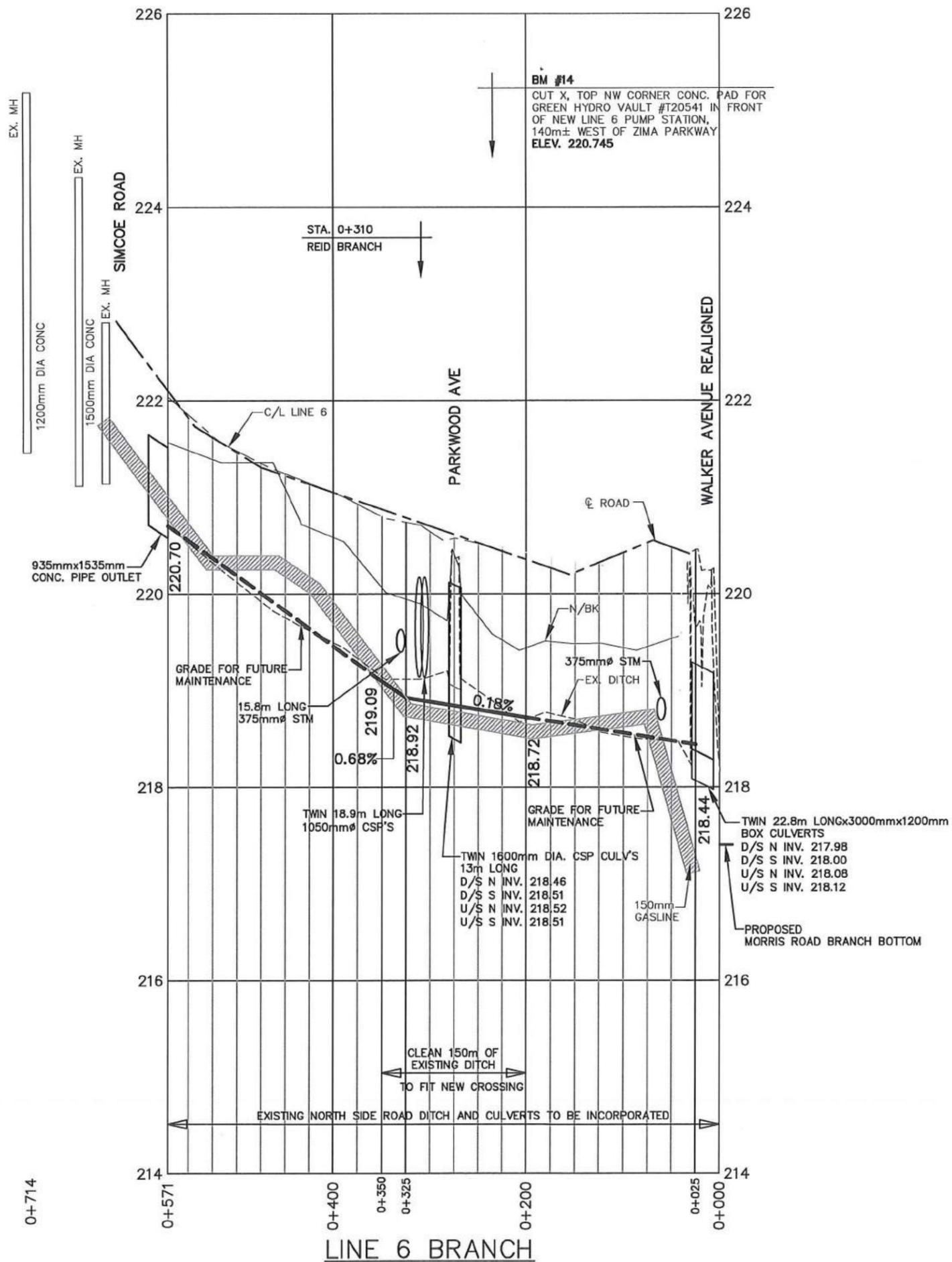
APR. 14, 2016

DESIGNED BY: K.A.S.
CHECKED BY: K.A.S.
DRAWN BY: N.M.B.
CHECKED BY: K.A.S.



REVISED:
JOB NUMBER: 12-267
DRAWING: 43

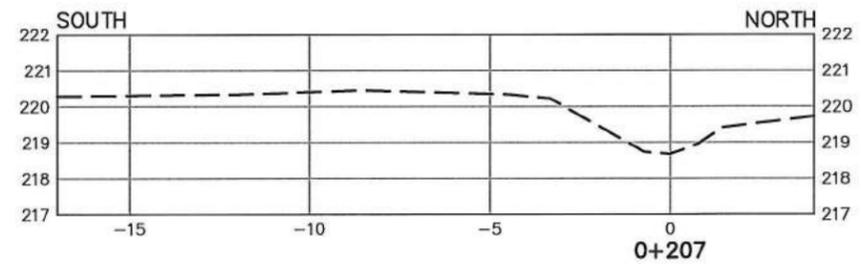
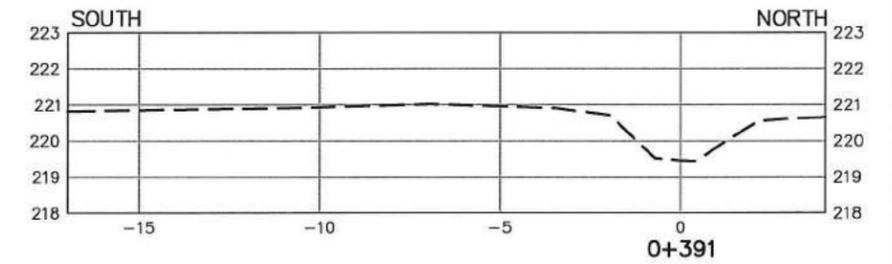
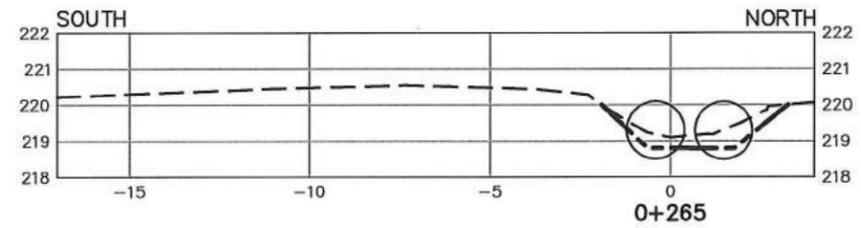
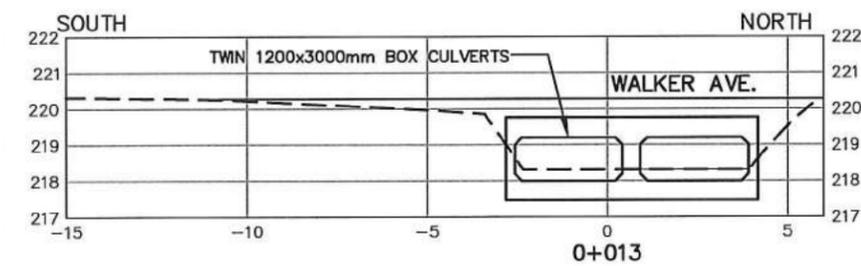
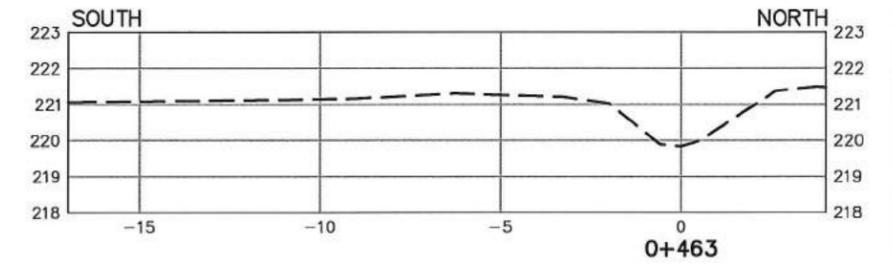
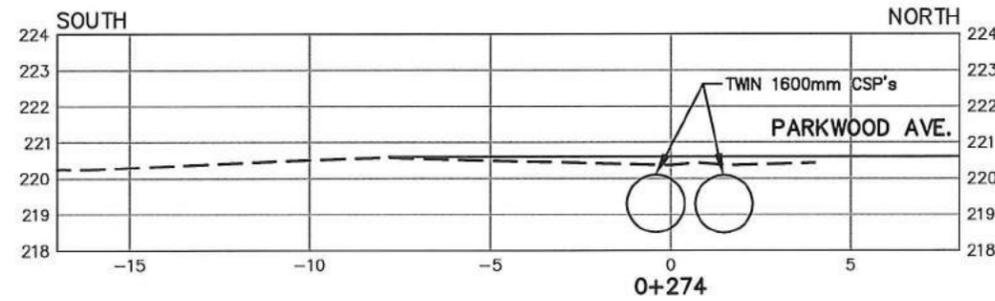
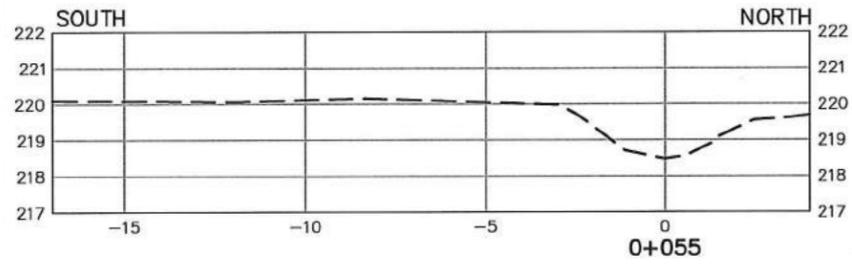
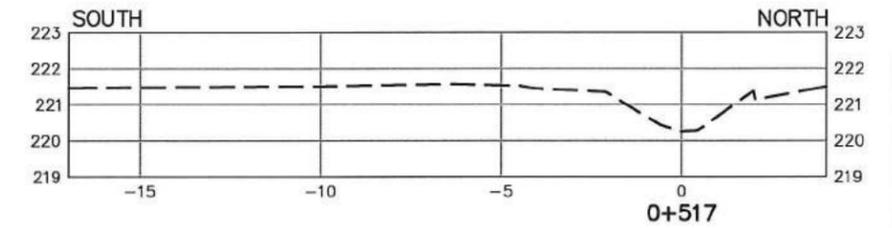
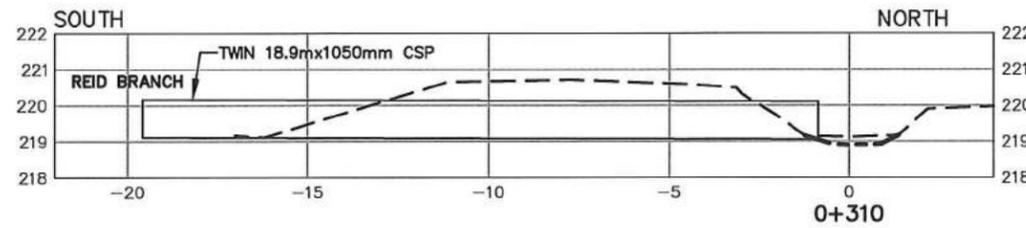
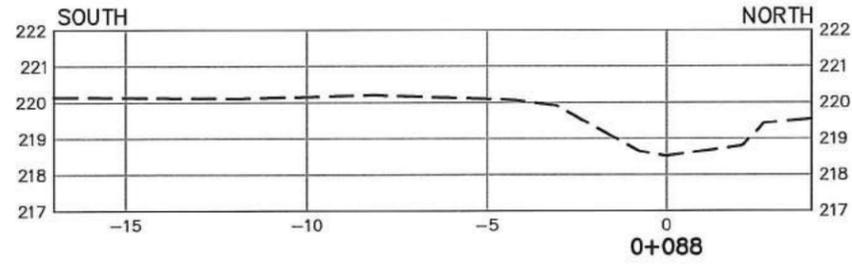
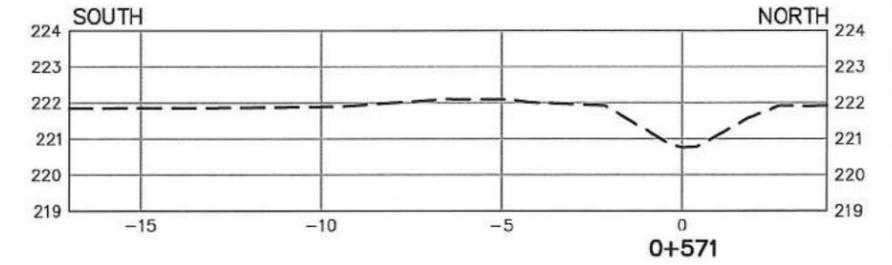
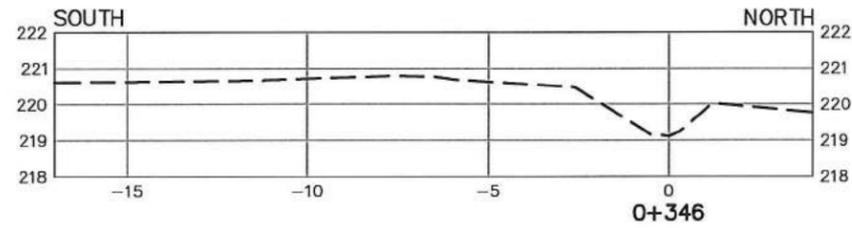
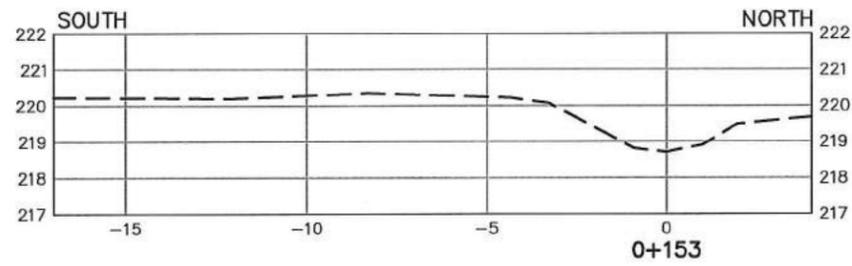




**LEGEND**

- EXISTING BANK
- - - EXISTING DITCH BOTTOM
- · - · - EXISTING CENTRELINE OF ROAD
- - - - - PROPOSED CENTRELINE OF ROAD
- PROPOSED GRADE LINE OF CLEANOUT
- ▨ GASLINE

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		0 50 100m
DRAWN BY: N.M.B.		HORZ. 1:5000
CHECKED BY: K.A.S.		0 0.5 1m
		VERT. 1:50 (ON 11"x17")
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		
<b>LINE 6 BRANCH PROFILE</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: <b>12-267</b> DRAWING: <b>45</b>



**NOTE:**  
FOR FUTURE MAINTENANCE DITCH TO BE  
0.5m PARABOLIC BOTTOM WITH 1.5:1 SIDE SLOPES MINIMUM

- LEGEND**
- EXISTING GROUND
  - POSSIBLE IMPROVEMENT SECTION
  - PROPOSED DITCH

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		 HOR. 1:200
DRAWN BY: N.M.B.		 VER. 1:200
CHECKED BY: K.A.S.		(ON 11"x17")

**MORRIS ROAD DRAIN**

TOWN OF BRADFORD-WEST GWILLIMBURY

**LINE 6 BRANCH  
CROSS SECTIONS**

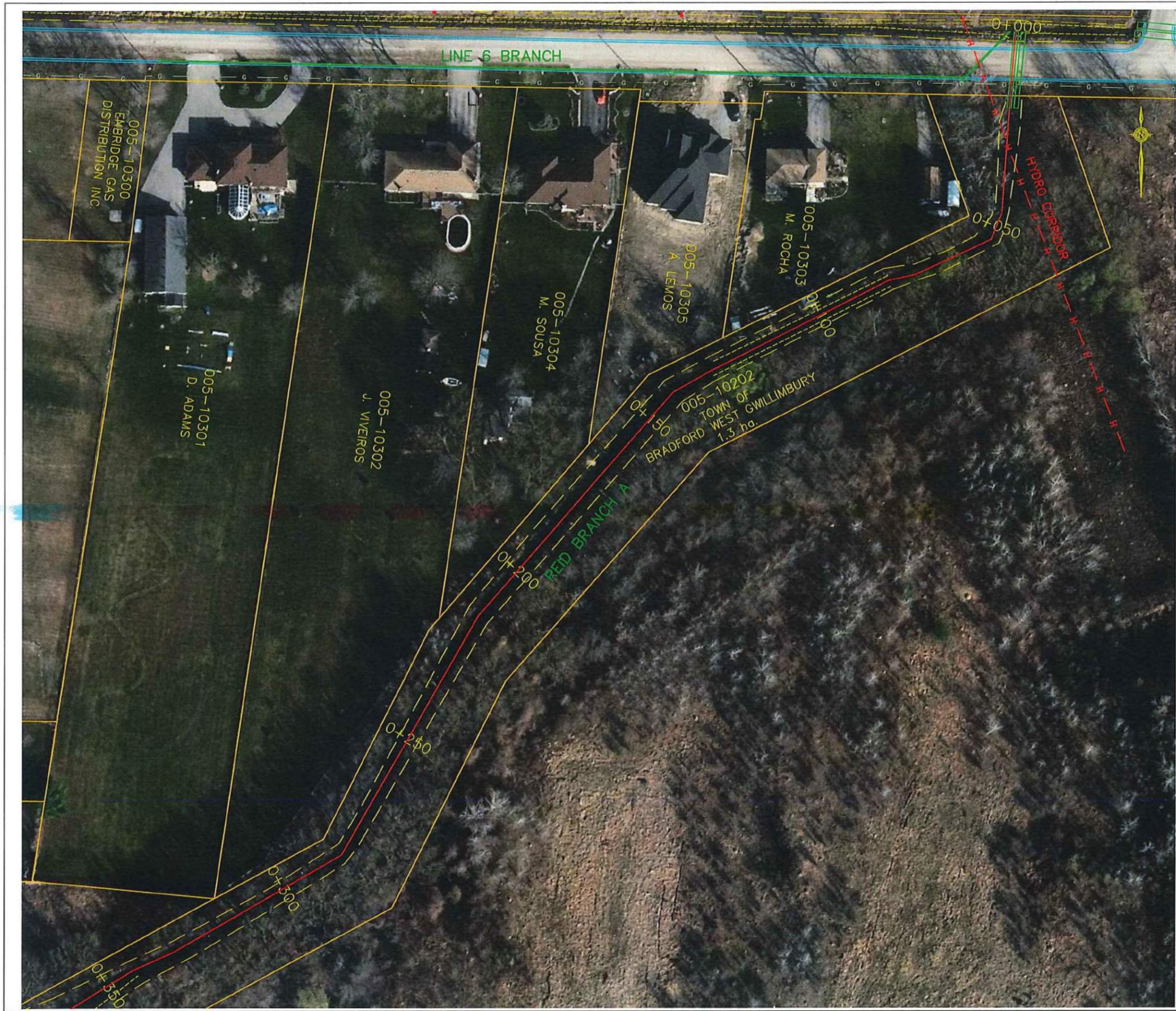
APR. 14, 2016

**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

REVISED:

JOB NUMBER: 12-267

DRAWING: 46



**SCOPE OF WORK (STA. 000 TO 300)**

**STA. 000 TO 018.90**  
 -EXISTING 18.9m LONG TWIN 1050mm DIA. CSP CULVERTS TO BE INCORPORATED  
 D/S INV. 219.05 W  
 D/S INV. 219.16 E  
 U/S INV. 219.12 W  
 U/S INV. 219.13 E

**STA. 018.9 TO 300**  
 -EXISTING OPEN CHANNEL TO BE INCORPORATED FOR FUTURE MAINTENANCE  
 -SEE PROFILE AND CROSS-SECTIONS FOR DETAILS  
 -EXCAVATED MATERIAL TO BE DISPOSED OF OFF SITE

**STA. 018.9 TO 094**  
 -BRUSHING OF CHANNEL REQUIRED NOW  
 -MATERIALS TO BE DISPOSED OF OFF SITE  
 -TYPE XII WORK

**WORKING AREA**  
 PARCEL 005-10202

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING DITCH CENTRE LINE
- EXISTING TOE
- PROPERTY LINE
- EXISTING CURB
- EXISTING STM
- EXISTING HYDRO CORRIDOR

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



**SCALE**  
  
 1:1000  
 (ON 11"x17")

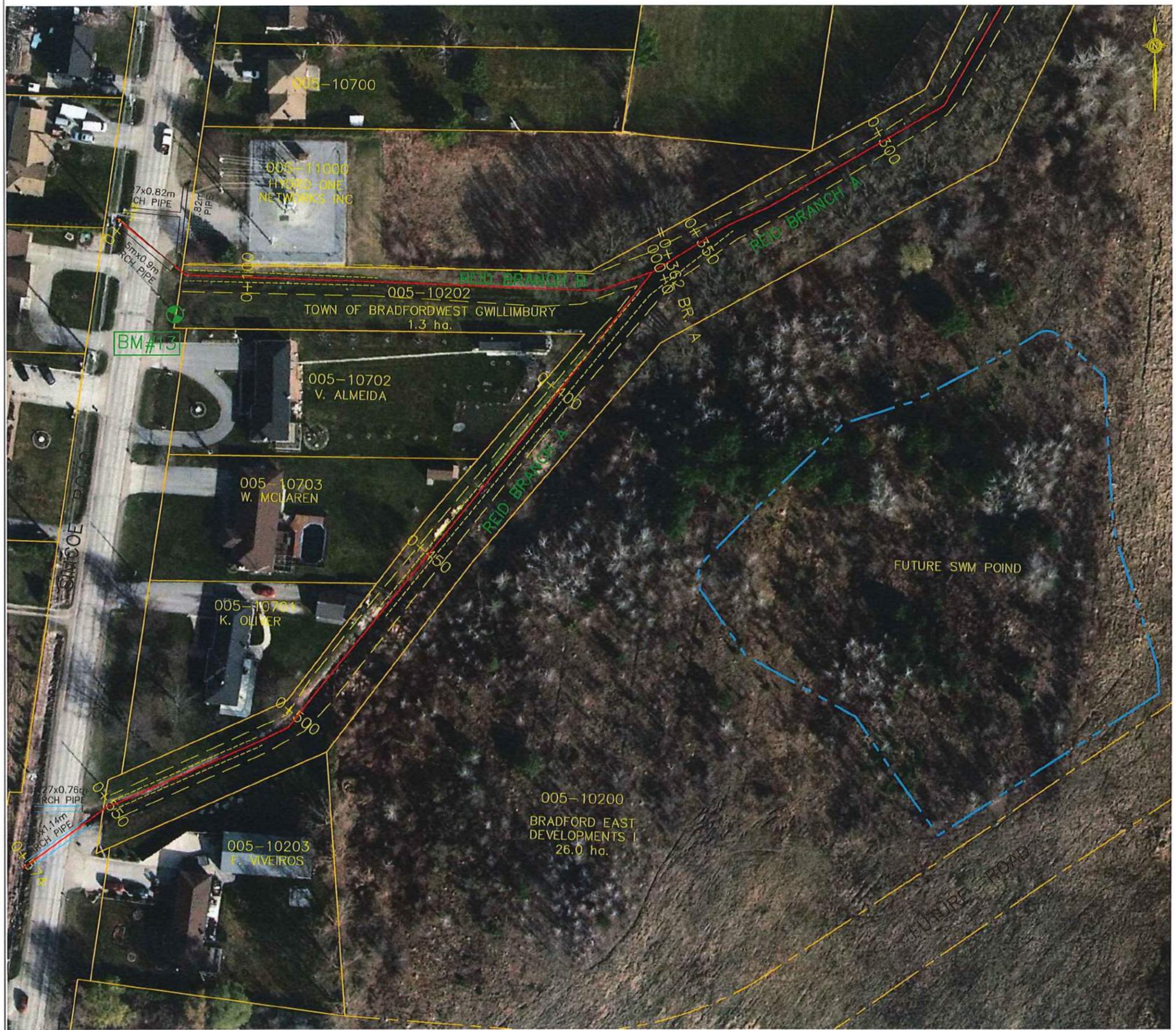
**MORRIS ROAD DRAIN**  
 TOWN OF BRADFORD WEST GWILLIMBURY

**REID BRANCH A ENLARGEMENT AERIAL 1**

APR. 14, 2016

**K. SMART ASSOCIATES LIMITED**  
 CONSULTING ENGINEERS AND PLANNERS  
 KITCHENER SUDBURY

REVISED:  
 JOB NUMBER: 12-267  
 DRAWING: 47



**SCOPE OF WORK (STA. 300 TO 574) (REID BRANCH A)**

**STA. 300 TO 550**  
 -EXISTING OPEN CHANNEL TO BE INCORPORATED FOR FUTURE MAINTENANCE.  
 -SEE PROFILE AND CROSS-SECTIONS FOR DETAILS  
 -EXCAVATED MATERIAL TO BE DISPOSED OF OFF SITE.

