Wurtemburg Tower
101 Wurtemburg Street
Ottawa, Ontario

Servicing Design Brief

WURTEMBURG TOWER
101 WURTEMBURG STREET
OTTAWA, ONTARIO

SERVICING DESIGN BRIEF

Prepared by:

NOVATECH ENGINEERING CONSULTANTS LTD.
240 Michael Cowpland Dr. - Suite 200
Ottawa, Ontario
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File No.: 111013
Report Reference No.: R-2011-033
February 25, 2011

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CONSULTANTS LTD.

February 25, 2011

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

Attention: **Mr. Bruce Coombe**

Dear Sir:

Reference: **Wurtemburg Tower – 101 Wurtemburg Street**
Servicing Design Brief
Our File No.: 111013

Enclosed herein is the Servicing Design Brief for the proposed residential development at 101 Wurtemburg Street, located on the east side of the intersection of Wurtemburg Street and Clarence Street. This brief is submitted in support of the rezoning and site plan applications and outlines how the site will be serviced, and demonstrates that adequate services are available for sanitary, storm and water.

Trusting this report is adequate for your purposes. Should you have any questions, or require additional information, please contact us.

Yours truly,

NOVATECH ENGINEERING CONSULTANTS LTD.

Greg MacDonald, P.Eng
Senior Project Manager

JAG/jag

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1.0 INTRODUCTION

The proposed Wurtemburg Tower residential development at 101 Wurtemburg Street is located on the east side of the intersection of Wurtemburg Street and Clarence Street in the City of Ottawa, as shown in Figure 1 - Key Plan. The proposed development will consist of an 18 storey tower with 66 condominium units. Also, a total of 54 parking spaces will be provided on 3 levels of underground parking. Refer to Figure 2 - Site Plan for details.

As identified in the City of Ottawa's Zoning By-law, this site is currently designated as R5C [926] F(2.5) – Residential Fifth Density Subzone C, Exception 926, FSI of 2.5; a mix of medium and high density residential units. The zoning amendment will revise the 926 exception to permit the proposed development, as shown in the site plan. Specific details are provided in a Planning Rationale submitted as part of the ZBL Amendment application.

The subject site consists of approximately 0.0795 ha and is currently occupied by a two-storey residential building, as shown in Figure 3 – Existing Conditions.

This servicing design brief will outline how the site will be serviced with sanitary, storm and water, as well will demonstrate that adequate municipal capacity is available to service the development.

2.0 SANITARY SEWER

The development will be serviced by a 200 mm dia. sanitary service that will connect to the existing 300 mm dia. sanitary sewer on Wurtemburg Street. All proposed sanitary services will be equipped with full-port backwater valves.

Proposed development flows, based on the City's guidelines for residential units, retail, and office space are presented below and are compared to the design flows based on current zoning.

