FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT STUDY

FOR

ASHCROFT HOMES CENTRAL PARK

CITY OF OTTAWA

PROJECT NO.: 10-473

JULY 2011 – REV 1

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1.0 INTRODUCTION

Ashcroft Homes have retained David Schaeffer Engineering Ltd. (DSEL) to prepare an Functional Servicing and Stormwater Management Study in support of their Site Plan Application for the first phase of their proposed Central Park development.

The subject property is located within City of Ottawa urban boundary. As illustrated in ***Figure 1***, the subject property has the Civic addresses of 1230 and 1232 Merivale Road and 1 and 300 Central Park Drive. The site is west of the Experimental north of Baseline Road.

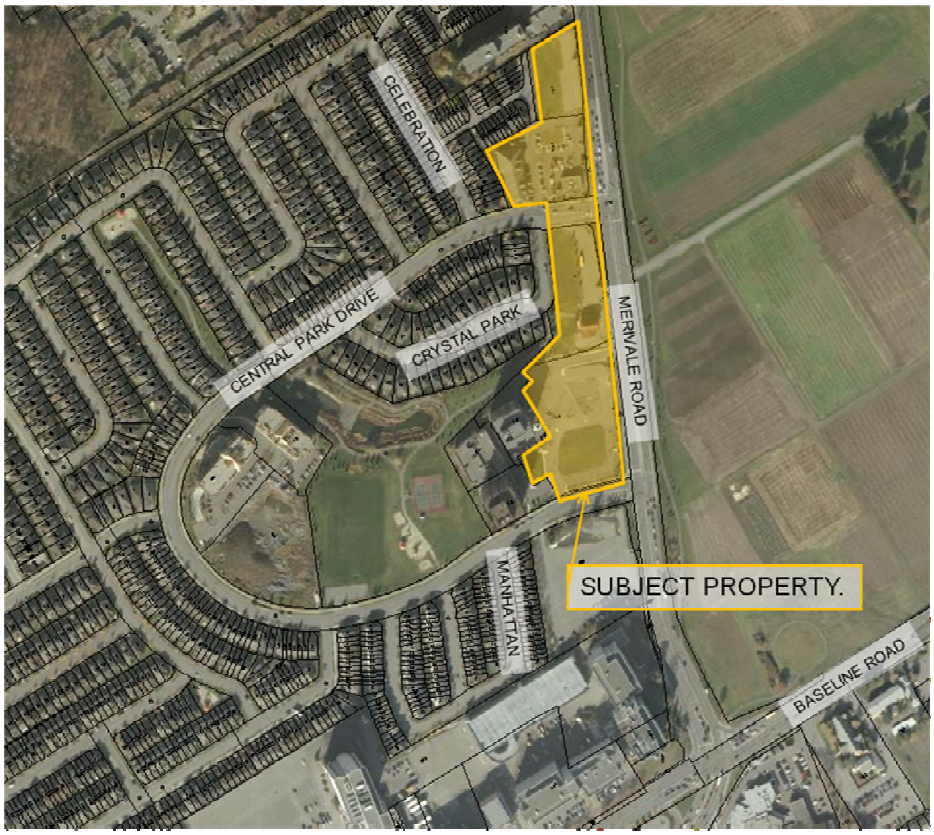

Figure 1: Site Location

The subject property measures approximately ***2.9ha*** and has a mixture of zoning. The existing site zoning is summarized as follows:

- 0.41 – R5K: High Density Residential
- 0.70 – AM1: Arterial Mainstreet
- 0.62 – AM2: Arterial Mainstreet
- 1.17 – AM5: Arterial Mainstreet

1230 and 1232 Merivale are currently developed as retail. The Region of Ottawa-Carleton approved as previously submitted site plan on September 1, 2002 for 1 and 300 Central Park Drive parcels. The previously approved plan included two one storey restaurants, 10 townhomes, and one 8 storey office building. The approved servicing plan prepared by Oliver, Mangione, McCalla and Assoc has been included in ***Drawings / Figures***.

The proposed development by Ashcroft Homes involves the construction of seven buildings to include approximately 18,105m^2 of retail, 4,440m^2 of office space, 727 apartment / condominiums, as well as 7 townhomes. The proposed preliminary site plan has been included in ***Drawings / Figures*** at the rear of this study.

The site is conceived to be developed in three phases; North, Central, and South precincts, with the Central Precinct proposed to develop first.

The objective of this report is to provide sufficient detail with respect to the availability of existing site services in addition to proposed servicing strategy to support the application for site plan control for the Central Precinct. Ashcroft Homes are pursuing Stage 2 site plan approval for the North and South Precincts.

1.1 Existing Conditions

Ashcroft Homes retained Annis, O'Sullivan, Vollebekk Ltd. to complete a detailed topographical survey of the site. A reduction plot of the survey is included in ***Drawings / Figures***.

The existing site consisted of developed as well as undeveloped portions. 1230 Merivale Road contained an asphalt parking lot and grasses areas. 1232 Merivale Road was developed into as retail and included a Tim Horton's restaurant and one storey strip mall. Total floor space measuring approximately 1,260m^2. A temporary Ascroft Sales Centre and associated asphalt parking is situated on 1 Central Park Drive. 300 Central Park Drive is primarily undeveloped.

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process.

The City of Ottawa must to approve the engineering design drawings and reports prior to the issuance of site plan control.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

The following studies were utilized in the preparation of this report.

- **Ottawa Sewer Design Guidelines,**
  City of Ottawa, November 2004.
  (City Standards)

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010
  (Water Supply Guidelines)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Water Supply for Public Fire Protection**
  Fire Underwriters Survey, 1999.
  (FUS)

- **Addendum to the Stormwater Design Plan Clyde/Merivale Lands, City of Ottawa – Ashcroft Development Inc.,**
  Cumming Cockburn Limited, March 1999
  (Existing SWM Plan)

- **Clyde and Merivale, MP12491A**
  OMM Trow, March 18, 1999
  (SWM Addendum #1)

- **Stormwater Drainage Area Report for Remaining areas of Central Park Subdivision**
  OMM Trow, May 17, 2001
  (SWM Addendum #2)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa Carlington Heights (ME) pressure zone. Potable water is available to the site via an existing 305mm PVC watermain within the Festive Private easement, an existing 406mm PVC watermain on Central Park North at Merivale and an existing 305mm PVC watermain on Central Park South at Merivale. The existing surrounding watermains are illustrated on drawing ***EX-1*** included in ***Drawings/Figures***.

The City of Ottawa Drinking Water Services branch completed fire hydrant testing in 2009. ***Table 1*** summarizes the results of the hydrant testing. Correspondence with the Drinking Water Services branch is located in ***Appendix B*** and location of existing services in ***Drawings / Figures***.

Table 1
Fire Hydrant Testing Results

Flow Hydrant	Residual Hydrant	Static Pressure (kPa)	Dynamic Pressure (kPa)	Pitot Pressure (kPa)	Measured Flow (L/min)	Available Fire Flow at 140kPa (L/min)
6425011	6425013	303.4	248.2	151.7	2986.8	5405.3
6425012	6425013	303.4	248.2	206.8	3486.9	6310.0
6425013	6425015	303.4	248.2	165.5	3118.6	5646.2
6425054	6425059	551.6	496.4	386.1	4764.3	14142.9
6425055	6425054	537.8	482.6	413.7	4932.5	14374.7
6425080	6425081	524.0	468.9	303.4	4223.3	12079.0
6425081	6425080	510.2	441.3	386.1	4764.3	11847.1

As discussed in ***Sections 1.0 and 1.1***, the subject property has a previously approved site plan as well as existing retail development. ***Table 2*** summarizes the anticipated water demand per current *Water Supply Guidelines*.

Table 2
Water Demand and Boundary Conditions
Existing / Approved SP Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	78.3	
Max Day + Fire Flow	169.9 + 8,000 = 8,169.9	
Peak Hour	287.5	

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa. Assumed ground elevation 96.4m.

3.2 Water Supply Servicing Design

Table 2 summarizes the ***Water Supply Guidelines*** employed in the preparation of the water demand estimate.

Table 3
Water Supply Design Criteria

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	3.0 x Average Daily *
Residential Maximum Hourly	4.5 x Average Daily *
Commercial Average Daily Demand (Retail)	2.5 L/m^2/d
Residential Maximum Daily Demand	1.5 x Average Daily
Residential Maximum Hourly	1.8 x Maximum Daily
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During Peak Hourly Demand operating pressure must remain within	275kPa and 552kPa
During fire flow operating pressure must not drop below	140kPa
** Residential Max. Daily and Max. Hourly peaking factors as per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*	

Table 3 summarizes the anticipated water supply demand and boundary conditions for the proposed development based on the ***Water Supply Guidelines***.

Table 4
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	379.0	685.7
Max Day + Fire Flow	891.1 + 8,000= 8,929.1	282.5
Peak Hour	1926.2	298.2
1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations. 2) Boundary conditions supplied by the City of Ottawa. Assumed ground elevation 96.4m. See ***Appendix B.***		

Fire flow requirements are to be determined in accordance with Local Guidelines (***FUS***), City of Ottawa Guidelines, and the Ontario Building Code. The ***FUS*** indicates that the minimum size water supply credited must be capable of delivering not less than 1000 L/min for two hours or 2000 L/min for one hour in addition to maximum daily demand. Furthermore, the provision for Fire Flow should not exceed 45,000L/s. If buildings are

contiguous, such as multi-block dwellings, a minimum of 8,000 L/min is recommended by the ***FUS***.

3.3 Water Supply Conclusion

Anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions.

As demonstrated in ***Table 4***, the recommended pressure range is respected during Maximum Day plus Fire Flow as well as Peak Hour demands. During average daily demand the pressure exceeds the recommended range. A pressure check should be conducted at the completion of construction to determine if pressure control is required.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject property is tributary to the Cave Creek collector sewer catchment. An existing 525mm diameter sanitary sewer located on Central Park Drive North is available to the development. The existing sewer flows East and empties in the Merivale Road sewer where it is conveyed North via a 525mm dia sewer. The Merivale Road sewer connects to the Cave Creek collector 750mm diameter at Kirkwood Avenue and Larose Avenue. The existing surrounding sanitary sewers are illustrated on drawing ***EX-1*** included in ***Drawings/Figures*** as well as as-built drawings of the Merivale Road sewer.

4.2 Wastewater Design

Table 4 summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 5
Wastewater Design Criteria

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Average Daily Demand	350 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial Floor Space	5 L/m^2/d
Office Space	75 L/9.3m^2/d
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$

Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, November 2004.	

As demonstrated on the attached calculation sheets the anticipated peak flow from the development was estimated to be ***29.73L/s*** including a 0.28L/s/ha allowance for extraneous flow, see ***Appendix C*** for associated calculations.

The available capacity of the receiving sewer was reviewed. ***Appendix C*** contains drainage area plans and calculation sheet for the first leg of sanitary sewer on Merivale Road. Based on the attached analysis this existing 525mm diameter sanitary sewer on Merivale with a slope of 0.226% has a full flowing capacity of ***204.0L/s***. The total area tributary to this leg contributes ***71.1L/s***. Including the proposed development the total peak flow was estimated to be ***96.1L/s***. The sanitary drainage area plan indicates that the area tributary to the first leg of sewer was considered to have a population equivalent of ***9,657p***. The population equivalent for the combined existing and proposed developments is approximately ***7,146p.***

4.3 Wastewater Servicing Conclusions

The proposed wastewater design conforms to all relevant City guidelines. The existing sanitary sewer on Merivale Road has sufficient capacity to convey the existing and proposed peak wastewater flow. A review of the population equivalent considered in the original design indicates further demonstrates that the sewers downstream have been sufficient sized.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

The subject lands are located within Ottawa Central sub-watershed which is under the Rideau Valley Conservation Authority jurisdiction.

Stormwater Management for the subject parcels of land were considered in the following reports:

- **Addendum to the Stormwater Design Plan Clyde/Merivale Lands, City of Ottawa – Ashcroft Development Inc.,**
  Cumming Cockburn Limited, March 1999

- **Clyde and Merivale, MP12491A**
  OMM Trow, March 18, 1999

- **Stormwater Drainage Area Report for Remaining areas of Central Park Subdivision**
  OMM Trow, May 17, 2001

The above reports have identified that the subject parcel of land is tributary to the existing 1500mm diameter storm sewer on Merivale Road. The total flow directed to the subject sewer is to be restricted to 6.0m^3/s (page 4 CCL March 1999). All stormwater runoff directed to the Merivale storm sewer must be treated to "Normal" level of TSS removal per Ministry of Environment SWMP guidelines. Due to grading constraints storm runoff generated within 1 Central Park, 1230 and 1232 Merivale by-pass the existing stormwater management pond. 300 Central Park is tributary to the existing stormwater management pond. Figure 1 as well as Table 2, from the 1999 CCL is has been included in ***Appendix D***. The figure illustrates the areas that by-pass the existing stormwater management pond on Central Park Drive. Furthermore, emergency overland flow routes for storms less frequent than 100-year event or catastrophic failure have been indicated. There are two locations that emergency overland flow routes that must be considered in the development of the subjects lands. One to the most northern property line and the other bi-secting 1 and 300 Central Park Drive.

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development have been based on the review of available background material:

- Allowable release rate for
  - 300 Central Park Drive (approximately 1.1ha) directed to the existing 750mm diameter storm sewer on Central Park Drive South is approximately ***170L/s.***
  - 1 Central Park Drive and 1232 Merivale Road (approximately 0.70ha) directed to the existing 1500mm diameter storm sewer on Central Park Drive North is approximately ***57L/s***.
  - 1230 Merivale Road (approximately 1.0ha) directed to the existing 1500mm diameter storm sewer on Central Park Drive North is approximately ***170L/s***.
- All storms up to and including the City of Ottawa 100-year design event are to be attenuated on site.
- Quality controls are required for 1 Central Park Drive, 1230 Merivale Road, and 1232 Merivale Road where runoff is to be treated to the MOE "Normal" level, 70% TSS removal.

5.3 Proposed Stormwater Management System

The proposed development will contain a combination of surface storage, roof top flow attenuation, and potentially a cistern storage and / or underground storage. Quality Treatment will be provided through a Stormceptor® structure located at the outlet of the development.

Although this application for site plan control is specific to the Central Precinct, a stormwater management solution was developed to accommodate both the South and Central areas. The North precinct will be required to provide a standalone stormwater solution to address the required quantity and quality controls. Therefore, the target release rates are summarized as follows:

- ***South and Central Precinct*** (170L/s + 57L/s) ***227L/s***
- ***North Precinct 170L/s***

The proposed development will contain a combination of roof top flow attenuation, surface storage, and underground storage. Drawing ***SWM-1***, located in ***Appendix D*** illustrates the sub-drainage catchments.

As illustrated, stormwater runoff from Building's Three and Four are proposed to be directed downstream of the proposed Inlet Control Device Located in MH102. See ***Appendix D*** for ICD sizing. The remaining site area is to be attenuated in the sub-surface and surface through a single restrictive control device.

Table 6 summarizes the release rate characteristics for each area. See ***Appendix D*** for detailed calculations.

Table 6
Summary of Proposed Release Rate and Storage Characteristics

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage	Available Storage
	(L/s)	(m^3)	(L/s)	(m^3)	(m^3)
Un-attenuated Areas	8.39	0.0	15.92	0.0	0.0
Building Three	3.87	46.0	6.56	78.0	161.4
Building Four	0.47	7.7	0.79	13.1	25.0
Attenuated Areas	107.39	202.6	203.73	384.4	385.9
Total	**120.1**	**256.3**	**227.0**	**475.5**	**572.3**

The release rate and storage calculations for roof top attenuation were estimated based Zurn Industries Ltd. design guidelines for Model Z-105-5 Control-Flo Single Notch drains. Other products may be specified provided that the restricted release rate and sufficient storage is provided to meet or exceed the values summarized in ***Table 6***.

Table 7 summarizes the target and post-development flow rates for the South and Central Precincts.

Table 7
Stormwater Flow Rate Summary

Design Storm Event	Target Release Rate	Post-Dev Peak Rate	Required Storage
	(L/s)	(L/s)	(m^3)
5-year	227	120.1	256.3
100-year	227	227.0	475.5

Detailed storage calculations are contained within ***Appendix D***.

5.4 Stormwater Servicing Conclusions

The proposed stormwater design conforms to all relevant City guidelines and Policies and meets the design objectives.

The proposed stormwater management target results in a significant reduction in peak flow from existing conditions.

6.0 CONCLUSION AND RECOMMENDATIONS

Ashcroft Homes are applying for site plan control for the first phase of their Central Park development, referred herein as the Central Precinct. Furthermore, Ashcroft Homes are pursuing Stage 2 site plan approval for the North and South Precincts. DSEL was retained to prepare a Functional Servicing and Stormwater Management report in support of their Central Precinct.

- The existing watermain network on Merivale and Central Park has sufficient water supply for the proposed development
- The recommended pressure range is respected during Maximum Day plus Fire Flow as well as Peak Hour demands;
- The existing 525mm dia. Sanitary sewer on Merivale Road has adequate capacity available for the proposed development;
- Stormwater management for the subject lands were considered in previous studies. Ultimately all flow will be directed to the existing 1500mm diameter storm sewer on Merivale Road. 1230 and 1232 Merivale Road as well as 1 Central Park Drive will be required to provide separated quality control measures.

Prepared by,
David Schaeffer Engineering Ltd.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Adam D. Fobert, P.Eng.

Per: Stephen J. Pichette, P.Eng.

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APPENDIX A

Pre-Consultation

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.

☑ 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.

N/A ☐ 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

N/A ☐ 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

N/A ☐ Address reliability requirements such as appropriate location of shut-off valves

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

N/A ☐ 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

N/A ☐ 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).

N/A ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.

N/A ☐ 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.

N/A ☐ 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)

N/A ☐ 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.

N/A ☐ 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.

N/A ☐ 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.

