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August 19, 2019

City of Ottawa
Development Review - Urban Services Branch
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor, Ottawa, ON, K1P 1J1

Attention Steve Gauthier, Planner II

Re Elmdale Public School Addition, 49 Iona Street, Ottawa, ON
Site Servicing and Stormwater Management Brief

Dear Steve:

We provide the following Site Servicing and Stormwater Management Brief in accordance with the City of Ottawa Site Plan Control Application requirements for the Ottawa Carleton District School Board's (OCDSB) proposed Elmdale Public School Addition at 49 Iona Street, Ottawa, see attached City of Ottawa Pre-consultation meeting notes in **Appendix A**. The purpose of the report is to confirm that existing site services, including water, storm and sanitary, can support the increased demand from the proposed re-development of the site.
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Reference documents

- C1 - Site Servicing Pan, C2 - Site Grading and Drainage, Erosion and Sediment Control Plan, and C3 - Details Plan, by Jp2g Consultants Inc., August 15, 2019.
- Topographical Survey by Farley, Smith & Denis Surveying Ltd., October 5, 2018, File No. 498-18.

Background

The existing school property is located on a 1.15 ha lot, fronting onto Iona Street, Clarendon Avenue, and Java Street. The proposed site development includes the construction of a 690 m^2 two-storey, building addition adjacent to the west of the school and an associated walkway.

Servicing

1.1 Storm Servicing

Based on record drawings, the existing school roof is currently serviced by a 150mm diameter combined sewer service that discharges roof drainage and sanitary sewage from the existing school to Java Street. Based on record drawings and field investigation, it appears that the existing school does not connect to the municipal storm system. The site itself sheet drains to the catchbasins in the right-of-way.

The proposed addition roof, parking lot, and landscaped areas, will connect to a new storm sewer network and ultimately connect to Java Street municipal storm sewer. New structures will include two (2) catchbasins, two (2) catchbasin manholes, and four (4) manholes. Drainage from the catchbasins and addition roof will be controlled and discharged to a new storm manhole, STMH-1. Footing drains will be installed around the proposed addition and will discharge to the same new storm manhole STMH-1. Drainage from the existing roof will be uncontrolled and discharged to a new storm manhole STMH-3. Currently, pre-development flows are directed overland to the storm sewer system in the right of way on Java Street and Iona Street. Stormwater quantity control will be achieved using three flow control roof drains on the proposed addition roof as well as a flow control in CBMH-2.

The proposed snow storage areas are located west of the new parking lot and in the existing grass field east of the school. The snow storage directly west of the new parking lot will is prohibited from crossing over the new fence to the south in order in order to keep the proposed CB-1 functional during the winter months.

The proposed renovations will include the separation of the sanitary and storm (roof drains) from the existing school building. The stormwater flows from the roof will be redirected from the sanitary sewer to the storm sewer.

However, the existing roof cannot support the weight of stormwater. Based on conversations with the City of Ottawa on March 11, 2019, the existing roof will connect separately and uncontrolled to the municipal storm sewer on Java Street. Stormwater management calculations are included in **Appendix B**.

1.2 Stormwater Management

Storm drainage calculations for the entire site are not included in this report and are for only the development area; stormwater management calculations can be found in **Appendix B**. The development areas, as shown on **Figure 1** and **Figure 2**, includes the pre- and post- stormwater drainage areas.

Stormwater management calculations provided within this report only include the development area (A1 – A3) parameters. Based on pre-development conditions, the average runoff coefficient for the development area is **C=0.62** however runoff coefficient of **C=0.50** is used as per City of Ottawa Sewer Design Guidelines, Section 5.4.5.2. In accordance with City of Ottawa requirements the allowable release rate for this site is to be restricted to the 5-year storm event. The pre-development area was divided into three drainage areas and analysed separately according to areas that will be altered from soft to hard surface.

Based on the 5-year design storm, a rainfall intensity of 104.2 mm/hr (t_c=10 min.), and a proposed drainage area (A1 – A3) of **0.442 ha**, the 5-year allowable release rate is: **$Q_{allowable}$ = 2.78 x 0.50 x 104.2 mm/hr x 0.442 ha = 64.0 l/s**.

The roof drains from the proposed addition connect externally to a 250mm diameter storm sewer lateral and ultimately to the new storm sewer system in the parking lot at a controlled release rate of 20.0 l/s for the 1:100-year event. The proposed 250mm diameter storm sewer from the parking lot will ultimately connects to the 300mm diameter municipal storm sewer on Java Street.

As noted above, the development area is approximately **0.442 ha** and has a post-development average weighted runoff coefficient of **C=0.63** and **C=0.71** for the 5-year and 100-year events, respectively. Stormwater management techniques are required to reduce peak flows from the development area, given that post-development peak flows will exceed the 5-year allowable release rate. Overall onsite storage requirements for the development area were calculated to be **24m^3** and **68m^3** for the 5-year and 100-year events, respectively.

Post-development peak flows will also be detained on the proposed two-storey addition roof by installing flow control roof drains at the proposed roof drains. The total cumulative flow of all three (3) roof drains will be limited **5.0 l/s**. The three roof drains for the new two-storey addition will outlet the proposed building addition through a 250mm diameter storm sewer and connect to the proposed 250mm diameter storm sewer in the parking lot. On the roof, the restricted flow will create rooftop storage of **9 m^3** (90mm ponding depth) and **23 m^3** (130mm ponding depth) for the 5-year and 100-year event, respectively. Based on the maximum ponding depth of 150mm on the roof, the total available storage is approximately **30 m^3**, which is sufficient to accommodate the 100-year event. Refer to Appendix B, Table B.1.4 – Site Storage for ponding calculations.

At CBMH-2, the restricted flow rate of **15.0 l/s** at an estimated head of **2.53m** will create parking lot ponding volume requirement of **16.0 m^3** and **46 m^3** for the 5-year and 100-year events, respectively,. Based on ponding depth of 220 mm, and the parking lot ponding area at CBMH-1 and CBMH-2 measuring 650m^2, the available storage is approximately **47 m^3**, which is sufficient to accommodate the 100-year event. There will be no above ground ponding at CB-1 because the top of frame elevation is 200mm higher than CBMH-1 and CBMH-2 and ponding for the 100-year event is less than the top of frame elevation difference.

Drainage area A4 represents the existing school building which currently discharges to the sanitary sewer on Java Street. The proposed renovations will include the separation of the sanitary and storm (roof drains) from the existing school building. Therefore, there will be an increase in stormwater to the municipal storm sewer and a decrease to the municipal sanitary sewer. Decreasing the sanitary flows will benefit the City of Ottawa by reducing the sanitary treatment volume. Based on conversations with the City of Ottawa on March 11, 2019, the existing roof will connect separately and uncontrolled to the municipal storm sewer on Java Street. The existing roof will not be storing water. Refer to **Appendix C** – for existing roof plan.

Stormwater management calculations/analysis for the entire site was not included in the scope of work. However, based on the topographical survey data, it appears that the direction of the overland flow route is split between the proposed parking lot entrance on Iona Street and free flowing to Java Street.

1.3 Sanitary Servicing

Based on record drawings, the existing Elmdale Public School site is currently serviced by a 150mm diameter sanitary service that discharges from the existing school to the existing 225mm diameter municipal sanitary sewer on Java Street. The existing sanitary system is a combined system that outlets the sanitary waste from the school as well as the existing buildings roof drains. The proposed renovations will include the separation of the sanitary and storm (roof drains) from the existing school building. The existing building roof drains will outlet independently through a 250mm diameter to the 300mm diameter municipal storm sewer. Based on available CCTV videos March 2019 the existing sewer services from the existing school building to the Right-of-Way on Java St. appear to be 150mm dia. functional and in fair condition and do not require replacement. Active flow is visible, and signs of sewer collapse were not observed. Pipe corrosion is visible, and the sewer service is submerged for a section length of approximately 20m.

The existing 150mm diameter sanitary sewer will continue to service the existing school building but will exclude the existing storm roof drain discharge resulting in a reduced sanitary treatment volume. A second sanitary sewer connection is proposed to service the proposed addition. The proposed 200mm diameter sanitary sewer will outlet the proposed addition at a slope of 2.0% and connect to the 225mm diameter municipal sanitary sewer on Java Street. The proposed elevator pit drain will be connected to the existing sanitary sewer system.

The peak sanitary flows for the entire site (1.153 ha) were calculated to be 0.56 l/s or 0.28 l/s for each section of sewer (Refer to **Appendix D** - Sanitary Sewer Design Sheet). The proposed 200mm diameter sanitary service will have a full flow capacity of 46.4 l/s which is adequate to handle the proposed development sanitary flows. The existing 150mm diameter sanitary service slope is unknown and assumed to be 0.5%; therefore, it will have a full flow capacity of 10.8 l/s, which will be reduced from the existing conditions. There will be a decrease in the sanitary flows to the existing municipal sanitary sewer.

1.4 Water Servicing

Based on record drawings, the existing Elmdale Public School site is currently serviced by a 100mm diameter water service connected to the 150mm diameter municipal watermain on Iona Street. The existing 100mm diameter watermain will be removed and replaced with a 150mm diameter watermain to accommodate a sprinkler system in the existing school and the proposed addition.

Water requirements were provided to the City of Ottawa for the hydraulic analysis of the boundary conditions for the school site. The water demand for the proposed school was calculated based on Table 4.2 from the City of Ottawa Design Guidelines for Water Distribution. The calculations are based on the following criteria:

- Average daily demand for schools = 70 l/student/day
- School day = 8 hours
- School occupancy = 591 persons (staff and students)

Average Daily Demand: $\frac{70 \text{ l/student/day} \times 591 \text{ persons}}{8 \text{ hrs/day} \times 3600 \text{ s/hr}} = 1.44$ l/s

Maximum Daily Demand: 1.44 l/s x 1.5 = 2.15 l/s

Maximum Hour Demand: 2.15 l/s x 1.8 = 3.88 l/s

1. Average daily demand: 1.44 L/s.
2. Maximum daily demand: 2.15 L/s.
3. Maximum hourly daily demand: 3.88 L/s.

Based on the Fire Underwriters Survey Method, the fire flow demand for the school was calculated to be: 216.7 L/s (refer to **Appendix E** – Fire Flow Calculations AND Boundary Conditions). The existing building and proposed building addition will be equipped with a sprinklers system.