**STA. 362 BR. A=STA. 000 BR. B**

**STA. 550 TO 574**  
 -EXISTING 1.83mx1.14m AND 1.27mx0.86m ARCH CULVERTS TO BE INCORPORATED AS PART OF REID BRANCH A.

**SCOPE OF WORK (362 BR. A=000 BR. B TO 134) (REID BRANCH B)**

**STA. 000 TO 116**  
 -EXISTING OPEN CHANNEL TO BE INCORPORATED FOR FUTURE MAINTENANCE.  
 -SEE PROFILE AND CROSS-SECTIONS FOR DETAILS  
 -EXCAVATED MATERIAL TO BE DISPOSED OF OFF SITE.

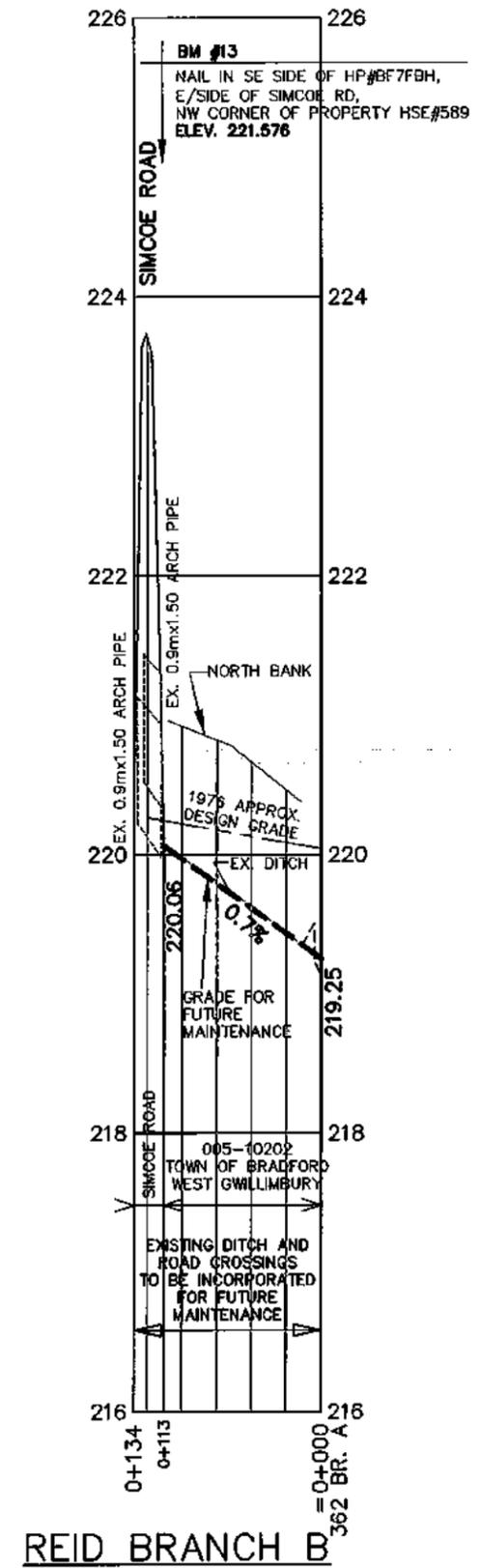
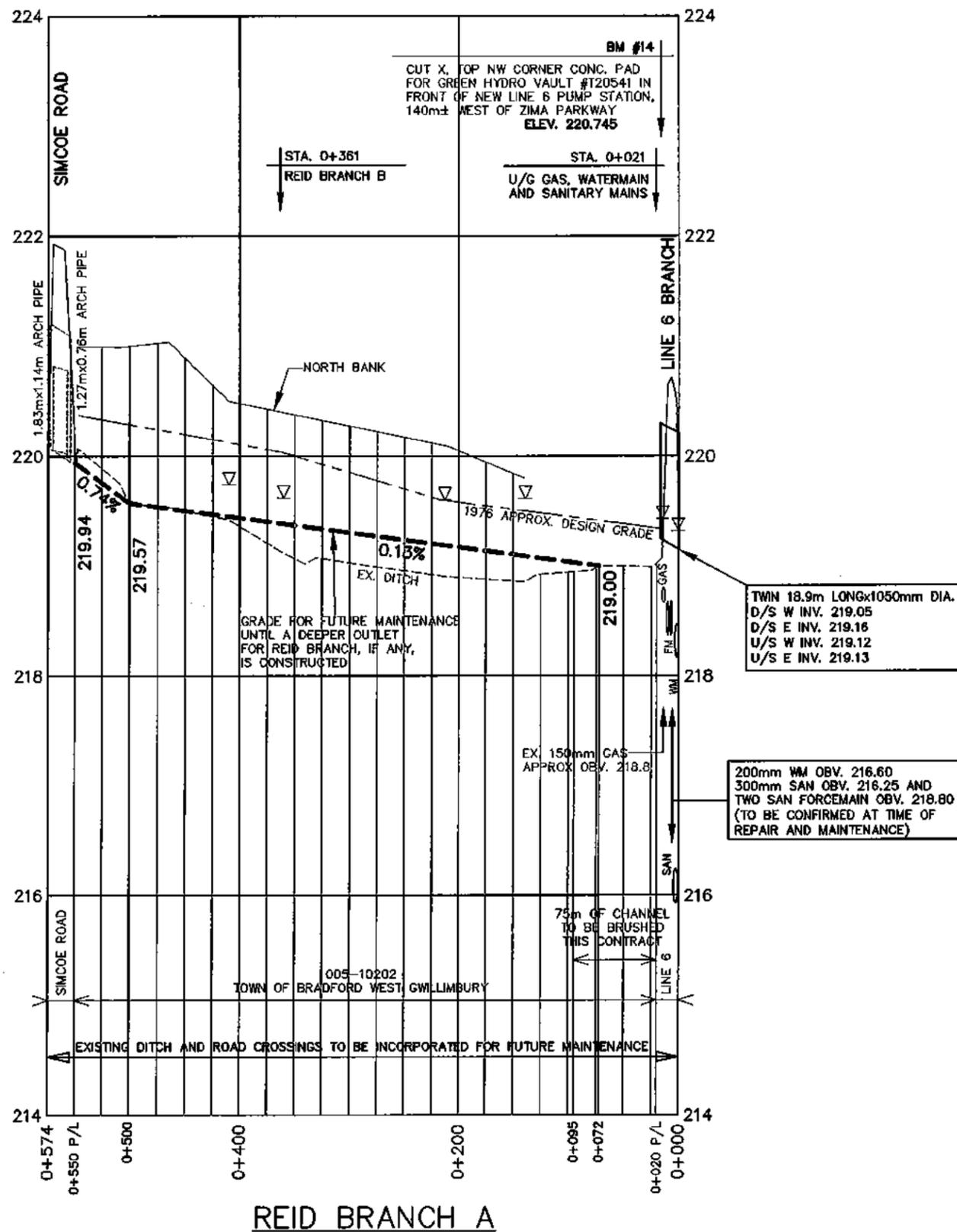
**STA. 116 TO 134**  
 -EXISTING 1.5mx0.9m ARCH CULVERT AND EXISTING 1.27mx0.82m ARCH CULVERT TO BE INCORPORATED AS PART OF REID BRANCH B.

**WORKING AREA**  
 PARCEL 005-10202

**LEGEND**

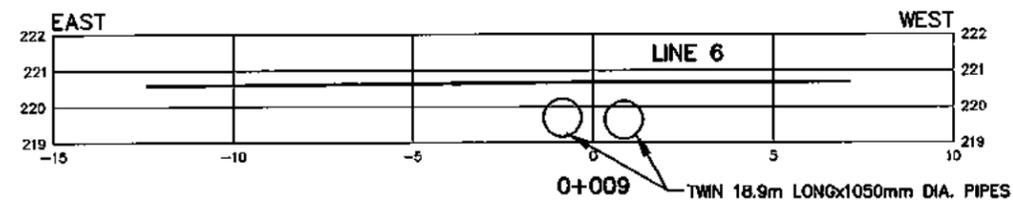
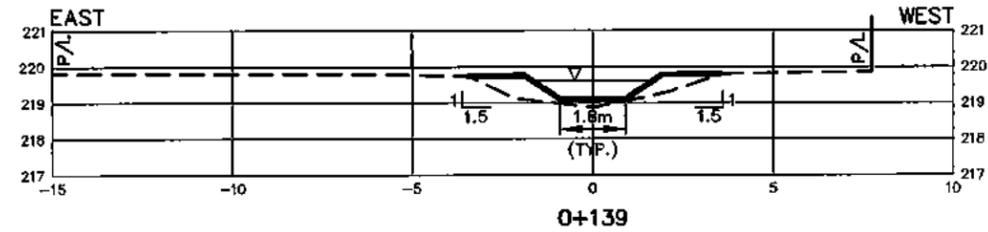
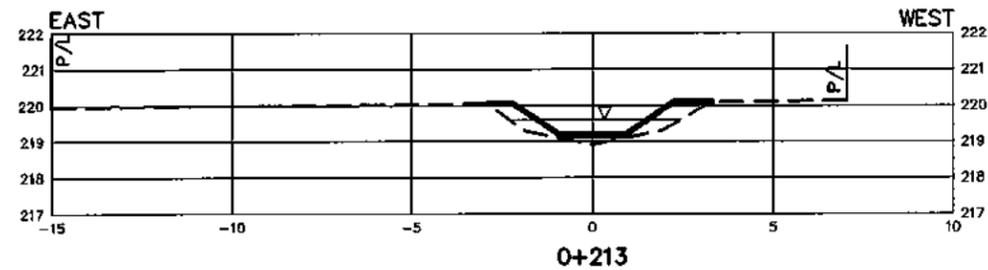
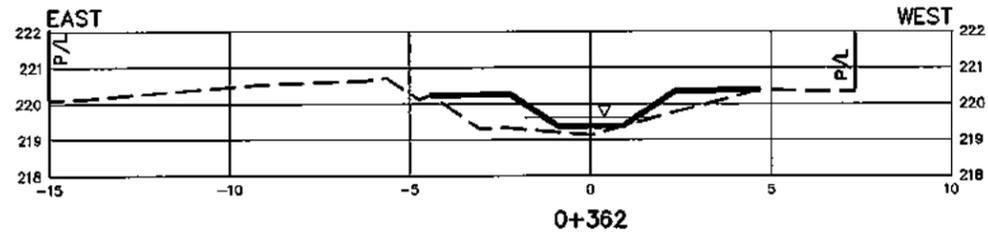
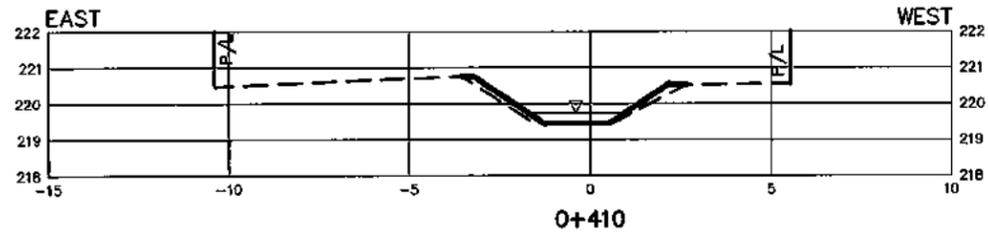
- EXISTING DITCH BANKS
- EXISTING DITCH CENTRE LINE
- EXISTING TOE
- PROPERTY LINE
- FUTURE SWM POND
- FUTURE ROAD ALLOWANCE

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		1:1000
CHECKED BY: K.A.S.		(ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>REID BRANCH A REID BRANCH B ENLARGEMENT AERIAL 2</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 48



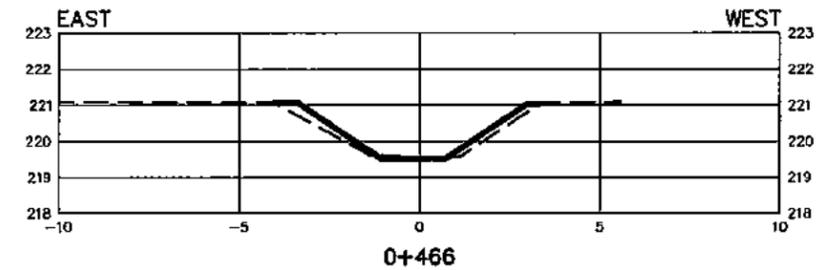
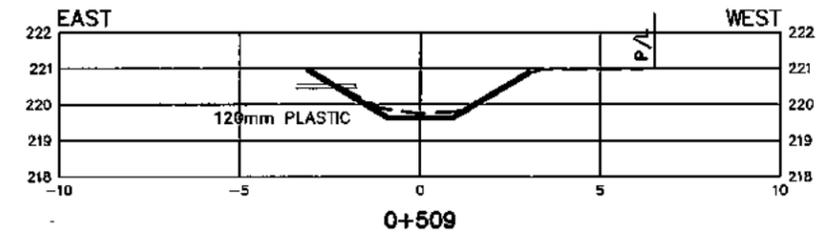
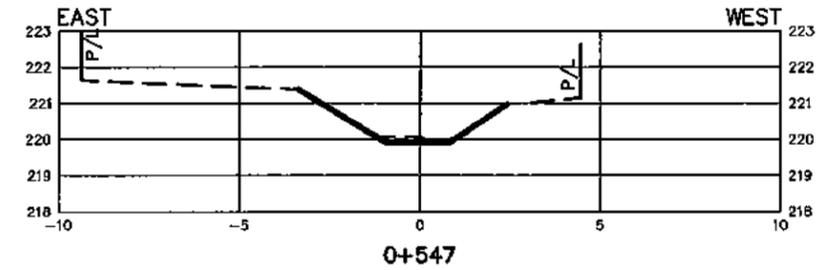
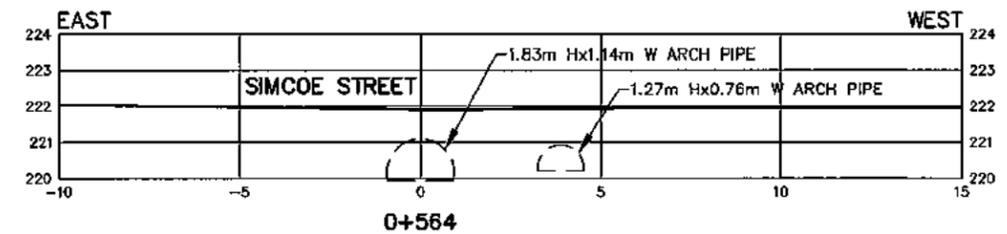
- LEGEND**
- EXISTING BANK
  - - - - - EXISTING DITCH BOTTOM
  - · - · - DESIGN GRADE 1976
  - - - - - PROPOSED GRADE LINE FUTURE MAINTENANCE

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		HORZ. 1:5000
CHECKED BY: K.A.S.		VERT. 1:50 (ON 11"x17")
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		
<b>REID BRANCH A and B PROFILES</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 49

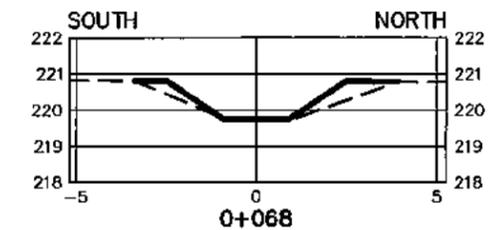
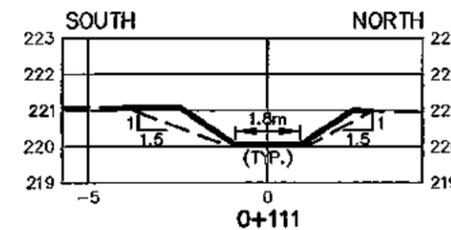


**REID BRANCH A**

**NOTES:**  
 -FOR FUTURE MAINTENANCE REID BRANCH A AND B TO HAVE  
 1.8m BOTTOM, 1.5:1 SIDE SLOPES MINIMUM  
 -MINIMUM MAINTENANCE CHANNELS ARE SHOWN BY HEAVY LINEWORK



**REID BRANCH A**



**REID BRANCH B**

**LEGEND**

--- EXISTING GROUND  
 ——— PROPOSED GRADE LINE

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



**SCALE**  
 0 2 4m  
 HOR. 1:200  
 0 2 4m  
 VER. 1:200  
 (ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		APR. 14, 2016
<b>REID BRANCH A AND B CROSS SECTIONS</b>		REVISED:
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUBURBY		JOB NUMBER: 12-267
		DRAWING <b>50</b>





**SCOPE OF WORK (STA. -075 TO 300)**

- STA. -075 TO 300**  
 -BRUSH DYKE  
 -RAISE AND WIDEN DYKE WITH IMPORTED CLAY AS PER SECTIONS  
 -NEW IRRIGATION SLEEVE REQUIRED AT STA. 050±, 130±, 215±  
 SEE SPECIAL PROVISION 39.  
 -TYPE VIII WORK

**WORKING AREA**  
 SMALL SCHEME DYKE AND DITCH

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE

**MORRIS ROAD DRAIN**  
 TOWN OF BRADFORD WEST GWILLIMBURY

<b>SMALL SCHEME DYKE AND DITCH ENLARGEMENT AERIAL 2</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 52

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



**SCALE**  
 0 10 20  
 1:1000  
 (ON 11"x17")



SCOPE OF WORK (STA. 300 TO 570)

STA. 300 TO 570

- BRUSH DYKE
- RAISE AND WIDEN WITH IMPORTED CLAY AS PER SECTIONS
- TYPE XIII WORK

STA. 325

- NEW IRRIGATION SLEEVE REQUIRED
- SEE SPECIAL PROVISIONS 39.0

STA. 600 TO 650

- DECISION MAY BE MADE LATER TO USE THIS PART OF DYKE AS HAUL ROUTE

WORK AREA  
SMALL SCHEME DYKE AND DITCH

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE
- DIVERSION ROUTE

DESIGNED BY: K.A.S.
CHECKED BY: K.A.S.
DRAWN BY: N.M.B.
CHECKED BY: K.A.S.



SCALE  
0 10 20  
1:1000  
(ON 11"x17")

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SMALL SCHEME DYKE AND DITCH ENLARGEMENT AERIAL 3</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267 DRAWING: 53



**SCOPE OF WORK**

**STA. 650 TO 1+100**

-DECISION MAY BE MADE LATER TO USE THIS PART OF DYKE AS HAUL ROUTE

**STA. 750 TO 1+000**

-DYKE AND DITCH MAY BE ALSO USED AS TEMPORARY STORAGE AREA FOR CLAYS  
-SEE CROSS SECTIONS

**STA. 675 TO 725**

-IF DYKE IS USED AS HAUL ROUTE, 50m OF 600mm DIA HDPE TO BE PLACED  
IN CHANNEL TO NORTH OF BUILDINGS, BUILD LANE OVER PIPE AND USE AS  
ROUTE TO BYPASS BUILDINGS

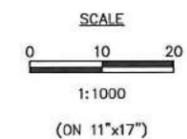
**WORK AREA**

SMALL SCHEME DYKE AND DITCH AND NORTH PART OF PARCEL 005-192

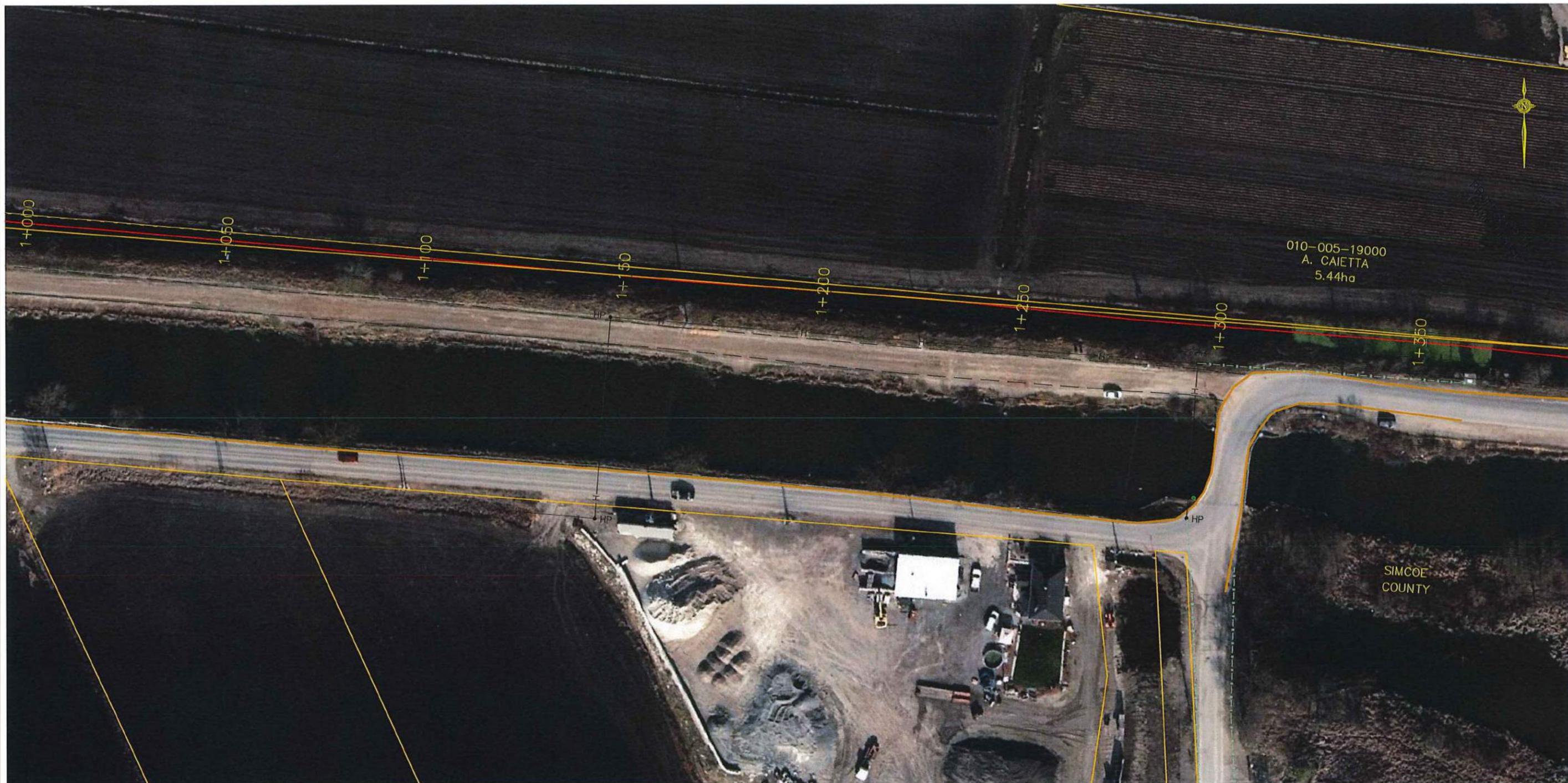
**LEGEND**

-  EXISTING DITCH BANKS
-  EXISTING TOE
-  PROPERTY LINE

DESIGNED BY: K.A.S.
CHECKED BY: K.A.S.
DRAWN BY: N.M.B.
CHECKED BY: K.A.S.



