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Apetito HFS Ltd.
1010 Dairy Drive,
Ottawa, Ontario

Building Expansions
Functional Servicing & Stormwater Management Report

MCG File No. 21008

Submitted To:

City of Ottawa
Planning Department

Submitted By:

Mallot Creek Group Inc.
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Grant Beeler, P.Eng.
September 10th, 2021
Revised: September 7th, 2022

1.0 INTRODUCTION

Mallot Creek Group (MCG) was retained by Apetito HFS Ltd. to complete a full engineering design for their proposed expansions to their existing facility. This report was prepared to summarize the servicing and stormwater management at the subject property located at 1010 Dairy Drive in the City of Ottawa, Ontario. The subject property is approximately 3.08 hectares (ha) and is currently functioning as an industrial facility that prepares hospital food services. The proposed development will consist of two expansions to the existing facility that will occur in two phases. Phase one will consist of the construction of a building with a gross area of 917.2 m^2 (9,872.66 ft^2) and Phase 2 will allow for a proposed expansion with a floor area of 676.20 m^2 (7,278.56 ft^2). The first expansion will be to increase freezer storage in the plant and the second is to provide extra space for shipping/receiving areas. The existing site entrances on Dairy Drive will remain and be utilized for the fire route. Existing parking will remain and disturbed parking from the expansions is relocated further east. Other site features will include landscaping, walkways, etc.

The following report addresses the servicing requirements for the proposed expansions including a description of the proposed water demands, sanitary servicing strategy, and stormwater management strategy. It should be noted that the Phase 2 (ultimate build-out) scenario was used for all calculations.

2.0 BACKGROUND INFORMATION

2.1 Guidelines and Background Documents

This report was prepared recognizing the pertinent agencies/authorities as well as applicable City and Provincial guidelines, including the following publications:

- City of Ottawa Sewer Design Guidelines, (City of Ottawa), October 2012;
- Ottawa Design Guidelines Water Distribution, (City of Ottawa), July 2010;
- Stormwater Management and Servicing Report, (David McManus Engineering Ltd.), March 25th, 2002;
- Geotechnical Investigation Proposed Building Expansions 1010 Dairy Drive, (Paterson Group Inc.), June 28th, 2021; and,
- Stormwater Management Planning and Design Manual, (MOECC), March 2003.

2.2 Existing Conditions

The subject property is approximately 3.08 ha of industrial land currently used as a food manufacturing plant producing hospital services. The site is located northeast of the Trim Road and St. Joseph Blvd. intersection within the City of Ottawa in the Cardinal Creek Business Park. The subject property is bound to the north and east by Dairy Drive, to the west by vacant land, and to the south by Highway 34. The property is currently zoned as General Industrial and the zoning is conducive to the proposed development. The property is legally described as Part of Lot 29, Plan 4R-17951, in the City of Ottawa and Geographic Township of Cumberland, formerly in the City of Cumberland.

In the existing condition, the site generally drains from south to north. There is an existing SWM Pond at the north end of the site that accepts runoff from the entire site except for a small portion that runs off uncontrolled to Dairy Drive. The elevations range from approximately 62.60 m at the southeast corner of the site to 55.80 at the bottom of the SWM Pond at the northwest corner of the site. A geotechnical report for the subject property was completed by Paterson Engineering Inc. dated June 28th, 2021. Their investigation included six boreholes dug to a maximum depth of 6.7 m below ground level. The boreholes revealed sub soil conditions that included varying layers of topsoil, fill, silty sand and silty clay. Groundwater was located throughout the site at depths ranging from 1.29 m to 5.91 m below ground surface elevation.

3.0 WATER

3.1 Existing Infrastructure

According to Plan & Profile Drawings prepared by McNeely Engineering Consultants Ltd. (July 1992), there is a 406 mm diameter watermain on Dairy Drive. A Site Servicing and Grading Plan prepared for the property by David McManus Engineering (March 2002) indicates that a 203 mm diameter watermain services the site via. the existing 406 mm diameter watermain on Dairy Drive. There are four existing fire hydrants along Dairy Drive that front the site.

3.2 Domestic & Process Water Demands

The water and sanitary demands for the existing plant and the proposed expansion are calculated based on current City of Ottawa design guidelines referenced in Section 2.1. As well, preliminary demands are calculated based on existing water meter readings and expected demands from the increase in processes in the facility. Both methods for calculation of demands are summarized in this section.

City of Ottawa standards note average daily demands for light industrial developments to be 35,000 L/gross ha/day. The size of the existing building and both expansions equates to a gross floor area of 7,698.40 m². Therefore, average daily water demand is 0.32 L/s. Utilizing the peaking factors in the Design Guidelines: maximum daily water demand is 0.48 L/s and maximum hour water demand is 0.57 L/s. Refer to Appendix B for supporting calculations.

Information obtained from the existing processes in the facility was also used to understand the water demands of the site. The industrial processes used for food manufacturing often exceed the demands calculated from Municipality's standards and therefore, this method is also used. Current average daily water consumption (from water meter readings) is equal to 1.3 L/s and is typical for a production day. Phase 1 and Phase 2 expansions are expected to increase water consumption from the addition of handwash sinks, hose stations, etc. This increase in Fixture Units results in an average daily water demand to 2.2 L/s. Utilizing the peaking factors in the Design Guidelines: maximum daily water demand is 3.3 L/s and maximum hour water demand is 6.16 L/s.

3.3 Fire Water Demand

The proposed building expansions will be sprinklered and therefore, an increase in the fire demand of the site is expected. Fire demand for the building is calculated based on the Fire Underwriter's Survey (FUS) in accordance with the City of Ottawa's Design Guidelines. The total fire flow is calculated to be 140 L/s for the ultimate build-out of the site. Refer to Appendix B for assumptions and calculations for the fire flow demand.

3.4 Proposed Infrastructure

No further connections for water servicing are proposed. The existing 203 mm diameter watermain is expected to provide enough water supply to the facility with the proposed expansions.

4.0 SANITARY

4.1 Existing Infrastructure

According to Plan & Profile Drawings prepared by McNeely Engineering Consultants Ltd. (July 1992), there is a 375 mm diameter sanitary sewer on Dairy Drive. A Site Servicing and Grading Plan prepared by David McManus Engineering (March 2002) indicates that a 200 mm diameter sanitary sewer services the site via. the existing 375 mm diameter sanitary on Dairy Drive. A 150 mm diameter sanitary service connects to the 200 mm diameter sewer for domestic sewage. As well, a 5,000-gallon precast grease trap is currently located on the west end of the site to treat process sewage. Both the process and domestic lines connect into the 200 mm diameter sanitary service connection.

4.2 Sanitary Demands

Using City of Ottawa Standards for sanitary demands provides an average daily sanitary demand of 0.32 L/s. A peaking factor of 5.4 is applied to average daily demand in accordance with Appendix 4B of the City of Ottawa Sewer Design Guidelines. This results in a peak sanitary flow of 1.72 L/s. Inflow & infiltration for the site is accounted for as 0.86 L/s. This results in a total peak sanitary flow of 2.58 L/s. The Stormwater Management and Servicing Report prepared by David McManus Engineering (March 2002) for the existing site quantifies existing sanitary demands as 2.6 L/s for domestic sanitary. The calculated 2.58 L/s peak domestic flow will be used instead of the 2.6 L/s as standards have changed since the 2002 report. Furthermore, no washrooms are proposed as part of the expansions and therefore, no increase to domestic flow is proposed.

Existing process flow is calculated as 19 L/s per the mechanical Engineer's design (clemman, Large, Paterson) as outlined in the David McManus Engineering Report (2002). Increased process sanitary is expected and is approximated as 2.9 L/s for peak sanitary demand. This results in a total peak sanitary flow of 21.9 L/s. The existing 200 mm dia. PVC sanitary service with a slope of 1.3% is expected to remain. This service has a capacity of 39 L/s and therefore, can convey the peak sanitary flow of 21.9 L/s. A new 150 mm dia. process sanitary line is proposed to connect into the existing 200 mm diameter sanitary sewer to convey the proposed process flows added from the expansions. A 150 mm dia. sanitary sewer at minimum 1% can convey 19.35 L/s and therefore has capacity for the 2.9 L/s process flow. Refer to Drawing C3.10 for locations of the sanitary sewers.

4.3 Proposed Infrastructure

A new connection into the existing 200 mm diameter sanitary sewer is proposed to convey the increased flow from the expansions. A 150 mm diameter sanitary sewer is proposed from Phase 1 and will travel through a Grease Interceptor before entering the existing 200 mm diameter sanitary sewer. Refer to MCG Drawing C3.10 for information on the size of the Interceptor. The existing 200 mm diameter sanitary sewer connection is expected to remain and convey all flows to the existing 375 mm dia. sanitary sewer on Dairy Drive.

5.0 STORMWATER MANAGEMENT

5.1 Existing Conditions

The existing site is an industrial food plant with parking areas, loading doors, drive aisles and landscaped areas. The site has been provided with an allowable release rate for the 5-year storm of 81.31 L/s (26.4 L/s/ha). The existing stormwater management approach collected runoff from the site via. catchbasins and storm pipes and conveyed it to SWM Pond at the northwest corner of the site. An orifice plate is used to store stormwater in the pond until an elevation of 56.44 where it then overflows to Dairy Drive. A small area runs off uncontrolled to Dairy Drive. Refer to the Stormwater Management and Servicing Report by David McManus Engineering (March 2002) for details.

5.2 Proposed Infrastructure

The existing SWM approach is expected to be maintained as much as possible. The site area remains unchanged so the allowable release rate will still be 81.31 L/s. The existing SWM Pond will also remain but new storm pipes and structures will be proposed in some areas to accommodate the footprints of the new expansions. Runoff from the Phase 1 roof will be conveyed to the existing SWM Pond via. A piped connection into Pr. CBMH7 and entering the storm sewer system. The Phase 2 roof will enter the storm sewer system via. a piped underground connection to proposed Pr. MH8. Refer to the Storm Sewer Design sheet in Appendix B. The overflow elevation of the SWM Pond is proposed to be raised to 56.50 to provide more storage due to the increased level of imperviousness. The overflow channel will be regraded and more rip-rap will be added to ensure the overflow elevation is raised. Refer to MCG Drawing C3.11 (included in Appendix A) for grading details and revisions to the existing SWM Pond.

A comparison table is provided below to outline the difference in the original SWM Pond design from David McManus (March 2002) and the proposed SWM Pond design. Refer to Appendix B for the storage calculations in the SWM Pond. Revised imperviousness level and SWM Pond cross-sections are provided in MCG Drawing C4.20 (included in Appendix A).

Site Condition	Allowable Site Release Rate (L/s)	Allowable SWM Pond Release Rate (L/s)	Overflow Elevation in SWM Pond (m)	Storage Provided in SWM Pond (m^3)	Orifice Plate Size
Original 2002 Design	81.31	69.51	56.44	323.40	145 x 145 mm
Post-Development Design	81.31	69.51	56.50	366.84	145 x 145 mm

Water quality control is provided off site by an existing facility as noted in the original Stormwater Management and Servicing Report by David McManus Engineering (March 2002). Due to the negligible increase in imperviousness, the existing facility is expected to be sufficient to provide water quality control. Best management practices during construction will be employed to provide sediment and erosion control. Refer to Section 5.4 below for details.