Proposed Average Sanitary Flows Under Proposed Development

Wurtemburg Tower

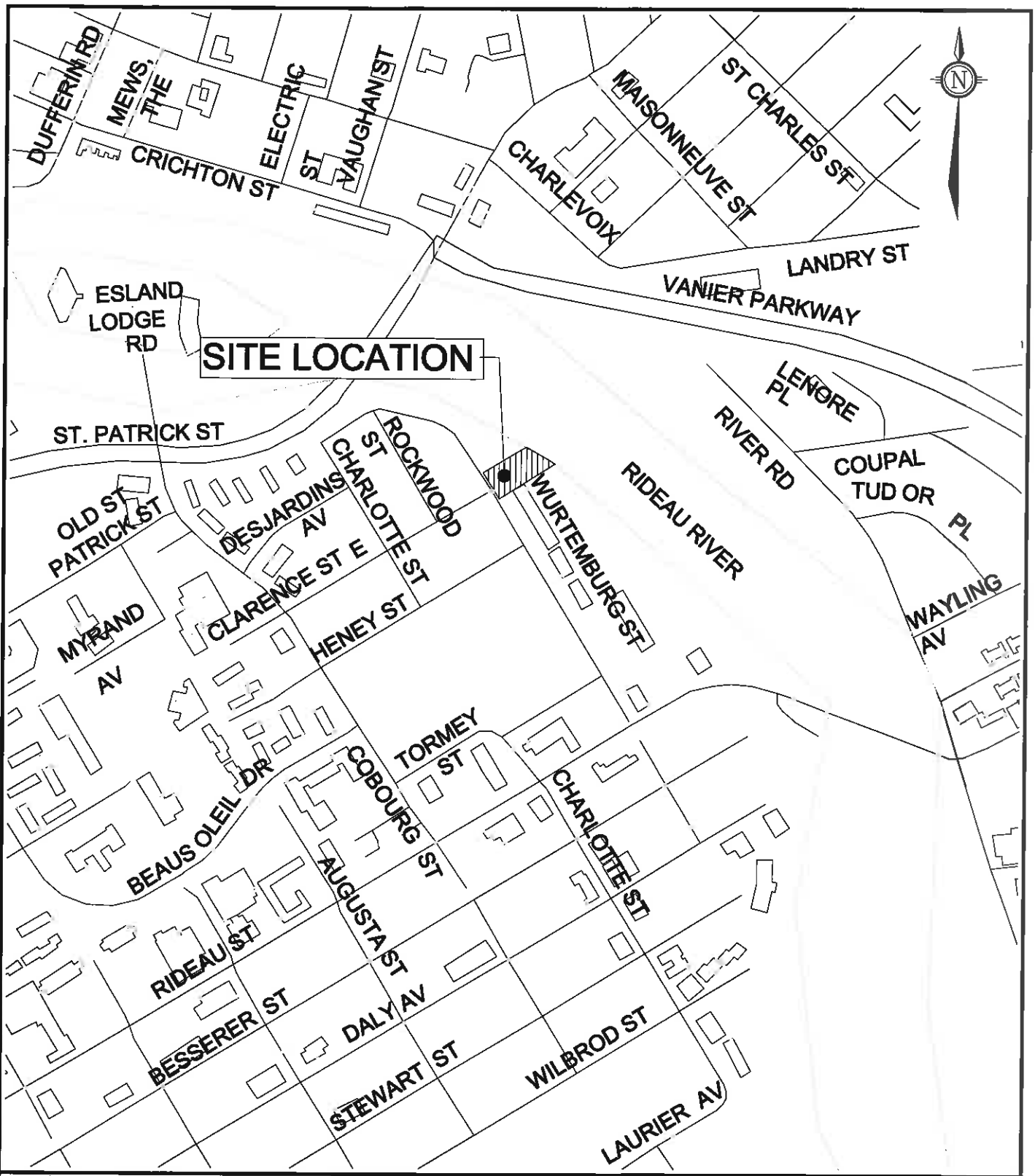
Residential: Q_{SAN} = 66 units x 1.8 persons/unit x 350 L/cap/day = 41,580 L/day

Total Wurtemburg Tower Average Sanitary Flow = 41,580 L/day = 0.48 L/sec

Total Wurtemburg Tower Peak Sanitary Flow = 1.92 L/sec (with PF = 4.22 $\therefore$ use 4.0 $\Rightarrow$ max for residential)

Therefore,

Total Site Average Sanitary Flow = 0.48 L/sec
Total Site Peak Sanitary Flow = 1.92 L/sec (with PF)



