

March 23, 2010

RVA 081785

Arnon Corporation
1801 Woodward Dr.
Ottawa, ON
K2C 0R3

Attention: Mike Casey

Re: 855 Carling – Site Servicing Preliminary Design Brief

Dear Mr. Casey:

We are pleased to submit to you this revised version of the Site Servicing Preliminary Design Brief for the above noted project as prepared by R.V. Anderson Associates Limited.

The revisions to the brief are to outline the scenario of a residential development instead of office buildings.

If you have any questions please feel free to call.

Yours very truly,

R. V. ANDERSON ASSOCIATES LIMITED



Trevor Kealey, P.Eng.
Associate, Project Engineer

Site Servicing Preliminary Design Brief

855 Carling Proposed Redevelopment

Prepared For:

Arnon Corporation
1801 Woodward Dr.
Ottawa, ON
K2C 0R3

Submitted By:

R. V. Anderson Associates Limited
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March 2010

RVA 081785

1.0 INTRODUCTION

R.V. Anderson Associates Limited has been retained by Arnon Corporation to undertake the preliminary site servicing design for the proposed two new residential buildings at 855 Carling, in Ottawa.

The site is located on the north side of Carling Avenue, between Champagne Ave. South and the O-Train corridor. The lot is bordered to the north by Hickory St.

2.0 BACKGROUND

The new buildings will be built on an existing parking area. Development of the site has to meet certain City of Ottawa criteria with respect to stormwater management, sanitary sewer drainage, and water main connections, which are outlined in the sections below.

If construction occurs in the near future, servicing will be provided from Champagne Ave. S and Hickory St. due to a 3-year moratorium on pavement on Carling Ave. If the construction occurs after the moratorium on Carling has expired, some of the services would be more cost effective to come from Carling. More information is included in the following sections.

3.0 GAS SERVICE

As-built information provided by the City of Ottawa indicates that there is a 100mm gas main on Champagne Ave. S, as well as a 300mm gas main under the sidewalk on Carling. Discussions with the gas utility agency will need to be undertaken when building demands are determined.

4.0 WATER

Based on City of Ottawa Water Design Guidelines from May of 1991, Section 3.1.5, the maximum hourly water flow rate to the site would be **27.5 L/s** for a residential development of the proposed size. The site is currently zoned for a maximum hourly flow rate of **4.1 L/s**. However, based on the Ontario Building Code of 1997, required water supply for fire-fighting based on building volume is **150 L/s**. In order to supply the required fire flow, the water service for the buildings would need to be taken from the 203mm watermain on Champagne Ave. north of Hickory Street. This is based on City of Ottawa Hydrant Test results in the area. See Appendix A for calculations and details.

Based on the work taking place before the moratorium on paving on Carling Avenue, the water service for the buildings would be taken from the 203mm watermain on Champagne Ave. north of Hickory, as hydrant flow data from the City of Ottawa indicates that the watermain on Hickory would not be sufficient to supply the site with the required fire protection as outline below. The private main would be installed in a shared trench with the sanitary sewer where possible. The length of the pipe will be approximately 145m, and would include a valve box at the property line. Proper cover of 2.4m must be maintained for the entire length of the service.

If the work were to take place after the moratorium has expired, consideration could be given to servicing the site from the 403mm watermain on Carling. In this case the line would be

approximately 30m long and would include a valve box at the property line. Again proper cover of 2.4m must be maintained for the entire length of the service.

5.0 STORM SEWER and STORMWATER MANAGEMENT

The drainage on the existing parking lot is serviced by existing catch basins in the parking lot, which drain onto Champagne Ave. S. As such, the proposed building would drain to the 1050mm storm sewer on Champagne Ave. S. The service would be built in a separate trench from the water main and sanitary sewer service, both of which would connect at the north side of the site. The existing catchbasins would be removed. The pipe would be a 375mm diameter PVC pipe at a minimum depth of 1.5m at the building face, which will connect to the City storm sewer at a depth of approximately 4.8m. The storm line would also require a maintenance hole at the property line in addition to other drainage structures.