5.3 Stormwater Management Highlights

- The stormwater management plan developed for the subject property is in accordance with the criteria set forth by the City of Ottawa and the Ministry of the Environment Stormwater Management Planning and Design Manual (March 2003).
- Stormwater management for the site is in accordance with the Stormwater Management and Servicing Report by David McManus Engineering (March 2002).
- Best Management Practices are used to provide water quality control for the site.

5.4 Siltation and Erosion Control

Siltation and erosion controls will be implemented for all construction activities, including topsoil stripping, material stockpiling, road construction, and grading operations. The detailed erosion and sediment control measures are proposed to be installed in accordance with Dwg C1.10 (included in Appendix A) and will address the following requirements:

1. Heavy-duty silt fence will be erected around the perimeter of the site before any grading operations commence to control sediment movement.

2. All existing and proposed catchbasins will be fitted with catchbasin sediment traps during construction activities, and cleaned out as required and prior to assumption of the works

3. City roadways are to be cleaned of all sediments from vehicular tracking/movement to and from the site, at the end of each workday.

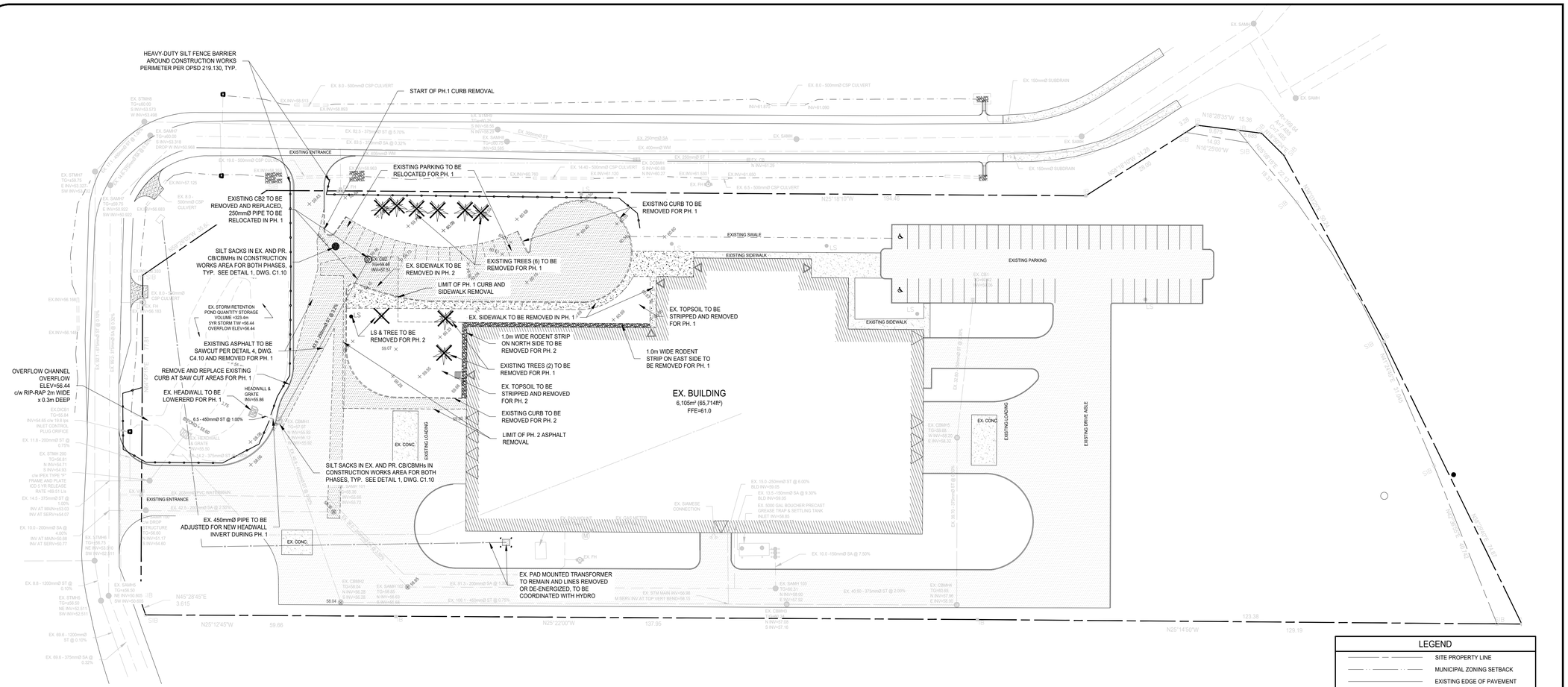
We trust that this Functional Servicing & Stormwater Management Report meets your expectations. Should you have any questions or comments please contact the undersigned.

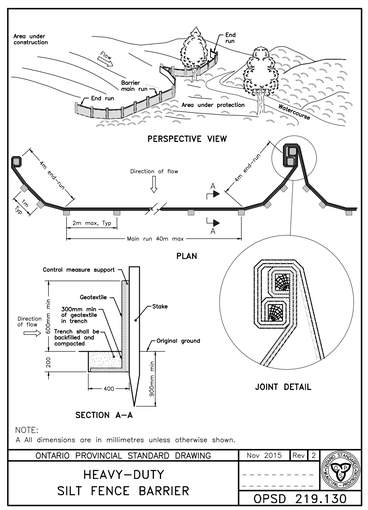
Mallot Creek Group Inc.

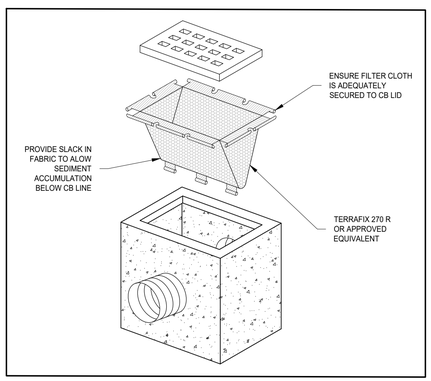
Grant Beeler, P. Eng.
Manager – Civil Engineering

Allison Teves, P.Eng.
Civil Engineer

APPENDIX A
Supporting Drawings







1 C1.10 SILT SACK DETAIL
SCALE: NOT TO SCALE

LEGEND

- SITE PROPERTY LINE
- MUNICIPAL ZONING SETBACK
- EXISTING EDGE OF PAVEMENT
- EXISTING CURB
- EXISTING TOP OF SLOPE
- EXISTING BOTTOM OF SLOPE
- EXISTING DITCH
- EX. 0.0m 200mmØ PVC WM — EXISTING WATERMAIN
- EX. 0.0m 200mmØ PVC SA @0.0% — EXISTING STORM SEWER
- EX. 0.0m 200mmØ PVC SA @0.0% — EXISTING SANITARY SEWER
- OH — EXISTING OVERHEAD WIRE
- GAS — EXISTING GAS UTILITY
- MW — EXISTING MONITORING WELL
- UTILITY POLE
- LIGHT POLE
- BELL PED
- GAS METER
- TRANSFORMER
- STORM MANHOLE
- CATCHBASIN
- CATCHBASIN MANHOLE
- DOUBLE CATCHBASIN
- HEADWALL
- SANITARY MANHOLE
- PROCESS MANHOLE
- SANITARY CLEANOUT
- WATERMAIN VALVE
- FIRE HYDRANT
- REDUCER
- BLOW OFF
- ROOF LEADER
- SIAMESE CONNECTION
- TAPPING SLEEVE, VALVE AND BOX
- VALVE AND BOX
- 58.04 — GRADE SPOT ELEVATION
- FLOW DIRECTION ARROW
- GRADE SLOPE
- PROPOSED SILT FENCING
- SBFC — STRAW BALE FLOW CHECK DAM
- EXISTING TREE
- TREE TO BE REMOVED
- ITEM TO BE REMOVED

PROJECT n TRUE n

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2	2022.08.24	ISSUED FOR OWNER'S REVIEW	AT
3	2022.09.07	ISSUED FOR SECOND SPA SUBMISSION	AT

LEGAL INFORMATION

PART OF
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GEOGRAPHIC TOWNSHIP OF CUMBERLAND
CITY OF OTTAWA
FORMERLY IN THE CITY OF CUMBERLAND

DRAWING REFERENCES:

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2. LEGAL BOUNDARY INFORMATION SHOWN ON THIS PLAN WAS TAKEN FROM A PLAN PREPARED BY WEBSTER & SIMMONDS SURVEYING LTD., 2002, PLAN 4R-1795
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4. INFORMATION RELATED TO THE EXISTING SERVICES ON DAIRY DRIVE WAS TAKEN FROM PLANS PREPARED BY ROBINSON CONSULTANTS FOR THE CITY OF OTTAWA, TITLED DAIRY DRIVE EXTENSION AND TRIM ROAD PARK & RIDE EXPANSION, GRADING AND DRAINAGE, DATED APRIL 26TH 2013, PROVIDED BY THE CITY OF OTTAWA.
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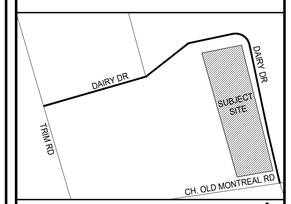
7. LANDSCAPING PLANS PREPARED BY THAKAR ASSOCIATES DESIGN. TREE CONSERVATION REPORT PREPARED BY ARBORSPHERE