<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SMALL SCHEME DYKE AND DITCH ENLARGEMENT AERIAL 4</b>	APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING <b>54</b>



**SCOPE OF WORK (STA. 1+000 TO 1+300)**

**STA. 1+000 TO 1+300**  
 -DECISION MAY BE MADE LATER TO USE THIS PART OF DYKE AS HAUL ROUTE  
 -DYKE AND DITCH MAY BE USED AS TEMPORARY STORAGE AREA FOR CLAYS  
 -SEE CROSS SECTIONS

**STA. 1+150 TO 1+300**  
 -STORAGE, IF DONE, TO BE REDUCED DUE TO HYDRO LINE

**WORK AREA**  
 SMALL SCHEME DYKE AND DITCH

**LEGEND**

- EXISTING DITCH BANKS
- EXISTING TOE
- PROPERTY LINE

DESIGNED BY: K.A.S.
CHECKED BY: K.A.S.
DRAWN BY: N.M.B.
CHECKED BY: K.A.S.



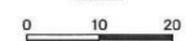
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 (ON 11"x17")

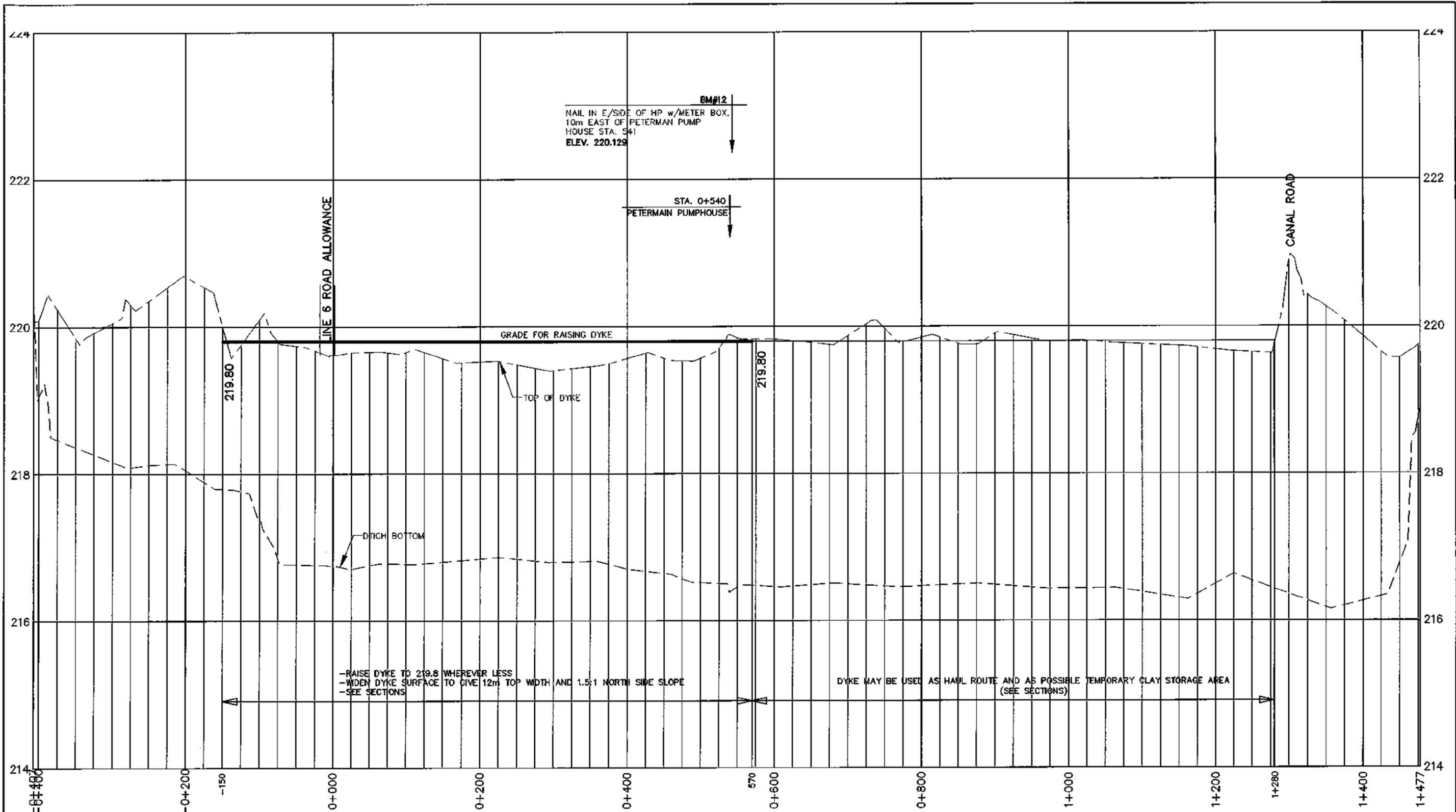
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SMALL SCHEME DYKE AND DITCH ENLARGEMENT AERIAL 5</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 55



**LEGEND**

-  EXISTING DITCH BANKS
-  EXISTING TOE
-  PROPERTY LINE

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		 1:1000 (ON 11"x17")
DRAWN BY: N.M.B.		
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SMALL SCHEME DYKE AND DITCH ENLARGEMENT AERIAL 6</b>		APR. 14, 2016
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: <b>12-267</b> DRAWING <b>56</b>



**SMALL SCHEME CANAL**

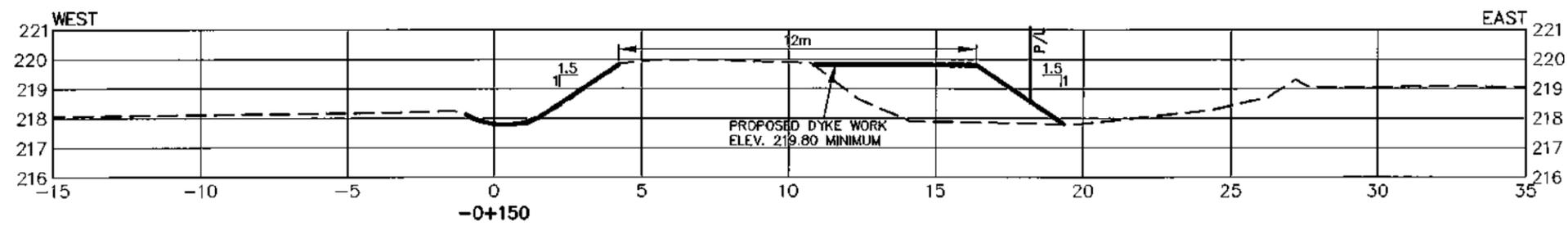
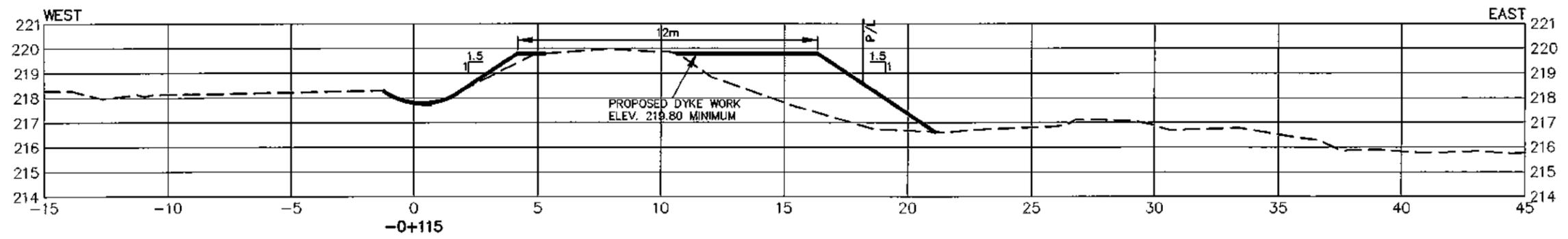
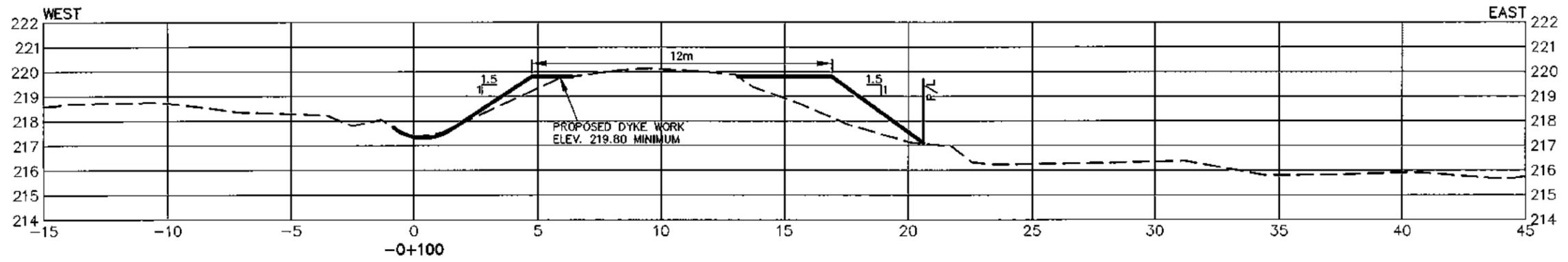
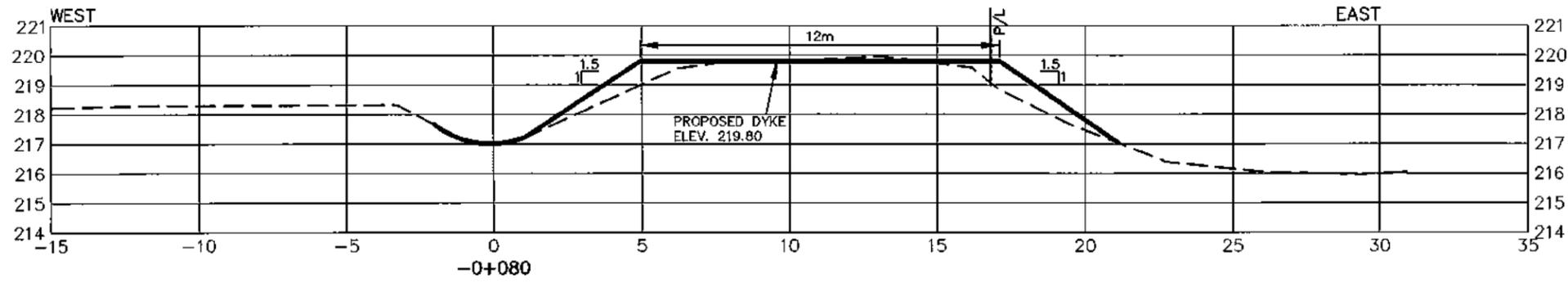
- LEGEND**
- TOP OF DYKE
  - EXISTING DITCH BOTTOM
  - PROPOSED GRADE LINE

DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.

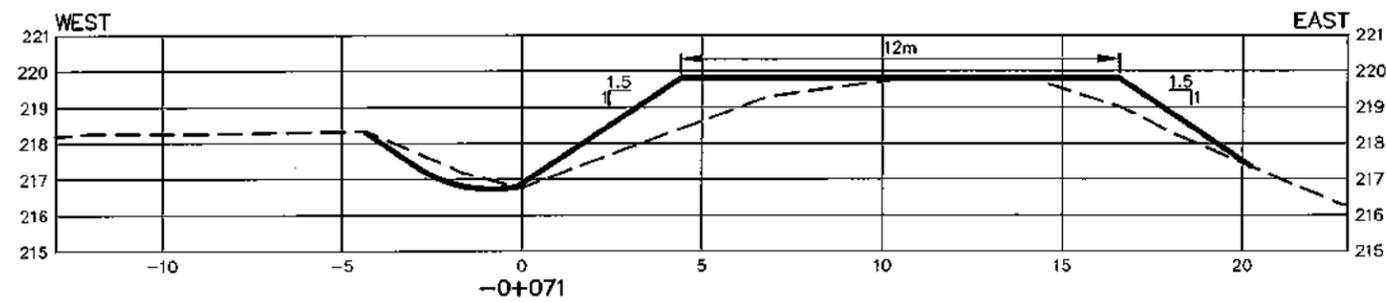
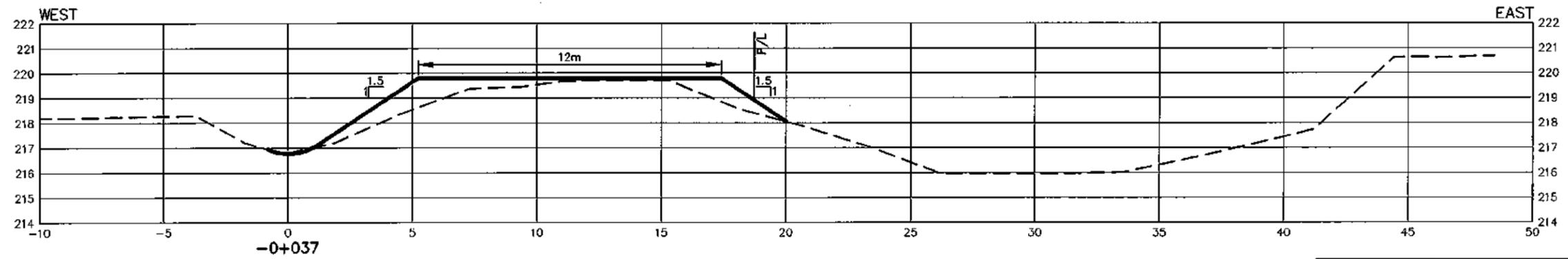
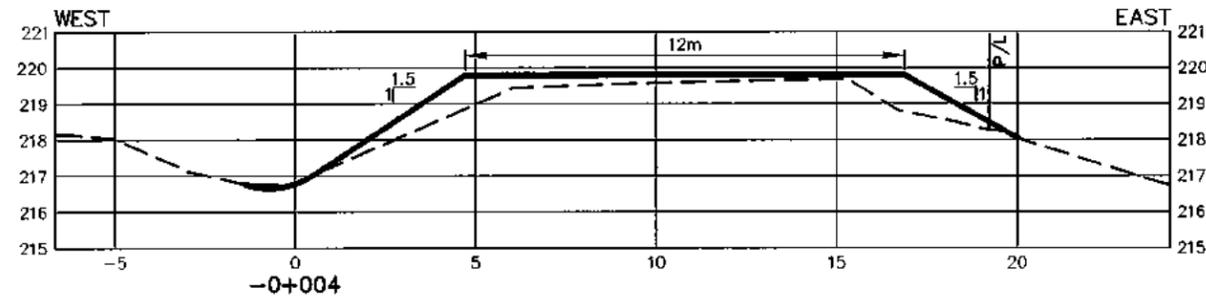
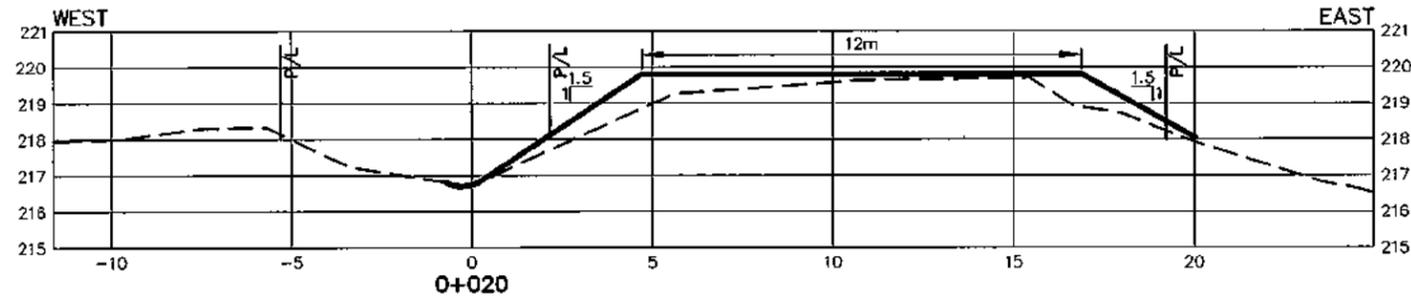
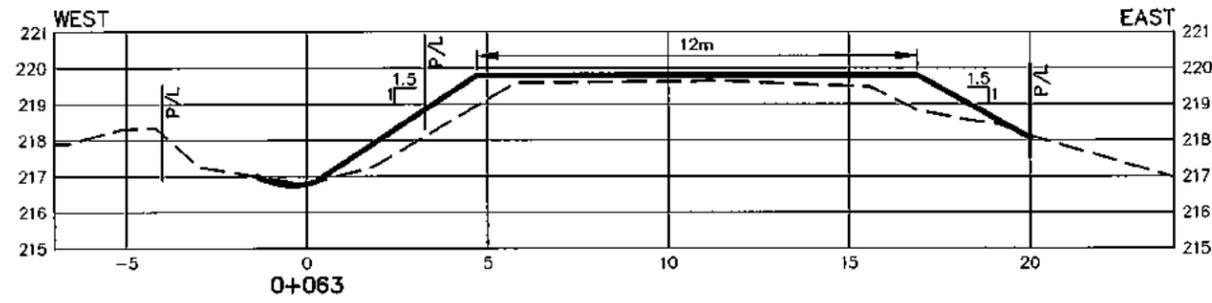


SCALE  
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 VER. 1:50  
 (ON 11"x17")

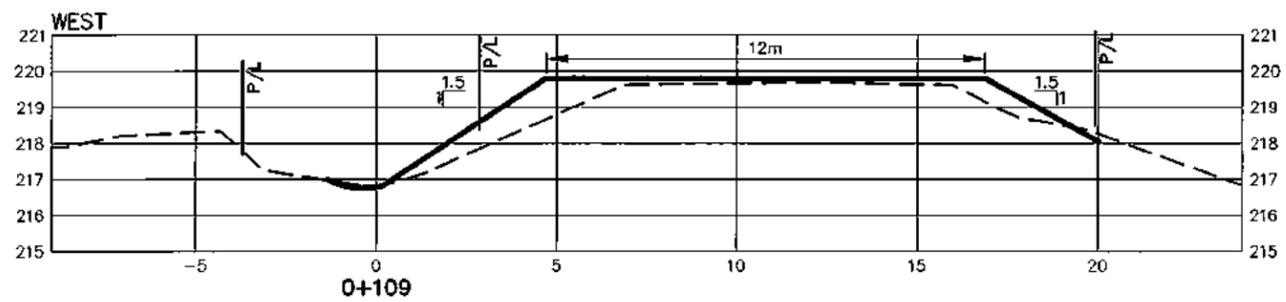
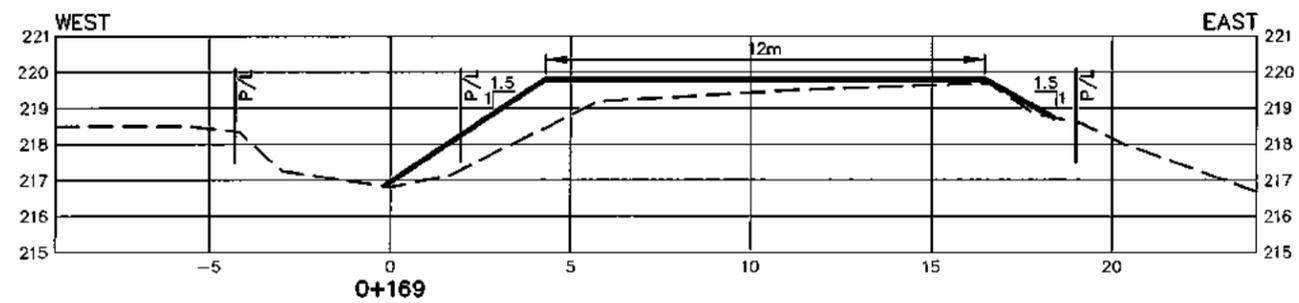
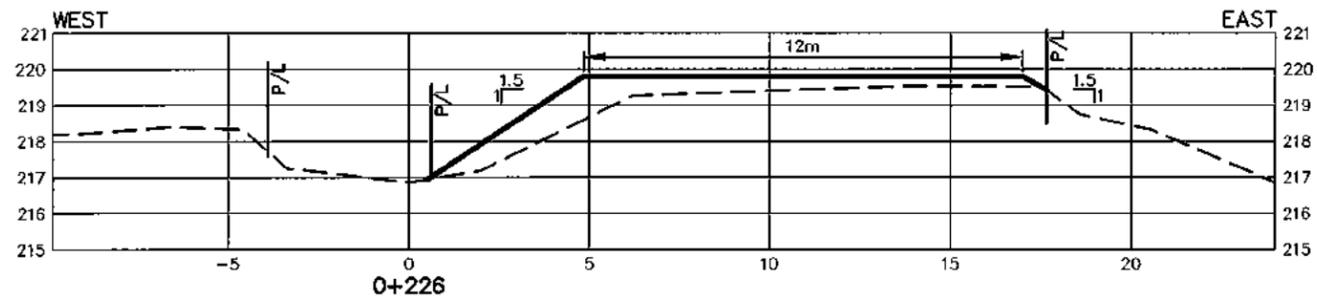
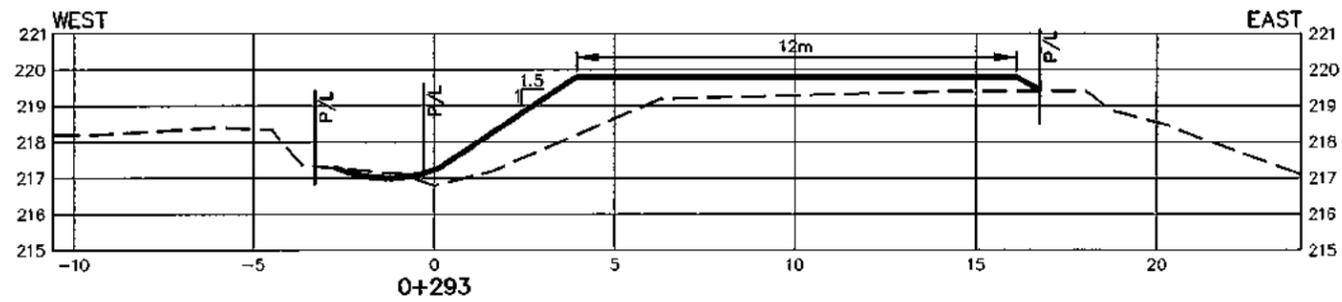
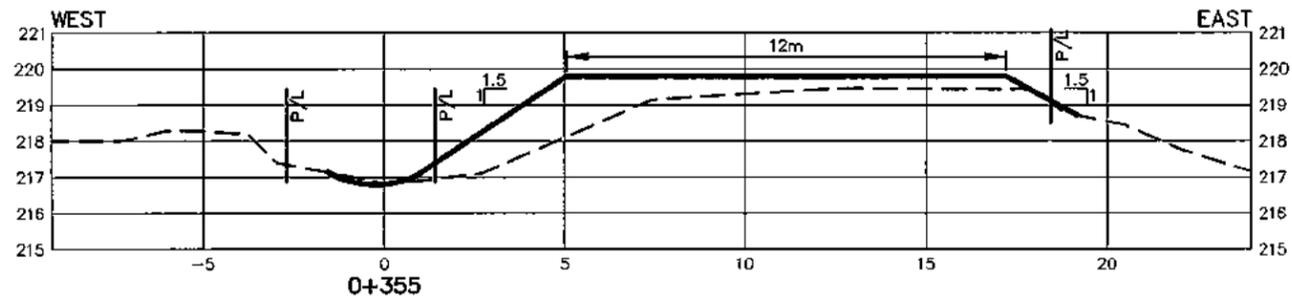
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>SMALL SCHEME DYKE AND DITCH PROFILES</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS SUDBURY	
REVISED:	JOB NUMBER: 12-267
DRAWING: <b>57</b>	