5.1 Stormwater Management

The stormwater management approach best suited to the 855 Carling site is through rooftop and surface storage for quantity control in order to meet the City requirements. Roof drains and Inlet Control Devices will control the quantity of storm water allowed off site.

Preliminary calculations presented here are based on the City requirement that the post construction runoff be controlled to a runoff coefficient of 0.5. The total disturbed area of the site is approximately 9320m², which currently consists entirely of asphalt paving.

The allowable peak discharge rate for this site is equal to the 5-year peak development flow using the above weighted pre-construction runoff coefficient at a time of concentration of 20 minutes. Therefore the allowable peak discharge rate from the site is:

$$Q_{\text{Allowable}} = 0.50 \times 70.25\text{mm/hr} \times 9320\text{m}^2 / 3600$$
$$Q_{\text{Allowable}} = \mathbf{90.9 \text{ l/s}}$$

Similarly, the 5-year peak post-construction flow can be calculated using standard runoff coefficients. Of the 9320m, 3677m² will be rooftop, 3249 will be asphalt, and 2394 will be grassed or landscaped. The overall weighted runoff coefficient for the site is calculated as:

$$c_{\text{post}} = [0.95(3,677) + 0.9(3,249) + 0.2(2,394)] / 9320 = 0.64$$

Using this, the 5-year peak post-construction discharge rate is calculated as:

$$Q_{\text{post}} = 0.64 \times 70.25\text{mm/hr} \times 9320\text{m}^2 / 3600$$
$$Q_{\text{post}} = 116.4 \text{ l/s}$$

This shows that the proposed construction on the site will increase the overall discharge rate for the 5-year peak development flow. Therefore, the City of Ottawa requires that there is a storage allowance for the 100-year storm on site and have runoff limited to the coefficient of 0.5. Using the allowable discharge for the site, the resulting storage volume can be calculated. This storage can be achieved through a combination of rooftop storage, on the surface via ponding areas, as well as underground in the proposed pipes and manholes.

By limiting the rooftop flow to 5.0 l/s, 200m³ can be stored on the roof. In addition to this storage, an additional 70m³ will need to be stored on the surface and/or underground. This is achievable, given the relatively flat topography of the site and parking area configuration.

5.2 Grading and Asphalt

The parking lot will be graded in order to ensure surface runoff flows into catchbasins and manholes and away from buildings. Access points from Hickory and Champagne will be sloped to match existing at these locations. Some heavy duty pavement would be needed to handle any truck traffic to the buildings.

6.0 SANITARY SEWER

The proposed site would be served by the 300mm sanitary sewer on Hickory St., in the shared trench with the water main where possible if construction occurred prior to the Carling moratorium. The pipe would be a 123m long, 200mm diameter PVC pipe at a minimum depth of 1.5m at the building face, connecting to the city sanitary sewer at an invert depth of approximately 4.2m from the surface. Currently the sanitary sewer on Hickory has no connections to it and thus no flow into it. From asbuilt information, the 300mm sewer is at 0.2% grade so the calculated capacity in this sewer is **43.3 L/s**. The City does not have flow data for this sewer.

If the work takes place after the moratorium on Carling expires, the sanitary service may be able to be run off the 300mm pipe on Carling. The exact location and depth of the City's service would need to be confirmed on site, however from record drawings it seems to be in place only to serve this site. Some condition assessment may be required as well using CCTV.

For either outlet, the sanitary line would also require maintenances holes at every turning point, as well as one at the property line.

Based on the 2004 City of Ottawa Sewer Design Guidelines, Figure 4.3, the peak design flow would be **11.5 L/s** for a residential development of the proposed size. The site is currently zoned for a peak design flow of **4.1 L/s** (refer to appendix A for calculations). Based on the slope and size of the existing sewer, and the fact that there is no other connection to either pipe (Hickory or Carling), the extra **7.4 L/s** can easily be accommodated in both sewers.