- [x] 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.
- N/A [ ] 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.
- N/A [ ] Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- N/A [ ] 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.
- [x] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- N/A [ ] 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.
- N/A [ ] 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:

- N/A [ ] 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

- [x] Clearly stated conclusions and recommendations
- [x] 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.
- [x] All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

APPENDIX B

Water Supply

Central Park
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7	7	19
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	727	1309

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	1328	464.6	322.7	1161.6	806.6	2555.4	1774.6

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5 $L/m^2/d$	18,105	45.26	31.4	67.9	47.1	122.2	84.9
Office	75 $L/9.3m^2/d$	4,440	35.81	24.9	53.7	37.3	96.7	67.1
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			81.1	56.3	121.6	84.4	218.9	152.0
Total Demand			**545.7**	**379.0**	**1283.2**	**891.1**	**2774.3**	**1926.6**

Blair Pearen

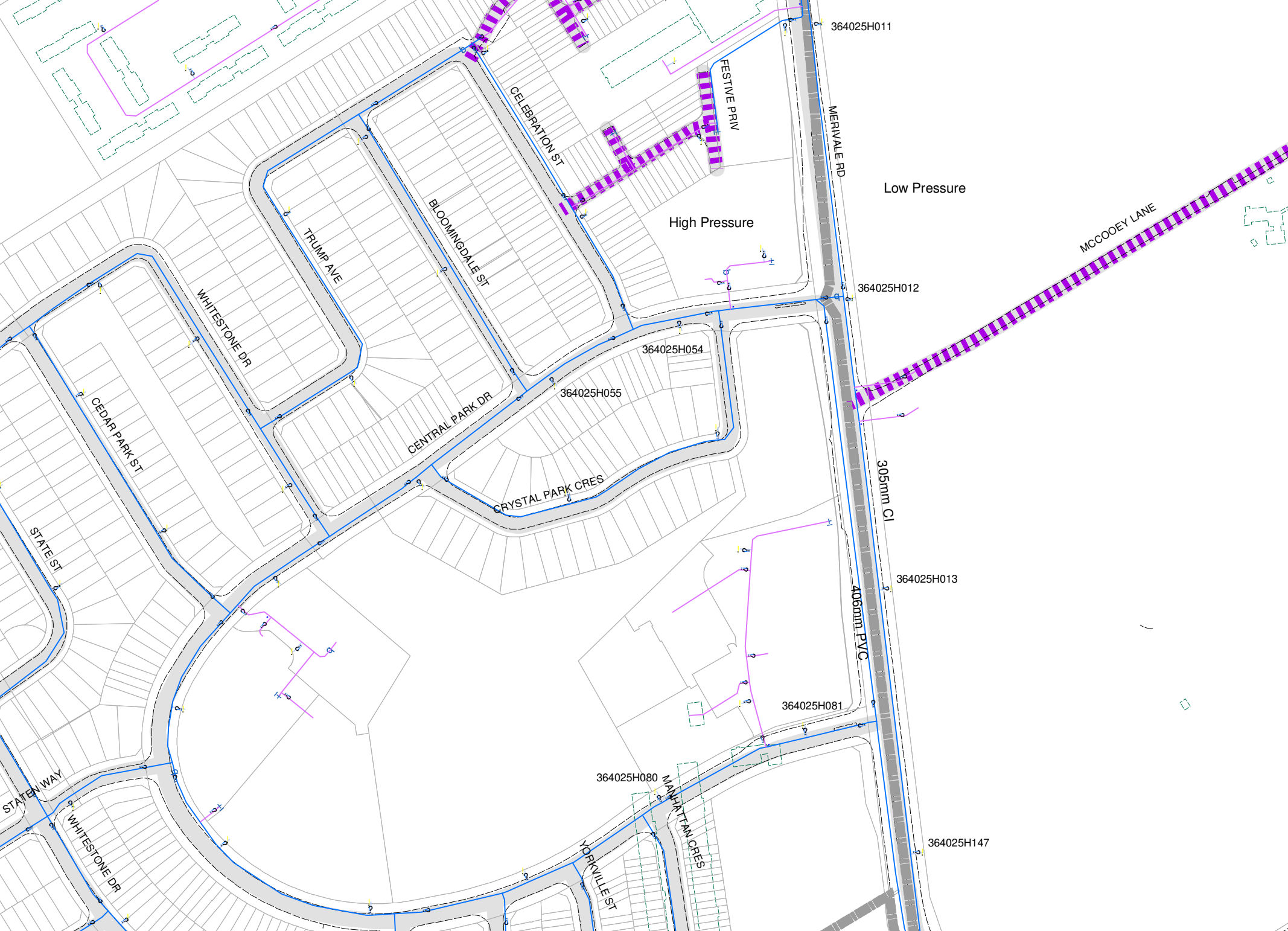
From: Crowder, Murray [Murray.Crowder@ottawa.ca]
Sent: April 18, 2011 8:22 AM
To: bpearen@dsel.ca
Subject: RE: North and South Intersection of Central Park Drive and Merivale Road
Attachments: Central Park @ Merivale.pdf

Note: the computed flows are approximate and performed for hydrant colour coding purposes, thus these values are not intended for design purposes.

` **Blair Pearen**
Company: **DSEL_David Schaeffer Engineering Ltd.**
Tel: **(613) 836-0856 ext.258**
Fax: **(613) 836-7183**
Location: **Central Park @ Merivale**
Request_dt: **11-04-18-08:10:19**
Email: **bpearen@dsel.ca**

Inspection Date	Flow Hydrant	Residual Hydrant	Pressure (psi) Static	Dynamic	Pitot	Flow (igpm) actual	@ 20 psi
2009/09/24	6425011	6425013	44	>36	22	657	1189
2009/09/24	6425012	6425013	44	>36	30	767	1388
2009/09/24	6425013	6425015	44	>36	24	686	1242
2009/09/24	6425054	6425059	80	72	56	1048	3111
2009/09/25	6425055	6425054	78	70	60	1085	3162
2009/09/28	6425080	6425081	76	>68	44	929	2657
2009/09/28	6425081	6425080	74	64	56	1048	2606

Murray Crowder
Technical Support
Drinking Water Operations Branch
Environmental Services Department
City of Ottawa
951 Clyde Avenue, Ottawa, On K1Z 5A6
Mail Code 06-65
Tel: (613) 580-2424 x 22231
Fax: (613) 728-4183
e-mail: murray.crowder@ottawa.ca


364025H011
FESTIVE PRIV
CELEBRATION ST
MERIVALE RD
Low Pressure
High Pressure
MCCOOEY LANE
TRUMP AVE
BLOOMINGDALE ST
WHITESTONE DR
364025H012
364025H054
364025H055
CEDAR PARK ST
CENTRAL PARK DR
CRYSTAL PARK CRES
305mm CI
STATE ST
364025H013
406mm PVC
364025H081
364025H080
MANHATTAN CRES
STATEN WAY
WHITESTONE DR
YORKVILLE ST
364025H147

Adam Fobert

From: Mottalib, Abdul [Abdul.Mottalib@ottawa.ca]
Sent: Wednesday, June 15, 2011 2:45 PM
To: afobert@DSEL.ca
Cc: Mottalib, Abdul
Subject: FW: Ashcroft - Central Park
Attachments: Ashcroft Central Park with node_20110609.pdf

Hi Adam,

Please note water boundary conditions in the e-mail below as requested.

Thank you,
Abdul

Boundary Condition results

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly.******

Note: When further design is completed, boundary conditions shall be completed at the connection to Merivale Rd and to Central Park Rd with appropriate Average day, maximum day and Peak hour flows provided by the consultant.

The following are boundary conditions, HGL, for hydraulic analysis at a point on the 406 mm watermain on Merivale Road approximately midway between Central Park Drive North and Central Park Drive South (see attached PDF for location).

Max Day + FF = 125.2 m assuming a fire flow of 135 L/s

Minimum Pressure during Peak Hour = 126.8 m. The estimated ground elevation is 96.4 m, which corresponds to a minimum pressure of approx. 43.2 psi, which is greater than the minimum allowable pressure of 40psi.

Max Pressure Check = 166.3 m. The estimated ground elevation is 96.4 m, the maximum pressure is estimated to be 99.4 psi which is more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

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.

From: Adam Fobert [mailto:afobert@dsel.ca]
Sent: June 06, 2011 10:19 AM
To: Mottalib, Abdul
Subject: RE: Ashcroft - Central Park

Hello Abdul,

For the site description, I've inserted the introduction from our updated servicing study. See below.

The subject property is located within City of Ottawa urban boundary. As illustrated in ***Figure 1***, the subject property has the Civic addresses of 1230 and 1232 Merivale Road and 1 and 300 Central Park Drive. The site is west of the Experimental north of Baseline Road.

Figure 1: Site Location

The proposed development by Ashcroft Homes involves the construction of seven buildings to include approximately 16,750m^2 of retail, 4,440m^2 of office space, 768 apartment / condominiums, as well as 7 townhomes. The proposed buildings will range in height from 1 storey to 25 stories. Please refer to the attached site plan prepared by BBB for additional details.

Adam Fobert, P.Eng.
Senior Design Engineer

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 203
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.231
fax: (613) 836-7183
email: afobert@DSEL.ca

From: Adam Fobert [mailto:afobert@dsel.ca]
Sent: Thursday, June 02, 2011 2:39 PM

To: 'Mottalib, Abdul'
Subject: RE: Ashcroft - Central Park

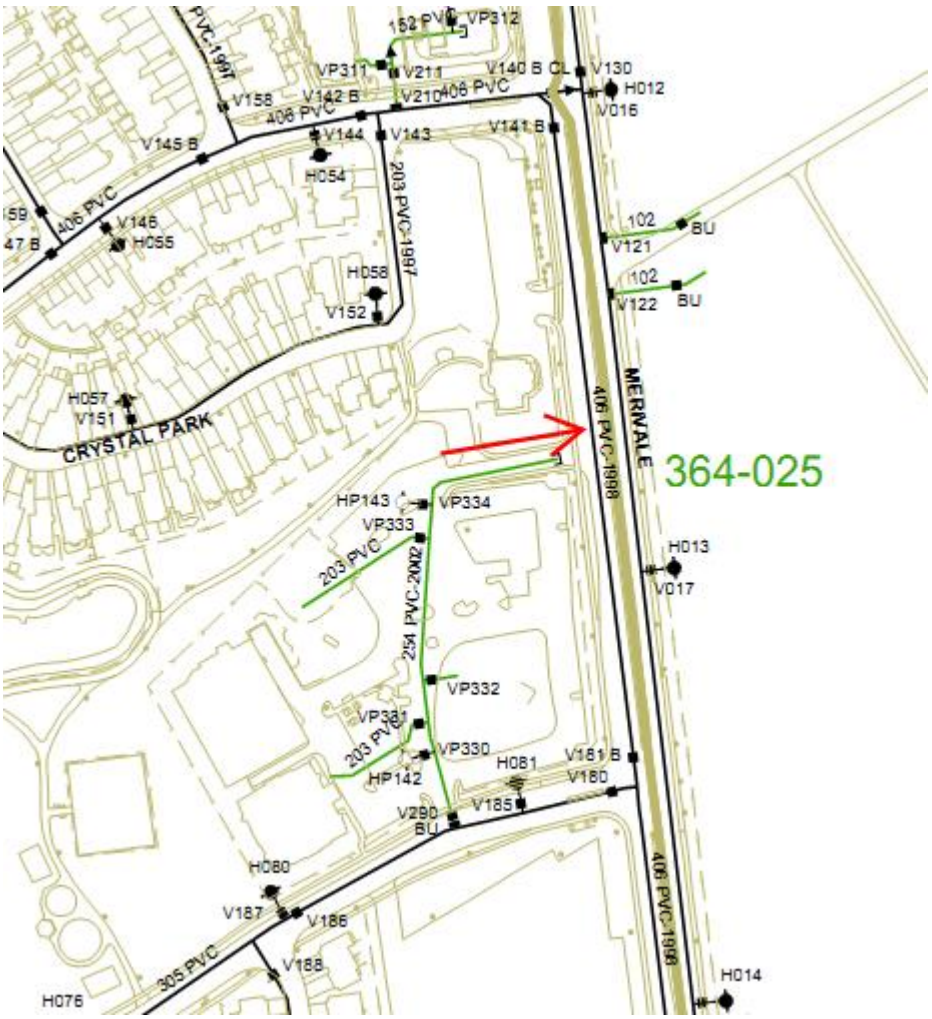
Hello Abdul,

As discussed, I am updating our Adequacy of Services Estimate. It appears that I do have the majority of background work completed in order to satisfy the City Report Guidelines. However, I have noticed that boundary conditions for water supply services have not been requested. Would you kindly coordinate with your Water Resources group the following water supply demands? Thank you for your help. Feel free to call should you have any questions or comments.

Average Daily Demand: 393.2L/min
Max Day + Fire Flow: 929.1L/min + 8.000L/min = 8,929.1L/min
Peak Hour = 2011.7L/min

For this analysis we would like to request the simulated pressure with proposed a 250mm dia connection to the existing 400mm dia watermain on Merivale, approximately mid way between Central Park Drive North and Central Park Drive South. See image below.

Ultimately we would extend and connect the existing private 250mm dia to the 406mm on Merivale as well as extend a new 250mm dia main to the existing 400mm dia on Central Park North.



Adam Fobert, P.Eng.
Senior Design Engineer

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120 Iber Road, Unit 203
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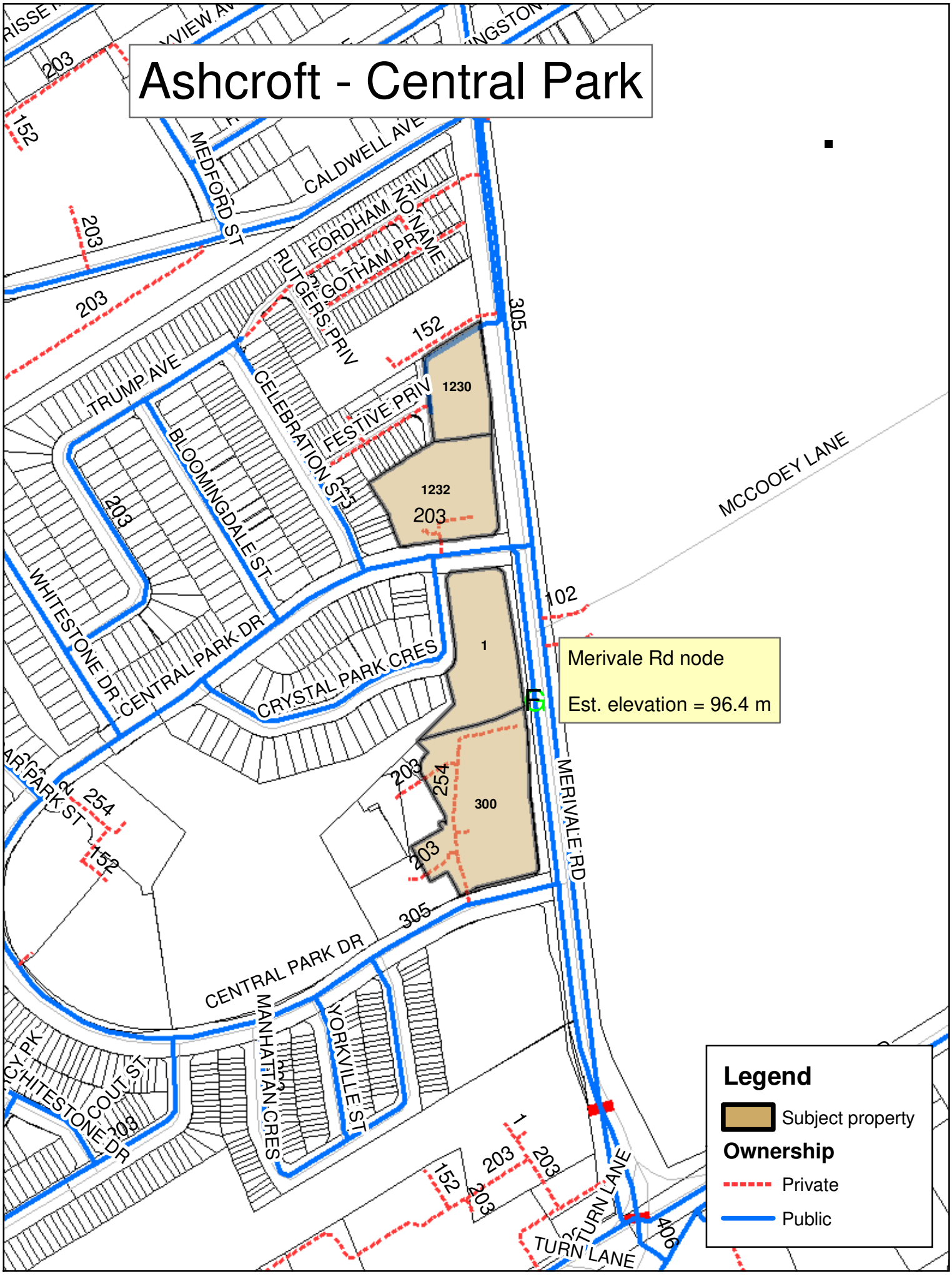

Ashcroft - Central Park
MEDFORD ST
CALDWELL AVE
FORDHAM DR
GOTHAM PRAIME
RUTGERS PRIV
TRUMP AVE
CELEBRATION ST
FESTIVE PRIV
BLOOMINGDALE ST
WHITESTONE DR
CENTRAL PARK DR
CRYSTAL PARK CRES
MCCOOEY LANE
MERIVALE RD
CENTRAL PARK DR
MANHATTAN CRES
YORKVILLE ST
TURN LANE
1230
1232
1
300
203
152
305
102
254
406
Merivale Rd node
Est. elevation = 96.4 m
Legend
Subject property
Ownership
Private
Public

APPENDIX C

Wastewater Collection

Existing Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 2.900 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.81 L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Duplex	2.3		0
Townhouse	2.7	10	27
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

Total Pop **27**

Average Domestic Flow **0.11 L/s**

Peaking Factor **4**

Peak Domestic Flow **0.44 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Commercial floor space*	5	$L/m^2/d$	1,260	0.15
Office	75	$L/9.3m^2/d$	11,200	1.05
Restaurant**	125	L/seat/d	78	0.11
Industrial - Light***	35,000	L/gross ha/d		0.00
Industrial - Heavy***	55,000	L/gross ha/d		0.00

Average I/C/I Flow **1.30**

Peak Institutional / Commercial Flow 1.96
Peak Industrial Flow** 0.00
Peak I/C/I Flow **1.96**

** assuming a 12 hour commercial operation*
*** Estimated number of seats at 1 seat per $9.3m^2$*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**1.41 L/s**
Total Estimated Peak Dry Weather Flow Rate	**2.39 L/s**
Total Estimated Peak Wet Weather Flow Rate	**3.21 L/s**

Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004

Site Area 2.900 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.81 L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7	7	19
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	727	1309

Total Pop **1328**

Average Domestic Flow **5.38 L/s**

Peaking Factor **3.72**

Peak Domestic Flow **20.00 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5	$L/m^2/d$	18,105	2.10
Office	75	$L/9.3m^2/d$	4,440	3.85
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow **5.95**

Peak Institutional / Commercial Flow 8.92
Peak Industrial Flow** 0.00
Peak I/C/I Flow **8.92**

** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**11.33 L/s**
Total Estimated Peak Dry Weather Flow Rate	**28.92 L/s**
Total Estimated Peak Wet Weather Flow Rate	**29.73 L/s**