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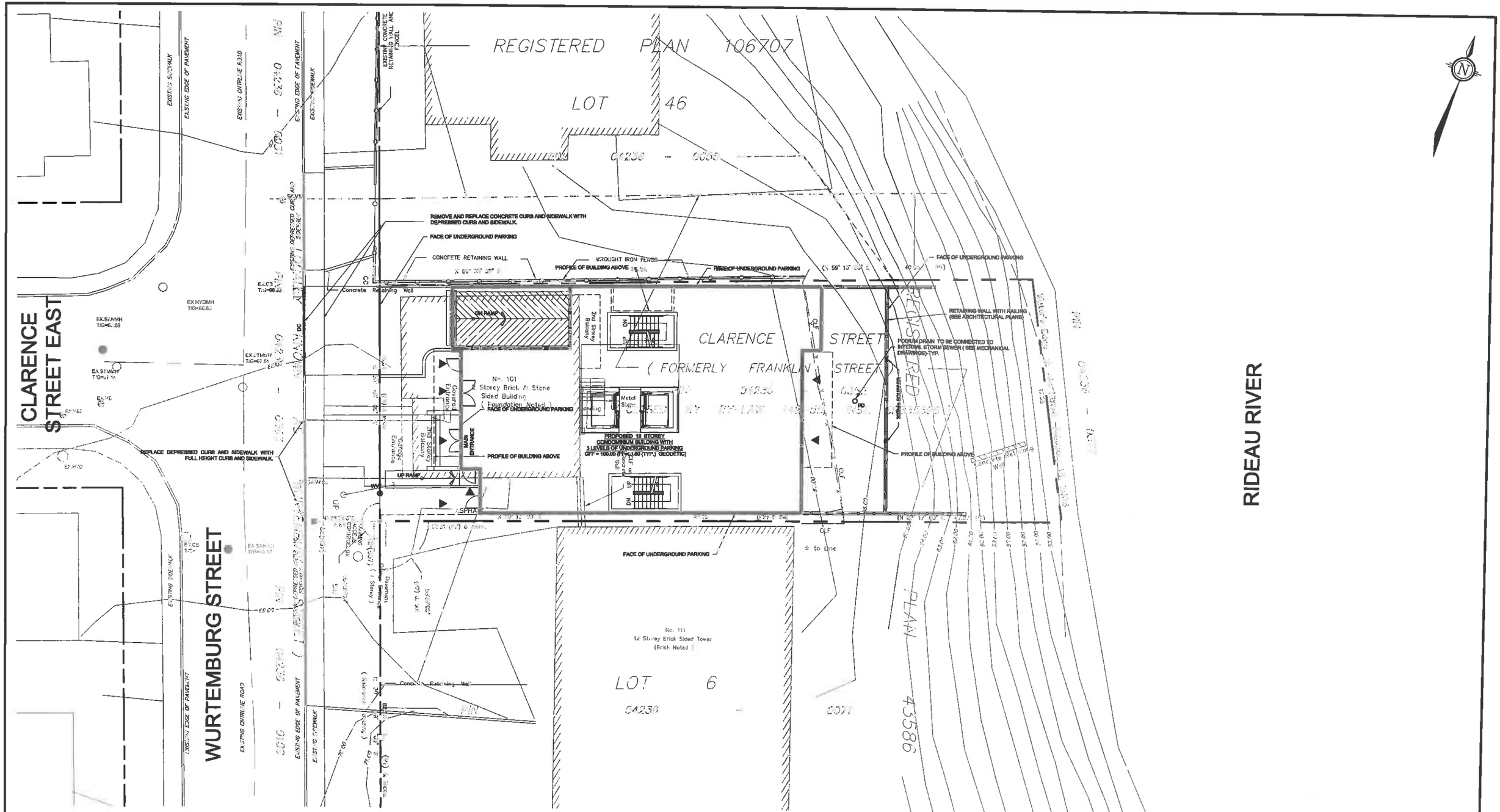
CITY OF OTTAWA

WURTEMBURG TOWER
101 WURTEMBURG STREET

KEY PLAN

FEB. 2011 111013 FIGURE 1

SHT8X11.DWG - 216mmX279mm



LEGEND

SITE PLAN AREA

NTS

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CITY OF OTTAWA

WURTEMBURG TOWER
101 WURTEMBURG STREET

SITE PLAN

FEB. 2011 111013 **FIGURE 2**

SHT: 11X17 DWG – 278mmX431mm

LEGEND

SITE PLAN AREA

NTS

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CITY OF OTTAWA

WURTEMBURG TOWER
101 WURTEMBURG STREET

EXISTING CONDITIONS

FEB. 2011 111013 FIGURE 3

SHT11X17.DWG – 279mmX431mm

Calculated Average Sanitary Flows Under Current Zoning

Currently, the site is zoned R5C [926] F(2.5), a mix of medium and high density residential units. Zoning flows are calculated using the City's general population densities from Table 4.1 of the City of Ottawa Sewer Design Guidelines and are as follows:

Site Area = 0.0795 ha
Population Density = 1800 people/ha
Population = 0.0795 ha * 1800 people/ha = 143 people

Average Sanitary flow = 143 people * (350 L/person/day) / (86,400 s/day) = 0.58 L/sec

Total Sanitary flow = 2.32 L/sec (with PF = 4.20 ∴ use 4.0 ⇒ max for residential)

Therefore, the proposed development sanitary flows are less than the flows calculated under the existing zoning.

3.0 STORMWATER

Stormwater flows from the site are currently conveyed to the existing storm sewer system via road catchbasins by overland flows and to the river. As part of this development, all stormwater will be controlled on site and discharged via a 200 mm dia. storm service that will connect to the existing 300 mm dia. storm sewer on Wurtemburg Street. All proposed storm services will be equipped with backwater valves.

The City will require that on-site stormwater management be implemented to control post-development stormwater discharge for both the 5 & 100 year storm events based on an allowable runoff coefficient (C) of 0.50, a time of concentration (t_c) of 20 minutes, and 5-year storm control. Stormwater management will be achieved through the use of rooftop controls. Should surplus storage be required, stormwater management alternatives such as storage tanks will be implemented.

The site will be graded such that flows in excess of the 100-year storm event will be conveyed overland to Wurtemburg Street and the river (as per existing conditions). Erosion and sediment control measures will be implemented during all phases of construction and inspected regularly. A separate stormwater management report will also be submitted as part of the site plan application.

4.0 WATERMAIN

The proposed development will be serviced by a 150 mm dia. water service that will connect to the existing 200mm dia. watermain on Wurtemburg Street. A shut off valve will be provided on the property line per City of Ottawa Specifications. The water meter will be located in the basement level mechanical room of the building. Similarly, a remote receptacle will be located at the surface near the entrance to the building on the exterior.

Estimated domestic water demands for the development are roughly the same as the proposed development sanitary flows listed above in Section 2.0.

Wurtemburg Tower

Average daily demand (L/sec): Q_{WATER} = 41,580 L/day ÷ 86,400 sec/day
= 0.48 L/sec

Using a peak factor of 2.5, the required maximum daily demand yields:

$$Q_{WATER} = 1.20 \text{ L/sec}$$

Using a peak factor of 2.2, the required maximum hour demand yields:

$$Q_{WATER} = 2.64 \text{ L/sec}$$

Estimated water demands for the development are as follows (based on fixture units):

Wurtemburg Tower

Estimated domestic demand (max peak day) = 100 igpm = 7.58 L/sec

Based on the data provided by the City, the existing watermains in the area are adequate to service this development. A copy of the watermain data is attached.

The building will be provided with standpipe and sprinkler system for fire protection. Typically the fire demand for a development of this type is in the order of 750 US gal/min (approx. 625 igpm). The available supply at 20 psi is in the neighbourhood of 2100 igpm around the site, based on the hydrant data supplied by the City.

5.0 CONCLUSIONS

Based on the foregoing, adequate sanitary, storm and water services are available to support this development.

NOVATECH ENGINEERING CONSULTANTS LTD.

Prepared by:

Justin Gauthier, B.Eng.
Junior Engineer

Reviewed by:

Greg MacDonald, P.Eng.
Senior Project Manager

APPENDIX A
Excerpts from Ottawa Sewer Design Guidelines

specifically the downtown core. The construction of new combined sewer systems is no longer permitted in the City of Ottawa other than for the replacement of existing combined sewers within the City's defined Combined Sewer Area (see Section 5.1.6).

