

SERVICING REPORT

**CORNERSTONE PRESSURE WASHING
5310 Leyton Street**

**Community of Wanstead
Town of Plympton-Wyoming**

Issued for Site Plan Approval



**BLACK CREEK
ENGINEERING INC.**

Project No. 2040.00
Updated March 11, 2025

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1.0 INTRODUCTION

It is proposed that a parcel of land comprised of approximately 0.64 hectares be further developed with the construction of a commercial building to be used as an agricultural vehicle washing facility. The property is located in the community of Wanstead and consists of Lots 39 to 43 of Registered Plan 5 (Geographic Township of Plympton) in the Town of Plympton-Wyoming, County of Lambton.

This servicing report outlines the stormwater management requirements for the property to be developed, the servicing and the layout of the proposed facilities.

2.0 SITE DESCRIPTION

The subject parcel of land is composed of two parcels of land that were previously known as #5507 Co-op Street and #5310 Leyton Street, but consists of Lots 39 to 43 of Registered Plan 5 (Geographic Township of Plympton) (roll numbers 340-010-17701 and 340-010-17600). The zoning for the subject property is a combination of Rural Commercial – 3 and Agricultural – 4, while the adjacent properties are zoned Agricultural – 4.

The topography of the site and surrounding areas was defined using robotic total station survey equipment and generally slopes from north to south. The topographic mapping of the site is illustrated on drawing EC.

Report No. 22 of the Ontario Soil Survey, *the Soils of Lambton County*, identifies the surficial soils in the area of the subject property as Brookston Clay. These soils have slow infiltration rates and slow rates of water transmission.

3.0 PROPOSED DEVELOPMENT

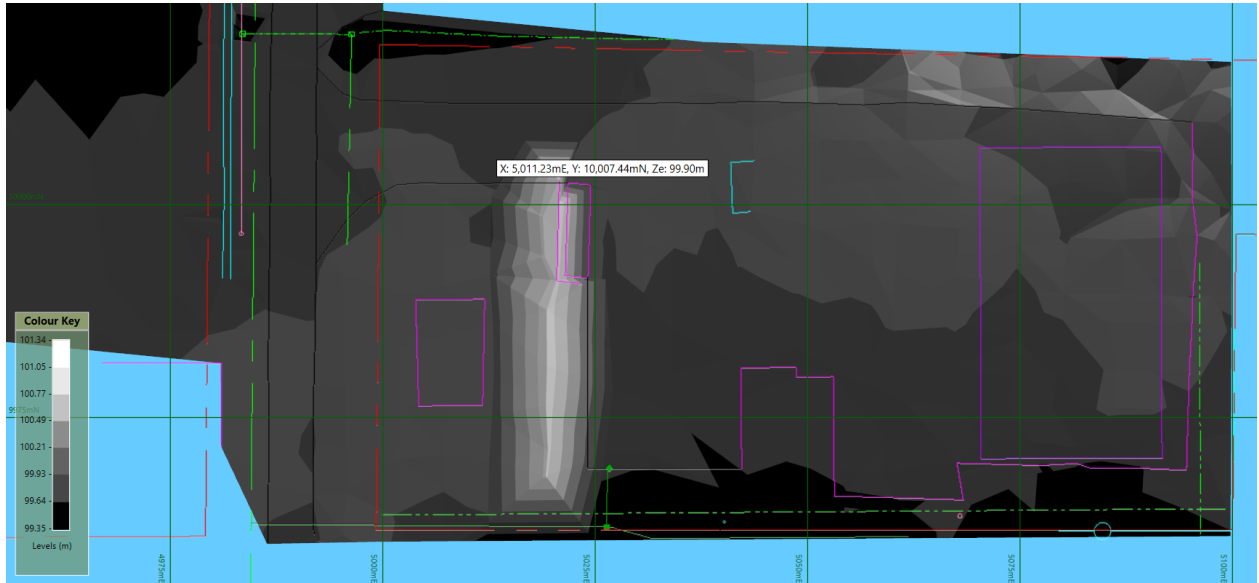
It is proposed that the property be further developed with the construction of a new commercial building to serve as an agricultural vehicle washing facility.

Stormwater works have been proposed to accommodate the run-off from the building and gravel yard including swale ditches, catch basins, closed drains and a dry stormwater retention facility with a controlled outlet to provide quantity control up to the 100-year storm event.

4.0 STORM WATER MANAGEMENT

4.1 EXISTING DRAINAGE

The central portion of the site generally slopes from north to south, where water ponds in a low area along the boundary with the property to the south with overflow through the property to the south towards Elevator Street.



The west side of the property slopes towards Leyton Street where surface water is collected in catchbasins connected to a branch of the Wanstead Drain constructed circa 1980.

The northern side of the property slopes towards Co-op Street where surface water is collected in a roadside ditch, which drains to a catchbasin at Leyton Street that is connected to a branch of the Wanstead Drain constructed circa 1980.

The northeastern corner of the property slopes towards the intersection of Co-op Street and Woodford Street where surface water is collected in a roadside ditch. Records show that a municipal drain known as the Wanstead Relief Drain was constructed circa 1955 and included a section along the south limit of Co-op Street and the west limit of Woodford Street. The drain consists of a 200mm (8") tile drain and, while the current condition is known, the local experience is that the surface run-off drains away after a storm event thus it is assumed that the drain is functional.