KEY PLAN
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apetito HFS

APETITO HFS
1010 DAIRY DR
OTTAWA, ON K4A 3N3

PROPOSED EXPANSIONS

EXISTING CONDITIONS, REMOVALS & SEDIMENT CONTROL PLAN

LICENSED PROFESSIONAL ENGINEER G. S. BEBLER 100260232 Sept 7, 2022 PROVINCE OF ONTARIO

DESIGN BY:	AT
DRAWN BY:	KW
CHECKED BY:	GB
DATE:	2021.06.18
SCALE:	1:500
PROJECT NUMBER:	21008
CURRENT REVISION:	3

C1.10

D07-12-21-0141

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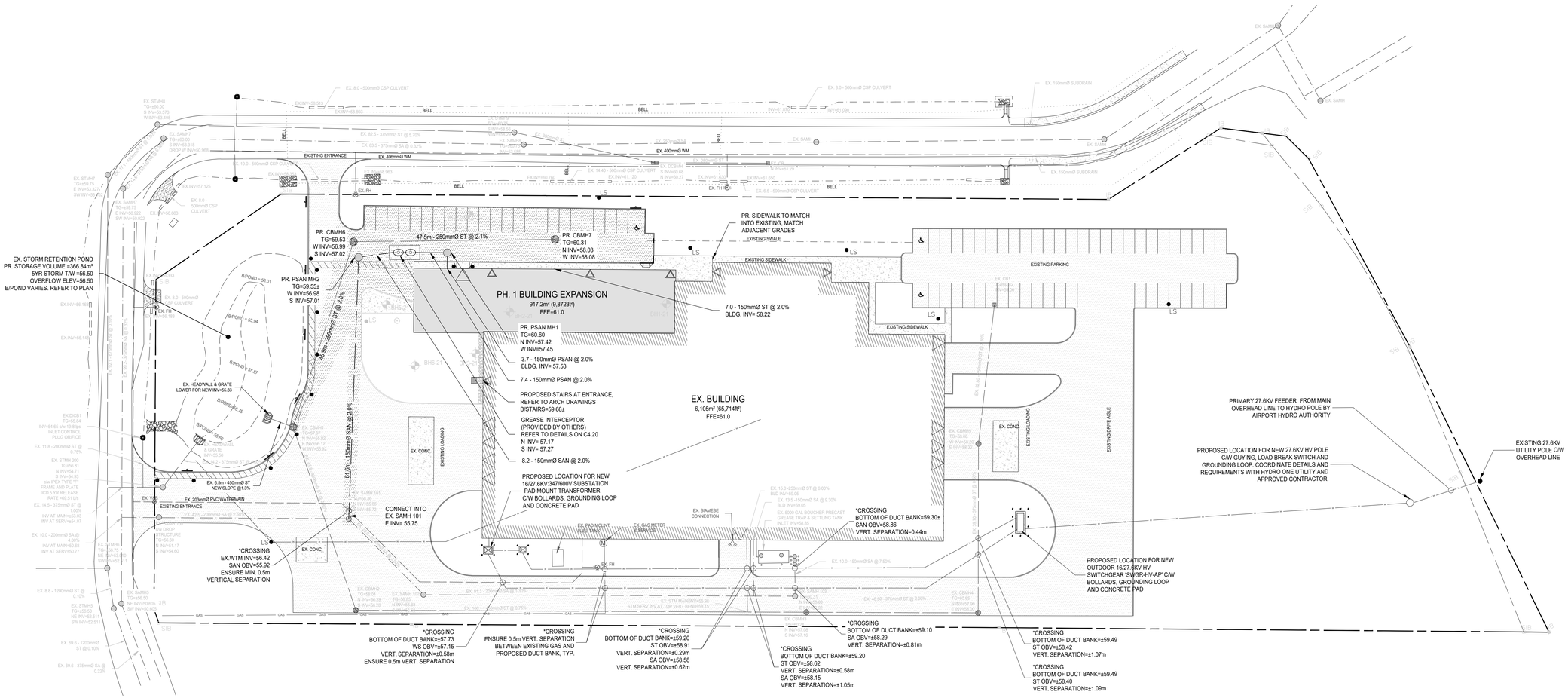

GEOTECHNICAL DETAILS	BH1-21	BH2-21	BH3-21	BH4-21	BH5-21	BH6-21
O/G PIT ELEVATION	60.82	60.72	60.65	60.41	59.88	59.60
TOPSOIL	60.82	60.72	60.65	60.41	59.88	59.60
FILL	60.57	60.42	60.35	60.16	59.65	59.35
SILTY CLAY	60.06	59.20	59.43	50.14	58.56	58.30
END OF BOREHOLE	54.42	54.02	54.10	53.86	53.33	53.05
GROUNDWATER ELEVATION	59.53	59.21	58.07	58.32	53.97	56.98

NOTE:
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2. ND IS 'NOT DETECTED'

LEGEND

PROP.	EX.	
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0.0m 200mmØ PVC ST @0.0%	EX. 0.0m 200mmØ PVC ST @0.0%	PROPOSED STORM SEWER / EXISTING STORM SEWER
0.0m 200mmØ PVC SA @0.0%	EX. 0.0m 200mmØ PVC SA @0.0%	PROPOSED SANITARY SEWER / EXISTING SANITARY SEWER
		MAINTENANCE HOLE
		CATCHBASIN
		CATCHBASIN MANHOLE
		DOUBLE CATCHBASIN
		HEADWALL
		SANITARY MANHOLE
		PROCESS MANHOLE
		SANITARY CLEANOUT
		WATERMAIN VALVE
		FIRE HYDRANT
		REDUCER
		BLOW OFF
		ROOF LEADER
		SIAMESE CONNECTION
		TAPPING SLEEVE AND VALVE AND BOX
		VALVE AND BOX

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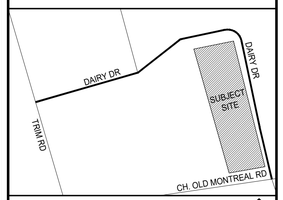

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PROPOSED EXPANSIONS

PHASE 1 - SITE SERVICING PLAN

LICENSED PROFESSIONAL ENGINEER
G. S. BEELER
100200232
Sept 7, 2022
PROVINCE OF ONTARIO

DESIGN BY:	AT
DRAWN BY:	KW
CHECKED BY:	GB
DATE:	2021.06.18
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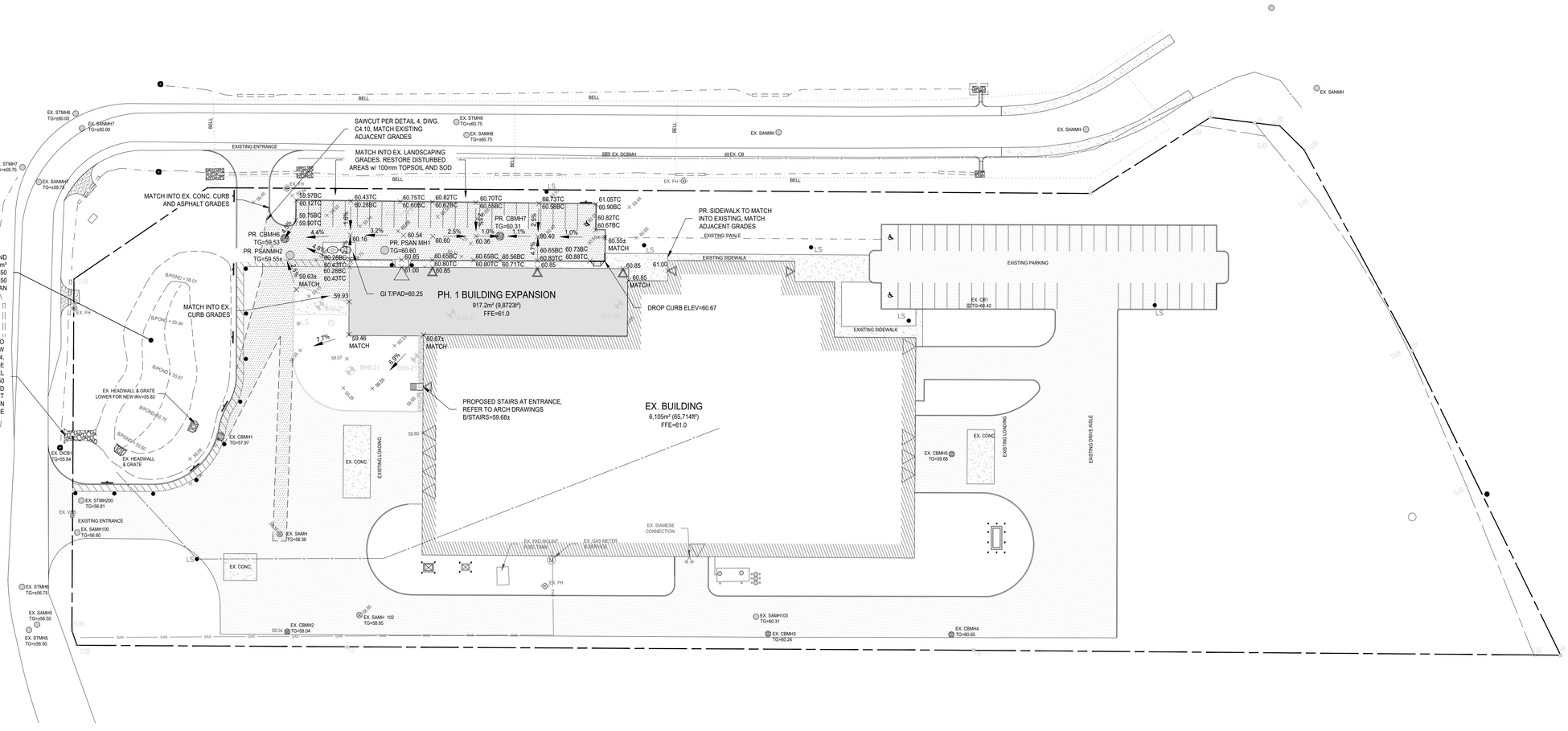

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0.0m 200mmØ PVC SA @0.0%		PROPOSED SANITARY SEWER
	EX. 0.0m 200mmØ PVC SA @0.0%	EXISTING SANITARY SEWER
○	○	MAINTENANCE HOLE
▤	▤	CATCHBASIN
◍	▤	CATCHBASIN MANHOLE
▤▤	▤▤	DOUBLE CATCHBASIN
		HEADWALL
○	○	SANITARY MANHOLE
○	○	PROCESS MANHOLE
⦸	⦸	SANITARY CLEANOUT
⊗	⊗	WATERMAIN VALVE
		FIRE HYDRANT
▶	▶	REDUCER
∘	∘	BLOW OFF
○▶	○▶	ROOF LEADER
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⋈	⋈	TAPPING SLEEVE AND VALVE AND BOX
⋈	⋈	VALVE AND BOX

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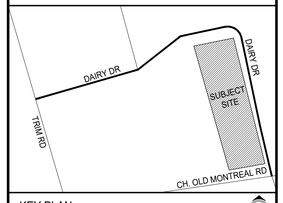


KEY PLAN
N.T.S.