New storm drainage systems cannot be connected to existing combined sewers except as an interim measure where sewer separation is to be ultimately implemented or where circumstances allow no other alternative.

Section 5 discusses combined sewers in greater detail since their design must consider peak storm flows.

4.2.4 Private Sanitary Servicing

Private servicing consists mainly of private sewage collection and treatment systems on individual lots and do not form part of these guidelines.

4.3 GENERAL POPULATION DENSITIES

Pre-zoned Land – When lands are zoned for a specific residential use and detailed information is not available, the following population densities shall apply:

Table 4.1 Population Densities

Unit Type (Min Lot Area M^2)	Zoning (And all similar zonings)	Persons per unit[1]	Units per net ha avg. [2]	Persons (per net ha)[3]	Persons (per gross ha) [4]
Res-Single Family (600)	R1A-B*	3.4	16.7	57	34
Res-Single Family (501)	R1C-E*	3.4	20.0	68	41
Res-Single Family (441)	R1F-H*	3.4	22.7	77	47
Res-Single Family (360)	R1I-K*	3.4	27.8	94	57
Res-Single Family (270)	R1L-N*	3.4	37.1	126	76
Res-Single Family (197)	R1P-Q*	3.4	50.8	173	105
Res-Semi-detached (278)	R2A-B*	2.7	36.0	97	59
Res-Semi-detached (232)	R2C*	2.7	43.1	116	71
Res-Semi-detached (180)	R2D-E*, G*	2.7	55.6	150	91
Res-Semi-detached (135)	R2F*	2.7	74.1	200	121
Townhouse (170)	R3F*, R4A-B*	2.7	58.8	159	96
Townhouse (110)	R3M*	2.7	90.9	246	149
Res-Duplex (441)	R2A-C*	2.3	45.4	104	63
Res-Duplex (360)	R2D*, R3F-G*	2.3	55.6	128	77
Res-Duplex (270)	R2E-F*, R3K*	2.3	74.1	170	103
Res-Duplex (197)	R2G*, R4F*	2.3	101.6	234	141
Res-Triplex (557)	R3A-C*	2.3	53.9	124	75

Unit Type (Min Lot Area M^2)	Zoning (And all similar zonings)	Persons per unit[1]	Units per net ha avg. [2]	Persons (per net ha)[3]	Persons (per gross ha) [4]
Res-Triplex (330)	R3D-E*, H-J*, L*, N*, R4C-E*	2.3	90.9	209	127
Apartments:					
Low Density		1.8	100	180	
Medium Density		1.8	300	540	
High Density		1.8	1000	1800	
Very High Density[5]		1.8	1000 +	1800 +	

*) former City of Ottawa zoning designation.
1) from 1996 census data.
2) new suburban construction, 5-year average (1997-2001), except apartments data which is based on site plans & duplex density which is an assumed average.
3) "net ha" refers to population densities per hectare of purely residential land (i.e. area of the building lots only including private parking and roads but excluding all public road rights-of-way and all other non-residential uses such as parks, stormwater management facilities, commercial developments, schools, community centres, etc.).
4) "gross ha" refers to population densities per hectare of residential and all other non-residential land uses such as streets, schools and parks. Numbers provided apply to large subdivision situations. For smaller residential situations the persons per gross ha will be higher, about 75% of the persons per net ha.
5) apartment densities in the downtown have been as high as 4,000 units/net ha. Proposals with a units/net ha density greater than 1000 will be evaluated on a case-by-case basis.