The Wanstead Branch Drain (1980) and the Wanstead Relief Drain both outlet to the Wanstead Drain, which flows easterly to the McIlwain Drain and ultimately to Bear Creek.

4.2 DESIGN OBJECTIVES

The design objectives for storm water management include the following:

- Reproduce the pre-development hydrological conditions;
- Confine development and construction activities to the least critical areas;
- Minimize changes to the existing topography, and

- Preserve and utilize the natural drainage system.

4.3 STORM WATER MANAGEMENT MEASURES

Storm water management practices include several different methods to control water quantity and water quality. Several methods considered in this report include the following:

4.3.1 Storm water conveyance controls

Storm water conveyance controls are implemented as part of the storm water conveyance system. Storm water is conveyed from developed areas by either sewers or grassed swales. Storm water conveyance controls involve the use of pervious pipe systems, pervious catch basins (catch basins have a larger sump connected to exfiltration storage media), and grassed swales.

4.3.2 End of pipe storm water management facilities

End of pipe storm water management facilities receive storm water from a conveyance system and discharge the treated water to the receiving system. End of pipe facilities can include wet ponds, wetlands, dry ponds, infiltration basins and/or trenches, filter or buffer strips, or oil/grit separators.

4.4 STORM WATER MANAGEMENT PROPOSALS

Proposals have been developed to minimize the effects of the storm water runoff from the proposed development as follows:

- The discharge from the roof tops and gravel yard will be contained within an internal stormwater system designed to store the volume up to the 100-year storm event.
- The system will include a dry pond and a ditch-inlet catch basin complete with a control device to restrict the outflow to the municipal storm sewer.

4.5 HYDROLOGY

The storm drainage required for the proposed development has been designed using an SCS Curve # of 78 for grassed areas, 98 for gravel areas and 100 for the buildings.

Computer modeling was completed using MIDUSS[®] design software. The output is included in the appendices of this report. The rainfall intensities were generated using the Ontario Ministry of Transportation IDF Curve Look-up website.

Pre-development and post-development flows were calculated for the 100-year return period for storm events ranging from 1 hour to 24 hours.

The site will contain areas along the perimeter that will discharge from the site uncontrolled. The area that will be contained within the proposed stormwater system is 3,836 sq.m (0.384 ha.).

4.6 PROPOSED DRAINAGE

The design philosophy would generally be that post development flows will be restricted to the pre-development levels through the use of storm water conveyance controls and end of pipe facilities. However, given the limited capacity of the branch to the Wanstead Drain along Leyton Street, the design has been based on discharging the post development flows at an allowable release rate which has been determined on a flow rate per hectare basis.

4.6.1 Proposed Storm Water Conveyance Controls

Swale ditches have been proposed along the south and east boundaries to intercept and re-direct surface water away from the building.

Berms will also be constructed along the south and east boundaries to prevent surface water from flowing onto the adjacent properties.

A 100mm diameter tile drain is also proposed along the south boundary to provide drainage to the existing low area.

4.6.2 Proposed End of Pipe Management Facilities

As per the drainage report for the Wanstead Branch Drain (1980), the tributary area to the drain is 16.35 ha. The section of the drain, from the subject property to the junction with the main drain at Elevator Street, consists of 250mm \varnothing reinforced concrete pipe at a grade of 0.2%. This section of the branch drain would have a capacity of 28.3 L/s, thus the allowable release rate was determined to be 1.73 L/s/Ha. and, based on the controlled area of 0.384 ha., the allowable release rate from the site would be 0.66L/s. However, it is not clear from the assessment plan in the 1980 drainage report as to whether the entirety of the subject property was included in the watershed area, therefore it is possible that the allowable release rate could be slightly less.

It is proposed to make use of the existing low area along the south side of the site to construct a dry storm water management pond (SWMF). The existing gravel area will be regraded towards the dry SWMF.

The SWMF has a total temporary (active) storage capacity of 436 m³, which includes some storage in the gravel area before storm water would overflow towards Co-op Street in storms that exceed the 100-year event.

The sideslopes of the berms, swale ditches and SWMF are to be minimum 3 horizontal:1 vertical and covered with 75 mm of topsoil and seeded upon completion.

The outlet structure to the municipal storm drain is to consist of a 600 mm concrete catch basin complete with an inlet control device (ICD) to restrict the flows. To restrict the flow the calculated allowable release rate of 0.66 L/s with a conventional orifice plate would require a 17mm ø orifice plate, which would be susceptible to clogging. To minimize the potential of clogging, an IPEX Tempest® model LMF40 ICD was selected. This model has a rated discharge capacity of 2 L/s, which exceeds the calculated allowable release rate, however this is the smallest model that they manufacture.

Based on the above, the maximum discharge calculated for the site was 1.75 L/s with a maximum stored volume of 318 m³ for the 100-year storm event. This, of course, assumes an unrestricted outlet from the SWMF. In reality, the storm drain along Leyton Street would be surcharged during a 100-year event, thus the discharge would be much less.

A private storm connection is proposed to connect to the existing 250mm ø concrete storm drain along the west side of Leyton Street. Storm service pipe shall be SDR 28 PVC with a diameter of 100 mm and shall be green in colour.

5.0 SANITARY SEWERS

5.1 EXISTING FACILITIES

No sanitary sewer system exists in the community of Wanstead.