SANITARY SEWER CALCULATION SHEET

PROJECT: **Ashcroft - Central Park**
LOCATION: **Merivale Road - Ottawa**
FILE REF: **10-473**
DATE: **7-Jun-11**

DESIGN PARAMETERS

Avg. Daily Flow Res.	350	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28	L/s/ha
Avg. Daily Flow Comm	50,000	L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	50,000	L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indust	35,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population									Commercial		Institutional		Industrial			Infiltration				Pipe Data							
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
A			4.380	49				167.0	4.380	167.0	4.00	2.71		0.00		0.00		0.00	0.0	4.380	4.380	1.226	3.93								
B			7.000		151			408.0	11.380	575.0	3.94	9.18		0.00		0.00		0.00	0.0	7.000	11.380	3.186	12.37								
C			2.700			95		257.0	14.080	832.0	3.85	12.98		0.00		0.00		0.00	0.0	2.700	14.080	3.942	16.92								
D			1.000			37		100.0	15.080	932.0	3.82	14.42		0.00		0.00		0.00	0.0	1.000	15.080	4.222	18.64								
E			3.970	84				286.0	19.050	1218.0	3.74	18.47		0.00		0.00		0.00	0.0	3.970	19.050	5.334	23.80								
F			7.250			156	220	817.0	26.300	2035.0	3.58	29.51		0.00		0.00		0.00	0.0	7.250	26.300	7.364	36.88								
G			7.350	97	12	17		408.0	33.650	2443.0	3.52	34.80		0.00		0.00		0.00	0.0	7.350	33.650	9.422	44.22								
H			0.740				184	331.0	34.390	2774.0	3.47	39.01		0.00		0.00		0.00	0.0	0.740	34.390	9.629	48.63								
I			5.430	19		211		634.0	39.820	3408.0	3.39	46.87		0.00		0.00		0.00	0.0	5.430	39.820	11.150	58.02								
J			2.570	36		19		174.0	42.390	3582.0	3.38	48.99		0.00		0.00		0.00	0.0	2.570	42.390	11.869	60.85								
K			2.820			136		367.0	45.210	3949.0	3.34	53.40		0.00		0.00		0.00	0.0	2.820	45.210	12.659	66.06								
L			0.640				228	410.0	45.850	4359.0	3.30	58.27		0.00		0.00		0.00	0.0	0.640	45.850	12.838	71.10								
Subject Lands			2.900			5	727	1322.0	48.750	5681.0	3.19	73.49		0.00		0.00		0.00	8.9	2.900	48.750	13.650	96.06	525	0.23	101.8	0.216	0.131	0.94	204.0	0.47


(A)
4.38ha
49 single
(B)
7.00ha
151 semi-detached
(C)
2.70ha
37 Townhomes
(D)
1.00ha
37 Townhomes
(E)
3.97ha
84 single
(F)
7.25ha
156 Townhomes
220 Apartment
(G)
7.35ha
97 single
17 Townhomes
(H)
0.74ha
184 Apartment
(I)
5.43ha
19 single
211 Towhhomes
(J)
2.57ha
36 single
19 Townhomes
(K)
2.82ha
136 Townhomes
(L)
0.64ha
228 Apartment
SUBJECT
PROPERTY
L1
EP
R5B H(63)
R3D[618]
R2U[547]
R2U[548]
O1
R2G
R3O[612]
R1O[623] H(8)
R5B[496] H(42)
LC4[1496]
O1[316]-h
R4B
R4N
R3Q[877]
R3Q[931]
R5K[964] H(28) S215
L1[367]
AM5[134] H(28)
AM5[19] H(28)
AM5[19]
I1B
R3Z[674] S91
R3Z[651]
CALDWELL AVE
MERIVALE RD
MCCOOEY LANE
BASELINE RD
CENTRAL PARK DR
SCOUT ST
COLERIDGE ST
GRAMMERCY PK
STATEN WAY
WHITESTONE DR
CASTLE HILL CRES
BONNIE CRES
GREYROCK CRES
MAITLAND AVE
CAMEO DR
CLYDE AVE
FARLANE BLVD
LYALL ST
SUTTON PL
ENCORE PRIV
ELEANOR DR

REGIONAL MUNICIPALITY
OF
OTTAWA-CARLETON

ENVIRONMENTAL SERVICES DEPARTMENT

R. DENHAM, P.Eng.
ENVIRONMENTAL SERVICES COMMISSIONER

Approved by: J. McEWAN, P.Eng. Manager of Design & Construction Date: JULY 4, 1994	LICENCED PROFESSIONAL ENGINEER J. I. MOFFATT PROVINCE OF ONTARIO
Project Officer: J.I. MOFFATT, P.Eng.	Date
Drawn by: DENIS DORE	Verified by: / Date
Survey details by: C.C.L.	Book # / Date
"As Built" Inspection by:	Date

LEGEND :

57.0 / 9657 — AREA IN HECTARES / POPULATION EQUIVALENT

No.	Revision	Date
0.	ISSUED FOR APPROVAL	94/07/04

Scales: HORIZ. 1:5000

Project Title:

CLYDE – MERIVALE EXTERNAL SERVICES

SANITARY DRAINAGE AREA PLAN

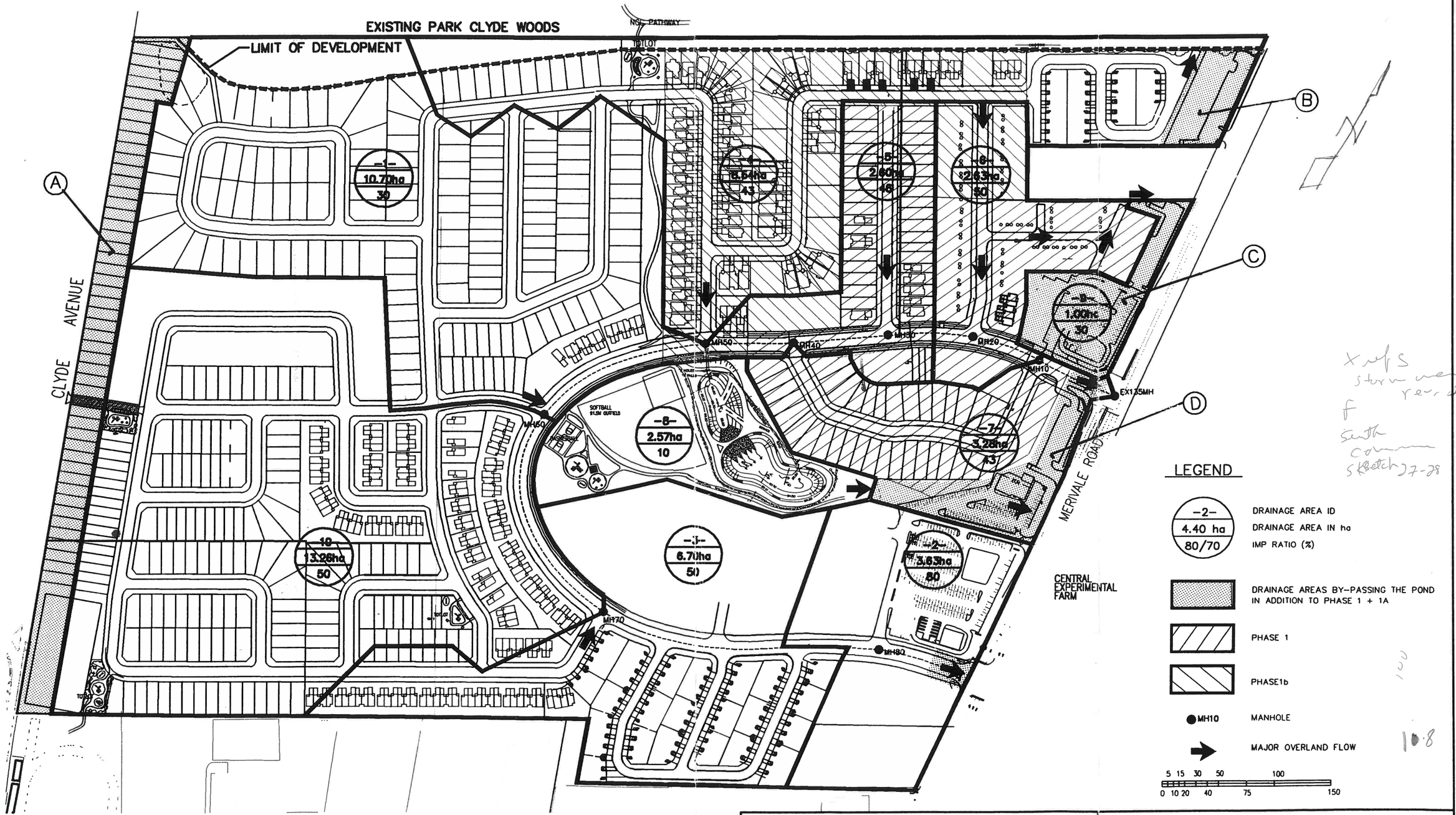
Drawing No.: CC-4040-501

Rev. No.:

4130

APPENDIX D

Stormwater Management



ASHCROFT HOMES

CENTRAL PARK

STORMWATER DESIGN PLAN ADDENDUM

CLYDE / MERIVALE CITY OF OTTAWA

FIGURE 1

STORM WATER MANAGEMENT POND OTTHYMO MODEL DRAINAGE SCHEMATIC

Cumming Cockburn Limited

Consulting Engineers, Planners, and Environmental Scientists

TABLE 2: COMPARISON OF PEAK FLOWS AND SURFACE STORAGE REQUIREMENTS

DRAINAGE SUB-AREA OR FLOW POINT LOCATION (HA)	TYPE OF SURFACE PONDING	5 YEAR STORM		100 YEAR STORM	
		ATTENUATED PEAK FLOW (cms)	REQUIRED STORAGE (m^3/ha)	ATTENTUATED PEAK FLOW (cms)	REQUIRED STORAGE (m^3/ha)
1 (10.70)	Street	0.64	0	0.86	47
2 (3.63)	Street Parking Lots Roofs	0.58	0	0.58	124
3 (6.70)	Street	0.65	0	0.87	45
4 (8.54)	Street	0.69	0	0.92	52
5 (2.60)	Street	0.24	0	0.31	58
6 (2.63)	Street	0.26	0	0.34	50
7 (3.28)	Street Parking Lot Roofs	0.27	0	0.27	73
9 (1.00)	Street Parking Lot Roofs	0.16	0	0.17	120
10 (13.26)	Street	1.25	0	1.68	45
Control Weir Manhole 50	N/A	3.8	N/A	4.9	N/A
Total Flow At Merivale	N/A	4.7	N/A	6.0	N/A

The above noted results indicate that during the 1:100 year storm event, the total outflow at the Merivale Road outlet sewer will be reduced to 6.0 m^3/s which is equal to the maximum outflow recommended in the previous studies. On-site detention storage requirements are similar to the volumes recommended in the 1994 study [1].

The maximum storage required within residential areas is between 45 m^3/ha and 73 m^3/ha and the maximum storage requirement within the commercial area is from

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2004

Target Flow Rate

Area	1.8537	ha
C	0.90	Rational Method runoff coefficient
t_c	20.0	min
Q	227.0	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.04778	ha
C	0.90	Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
20.0	70.3	8.4	8.4	0.0	0.0	120.0	15.9	15.9	0.0	0.0

Estimated Post Development Storage Requirement - Roof top: Building Three

Roof Area	0.2018	ha
Avail. Storage Area	0.16144	ha, assuming 50% of the roof area is available for storage
C	0.90	Rational Method runoff coefficient

Zurn Model Z-105-5 Control-Flo Single Notch Roof Drain

m^2 / Notch	232	as recommended by Zurn for Ottawa
Required Notches	9	

Roof Top Rating Curve per Zurn Model Z-105-5				
d (m)	Q_{notch} (L/s)	Q_{roof} (L/s)	V_{avail} (m^3)	$V_{drawdown}$ (hr)
0.000	0.00	0.0	0.0	0
0.025	0.38	3.4	40.4	3.30
0.050	0.75	6.8	80.7	4.95
0.075	1.13	10.2	121.1	6.05
0.100	1.51	13.6	161.4	6.88

** flow per notch based on Zurn Control Flow Manual (23L/min per Inch of depth at the drain)*

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
20	70.3	35.4	3.9	31.6	37.9	120.0	60.5	6.6	54.0	64.7
25	60.9	30.7	3.9	26.9	40.3	103.8	52.4	6.6	45.8	68.7
30	53.9	27.2	3.9	23.3	42.0	91.9	46.3	6.6	39.8	71.6
35	48.5	24.5	3.9	20.6	43.3	82.6	41.7	6.6	35.1	73.7
40	44.2	22.3	3.9	18.4	44.2	75.1	37.9	6.6	31.3	75.2
45	40.6	20.5	3.9	16.6	44.9	69.1	34.8	6.6	28.3	76.3
50	37.7	19.0	3.9	15.1	45.4	64.0	32.3	6.6	25.7	77.1
55	35.1	17.7	3.9	13.9	45.7	59.6	30.1	6.6	23.5	77.6
60	32.9	16.6	3.9	12.8	45.9	55.9	28.2	6.6	21.6	77.9
65	31.0	15.7	3.9	11.8	46.0	52.6	26.6	6.6	20.0	78.0
70	29.4	14.8	3.9	10.9	46.0	49.8	25.1	6.6	18.6	77.9
75	27.9	14.1	3.9	10.2	45.9	47.3	23.8	6.6	17.3	77.8
80	26.6	13.4	3.9	9.5	45.7	45.0	22.7	6.6	16.1	77.5
85	25.4	12.8	3.9	8.9	45.5	43.0	21.7	6.6	15.1	77.1
90	24.3	12.3	3.9	8.4	45.3	41.1	20.7	6.6	14.2	76.6
95	23.3	11.8	3.9	7.9	45.0	39.4	19.9	6.6	13.3	76.0
100	22.4	11.3	3.9	7.4	44.6	37.9	19.1	6.6	12.6	75.4
105	21.6	10.9	3.9	7.0	44.2	36.5	18.4	6.6	11.9	74.7
110	20.8	10.5	3.9	6.6	43.8	35.2	17.8	6.6	11.2	73.9
115	20.1	10.2	3.9	6.3	43.3	34.0	17.2	6.6	10.6	73.1
120	19.5	9.8	3.9	6.0	42.9	32.9	16.6	6.6	10.0	72.2

5-year Q_{roof}	**3.87 L/s**	**100-year Q_{roof}**	**6.56 L/s**
5-year Max. Storage Required	**46.0 m^3**	**100-year Max. Storage Required**	**78.0 m^3**
5-year Storage Depth	**0.028 m**	**100-year Storage Depth**	**0.048 m**
5-year Estimated Drawdown Time	**3.53 hr**	**)0-year Estimated Drawdown Time**	**4.84 hr**

Estimated Post Development Storage Requirement - Roof top: Building Four

Roof Area 0.0312 ha
Avail. Storage Area 0.02496 ha, assuming 50% of the roof area is available for storage
C 0.90 Rational Method runoff coefficient

Zurn Model Z-105-5 Control-Flo Single Notch Roof Drain
m^2 / Notch 232 as recommended by Zurn for Ottawa
Required Notches 1

Roof Top Rating Curve per Zurn Model Z-105-5				
d	Q_{notch}	Q_{roof}	V_{avail}	$V_{drawdown}$
(m)	(L/s)	(L/s)	(m^3)	(hr)
0.000	0.00	0.0	0.0	0
0.025	0.38	0.4	6.2	4.59
0.050	0.75	0.8	12.5	6.89
0.075	1.13	1.1	18.7	8.42
0.100	1.51	1.5	25.0	9.57

** flow per notch based on Zurn Control Flow Manual (23L/min per Inch of depth at the drain)*

	5-year					100-year				
t_c	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
20	70.3	5.5	0.5	5.0	6.0	120.0	9.4	0.8	8.6	10.3
25	60.9	4.7	0.5	4.3	6.4	103.8	8.1	0.8	7.3	11.0
30	53.9	4.2	0.5	3.7	6.7	91.9	7.2	0.8	6.4	11.5
35	48.5	3.8	0.5	3.3	7.0	82.6	6.4	0.8	5.7	11.9
40	44.2	3.4	0.5	3.0	7.2	75.1	5.9	0.8	5.1	12.2
45	40.6	3.2	0.5	2.7	7.3	69.1	5.4	0.8	4.6	12.4
50	37.7	2.9	0.5	2.5	7.4	64.0	5.0	0.8	4.2	12.6
55	35.1	2.7	0.5	2.3	7.5	59.6	4.7	0.8	3.9	12.7
60	32.9	2.6	0.5	2.1	7.6	55.9	4.4	0.8	3.6	12.9
65	31.0	2.4	0.5	2.0	7.6	52.6	4.1	0.8	3.3	12.9
70	29.4	2.3	0.5	1.8	7.7	49.8	3.9	0.8	3.1	13.0
75	27.9	2.2	0.5	1.7	7.7	47.3	3.7	0.8	2.9	13.0
80	26.6	2.1	0.5	1.6	7.7	45.0	3.5	0.8	2.7	13.1
85	25.4	2.0	0.5	1.5	7.7	43.0	3.4	0.8	2.6	13.1
90	24.3	1.9	0.5	1.4	7.7	41.1	3.2	0.8	2.4	13.1
95	23.3	1.8	0.5	1.4	7.7	39.4	3.1	0.8	2.3	13.0
100	22.4	1.7	0.5	1.3	7.7	37.9	3.0	0.8	2.2	13.0
105	21.6	1.7	0.5	1.2	7.7	36.5	2.8	0.8	2.1	13.0
110	20.8	1.6	0.5	1.2	7.6	35.2	2.7	0.8	2.0	12.9
115	20.1	1.6	0.5	1.1	7.6	34.0	2.7	0.8	1.9	12.9
120	19.5	1.5	0.5	1.1	7.6	32.9	2.6	0.8	1.8	12.8

5-year Q_{roof} 0.47 L/s — **100-year Q_{roof} 0.79 L/s**
5-year Max. Storage Required 7.7 m^3 — **100-year Max. Storage Required 13.1 m^3**
5-year Storage Depth 0.031 m — **100-year Storage Depth 0.052 m**
5-year Estimated Drawdown Time 5.14 hr — **100-year Estimated Drawdown Time 7.03 hr**