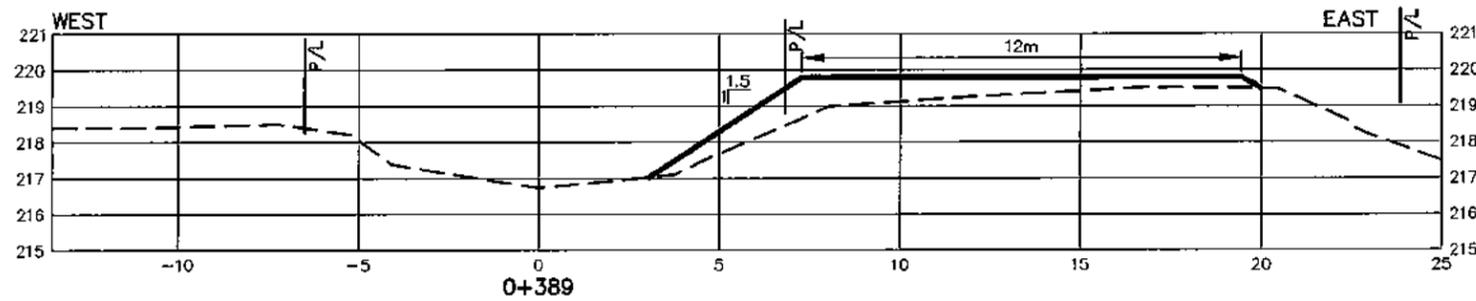
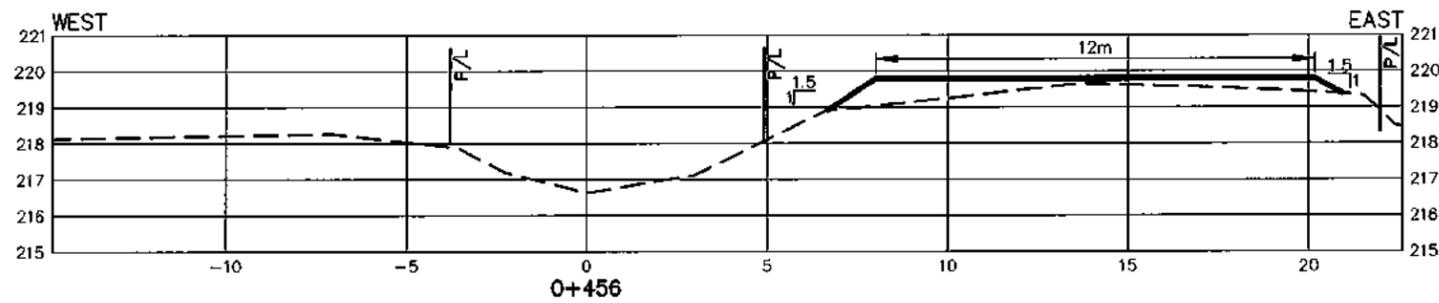
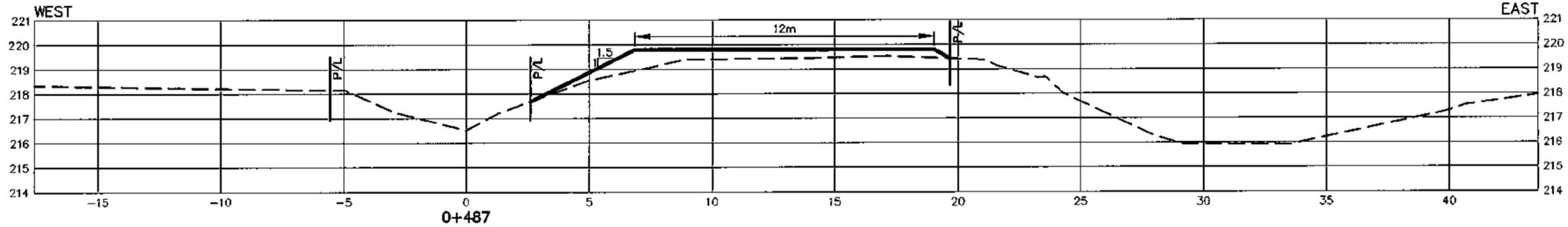
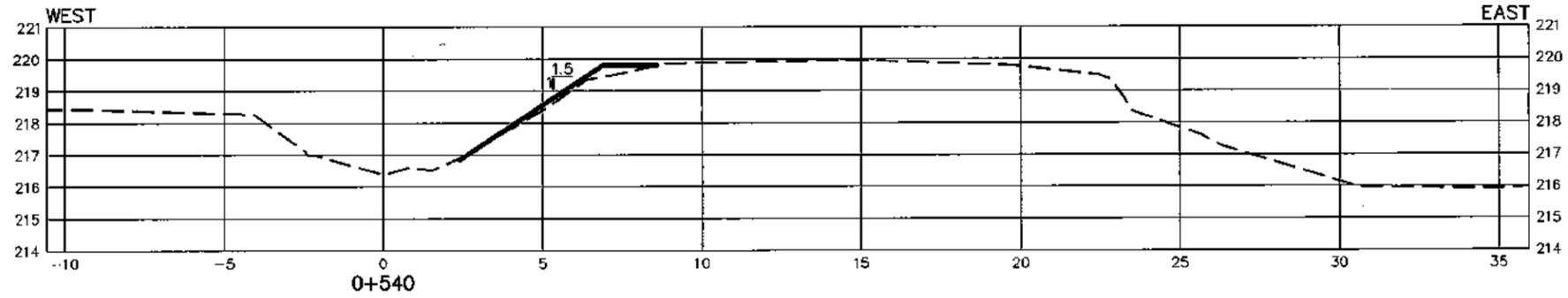
DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		HOR. 1:200
CHECKED BY: K.A.S.		
		VER. 1:200 (ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SMALL SCHEME DYKE AND DITCH CROSS SECTIONS 1</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:	
	JOB NUMBER: 12-267	
	DRAWING <b>58</b>	



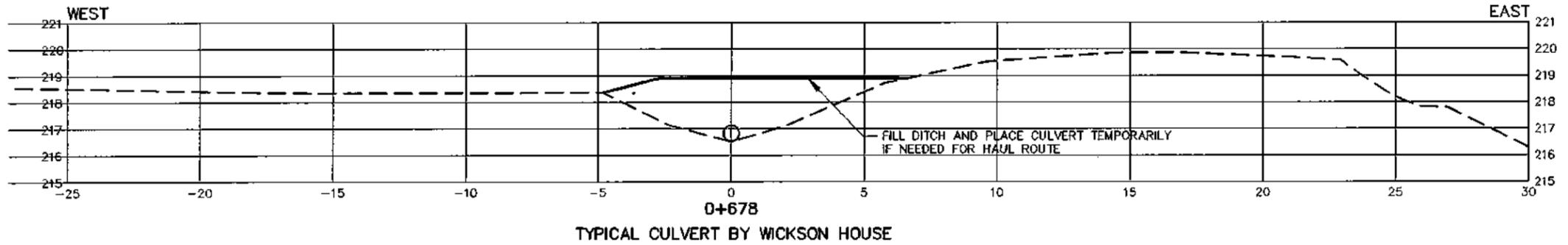
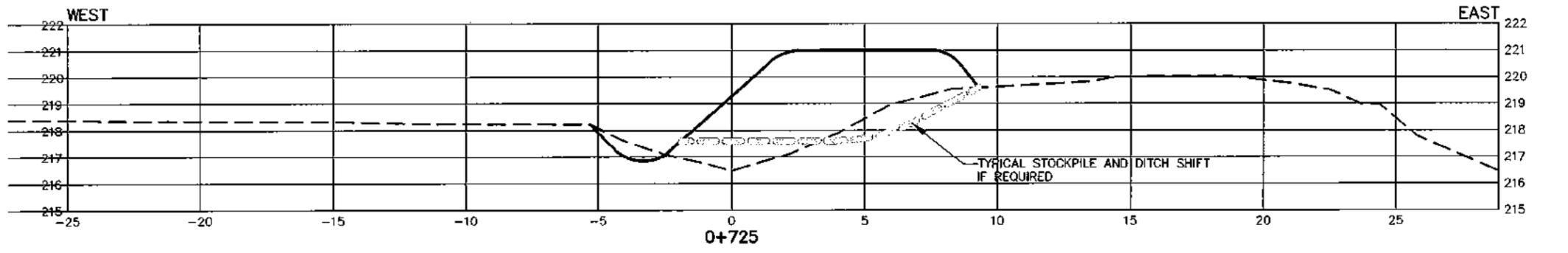
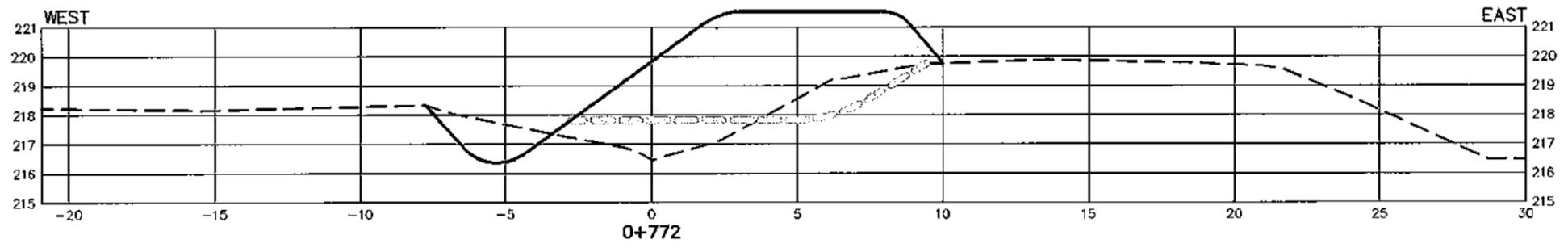
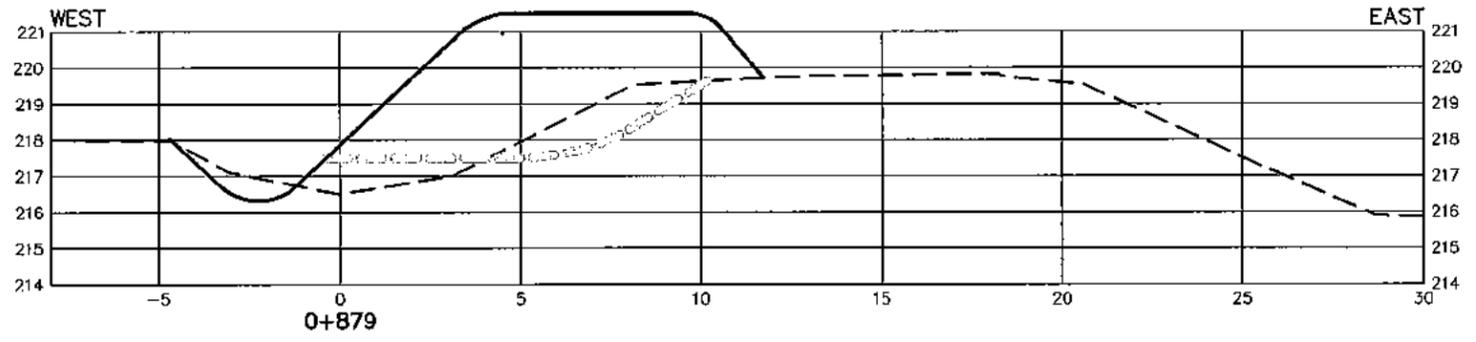
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CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		APR. 14, 2016
<b>SMALL SCHEME DYKE AND DITCH CROSS SECTIONS 2</b>		REVISED: JOB NUMBER: 12-267 DRAWING 59
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		



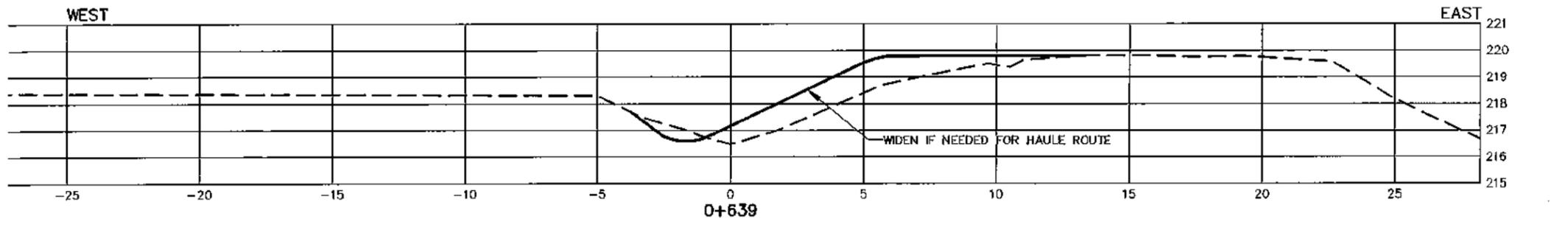
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CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SMALL SCHEME DYKE AND DITCH CROSS SECTIONS 3</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-287 DRAWING: 60



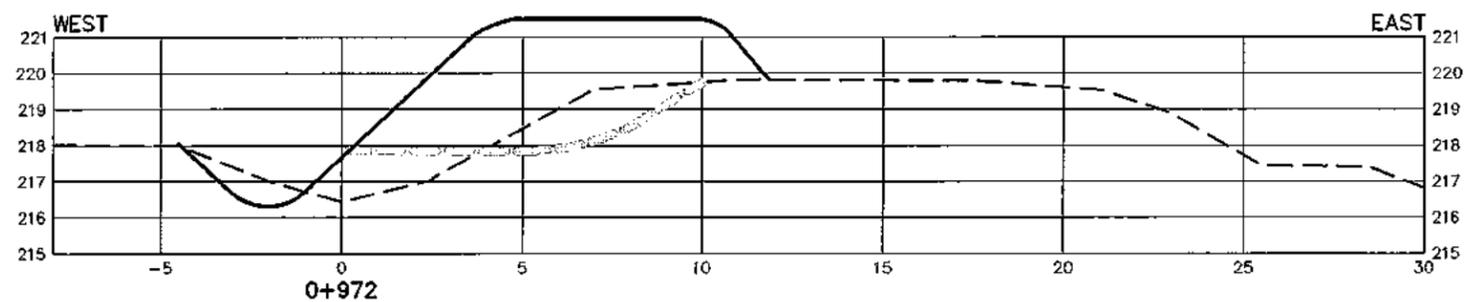
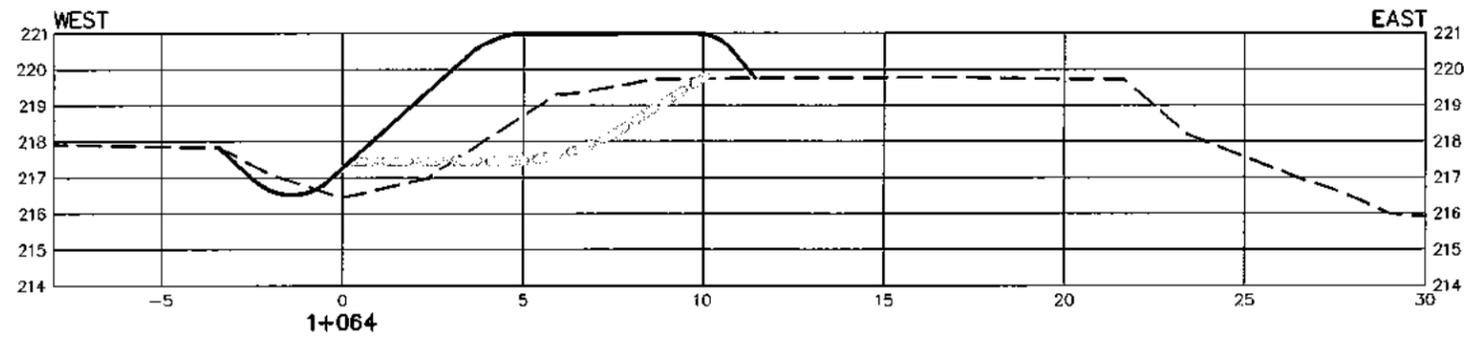
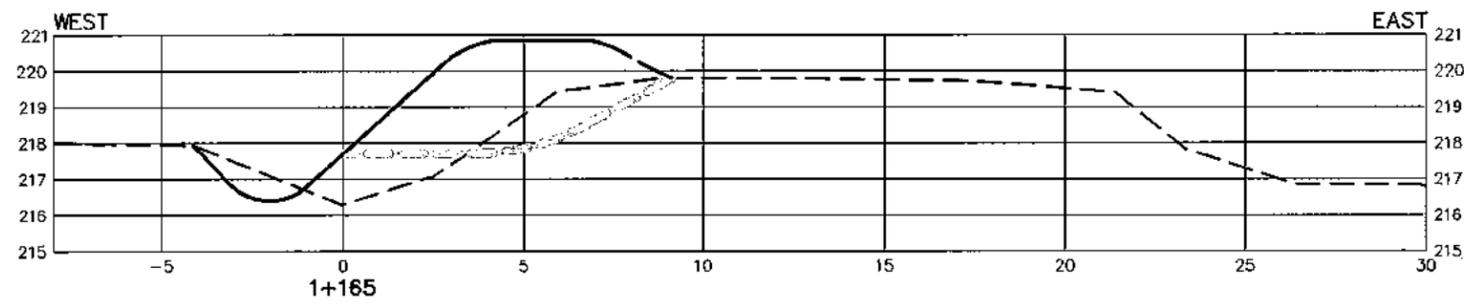
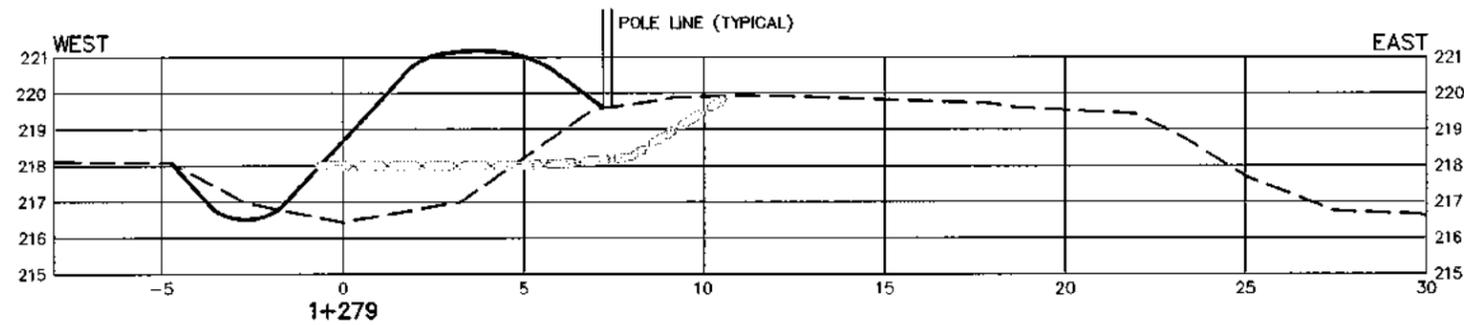
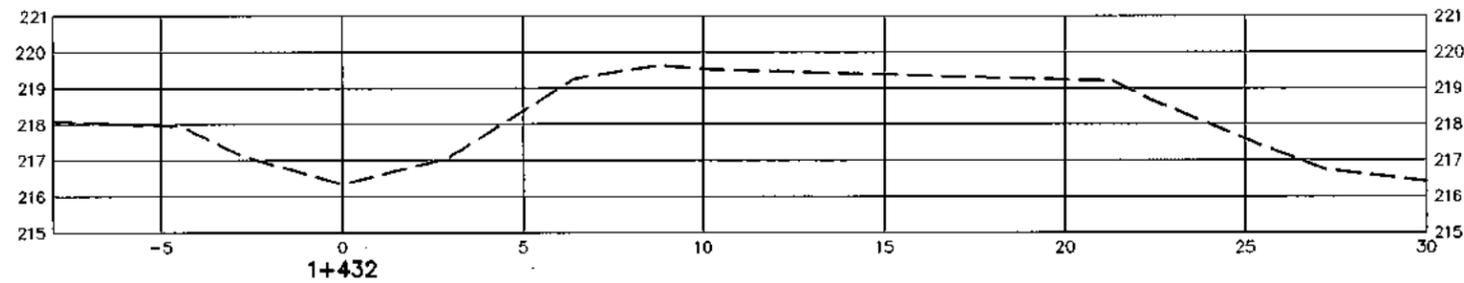
DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		
CHECKED BY: K.A.S.		HOR. 1:200 VER. 1:200 (ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SMALL SCHEME DYKE AND DITCH CROSS SECTIONS 4</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:	
	JOB NUMBER: 12-287	
	DRAWING	<b>61</b>



TYPICAL CULVERT BY WICKSON HOUSE



DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		
DRAWN BY: N.M.B.		HOR. 1:200
CHECKED BY: K.A.S.		
		VER. 1:200 (ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SMALL SCHEME DYKE AND DITCH CROSS SECTIONS 5</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:	
	JOB NUMBER: 12-267	
	DRAWING: 62	



DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		 HOR. 1:200
DRAWN BY: N.M.B.		 VER. 1:200
CHECKED BY: K.A.S.		(ON 11"x17")
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>SMALL SCHEME DYKE AND DITCH</b>		APR. 14, 2016
<b>CROSS SECTIONS 6</b>		
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER ONTARIO	REVISED:	
	JOB NUMBER: 12-267	
	DRAWING	<b>63</b>



**LEGEND**

- EXISTING DITCH BANKS
- EXISTING DITCH CENTRE LINE
- EXISTING TOE
- PROPERTY LINE
- PROPOSED CURB
- PROPOSED STM
- EXISTING CULVERT
- EXISTING HYDRO CORRIDOR
- EXISTING GAS LINE APPROX. LOCATION
- EXISTING POLE LINE
- TEST HOLE LOCATION AND NUMBER
- EXISTING SWALE

**SCOPE OF WORK**

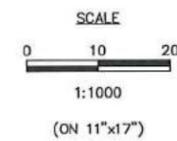
IF LINE 6 RIGHT-OF-WAY IS TO BE USED AS A HAUL ROUTE AND/OR ACCESS ROUTE, BRUSHING AND SOME GRADING WILL BE NECESSARY. ALSO EXISTING SHED AND MATERIALS IN RIGHT-OF-WAY TO BE MOVED.