5.2 DESIGN CRITERIA

Various references suggest that a typical factory worker would use 5 to 12.5L of water per hour during the working day, of which, most reference the work of Metcalfe & Eddy.

5.3 PROPOSED SANITARY

It is anticipated that up to fifteen (15) persons would be employed, however, it is assumed that thirteen (13) of the employees would work offsite and would be at the facility for less than an hour per day. The other two (2) employees would be on-site for an eight-hour work day, thus resulting in 29 employee-hours per day.

We would anticipate water usage to be near the middle of the range at 7.5L/employee/hour, which would equate to a total flow of 217.5L per 8-hour working day.

Based on an average of 21 working days per month, the total monthly volume produced would be approximately 4,568L. If a monthly pumping schedule was to be followed, the next larger commercially available size of holding tank of 5,600L would be required, as a minimum.

6.0 WATER SUPPLY

6.1 EXISTING FACILITIES

No water distribution system exists in the community of Wanstead.

6.2 DESIGN CRITERIA

Various references suggest that a typical factory worker would use 5 to 12.5L of water per hour during the working day, of which, most reference the work of Metcalfe & Eddy.

6.3 PROPOSED POTABLE WATER

It is anticipated that up to fifteen (15) persons would be employed, however, it is assumed that thirteen (13) of the employees would work offsite and would be at the facility for less than an hour per day. The other two (2) employees would be on-site for an eight-hour work day.

We would anticipate water usage to be near the middle of the range at 7.5L/employee/hour, thus the peak demand would be the hour when all employees are on-site, which would equate to a peak flow of 112.5L/hr (1.9 L/min).

It is proposed to utilize the existing water well, located on the portion of the property formerly known as # 5707 Co-op Street, as the source for potable water.

It is also proposed to install a treatment system to reuse up to 21,850L/day of the vehicle wash water that would consist of the following:

- A 6,813L primary sedimentation tank;
- A 6,813L secondary sedimentation tank;
- A 1,892L intermediate pump tank;
- A 13,249L holding tank, and
- A packaged treatment system c/w pumping system rated at 151.4L/min.

The existing water well would also be used to top up the wash water system and it is anticipated that approximately 1,500 L/day will be required.

The MOECP criteria for designing municipal water and sanitary sewer systems for residential areas is that the average daily domestic flow would range from 225 to 450 L/person/day. In Plympton-Wyoming we would use 365 L/person/day. This is, however, meant to be a conservative number to ensure that the system has sufficient capacity.

It is our experience that actual water usage for the average person would be somewhere in the range of 200-240 L/person/day. So based on that, the 1,500 L/day required to top up the wash water system would equate to about 7 people.

7.0 ACCESS

7.1 EXISTING ACCESS

There is an existing access to the site located off of Leyton Street, just south of the intersection of Co-op Street. The travelled portion of Leyton Street consists of tar & chip surface treatment with an approximate width of 5.5m.

7.2 DESIGN CRITERIA

The access and turning movements on the site have been designed using the Transportation Association of Canada (TAC) WB-20 design truck, the dimensions of which are shown on the plans.

7.3 ACCESS

It is anticipated that a maximum of six (6) trucks would access/egress the site during a typical work day, and those vehicles would access from/egress to Wanstead Road via Elevator Street to the south.

The existing 9.9m wide access is of sufficient width for the proposed design truck and would also, therefore, be sufficient for the access of emergency vehicles.

8.0 SUMMARY

The measures outlined in this conceptual report will meet the quantitative requirements based on Town of Plympton-Wyoming standards.

It is proposed to address storm runoff quantity by the following:

- roof downspouts to be directed to the internal stormwater system
- construction of a dry pond
- restricted outlet

It is proposed to connect the proposed storm system to the existing branch of the Wanstead Drain along Leyton Street.

It is proposed to install a sanitary holding tank for the collection of domestic sewage.

It is proposed to utilize the existing water well on the site for potable water. It is also proposed to treat and reuse the vehicle wash water.

It is proposed to utilize the existing 9.9m wide access from Leyton Street for all vehicle traffic including emergency vehicles.

9.0 SITE DEVELOPMENT

It is proposed that measures will be taken during development of the site during construction.

During site servicing construction, straw bales and/or silt fence shall be placed to prevent erosion and the migration of sediment.

Filter fabric shall be placed over the grates to prevent the entry of sediment. Trucks will be closely monitored to prevent mud from being tracked onto the street. Granular and fill material shall not be stockpiled on completed streets. Berms, swales and grassed areas shall be seeded immediately after completion.

10.0 CONSTRUCTION

All construction is to be carried out as per the Town of Plympton-Wyoming standards and the Ontario Provincial Standard Specifications and Drawings.