The above water demand requirements were provided to the City of Ottawa for the hydraulic analysis of the boundary conditions at the proposed institutional development location. The following Boundary Conditions, included in **Appendix E**, were returned from a previous set of water requirements:

Minimum HGL = 108.0m
Maximum HGL = 115.0m
Available Flow @ 20psi = 70 L/s assuming a ground elevation of 70.8m
In accordance with the City of Ottawa Technical Bulletin ISTB-2018-02 issued March 21, 2018, no new hydrants will be required as part of this project. Refer to **Appendix F** for existing hydrant locations. Two municipal hydrants are within 150m of the existing school and one municipal and one private hydrant are within 75m of the existing school. Combined the hydrants can provide a total of 236 l/s (55 l/s + 55 l/s + 63 l/s + 63 l/s), which exceeds the required fire flow of 216 L/s.

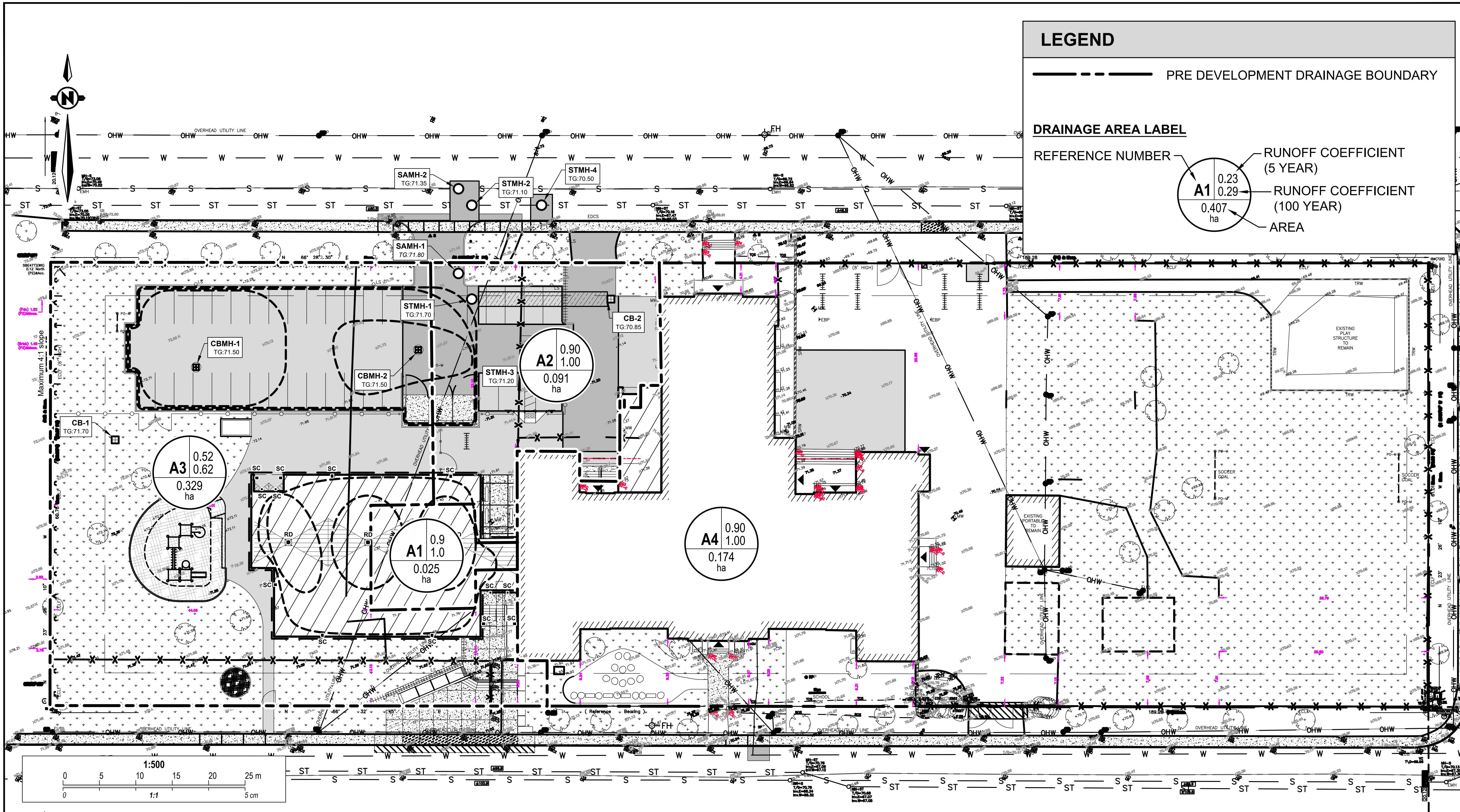
1.5 Agency Approvals

We understand that ultimately, the receiving watercourse for this site is the Ottawa River. Based on correspondence with the Rideau Valley Conservation Authority (RVCA), attached in **Appendix G**, given the distance to the watercourse outlet, onsite water quality controls would have a negligible impact on surface water improvement.

End of Site Servicing and Stormwater Management Brief

David Nguyen, P.Eng. ing.
Principal, Operations Manager, Civil Engineer

Att. Figure 1 – Pre-Development Stormwater Management Sub-Drainage Areas
Figure 2 – Post-Development Stormwater Management Sub-Drainage Areas
Appendix A – City of Ottawa Pre-consultation meeting notes
Appendix B – Stormwater Management Calculations
Appendix C – Existing Roof Plan
Appendix D – Sanitary Service Calculations and Coordination
Appendix E – Fire Flow Calculations and Boundary Conditions
Appendix F – RVCA Correspondence, dated November 29, 2018
Appendix G – Development Servicing Study Checklist



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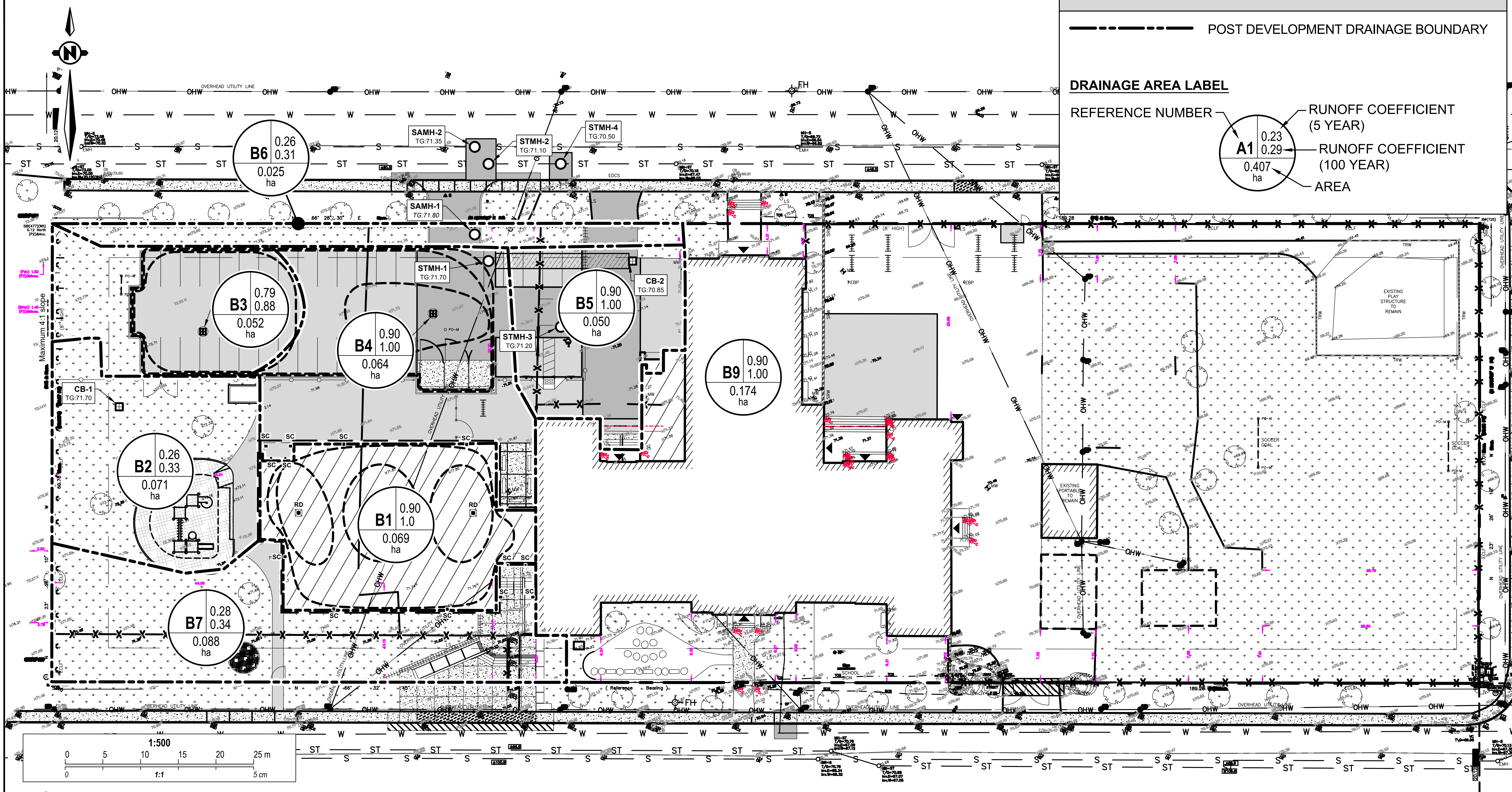
ELMDALE PUBLIC SCHOOL

49 IONA STREET, OTTAWA, ONTARIO

FIGURE 1: PRE-DEVELOPMENT STORMWATER MANAGEMENT SUB-DRAINAGE AREAS

Designed : SM		Project No. : 18-1065A
Drafted : RW		Revision Date : 2018-12-17
Checked :	Approved :	Revision No. : 1
Scale : 1:500		