Estimated Post Development Peak Flow from Attenuated Areas

Total Area 1.5729 ha
C 0.90 Rational Method runoff coefficient

	5-year					100-year				
t_c	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
20	70.3	276.2	107.4	168.9	202.6	120.0	524.1	203.7	320.4	384.4
25	60.9	239.5	107.5	131.9	197.9	103.8	453.7	203.7	250.0	375.0
30	53.9	212.1	107.6	104.4	188.0	91.9	401.4	203.7	197.7	355.8
35	48.5	190.8	107.7	83.1	174.4	82.6	360.8	203.7	157.1	329.9
40	44.2	173.7	107.8	65.9	158.2	75.1	328.3	203.7	124.6	299.0
45	40.6	159.8	107.9	51.9	140.1	69.1	301.7	203.7	98.0	264.5
50	37.7	148.1	108.0	40.1	120.3	64.0	279.4	203.7	75.7	227.1
55	35.1	138.1	108.0	30.1	99.3	59.6	260.5	203.7	56.8	187.4
60	32.9	129.5	108.1	21.5	77.3	55.9	244.2	203.7	40.5	145.8
65	31.0	122.1	108.1	14.0	54.4	52.6	230.0	203.7	26.3	102.6
70	29.4	115.5	108.2	7.3	30.8	49.8	217.5	203.7	13.8	58.0
75	27.9	109.7	108.2	1.5	6.6	47.3	206.5	203.7	2.7	12.3
80	26.6	104.5	108.3	0.0	0.0	45.0	196.6	203.7	0.0	0.0
85	25.4	99.8	108.3	0.0	0.0	43.0	187.7	203.7	0.0	0.0
90	24.3	95.5	108.3	0.0	0.0	41.1	179.6	203.7	0.0	0.0
95	23.3	91.6	108.4	0.0	0.0	39.4	172.3	203.7	0.0	0.0
100	22.4	88.1	108.4	0.0	0.0	37.9	165.6	203.7	0.0	0.0
105	21.6	84.9	108.4	0.0	0.0	36.5	159.5	203.7	0.0	0.0
110	20.8	81.9	108.5	0.0	0.0	35.2	153.8	203.7	0.0	0.0
115	20.1	79.1	108.5	0.0	0.0	34.0	148.6	203.7	0.0	0.0
120	19.5	76.6	108.5	0.0	0.0	32.9	143.7	203.7	0.0	0.0

5-year $Q_{attenuated}$ 107.39 L/s — **100-year $Q_{attenuated}$ 203.73 L/s**
5-year Max. Storage Required 202.6 m^3 — **100-year Max. Storage Required 384.4 m^3**

Available Surface Storage

Stage (m)	A (m^2)	d (m)	delta d (m)	V (m^3)	Vacc (m^3)
95.67	1	0			
95.82	562	0.15	0.15	29.6	29.6
95.93	1,566	0.26	0.11	112.4	142.0

Available Sub-surface Storage

Maintenance Structures

$$V = \frac{\pi D^2 L}{4}$$

	ID	102	103	104	105	106	
Maintenance Structure dia, mm		2400	3000	3000	2400	2400	
	T/L	95.85	95.85	96.00	96.00	96.5	
	INV	92.91	93.04	93.14	93.42	93.75	
	depth	1.62	1.49	1.54	1.26	1.43	*excludes 1.32m chimney
	$V_{structure}$	8.3	11.5	11.8	6.7	7.4	*added 0.95m^3 for vol in chimney

Sewers

$$V = \frac{\pi D^2 L}{4}$$

Storage Pipe Dia	1350	mm
L	138.5	m
V_{sewer}	198.2	m^3
Total Subsurface Storage	243.9	m^3

Orifice Equation for Restricted outlet from MH 102

Dia	240	mm
Cd	0.6	
Area	0.0452389	m^2
100-year elev	95.93	
INV	92.91	
h_o	2.90	m
Q =	204.7	L/s

Per Eq 7.68 Haestad

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage Storage (m^3)	100-Year Release Rate Release Rate (L/s)	100-Year Storage Storage (m^3)	Available Storage (m^3)
Unattenuated	8.39	0.0	15.92	0.0	0.0
Building Three	3.87	46.0	6.56	78.0	161.4
Building Four	0.47	7.7	0.79	13.1	25.0
Attenutated Areas	107.39	202.6	203.73	384.4	385.9
Total	**120.1**	**256.3**	**227.0**	**475.5**	**572.3**

Stormceptor Sizing Detailed Report

PCSWMM for Stormceptor

Project Information

Date	7/7/2011
Project Name	Central Park
Project Number	N/A
Location	Ottawa, Ontario

Stormwater Quality Objective

This report outlines how Stormceptor System can achieve a defined water quality objective through the removal of total suspended solids (TSS). Attached to this report is the Stormceptor Sizing Summary.

Stormceptor System Recommendation

The Stormceptor System model STC 2000 achieves the water quality objective removing 73% TSS for a Fine (organics, silts and sand) particle size distribution and 88% runoff volume.

The Stormceptor System

The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for all rainfall events, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.

Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Stormceptor is the only oil and sediment separator on the market sized to remove TSS for a wide range of particle sizes, including fine sediments (clays and silts), that are often overlooked in the design of other stormwater treatment devices.

Small storms dominate hydrologic activity, US EPA reports

"*Early efforts in stormwater management focused on flood events ranging from the 2-yr to the 100-yr storm. Increasingly stormwater professionals have come to realize that small storms (i.e. < 1 in. rainfall) dominate watershed hydrologic parameters typically associated with water quality management issues and BMP design. These small storms are responsible for most annual urban runoff and groundwater recharge. Likewise, with the exception of eroded sediment, they are responsible for most pollutant washoff from urban surfaces. Therefore, the small storms are of most concern for the stormwater management objectives of ground water recharge, water quality resource protection and thermal impacts control.*"

"*Most rainfall events are much smaller than design storms used for urban drainage models. In any given area, most frequently recurrent rainfall events are small (less than 1 in. of daily rainfall).*"

"Continuous simulation offers possibilities for designing and managing BMPs on an individual site-by-site basis that are not provided by other widely used simpler analysis methods. Therefore its application and use should be encouraged."

– US EPA Stormwater Best Management Practice Design Guide, Volume 1 – General Considerations, 2004

Design Methodology

Each Stormceptor system is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology from up-to-date local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective.

The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing (summary of analysis presented in Appendix 2):

- Site parameters
- Continuous historical rainfall, including duration, distribution, peaks (Figure 1)
- Interevent periods
- Particle size distribution
- Particle settling velocities (Stokes Law, corrected for drag)
- TSS load (Figure 2)
- Detention time of the system

The Stormceptor System maintains continuous positive TSS removal for all influent flow rates. Figure 3 illustrates the continuous treatment by Stormceptor throughout the full range of storm events analyzed. It is clear that large events do not significantly impact the average annual TSS removal. There is no decline in cumulative TSS removal, indicating scour does not occur as the flow rate increases.

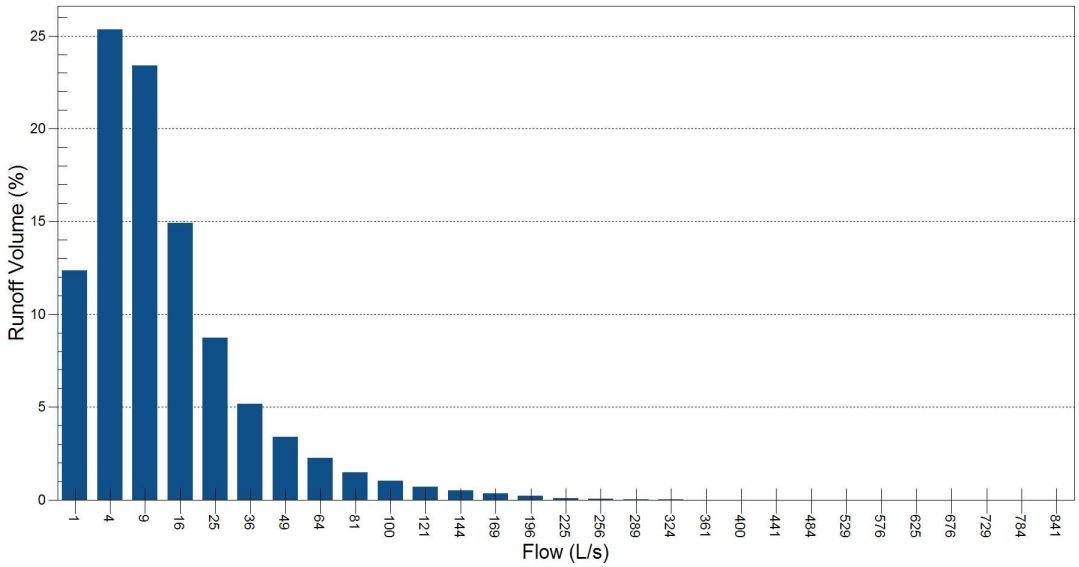


Figure 1. Runoff Volume by Flow Rate for OTTAWA MACDONALD-CARTIER INT'L A – ON 6000, 1967 to 2003 for 1.854 ha, 90% impervious. Small frequent storm events represent the majority of annual rainfall volume. Large infrequent events have little impact on the average annual TSS removal, as they represent a small percentage of the total annual volume of runoff.

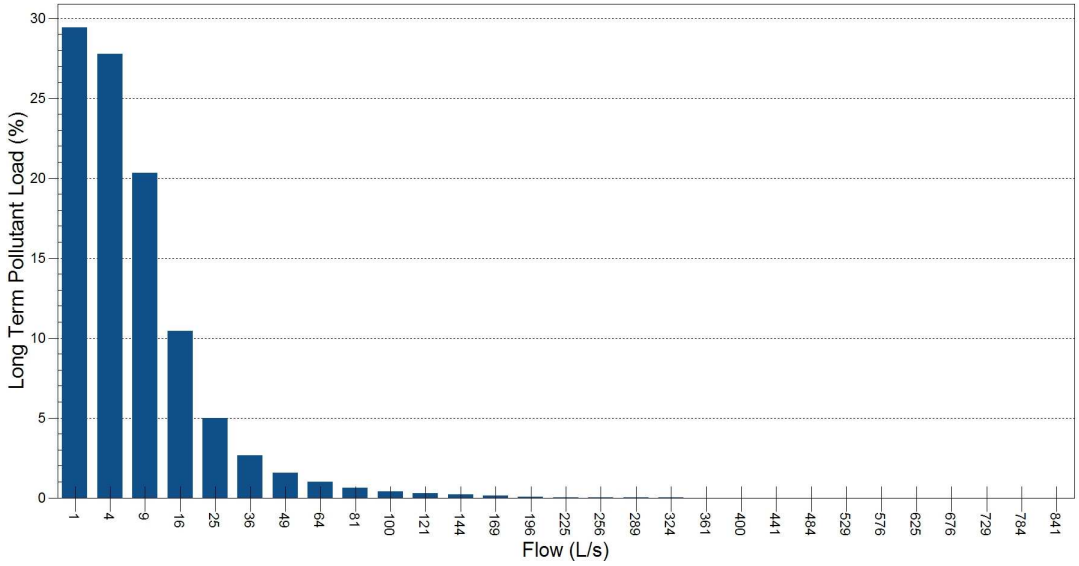
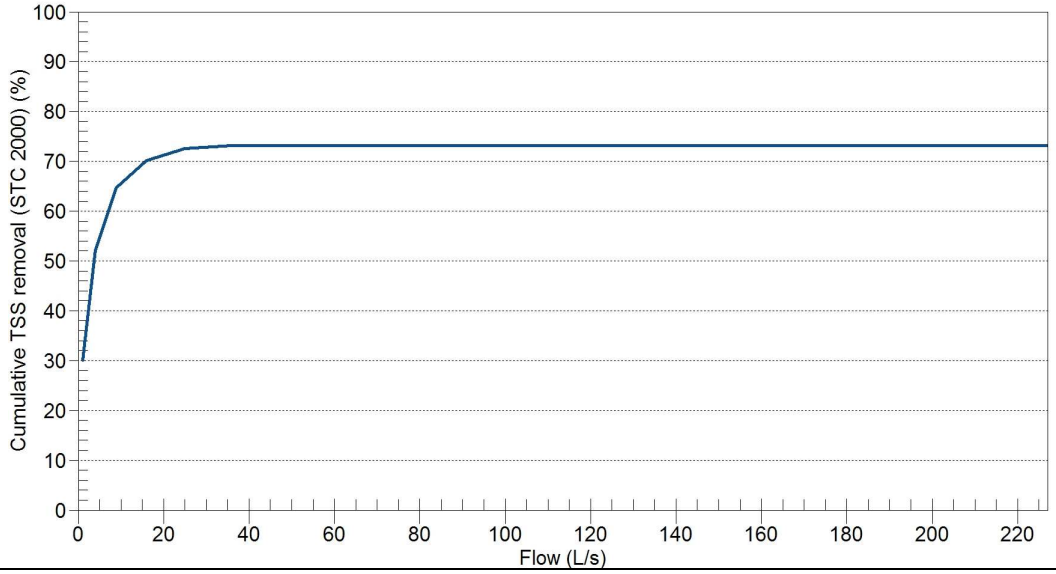


Figure 2. Long Term Pollutant Load by Flow Rate for OTTAWA MACDONALD-CARTIER INT'L A – 6000, 1967 to 2003 for 1.854 ha, 90% impervious. The majority of the annual pollutant load is transported by small frequent storm events. Conversely, large infrequent events carry an insignificant percentage of the total annual pollutant load.



Stormceptor Model	STC 2000	Drainage Area (ha)	1.854
TSS Removal (%)	73	Impervious (%)	90

Figure 3. Cumulative TSS Removal by Flow Rate for OTTAWA MACDONALD-CARTIER INT'L A – 6000, 1967 to 2003. Stormceptor continuously removes TSS throughout the full range of storm events analyzed. Note that large events do not significantly impact the average annual TSS removal. Therefore no decline in cumulative TSS removal indicates scour does not occur as the flow rate increases.

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Appendix 1
Stormceptor Design Summary

Project Information

Date	7/7/2011
Project Name	Central Park
Project Number	N/A
Location	Ottawa, Ontario

Designer Information

Company	DSEL
Contact	Adam Fobert

Notes

N/A

Drainage Area

Total Area (ha)	1.854
Imperviousness (%)	90

The Stormceptor System model STC 2000 achieves the water quality objective removing 73% TSS for a Fine (organics, silts and sand) particle size distribution and 88% runoff volume.

Rainfall

Name	OTTAWA MACDONALD-CARTIER INT'L A
State	ON
ID	6000
Years of Records	1967 to 2003
Latitude	45°19'N
Longitude	75°40'W

Water Quality Objective

TSS Removal (%)	70
Runoff Volume (%)	85

Upstream Storage

Storage (ha-m)	Discharge (L/s)
0	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %	Runoff Volume %
STC 300	54	57
STC 750	66	79
STC 1000	67	79
STC 1500	67	79
STC 2000	**73**	**88**
STC 3000	74	88
STC 4000	78	94
STC 5000	79	94
STC 6000	82	96
STC 9000	86	98
STC 10000	85	98
STC 14000	88	99

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

Fine (organics, silts and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s
20	20	1.3	0.0004					
60	20	1.8	0.0016					
150	20	2.2	0.0108					
400	20	2.65	0.0647					
2000	20	2.65	0.2870					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor version 1.0
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 300 is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 750 to STC 6000 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 300	STC 750 to STC 6000	STC 9000 to STC 14000
Single inlet pipe	75 mm	25 mm	75 mm
Multiple inlet pipes	75 mm	75 mm	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Imbrium Systems Inc., 1-800-565-4801.

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Appendix 2
Summary of Design Assumptions

SITE DETAILS

Site Drainage Area

Total Area (ha)	1.854	Imperviousness (%)	90

Surface Characteristics

Width (m)	272.3233
Slope (%)	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Maintenance Frequency

Sediment build-up reduces the storage volume for sedimentation. Frequency of maintenance is assumed for TSS removal calculations.	
Maintenance Frequency (months)	12

Infiltration Parameters

Horton's equation is used to estimate infiltration	
Max. Infiltration Rate (mm/h)	61.976
Min. Infiltration Rate (mm/h)	10.16
Decay Rate (s^{-1})	0.00055
Regeneration Rate (s^{-1})	0.01

Evaporation

Daily Evaporation Rate (mm/day)	2.54

Dry Weather Flow

Dry Weather Flow (L/s)	No

Winter Months

Winter Infiltration	False

Upstream Attenuation

Stage-storage and stage-discharge relationship used to model attenuation upstream of the Stormceptor System is identified in the table below.

Storage ha-m	Discharge L/s
0	0

PARTICLE SIZE DISTRIBUTION

Particle Size Distribution

Removing fine particles from runoff ensures the majority of pollutants, such as heavy metals, hydrocarbons, free oils and nutrients are not discharged into natural water resources. The table below identifies the particle size distribution selected to define TSS removal for the design of the Stormceptor System.

Fine (organics, silts and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s
20	20	1.3	0.0004					
60	20	1.8	0.0016					
150	20	2.2	0.0108					
400	20	2.65	0.0647					
2000	20	2.65	0.2870					

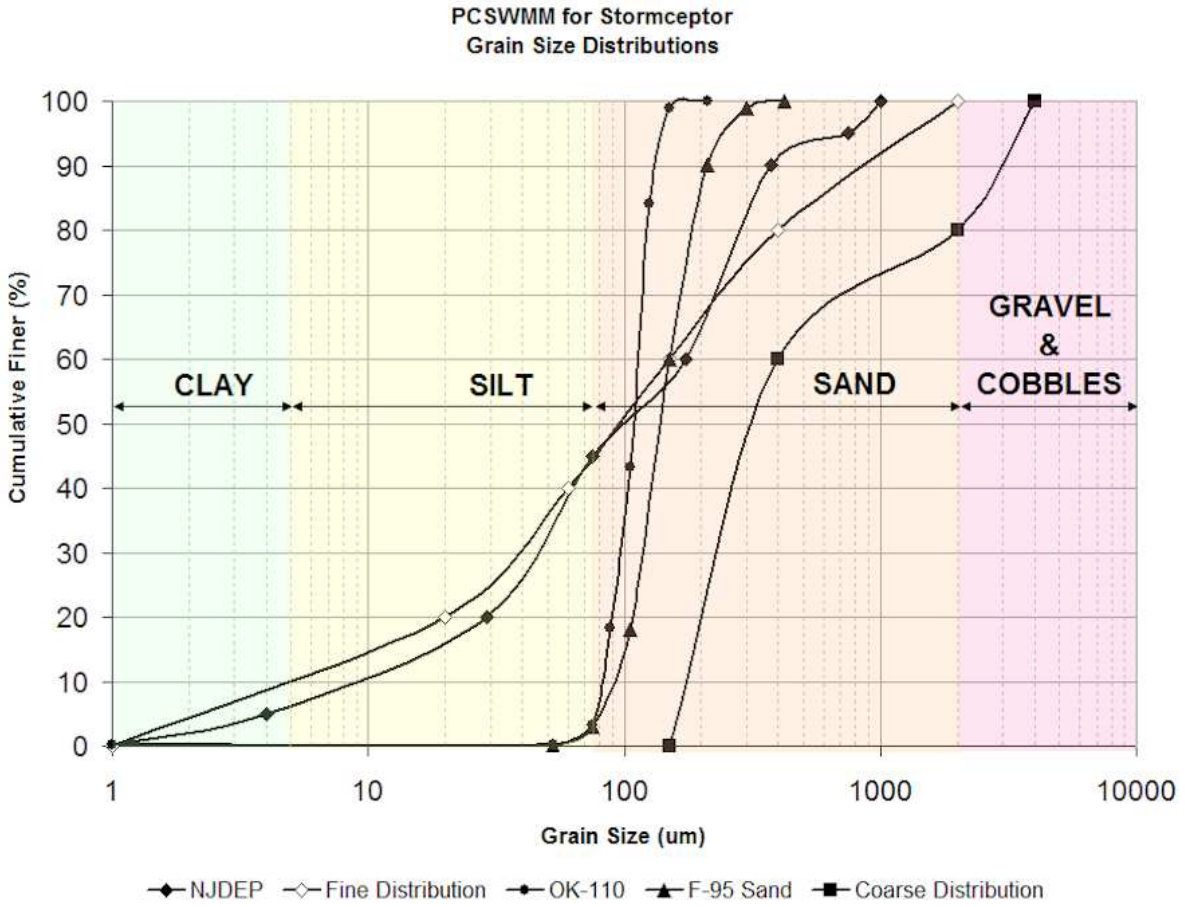

Figure 1. PCSWMM for Stormceptor standard design grain size distributions.