Report prepared by:

Ken Graham, P.Eng.
Consulting Engineer



APPENDIX 'A'

HYDROLOGY & HYDRAULIC CALCULATIONS

Active coordinate

42° 56' 44" N, 82° 2' 45" W (42.945833,-82.045833)

Retrieved: Tue, 18 Apr 2023 14:06:16 GMT



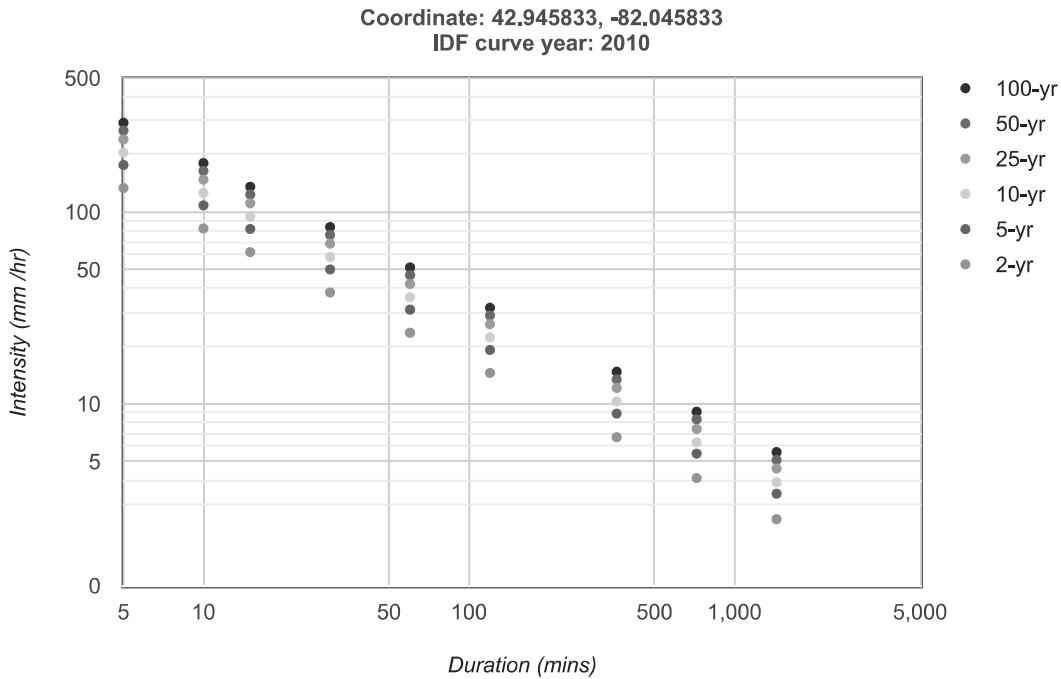
Location summary

These are the locations in the selection.

IDF Curve: 42° 56' 44" N, 82° 2' 45" W (42.945833,-82.045833)

Results

An IDF curve was found.



Coefficient summary

IDF Curve: 42° 56' 44" N, 82° 2' 45" W (42.945833,-82.045833)

Retrieved: Tue, 18 Apr 2023 14:06:16 GMT

Data year: 2010

IDF curve year: 2010

Return period	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
A	23.5	31.0	36.0	42.2	46.9	51.5
B	-0.699	-0.699	-0.699	-0.699	-0.699	-0.699

Statistics

Rainfall intensity (mm hr⁻¹)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	133.5	82.2	61.9	38.1	23.5	14.5	6.7	4.1	2.5
5-yr	176.1	108.5	81.7	50.3	31.0	19.1	8.9	5.5	3.4
10-yr	204.5	126.0	94.9	58.4	36.0	22.2	10.3	6.3	3.9
25-yr	239.7	147.7	111.2	68.5	42.2	26.0	12.1	7.4	4.6
50-yr	266.4	164.1	123.6	76.1	46.9	28.9	13.4	8.3	5.1
100-yr	292.5	180.2	135.7	83.6	51.5	31.7	14.7	9.1	5.6

Rainfall depth (mm)

Duration	5-min	10-min	15-min	30-min	1-hr	2-hr	6-hr	12-hr	24-hr
2-yr	11.1	13.7	15.5	19.1	23.5	29.0	40.3	49.6	61.2
5-yr	14.7	18.1	20.4	25.2	31.0	38.2	53.2	65.5	80.7
10-yr	17.0	21.0	23.7	29.2	36.0	44.4	61.7	76.1	93.7
25-yr	20.0	24.6	27.8	34.3	42.2	52.0	72.4	89.2	109.8
50-yr	22.2	27.3	30.9	38.1	46.9	57.8	80.4	99.1	122.1
100-yr	24.4	30.0	33.9	41.8	51.5	63.4	88.3	108.8	134.0

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Last Modified: September 2016

MIDUSS Watershed Worksheet

CORNERSTONE PRESSURE WASHING - 5310 LEYTON STREET - PREDEVELOPMENT CONDITION

[illegible][illegible]

MIDUSS Watershed Worksheet

CORNERSTONE PRESSURE WASHING - 5310 LEYTON STREET - DEVELOPED CONDITION

[illegible][illegible]

SWM QUANTITY CONTROL CALCULATIONS - SUMMARY

Cornerstone Pressure Washing – 5310 Leyton Street

	100 Year Storm 1 hour duration	100 Year Storm 2 hour duration	100 Year Storm 3 hour duration	100 Year Storm 6 hour duration	100 Year Storm 12 hour duration	100 Year Storm 24 hour duration
Total Rainfall (mm)	51.5	63.4	71.7	88.3	108.8	134.0
Pre-Development Discharge (L/s)	15	17	18	18	13	9
Total run-off volume (cu.m)	56	83	104	149	209	288
Post-Development Peak Inflow (L/s)	86	55	43	29	19	12
Total run-off volume (cu.m)	130	168	200	262	335	429
Peak Discharge Orifice (L/s)	2	2	2	2	2	2
Peak Discharge Overflow (L/s)	0	0	0	0	0	0
High Water Level (m)	99.36	99.46	99.53	99.64	99.73	99.79
Maximum Stored Volume (cu.m)	123	157	184	232	276	318

Calculations by K. Graham, P.Eng.