Folder: \\JP2GOTTNAS\PROJECT DATA\1-MULTIDISCIPLINE\2018\18-1065A - CUHACI - ELMDALE PS - ADDITION AND RENOVATION\05 DRAWINGS\1 ONGOING | Drawing: C1&C2 site servicing and grading plan Elmdale 2019-06-17.dwg | Layout: Pre-development drainage (11x17) | Print date: 8:59 AM June 19, 2019



LEGEND

POST DEVELOPMENT DRAINAGE BOUNDARY

DRAINAGE AREA LABEL

REFERENCE NUMBER — A1

RUNOFF COEFFICIENT (5 YEAR) — 0.23

RUNOFF COEFFICIENT (100 YEAR) — 0.29

AREA — 0.407 ha

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FIGURE 2: POST-DEVELOPMENT STORMWATER MANAGEMENT SUB-DRAINAGE AREAS

Designed : SM	Project No. : 18-1065A
Drafted : RW	Revision Date : 2018-12-17
Checked : Approved :	Revision No. : 1
Scale : 1:500	

Folder: \\JP2GOTTNAS\PROJECT DATA\1-MULTIDISCIPLINE\2018\18-1065A - CUHACI - ELMDALE PS - ADDITION AND RENOVATION\05 DRAWINGS\1 ONGOING | Drawing: C1&C2 site servicing and grading plan Elmdale 2019-06-17.dwg | Layout: Post-development drainage (11x17) | Print date: 8:59 AM June 19, 2019

Appendix A - Record of Pre-Consultation

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer to:

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	15	1. Site Servicing Plan	2. Site Servicing Study / Brief	S	3
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
TBD	3	9. Transportation Impact Study / Brief	10.Erosion and Sediment Control Plan / Brief	S	3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		
		13.Hydraulic Water main Analysis	14.Noise / Vibration Study (If on-site stationary noise source)		
		15.Roadway Modification Design Plan	16.Confederation Line Proximity Study		

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
		17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		
		19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	15	21.Site Plan	22.Minimum Distance Separation (MDS)		
		23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		
		25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		
S	15	27.Landscape Plan (showing existing trees)	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		
S	2	29.Survey Plan	30.Shadow Analysis		
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)		
		33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		
		36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		
		38.Record of Site Condition	39.Mineral Resource Impact Assessment		
		40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		
		42.Mine Hazard Study / Abandoned Pit or Quarry Study			

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
		43.	44.		

Meeting Date: November 1, 2018

Application Type: Site Plan Control

File Lead (Assigned Planner): Steve Gauthier

Infrastructure Approvals Project Manager: Jessica Valic

Site Address (Municipal Address): 49 Iona Street

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5☐

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the Planning and Growth Management Department will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning and Growth Management Department.

Appendix B - Stormwater Management Calculations

Elmdale Public School, 49 Iona Street, Ottawa, Ontario
DEVELOPMENT AREA

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B.1.1 - Allowable release rate

ID	Description	Type	Areas (m^2) $C_{0.90}$	$C_{0.50}$	$C_{0.20}$	Total (m^2)	$C_{pre-2-yr}$	$C_{pre-100-yr}$*
A1	Existing Addition	uncontrolled	225	0	0	225	0.90	1.00
A2	Area draining to Java Street	uncontrolled	910	0	0	910	0.90	1.00
A3	Area draining to Iona Street	uncontrolled	955	1320	1010	3285	0.52	0.62
			2090	**1320**	**1010**	**4420**	**0.62**	**0.72**

Using the Rational Method, the maximum allowable release rate is therefore:

Total Area, A = **0.442** ha
Runoff coefficient, C = **0.50** C=0.50 as per City of Ottawa Sewer Design Guidelines (Section 5.4.5.2)
Estimated time of concentration, t_c = **10.0** minutes
Based on Ottawa IDF curve, $i_{5\text{-years}}$ = $998.071/(t_c+6.053)^{0.814}$
104.2 mm/hr

$Q_{allowable}$ = ***Q = 2.78 C x i x A*** — *C is the Runoff Coefficient*
$Q_{allowable\ (5\text{-year})***}$ = **64.0** l/s ① — *i is the intensity in mm/hr*
A is the area in hectares (ha)

****In accordance with City of Ottawa requirements, the allowable release rate for this site is based on the 5-yr storm*

B.1.2 - Post-development release rate

ID	Description	Type	A Areas (m^2) $C_{0.90}$	B $C_{0.50}$	C $C_{0.20}$	D Total (m^2)	$C_{post-5-yr}$	$C_{post-100-yr}$*
B1	Proposed new addition	controlled	690	0	0	690	0.90	1.00
B2	Soft area draining to Java Street	controlled	0	150	555	705	0.26	0.33
B3	Hard area draining to Java Street - west parking	controlled	440	0	80	520	0.79	0.88
B4	Hard area draining to Java Street - centre parkin	controlled	885	0	0	885	0.90	1.00
B5	Hard area draining to Java Street - east parking l	uncontrolled	495	0	0	495	0.90	1.00
B6	Soft area adjacent to parking lot draining to Java	uncontrolled	20	0	225	245	0.26	0.31
B7	Soft area draining to Iona Street	uncontrolled	100	15	765	880	0.28	0.34
			2630	**165**	**1625**	**4420**	**0.63**	**0.71**

Calculations for post-development runoff coefficient
$C_{post-5-yr\ (col.\ D)}$ =(column A * 0.9 + column B * 0.5 + column C * 0.2) / column D
$C_{post-100-yr\ (col.\ E)}$ =(column A * 1.0 + column B * 0.5*1.25 + column C * 0.2*1.25) / column D
note: 0.90 x 1.25 = 1.125, use max. 1.0

Calculations for average weighted runoff coefficient
$C_{post-5-yr}$ =((2630*0.9)+(165*0.5)+(1625*0.2))/4420
$C_{post-100-yr}$ =((2630*1.0)+(165*0.5*1.25)+(1625*0.2*1.25))/4420

Estimated time of concentration, t_c = **10.0** minutes — **Minimum allowable value as per City of Ottawa Sewer Design Guidelines (Section 5.4.5.2)**
Based on Ottawa IDF curve, $i_{5\text{-years}}$ = $998.071/(t_c+6.053)^{0.814}$
104.2 mm/hr
Based on Ottawa IDF curve, $i_{100\text{-years}}$ = $1735.688/(t_c+6.014)^{0.820}$
178.6 mm/hr

B.1.2.1 - uncontrolled flow

Total uncontrolled area (B5, B6, B7) = **0.162** ha
5-year Runoff coefficient, C = **0.47**
100-year Runoff coefficient, C = **0.54**
Estimated time of concentration, t_c = **10.0** minutes

$Q_{uncontrolled\ 5\text{-year}}$ = **22.0** l/s ②
$Q_{net\text{-}allowable\ 5\text{-year}}$ = **42.0** l/s ③ = ①-②
$Q_{uncontrolled\ 100\text{-year}}$ = **43.3** l/s ④
$Q_{net\text{-}allowable\ 100\text{-year}}$ = **20.7** l/s ⑤ = ①-④

B.1.3 - Post-development onsite storage

B.1.3.1 - Overall onsite storage requirements

Total controlled development area	**0.280**	ha	
5-year Runoff coefficient, C	**0.72**		
100-year Runoff coefficient, C	**0.81**		
net-allowable 5-year release rate	**20.00**	l/s	⑤

Table 1.3.1a - 5-year onsite storage requirements

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	3	166.1	93.1	20.0	73.1	13.2
	4	152.5	85.5	20.0	65.5	15.7
	5	141.2	79.1	20.0	59.1	17.7
	10	104.2	58.4	20.0	38.4	23.0
peak Vstored --->	15	83.6	46.8	20.0	26.8	24.1
	20	70.3	39.4	20.0	19.4	23.2
	25	60.9	34.1	20.0	14.1	21.2
	30	53.9	30.2	20.0	10.2	18.4
	35	48.5	27.2	20.0	7.2	15.1
	40	44.2	24.8	20.0	4.8	11.4
	45	40.6	22.8	20.0	2.8	7.5
	50	37.7	21.1	20.0	1.1	3.3
	55	35.1	19.7	20.0	-0.3	-1.1
	60	32.9	18.5	20.0	-1.5	-5.5

Therefore **24** m^3 of onsite storage required during 2-year event

Table 1.3.1b - 100-year onsite storage requirements

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	10	178.6	112.6	20.0	92.6	55.6
	15	142.9	90.1	20.0	70.1	63.1
	20	120.0	75.6	20.0	55.6	66.8
	25	103.8	65.5	20.0	45.5	68.2
peak V_{stored} --->	30	91.9	57.9	20.0	37.9	68.3
	35	82.6	52.1	20.0	32.1	67.4
	40	75.1	47.4	20.0	27.4	65.7
	45	69.1	43.5	20.0	23.5	63.6
	50	64.0	40.3	20.0	20.3	61.0
	55	59.6	37.6	20.0	17.6	58.1
	60	55.9	35.2	20.0	15.2	54.9

Therefore **68** m^3 of onsite storage required during 100-year event

Table 1.3.1c - 100-year (+20%) estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	10	214.3	135.1	20.0	115.1	69.1
	15	171.5	108.1	20.0	88.1	79.3
	20	143.9	90.8	20.0	70.8	84.9
	25	124.6	78.6	20.0	58.6	87.9
	30	110.2	69.5	20.0	49.5	89.1
peak V_{stored} --->	35	99.1	62.5	20.0	42.5	89.2
	40	90.2	56.9	20.0	36.9	88.5
	45	82.9	52.2	20.0	32.2	87.1
	50	76.7	48.4	20.0	28.4	85.2
	55	71.5	45.1	20.0	25.1	82.9
	60	67.1	42.3	20.0	22.3	80.3

Therefore **89** m^3 of storage required during 100-year event + 20%

B.1.3.2 - Estimated detention created by installing roof weirs (B1)

Total flow controlled roof area	**0.069**	ha	
5-year Runoff coefficient, C	**0.90**		
100-year Runoff coefficient, C	**1.00**		
Install weirs at each of the roof drains limiting total flow to	**5.00**	l/s	*WATTS RD-100 Flow Control Roof Drain, or approved equivalent*