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TSS LOADING

TSS Loading Parameters

TSS Loading Function	Buildup / Washoff

Buildup/Washoff Parameters

Target Event Mean Concentration (EMC) (mg/L)	125
Exponential Buildup Power	0.4
Exponential Washoff Exponential	0.2

TSS Availability Parameters

Availability = $A + Bi^C$	
Availability Constant A	0.057
Availability Factor B	0.04
Availability Exponent C	1.1
Min. Particle Size Affected by Availability (µm)	400

HYDROLOGY ANALYSIS

PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of the Stormceptor System are based on the average annual removal of TSS for the selected site parameters. The Stormceptor System is engineered to capture fine particles (silts and sands) by focusing on average annual runoff volume ensuring positive removal efficiency is maintained during all rainfall events, while preventing the opportunity for negative removal efficiency (scour).

Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station

Rainfall Station	OTTAWA MACDONALD-CARTIER INT'L A		
Rainfall File Name	ON6000.NDC	Total Number of Events	4536
Latitude	45°19'N	Total Rainfall (mm)	20974.3
Longitude	75°40'W	Average Annual Rainfall (mm)	566. 9
Elevation (m)	371	Total Evaporation (mm)	1851.0
Rainfall Period of Record (y)	37	Total Infiltration (mm)	2090.2
Total Rainfall Period (y)	37	Percentage of Rainfall that is Runoff (%)	81.6

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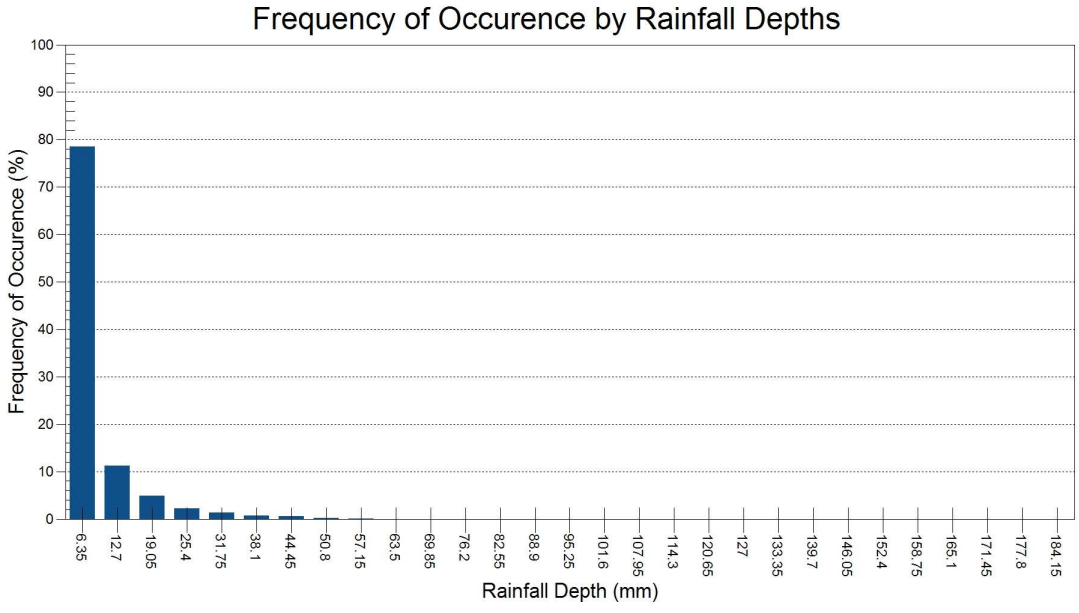
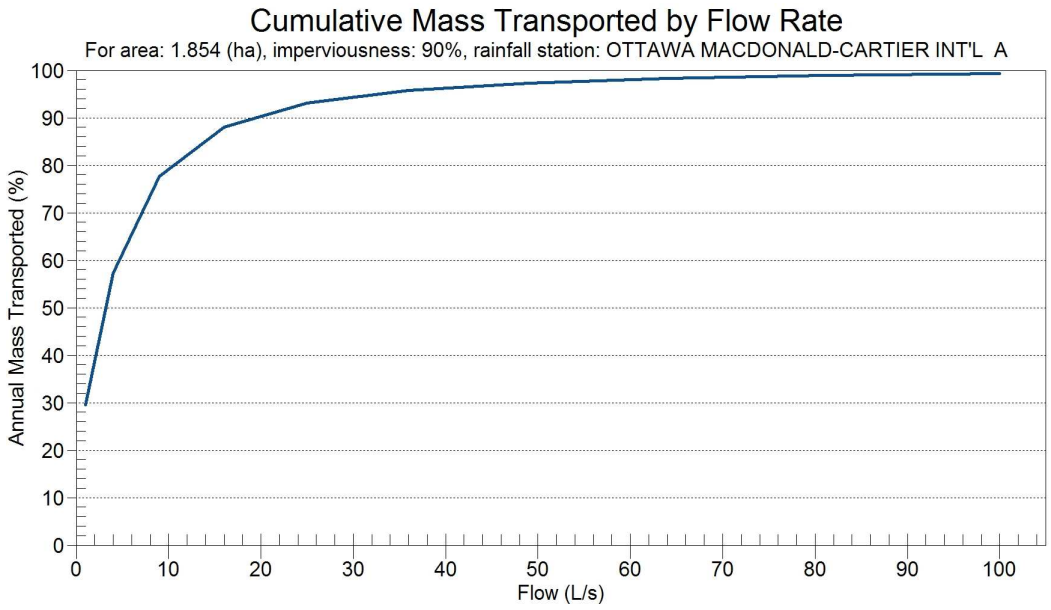
Rainfall Event Analysis

Rainfall Depth mm	No. of Events	Percentage of Total Events %	Total Volume mm	Percentage of Annual Volume %
6.35	3563	78.5	5667	27.0
12.70	508	11.2	4533	21.6
19.05	223	4.9	3434	16.4
25.40	102	2.2	2244	10.7
31.75	60	1.3	1704	8.1
38.10	33	0.7	1145	5.5
44.45	28	0.6	1165	5.6
50.80	9	0.2	416	2.0
57.15	5	0.1	272	1.3
63.50	1	0.0	63	0.3
69.85	1	0.0	64	0.3
76.20	1	0.0	76	0.4
82.55	0	0.0	0	0.0
88.90	1	0.0	84	0.4
95.25	0	0.0	0	0.0
101.60	0	0.0	0	0.0
107.95	0	0.0	0	0.0
114.30	1	0.0	109	0.5
120.65	0	0.0	0	0.0
127.00	0	0.0	0	0.0
133.35	0	0.0	0	0.0
139.70	0	0.0	0	0.0
146.05	0	0.0	0	0.0
152.40	0	0.0	0	0.0
158.75	0	0.0	0	0.0
165.10	0	0.0	0	0.0
171.45	0	0.0	0	0.0
177.80	0	0.0	0	0.0
184.15	0	0.0	0	0.0
190.50	0	0.0	0	0.0
196.85	0	0.0	0	0.0
203.20	0	0.0	0	0.0
209.55	0	0.0	0	0.0
>209.55	0	0.0	0	0.0



Pollutograph

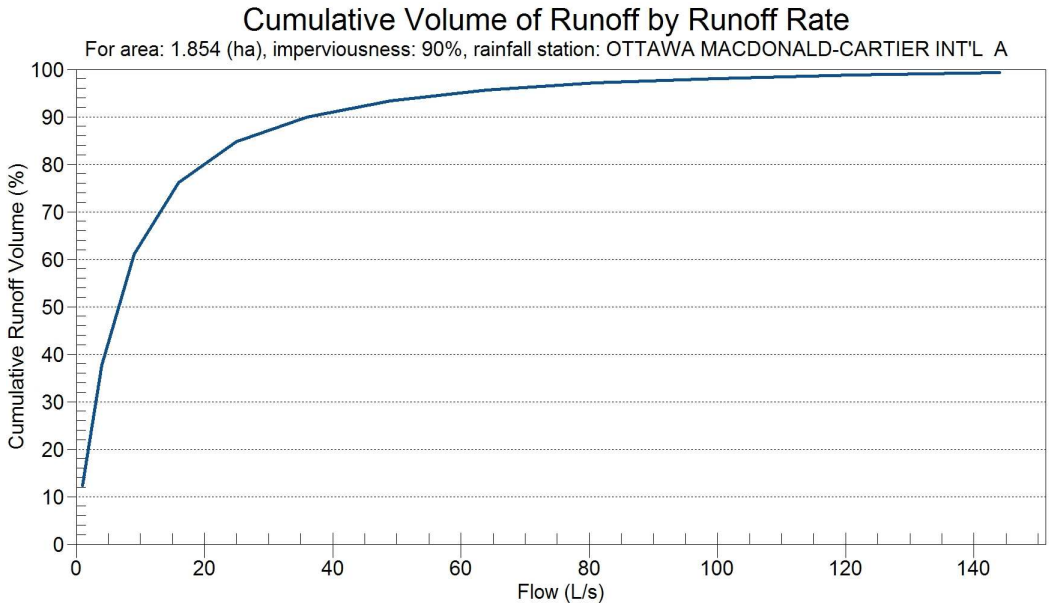
Flow Rate L/s	Influent Mass kg	Effluent Mass kg	Total Mass kg	Cumulative Mass %
1	34802	83410	118008	29.5
4	67618	50566	118008	57.3
9	91625	26452	118008	77.6
16	103943	14094	118008	88.1
25	109809	8213	118008	93.1
36	112948	5065	118008	95.7
49	114800	3211	118008	97.3
64	115963	2048	118008	98.3
81	116678	1333	118008	98.9
100	117164	847	118008	99.3
121	117493	517	118008	99.6
144	117721	289	118008	99.8
169	117862	148	118008	99.9
196	117933	76	118008	99.9
225	117963	45	118008	100.0
256	117982	26	118008	100.0
289	117999	10	118008	100.0
324	118007	2	118008	100.0
361	118008	0	118008	100.0
400	118008	0	118008	100.0
441	118008	0	118008	100.0
484	118008	0	118008	100.0
529	118008	0	118008	100.0
576	118008	0	118008	100.0
625	118008	0	118008	100.0
676	118008	0	118008	100.0
729	118008	0	118008	100.0
784	118008	0	118008	100.0
841	118008	0	118008	100.0
900	118008	0	118008	100.0



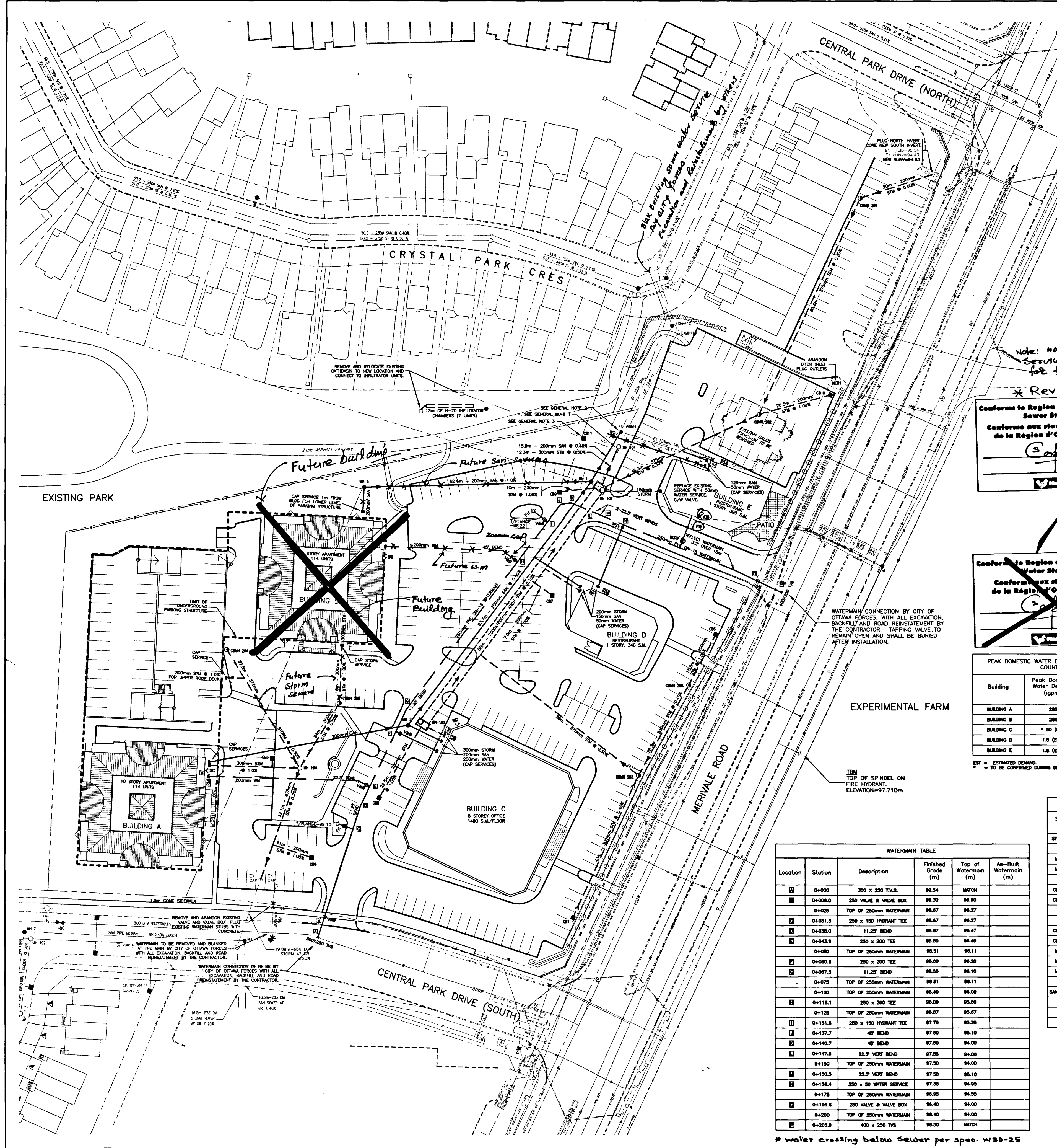
Stormceptor®

Cumulative Runoff Volume by Runoff Rate

Runoff Rate L/s	Runoff Volume m³	Volume Overflowed m³	Cumulative Runoff Volume %
1	39226	278133	12.4
4	119693	197646	37.7
9	193987	123432	61.1
16	241333	75984	76.1
25	268996	48337	84.8
36	285363	31948	89.9
49	296161	21150	93.3
64	303296	14010	95.6
81	307975	9331	97.1
100	311244	6061	98.1
121	313435	3867	98.8
144	314979	2322	99.3
169	316082	1220	99.6
196	316722	579	99.8
225	316986	315	99.9
256	317160	141	100.0
289	317242	59	100.0
324	317288	13	100.0
361	317301	0	100.0
400	317301	0	100.0
441	317301	0	100.0
484	317301	0	100.0
529	317301	0	100.0
576	317301	0	100.0
625	317301	0	100.0
676	317301	0	100.0
729	317301	0	100.0
784	317301	0	100.0
841	317301	0	100.0
900	317301	0	100.0

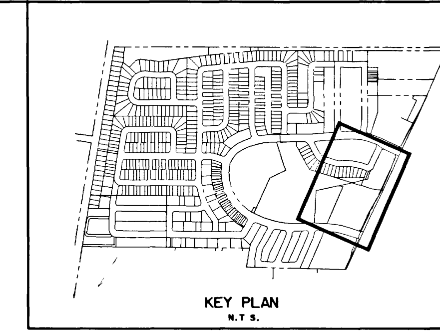


DRAWINGS / FIGURES



Conforms to Region of Ottawa-Carleton Sewer Standards
Conforme aux standards des égouts de la Région d'Ottawa-Carleton
Date 9/1/2002

Conforms to Region of Ottawa-Carleton Water Standards
Conforme aux standards d'eau de la Région d'Ottawa-Carleton
Date 8 NOV.01



LEGEND

DESCRIPTION	PROPOSED	EXISTING
ASPHALT EDGE		
CONCRETE BARRIER CURB WITH DEPRESSION		
SIDEWALK & TYPE	ASPH CONC	ASPH CONC
PROPERTY LINE		
SANITARY SEWER & MANHOLE (TYPE & DIA)	MH 2	MH
STORM SEWER & MANHOLE (TYPE & DIA)	MH 101	MH
CATCHBASIN	CB2	CB
CATCHBASIN MANHOLE	CBMH 203	CBMH 203
DOUBLE CATCHBASIN	DCB	
DITCH INLET CATCHBASIN	DCB	
VALVE & BOX	V&B	V&B
WATER SERVICE VALVE (CURB STOP)	WSV	WSV
FIRE HYDRANT AND VALVE		
WATER METER		
REMOTE WATER METER READER	RM	
SIMEASE CONNECTION		

GENERAL NOTES

1) INLET CONTROL DEVICE TO BE INSTALLED IN THE UPSTREAM END OF STORM MANHOLE RUN MH102–MH101 AT THE NORTH INVERT OF MANHOLE 102. INLET RESTRICTOR TO BE IPEX 'TYPE C' RESTRICTED TO 37.0 L/SEC THE EXISTING DITCH INLET CATCHBASIN TO BE REMOVED AND REPLACED WITH A STORMCEPTOR MANHOLE, MODEL STC–2000. THE CONTRACTOR SHALL SUPPLY AND INSTALL A FLAP GATE "ARMTEC MODEL 10C" WITHIN MANHOLE 102 ON THE 375mm DIAMETER FROM MANHOLE 102 TO CATCHBASIN MANHOLE 202.