100-year storm IDF parameters

a=51.5

b=-0.699

Chicago Storm Parameters (100 yr)

A=

B=

C=

R=

CORNERSTONE PRESSURE WASHING - 5310 LEYTON STREET - STAGE / STORAGE / DISCHARGE CURVES

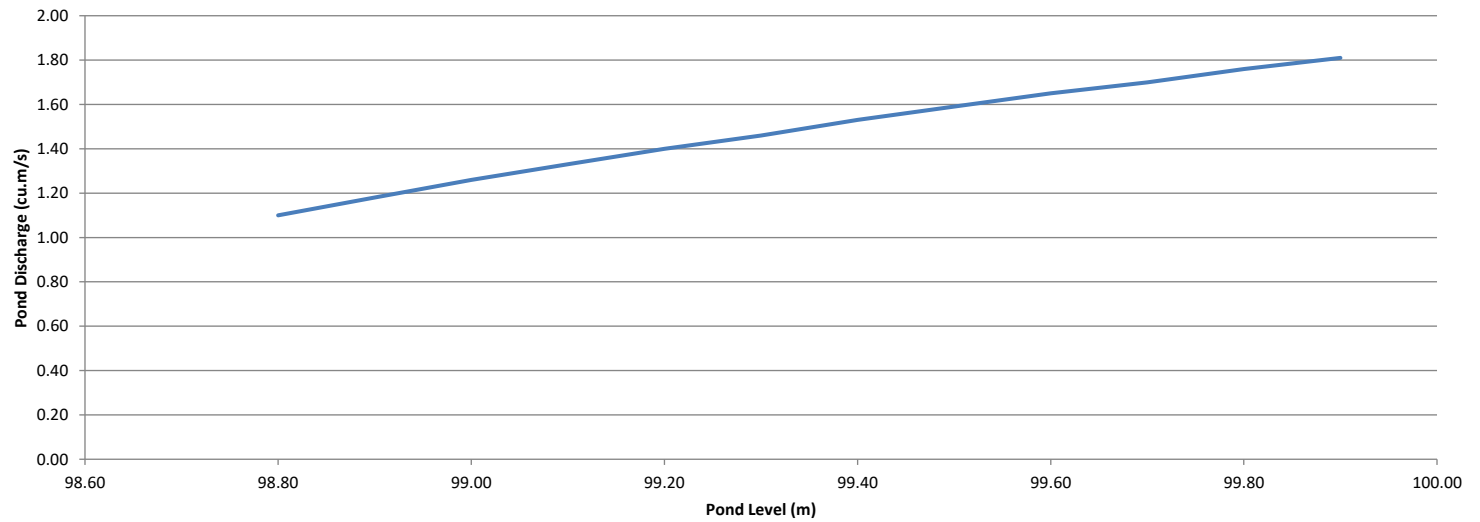
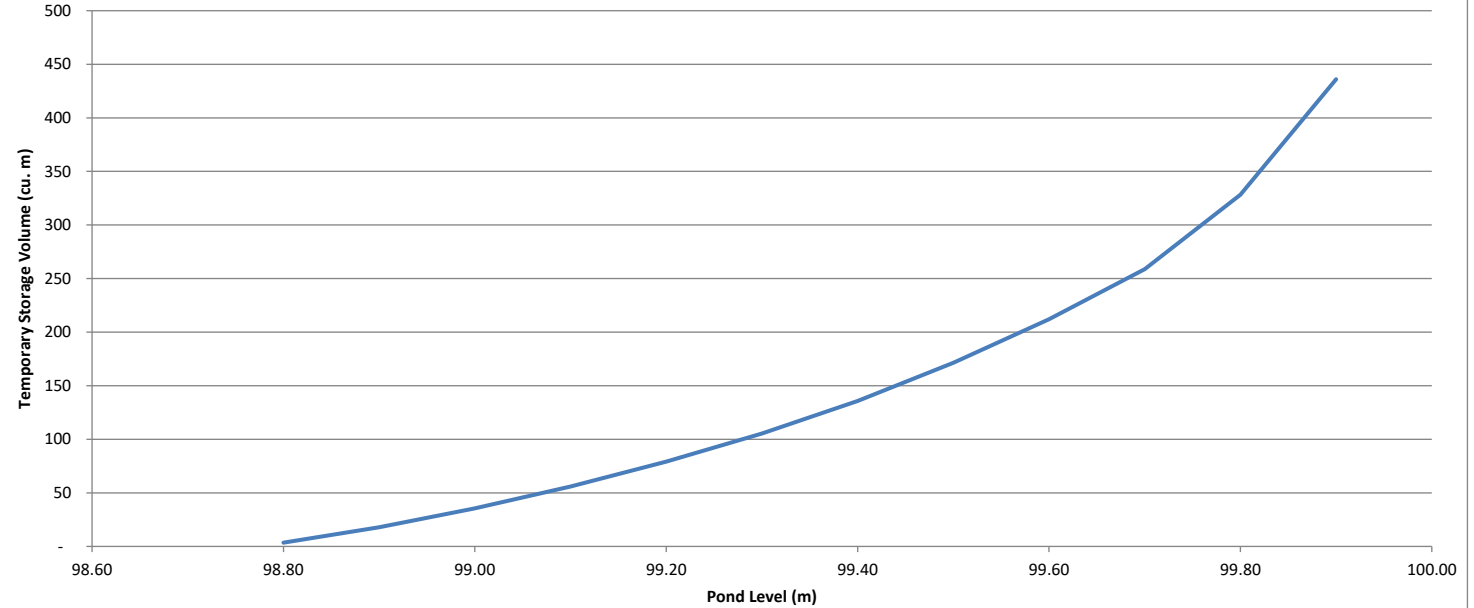
[illegible]