Development Proposed Land – When the number and type of housing units within a proposed development are known, the calculation of population for the proposed development shall be based on the following:

Table 4.2 Per Unit Populations

Unit Type	Persons Per Unit
Single Family	3.4
Semi-detached	2.7
Duplex	2.3
Townhouse (row)	2.7
Apartments:	
Bachelor	1.4
1 Bedroom	1.4
2 Bedroom	2.1
3 Bedroom	3.1
Average Apt.	1.8

4.4.1 Calculation of Peak Design Flows

The formulae and parameters to be applied in the calculation of peak design flows (standard peak flow design parameters) for new or infill developments are illustrated in Figure 4.3 and described as follows:

Figure 4.3 Peak Flow Design Parameters Summary

AVERAGE WASTEWATER FLOWS:

Residential Average Flow:	350 L/c/day
Commercial Average Flow:	50,000 L/gross ha/d
Institutional Average Flow:	50,000 L/gross ha/d
Average Light Industrial Flow:	35,000 L/gross ha/d
Average Heavy Industrial Flow	55,000 L/gross ha/d

PEAKING FACTORS:

Residential Peak factor: Harmon Equation

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000} \right)^{\frac{1}{2}}} \right) * K$$

where: P=Population
K=Correction Factor = 1

Commercial Peak factor:	1.5
Institutional Peak factor:	1.5
Industrial Peak Factor:	Per Figure in Appendix 4-B

PEAK EXTRANEOUS FLOWS: (design event)

Infiltration Allowance:	0.28 L/s/effective gross ha (for all areas)
Less than 10 ha.	
Foundation Drain Allowance:	5.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)
10 ha – 100 ha	
Foundation Drain Allowance:	3.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)
Greater than 100 ha	
Foundation Drain Allowance:	2.0 L/s/gross ha (if necessary for existing partially separated and combined areas only)

APPENDIX B
Hydrant Flow Data

Justin Gauthier

From: Crowder, Murray [Murray.Crowder@ottawa.ca]
Sent: Thursday, February 03, 2011 8:34 AM
To: j.gauthier@novatech-eng.com
Subject: RE: Hydrant Flow Data Request (Wurtemburg Street)
Attachments: Wurtemburg & Clarence.pdf

Follow Up Flag: Follow up
Flag Status: Completed

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

`
Justin Gauthier
Company: **Novatech Engineering Consultants Ltd.**
Tel: **254-9643x217**
Fax: **254-5867**
Location: **Wurtemburg @ Clarence**
Request_dt: **11-02-03-08:17:42**
Email: **j.gauthier@novatech-eng.com**

Inspection Date	Flow Hydrant	Residual Hydrant	Pressure (psi) Static	Dynamic	Pitot	Flow (igpm) actual	@ 20 psi
2009/06/01	6833125	6832186	56	>48	52	1010	2275
2009/06/01	6833127	6832186	56	>48	44	929	2093
2009/06/02	6832160	6832161	64	>56	44	929	2333
2009/06/02	6832173	6832161	64	>56	36	840	2110
2009/06/01	6832184	6832186	56	48	42	908	2045
2009/06/01	6832174	6832162	58	>50	44	929	2155
2009/06/01	6832185	6832186	56	>48	38	863	1945
2009/06/01	6832186	6832136	60	>52	46	950	2265
2009/06/01	6832187	6832188	60	>52	38	863	2059

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

From: Justin Gauthier [mailto:j.gauthier@novatech-eng.com]
Sent: February 02, 2011 3:57 PM
To: Crowder, Murray
Subject: Hydrant Flow Data Request (Wurtemburg Street)
Importance: High

Hi Murray,

We are currently working on a Site Plan located at 101 Wurtemburg Street. I send this e-mail requesting that you please provide me with hydrant flow data (static, fire flows @ 20 psi, etc.) for the following hydrants:

H125, H127, H186, H187 on Wurtemburg;
H160, H184 on Clarence;
H174, H185 on Heney;
H173 on Charlotte.

Refer to attached sketch for hydrant locations, they are located on City of Ottawa grid 368-032 & 368-033.

Could you please also send me the sketch from your program showing the watermain sizes you have on file for the above-mentioned streets around the site, as you have in the past (if you have it for SAN & STM as well), thanks in advance.

I'm in a little bit of a rush for the information, so a quick response would be greatly appreciated.

Should you have any questions, or require additional information, don't hesitate to contact me.