2) THE FINISHED GRADE ELEVATION OF EXISTING SANITARY MANHOLE (BESIDE STORM MH 101) TO BE RAISED FROM CURRENT ELEVATION OF 96.26 TO 97.50 WITH APPROVED MANHOLE RISER SECTORS AS REQUIRED

3) NEW CATCHBASIN TO BE INSTALLED ON EXISTING CATCHBASIN LEAD FROM PARK CATCHBASIN. REMAINING PIPE TO BE ABANDONED AND CONCRETED AT BOTH ENDS TO THE SATISFACTION OF THE ENGINEER.

4) BACKFLOW PREVENTERS TO BE INSTALLED ON ALL STORM SEWER SERVICE LATERALS.

5) ALL MATERIALS AND CONSTRUCTION METHODS TO OPSS AND THE CITY OF OTTAWA STANDARD SPECIFICATIONS.

6) THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED TO COMPLETE THIS WORK AND BEAR COST OF SAME.

7) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION AND TRENCHING ALONG WITH BACKFILL TO STANDARDS SPECIFIED

8) THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL CONNECTIONS INTO THE EXISTING SEWERS.

9) SITE LAYOUT IS THE RESPONSIBILITY OF THE CONTRACTOR.

10) AS–BUILT "SITE SERVICING & GRADING PLANS" WILL BE MAINTAINED ON SITE BY THE CONTRACTOR.

11) ALL WATERMAIN TO BE 2.4m BELOW FINISHED GRADE AS INDICATED IN THE WATERMAIN TABLE.

12) THERMAL INSULATION AT OPEN STRUCTURES AS PER CITY OF OTTAWA WSD–23

13) CATHODIC PROTECTION FOR WATERMAINS AS PER CITY OF OTTAWA WSD–40, WSD–42.

14) FIRE HYDRANT ISOLATION VALVE TO BE 1.0m FROM WATERMAIN AS PER CITY OF OTTAWA STANDARDS WSD–19.

15) CATCH BASIN LEADS WILL BE 200mm DIAMETER (MINIMUM) AND HAVE A MINIMUM SLOPE OF 1.0% UNLESS OTHERWISE NOTED. LEADS TO HAVE A MINIMUM 0.25m VERTICAL CLEARANCE AT WATERMAIN CROSSINGS.

16) CONTRACTOR TO ADJUST FINAL GRADE OF EXISTING CATCH BASINS, MANHOLES, FIRE HYDRANTS, VALVE CHAMBERS AND VALVE BOXES AS REQUIRED.

17) SUB–EXCAVATE SOFT AREAS & FILL WITH GRANULAR 'B' COMPACTED IN 0.15m LAYERS.

18) SEWERS SHALL BE VIDEO INSPECTED AFTER CONSTRUCTION.

19) FOR THE ENTIRE CONSTRUCTION PERIOD MAINTAIN A FILTER FABRIC AROUND ALL CATCHBASIN AND MANHOLE TOPS

20) GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300 mm AROUND ALL STRUCTURES WITHIN PAVEMENT

21) SEWER TRENCH SHALL CONSIST OF A CLASS "B" BEDDING CONSISTING OF 150 mm OF GRANULAR "A" BEDDING AND BACKFILLED WITH GRANULAR "A" TO 300mm OVER SEWER. COMPACTION SHALL BE A MINIMUM OF 98 % STANDARD PROCTOR DENSITY.

22) ALL GRANULAR FOR ROADS AND PARKING AREAS SHALL BE COMPACTED TO A MINIMUM OF 100 % STANDARD PROCTOR DENSITY

23) CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING FOUNDATION OF ADJACENT BUILDINGS DURING EXCAVATION AND CONSTRUCTION PERIOD

24) CONTRACTOR TO PROVIDE TEMPORARY SEDIMENT CONTROLS AND SILT FENCES TO CONTROL STORMWATER RUNOFF FROM THE CONSTRUCTION SITE.

25) THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE THE LOCATION AND STATUS OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION OF PLANT AND EQUIPMENT FROM DAMAGE.

26) SOIL INFORMATION, IF SHOWN, IS NOT GUARANTEED. CONTRACTORS ARE ADVISED TO COLLECT ADDITIONAL SOIL FORMATION AS DEEMED NECESSARY.

27) ALL CONNECTIONS OF NEW W.M. TO EXIST. W.M AND ALL BLANKINGS OF EXIST. MAINS AND SERVICES SHALL BE PERFORMED BY CITY OF OTTAWA FORCES. THE CONTRACTOR SHALL PROVIDE EXCAVATION, BACKFILL AND REINSTATEMENT.

28) ALL NEW WATER SERVICES SHALL BE INSTALLED AT 2.4m COVER.

CONTINUED ON DRAWING 12491F–GP1

CATHBASIN AND MANHOLE STRUCTURE DATA

No.	Invert Elevation					Remarks
	Grate	West Invert	East Invert	North Invert	South Invert	
STORM						
MH103	98.40		96.20	94.34	96.78	1680 x 3000
MH102	97.70		94.25	94.19	94.26	1680 x 3000
MH101	97.50			94.10	94.13	STORMCEPTOR
MH104	99.30	97.35	97.35	97.28	96.97	1500 DIA
CBMH201	95.60			94.81	94.63	1200 DIA
CBMH202	96.90		94.64	94.43	94.40	1200 DIA
CBMH203	97.95	96.40		96.48	96.48	1200 DIA
CBMH204	98.95				97.39	1200 DIA
CBMH205	99.00			97.53	97.47	1200 DIA
CBMH206	97.65			96.69	96.59	1200 DIA
CB1	98.00			96.65		
CB3	99.20			97.80		
CB4	98.70	97.50				
CB5	98.40			97.00		
CB6	97.65				96.85	
CB7	97.75	96.35				
CB9	97.65		96.25			
CB10	96.25				94.85	
SANITARY						
MH1	97.75	94.65		94.59	94.62	1200 DIA
MH2	98.45	95.10	95.50	94.95		1200 DIA
MH3	98.50		95.27		95.33	1200 DIA

PEAK DOMESTIC WATER DEMAND AND FIXTURE COUNTS.

Building	Peak Domestic Water Demand (igpm)	Total Fixture Count
BUILDING A	280	1600
BUILDING B	280	1600
BUILDING C	* 50 (EST)	N/A
BUILDING D	1.5 (EST)	N/A
BUILDING E	1.5 (EST)	N/A

EST – ESTIMATED DEMAND.
* – TO BE CONFIRMED DURING DESIGN OF BUILDING C.

SANITARY AND STORM SEWER MAINS

Structure From	Structure To	Diameter (mm)	Type	Class	Length (m)	Slope (%)	Invert Elevation	
							Upstream	Downstream
STORM MAINS								
CB5	MH 103	200	PVC	SDR35	23.0	0.40%	97.00	96.78
MH 103	MH 102	2500 x 1800	CSP ARCH	CS 800	80.0	0.10%	94.34	94.26
MH 102	MH 101	300	PVC	SDR 35	12.3	0.50%	94.19	94.13
EXCB	CBMH 201	200	PVC	SDR 35	20.0	0.60%	94.81	94.93
CBMH 201	CBMH 202	375	CONC	CL 100–D	65.6	0.30%	94.63	94.43
CBMH 202	MH 102	375	CONC	CL 100–D	48.3	0.30%	94.40	94.25
CB1	CBMH 203	300	PVC	SDR35	43.0	0.40%	96.65	96.48
CB6	CBMH 206	200	PVC	SDR35	15.5	1.00%	96.85	96.69
CBMH 206	CBMH 203	300	PVC	SDR35	28.5	0.40%	96.59	96.48
CBMH 203	TEE	375	CONC	CL 100–D	56.0	0.50%	96.40	96.12
MH 204	MH 104	375	CONC	CL 100–D	37.5	0.30%	97.39	97.28
MH 205	MH 104	300	PVC	SDR 35	24.0	0.50%	97.47	97.35
MH 104	STUB	675	CONC	CL 100–D	32.1	0.20%	96.97	96.91
SANITARY MAINS								
MH 2	MH 1	200	PVC	SDR 35	83.7	0.40%	94.95	94.62
MH 1	EXMH	200	PVC	SDR 35	15.9	0.40%	94.59	94.53
MH 3	MH 1	200	PVC	SDR 35	62.5	1.0%	95.27	94.65

INVERT ELEVATIONS OF SERVICES AT 1.5m FROM BUILDING FACE

Location	Finished Floor Elev	Sanitary Elev, (Dia), Slope	Storm Elev, Dia, Slope	Water Elev, Dia
BUILDING A	100.00	95.66, (200), 1.00%	97.60, (300), 1.00%	97.60, (200)
BUILDING B	99.50	95.40, (200), 1.00%	97.69, (300), 1.00%	97.10, (200)
BUILDING C	98.80	96.20., (200), 1.00%	96.25, (300), 1.00%	96.40, (200)
BUILDING D	98.10	96.45, (150), 1.00%	96.40, (200), 1.00%	95.70, (50)
BUILDING E	97.40	N/A , (150), N/A	95.70, (150), 1.00%	95.00, (50)

WATERMAIN TABLE

Location	Station	Description	Finished Grade (m)	Top of Watermain (m)	As–Built Watermain (m)
A	0+000	300 X 250 T.V.S.	99.54	MATCH	
B	0+006.0	250 VALVE & VALVE BOX	99.30	96.90	
	0+025	TOP OF 250mm WATERMAIN	98.67	96.27	
C	0+031.3	250 x 150 HYDRANT TEE	98.67	96.27	
D	0+038.0	11.25° BEND	98.87	96.47	
E	0+043.9	250 x 200 TEE	98.80	96.40	
	0+050	TOP OF 250mm WATERMAIN	98.51	96.11	
F	0+060.6	250 x 200 TEE	98.60	96.20	
G	0+067.3	11.25° BEND	98.50	96.10	
	0+075	TOP OF 250mm WATERMAIN	98.51	96.11	
	0+100	TOP OF 250mm WATERMAIN	98.40	96.00	
H	0+118.1	250 x 200 TEE	98.00	95.60	
	0+125	TOP OF 250mm WATERMAIN	98.07	95.67	
I	0+131.8	250 x 150 HYDRANT TEE	97.70	95.30	
J	0+137.7	45° BEND	97.50	95.10	
K	0+140.7	45° BEND	97.50	94.00	
L	0+147.5	22.5° VERT BEND	97.55	94.00	
	0+150	TOP OF 250mm WATERMAIN	97.50	94.00	
M	0+150.5	22.5° VERT BEND	97.50	95.10	
N	0+156.4	250 x 50 WATER SERVICE	97.35	94.95	
	0+175	TOP OF 250mm WATERMAIN	96.95	94.55	
O	0+196.6	250 VALVE & VALVE BOX	96.40	94.00	
	0+200	TOP OF 250mm WATERMAIN	96.40	94.00	
P	0+203.9	400 x 250 TVS	96.50	MATCH	

* water crossing below sewer per spec. WSD-25

Trow OMM
OLIVER, MANGIONE, McCALLA & ASSOCIATES
a division of Trow Consulting Engineers Ltd.
154 COLONNADE ROAD SOUTH
NEPEAN, ONTARIO K2E 7J5
Tel: (613) 225-9940
Fax: (613) 225-7337

LICENSED PROFESSIONAL ENGINEER J.L. FITZPATRICK 02/11/01 PROVINCE OF ONTARIO
LICENSED PROFESSIONAL ENGINEER B M THOMAS 02/11/01 PROVINCE OF ONTARIO

Revisions:

No	Date	Description	Drawn By	Appr'd By
1	03/04/2001	SUBMITTED FOR CLIENT REVIEW	J.L.F.	B.M.T
2	05/04/2001	REVISED AS PER CLIENT, RESUBMITTED FOR CLIENT REVIEW	J.L.F.	B.M.T.
3	25/04/2001	SUBMITTED FOR APPROVAL	J.L.F.	B.M.T
4	03/04/2001	GENERAL REVISIONS	J.L.F.	B.M.T
5	20/07/2001	REVISED BUILDING LAYOUT REUBMITTED FOR APPROVAL	J.L.F.	B.M.T.
6	26/07/2001	ISSUED FOR ROAD CUT PERMIT	C.C.C.	B.M.T
7	31/07/2001	REVISIONS TO SAN, STORM CHART RESUBMITTED FOR APPROVAL	J.L.F.	B.M.T.
8	25/09/2001	REVISED AS PER CITY OF OTTAWA RESUBMITTED FOR APPROVAL	J.L.F.	B.M.T.
9	01/11/2001	REVISED AS PER CITY OF OTTAWA RESUBMITTED FOR APPROVAL	J.L.F.	B.M.T.

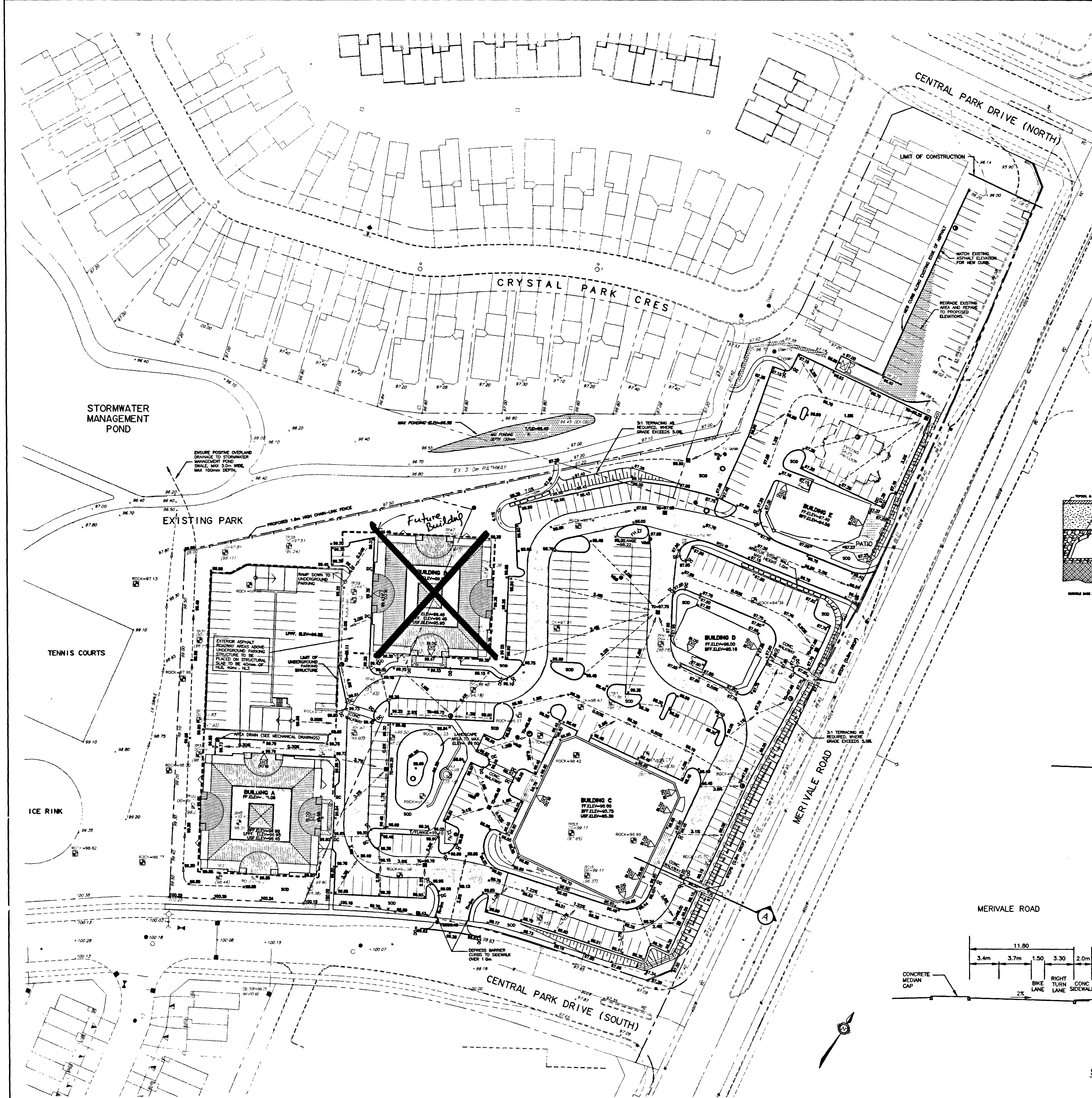
Ottawa

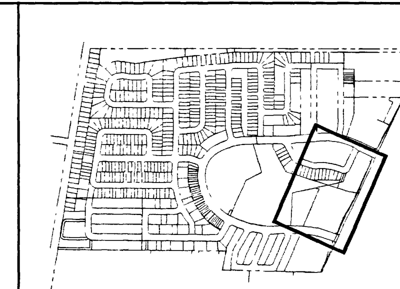
Commissioner | Branch Director P.Eng

CENTRAL PARK SUBDIVISION
SOUTH COMMERCIAL AREA
SITE SERVICING PLAN

Contract No	Design / Drawn / Checked	Scales	Plan No
MP12491F	Design J.L.F. / Drawn J.L.F. / Checked B M T	1:500	12491F–SP14

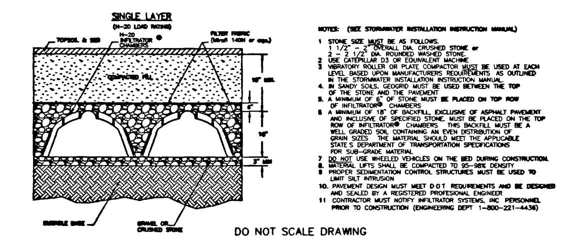
DWG # 11013



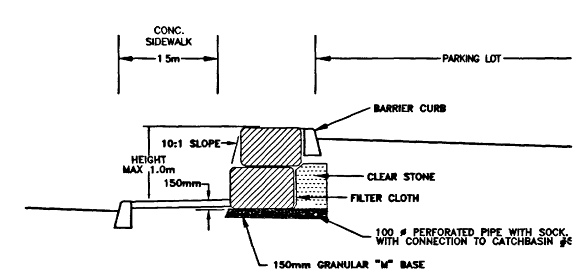


LEGEND

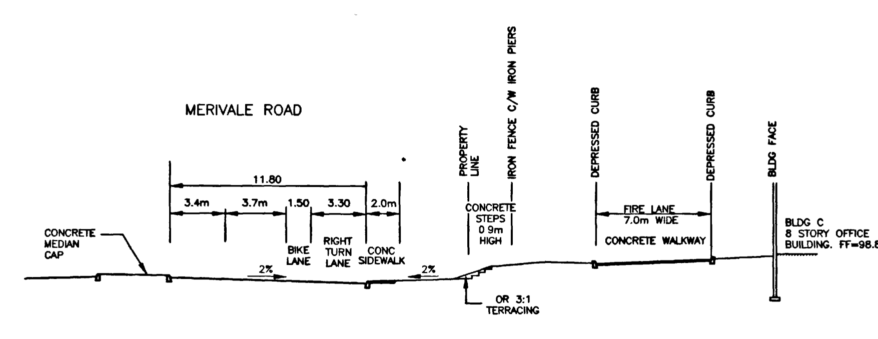
FINISHED FLOOR ELEVATION	FF=101.20
BASEMENT FINISHED FLOOR ELEVATION	BFF=101.20
LOWER PARKING FINISHED FLOOR ELEVATION	LPFF=101.20
UNDERSIDE OF FOOTING ELEVATION	USF =101.20
TERRACE (3:1 MAX – TYPICAL)	
PROPOSED GRADE	97.00
EXISTING ELEVATION	98 65
PROPOSED SLOPE	0.0%
TESTPIT ROCK ELEVATION BY TROW–OMM NOV 25, 2000	ROCK=97 96
TESTPIT OG=ORIGINAL GROUND ELEVATION (99 00) INFERRED BEDROCK SURFACE ELEVATION (m) [99 00] BEDROCK SURFACE ELEVATION (m) PROVIDED BY JOHN D PATTERSON AND ASSOC LTD	TP31 OG=100 04 (98 44)
ARMOUR STONE WALL MAXIMUM HEIGHT 1 0m	
PAVEMENT STRUCTURE FOR ACCESS ROADWAYS AND HEAY TRUCK PARKING	
TERRACING AT 3:1 MAX	



INLITRRATOR PIPE (H-20) DETAIL N.T.S.