Chart 1: LMF 14 Preset Flow Curves

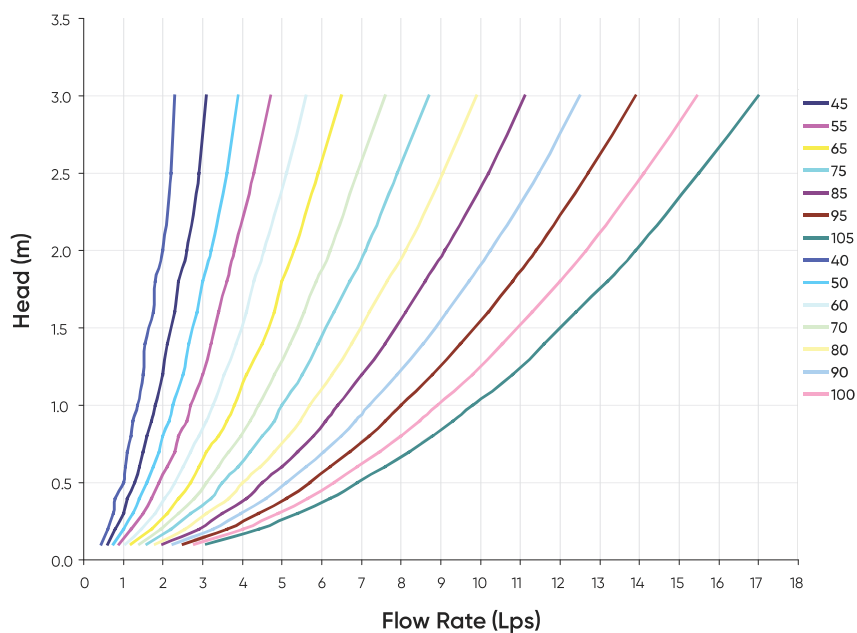
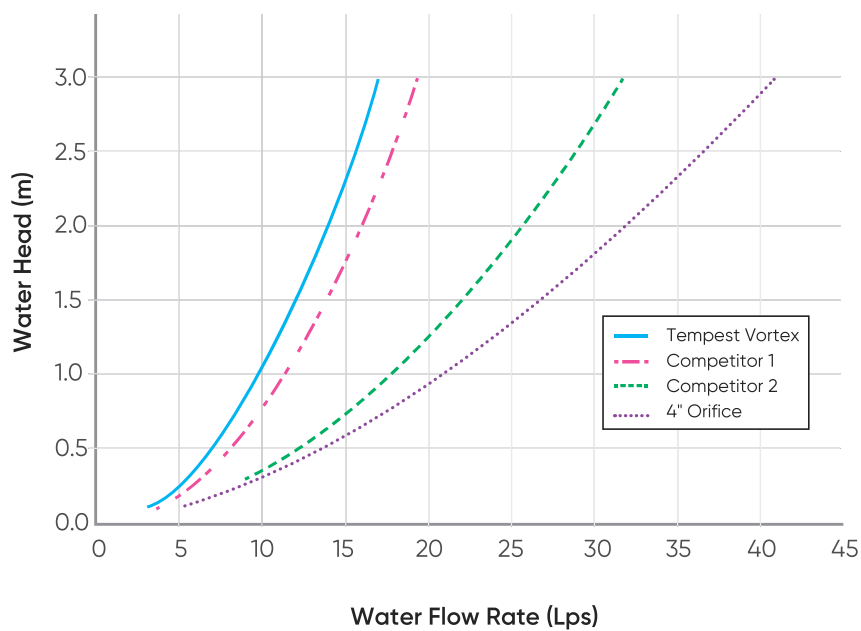
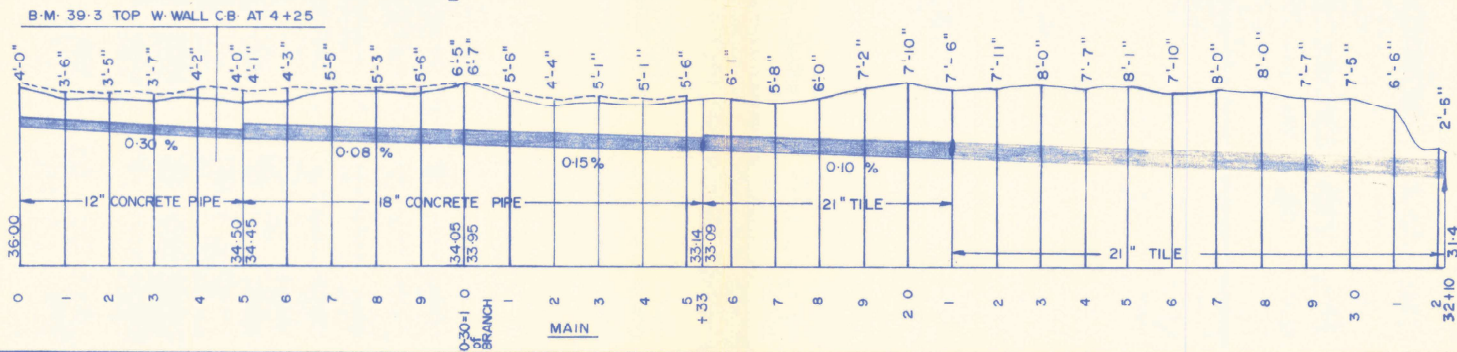