Mallot Creek Group Inc.
294 Mill Street East, Suite 201
Elora, ON N0B 1S0
T: 519•846•1830
F: 519•846•1833
info@mallotcreek.com
www.mallotcreek.com

apetito HFS

APETITO HFS
1010 DAIRY DR
OTTAWA, ON K4A 3N3

PROPOSED EXPANSIONS

PHASE 1 - SITE GRADING PLAN

LICENSED PROFESSIONAL ENGINEER
G. S. BEELER
100200232
Sept 7, 2023
PROVINCE OF ONTARIO

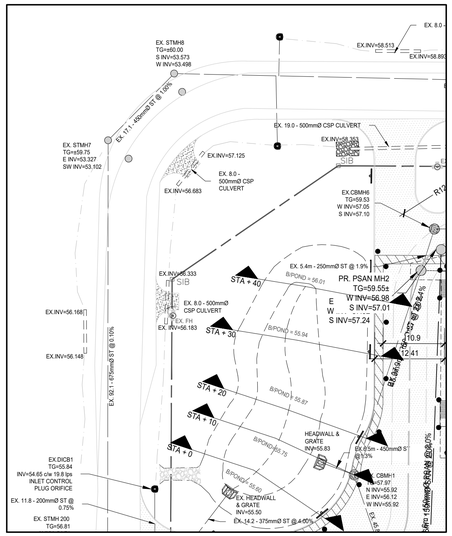
DESIGN BY:	AT
DRAWN BY:	KW
CHECKED BY:	GB
DATE:	2021.06.18
SCALE:	1:500
PROJECT NUMBER:	21008

CURRENT REVISION: 3

C3.11

D07-12-21-0141

#18598



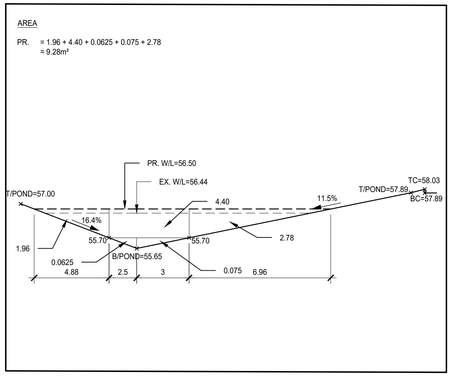
SWM CALCULATIONS

ASPHALT/CONCRETE	= 9,848.66 m²
BUILDING	= 7,698.40 m²
GRASS	= 13,252.93 m²
TOTAL	= 30,800.00 m² (3.08 ha)
A1 (UNCONTROLLED)	= 0.15 ha C = 0.42
A2 (TO POND)	
ASPHALT	= 0.98200 ha
BUILDING	= 0.76984 ha
GRASS	= 1.21500 ha

C = (1.215 x 0.25) + (0.770 x 0.95) + (0.982 x 0.95) / (0.982 + 0.770 + 1.215)

= 0.66 > 0.61

THEREFORE, 37m³ MORE STORAGE IS REQUIRED IN POND, SEE APPENDIX B OF SWM REPORT BY MCG FOR MORE DETAILS



1 C4.20 SECTION STA + 0
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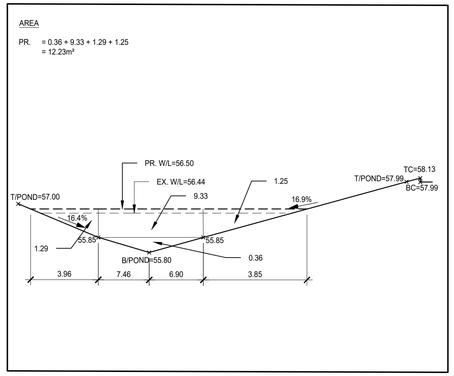

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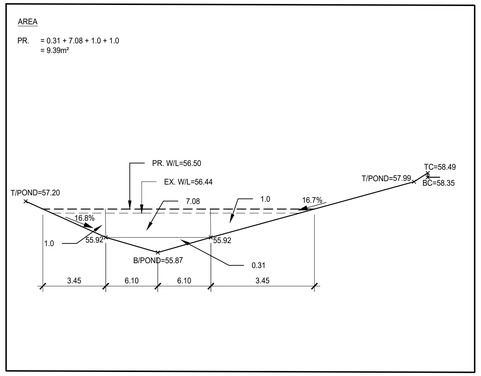

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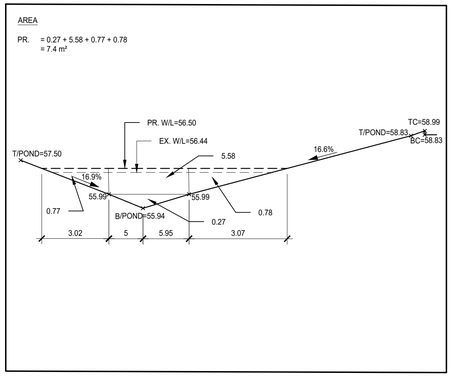

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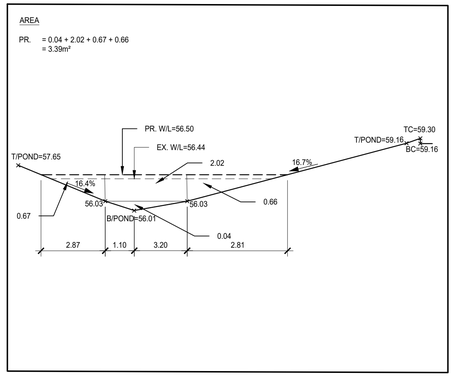

5 C4.20 SECTION STA + 40
SCALE: NOT TO SCALE

VOLUMES:			
	= (9.28+0)/2	= 4.64 x 2.37	= 11.00m³
	= (12.23+9.28)/2	= 10.755 x 10	= 107.55m³
	= (12.23+9.39)/2	= 10.81 x 10	= 108.10m³
	= (9.39+7.4)/2	= 8.40 x 10	= 84.00m³
	= (7.4+3.39)/2	= 5.40 x 10	= 54.00m³
	= (3.39+0)/2	= 1.695 x 1.29	= 2.187m³

PR. VOLUME = 366.84m³

DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION UNLESS SEALED BY A PROFESSIONAL ENGINEER. CONTRACTOR SHALL CHECK ALL DIMENSIONS ON DRAWINGS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF THE HEALTH AND SAFETY ACT.

No.	DATE	REVISION	BY
1	2021.09.10	ISSUED FOR SITE PLAN APPROVAL	GB
2	2022.08.24	ISSUED FOR OWNER'S REVIEW	AT
3	2022.09.07	ISSUED FOR SECOND SPA SUBMISSION	AT

LEGAL INFORMATION

PART OF
LOT 29
CONCESSION 1 (OLD SURVEY)
GEOGRAPHIC TOWNSHIP OF CUMBERLAND
CITY OF OTTAWA
FORMERLY IN THE CITY OF CUMBERLAND

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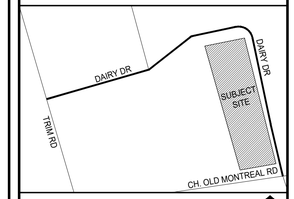

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APETITO HFS
1010 DAIRY DR
OTTAWA, ON K4A 3N3

PROPOSED EXPANSIONS

STORMWATER MANAGEMENT POND
CROSS-SECTIONS

LICENSED PROFESSIONAL ENGINEER
G. S. BELER
100200232
Sept. 7, 2022
PROVINCE OF ONTARIO

DESIGN BY:	AT
DRAWN BY:	KW
CHECKED BY:	GB
DATE:	2021.06.18
SCALE:	
PROJECT NUMBER:	21008

CURRENT REVISION: 3

C4.20

D07-1221-0141

#18598

APPENDIX B
Supporting Calculations

apetito

WATER DEMANDS

Ottawa, Ontario

Project #: 21008
Date: September 10, 2021
Date Printed:
By: AAT

Development Information - Proposed Development[1]								Fire Underwriters Survey								Domestic Flow[2,3]				
Node ID / Area ID / Building #	F.F.E. (m.a.s.l.)	Description	Bldg Area	Site Area	Bldg Area (1st Floor)	Total Bldg Area	Building Volume	C	A	F	(2) Occupancy Reduction	(3) Sprinkler Protection	Building Exposure	F	F	City of Ottawa Guidelines	Average Day	Max Day	Max Hour	Max Day + Fire Flow
			m^2	ha	m^2	m^2	m^3		m^2	L/min				L/min	L/s	L/s	L/s	L/s	L/s	L/s
Existing Building	61.00	Industrial Building	5950	3.08	5,950	6,565	68,933	0.80	6,565	14,000	-25%	-50%	20%	7,350	123	0.266	0.266	0.399	0.479	123
Phase 1	61.00	Expansion	629	3.08	6,579	7,194	75,537	0.80	7,194	15,000	-25%	-50%	20%	7,875	131	0.291	0.291	0.437	0.525	132
Phase 2	61.00	Expansion	671	3.08	7,250	7,865	82,583	0.80	7,865	16,000	-25%	-50%	20%	8,400	140	0.319	0.319	0.478	0.573	140
															Sum of Maximum Day Flows + Largest Fire Flow (L/s) =					**142**
		TOTALS FOR SITE	**7,250**		**-**	**21,624**	**227,052**							**Max Fire Flow =**	**140**					

Largest Demand For The Entire Site (L/s) = 140

Assumptions:

1 All building areas are based on the original Site Plan by Crain Limmert Architects (2001) and the current Site Plan by Mallot Creek Group Inc. (2021)
Site Area 3.08 ha

2 Average Daily Demands for industrial developments are taken from City of Ottawa Design Guidelines - Water Distribution dated July 2010
Industrial 35,000 L/ha/day

3 Peaking Factors are taken from City of Ottawa Design Guidelines - Water Distribution dated July 2010
Average Day = 1
Maximum Day = 1.5
Max Hour = 1.8

Storage Calculation w/ new C Value

Return Period	Time (min)	Intensity (mm/hr)	Flow (L/s)	Allowable Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Req'd (m^3)
5 Year	20	67.3	361.8024	69.51	292.292377	350.75085
	25	57.3	308.0427	69.51	238.532737	357.79911
	30	50.2	269.8734	69.51	200.363393	**360.65411**
	35	44.8	240.8432	69.51	171.333187	359.79969
	40	40.7	218.8017	69.51	149.291735	358.30016

STORM SEWER DESIGN SHEET

i = 30.3 x (T)^0.727

Flow Criteria

Mannings 'n' CONC/PVC 0.013
Design Storm (5 year)

Municipality - City of Ottawa
Project - Apetito - 1010 Dairy Drive
Project No. - 21008

Designed By - KW/AT

	Area	From Upstream	To Downstream	Tributary Area	Runoff Coefficient	Individual A x C	Cumulative Area	Cumulative A x C	Time of Concentration	Rainfall Intensity	Peak Flow	Manning's "n"	Slope	Diameter	Length	Full Flow Velocity	Full Flow Capacity	Actual Velocity	Time of Flow	Calculated Pipe Diameter	Time of Concentration to Next Segment
		MH #	MH#	Aa	Ca	Aa x Ca	A=Sum Aa	A x C=	Tc	i	q		S	D	L	vf	Q	va	t=L/60xva	d	tf=Tc+t
RUN 1	201	ROOF PH. 1	CBMH7	0.092	0.95	0.087	0.092	0.087	20.00	67.35	0.016	0.013	0.0200	150	7.2	1.22	0.022	1.22	0.10	135	20.10
		CBMH7	CBMH6	0.170	0.62	0.105	0.262	0.193	20.10	67.11	0.036	0.013	0.0200	250	48.2	1.71	0.084	1.54	0.52	182	20.62
	202	CBMH6	MH8	0.070	0.81	0.057	0.332	0.249	20.62	65.87	0.046	0.013	0.0190	250	5.4	1.67	0.082	1.61	0.06	201	20.68
	204	ROOF PH. 2	MH8	0.067	0.95	0.064	0.067	0.064	20.00	67.35	0.012	0.013	0.0200	150	7.4	1.22	0.022	1.17	0.11	120	20.11
		MH8	CBMH1				0.399	0.313	20.68	65.74	0.057	0.013	0.0240	250	37.5	1.88	0.092	1.87	0.33	209	21.01
RUN 2	CB1	CB1	CBMH5	0.330	0.55	0.182	0.330	0.182	**20.00**	67.35	0.034	0.013	0.0230	250	32.8	1.84	0.090	1.60	0.34	173	20.34
	CBMH5	CBMH5	CBMH4	0.560	0.49	0.274	0.890	0.456	20.34	66.52	0.084	0.013	0.0050	375	39.7	1.12	0.124	1.12	0.59	324	20.93
	CBMH4	CBMH4	CBMH3	0.360	0.36	0.130	1.250	0.586	20.93	65.15	0.106	0.013	0.0200	375	40.5	2.25	0.248	2.02	0.33	273	21.27
RUN 3	EX. ROOF	EX. ROOF	EX. ST LINE	0.650	0.95	0.618	0.730	0.618	**20.00**	67.35	0.026	0.013	0.0600	250	15.0	2.97	0.146	2.11	0.12	130	20.12
RUN 2 + 3	CBMH3	CBMH3	CBMH2	0.130	0.55	0.072	2.110	1.275	21.27	64.41	0.228	0.013	0.0075	450	106.1	1.55	0.247	1.55	1.14	437	22.40
	CBMH2	CBMH2	CBMH1	0.230	0.59	0.136	2.340	1.410	22.40	62.01	0.243	0.013	0.0080	450	45.6	1.60	0.255	1.60	0.47	442	22.88
ALL RUNS	203	CBMH1	POND	0.226	0.88	0.199	2.965	1.922	22.88	61.07	0.326	0.013	0.0130	450	6.5	2.04	0.325	2.04	0.05	450	22.93