Table 1.3.2a - 5-year estimated detention on new 2-storey roof

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	4	152.5	26.3	5.0	21.3	5.1
	5	141.2	24.4	5.0	19.4	5.8
	6	131.6	22.7	5.0	17.7	6.4
	7	123.3	21.3	5.0	16.3	6.8
	8	116.1	20.0	5.0	15.0	7.2
	10	104.2	18.0	5.0	13.0	7.8
	15	83.6	14.4	5.0	9.4	8.5
peak V_{stored} --->	20	70.3	12.1	5.0	7.1	8.6
	25	45.2	7.8	5.0	2.8	4.2
	30	40.0	6.9	5.0	1.9	3.4

Therefore **9** m^3 estimated roof detention

Table 1.3.2b - 100-year estimated detention on new 2-storey roof

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	10	178.6	34.3	5.0	29.3	17.6
	15	142.9	27.4	5.0	22.4	20.2
	20	120.0	23.0	5.0	18.0	21.6
	25	103.8	19.9	5.0	14.9	22.4
	30	91.9	17.6	5.0	12.6	22.7
peak V_{stored} --->	35	82.6	15.8	5.0	10.8	22.8
	40	75.1	14.4	5.0	9.4	22.6
	45	69.1	13.2	5.0	8.2	22.3
	50	64.0	12.3	5.0	7.3	21.8
	55	59.6	11.4	5.0	6.4	21.2
	60	55.9	10.7	5.0	5.7	20.6

Therefore **23** m^3 estimated roof detention

Table 1.3.2c - 100-year (+20%) estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	10	214.3	41.1	5.0	36.1	21.7
	15	171.5	32.9	5.0	27.9	25.1
	20	143.9	27.6	5.0	22.6	27.1
	25	124.6	23.9	5.0	18.9	28.4
	30	110.2	21.1	5.0	16.1	29.1
	35	99.1	19.0	5.0	14.0	29.4
peak V_{stored} --->	40	90.2	17.3	5.0	12.3	29.5
	45	82.9	15.9	5.0	10.9	29.4
	50	76.7	14.7	5.0	9.7	29.2
	55	71.5	13.7	5.0	8.7	28.8
	60	67.1	12.9	5.0	7.9	28.3

Therefore **30** m^3 estimated roof detention

B.1.3.3 - Estimated detention created by installing flow restrictor at CBMH-2 (B2, B3 & B4) outlet in parking area

Total controlled area	**0.211**	ha	
5-year Runoff coefficient, C	**0.66**		
100-year Runoff coefficient, C	**0.75**		
Install flow control at EX CB (B2) outlet*	**15.0**	l/s	*0.0m head*

Table 1.3.3a - 5-year estimated detention in parking area

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	2	182.7	70.8	15.0	55.8	6.7
	3	166.1	64.4	15.0	49.4	8.9
	4	152.5	59.1	15.0	44.1	10.6
	5	141.2	54.7	15.0	39.7	11.9
	6	131.6	51.0	15.0	36.0	13.0
	10	104.2	40.4	15.0	25.4	15.2
peak V_{stored} --->	15	83.6	32.4	15.0	17.4	15.7
	20	70.3	27.2	15.0	12.2	14.7
	25	60.9	23.6	15.0	8.6	12.9

Therefore **16** m^3 estimated yard detention

Table 1.3.3b - 100-year estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	8	199.2	87.4	15.0	72.4	34.8
	9	188.3	82.6	15.0	67.6	36.5
	10	178.6	78.3	15.0	63.3	38.0
	11	169.9	74.5	15.0	59.5	39.3
	20	120.0	52.6	15.0	37.6	45.2
peak V_{stored} --->	30	91.9	40.3	15.0	25.3	45.6
	40	75.1	33.0	15.0	18.0	43.1
	50	64.0	28.1	15.0	13.1	39.2
	60	55.9	24.5	15.0	9.5	34.3
	70	49.8	21.8	15.0	6.8	28.8
	80	45.0	19.7	15.0	4.7	22.8

Therefore **46** m^3 estimated yard detention

Table 1.3.3c - 100-year (+20%) estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	9	225.9	99.1	15.0	84.1	45.4
	10	214.3	94.0	15.0	79.0	47.4
	11	203.9	89.5	15.0	74.5	49.1
	12	194.6	85.4	15.0	70.4	50.7
	20	143.9	63.2	15.0	48.2	57.8
peak V_{stored} --->	30	110.2	48.4	15.0	33.4	60.1
	40	90.2	39.6	15.0	24.6	59.0
	50	76.7	33.7	15.0	18.7	56.0
	60	67.1	29.4	15.0	14.4	51.9
	70	59.7	26.2	15.0	11.2	47.1
	80	54.0	23.7	15.0	8.7	41.7

Therefore **60** m^3 estimated yard detention

B.1.4 - Site storage

	5-year event	100-year event	100-year event +20%		
overall storage requirements	24	68	89	m^3	*Table B.1.3.1*
estimated roof detention	9	23	30	m^3	*Table B.1.3.2*
roof ponding depth	0.09	0.13	0.15	m	*maximum allowable: 0.15m*
estimated roof ponding volume	9	23	30	m^3	*pyramid equation (V=roof area*ponding depth/3)*
estimated soft area detention	16	46	60	m^3	*Table B.1.3.3*
soft area ponding depth (CB-1)	0.00	0.00	0.00	m	*maximum allowable: 0.3m*
estimated soft area ponding volume (CB-1)	0	0	0	m^3	*pyramid equation (V=roof area*ponding depth/3)*
parking lot area ponding depth (CBMH-1 & CBMH-2)	0.11	0.22	0.24	m	*maximum allowable: 0.3m*
estimated pasrking lot area ponding volume (CBMH-1 & CBMH	16	47	60	m^3	*pyramid equation (V=roof area*ponding depth/3)*
Total available onsite storage > overall storage requirements	OK	OK	OK		
Total available onsite storage > estimated detention	OK	OK	OK		

B.1.5 - Release rate for site

Release rate		
Allowable release rate (5-yr)	64.01	*Section B.1.1*
Uncontrolled release rate for (100-yr)	43.28	*Section B.1.2.1*
Controlled release rate at roof (100-yr)	5.00	*Section B.1.3.2*
Controlled release rate at CBMH-2 (100-yr)	15.00	*Section B.1.3.3*
Total release rate (100-yr)	63.28	*CRR*
Total release rate (100-yr) < Allowable release rate (5-yr)	OK	

Elmdale Public School, 49 Iona Street, Ottawa, Ontario
EXISTING BUILDING ROOF

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B.1.6 - Allowable release rate

ID	Description	Type	Areas (m^2) $C_{0.90}$	$C_{0.50}$	$C_{0.20}$	Total (m^2)	$C_{pre\text{-}2\text{-}yr}$	$C_{pre\text{-}100\text{-}yr}$*
A4	Existing School	uncontrolled	1735	0	0	1735	0.90	1.00
			1735	0	0	1735	0.90	1.00

Using the Rational Method, the maximum allowable release rate is therefore:

Total Area, A =	0.174	ha	
Runoff coefficient, C =	0.50		C=0.50 as per City of Ottawa Sewer Design Guidelines (Section 5.4.5.2)
Estimated time of concentration, t_c =	10.0	minutes	
Based on Ottawa IDF curve, $i_{5\text{-}years}$ =	$998.071/ (t_c+6.053)^{0.814}$		
	104.2	mm/hr	

$Q_{allowable}$ = *Q = 2.78 C x i x A* — *C is the Runoff Coefficient*

$Q_{allowable\ (5\text{-}year)***}$ = 25.1 l/s — *i is the intensity in mm/hr*

A is the area in hectares (ha)

****In accordance with City of Ottawa requirements, the allowable release rate for this site is based on the 5-yr storm*

B.1.7 - Post-development release rate

			A	B	C	D		
ID	Description	Type	Areas (m^2) $C_{0.90}$	$C_{0.50}$	$C_{0.20}$	Total (m^2)	$C_{post\text{-}2\text{-}yr}$	$C_{post\text{-}100\text{-}yr}$*
B8	Existing School	uncontrolled	1735	0	0	1735	0.90	1.00
			1735	0	0	1735	0.90	1.00

Calculations for post-development runoff coefficient
$C_{post\text{-}5\text{-}yr\ (col.\ D)}$ =(column A * 0.9 + column B * 0.5 + column C * 0.2) / column D
$C_{post\text{-}100\text{-}yr\ (col.\ E)}$ =(column A * 1.0 + column B * 0.5*1.25 + column C * 0.2*1.25) / column D
note: 0.90 x 1.25 = 1.125, use max. 1.0

Calculations for average weighted runoff coefficient
$C_{post\text{-}5\text{-}yr}$ =((1735*0.9)+(0*0.5)+(0*0.2))/1735
$C_{post\text{-}100\text{-}yr}$ =((1735*1.0)+(0*0.5*1.25)+(0*0.2*1.25))/1735

Estimated time of concentration, t_c =	10.0	minutes	Minimum allowable value as per City of Ottawa Sewer Design Guidelines (Section 5.4.5.2)
Based on Ottawa IDF curve, $i_{5\text{-}years}$ =	$998.071/ (t_c+6.053)^{0.814}$		
	104.2	mm/hr	
Based on Ottawa IDF curve, $i_{100\text{-}years}$ =	$1735.688/ (t_c+6.014)^{0.820}$		
	178.6	mm/hr	

<u>B.1.7.1 - uncontrolled flow</u>

Total uncontrolled area (B8) =	0.174	ha
5-year Runoff coefficient, C =	0.90	
100-year Runoff coefficient, C =	1.00	
Estimated time of concentration, t_c =	10.0	minutes

$Q_{uncontrolled\ 5\text{-}year}$ =	45.2	l/s	②
$Q_{net\text{-}allowable\ 5\text{-}year}$ =	-20.1	l/s	③ = ①-②
$Q_{uncontrolled\ 100\text{-}year}$ =	86.1	l/s	④
$Q_{net\text{-}allowable\ 100\text{-}year}$ =	-61.0	l/s	⑤ = ①-④

B.1.8 - Release rate for site

<u>Release rate</u>

Allowable release rate (5-yr)	25.13	l/s	*Section B.1.6*
Uncontrolled release rate for (100-yr)	86.12	l/s	*Section B.1.7.1*
Additional stormwater added to the system (100-yr)	61.00	l/s	*CRR*