Regards,

Justin Gauthier, B.A.Sc.
EIT

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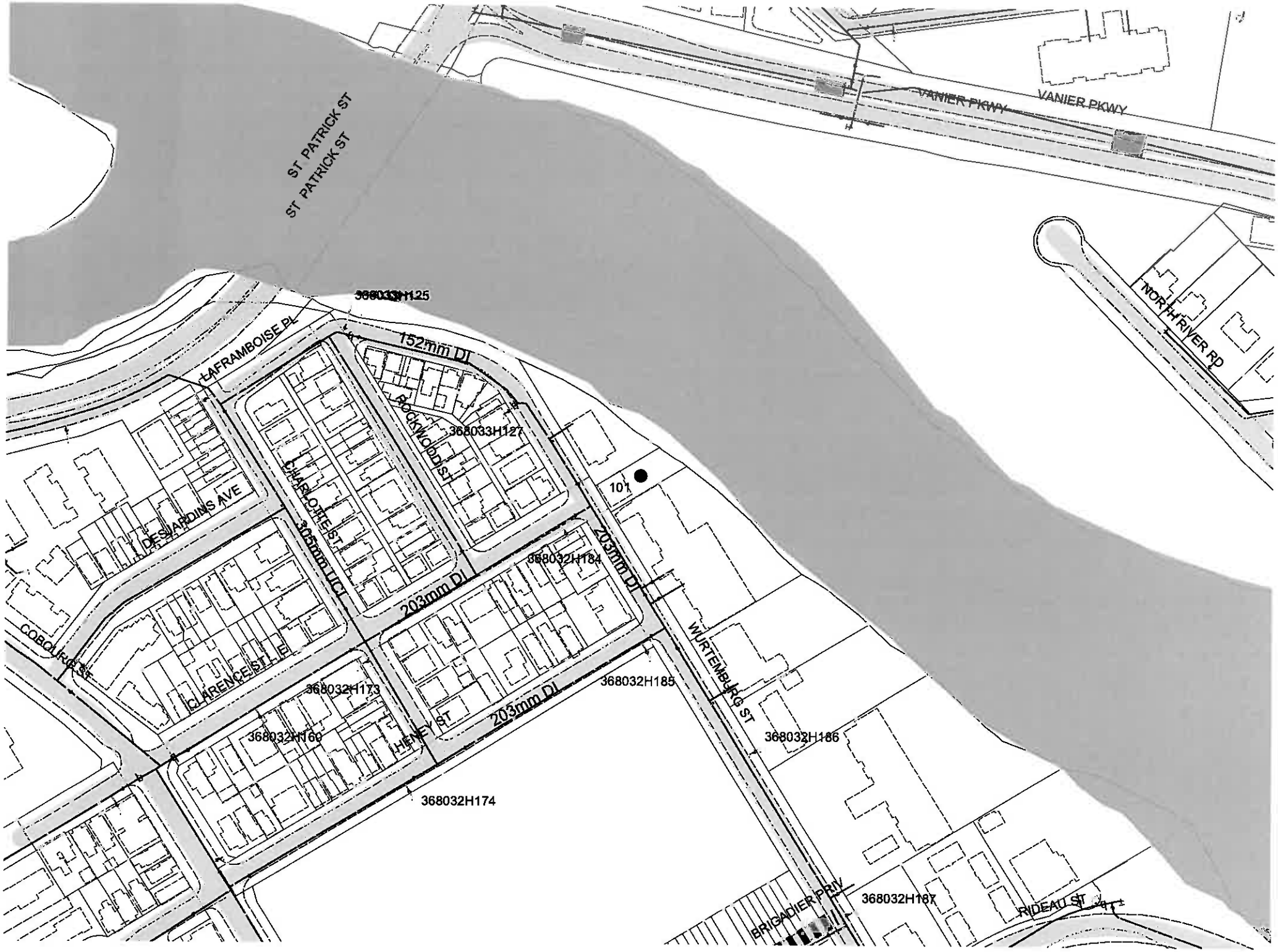
Website: www.novatech-eng.com