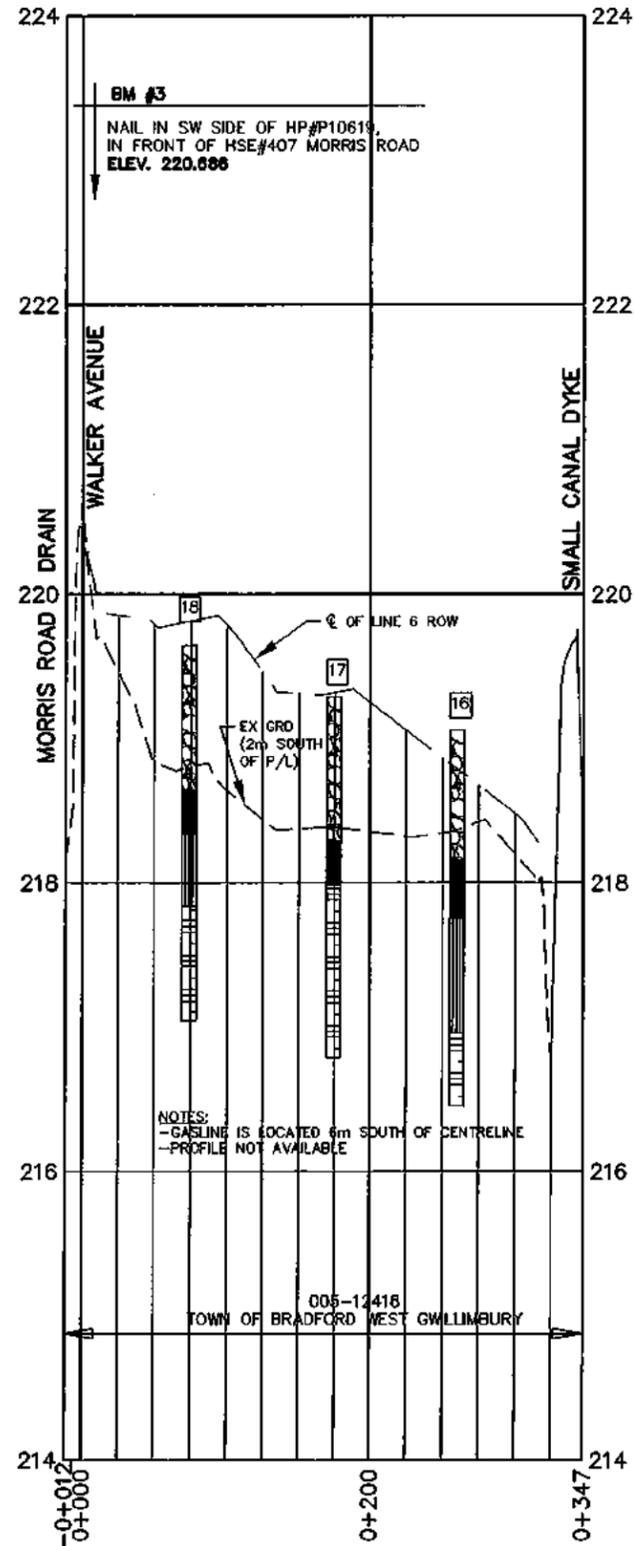
**WORKING AREA**  
LINE 6 RIGHT-OF-WAY

**NOTE:**  
LINE 6 RECONSTRUCTION DATA BASED ON DRAWINGS BY MTE

<b>MORRIS ROAD DRAIN</b>		APR. 14, 2016
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>LINE 6 POSSIBLE ACCESS AND HAUL ROUTE ENLARGEMENT AERIAL</b>		REVISED:
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		JOB NUMBER: 12-267
		DRAWING <b>64</b>

DESIGNED BY: K.A.S.
CHECKED BY: K.A.S.
DRAWN BY: N.M.B.
CHECKED BY: K.A.S.



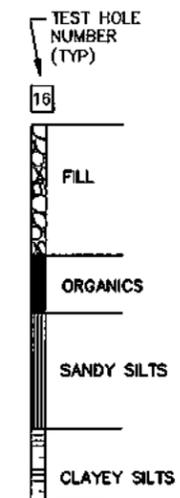


LINE 6 ROW ALLOWANCE

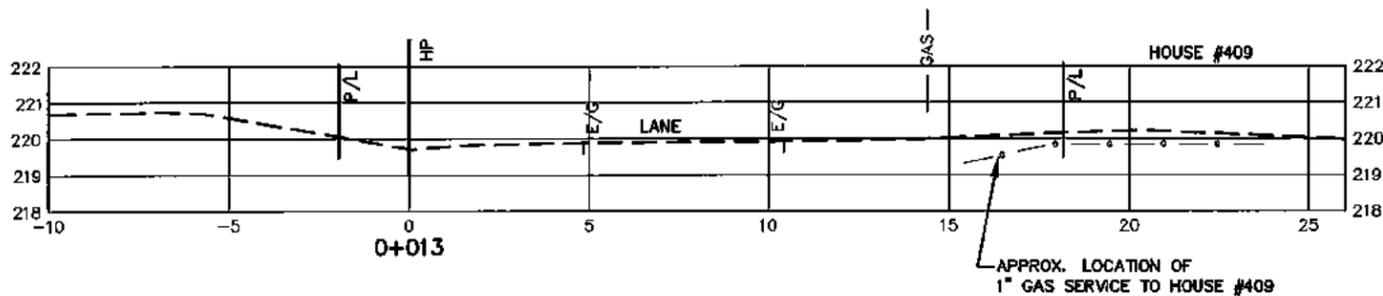
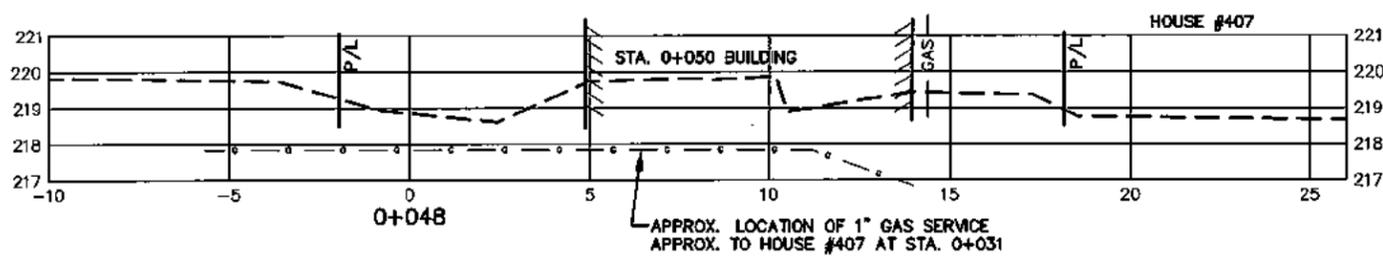
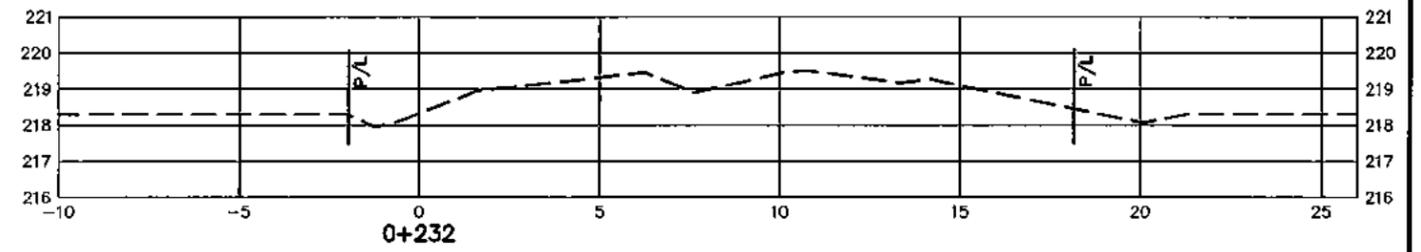
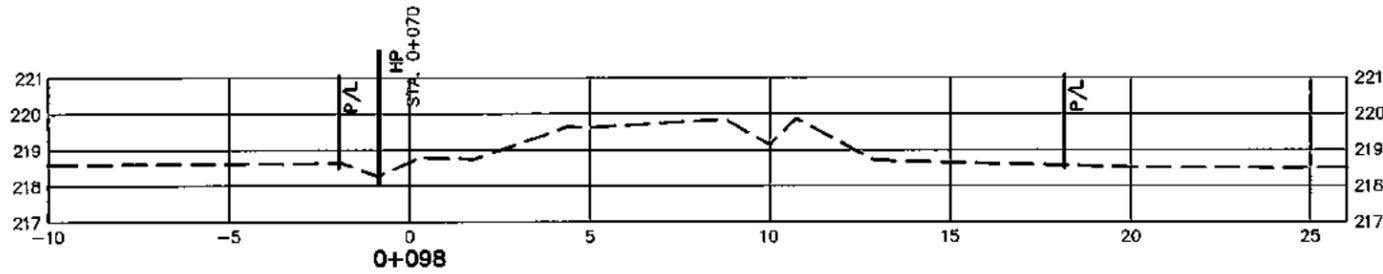
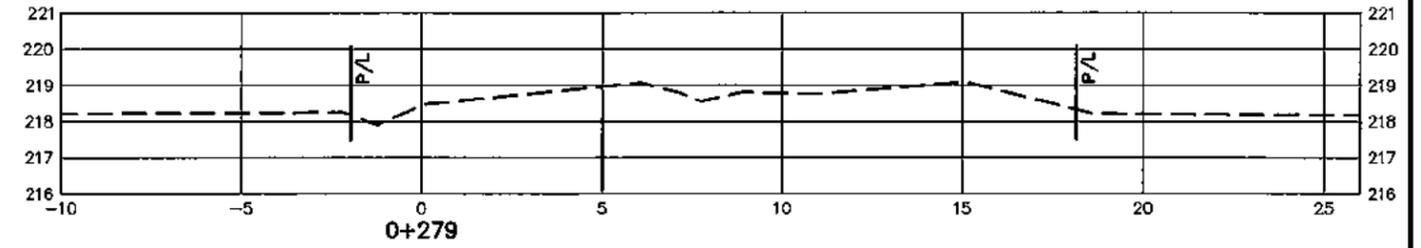
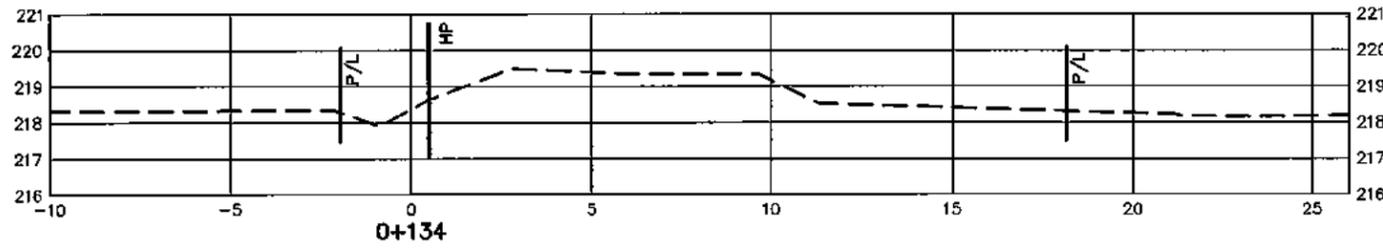
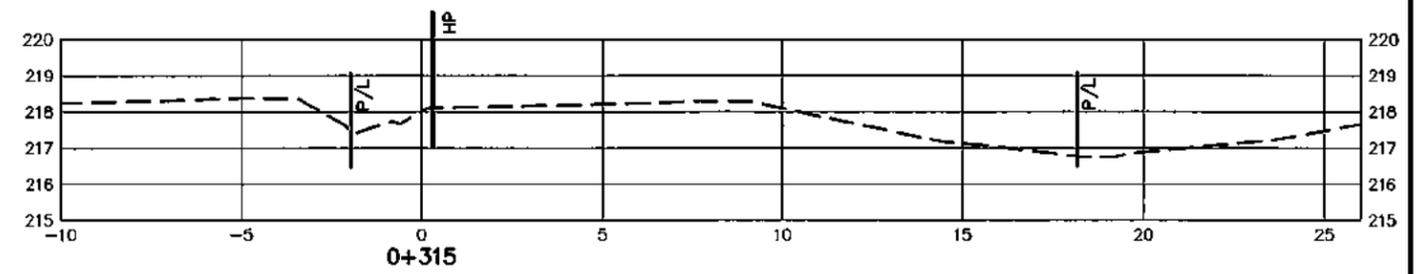
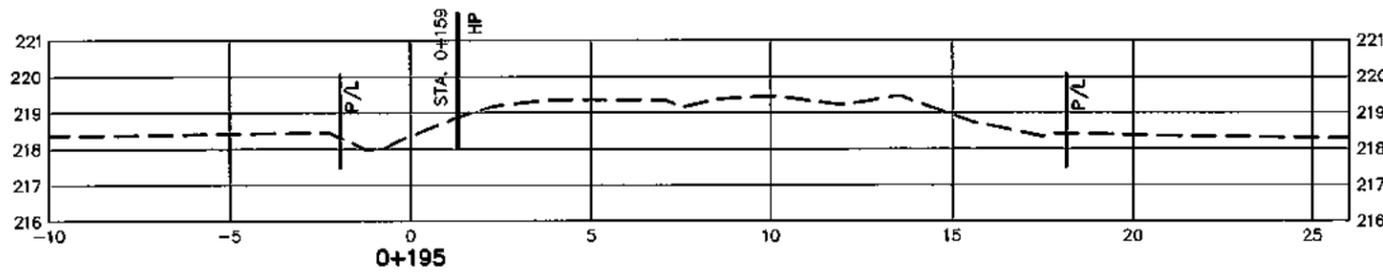
**LEGEND**

- EXISTING BANK
- - - - - EXISTING DITCH BOTTOM
- EXISTING CENTRELINE OF ROAD

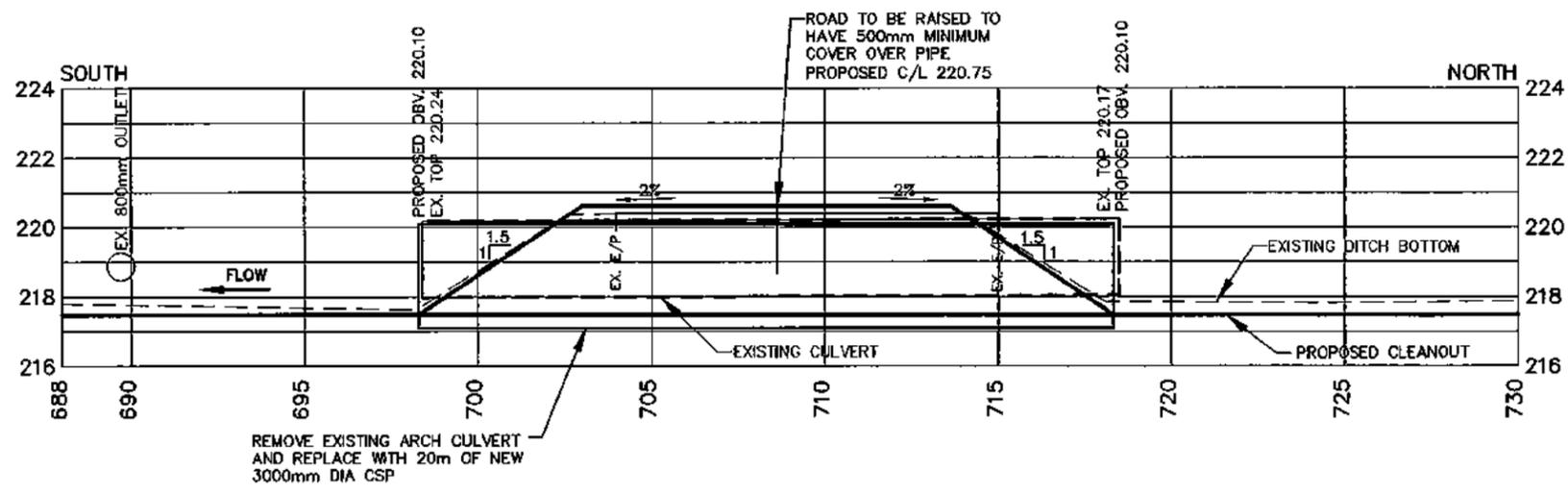
**TEST HOLE LEGEND**



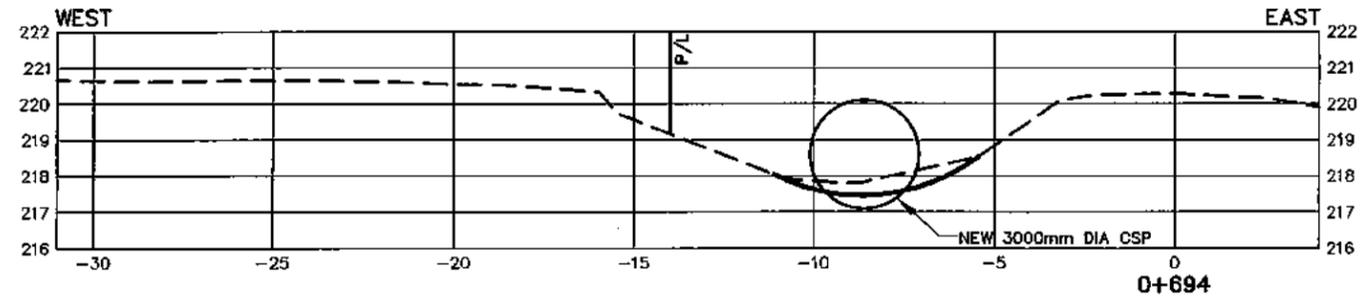
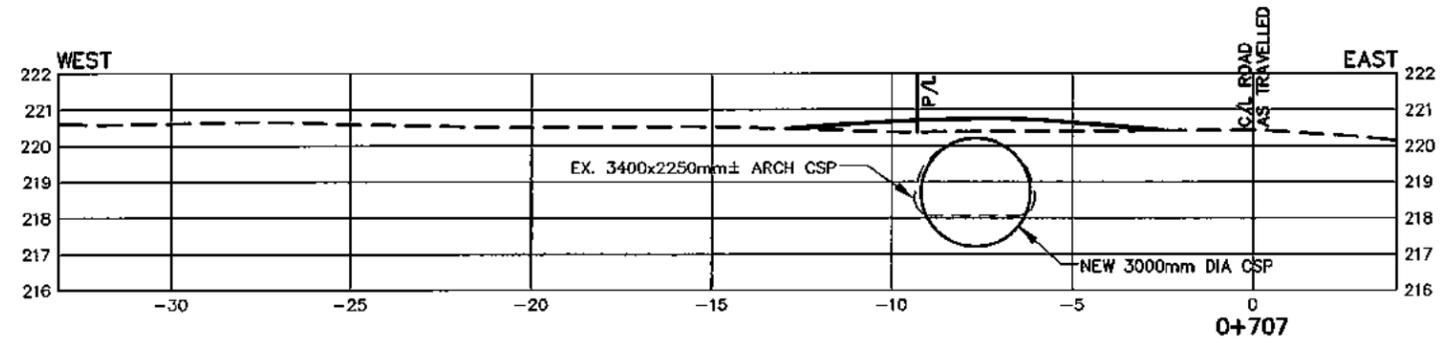
DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		 HORZ. 1:5000
DRAWN BY: N.M.B.		 VERT. 1:50 (ON 11"x17")
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>LINE 6 POSSIBLE ACCESS AND HAUL ROUTE PROFILE</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-287 DRAWING: 65



DESIGNED BY: K.A.S.		SCALE	
CHECKED BY: K.A.S.			
DRAWN BY: N.M.B.			
CHECKED BY: K.A.S.			
<b>MORRIS ROAD DRAIN</b>			
TOWN OF BRADFORD WEST GWILLIMBURY			
<b>LINE 6 POSSIBLE ACCESS AND HAUL ROUTE CROSS SECTIONS</b>			APR. 14, 2016
			REVISED:
			JOB NUMBER: 12-287 DRAWING: 66