Total release rate (100-yr) > Allowable release rate (5-yr)

B.2.1 - Storm Sewer Design Sheet
DEVELOPMENT AREA

Jp2g Consultants Inc.
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Project Name: Elmdale Public School, 49 Iona Street, Ottawa, Ontario

Definitions		Rational Method	Notes	
Manning's Coefficient =	0.013	Q = 2.78 CIA (l/s), where	1) Used City of Ottawa IDF Curve	Designed SM
Return Frequency (yrs) =	5	C= Runoff Coefficient	2) Min. velocity = 0.8 m/sec	Checked
1 acre = 0.4047 hectares		i = Rainfall Intensity (mm/hr)	3) Max. velocity = 6.0 m/sec	Dwg. Reference C1
		A = Areas in Hectares (ha)		Jp2g project No 18-1065A

LOCATION		AREA (ha)			FLOW							SEWER DATA							
From	To	C= 0.90	C= 0.50	C= 0.20	Individual 2.78CA	Cum. 2.78CA	tc (min.)	$i_{5\ years}$ (mm/hr)	$i_{100\ years}$ (mm/hr)	Flow $_{5\ years}$ (l/s)	Flow $_{100\ years}$ (l/s)	Dia. (mm)	Slope (%)	Length (m)	Capacity (full) (l/s)	Velocity (full) (m/s)	Sect.Time (minutes)	Tot. Time (minutes)	Utilization (%)
proposed roof	STMH-1	0.069	0.000	0.000	0.17	0.17	10.0	104.2	178.6	5.0	5.0	250	2.0	16.7	84.1	1.7	0.2	10.2	6
CB-1	CBMH-1	0.000	0.015	0.056	0.05	0.05	10.0	104.2	178.6	5.4	9.2	250	1.0	14.9	59.5	1.2	0.2	10.2	9
CBMH-1	CBMH-2	0.044	0.000	0.008	0.11	0.17	10.2	103.1	176.7	17.1	29.4	250	1.0	30.6	59.5	1.2	0.4	10.6	29
CBMH-2	STMH-1	0.064	0.000	0.000	0.16	0.33	10.6	101.0	173.0	15.0	15.0	250	1.0	10.1	59.5	1.2	0.1	10.8	25
CB-2	STMH-1	0.050	0.000	0.000	0.12	0.12	10.0	104.2	178.6	12.9	22.1	250	1.0	19.1	59.5	1.2	0.3	10.3	22
STMH-1	STMH-2	0.000	0.000	0.000	0.00	0.62	10.8	100.3	171.9	32.9	42.1	250	1.0	12.9	59.5	1.2	0.2	10.9	55

(Red fill) Flow control installed at outlet

B.2.2 - Storm Sewer Design Sheet
EXISTING BUILDING ROOF

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Project Name: Elmdale Public School, 49 Iona Street, Ottawa, Ontario

Definitions
Manning's Coefficient = 0.013
Return Frequency (yrs) = 5
1 acre = 0.4047 hectares

Rational Method
Q = 2.78 CIA (l/s), where
C= Runoff Coefficient
i = Rainfall Intensity (mm/hr)
A = Areas in Hectares (ha)

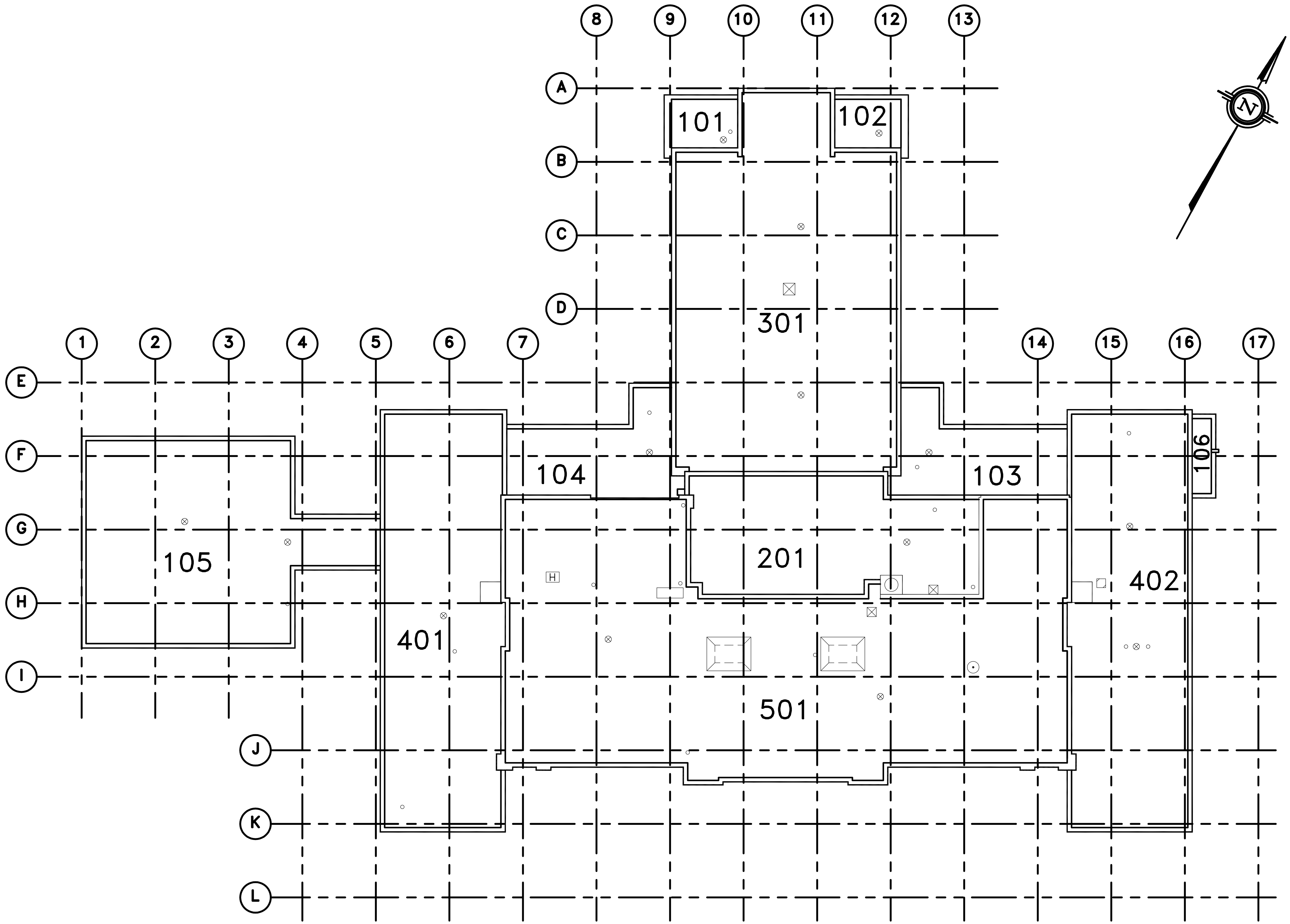
Notes
1) Used City of Ottawa IDF Curve
2) Min. velocity = 0.8 m/sec
3) Max. velocity = 6.0 m/sec

Designed SM
Checked
Dwg. Reference C1
Jp2g project No 18-1065A

LOCATION		AREA (ha)			FLOW							SEWER DATA							
		C=	C=	C=	Individual	Cum.	tc	$i_{5\ years}$	$i_{100\ years}$	$Flow_{5\ years}$	$Flow_{100\ years}$	Dia.	Slope	Length	Capacity	Velocity	Sect.Time	Tot. Time	Utilization
From	To	0.90	0.50	0.20	2.78CA	2.78CA	(min.)	(mm/hr)	(mm/hr)	(l/s)	(l/s)	(mm)	(%)	(m)	(full) (l/s)	(full) (m/s)	(minutes)	(minutes)	(%)
existing roof	STMH-3	0.130	0.000	0.000	0.33	0.33	10.0	104.2	178.6	33.9	58.1	250	2.0	15.0	84.1	1.7	0.1	10.1	40
existing roof	STMH-3	0.043	0.000	0.000	0.11	0.11	10.0	104.2	178.6	11.3	19.4	250	2.5	13.8	94.0	1.9	0.1	10.1	12
STMH-3	STMH-4	0.000	0.000	0.000	0.00	0.43	10.1	103.4	177.2	44.9	76.9	250	1.0	21.6	59.5	1.2	0.3	10.4	76

Flow control installed at outlet

Appendix C - Existing Roof Plan



OTTAWA-CARLETON DISTRICT SCHOOL BOARD

LEGEND

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- CHIMNEY
- ROOF SCUPPER
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- CONTROL JOINT
- ROOF HATCH
- MECHANICAL CURB
- MECHANICAL UNIT SUPPORT
- SAFETY ANCHOR
- PIPE SUPPORT
- FENCE
- PITCH POCKET
- SLEEPER
- LADDER
- PAVER
- SKYLIGHT
- DIRECTION OF ROOF SLOPE
- PIPE ENCLOSURE

INFORMATION ON EXISTING CONDITIONS IS PROVIDED AS A GUIDELINE ONLY. CONTRACTOR IS RESPONSIBLE FOR VERIFYING EXISTING MEASUREMENTS, CONDITIONS AND ROOF ASSEMBLY.

NEW RAINWATER LEADER

ND NEW DRAIN LOCATION

RD REMOVE AND DISCARD EXISTING DRAIN AND CLOSE-IN DRAIN

ED EXISTING DRAIN LOCATION

SUMP AREA AROUND DRAIN TO BE 2.4m x 2.4m, TYPICAL.

IRC BATTEN SEARS Group Inc.