Building	0.95
Asphalt/Conc.	0.90
Grass	0.10

APPENDIX C

Original Site SWM Report and Drawings (David McManus Engineering, 2002)

STORMWATER MANAGEMENT AND SERVICING REPORT

HOSPITAL FOOD SERVICES PRODUCTION PLANT CITY OF OTTAWA

DME Ltd.
David McManus
Engineering Ltd.

STORMWATER MANAGEMENT AND SERVICING REPORT

HOSPITAL FOOD SERVICES PRODUCTION PLANT CITY OF OTTAWA

REV: 3
MAR. 25, 2002

Prepared by:

DAVID McMANUS ENGINEERING LTD.

D.M.E. Project No. 2297

TABLE OF CONTENTS

1.0 INTRODUCTION

David M°Manus Engineering Ltd. was appointed by Westeinde Construction Ltd. to provide engineering services for the site development of a new Hospital Food Services production plant in the Cardinal Creek Business Park, in the City of Ottawa (formerly the Township of Cumberland). The development located on Dairy Drive (formerly Ault Drive), is approximately 3.08 hectares in area bounded by Dairy Drive to the north, and Queen Street to the south.

Servicing of the site will be completed in accordance with City of Ottawa Standards

Paul Wisner and Associates completed a *Stormwater Design Plan* for the Cardinal Creek Business Park which provides guidelines for the detailed stormwater management design.

2.0 WATER DISTRIBUTION SYSTEM

This development will be serviced from an existing 406 mm diameter watermain located on Dairy Drive.

The proposed water service to the production plant will be a 203 mm diameter water main. The location of the proposed water main on the site is shown on Drawing No. 2297-S1 attached to this report.

3.0 SANITARY SEWER DESIGN

Two separate Sanitary building services are proposed for the building. One for waste water from food process operations and the other for typical water closet and sink usage. Waste water from food processing shall pass through a proposed 5,000 gal grease trap and settling tank, installed outside the building, before discharge to the site sanitary sewer. A manhole has been provided for monitoring discharge from this tank.

Sanitary sewer flows for this development have been calculated based on Regional Municipality of Ottawa-Carleton criteria indicated in the "ROC" Design Guidelines (Section 7) and this has been compared to the Mechanical Engineer's (Clemann, Large, Paterson) design for Peak Water Demand(non-fire flow)

The "R.O.C" design criteria for this development is as follows:

- average flow — 50,000 l/ha/day
- peaking factor — 1.5
- extraneous flow allowance — 0.28 l/ha/sec
- maximum velocity — 3.0 m/sec
- minimum pipe size — 200 mm

The peak sanitary design flow is as follows:

$$Q_{peak} = \frac{(1.5)\ X\ (3.0\ ha)\ X\ (50{,}000)}{86{,}400} = 2.6\ l/sec$$

From Clemman, Large, Paterson the Peak domestic water flow for this project is 280 gal/min or 19 L/s.

The sanitary sewer for this development is proposed to be 200 mm diameter P.V.C. at grades from 1.3% of 4% and will connect to an existing 375 mm diameter municipal sanitary sewer in Dairy Drive. A 200mm dia. P.V.C. pipe at 1.3 % has a capacity of 39 L/S therefore this pipe size is acceptable. The proposed building services are two 150mm dia. laterials. A 150mm dia. P.V.C. pipe at 2.0 % has a capacity of 21.6 L/S therefore this pipe size is acceptable as design grades are greater than 2%.. The location of the proposed sanitary sewer on the site is shown on Drawing No. 2297-S1, attached to this report.

4.0 Storm Water Management

This section documents our proposed method of attenuating the storm water runoff from the site. Items addressed include:

Calculating a maximum allowable site release rate, the post-development site runoff and the corresponding storage volume requirements.

Determine the location, sizes and storage volumes of the proposed drainage system components located within the site.

The storm water runoff, from the developed site, is to be controlled and released at a maximum rate for the site that is calculated, as directed by City Staff, using the former Township of Cumberland, development guidelines. These guidelines are provided in the Paul Wisner and Associates design report for this industrial park. This development site is designed to drain to the municipal storm sewer main located in Dairy Drive (formerly Ault Dr.).

The storm sewer on Dairy Drive has been designed to accept drainage from individual sites at **a maximum controlled rate of 26.4 l/sec/ha .** The post development increase up to the five year storm event is to be stored on site and released at the calculated maximum allowable release rate. Storm events in excess of the five year event must not impact site buildings. Major flows will be directed to Dairy Drive and from there shall overland flow to an existing ditch that provides outlet for such events.

The site consists of 7 site catchment areas which drain into site catchbasins and then through the site storm sewer system and into the proposed site storm water storage pond. The proposed storage pond shall discharge to the industrial park storm sewer system. Pond storage shall be fully contained within the proposed pond for storms up to the 100 year storm event.. There is no roof top storage proposed. A strip of land running along most of the north site frontage shall be allowed to "free flow". This free flow will sheet flow off the site and drain into Dairy Drive Catchbasins. Please refer to the included "Storm Area drainage Plan 2297-SWM-1'' for proposed pond location and extents.

4.1 Storm Water Management Calculations

4.1.1 Maximum Allowable Site Release Rate

In accordance with the development guidelines for this Industrial Park, the maximum release rate from the site is calculated as follows;

Total Area of Site = 3.08 ha
Maximum Allocated Release Rate = 26.4 L/s
Q(allowable for Total Site) = 26.4(L/s0 x 3.08(ha)
Q(allowable for Total Site) = 81.31 l/s

4.1.2

Uncontrolled Flow Area: = **A1 = 0.15 ha**

Q(uncontrolled flow) = 2.78CiA
where: Free Flow Area(ha) = 0.15
where: I(5yr, 20min) = 67.3
where: C is calculated as follows:

A1:	Area (ha)	"C"
Grass	0.11	.25
Roof:	0.00	.95
Asphalt:	0.04	.90

C = [(0.11x 0.25)+(0.04 x 0.9)+)]/(0.11+.04)
C = 0.42

Q(uncontrolled flow) = 2.78 x .42 x 67.3 x .15

= **11.8 l/s**

Therefore the remainder of the site must be controlled to a maximum release rate of : **81.31 l/s – 11.8 l/s = 69.51 l/s**

4.1.3 Post Development Release Rates and Pond Storage Requirements

For post development runoff calculations the 5 year return period rain fall intensity curve from the former City of Gloucester is used. Storm water release rates and the pond storage volume required are calculated as follows:

Storm Catchment Area A2; Total Area = 2.93 ha

Storm Area A2:	**Area (ha)**	**"C"**
Grass	1.44	.25
Roof:	0.6	.95
Asphalt:	0.89	.90

C = [(1.44x 0.25)+(0.6 x 0.95)+(0.89 x 0.95)]/(1.44+.60+0.89)

C = 0.61

STORAGE VOLUME CALCULATIONS
AREA A2

AREA(ha)= 2.93
C = 0.61

Return Period	Time (min)	*Intensity (mm/hr)	** Flow Q in l/s	Allowable Release in l/s	Net Runoff To Be Stored in l/s	Storage Req'd m3
5 Year	20	67.3	334.6	**69.51**	265.1	318.1
	25	57.3	**284.5**	**69.51**	215.0	322.5
	30	**50.2**	249.2	**69.51**	**179.7**	**323.4**
	35	44.8	222.8	**69.51**	153.3	321.9
	40	40.7	202.2	**69.51**	132.7	318.4

* from former City of Goucester Rainfall Curves
** Q = 2.78 CiA

Therefore 323.4 cubic metres are required to store the store the 5 year return period event. The proposed storage pond has been sized to hold this volume of water at a maximum ponding depth of **.84** metres. An overflow channel has

been provided allowing flows from storm events greater than the five year return period, to outlet to Dairy Drive.

4.1.4 Orifice Sizing

Total release rate from A2 = **69.51 l/s**

Orifice at the St MH Outlet

Head at CL of Controlled 375mm dia.Outlet Pipe

Outlet Pipe Inv El = 54.7
Max. Top Water El = 56.44
Cl 375mm Outlet El = 54.89
Therefore **h = 1.55 m**

Using the orifice equation $Q = 0.6(A)(2gh)^{0.5}$

The required area of the orifice is,

$$A = \frac{69.51/1000}{0.6(2 \times 9.81 \times 1.55)^{0.5}} = \mathbf{0.021\ m^2}$$

This area requirement is satisfied by a 145mm x 145mm square opening, or a 163.5 mm dia. circular opening in an ICD placed at the STMH outlet pipe. An Ipex, Type F, plate and frame ICD is selected. The IPEX sizing nomograph used, "Calibration Curves for Standard ICDs", is included in the Appendices.

5.0 Storm Sewer Design Sheets:

Design sheets and the Storm Area Plan for sizing of the site storm sewers are included in Appendices.

6.0 Storm Water Quality Control Measures:

Storm water quality treatment for the Cardinal Creek Business Park is provided off site by an existing facility. Therefore individual sites in this industrial park are not required to provide for on site storm water quality treatment

B.M.P.s shall be employed during construction. Sediment control measures implemented during construction shall consist of:

1) a sediment fence shall be installed around the north end of the site. It shall extend along the property line, from proposed entrance to proposed entrance, with an opening for the north entrance as shown on the Storm Area Plan enclosed and the Site Service and Grading Drawing.

2) geotextile fabric "sediment catches" between the frame and cover of all site sewer structure covers and also at proposed and existing ditch inlet catchbasins which front the site.. The fabric shall be maintained, cleaned and replaced as necessary until all site construction is complete.