**WALKER AVE EXISTING AND NEW CULVERT PROFILE**

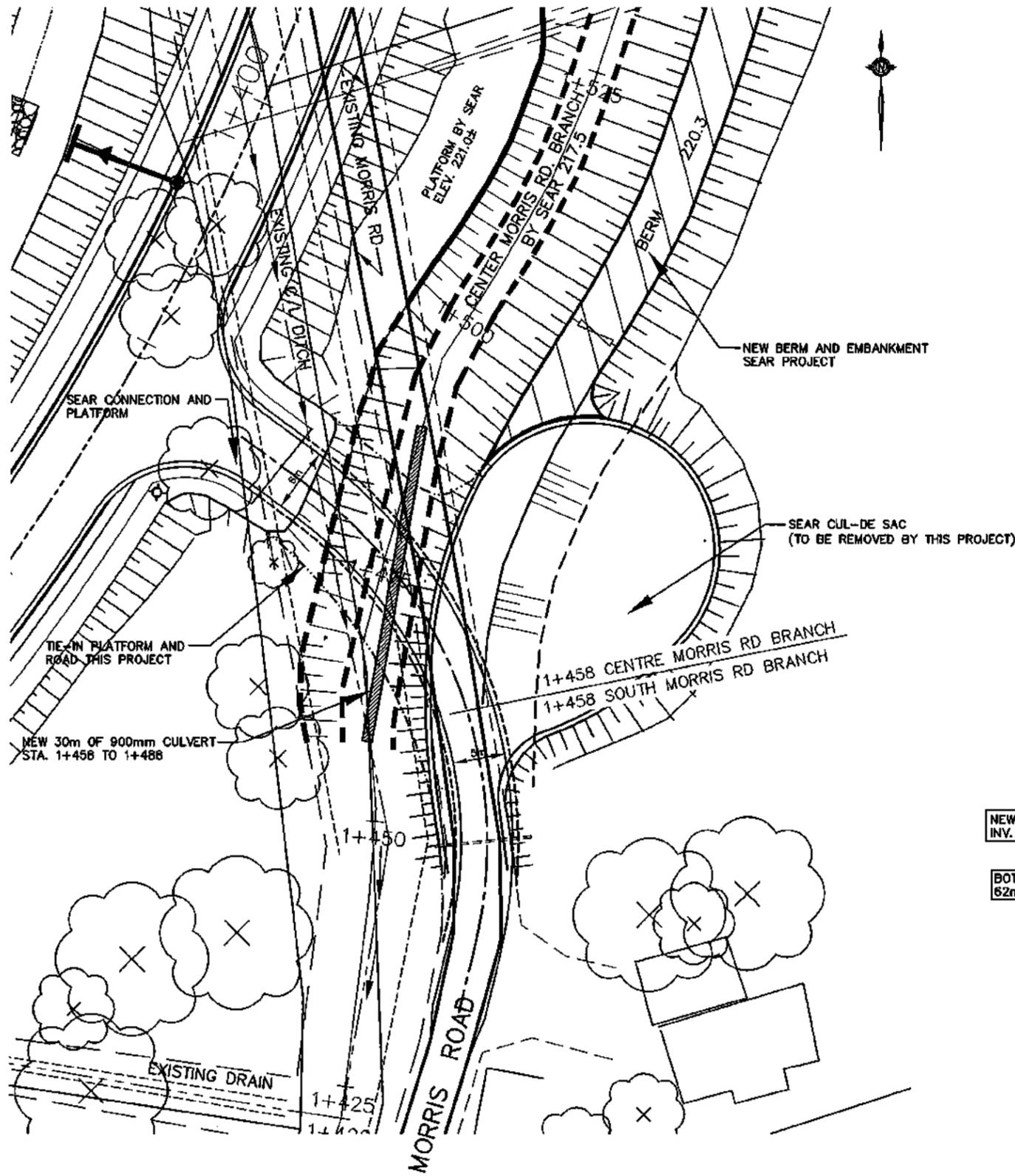


<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>WALKER AVENUE CULVERT PROFILE AND CROSS SECTIONS</b>	APR. 14, 2016
REVISED:	
JOB NUMBER: 12-267	
DRAWING: 67	
 <b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	

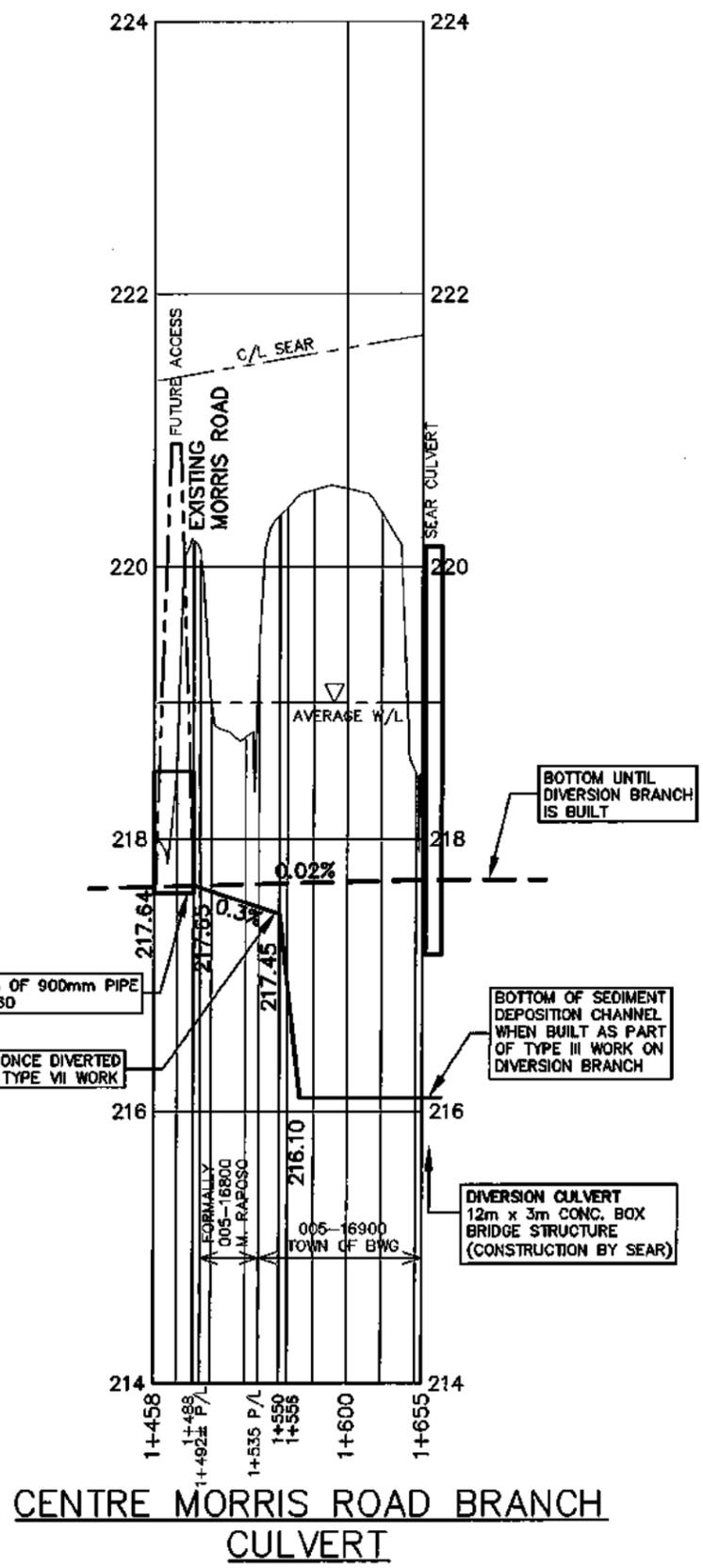
DESIGNED BY: K.A.S.  
 CHECKED BY: K.A.S.  
 DRAWN BY: N.M.B.  
 CHECKED BY: K.A.S.



SCALE  
 0 2 4m  
 HOR. 1:200  
 0 4m  
 VER. 1:200  
 (ON 11"x17")

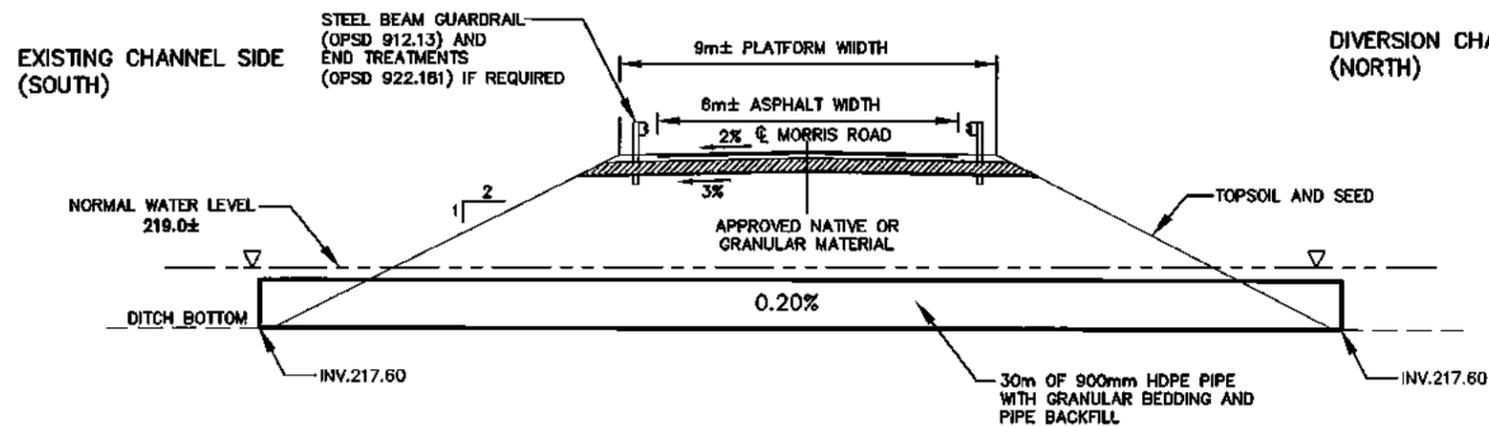
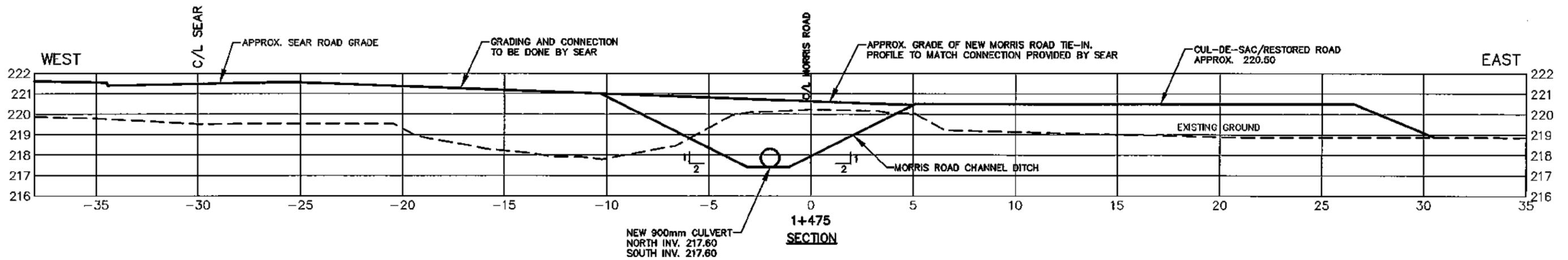


**PLAN**  
 0 5 10m  
 SCALE 1:500



**CENTRE MORRIS ROAD BRANCH  
 CULVERT**

DESIGNED BY: K.A.S.		SCALE	
CHECKED BY: K.A.S.		0 50 100m	HORZ. 1:5000
DRAWN BY: N.M.B.		0 0.5 1m	VERT. 1:50
CHECKED BY: K.A.S.		(ON 11"x17")	
<b>MORRIS ROAD DRAIN</b>			
TOWN OF BRAZFORD WEST GWILLIMBURY			
<b>CENTRE MORRIS ROAD BRANCH    CULVERT PROFILE AND TIE-IN DETAIL</b>			APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY			REVISION: JOB NUMBER: 12-267 DRAWING: 68

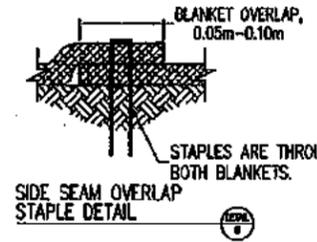
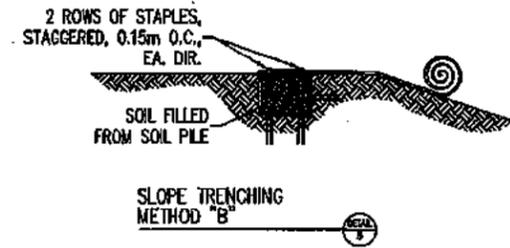


**ROAD AND CULVERT DETAIL**  
N.T.S.

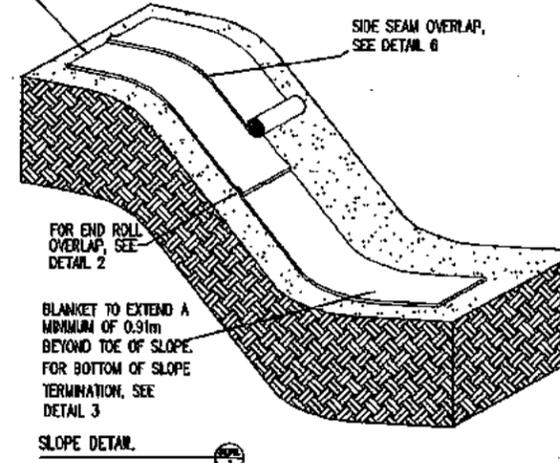
**NOTES:**

1. ALL GRANULAR MATERIAL TO BE COMPACTED TO 98% SPMD WITH A MECHANICAL VIBRATORY COMPACTOR.
2. PLATFORM AND ASPHALT WIDTHS TO BE 9m± AND 6m± RESPECTIVELY AT CROSSING LOCATION
3. 60mm SP 12.5, 150mm GRAN A, 300mm GRAN B FOR ROAD

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		0 2 4m HORIZ. 1:200
DRAWN BY: N.M.B.		0 2 4m VERT. 1:200 (ON 11"x17")
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY		
<b>CENTRE MORRIS ROAD BRANCH</b> <b>CROSS SECTION AND DETAIL</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY		REVISED: JOB NUMBER: 12-267 DRAWING: 69

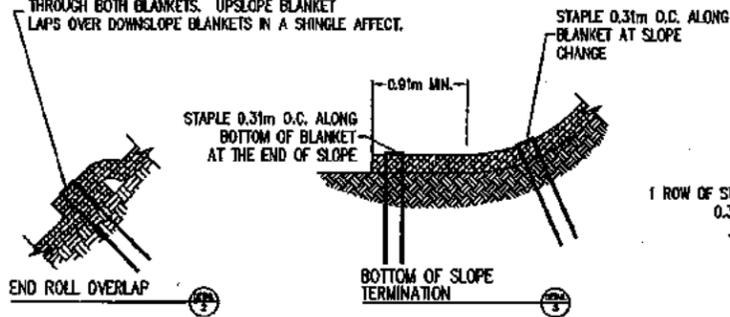


EXTEND BLANKET A MINIMUM OF 0.91m OVER CREST OF SLOPE, SEE DETAIL 4. TRENCHING NEEDED IF A MINIMUM OF 0.91m IS NOT AVAILABLE AT THE CREST OF SLOPE OR IF OVERLAND FLOW IS ANTICIPATED FROM UPLAND SEE DETAIL 5

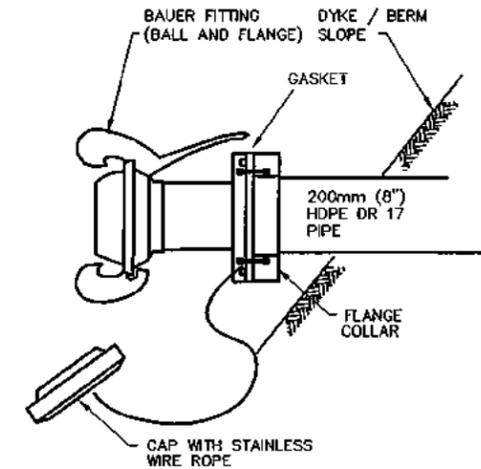


**EROSION BLANKET**

END SEAM OF BLANKETS OVERLAP 0.05m-0.10m. PLACE STAPLES, ONE ON EACH CORNER OF BLANKET, 0.31m O.C. ALONG BLANKET END THROUGH BOTH BLANKETS. UPSLOPE BLANKET LAPS OVER DOWNSLOPE BLANKETS IN A SHINGLE AFFECT.

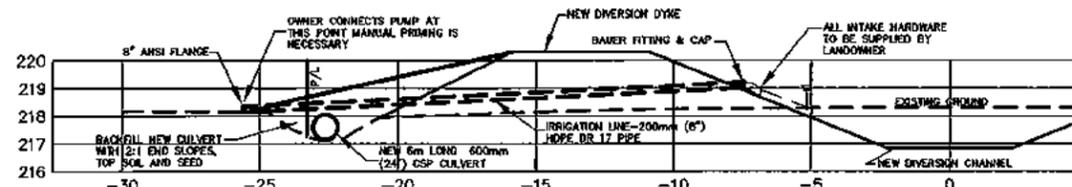


DO NOT NEED TO TRENCH BLANKET IN IF IT CAN BE EXTENDED A MINIMUM OF 0.91m OVER THE CREST OF THE SLOPE.

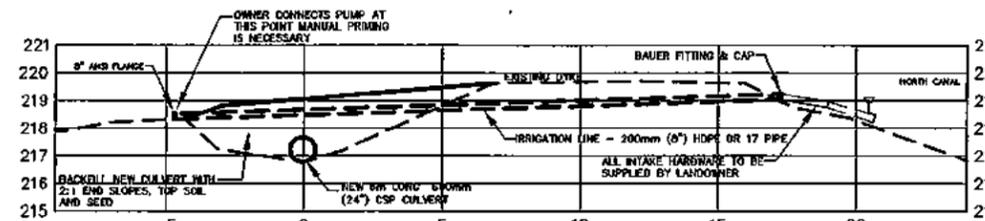


**IRRIGATION DETAIL (CANAL SIDE)**  
N.T.S.

**IRRIGATION**



**0+044 DIVERSION TYPICAL IRRIGATION DETAIL (STA. 044±)**



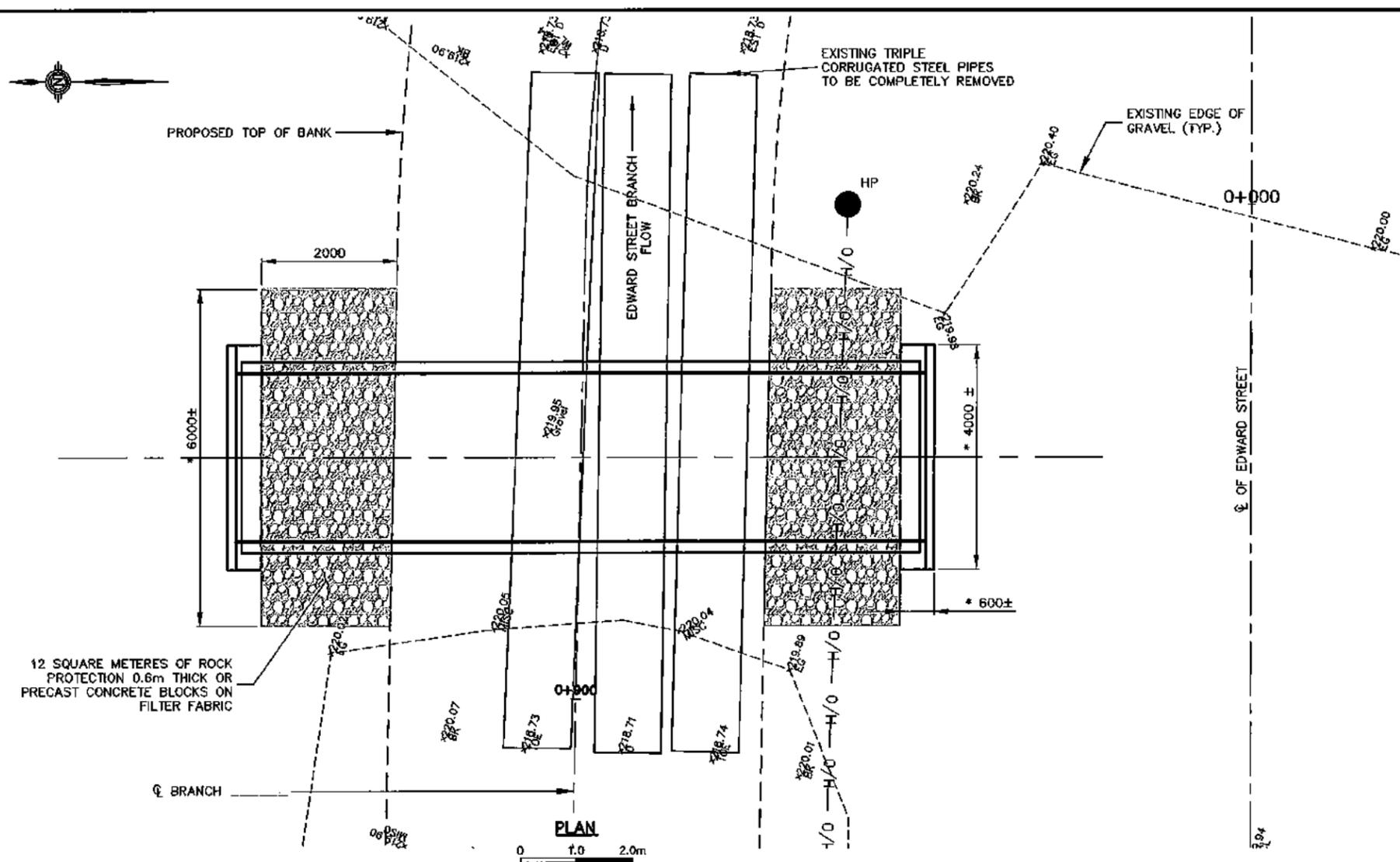
**0+109 NORTH CANAL TYPICAL IRRIGATION DETAIL (STA. 130±)**

DESIGNED BY: K.A.S.		SCALE
CHECKED BY: K.A.S.		0 1 2 3m
DRAWN BY: N.M.B.		HOR. 1:150
CHECKED BY: K.A.S.		0 1 2 3m
		VER. 1:150 (ON 11"x17")