ST PATRICK ST
ST PATRICK ST
VANIER PKWY
VANIER PKWY
NORTH RIVER RD
368033H125
LAFRAMBOISE PL
152mm DI
ROCKWOOD ST
368033H127
DESJARDINS AVE
CHARLOTTE ST
305mm DI
203mm DI
368032H184
203mm DI
101
COBOURG ST
CLARENCE ST E
368032H173
368032H160
HENEY ST
203mm DI
368032H185
WURTEMBURG ST
368032H186
368032H174
BRIGADIER PRIV
368032H187
RIDEAU ST

APPENDIX C
Servicing Study Guidelines Checklist

NOVATECH ENGINEERING CONSULTANTS LTD.

Project Name: Wurtemburg Tower
Project Number:111013
Date:02/25/2011

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Executive Summary (for larger reports only).	NA		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y		Figures 1, 2 and 3
Plan showing the site and location of all existing services.	Y		Figures 2 and 3
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.	Y	1.0	
Summary of Pre-consultation Meetings with City and other approval agencies.	N		
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.	Y	2.0 - 4.0	
Statement of objectives and servicing criteria.	Y		Addressed in Section 2.0, 3.0. 4.0.
Identification of existing and proposed infrastructure available in the immediate area.	Y		Figures 2 and 3
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).	NA		
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 neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N		Will be addressed in Site plan application.

Development Servicing Study Checklist

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
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.	NA		
Proposed phasing of the development, if applicable.	NA		
Reference to geotechnical studies and recommendations concerning servicing.	N		
All preliminary and formal site plan submissions should have the following information:			
Metric scale	Y	ALL	
North arrow (including construction North)	Y	ALL	
Key plan	Y	ALL	
Name and contact information of applicant and property owner	Y	ALL	
Property limits including bearings and	Y	ALL	
Existing and proposed structures and parking	Y	ALL	
Easements, road widening and rights-of-way	Y	ALL	
Adjacent street names	Y	ALL	

Development Servicing Study Checklist

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	Y	5.0	Also refer to Appendix B for Hydrant Flow data.
Availability of public infrastructure to service proposed development.	Y		Figures 2 and 3
Identification of system constraints.	Y	4.0	
Identify boundary conditions.	Y	4.0	
Confirmation of adequate domestic supply and pressure.	Y	4.0	
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.	Y	4.0	
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.	Y	4.0	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	NA		
Address reliability requirements such as appropriate location of shut-off valves.	Y	4.0	
Check on the necessity of a pressure zone boundary modification.	NA		
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.	Y	4.0	
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.	Y	4.0	
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.	NA		
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	4.0	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N		Figure 3 shows main.

Development Servicing Study Checklist

4.3 Wastewater	Addressed (Y/N/NA)	Section	Comments
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).	Y	2.0	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	Y	2.0	
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.	Y	2.0	
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	2.0	
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)	Y	2.0	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Y	2.0	
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	2.0	Figures 2 and 3
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).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	3.0	
Analysis of the available capacity in existing public infrastructure.	Y	3.0	
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y		Figures 2 and 3
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.	Y	3.0	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	NA		
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	3.0	
Set-back from private sewage disposal systems.	NA		
Watercourse and hazard lands setbacks.	NA		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Y	3.0	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	3.0	
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	NA		
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.	Y	3.0	
Any proposed diversion of drainage catchment areas from one outlet to another.	NA		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	3.0	
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.	NA		

Development Servicing Study Checklist

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Identification of municipal drains and related approval requirements.	NA		
Description of how the conveyance and storage capacity will be achieved for the development.	Y	3.0	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y	3.0	
Inclusion of hydraulic analysis including HGL elevations.	N		
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	3.0	
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.	NA		
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

Development Servicing Study Checklist

4.5 Approval and Permit Requirements	Addressed (Y/N/NA)	Section	Comments
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.	NA		
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N		
Changes to Municipal Drains.	N		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	NA		

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y	5.0	
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.	NA		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	5.0	