7.0 SUMMARY

In conclusion, the proposed development on the site, consisting of two new residential buildings, can be accommodated in terms of water, sanitary, and storm servicing. The existing watermain and sanitary sewer have adequate capacity to service the site based on discussions with the City of Ottawa and brief capacity analysis done by R.V. Anderson.

The storm servicing of the proposed development will be designed to meet all requirements from governing authorities including, but not limited to, the City of Ottawa, the Rideau Valley Conservation Authority, the Ministry of the Environment, the National Capital Commission, and OCTranspo and/or O-Train. The concept includes underground and surface ponding, as well as rooftop storage of stormwater.

If you have any questions or concerns, please do not hesitate to contact me.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED

Reviewed by:

Prepared by:

**Trevor Kealey, P.Eng.
Associate, Project Manager**

**Andrew Bernius, B.A.Sc., EIT
Project Coordinator**

APPENDIX A
CALCULATIONS

**855 Carling
Water Supply Calculations**

HYDRANT DATA

Inspection Date	Flow	Hydrant	Residual Hydrant	Static	Dynan	Pressure (Pitot)	Flow (igpm) actual @ 20 psi		
7/19/2007	6628024	6628023			58	48	38	863	1775
7/19/2007	6628173	6628024			66	54	52	1010	2087
7/24/2007	6628030	6628031			64	>56	26	714	1793

Ontario Building Code Table 3.1.2.1 (1997)

Occupancy class D (business and personal services)

Assumed Building is of combustible construction with fire separations and fire resistance ratings (Row 3)

K = 18

H024= 1775 gpm **8069** L/min
H030= 1793 gpm **8151** L/min
H173= 2087 gpm **9488** L/min **

Stot = 2.0

Tower 1 2667.8 8003.4
17592 52776
4754.1 14262.3
25014 75041.7

Tower 2 19736 59208 134249.7

WITH K=18 Q= 4832989.2

Both Q>270,000L
Requires 9000L/min

Therefore, hydrant H173 has enough capacity.

Section 3.1.5 City of Ottawa Water Design Guidelines

Proposed Population	apts	persons/unit	persons
avg apt	400	2.4	960
Total	400		960

Water Consumption Rates

Proposed Zoning	
Area =	0.45 m ³ /c/d
Residential	960 persons
Average Daily	Flow = 432.00 m ³ /d
Max Daily	= 1080.00 m ³ /d
Max Hourly	= 2376.00 m ³ /d
	= 27.50 L/s

Average Daily
Maximum Daily
Maximum Hourly

Existing Zoning	
Area =	2.18 gross ha
Commercial =	60 m ³ /h/d
	Flow = 130.80 m ³ /d
	= 196.20 m ³ /d
	= 353.16 m ³ /h
	= 4.09 L/s

Average Daily
Maximum Daily
Maximum Hourly

Section 4.3 City of Ottawa Sewer Design Guidelines

Proposed Population	apts	persons/unit	persons
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avg apt	400	1.8	720
Total	400		720

Peak Sewage Flows

Proposed Zoning		
Population	=	720 c
Residential	=	350 L/c/day
PF	=	3.88747422
Average Daily	Flow =	2.92 L/s
Peak Flow	=	11.34 L/s
Infiltration Allowance	=	0.12 L/s
Total	=	11.46 L/s

Average Daily

Extraneous flow

Existing Zoning		
Area	=	2.18 gross ha
Commercial	=	50 m3/h/d
Average Daily	Flow =	109.00 m3/d
Max Hourly	=	9.08 m3/h
Peak Flow	=	13.63 m3/h
Extraneous	=	14.63
	=	4.06 L/s

Average Daily

Max Hourly based on 12 hour work day for office environment

Peak Factor 1.5

Extraneous Flows 0.28 L/s



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