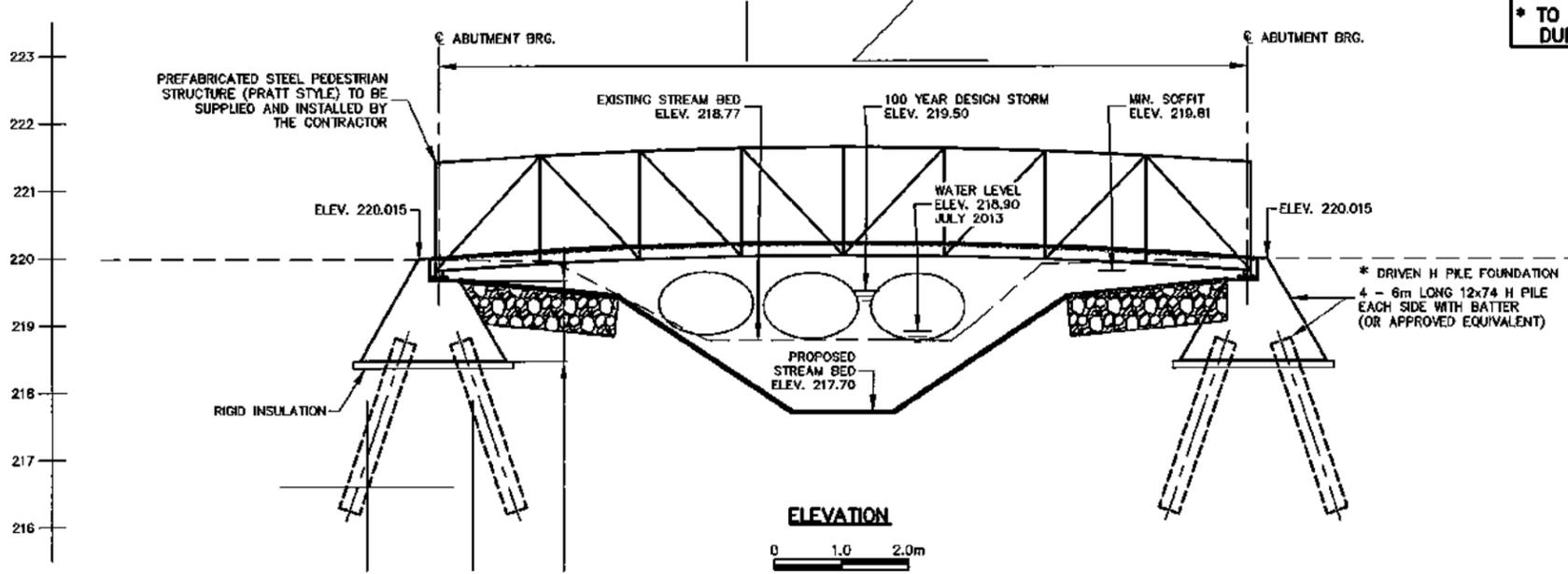
**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

**IRRIGATION DETAIL AND EROSION CONTROL BLANKET** APR. 14, 2016

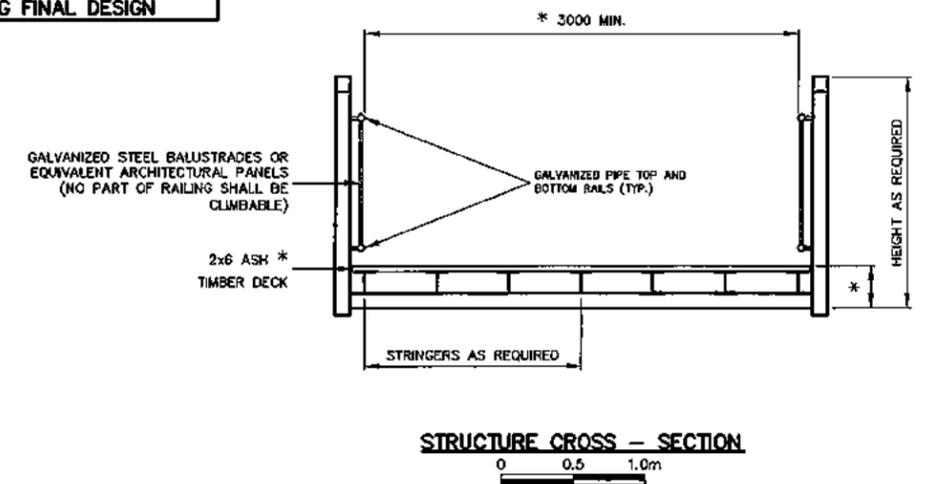
	REVISIONS:
	JOB NUMBER: 12-267
	DRAWING: 70



- CONSTRUCTION NOTES**
- STRUCTURE TO BE DESIGNED FOR PEDESTRIAN LOADING AND MAINTENANCE VEHICLE LOADING (80 KN) IN ACCORDANCE WITH THE CANADIAN HIGHWAY BRIDGE DESIGN CODE 2006.
  - PRE-FABRICATED STRUCTURE SHALL BE STEEL TYPE LOW PROFILE PRATT TRUSS WITH 300mm± CAMBER AT CENTRE. STEEL SHALL BE IN ACCORDANCE WITH CSA STANDARD CAN G40.21 - M92 GRADE 350A (WEATHERING STEEL).
  - TOTAL DEAD LOAD OF PRE-FABRICATED STRUCTURE NOT TO EXCEED 80 KN (FACTORED)
  - THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR THE FABRICATION AND ERECTION OF THE PRE-FABRICATED STRUCTURE AND ALL OTHER STEEL MEMBERS FOR THE CONTRACT ADMINISTRATOR'S REVIEW PRIOR TO ORDERING THE MATERIAL.
  - WORK ON THE STRUCTURE MUST NOT BE COMMENCED UNTIL MONUMENTS TO FIX CONTROL POINTS HAVE BEEN ERECTED AND CHECKED BY THE CONTRACT ADMINISTRATOR.
  - STRUCTURE TO BE BUILT IN ACCORDANCE WITH OPSS 9 (REVISED) AND THE CONTRACT ADMINISTRATOR'S SPECIFICATIONS.
  - DEWATERING IS NOT EXPECTED. IF REQUIRED, CONVENTIONAL SUMP PUMPS SHALL BE USED.
  - A SOIL INVESTIGATION REPORT BY CHUNG AND VANDER DOELEN ENGINEERING LTD. WAS COMPLETED IN ADJACENT AREAS AND SIMILAR SOILS CAN BE EXPECTED. A COPY OF THE REPORT IS INCLUDED IN THE CONTRACT DOCUMENTS. THE CONTRACT ADMINISTRATOR DOES NOT GUARANTEE THE ACCURACY OF THIS REPORT.
  - REINFORCED CONCRETE BRIDGE SEATS TO BE CONSTRUCTED SUBJECT TO APPROVED DRAWINGS.
  - CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON THE JOB AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE WORK.
  - CLASS OF CONCRETE:
    - 35 MPa MINIMUM AT 28 DAYS
    - AIR CONTENT OF CONCRETE TO BE IN ACCORDANCE WITH CURRENT OPS SPECIFICATIONS.
  - CLEAR COVER TO REINFORCING STEEL:
    - FOOTINGS 100 ± 20mm
    - REMAINDER 70 ± 20mm
  - REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED.
  - MINIMUM LAP OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH THE CHBDC.
  - BEARING SEATS SHALL BE FINISHED DEAD LEVEL TO THE SPECIFIED ELEVATIONS WITHIN A TOLERANCE OF 3mm.
  - ANY EXCAVATED MATERIAL SHALL BE DISPOSED OF TOGETHER WITH OTHER EXCAVATED MATERIAL FROM THE EDWARD STREET BRANCH.
  - CONTRACTOR MAY PROPOSE AN ALTERNATE FOUNDATION AND SEAT DETAILS FOR ENGINEER'S APPROVAL (I.E. STEEL BEAM SEAT AND/OR FULL CONCRETE FOOTING COULD BE SUGGESTED).



**\* TO BE CONFIRMED/VERIFIED DURING FINAL DESIGN**



**STRUCTURE CROSS - SECTION**

**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GUILMBURY

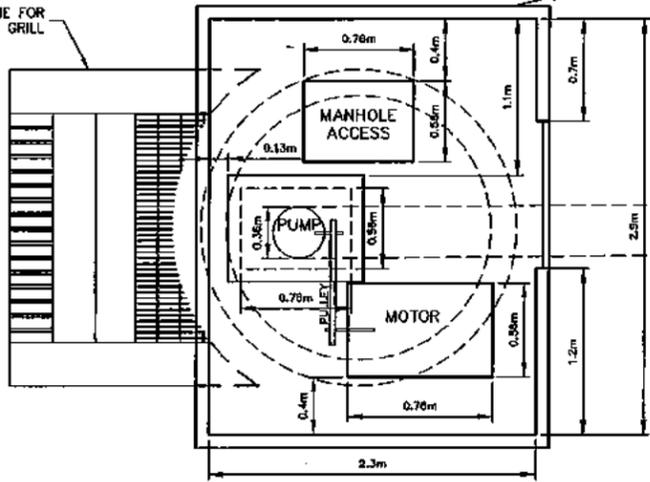
<b>EDWARD STREET BRANCH PEDESTRIAN BRIDGE</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUBURBY	REVISED: JOB NUMBER: <b>12-267</b> DRAWING <b>71</b>

DESIGNED BY: K.A.S.
CHECKED BY: K.A.S.
DRAWN BY: D.S.
CHECKED BY: K.A.S.





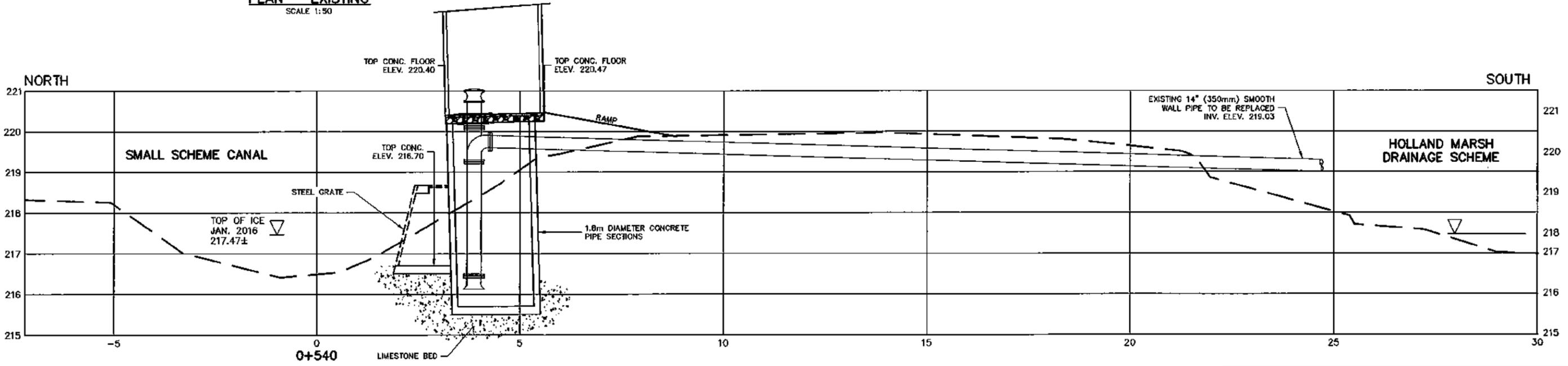
CONCRETE FRAME FOR GRATING AND GRILL



**PLAN - EXISTING**  
SCALE 1:50



HP



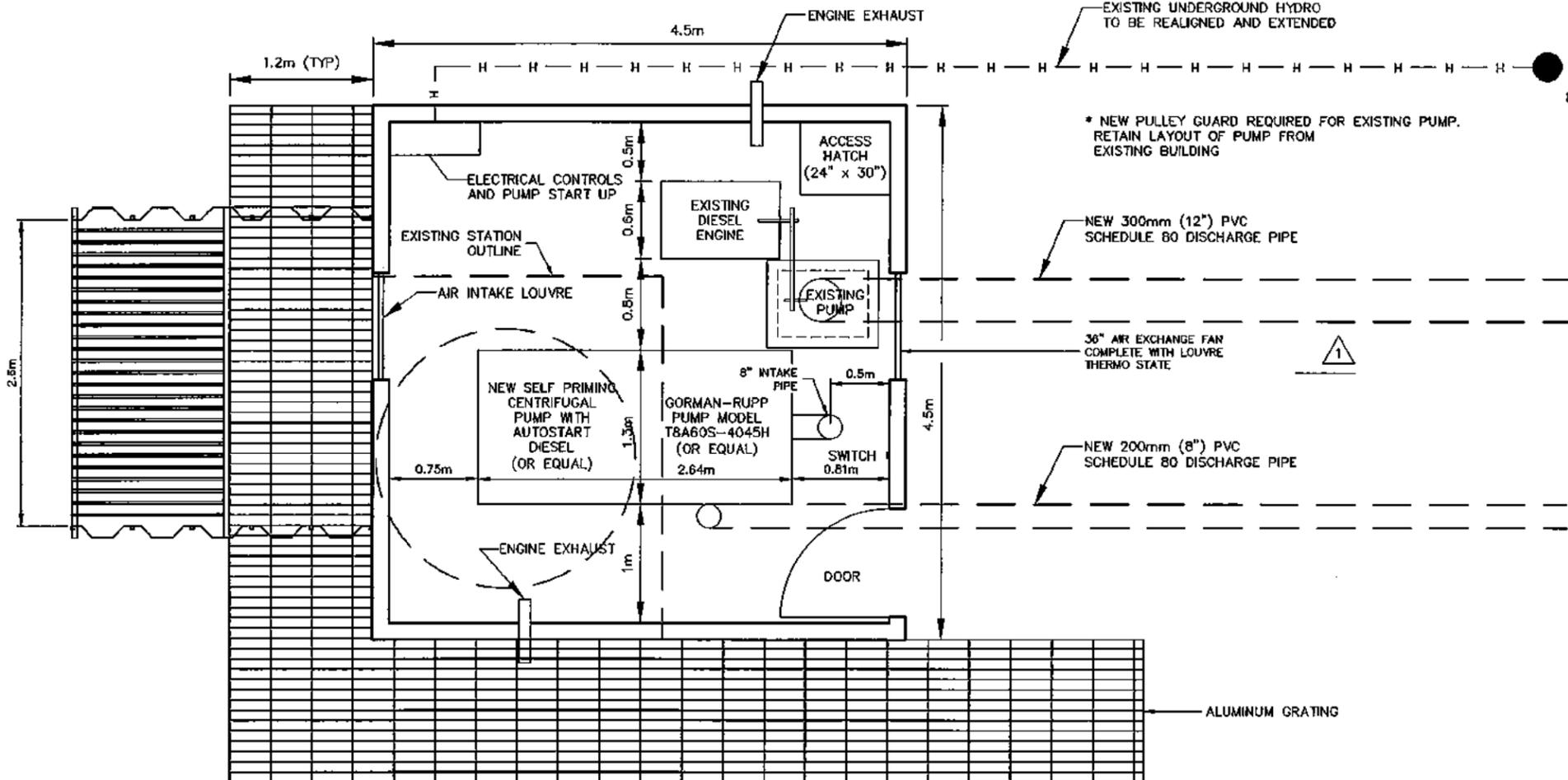
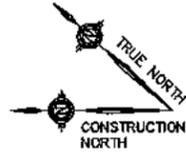
**SECTION 1**  
SCALE 1:100

DESIGNED BY: N/A		SCALE
CHECKED BY: K.A.S.		AS NOTED (ON 11"x17")
DRAWN BY: D.S.S.		
CHECKED BY: K.A.S.		

**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWILLIMBURY

<b>PUMPING STATION EXISTING CONDITIONS</b>	APR. 14, 2016
	REVISED:
	JOB NUMBER: 12-287
	DRAWING: 72

**LEGEND**  
— — — — — EXISTING GROUND



**PLAN - PROPOSED**  
SCALE 1:50

**NOTES:**

1. BUILDING TO COMPLY WITH REQUIREMENTS OF ONTARIO BUILDING CODE 2012.
2. CONCRETE SHALL BE 30 MPa AND COMPLY TO CSA A23-1.
3. STRUCTURAL STEEL SHALL BE 350W.
4. FLOOR LOADING 20 PSF DEAD AND 50 PSF LIVE. DESIGN DEFLECTION LIMIT L/360.
5. ALL ELECTRICAL TO COMPLY WITH MOST CURRENT CODE.
6. SHOP DRAWINGS FOR STRUCTURAL STEEL FRAMING TO BE SUBMITTED.
7. ALL WELDING SHALL COMPLY WITH CSA W59. BOLTED CONNECTIONS SHALL USE A325 BOLTS, BEARING TYPE.
8. WOOD FRAMING TO BE SPF No. 1/No. 2 AND COMPLY WITH ONTARIO BUILDING CODE 2012.

**ELECTRICAL:**

- 4 INTERIOR SOCKETS & BULBS (100w INCANDESCENT).
- 2 EXTERIOR WALL MOUNTED UNITS (HIGH PRESSURE SODIUM).
- ELECTRICAL PANEL AND ALL PUMP CONTROLS TO BE ON INTERIOR EAST WALL.
- SWITCH AS SHOWN (SEPARATE SWITCHING FOR FRONT, INTERIOR, AND BACK LIGHTS).

DESIGNED BY: D.H.		SCALE
CHECKED BY: K.A.S.		AS NOTED (ON 11"x17")
DRAWN BY: D.S.S.		
CHECKED BY: K.A.S.		

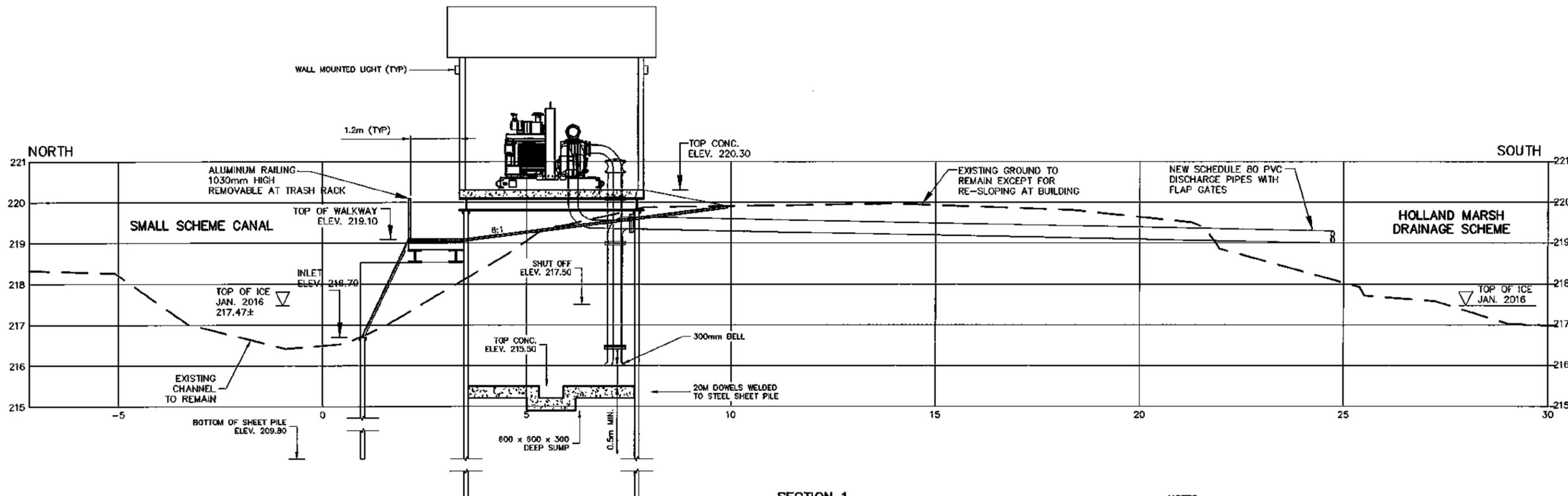
**MORRIS ROAD DRAIN**  
TOWN OF BRADFORD WEST GWLLIMBURY

**PUMPING STATION  
NEW FLOOR PLAN**

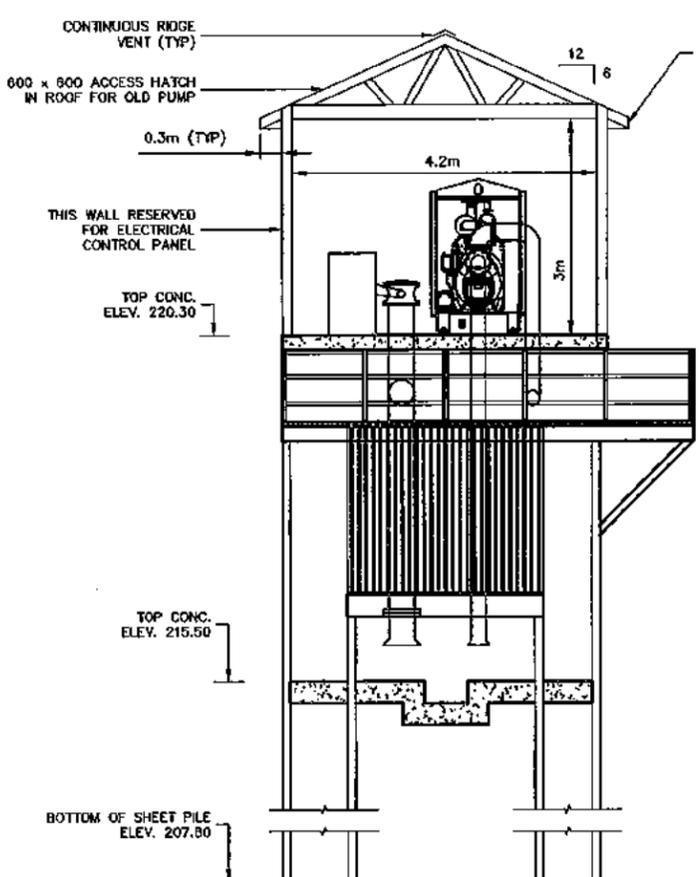
APR. 14, 2016

**K. SMART ASSOCIATES LIMITED**  
CONSULTING ENGINEERS AND PLANNERS  
KITCHENER SUDBURY

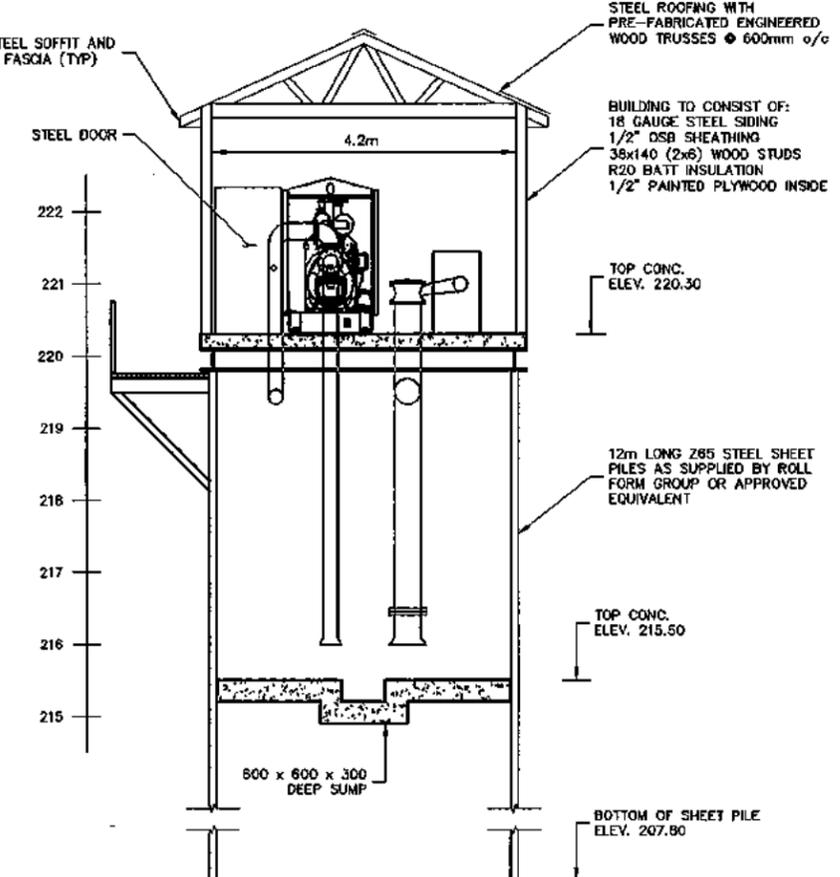
REVISED:  
JOB NUMBER: 12-267  
DRAWING  
73



**SECTION 1**  
SCALE 1:100



**SECTION 2**  
SCALE 1:100



**SECTION 3**  
SCALE 1:100

**NOTES:**

1. BUILDING TO COMPLY WITH REQUIREMENTS OF ONTARIO BUILDING CODE 2012.
2. CONCRETE SHALL BE 30 MPa AND COMPLY TO CSA A23-1.
3. STRUCTURAL STEEL SHALL BE 350W.
4. FLOOR LOADING 20 PSF DEAD AND 50 PSF LIVE. DESIGN DEFLECTION LIMIT L/360.
5. ALL ELECTRICAL TO COMPLY WITH MOST CURRENT CODE.
6. SHOP DRAWINGS FOR STRUCTURAL STEEL FRAMING TO BE SUBMITTED.
7. ALL WELDING SHALL COMPLY WITH CSA W59. BOLTED CONNECTIONS SHALL USE A325 BOLTS, BEARING TYPE.
8. WOOD FRAMING TO BE SPF No. 1/No. 2 AND COMPLY WITH ONTARIO BUILDING CODE 2012.