7.0 Grass Cuttings Management

The owner and operator of this facility shall ensure that adequate measure are taken to prevent cut grass clippings from entering the Site Storm Sewer System and to remove them from structures should this occur. Grass clippings left to decompose in catchbasins and manholes will generate ammonia, which may reach downstream fish habitat. This is in contravention of the Ontario Water Resources Act (OWRA).

8.0 Site Spills Procedures:

As a condition of the M.O.E. Certificate of Approval for this project the owner and operator of this facility acknowledge the requirement to provide for, and implement as required, a "Spill Control Procedure" to prevent and mitigate the risk of spilled of materials entering into the site storm water sewer system. Nothing in this report addresses the advisability, or necessity, of measures to reduce and contain spills from handling and storing products and materials within the facility.

The following portion of this report concerns itself only with spills that might enter the site storm water sewer and is intended to highlight the requirement for the facility to develop its own spills procedure(s). Information provided in this section is not intended to be definitive or comprehensive and regulations, available products, technology and "best practices" to deal with spills will continue to evolve. It is the facility owner/operators obligation to prepare an adequate response plan to address site spills.

Not withstanding that the owner/operator is obligated to ensure compliance with all statutes and regulations regarding hazardous materials handling, storage, spill containment, spill clean up, worker safety etc. the following lists some elements that should be considered in developing the portion of a "Spill Procedure Policy and Plan" for this facility which deals with preventing spills from entering the site storm water sewer system.

8-1) Identify Potential Spills Locations

This report concerns itself with the potential for spills that may enter the storm water sewer system via exterior site Catchbasins or Manholes. There is no site storage proposed outside of the building, therefore the focus of attention for potential spills to the site storm sewers is at truck loading and unloading areas.

The proposed usage of this building is as a miscellaneous food processing facility. No primary processing of food product is to take place but rather meals are prepared from bulk grocery produce delivered to this building. The final products consist of bulk and individual meals to be delivered to hospital clients. Prepared bulk meals consist of items such as soups, stews, purees and "thickened water" delivered in sealed plastic pails and frozen in aluminum pans. Individual breakfast, lunch and dinner meals are shipped, frozen, in plastic pouches or as complete "plated" meals.

Shipping Bay Evaluation:

These prepared meals will shipped out from the north end of the building at the truck bay with the designation of "Shipping Apron" as shown on the D.M.E. Site Servicing and Grading Plan, 2297-S1. In consultation with the local M.O.E. office it has been determined that no hazardous products or materials are to be shipped from this location which pose a concern in regard to potential spills into the site storm water system. However a food spill at this location, if not contained, could lead to high BOD loading on the receiving stream. Therefore the plant must have a clean up policy and procedures for containing and cleaning up a food spill at this location

Receiving Bays Evaluation:

Bulk grocery produce for the preparation of meals will be received, by truck, at two locations. The first is the smaller entrance at approximately the center of the west face of the building and the second is at the south end of the building at the truck bay with the designation of "Receiving Apron" as shown on the D.M.E. Site Servicing and Grading Plan, 2297-S1.

Grocery produce materials to be delivered to the proposed facility have been identified by the local M.O.E. office as posing a concern in regards to potential spills at these receiving locations. In addition it has been determined that various **liquid detergents** and **caustic cleaning agents** of concern will be delivered to the facility and they will be unloaded from trucks at both the south and the west building entrances.

Therefore any materials, supplies, equipment etc. required for spills containment and clean up should be made readily available for use at all three of the above shipping and receiving areas. Consideration should be given to providing separate, self-contained, "Spill Kits" at each of these entrances.

8-2) Spill Containment and Control

Spill containment, from the point of view of this report, is three pronged.

A) Contain Materials Spilled in Trucks

B) Contain Site Spills at Source

C) Seal possible points of entry into the Storm Water Sewer System

A) Contain Materials Spilled in Trucks

Materials/ supplies should be inspected on the truck, by designated facility staff, to determine that only "sound" undamaged containers are off loaded from trucks. Any damaged containers should be rejected and not off loaded. If containers are damaged within a truck by plant shipping staff, and it is determined that removal of the container must take place, then the damaged container should not be moved out of the truck until placed within an adequate secondary spill container or spill containment pallet with an appropriate quantity of absorptive and neutralizing material added.

Trucks containing leaked product should have their floor drain sealed and if leakage has occurred onto pavement then adequate spill containment and clean up procedures shall be followed. No cleaning or washing out of spilled materials from trucks shall be allowed on site.

B) Contain Site Spills at Source

Spilled food or cleaning agents should be contained as quickly as possible so as to prevent it from spreading out over a wider area. Various, reusable, commercial products are available to form a temporary barrier to stop the spread of spilled liquid material. These take the form of lengths of a flexible, synthetic, "dyke" material, approx. 100-200mm high and wide. They have a flat "sticky" bottom to help form a seal with the ground surface. They can be connected together to form a continuous barrier of the length required.

As this is likely the first response a sufficient length(s) of this type of product should be kept in close proximity to each loading area so that spills can be contained quickly and efficiently. Consideration should be given to providing a source of sand as back up.

Personnel in charge of spill containment should be aware of the direction of flow towards the nearest storm water catchbasin or manhole lid and ensure the spillage flow is dyked off from the down stream side first, before attempting to completely enclose the spill.

C) Seal possible points of entry into the Storm Water Sewer System

Catchbasin or manhole lids downstream of a spill should be immediately sealed until the spillage has been contained and cleaned up. Commercially available products include weighted waterproof "mats" of materials such as neoprene or a polyurethane coated fabric. These are placed over, and extend past, catchbasin or manhole lids. Weight has been sewn into the border seam to seal the edge and prevent the cover from floating up.

Consideration could be given to using this type of cover in combination with additional sand over top, to help seal and weight down the cover, and the use of additional temporary dykes, as described above, to encircle lids.

Personnel in charge of spill containment should be instructed on the location and function of the sewer structures in proximity to potential spill areas so that they may be sealed quickly and efficiently in the event of a spill.

8-3) Spill Clean Up

Various, absorptive and neutralizing, agents and materials are available. Quantities sufficient to deal with the largest likely event at one time, that could be reasonably be anticipated, should be available and on hand. Additional quantity should be available, in storage, to allow protection for any additional unloading until new stock of absorptive can be delivered to the facility.

Some of these materials are packaged within lengths of absorbent sock or pillows. These may be used to help control the flow but are more often used where a spill may be required to be absorbed out of another liquid. For spills on the ground absorbent, loose,

granular material to be "sprinkled" on is typical. Absorbent materials should be selected for their compatibility with the type of spill to be cleaned up, as per the manufacturers directions.

In particular there are specific, different, products for neutralizing acids or bases. Some of these products are designed to change colour when the material has been properly neutralized.

Loose spill control material should be distributed over the entire spill area working from the outside, circling to the inside, thus reducing the chance of splash and further spread on spilled material.

When spilled materials have been absorbed use a brush and scoop to place materials in an appropriate container. These could range from polyethylene bags to 5-gallon pails to 20-gallon drums with polyethylene liners for larger quantities. If the spilled material is designated as "hazardous" a hazardous waste sticker should be fixed to the container and the spill material disposed of as hazardous waste. Collected hazardous waste from spills must be disposed of in accordance with Part V of the Environmental Protection Act (EPA). When appropriate decontaminate the surface where the spill occurred using a mild detergent and water.

8-4) Spill Clean Up Safety

Obtain material safety data sheets, WHMIS sheets, manufacturers recommendations, Part V of the Environmental Protection Act (EPA) and other relevant references to determine recommended: spill clean up methods, materials, practices, personal safety equipment, and waste disposal requirements.

Company staff, designated and trained, as spill clean up personnel should be available at all times that products are being unloaded. There should be written company policy and instruction in spill avoidance, safety, containment, and clean up including the function of, and need to prevent spill into, the site storm water system. These personnel should be instructed as to the possible hazardous reactions that could possibly occur using inappropriate absorptive materials/products with acid and base materials and to watch for hazardous reactions such as splattering and emissions of gases, vapors or smoke.

During a spill event unnecessary personnel should be moved out of the spill area and hazard signs posted appropriately.

Spill clean up worker should be supplied with protective clothing including, but not limited to, adequate protective boot covers, plastic or Tyvek aprons and/or suits, rubber gloves, chemical splash goggles. If hazardous reactions causing emissions of gases, vapors or smoke are possible then an air purifying respirator or self contained breathing apparatus are needed. Personnel using such equipment must be trained and certified. Eye flushing stations are recommended in close proximity to entrances where off loading occurs (as well as other locations in the facility where

caustic materials are stored and handled). Personnel involved in spill clean up should be instructed in the dangers associated with caustic materials and in the correct procedures for neutralizing and apply first aid to areas of the body which have been in contact with such substances.

9.0 Fuel Tank Leakage Responsibility & Procedures

The owner and operator of this proposed facility acknowledge that there is a 2,200 gal fuel tank proposed for above ground storage outside of the building. This tank must comply with CSA Standards regarding construction, warning devices, operation and testing which address environmental, fire and safety issues regarding the tank system. The owner and operator of this proposed facility acknowledge that as soon as a spill is identified the Ministry of the Environment must be immediately notified and containment clean up procedures immediately initiated. Outside business hours the MOE Spills Action Centre is the point of contact (currently at 1-800-268-6060).

All containment and clean up must comply with "Part X of the Environmental Protection Act (EPA)". Part X of the E.PA also details responsibilities and duties in regards to containment and removal of contaminated soils.

10.0 Conclusions:

The site servicing design for this development has been completed in accordance with City of design standards and development guidelines for this Industrial Park. The stormwater management measures implemented will control runoff from the site to rates equal to the maximum allowable of 26.4 l/sec/ha .

Prepared by
David McManus Engineering Ltd.