CROSS SECTION AT ARMOUR STONE WALL N.T.S.



SECTION A-A

N.T.S.

GENERAL NOTES - CONTINUED

29) ALL WATER SERVICES THAT CONFLICT WITH SAN. AND STORM SEWERS AT CROSSINGS SHALL BE INSTALLED UNDER THE SEWERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

30) A MINIMUM 2.0m SEPARATION IS REQUIRED BETWEEN ALL NEW WATER SERVICES OR HYDRANTS AND CATCHBASINS OR OPEN STRUCTURES AND SHALL BE INSULATED AS PER CITY OF OTTAWA SPEC. WSD-23 AS APPLICABLE.

31) WATERMAIN MATERIAL TO BE:
150–250ø – PVC DR 18
50ø AND SMALLER – TYPE K COPPER

32) ALL SEWER CONSTRUCTION TO BE IN ACCORDANCE WITH THE LATEST EDITION SECTION F SPECIAL PROVISIONS – ITEMS OF THE CITY OF OTTAWA.

33) ALL SANITARY SEWER SERVICE LATERALS SHALL BE 150mm PVC DR 35 @ 1.00% SLOPE.

34) ALL CURBS BARRIER TYPE TO CITY OF OTTAWA STANDARDS C/W DEPRESSIONS WHERE NOTED ON THE DRAWINGS.

35) ALL SERVICES TO BE CONSTRUCTED TO 1.0m OUTSIDE FOUNDATION WALLS.

36) ALL SEWER MATERIAL TO BE:
200mmø & LARGER PVC DR 35
150mmø & SMALLER PVC DR 28

37) CATCH BASINS TO BE OPSD 700.01 WITH FRAME AND COVERS TO CITY OF OTTAWA STANDARDS DRAWING S5.

38) ALL CATCH BASIN MANHOLES TO BE OPSD 701.010 WITH FRAME AND COVER TO CITY OF OTTAWA STANDARDS.

39) STORM AND SANITARY MANHOLES TO BE TO OPSD 701 01 WITH FRAME AND COVER TO CITY OF OTTAWA STANDARDS.

40) ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCH BASIN OUTLETS ARE PROVIDED.

41) IT SHALL BE THE BUILDER'S RESPONSIBILITY TO ENSURE THAT GRADING AROUND HYDRANTS, TRANSFORMERS, AND UTILITY PEDESTALS, ETC., MEET CURRENT ROC, HYDRO AND UTILITY COMPANY REQUIREMENTS.

42) CONTRACTOR TO REPLACE EXISTING 19mm WATER SERVICE TO 1.0 METRES FROM THE BUILDING FACE WITH A 50mm COPPER WATER SERVICE AND RECONNECT EXISTING SALES PAVILLION WITH NECESSARY REDUCER AND CONNECTIONS.

43) CONNECTION OF STORM SERVICES AND CATCHBASIN LEADS TO THE 2500X1800 CSP ARCH PIPE TO BE AS PER MANUFACTURER'S RECOMMENDATIONS AND TO THE SATISFACTION OF THE ENGINEER.

44) CONTRACTOR TO INSULATE ALL STORM AND SANITARY SEWER LEADS, SERVICES AND MAINS WHICH HAVE A DEPTH OF COVER LESS THAN 1.8 METRES. THERMAL INSULATION REQUIREMENTS TO BE AS PER CITY OF OTTAWA STANDARDS WSD–22 AND WSD–21 AS REQUIRED.

45) THE REQUIRED PAVEMENT STRUCTURE FOR THE CAR ONLY PARKING AREA SHALL BE AS FOLLOWS:
50mm HL–3 SURFACE COURSE
150mm BASE – OPSS GRANULAR A CRUSHED STONE
300mm SUBBASE – OPSS GRANULAR B TYPE II
SUBGRADE – EITHER FILL, IN SITU SOIL OR OPSS GRANULAR B TYPE I OR MATERIAL PLACED OVER IN SITU SOIL OR FILL

46) THE REQUIRED PAVEMENT STRUCTURE FOR THE ACCESS LANES AND HEAVY TRUCK PARKING AREA SHALL BE AS FOLLOWS:
40mm HL–3 SURFACE COURSE
50mm HL–8 BINDER COURSE
150mm BASE – OPSS GRANULAR A CRUSHED STONE
350mm SUBBASE – OPSS GRANULAR B TYPE II
SUBGRADE – EITHER FILL, IN SITU SOIL OR OPSS GRANULAR B TYPE I OR I MATERIAL PLACED OVER IN SITU SOIL OR FILL

47) THE BASMENT OF BUILDINGS A, B ARE PART OF THE UNDERGROUND PARKING STRUCTURE. ALL STORM RUNOFF TO BE DIRETED TO THE SANITARY LATERAL PROIDED AT MANHOLE 3. THE RUNOFF FROM THE UPPPER LEVELS OF THE PARKING STRUCTURE, WHICH ARE EXPOSED TO THE OUTSIDE, SHALL BE DIRECTED TO THE STORM LATERAL PROVIDED NEAR CBMH 204.

48) THE BASEMENTS OF BUILINGS C, D, & E ARE FOR STORAGE ONLY. NO SANITARY FIXTURES ARE PRESENT AND REQUIRE NO SANITARY LATERAL FOR THE BASEMENT LEVLEL. FOUNDATION DRAINS FOR THESE BUILDINGS TO UTILIZING STANDARD SUMP PUMPS TO THE STORM LATERLAS PROVIDED.

Trow OMM OLIVER, MANGIONE, McCALLA & ASSOCIATES
a division of Trow Consulting Engineers Ltd.
154 COLONNADE ROAD SOUTH
NEPEAN, ONTARIO K2E 7J5
Tel: (613) 225-9940
Fax: (613) 225-7337

LICENSED PROFESSIONAL ENGINEER J.L FITZPATRICK 08/11/01 PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER B. M. THOMAS 08/11/01 PROVINCE OF ONTARIO

Revisions:

No	Date	Description	Drawn By	Appr'd By
1	07/04/2001	SUBMITTED FOR CLIENT REVIEW	J.L.F.	B M.T
2	25/04/2001	SUBMITTED FOR APROVAL	J.L.F.	B.M.T.
3	03/05/2001	GENERAL REVISIONS	J.L F.	B M T.
4	20/07/2001	REVISED BUILDING LAYOUT. RESUBMITTED FOR APPROVAL	J.L.F.	B.M T.
5	01/08/2001	GENERAL REVISIONS, RESUBMITTED FOR APPROVAL.	J.L.F.	B.M.T
6	25/09/2001	REVISED AS PER CITY OF OTTAWA RESUBMITTED FOR APPROVAL	J.L.F.	B.M.T.
7	01/11/2001	REVISED AS PER CITY OF OTTAWA RESUBMITTED FOR APPROVAL	J.L.F.	B.M.T.
8	08/11/2001	REVISED ASPHALT RADII AT ENTRANCE TO CENTRAL PARK DRIVE	J.L.F.	B.M.T.

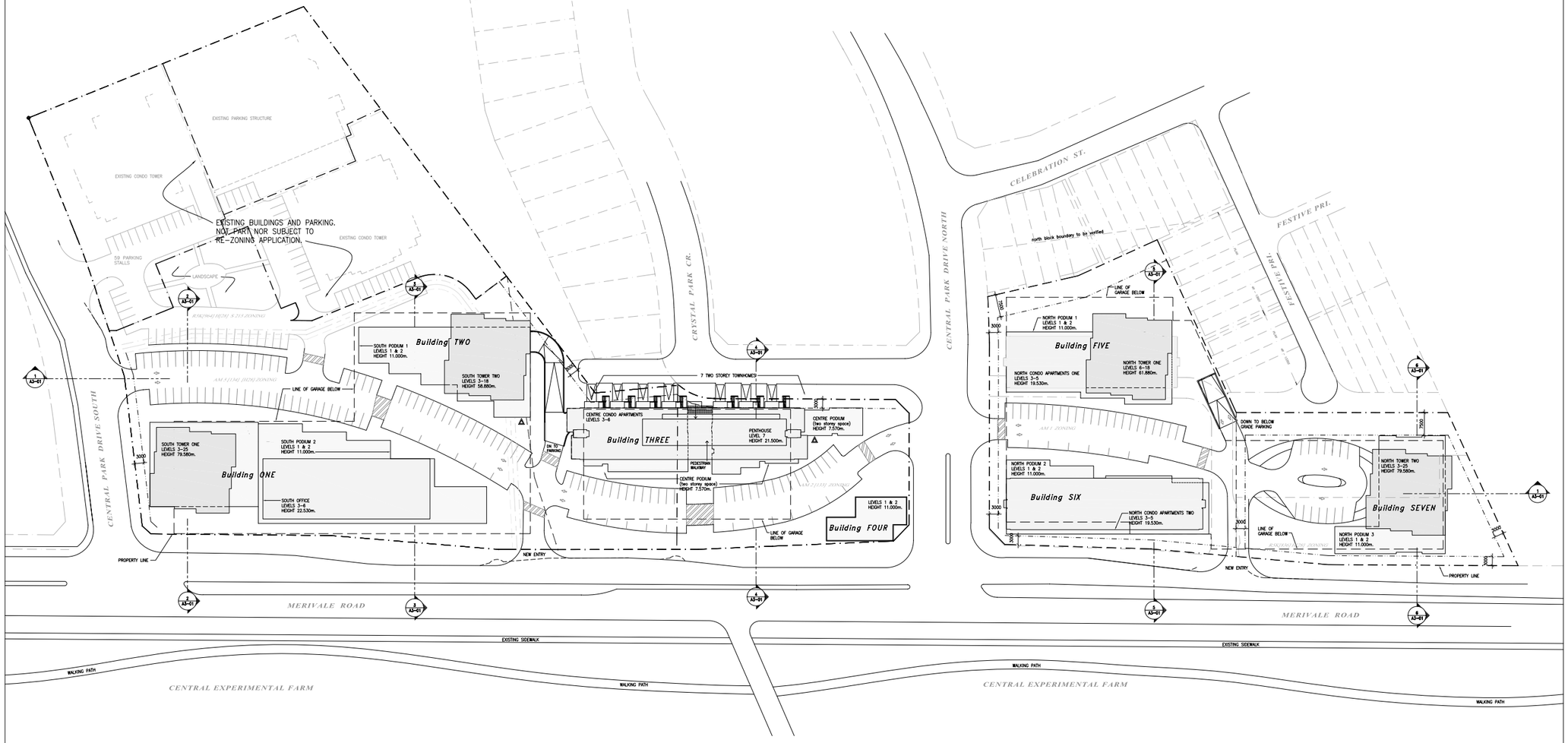
Ottawa

Commissioner

Branch Director P Eng

CENTRAL PARK SUBDIVISION
SOUTH COMMERCIAL AREA
GRADING PLAN

Contract No	Design / Drawn / Checked	Scales	Plan No
MP12491F	Design J.L.F. Drawn J.L.F. Checked B.M.T.	1:500	12491F-GP1



1 Site Plan
1:500

CCC 660
CCC 662
CCC 797

site data

CURRENT ZONING:
AM3[134] H(28)
AM2[133]
AM1 only
R5H[836] H(28)

Area 'B' Schedule 'I'

Zoning Requirements
AM3[134] H(28); AM2 133 and AM1 Zones

Front and Corner Side Yard
Non-residential or mixed use — no min.
Residential use building — min. 3.0m.
Minimum Interior Side Yard
Abutting residential zone — min. 7.5m.
All other cases — no min.
Minimum Rear Yard
Rear lot line abutting a street — min. 3.0m.
Rear lot line abutting residential zone — min. 7.5m.
For residential use bldg. — min. 7.5m.
All other cases — no min.

R5H[836] H(2) Zone:
Minimum Front Yard — min. 3.0m.
Minimum Corner Side Yard — min. 3.0m.
Minimum Rear Yard — 25% lot depth to max. 7.5m.

Parts of 1 & 6 Registered Plan 4M-970
and
Part of Block 71 Registered Plan 4M-1047
City of Ottawa

AREA:
North of Central Park Drive 11,140m² / 1.114ha
South of Central Park Drive 27,300m² / 2.730ha

Total: 38,440m² / 3844ha

Site information from official survey prepared by
Annis O'Sullivan Vollebekk Ltd.
Job No. 11859-11
Ashcroft Pt Blks 1 6 4m-970 T D4

building data

AREAS BY BUILDING (gfa)

		HEIGHT Stories	metres
Building ONE:	26,270m²		
South Podium 2	4,420m²	2	11.000
South Tower One	16,100m²	25	79.580
South Office	4,440m²	6	22.530
Building TWO:	13,550m²		
South Podium 1	2,350m²	2	11.000
South Tower Two	11,200m²	18	58.880
Building THREE:	7,486m²		
Centre Podium	1,575m²	2	7.570
Centre Residential	5,910m²	7	21.500
Building FOUR:			
Retail CR	600m²	1	11.000
Building FIVE:	14,404m²		
North Podium 1	2,384m²	2	11.000
North Tower One	9,100m²	18	61.880
North Condo Apts One	2,920m²	6	19.530
Building SIX:	6,180m²		
North Podium 2	2,820m²	2	11.000
North Condo Apts. Two	3,360m²	6	19.530
Building SEVEN:	18,070m²		
North Podium 3	1,970m²	2	11.000
North Tower Two	16,100m²	25	79.580

TOTAL AREA : 86,359m²
(929,540ft²)

parking data

Surface	169
South Garage	370
Centre Garage	108
North Garage	460
Total	1107
Typical Stall	2.60 x 5.2m
Accessible Stall	3.66 x 5.2m

NO.	DESCRIPTION	DATE YY/MM/DD	CHK
01	For Re-Zoning Application	11.05.06	RB

REVISIONS/ISSUES

CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY OMISSIONS OR DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
DO NOT SCALE THE DRAWINGS

THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES UNTIL SIGNED BY THE ARCHITECT.

DATE STAMPED
MM|DD|YY

DRAWN
G.F. J.G.