**ELECTRICAL:**

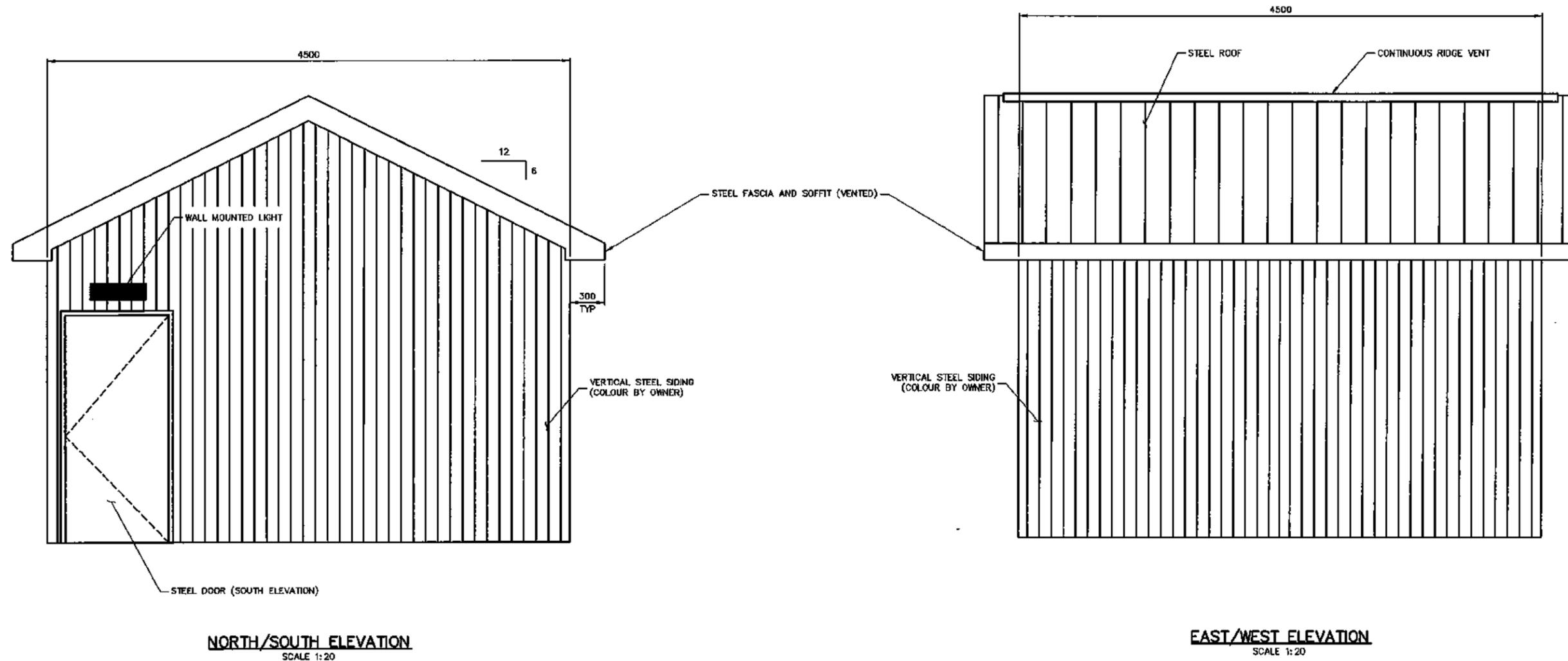
- 4 INTERIOR SOCKETS & BULBS (100w INCANDESCENT).
- 2 EXTERIOR WALL MOUNTED UNITS (HIGH PRESSURE SODIUM).
- ELECTRICAL PANEL AND ALL PUMP CONTROLS TO BE ON INTERIOR EAST WALL.
- SWITCH AS SHOWN (SEPARATE SWITCHING FOR FRONT, INTERIOR, AND BACK LIGHTS).

**LEGEND**

— — — — — EXISTING GROUND

DESIGNED BY: D.H.		SCALE
CHECKED BY: K.A.S.		AS NOTED (ON 11"x17")
DRAWN BY: D.S.S.		
CHECKED BY: K.A.S.		

<b>MORRIS ROAD DRAIN</b>	
TOWN OF BRADFORD WEST GWILLIMBURY	
<b>PUMPING STATION NEW SECTIONS</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	
REVISED:	JOB NUMBER: 12-287
	DRAWING: 74

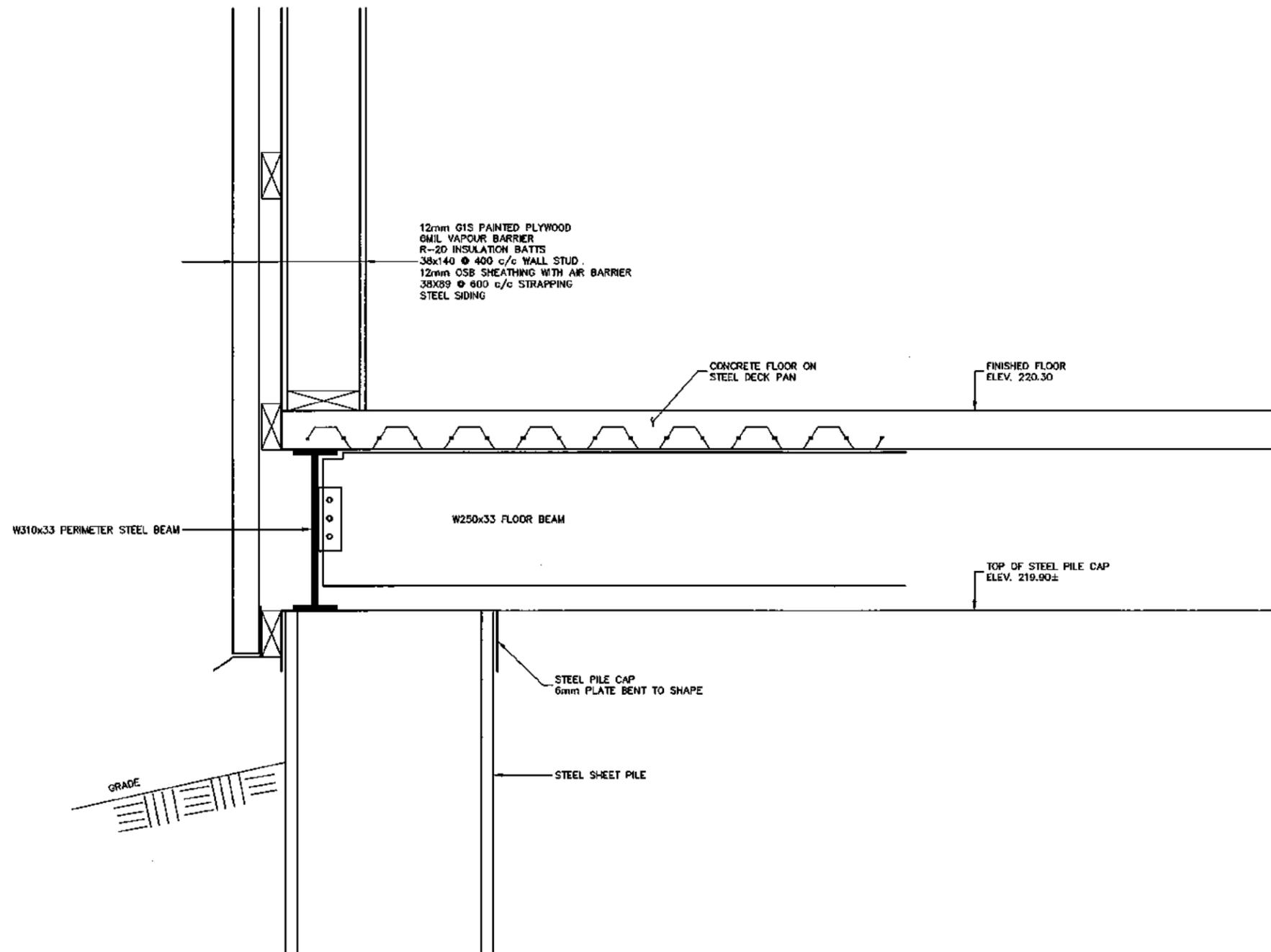


**NORTH/SOUTH ELEVATION**  
SCALE 1:20

**EAST/WEST ELEVATION**  
SCALE 1:20

**NOTES:**  
 THIS DRAWING PRESENTS A CONCEPTUAL DESIGN FOR THE PUMP STATION.  
 THE DRAWINGS SHOW THE OVERALL APPROXIMATE SIZE OF THE WET WELL, CONTROL/ELECTRICAL ROOM, DEPTH OF WET WELL AND OVERALL GENERAL STYLE OF CONSTRUCTION.  
 THIS DRAWING WILL FORM THE BASIS FOR THE FINAL DESIGN/BUILD CONTRACT  
 CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE FINAL PUMP STATION DESIGN

DESIGNED BY: D.H.		SCALE
CHECKED BY: K.A.S.		AS NOTED (ON 11"x17")
DRAWN BY: D.S.S.		
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>PUMPING STATION ELEVATION VIEWS</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:	
	JOB NUMBER: 12-287	
	DRAWING <b>75</b>	



**NOTES:**  
THIS DRAWING PRESENTS A CONCEPTUAL DESIGN FOR THE PUMP STATION.

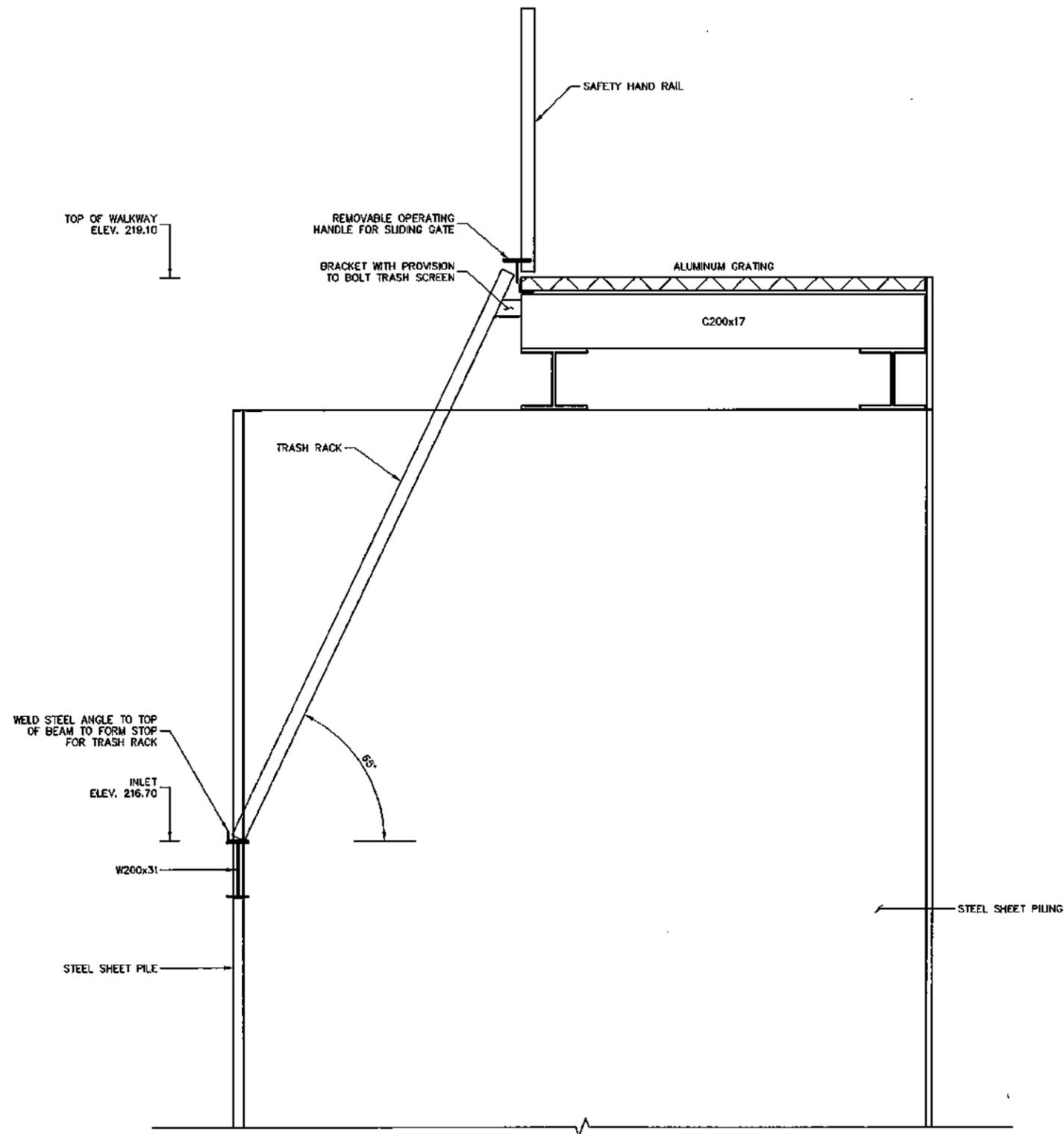
THE DRAWINGS SHOW THE OVERALL APPROXIMATE SIZE OF THE WET WELL, CONTROL/ELECTRICAL ROOM, DEPTH OF WET WELL AND OVERALL GENERAL STYLE OF CONSTRUCTION.

THIS DRAWING WILL FORM THE BASIS FOR THE FINAL DESIGN/BUILD CONTRACT

CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE FINAL PUMP STATION DESIGN

DESIGNED BY: D.H.		SCALE
CHECKED BY: K.A.S.		AS NOTED (ON 11"x17")
DRAWN BY: D.S.S.		
CHECKED BY: K.A.S.		

<b>MORRIS ROAD DRAIN</b> TOWN OF BRADFORD WEST GWILLIMBURY	
<b>PUMPING STATION ELEVATION VIEWS</b>	APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:
	JOB NUMBER: 12-267
	DRAWING: 76



**TRASH RACK DETAIL**  
SCALE 1:20

**NOTES:**  
THIS DRAWING PRESENTS A CONCEPTUAL DESIGN FOR THE PUMP STATION.

THE DRAWINGS SHOW THE OVERALL APPROXIMATE SIZE OF THE WET WELL, CONTROL/ELECTRICAL ROOM, DEPTH OF WET WELL AND OVERALL GENERAL STYLE OF CONSTRUCTION.

THIS DRAWING WILL FORM THE BASIS FOR THE FINAL DESIGN/BUILD CONTRACT

CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR THE FINAL PUMP STATION DESIGN

DESIGNED BY: D.H.		SCALE
CHECKED BY: K.A.S.		AS NOTED (ON 11"x17")
DRAWN BY: D.S.S.		
CHECKED BY: K.A.S.		
<b>MORRIS ROAD DRAIN</b>		
TOWN OF BRADFORD WEST GWILLIMBURY		
<b>PUMPING STATION TRASH SCREEN DETAIL</b>		APR. 14, 2016
<b>K. SMART ASSOCIATES LIMITED</b> CONSULTING ENGINEERS AND PLANNERS KITCHENER SUDBURY	REVISED:	
	JOB NUMBER: 12-267	
	DRAWING 77	

LUIS MANUEL TORRES - 345 WALKER AVENUE (4312 010 005 03200)

- Dead-trees-to-be-removed
- Other-trees-to-be-trimmed
- Channel here is already narrow,-so-minor-narrowing-is-required



JASON WESLEY TERRY - 341 WALKER AVENUE (4312 010 005 03101)

- One-large-tree-can remain-as-long-as-its-1m-back-from-existing-top-of-bank
- Cut-and-remove-smaller-trees-and-dead-trees
- Channel here is already narrow,-so-minor-narrowing-is-required



CYNTHIA HARMAN - 337 WALKER AVENUE (4312 010 005 03102)

- Fence-is-encroaching-on-canal-property-and-will-be-removed
- Dead-cedar-hedge-to-be-removed
- Narrowing-may-not-be-required



RONALD HARRISON - 333 WALKER AVENUE (4312 010 005 03100)

- Sheet-metal-wall-is-encroaching-on-canal-property-and-will-be-removed
- Large-tree-on-bank-to-be-removed
- Minor-narrowing-of-channel required



JEREMY WARD - 329 WALKER AVENUE (4312 010 005 03000)

- Chain-link-fence-to-remain
- Evergreen-trees-to-remain
- Trees-outside-of-fence/on-bank-to-be-removed
- Normal-narrowing-of-canal



GERALD FERADAY - 21 TOWNSEND AVENUE (4312 010 005 02930)

- Stone-wall-to-be-removed
- Normal-narrowing-of-canal



M. HOLLEDGE - 25 TOWNSEND AVENUE

(4312 010 005 02929)

- Normal-narrowing-of-canal



GORDON ALEXANDER MARTIN - 31 TOWNSEND AVENUE (4312 010 005 02928)

- Block-wall-to-be-removed
- Trees-can stay
- Normal-narrowing-of-canal



PETER CONNOR - 35 TOWNSEND AVENUE (4312 010 005 02927)

- Steps-and-dock-pilings-to-be-removed
- Normal-narrowing-of-canal



MARILYN SUZANNE LOCK - 39 TOWNSEND AVENUE (4312 010 005 02926)

- Fence-and-trees-can-stay
- Just-trim-branches
- Normal-narrowing-of-canal



JOHN CHARLES GONCALVES - 45 TOWNSEND AVENUE (4312 010 005 02925)

- 2-large-willow-trees-outside-of-fence-to-be-removed
- Brush-cleanup
- Normal-narrowing-of-canal



ANDREW LAWRENCE MCCARNEY - 51 TOWNSEND AVENUE (4312 010 005 02924)

- Wood-fence-can-stay
- Boat-ramp-to-be-removed
- Normal-narrowing-of-canal



DAVID BOYD - 55 TOWNSEND AVENUE (4312 010 005 02923)

- Fence-can-stay
- Normal-narrowing-of-canal



RONALD NELSON THRUSH - 59 TOWNSEND AVENUE (4312 010 005 02922)

- Storm-outlet-at property-line-to-be-adjusted
- Normal-narrowing-of-canal



AARON ALIAS ISH HINDS - 63 TOWNSEND AVENUE (4312 010 005 02921)

- Remove-cedars-on-bank
- Hedge-row-can-stay
- Fence-to-be-removed
- Normal-narrowing-of-canal



CHERRY LYNN HICKEY -10 BUCE AVENUE (4312 010 005 02963)

- Normal-narrowing-of-canal



MICHAEL WILLIAM VEY - 12 BUCE AVENUE (4312 010 005 02962)

- Fence-can-stay
- Willow-trees-to-be-removed
- Normal-narrowing-of-canal



RAYMOND REITZEL - 16 BUCE AVENUE (4312 010 005 02961)

- Shed-can-stay
- Trees-on-bank-to-be-removed
- Normal-narrowing-of-canal



LINDA KINUYO TANAKA - 18 BUCE AVENUE (4312 010 005 02960)

- Fence-can-stay
- Trees-on-bank-to-be-removed
- Normal-narrowing-of-canal



MELISSA COWELL - 20 BUCE AVENUE (4312 010 005 02959)

- Fence-can-stay
- No-trees-to-be-removed
- Normal-narrowing-of-canal



FERLIN LEONARD BAXTER - 24 BUCE AVENUE (4312 010 005 02958)

- Shed-and-bird-house-can-stay
- 4"-outlet-pipe-to-be-extended
- Normal-narrowing-of-canal



DOUGLAS GLENNEY - 28 BUCE AVENUE (4312 010 005 02957)

- Rocks-on-bank-to-be-removed
- Cedar-hedge-can-stay
- Normal-narrowing-of-canal



GARY WAYNE COTTINGHAM -30 BUCE AVENUE (4312 010 005 02956)

- Drain-outlet-to-be-addressed
- Landowners-have-asked-for-unhealthy-trees to-be-removed
- Normal-narrowing-of-canal



ROBERT NELSON SMITH - 32 BUCE AVENUE (4312 010 005 02955)

- Fence-can-stay
- Trees-to-be-trimmed
- Normal-narrowing-of-canal



VINCENZO THOMAS ROMANO - 36 BUCE AVENUE (4312 010 005 02954)

- Cedars-can-stay
- Brush-to-be-trimmed
- Normal-narrowing-of-canal



PAUL STREVEZ - 38 BUCE AVENUE (4312 010 005 02953)

- Hedge-can-stay
- No-trees-to-be-removed
- Normal-narrowing-of-canal



M4 BRADFORD INC. (4312 010 005 02601)

- Trim-trees-and-brush
- Keep-top-of-bank-as-is-but-redo-slope



MATTWOOD HOMES LTD. (4312 010 005 02400)

- Keep-top-of-bank-where is-but may do-littoral-shelf



TOWN OF BRADFORD WEST GWILLIMBURY – Sta. 1+700 (4312 010 005 01600)

- Channel-has-since-been-cleaned



A. VOLINSKI - 127 BACK STREET (4312 010 005 11100)

- Fence-can-stay
- Trees-have-since-been-trimmed
- Channel-has-been-cleaned



J. MARQUES - 138 CENTRE STREET (4312 010 005 10304)

- Fence-can-stay
- Trees-have-since-been-trimmed
- Channel-has-been-cleaned



A. LEMOS - 140 CENTRE STREET (4312 010 005 10302)

- Fence-can-stay
- Trees-have-since-been-trimmed
- Channel-has-been-cleaned



J. KIRSCHNER - 142 CENTRE STREET (4312 010 005 10303)

- Channel-has-been-recently-cleaned



J. KIRSCHNER - 142 CENTRE STREET (4312 010 005 10303)

- Channel-has-been-recently-cleaned