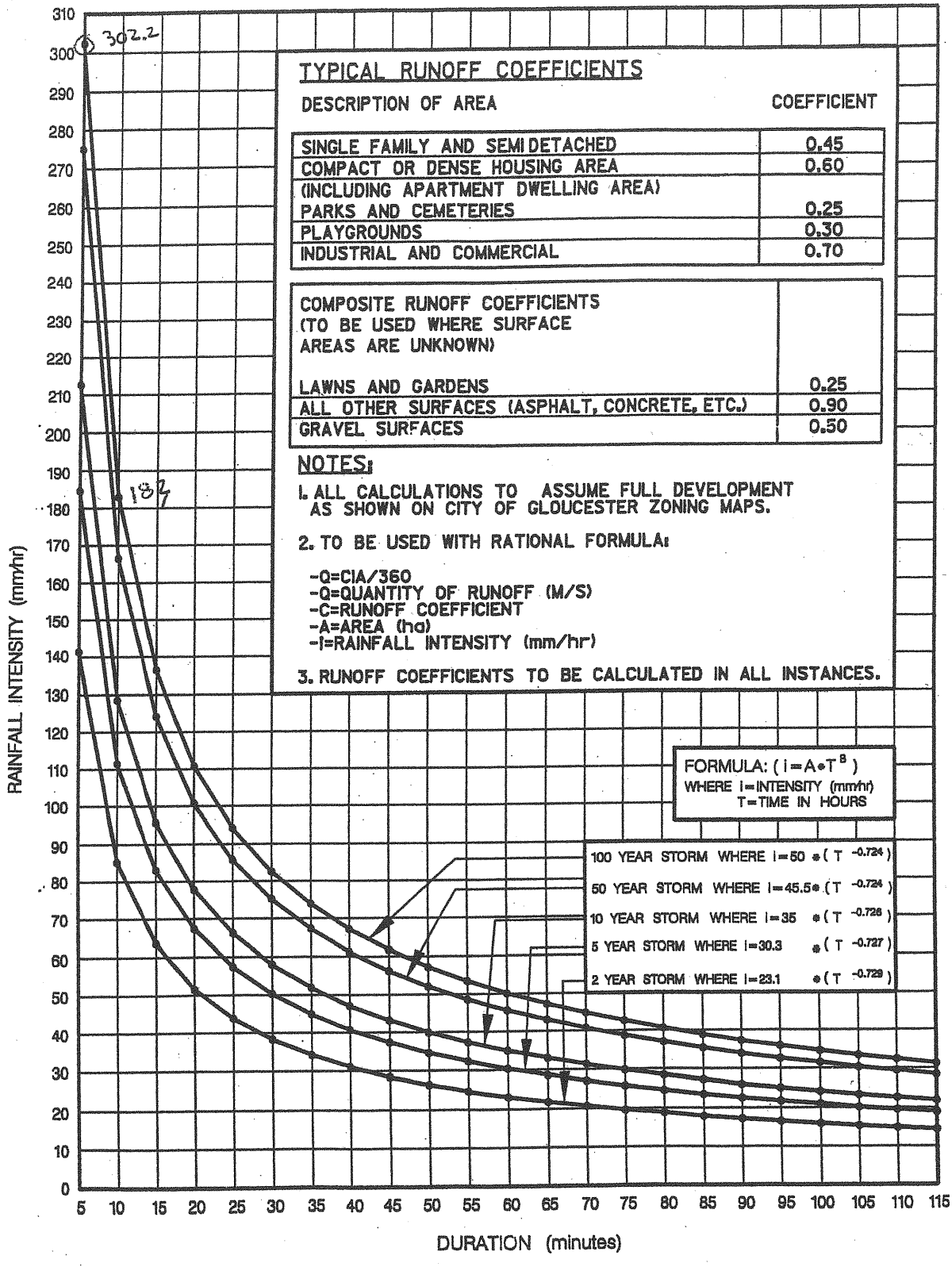
Kevin Mercer, C.E.T.

Checked by
David McManus Engineering Ltd.

Udo Boehme, P.Eng.

APPENDIX 1

SWM Area Plan
&
SWM Pond Storage Vol. Calc.'s



Gloucester

City of Gloucester

Operations and Fire Department

RAINFALL INTENSITY DURATION CURVES
OTTAWA INTERNATIONAL AIRPORT DATA (1967–1990)

Date 2000 03 01

Revision No.

Drawing No. 900

HOSPITAL FOOD BUILDING
POND VOLUME
No. 2297

TOTAL AREA =						2.82							
/W ELEV=	56.440												
						1.763							
AREAS:		0.51				0.043		0.50					
SLOPE:		3.0		1.82%		0.63%		3.00					
ELEV	57.85	ELEV	56.03	ELEV	56.01	ELEV	56.03	ELEV	59.16	ELEV	59.3	ELEV	59.16
O/S RT	6	O/SLT	1.1	O/S	0	O/S RT	3.2	O/S RT	12.6	O/S RT	13.8	O/S RT	13.8
	TBK		POND EDGE		POND CL		POND EDGE		TBK		T/CURB		EP
						STA +40							

TOTAL AREA =						6.41							
/W ELEV=	56.440												
						4.9275							
AREAS:		0.60				0.27375		0.61					
SLOPE:		3.0		1.00%		0.84%		3.01					
ELEV	57.5	ELEV	55.99	ELEV	55.94	ELEV	55.99	ELEV	58.83	ELEV	58.97	ELEV	58.83
O/S RT	9.5	O/SLT	5	O/S	0	O/S RT	5.95	O/S RT	14.5	O/S RT	15.7	O/S RT	15.7
	TBK		POND EDGE		POND CL		POND EDGE		TBK		T/CURB		EP
						STA +30							

TOTAL AREA =						8.26							
/W ELEV=	56.440												
						6.344							
AREAS:		0.80				0.305		0.81					
SLOPE:		3.0		0.82%		0.82%		3.0					
ELEV	57.2	ELEV	55.92	ELEV	55.87	ELEV	55.92	ELEV	58.35	ELEV	58.49	ELEV	58.35
O/S RT	9.9	O/SLT	6.1	O/S	0	O/S RT	6.1	O/S RT	13.4	O/S RT	14.6	O/S RT	14.6
	TBK		POND EDGE		POND CL		POND EDGE		TBK		T/CURB		EP
						STA +20							

TOTAL AREA =						10.96							
/W ELEV=	56.440												
						8.496							
AREAS:		1.06				0.36		1.04					
SLOPE:		3.0		0.67%		0.72%		3.0					
ELEV	57	ELEV	55.85	ELEV	55.8	ELEV	55.85	ELEV	57.99	ELEV	58.13	ELEV	57.99
O/S RT	11	O/SLT	7.5	O/S	0	O/S RT	6.9	O/S RT	13.3	O/S RT	14.5	O/S RT	14.5
	TBK		POND EDGE		POND CL		POND EDGE		TBK		T/CURB		EP
						STA +10							

TOTAL AREA =						8.27							
/W ELEV=	56.440												
						4.07							
AREAS:		1.88				0.1375		2.38					
SLOPE:		3.1		2.00%		1.67%		4.3					
ELEV	57	ELEV	55.7	ELEV	55.65	ELEV	55.7	ELEV	57.89	ELEV	58.03	ELEV	57.89
O/S RT	6.5	O/SLT	2.5	O/S	0	O/S RT	3	O/S RT	12.5	O/S RT	13.7	O/S RT	13.7
	TBK		POND EDGE		POND CL		POND EDGE		TBK		T/CURB		EP
						STA +0							

TOP WATER = 56.44

STA	DIST	AREA	AVG Area	VOLS
41.29		0		
	1.29		1.41	1.82
40		2.82		
	10		4.62	46.17
30		6.41		
	10		7.34	73.39
20		8.26		
	10		9.61	96.10
10		10.96		
	10		9.61	96.12
0		8.27		
	2.37		4.13	9.80
2.37		0		
		TOTAL VOL =		323.40

ICD

DESCRIPTION, APPLICATIONS

DESCRIPTION

The IPEX Inlet Control Device (ICD) is a fabricated PVC fitting that helps preserve sewer capacity and control stormwater by restricting flow. Developed at the University of Ottawa's Department of Civil Engineering, the ICD is available in a 'Plug' or 'Framed' configuration.

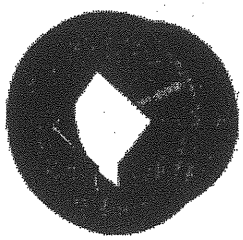
APPLICATIONS

During major storms, a surcharged sewer may back up into foundation drains (or basement drains in the case of combined sewers) causing major flooding and damage. What usually results is a public outcry against 'inadequate' sewer systems. Designing for '100-year' storms or even '25-year' storms can be a costly alternative. The IPEX patented ICD provides a cost-effective alternative by temporarily diverting rainfall to surface storage, away from basements.

Types Available:

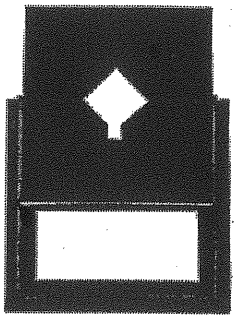
'Plug' ICD

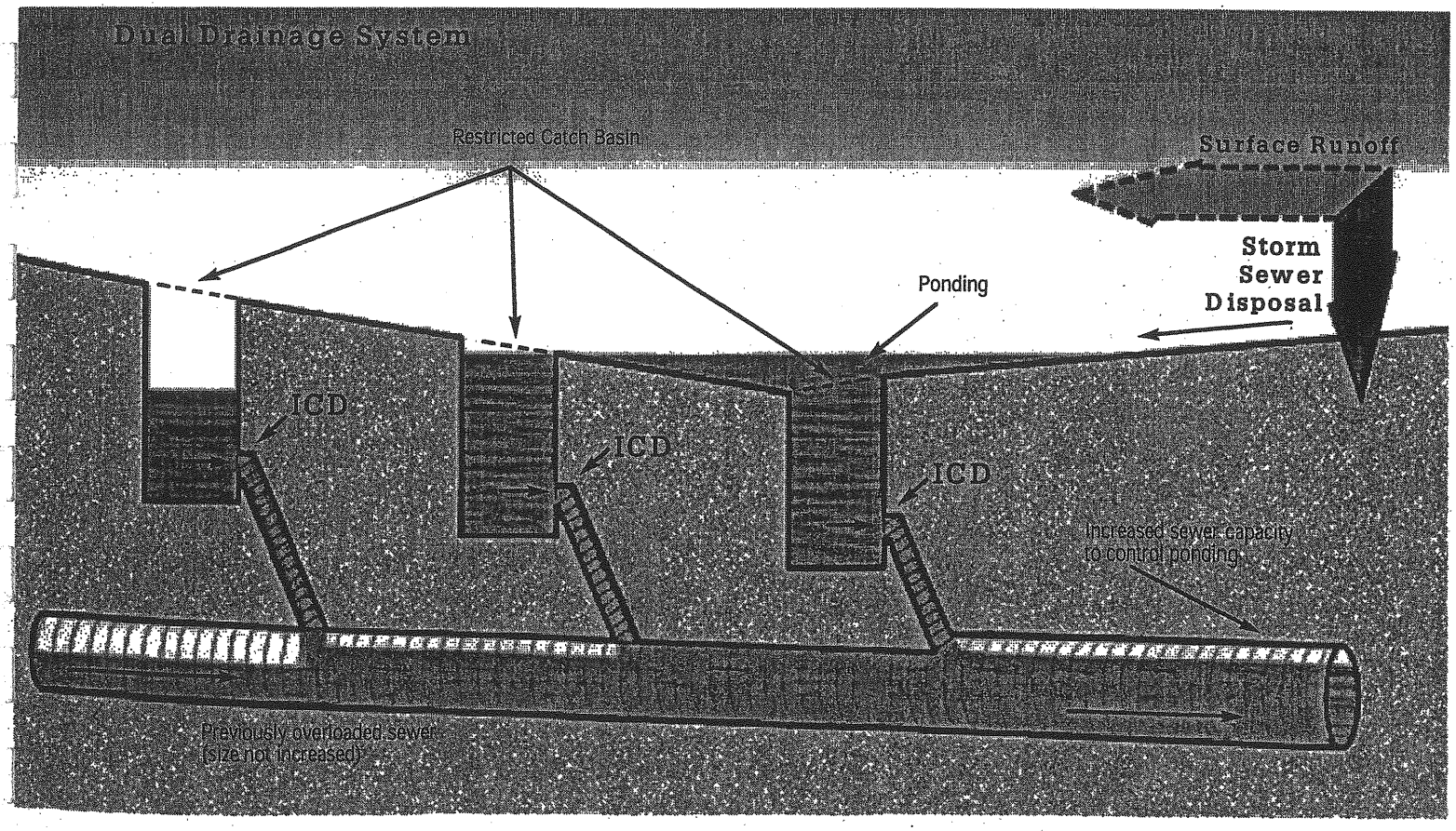
A short, slightly tapered plug is inserted in the outlet pipe from the catchbasin. Held in place by friction and hydrostatic pressure, plug ICDs are made to fit 200mm, 250mm & 300mm (8", 10" & 12") pipe made from any material (i.e. PVC, concrete, clay, etc.). The orifice plate sits flush with the inside of the catchbasin.