DATE
11.05.06

CHECKED
RB

DATE PLOTTED
MM|DD|YY

PROJECT NORTH

ASHCROFT

bbb architects

PROJECT
Central Park
Merivale Road

DWG. TITLE
Site Plan
Re-Zoning

SCALE 1:500
PROJ. NO. 1003
DWG. No. A0-01z
REV. 01

S:\1003 Merivale\Central Park Ashcroft\ACAD\Centre Precinct\Working Drawings\Ash01 - SITE\Ash01 Site Plan Re-Zoning.dwg, 1:1

BUILDING data

AREAS (gfa)

Retail

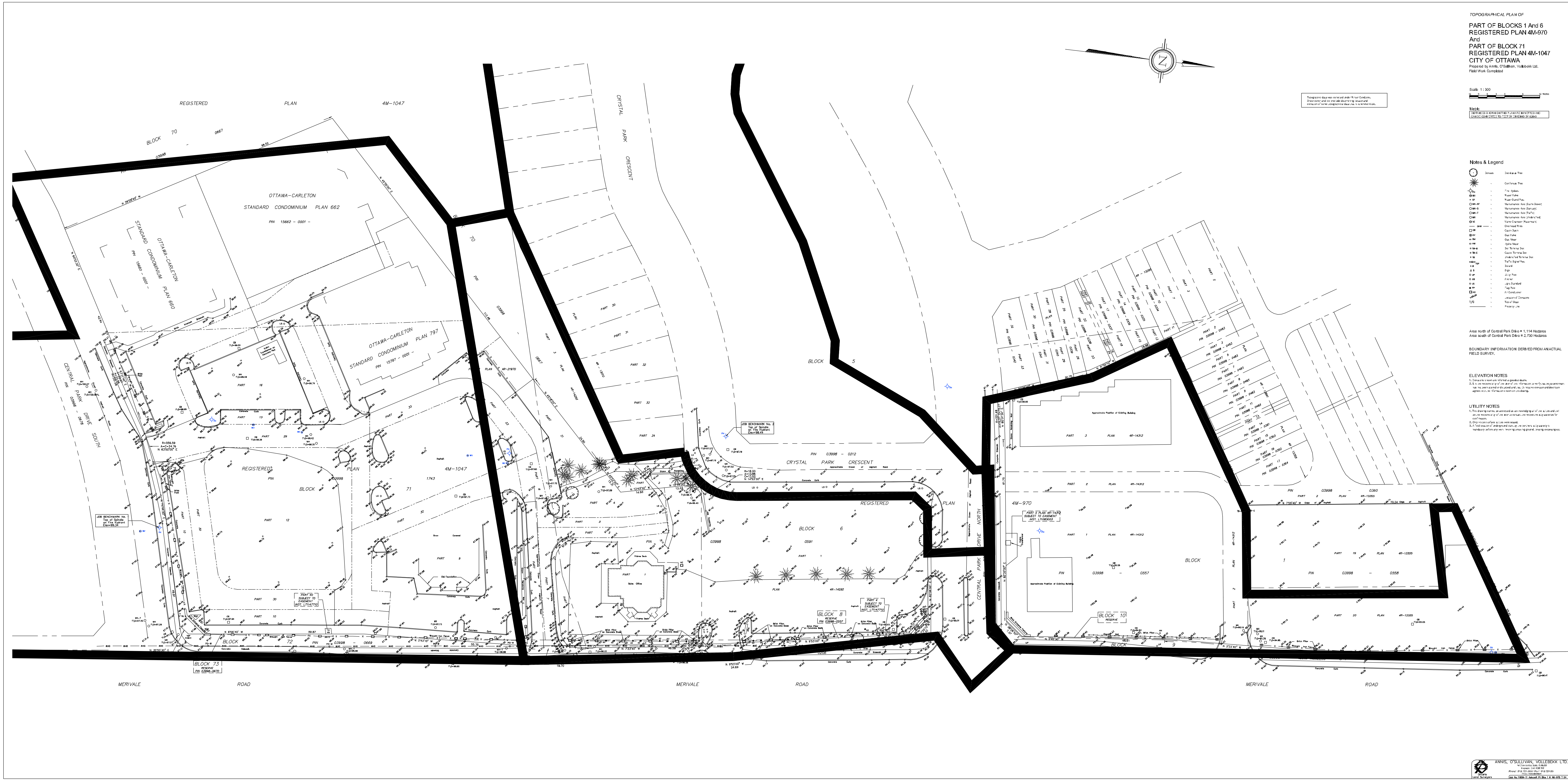
Retail S1	2350
Retail S2	5730
Retail C1	553
Retail C2	570
Retail C3	183
Retail C4	300
Retail N1	2384
Retail N2	2820
Retail N3	1860
TOTAL	16,750m² (177,710ft²)

Office

Office S1	4440
total	4440m² (47,790ft²)

Residential	Area	Units
SP Tower One	16,100	160
SP Tower Two	11,200	128
Centre Condo Apts	5060	56
Townhomes	430	5
NP Tower One	16,100	184
NP Tower Two	9100	104
North Condo Apts One	3360	40
North Condo Apts Two	2920	40
Total	64,270m² (691,800ft²)	773

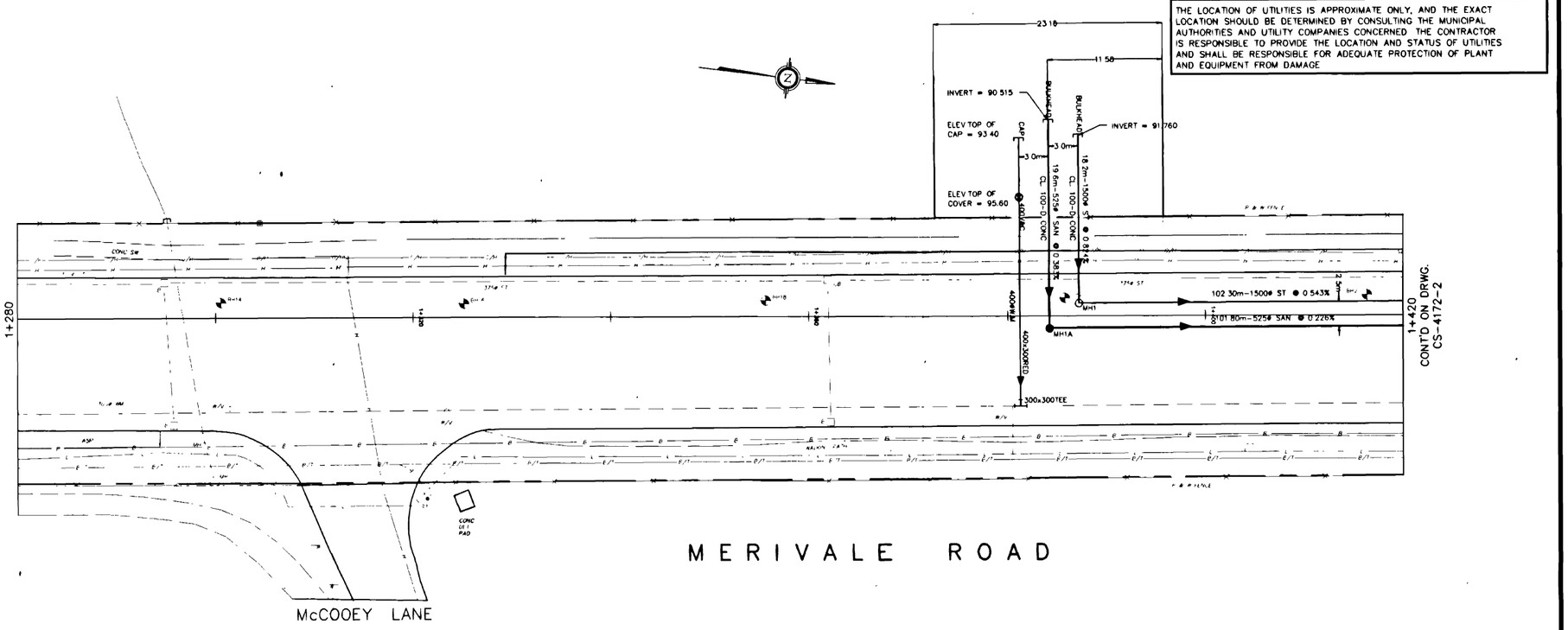
TOTAL AREA : 85,460m² (919,890ft²)



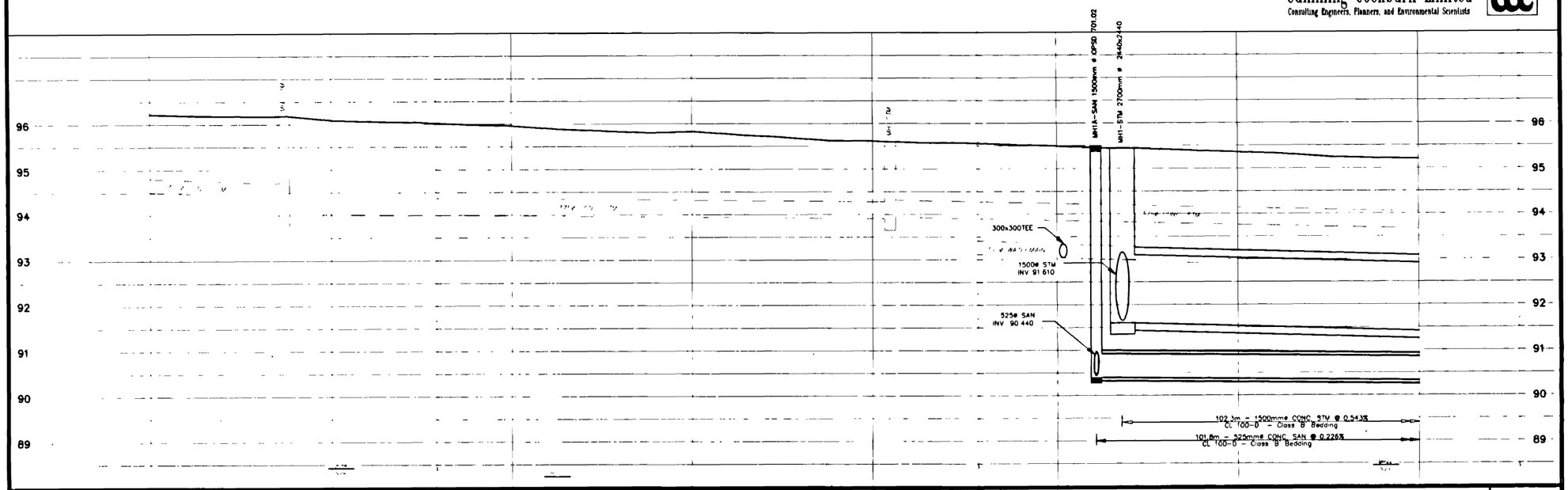
TOPOGRAPHICAL PLAN OF
PART OF BLOCKS 1 And 6
REGISTERED PLAN 4M-970
And
PART OF BLOCK 71
REGISTERED PLAN 4M-1047
CITY OF OTTAWA
Prepared by Annis, O'Sullivan, Vollebekk Ltd.
Field Work Completed
Scale 1 : 300
Metric
DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048
Notes & Legend
Area north of Central Park Drive = 1.114 Hectares
Area south of Central Park Drive = 2.730 Hectares
BOUNDARY INFORMATION DERIVED FROM AN ACTUAL FIELD SURVEY.
ELEVATION NOTES
UTILITY NOTES
REGISTERED PLAN 4M-1047
OTTAWA-CARLETON STANDARD CONDOMINIUM PLAN 662
OTTAWA-CARLETON STANDARD CONDOMINIUM PLAN 660
OTTAWA-CARLETON STANDARD CONDOMINIUM PLAN 797
CENTRAL PARK DRIVE SOUTH
CRYSTAL PARK CRESCENT
BLOCK 5
BLOCK 6
BLOCK 71
BLOCK 73
BLOCK 8
BLOCK 10
CENTRAL PARK DRIVE NORTH
4M-970
MERIVALE ROAD
ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

CAUTION

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE THE LOCATION AND STATUS OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION OF PLANT AND EQUIPMENT FROM DAMAGE.



Cumming Cockburn Limited
Consulting Engineers, Planners, and Environmental Scientists



REGIONAL MUNICIPALITY OF OTTAWA-CARLETON

ENVIRONMENTAL SERVICES DEPARTMENT

R DENHAM, P Eng
ENVIRONMENTAL SERVICES COMMISSIONER

Approved by:
W. BENNETT P.Eng
Manager of Design & Construction
Date: JULY 4, 1994

LICENCED PROFESSIONAL ENGINEER J. I. MOFFATT PROVINCE OF ONTARIO

Project Officer		Date
S FORESTELL, P Eng		JULY 4, 1994
Drawn by: DENIS DORE	Verified by: J I M.	Date: JULY 4,1994
Survey details by: CUMMING COCKBURN LIMITED	Book #	Date
"As Built" Inspection by:		Date

NOTES:

1. ALL SEWER CONSTRUCTION TO CITY OF OTTAWA STANDARDS.
2. ALL WATERMAIN CONSTRUCTION TO REGIONAL MUNICIPALITY OF OTTAWA CARLETON STANDARDS AND SPECIFICATIONS.
3. ALL MANHOLES SHALL BE PRE CAST TO ASTM C478 TO THE SIZES INDICATED ON THE DRAWINGS. ALL 1200ø, 1500ø AND 1800ø MANHOLES TO BE IN ACCORDANCE WITH OPSD 701.01 & 701.02 RESPECTIVELY.
4. ALL SEWER PIPE IS TO BE CONCRETE IN THE CLASS NOTED ON THE DRAWINGS TO ASTM C-76 C/W RUBBER GASKET JOINTS TO ASTM C443
5. UNLESS NOTED OTHERWISE ALL DROP STRUCTURES ARE TO BE IN ACCORDANCE WITH CITY OF OTTAWA DRAWING NO. G-9 12 OF 47 AND 15 OF 47
6. SOILS REPORT NO S6208-94 BY JOHN D PATERSON AND ASSOCIATES IS AVAILABLE FOR REVIEW. CONTRACTORS ARE ADVISED TO COLLECT ADDITIONAL SOILS INFORMATION AS NECESSARY.
7. THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTENANCE OF ALL EXISTING UTILITIES AND STRUCTURES WITH THE EXCEPTION OF LAPERIERRE AVENUE WHERE ROADWAY RESTORATION WILL INCLUDE AN ASPHALT OVERLAY. ROADWAY RESTORATION WILL BE TRENCH RESTORATION MATCHING TO EXISTING ASPHALT
8. EXISTING SANITARY SEWER IN MERIVALE ROAD IS TO BE ABANDONED.
9. EXISTING 150mmø GAS MAIN IN MERIVALE ROAD IS TO BE RELOCATED BY OTHERS PRIOR TO CONSTRUCTION.
10. ALL STORM BOX MANHOLES ARE TO HAVE 300mm DEEP SUMPS IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
11. ALL EXISTING WATERMAINS ARE ASSUMED TO BE APPROXIMATELY 2.20m BELOW EXISTING CENTRE LINE ROAD GRADES TO TOP OF MAINS
12. CONTRACTOR TO PROVIDE THREE 3.0m WIDE LANES FOR TRAFFIC DURING PEAK HOURS OF TRAFFIC AND TWO 3.25m WIDE LANES AT ALL OTHER TIMES

No	Revision	Date
2	AS BUILT	95/12/04
1	GENERAL REVISIONS	94/07/25
0	ISSUED FOR APPROVAL	94/07/04

Scales: HORIZ. 1:250
VERT. 1:50

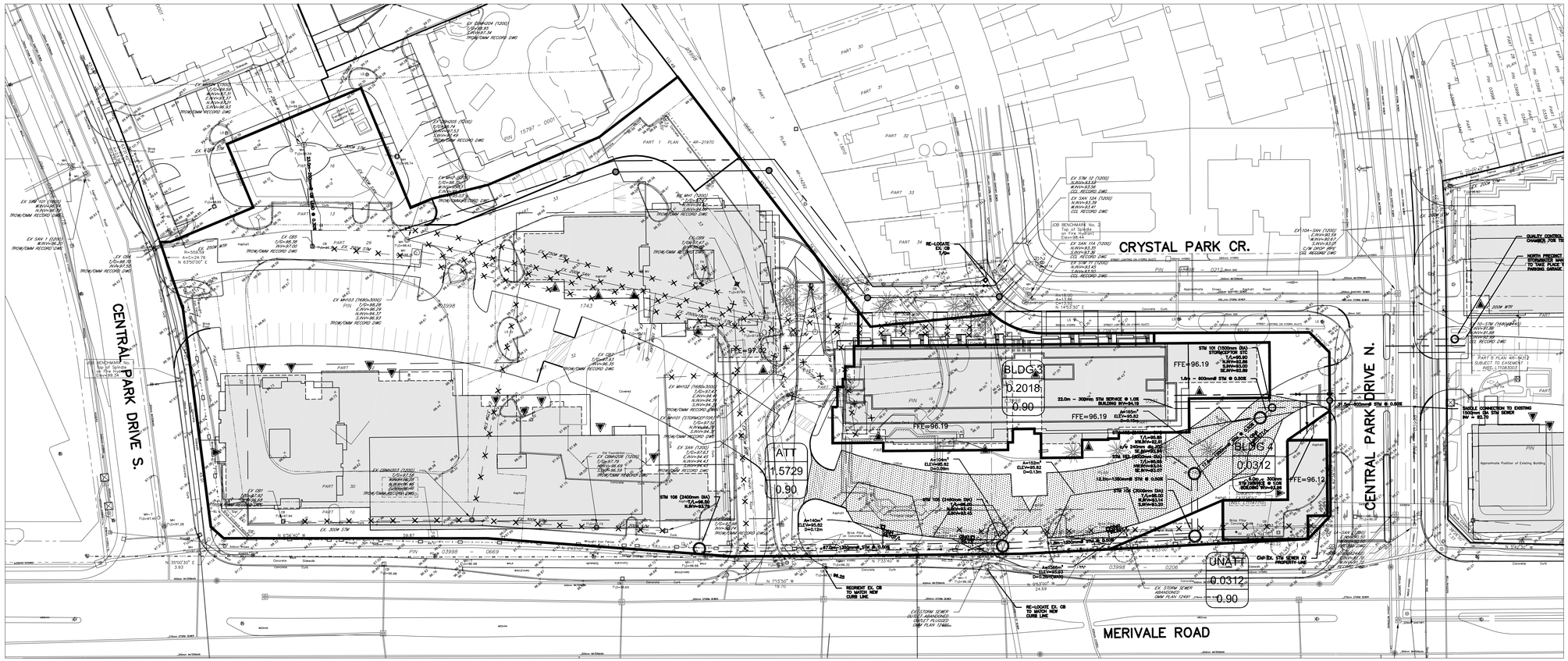
Project Title:

CLYDE – MERIVALE EXTERNAL SERVICES

KIRKWOOD/MERIVALE INTERSECTION TO 800 METERS SOUTH

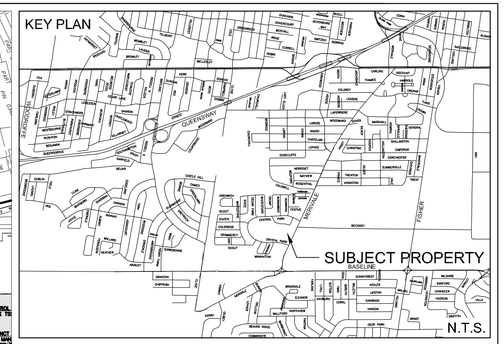
MERIVALE ROAD
STA. 1+280
To
STA. 1+420

Drawing No.: CS-4172-1
Rev No:



SOUTH AND CENTRAL PRECINCT

KEY PLAN



LEGEND

- PROPERTY LINE
- PROPOSED STORM SEWER
- STORM DRAINAGE AREA DIVIDE

RFCN 1	DRAINAGE AREA ID
0.0353	AREA (HA)
0.90	RATIONAL METHOD RUNOFF COEFFICIENT

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
PROJ. NO. 11859-11.

SITE PLAN INFORMATION

SITE PLAN PROVIDED BY bbb architects
PROJ. NO.:1003

BENCH MARK

TOP OF SPINDLE FH CENTRAL PARK DRIVE SOUTH
ELEV=99.34

No.	BY	YY.MM.DD	DESCRIPTION
1	A.D.F.	11.07.06	ISSUED FOR MUNICIPAL REVIEW

PROJECT No. 10-473

STORMWATER MANAGEMENT
CENTRAL PARK - MERIVALE ROAD

ASHCROFT HOMES
18 Antares Drive
Ottawa, ON K2E 1A9
Tel. (613) 226-7266

DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™
120 Iber Road Unit 203
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

DRAWN BY:	A.D.F.	CHECKED BY:	S.J.P.	DRAWING NO.	SHEET NO.
DESIGNED BY:	A.D.F.	CHECKED BY:	S.J.P.	SWM-1	1 of 1
SCALE:	1:500	DATE:	2011-07-06		

z:\projects\11-473 ashcroft - central park\b_design\b2_drawings\b2-2_main (dsel)\2011-06_spa\dwg_2011-07-06_473_spa.dwg