74 Colonnade Rd. North, Suite 200
Ottawa (Nepean), ON. K2E 7L2
TEL: (613) 225-[illegible] FAX: (613) 225-[illegible]
E-MAIL: ottawa@ircgroup.com

Ottawa – Mississauga – Cambridge – London

DRAWN BY: R. J. D.	DESIGNED BY:
DATE: MAY 1999	CHECKED BY: R. J. S.
SCALE: N.T.S.	PLOT DATE:

PROJECT:

ELMDALE PUBLIC SCHOOL

49 IONA STREET
OTTAWA, ONTARIO

JOB NO.:

DRAWING NAME: ROOF PLAN

R1

SHEET: 1 OF 1

Appendix D – Sanitary Service Calculations and Coordination

Elmdale Public School, 49 Iona Street, Ottawa

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Appendix D - Sanitary Sewer Design Sheet

D.1 - Peak Flow Design Based on Site Area - Existing 150mm dia Connection

Definitions

Manning's Coefficient (n) = 0.013

Manning's Formula

$Q = A*R^{2/3}*S^{1/2}/n$ (l/s), where

A = Areas in Hectares (ha)

R = Hydraulic Radius (m)

S = Slope

Design Parameters*

1) Average Daily Flow = 280 L/p/day

2) Commercial/Institutional Flow = 28,000 L/ha/day

3) Maximum Residential Peak Factor = 4

4) Commercial/Institutional Peak Factor = 1.50

5) Extraneous Flow = 0.33L/s/ha

6) Minimum Velocity = 0.76 m/s

Location		Institutional Flow			Infiltration Flow			Total Flow	Sewer Data					
		Area (ha)		Peak Flow	Area (ha)		Inf. Flow		Length	Dia.	Slope*	Capacity	Velocity	Utilization
From	To	Individual	Cumulative	(l/s)	Individual	Cumulative	(l/s)	(l/s)	(m)	(mm)	(%)	(full) (l/s)	(full) (m/s)	(%)
School	ROW	0.577	0.577	0.28	0.577	0.577	0.19	0.47	51.0	150	0.5	10.8	0.6	4.4

*Slope of sanitary sewer is unknown - 0.5% assumed

C.1.2 - Peak Flow Design Based on Site Area - Proposed 200mm dia Connection

Location		Institutional Flow			Infiltration Flow			Total Flow	Sewer Data					
		Area (ha)		Peak Flow	Area (ha)		Inf. Flow		Length	Dia.	Slope*	Capacity	Velocity	Utilization
From	To	Individual	Cumulative	(l/s)	Individual	Cumulative	(l/s)	(l/s)	(m)	(mm)	(%)	(full) (l/s)	(full) (m/s)	(%)
School	ROW	0.577	0.577	0.28	0.577	0.577	0.19	0.47	51.0	200	2.0	46.4	1.5	1.0

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No.

Project Name: Elmdale School Renovation & Addition

Building Location: 49 IONA STREET

Municipality: Ottawa

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ☐ Conventionally drained roof (no flow control roof drains used).

M2. ☒ Flow control roof drains meeting the following conditions have been incorporated in this design:

- (a) the maximum drain down time does not exceed 24h,
- (b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
- (c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
- (d) there is at least one drain for each 900 sq.m.

M3. ☐ A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: RYAN LEONARD

Firm: GOODKEY WEEDMARK AND ASSOCIATES

Phone #: 613 727-5111

City: Ottawa Province: ON

LICENSED PROFESSIONAL ENGINEER R. T. LEONARD 100153202 March 5/19 PROVINCE OF ONTARIO

Mechanical Engineer's Seal

S1. ☒ The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.

S2. ☐ The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: RICHARD I. CUNLIFFE, P.ENG.

Firm: CUNLIFFE & ASSOCIATES INC.

Phone #: 613 729-7242 x222

City: OTTAWA Province: ON

LICENSED PROFESSIONAL ENGINEER R. I. CUNLIFFE 2019/03/05 PROVINCE OF ONTARIO

Structural Engineer's Seal

EABO Standard form/Endorsed by OAA, PEO and Ontario Building Officials Association

From:	Marc MacDonald
To:	Ryan Leonard; Jerzy Jurewicz; Tim Brazeau; David Hendrycks
Cc:	Sarah McLaughlin
Subject:	RE: Sump Recommendations
Date:	Thursday, April 4, 2019 4:59:57 PM

Ryan,

I expect that can go to storm. It is elevated enough from the water table (away from existing contamination) and it will be surrounded primarily by clean engineered fill.

Regards,

Marc MacDonald, P.Eng., QP, EP
Principal

CM3 Environmental Inc.

5710 Akins Road
Ottawa, ON
K2S 1B8

marc@cm3environmental.com

www.cm3environmental.com

Cell: (613) 618-3554
Office: (613) 838-2323
Fax: (613) 838-2717

From: Ryan Leonard <r.leonard@gwal.com>
Sent: April 4, 2019 4:04 PM
To: Marc MacDonald <marc@cm3environmental.com>; Jerzy Jurewicz <jerzyj@cuhaci.com>; Tim Brazeau <timb@cuhaci.com>; David Hendrycks <David.Hendrycks@ocdsb.ca>
Cc: Sarah McLaughlin <SarahM@jp2g.com>
Subject: RE: Sump Recommendations

Hi Marc,

Thanks for this. What do you suspect will be the requirement for the perimeter drainage tiles around the new 2 storey addition? Can that drain to storm?

Ryan Leonard, P.Eng., Associate - Mechanical Engineer
Goodkey, Weedmark & Associates Limited

Consulting Engineers
1688 Woodward Drive, Ottawa, Ontario, K2C 3R8
Voice: 613-727-5111, ext. 203
Fax: 613-727-5115
Email: r.leonard@gwal.com
Web: www.gwal.com

From: Marc MacDonald [mailto:marc@cm3environmental.com]
Sent: Wednesday, April 03, 2019 9:38 AM
To: Ryan Leonard; Jerzy Jurewicz; Tim Brazeau; David Hendrycks
Subject: RE: Sump Recommendations

Ryan,

As it stands the effluent water meets the Sanitary Discharge levels in all sumps but the soil in the bottom of the sumps is contaminated.

When the bottoms of the sumps are sealed up that should satisfy the City.

For Sump#1 I agree we just tie the weepers into the new elevator sump pit and remove Sump#1.

My recommendation is to provide a piping detail that comes up through the top of the new elevator sump pit to allow the possible future connection of a treatment system if the City demands it.

I will provide a detailed report on the testing of the sumps today or tomorrow.

Regards,

Marc MacDonald, P.Eng., QP, EP
Principal

CM3 Environmental Inc.

5710 Akins Road
Ottawa, ON
K2S 1B8

marc@cm3environmental.com

www.cm3environmental.com

Cell: (613) 618-3554
Office: (613) 838-2323
Fax: (613) 838-2717

From: Ryan Leonard <r.leonard@gwal.com>
Sent: April 2, 2019 2:05 PM
To: Marc MacDonald <marc@cm3environmental.com>; Jerzy Jurewicz <jerzyj@cuhaci.com>; Tim Brazeau <timb@cuhaci.com>; David Hendrycks <David.Hendrycks@ocdsb.ca>
Subject: RE: Sump Recommendations

Marc, can you please confirm if we are treating the ground water which enters the weepers, then the elevator sump pit, in the new elevator addition before we pump to sanitary?

Also, I know why you asked about the tracing of the existing weepers now. I am not sure what we gain by tracing the ones a sump pit#1 as we are ripping it all up anyways and will address the tieins to existing remaining weepers when uncovered during site.

Ryan Leonard, P.Eng., Associate - Mechanical Engineer
Goodkey, Weedmark & Associates Limited
Consulting Engineers
1688 Woodward Drive, Ottawa, Ontario, K2C 3R8
Voice: 613-727-5111, ext. 203
Fax: 613-727-5115
Email: r.leonard@gwal.com
Web: www.gwal.com

From: Marc MacDonald [mailto:marc@cm3environmental.com]
Sent: Friday, March 22, 2019 12:20 PM
To: Ryan Leonard; Jerzy Jurewicz; Tim Brazeau; David Hendrycks
Subject: Sump Recommendations

Hi guys,

I was speaking with Ryan this morning and he was looking for some formal recommendations for the sumps.

Because Sumps #1, #2 and the Boiler sump have earth floors the City will be worried about discharge of contamination to the sewers.

All discharge water should go to sanitary.

We are recommending:

Sump#1

- Trace inlet piping to determine where the weepers go.
- Remove Sump#1 as part of the renovations and run existing weepers into the new elevator sump.

Sump#2

- Install a liner or pour a concrete floor to reduce the risk of contamination entering the sump and sewer.
- Install a vapour proof lid and p-trap to prevent sewer vapours.

Boiler Sump

- Install a liner or pour a concrete floor to reduce the risk of contamination entering the sump and sewer.

Basement Sump Pump

- No action required.

Marc MacDonald, P.Eng., QP, EP
Principal

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www.cm3environmental.com

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Appendix E – Fire Flow Calculations and Boundary Conditions

From:	Valic, Jessica
To:	Sarah McLaughlin
Subject:	RE: Elmdale Public School boundary conditions
Date:	Friday, November 16, 2018 3:41:55 PM
Attachments:	image001.png 49 Iona Nov 2018.pdf

Hello Sarah,

As requested. Have a great weekend.

The following are boundary conditions, HGL, for hydraulic analysis at 49 Iona (zone 1W) assumed to be connected to the 152mm on Iona (see attached PDF for location).

Minimum HGL = 108.0m

Maximum HGL = 115.0m

Available Flow @ 20psi = 70 L/s assuming a ground elevation of 70.8m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Regards,

Jessica Valic, E.I.T.
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - Central
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 15672
jessica.valic@ottawa.ca

From: Sarah McLaughlin <SarahM@jp2g.com>
Sent: Friday, November 09, 2018 10:36 AM
To: Valic, Jessica <jessica.valic@ottawa.ca>
Cc: David Nguyen <davidn@jp2g.com>
Subject: Elmdale Public School boundary conditions

Hi Jessica,

Please see attached fire flow demand calculations for Elmdale Public School. We would like to request boundary conditions for the school based on the following calculations:

Average Daily Demand: $\frac{70 \text{ l/student/day} \times 591 \text{ students}}{8 \text{ hrs/day} \times 3600 \text{ s/hr}} = 1.44$ l/s

Maximum Daily Demand: 1.44 l/s x 1.5 = 2.15 l/s

Maximum Hour Demand: 2.15 l/s x 1.8 = 3.88 l/s

Thank you,

Sarah McLaughlin, P.Eng.
Civil Engineer
Jp2g Consultants Inc.