'Framed' ICD

A plate containing the orifice is held in channels in the frame. The ICD frame is bolted over the outlet pipe inside the catchbasin. Framed ICDs can be fabricated for any size and type of pipe.



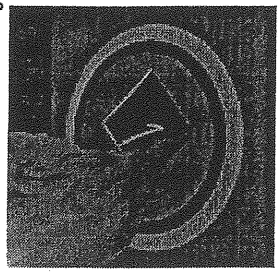


ADVANTAGES

Alleviates Basement Flooding

By restricting flow of stormwater into the sewer system, and temporarily ponding water in catchbasins, parking lots and roadways, sewer capacity is increased. Pipe upstream that would have otherwise been surcharged has greater capacity, reducing basement flooding. All this for a fraction of the cost of installing larger pipes.

Sump Scouring Action



The rectangular slot at the bottom of the orifice works effectively in two ways. First, during dry periods it draws the water level below the main orifice area, keeping it clear of floating debris. Second, it generates strong vortex action in the approach flow during heavy rainfalls, vigorously scouring sediment from the sump of the catchbasin.

Fits Any Type of Pipe

IPEX ICDs can be fabricated to fit any type of pipe – PVC, concrete, clay, or a host of other products. Simply contact your local representative with details and leave the rest to IPEX.

DESIGN NOTES

Calibration curves for the five standard sizes at various heads are shown. The values shown are empirical, developed by the University of Ottawa's Department of Civil Engineering.

*Head is measured from the centre line of the diamond to the water elevation or flood level.

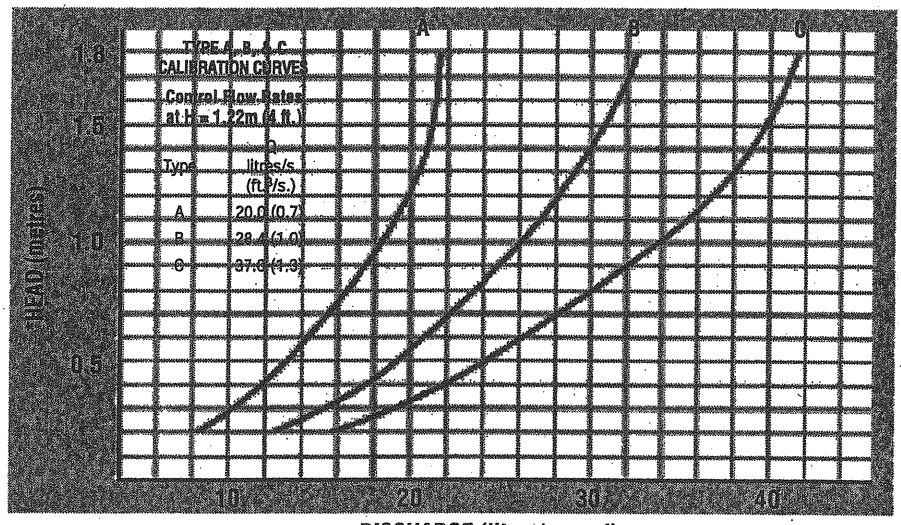
SHORT FORM SPECIFICATIONS

IPEX Inlet Control Devices (ICDs) are manufactured from Polyvinyl Chloride (PVC) to be supplied according to the type (i.e. A, B, C, D, or F) as shown in the engineer's drawings.

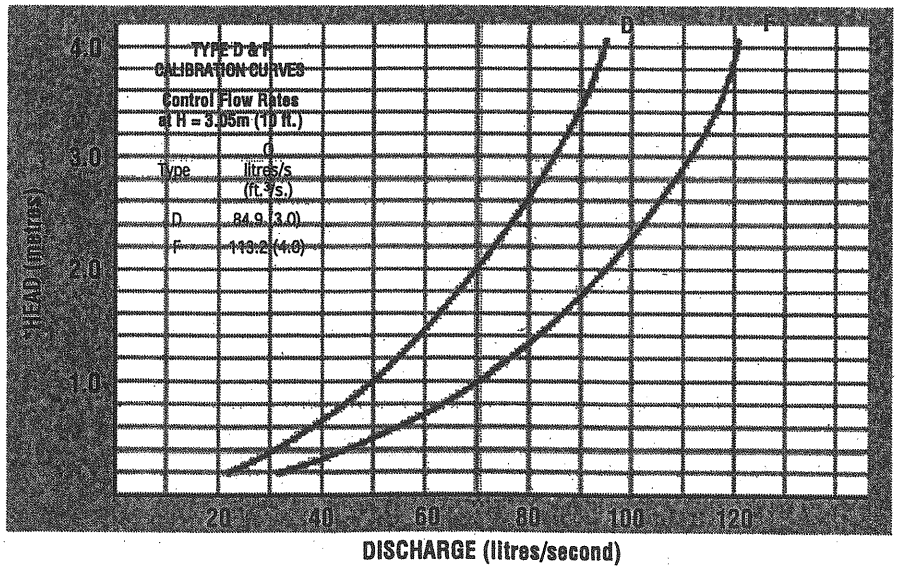
IPEX Plug ICDs are to be machined to provide a friction fit into the outlet pipe.

Framed ICDs are to be bolted in position over appropriate outlet pipe in the catchbasin/maintenance hole.

Calibration Curves for Standard ICDs



Note: 200mm (8") ICD Plugs available in Type A & B only.



Note: Type D and F can fit pipes ≥ 250mm (10").

APPENDIX 2

Storm Area Plan
&
Storm Design Sheet

David McManus Engineering Ltd.

STORM SEWER DESIGN SHEET

DESIGNED BY :KLM
CHECKED BY : UB

PROJECT: HOSPITAL FOOD SERVICES - PRODUCTION PLANT
DEVELOPER: WESTEINDE CONSTRUCTION LTD.
PROJECT No: 2297

DATE: MAR 18, 2002

LOCATION			AREA (ha)							PROPOSED SEWER					
PIPE	FROM MH	TO MH	AREA (ha)	R (BAL"C")	INDIV. 2.78AR	ACCUM. 2.78AR	TIME OF CONC.	RAINFALL INTENSITY I	PEAK FLOW Q (l/s)	PIPE SIZE (mm)	GRADE (%)	LENGTH (m)	CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)
PVC DR 35	CB1	CBMH 5	0.33	0.55	0.50	0.50	20.00	67.35	33.98	250	2.30	32.80	90.28	1.84	0.30
PVC DR 35	CBMH 5	CBMH 4	0.56	0.49	0.76	1.27	20.30	66.63	84.44	375	0.50	39.70	124.10	1.12	0.59
PVC DR 35	CBMH 4	CBMH 3	0.36	0.36	0.36	1.63	20.89	65.26	106.22	375	2.00	40.50	248.20	2.25	0.30
PVC DR 28	ROOF	TO LINE	0.6	0.95	1.58	1.58	20.00	67.35	106.72	250	6.00	15.00	145.81	2.97	0.08
PVC DR 35	CBMH 3	CBMH 2				3.21	21.18	64.60	207.50	450	0.75	106.10	247.16	1.55	1.14
PVC DR 35	CBMH 2	CBMH 1	0.23	0.59	0.38	3.59	22.32	62.19	223.22	450	0.80	45.60	255.26	1.60	0.47
PVC DR 35	CB 2	CBMH 1	0.33	0.51	0.47	0.47	20.00	67.35	31.51	250	3.20	43.90	106.49	2.17	0.34
PVC DR 35	CBMH 1	POND	0.26	0.75	0.54	4.60	22.79	61.24	281.69	450	1.00	6.50	285.39	1.79	0.06
PVC DR 35	POND	MH 200	0.15	0.25	0.10	4.60	22.85	61.13	281.15	375	4.00	14.20	351.01	3.18	0.07

N= 0.013

Run-off Coefficient: see Storm Area Plan for calc of Balanced "C" for each area

Rainfall Intensity = $30.3 \times (T)^{-0.727}$ T= time in hours
(5 year storm)

APPENDIX 3

MOE CORRESPONDENCE

Kevin Mercer

From: "Charles Goulet" <Charles.Goulet@ene.gov.on.ca>
To: <mkevin@igs.ca>
Sent: March 21, 2002 4:59 PM
Subject: Re: Hospital Food Services Building, Proof of Preconsultation& Applicable M.O.E. Review Fees

Kevin:

This will confirm our meeting of Thursday, February 7, 2002 at which I indicated to you that you met most of the MOE requirements with regards to stormwater management on industrial lands. The component which was missing - a contingency plan for spills - was later submitted to me for review.

Last week, I communicated with Mr. Udo Boehme, P. Eng., of your office to indicate the few omissions in the contingency plan (faxed to this office on February 12, 2002): in essence, food products should be included in the list of materials for which the plan must apply (high BOD loadings could be experienced by the receiving stream if food products are not contained & removed from the catchment area = just let go); in the section on fuel tank leakage: the MOE is to be notified immediately when a spill is identified (outside business hours, the MOE Spills Action Centre is the point of contact at 1-800-268-6060) and the cleanup is also to proceed immediately (please refer to Part X of the EPA for an exact description of duties & responsibilities); and, I suggested the inclusion of a section on Waste Management to address wastes generated as a result of cleaning up (all of which must be in accordance withe Part V of the EPA).

The above comments are not meant to be an approval of your plan but constructive criticism. It remains the responsibility of the Owner and the Operator of the facility of concern to obtain professional advice in the matter based on full disclosure from the company owning and/or operating the facility. At this time, I cannot confirm that I have full knowledge of the activities which will be carried out at the facility as what I know about the site was communicated to me by a third party, namely you. I am, however, satisfied to see the plan developed and I regard its communication to employees and others working at the site, to be essential to adequately respond to spills and in accordance with the Environmental Protection Act.

Should you have any questions, please do not hesitate to contact me.

Regards,
Charles Goulet, P. Eng.
District Engineer & Provincial Officer
Ottawa District Office
MOE Eastern Region
(613) 521- 3456 x 246
(613) 521-5437 (fax)