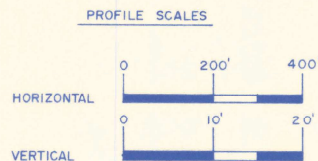
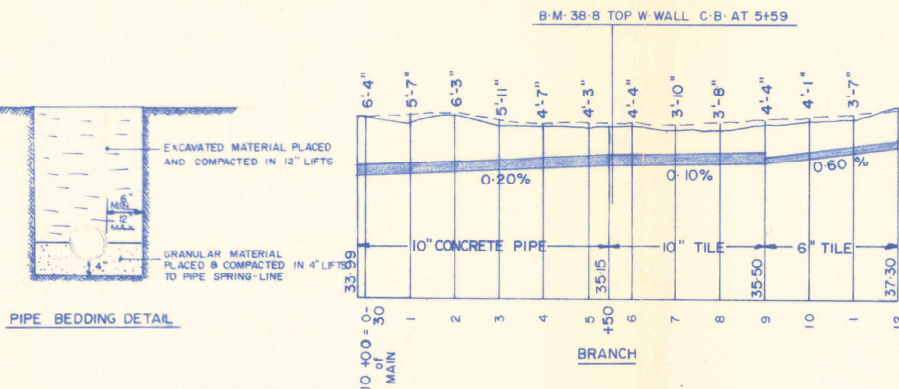
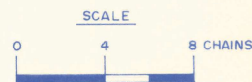
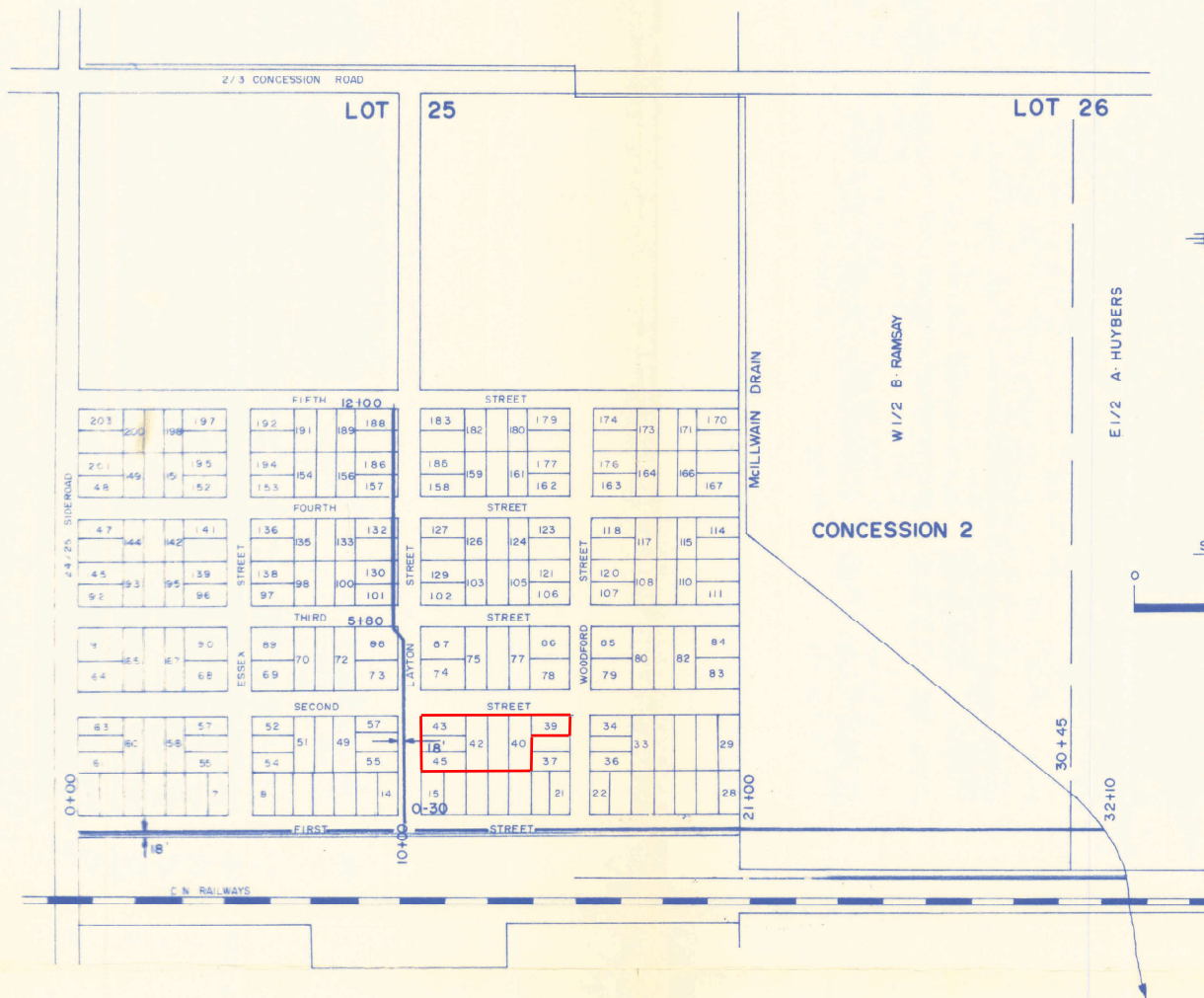