Email: sarahm@jp2g.com | Web: www.jp2g.com
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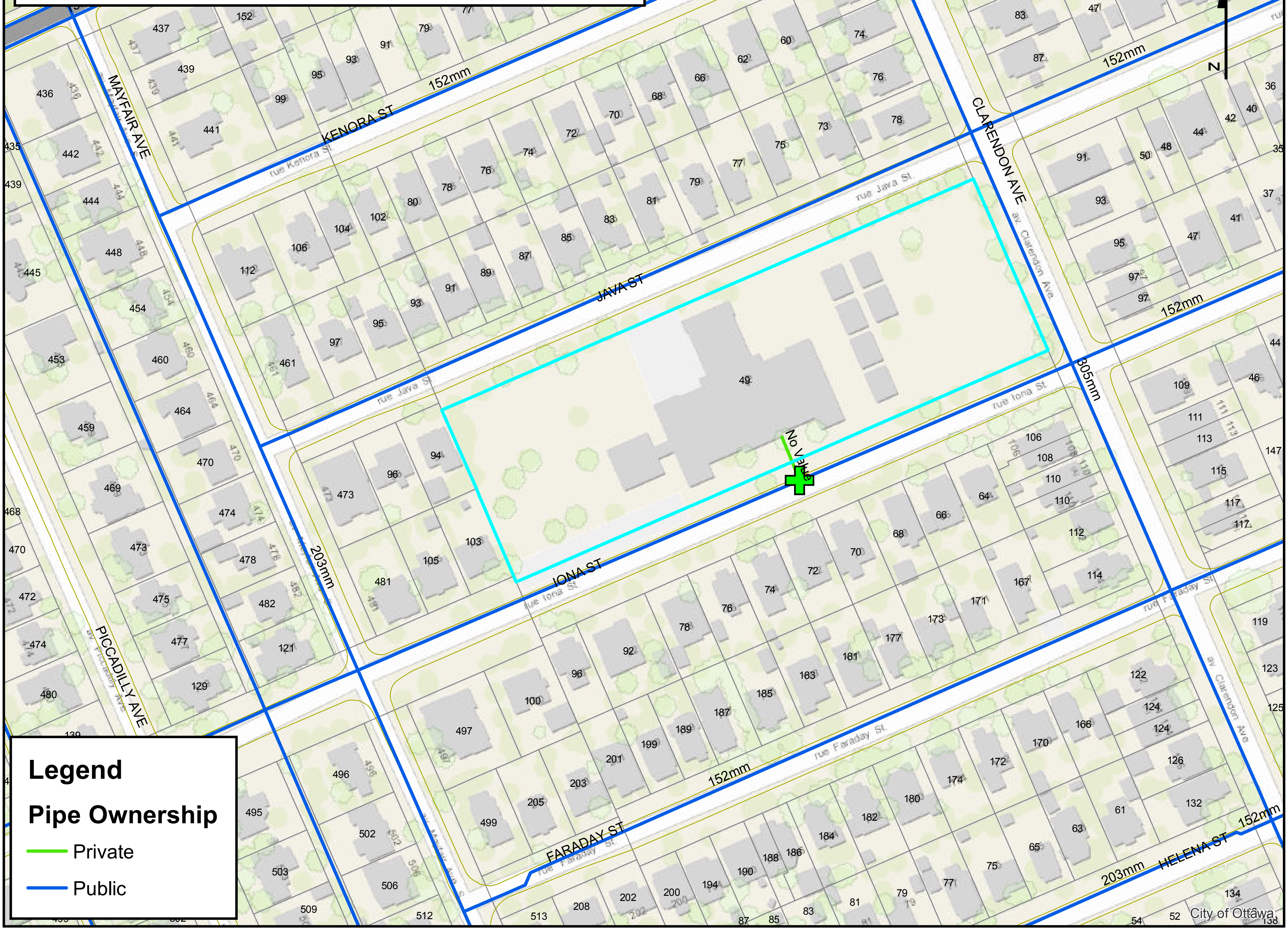
Boundary Condition for 49 Iona



Legend

Pipe Ownership

- Private
- Public

Elmdale Public School, 49 Iona Street, Ottawa, Ontario

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Appendix E - Water Demand

E.1 - Fire Flow Demand Requirements

Design Parameters*

Estimated Fire Flow Formula: $F=220*C*A^{1/2}$(L/min)

F = Required fire flow (L/min)
C = Coefficient related to the type of construction
$C_{1.5}$ = 1.5 for wood frame construction (structure essentially all combustible)
$C_{1.0}$ = 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
$C_{0.8}$ = 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)
$C_{0.6}$ = 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = Total floor area in square metres

Floor Area
existing building footprint: 1735m2
2 storey building : 245*2 = 490
3 storey building : 1490*3 = 4470
proposed addition footprint: 690m2
3 storey building : 690*3 = 2070
Total: 7030

Adjustments to the calculated fire flow are based on: reduction for low fire hazard occupancy (school), reduction for automatic sprinkler protection, and an increase for exposures for residences within 45 metres on two sides of the school.
The table below summarizes the adjustments made to the basic fire flow.

Building Construction	Floor Area	C	1 Fire Flow (F)	2 Occupancy		3 Sprinkler**		4 Exposure***		Final Adjusted Fire Flow	Final Adjusted Fire Flow
non-combustible construction	(m^2)		(L/min)	%	Adjusted Fire Flow(s) (L/min)	%	Adjusted Fire Flow(s) (L/min)	%	Adjusted Fire Flow(s) (L/min)	(L/min)	(L/s)
	7,030.0	0.8	15,000.0	-15.0	12,750.0	-30.0	-3,825.0	30.0	3,825.0	13,000.0	216.7

*Water Supply for Public Protection (Fire Underwriters Survey, 1999).
**The entire building is sprinklered and monitored.

E.2 - Existing Water Boundary Conditions

Water Demands

Average Daily Demand:	1.44	l/s
Maximum Daily Demand:	2.15	l/s
Maximum Hour Demand:	3.88	l/s
Fire Flow Demand:	216.67	l/s
Maximum Daily + Fire Flow Demand:	218.82	l/s

Design Parameters

Pipe Diameter:	150	mm
Pipe Material:	PVC	
Pipe Length	10.0	m
Finished Floor Elevation:	72.40	
Pavement (R.O.W.) Elevation:	70.80	

Boundary Conditions

Max. HGL:	115	m
Min HGL:	108	m
Availbale Flow @ 20psi = 70 L/s		

Boundary Condition Check

Check water pressure at municipal connection:

Min. HGL - Pavement elevation =	37.20	m
=	52.90	psi*
=	364.71	kPa*

*Normal operating pressure ranges between 345 kPa (50 psi) and 552 kPa (80 psi) under a condition of maximum daily flow as per City of Ottawa Design Guidelines - Water Distribution (Section 4.2.2)

Pressure at municipal connection — OK

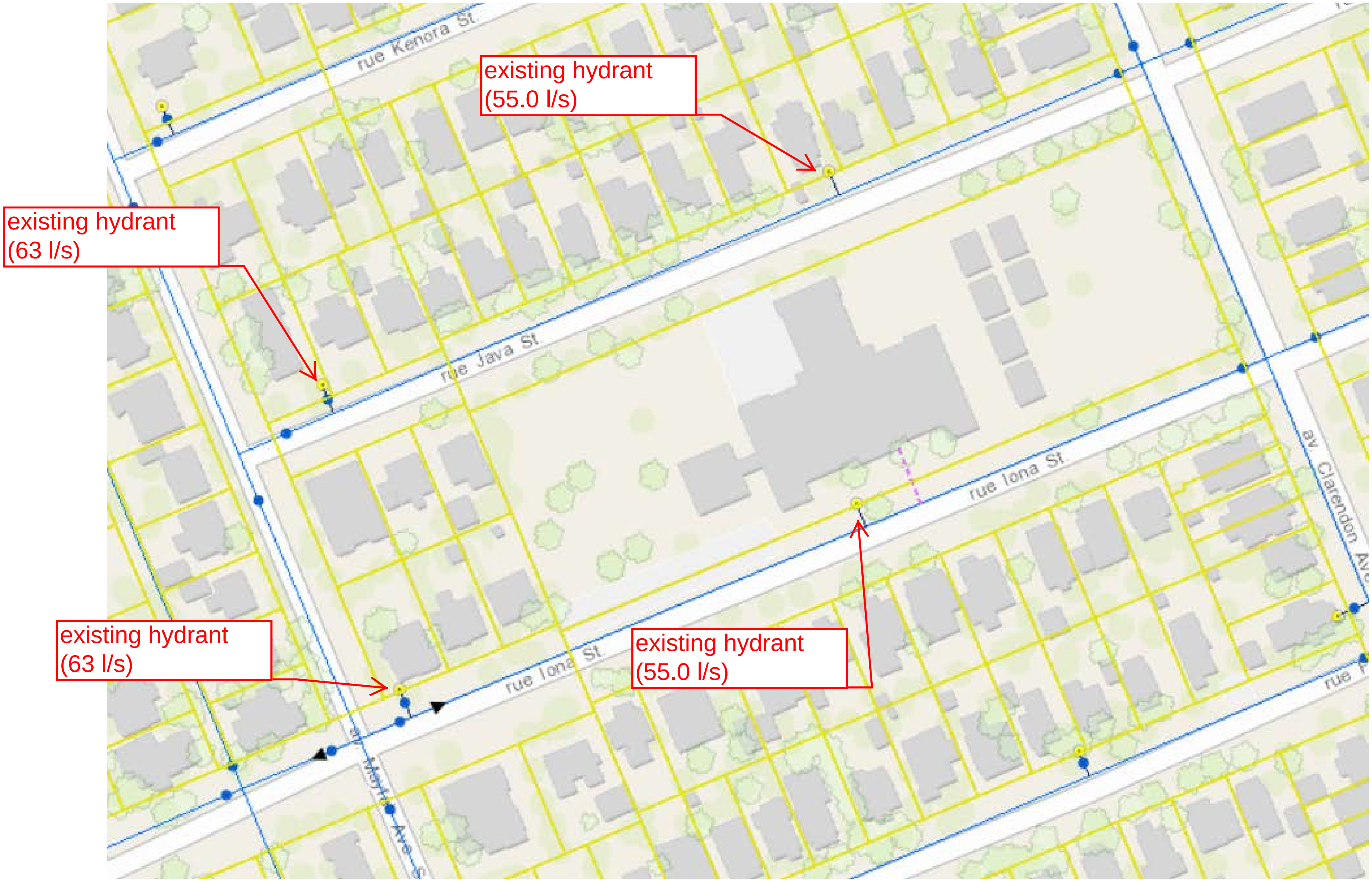
Check water pressure at building connection (at max. hour demand):