Chart 2: LMF Flow vs. ICD Alternatives





REVISED MARCH 1980



TOWNSHIP OF PLYMPTON

WANSTEAD DRAIN

j.a.monteith associates limited • consulting engineers • petrolia ontario

drawn: G.T.

date: Dec 179

checked: Jim

date: Dec 179

job no: 3122

sheet 1 of 1

APPENDIX 'B'

MIDUSS DATABASE

Column1	
"	MIDUSS Output ----->"
"	MIDUSS version Version 2.25 rev. 465"
"	MIDUSS created February 5, 2008"
"	10 Units used: ie METRIC"
"	Job folder: C:\MIDUSS FILES\Cornerstone\East\POST"
"	Output filename: Cornerstone.out"
"	Licensee name: 15193305372"
"	Company HP"
"	Date & Time last used: 2023-04-18 at 1:26:21 PM"
" 31	TIME PARAMETERS"
"	10.000 Time Step"
"	1440.000 Max. Storm length"
"	5000.000 Max. Hydrograph"
" 32	STORM Huff distribution"
"	2 Huff distribution"
"	134.000 Rainfall depth"
"	1440.000 Duration"
"	2.000 Huff quartile"
"	Maximum intensity 12.842 mm/hr"
"	Total depth 134.000 mm"
"	6 005hyd Hydrograph extension used in this file"
" 33	CATCHMENT 101"
"	1 Triangular SCS"
"	1 Equal length"
"	1 SCS method"
"	101 No description"
"	91.950 % Impervious"
"	0.384 Total Area"
"	79.000 Flow length"
"	0.500 Overland Slope"
"	0.031 Pervious Area"
"	79.000 Pervious length"
"	0.500 Pervious slope"
"	0.353 Impervious Area"
"	79.000 Impervious length"
"	0.500 Impervious slope"
"	0.150 Pervious Manning 'n'"
"	78.000 Pervious SCS Curve No."
"	0.604 Pervious Runoff coefficient"
"	0.100 Pervious Ia/S coefficient"
"	7.164 Pervious Initial abstraction"
"	0.015 Impervious Manning 'n'"
"	99.000 Impervious SCS Curve No."
"	0.854 Impervious Runoff coefficient"
"	0.100 Impervious Ia/S coefficient"
"	1.912 Impervious Initial abstraction"

"	0.012	0.000	0.000	0.000 c.m/sec"
"	Catchment 101	Pervious	Impervious	Total Area "
"	Surface Area	0.031	0.353	0.384 hectare"
"	Time of concentration	62.936	14.073	16.924 minutes"
"	Time to Centroid	748.806	648.160	654.035 minutes"
"	Rainfall depth	134.000	134.000	134.000 mm"
"	Rainfall volume	41.42	473.14	514.56 c.m"
"	Rainfall losses	53.017	19.608	22.298 mm"
"	Runoff depth	80.983	114.392	111.702 mm"
"	Runoff volume	25.03	403.90	428.94 c.m"
"	Runoff coefficient	0.604	0.854	0.834 "
"	Maximum flow	0.001	0.011	0.012 c.m/sec"
" 40	HYDROGRAPH Add Runoff "			
"	4 Add Runoff "			
"	0.012	0.012	0.000	0.000"
" 54	POND DESIGN"			
"	0.012	Current peak flow	c.m/sec"	
"	0.001	Target outflow	c.m/sec"	
"	428.9	Hydrograph volume	c.m"	
"	13. Number of stages"			
"	98.700	Minimum water level	metre"	
"	99.900	Maximum water level	metre"	
"	98.700	Starting water level	metre"	
"	0 Keep Design Data: 1 = True; 0 = False"			
"	Level Discharge	Volume"		
"	98.700	0.000	0.000"	
"	98.800	0.00110	3.490"	
"	98.900	0.00118	17.980"	
"	99.000	0.00126	35.530"	
"	99.100	0.00133	55.950"	
"	99.200	0.00140	79.080"	
"	99.300	0.00146	105.300"	
"	99.400	0.00153	135.820"	
"	99.500	0.00159	171.310"	
"	99.600	0.00165	212.030"	
"	99.700	0.00170	258.810"	
"	99.800	0.00176	328.310"	
"	99.900	0.00181	436.020"	
"	1. ORIFICES"			
"	Orifice	Orifice	Orifice Number of"	
"	invert	coefficie	diameter	orifices"
"	98.140	0.630	0.0250	1.000"
"	Peak outflow	0.002	c.m/sec"	
"	Maximum level	99.786	metre"	
"	Maximum storage	318.373	c.m"	
"	Centroidal lag	40.716	hours"	
"	0.012	0.012	0.002	0.000 c.m/sec"

" 38	START/RE-START TOTALS 101"		
"	3 Runoff Totals on EXIT"		
"	Total Catchment area	2.304	hectare"
"	Total Impervious area	2.119	hectare"
"	Total % impervious	91.950	"
" 19	EXIT"		