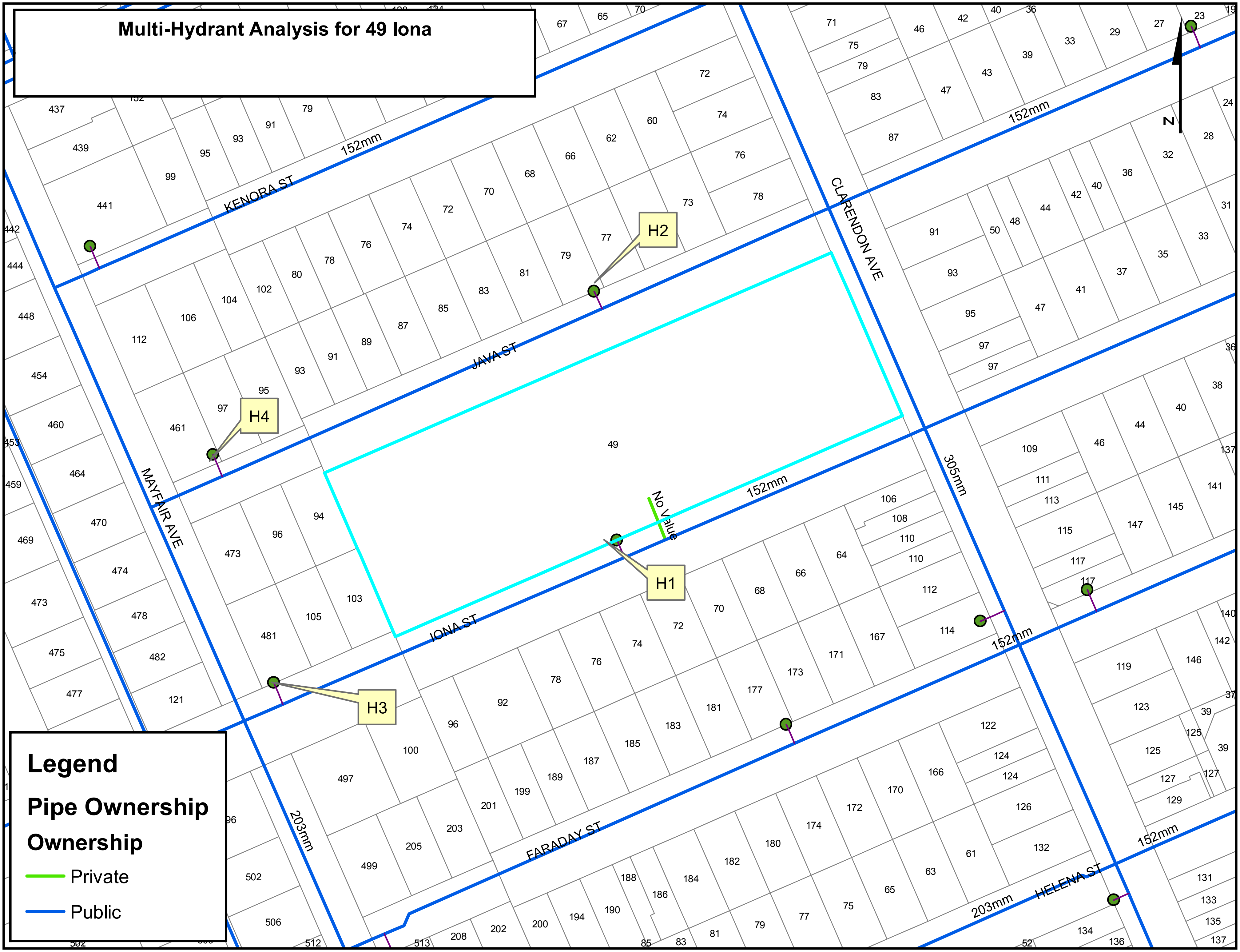
Min. HGL - Finished floor elevation - Friction Loss** =	35.59	m
=	50.61	psi***
=	348.97	kPa***

**Friction loss calculated using the Hazen-Williams Equation

***Under maximum hourly demand conditions the pressures shall not be less than 276 kPa (40 psi) as per City of Ottawa Design Guidelines - Water Distribution (Section 4.2.2)

Pressure at building connection (at max. hour demand) — OK


existing hydrant
(55.0 l/s)
existing hydrant
(63 l/s)
existing hydrant
(63 l/s)
existing hydrant
(55.0 l/s)
rue Kenora St
rue Java St
rue Iona St
rue Iona St
av Clarendon Ave


Multi-Hydrant Analysis for 49 Iona
KENORA ST
JAVA ST
IONA ST
FARADAY ST
HELENA ST
MAYFAIR AVE
CLARENDON AVE
152mm
203mm
305mm
No Value
H1
H2
H3
H4
49
N
Legend
Pipe Ownership
Ownership
Private
Public

From:	Valic, Jessica
To:	Sarah McLaughlin
Subject:	49 Iona - D07-12-18-0194
Date:	Wednesday, February 6, 2019 11:47:32 AM
Attachments:	49 Iona MultiHydrant Feb 2019.pdf

Good morning Sarah,

Please see revised multi-hydrant fire flow analysis for 49 Iona St below and attached.

You should be receiving the full list of site plan review comments within the coming days (the review period closed yesterday).

The following is the multi-hydrant fire flow analysis at 49 Iona (zone 1W)

MaxDay + FireFlow (assumed four hydrants running simultaneously, see attached for location)

H1 (55L/s) = 85.0m, connected to 152mm on Iona

H2 (55 L/s) = 85.0m, connected to 152mm on Java

H3 (63 L/s) = 95.0m, connected to 203mm on Iona

H4 (63 L/s) = 91.0m, connected to 152mm on Java

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Please do not hesitate to contact me with any questions/concerns.

Regards,

Jessica Valic, E.I.T.
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - Central
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613.580.2424 ext./poste 15672
jessica.valic@ottawa.ca

Appendix F – RVCA Correspondence

From:	Jamie Batchelor
To:	Sarah McLaughlin
Cc:	Eric Lalande; David Nguyen
Subject:	RE: 49 Iona Street, Ottawa Site Plan Control Application
Date:	Thursday, November 29, 2018 3:39:09 PM
Attachments:	image005.png

Good Afternoon Sarah,

We note that the site outlets to an existing storm sewer which runs more than 2 km to an outlet to a watercourse with no municipal treatment for quality provided. In the opinion of the RVCA, the distance to the outlet is sufficiently far that onsite water quality controls would have a negligible impact on surface water improvement. The RVCA would therefore accept that runoff from the site does not require any additional quality control measures.

Jamie Batchelor, MCIP,RPP
Planner
jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority

3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Sarah McLaughlin <SarahM@jp2g.com>
Sent: Wednesday, November 07, 2018 2:29 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Eric Lalande <eric.lalande@rvca.ca>; David Nguyen <davidn@jp2g.com>
Subject: 49 Iona Street, Ottawa Site Plan Control Application

Hi Jamie,

We are currently providing Civil Engineering services for the construction of an addition at Elmdale Public School located at 49 Iona Street, Ottawa, located in Fisher Park area of Ottawa, as shown on the attached map, below. The new addition will be located adjacent to the west side of the building. The addition we be located over the existing addition (to be removed) and hard surface play yard. Additionally, the parking lot on Iona will be eliminated and relocated to be accessed from Java Street. The proposed site plan is attached for your reference. As part of the Site Plan Control Application, the City has asked that we contact the RVCA to enquire about whether there are any quality control issues to consider in the stormwater management component of the application. Please advise whether there are any further matters we need to consider in preparing the Site Plan Application.

Thank you,

Sarah McLaughlin, P.Eng.

Civil Engineer
Jp2g Consultants Inc.

Email: sarahm@jp2g.com | Web: www.jp2g.com
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Appendix G – Development Servicing Study Checklist

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- N/A ☒ Executive Summary (for larger reports only).
- ☑ Date and revision number of the report.
- ☑ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☑ Plan showing the site and location of all existing services.
- N/A ☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☑ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☑ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☑ Statement of objectives and servicing criteria.
- ☑ Identification of existing and proposed infrastructure available in the immediate area.
- N/A ☒ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).

Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.

N/A Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.

N/A Proposed phasing of the development, if applicable.

Reference to geotechnical studies and recommendations concerning servicing.

All preliminary and formal site plan submissions should have the following information:

- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available

Availability of public infrastructure to service proposed development

Identification of system constraints

Identify boundary conditions

Confirmation of adequate domestic supply and pressure

Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.

Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.

N/A Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design

Address reliability requirements such as appropriate location of shut-off valves

N/A Check on the necessity of a pressure zone boundary modification.

☑ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

☑ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.

N/A ☒ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.

☑ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.

N/A ☒ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

☑ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).

☑ Confirm consistency with Master Servicing Study and/or justifications for deviations.

☑ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.

☑ Description of existing sanitary sewer available for discharge of wastewater from proposed development.

☑ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)

☑ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.

☑ Description of proposed sewer network including sewers, pumping stations, and forcemains.

N/A ☒ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).

N/A ☒ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.

N/A ☒ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.

N/A ☒ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.

N/A ☒ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

☑ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)

☑ Analysis of available capacity in existing public infrastructure.

☑ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.

☑ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.

☑ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.

☑ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.

N/A ☒ Set-back from private sewage disposal systems.

N/A ☒ Watercourse and hazard lands setbacks.

☑ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.

☑ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.

- ☑ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- N/A ☒ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☑ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- N/A ☒ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☑ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☑ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.
- N/A ☒ Identification of potential impacts to receiving watercourses
- N/A ☒ Identification of municipal drains and related approval requirements.
- ☑ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☑ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.
- N/A ☒ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☑ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- N/A ☒ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- N/A ☒ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

☑ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.

N/A ☒ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.

N/A ☒ Changes to Municipal Drains.

N/A ☒ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

☑ Clearly stated conclusions and recommendations

☑ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.

☑ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario