

MEMORANDUM

To:	<u>Two Sisters Resorts Corp.</u>	Date:	<u>February 3, 2023</u>
From:	<u>R.V. Anderson Associates Limited</u>	Project No.:	<u>226757</u>
Subject:	<u>325 King Street, Niagara-on-the-Lake – Functional Servicing Brief</u>		

1.0 Introduction

Two Sisters Resorts Corp. is proposing the redevelopment of 325 King Street in the Town of Niagara-on-the-Lake (Town). The existing 1.65-hectare site is currently occupied by the Parliament Oak Public School, which is no longer operational, and will be demolished as part of the proposed works. The proposed development includes a four-storey hotel, with a restaurant and conference rooms on the first floor, above a single storey parking level below. The proposed development will be comprised of 129 hotel rooms, in addition to roughly 1,600 m² of commercial space within the building. For the purposes of this brief, it is anticipated that the population of the development will be 350 people.

Information with respect to existing municipal services and utilities was determined from as-built plan and profile drawings and GIS data obtained from the Town.

R.V. Anderson Associates Limited (RVA) has been retained by Two Sisters Resorts Corp. to prepare a Site Servicing and Stormwater Management Brief in support of an Official Plan Amendment (OPA) and Zoning By-law application (ZBA).

The scope of this brief will summarize existing and proposed servicing and stormwater management strategies for the subject site.

2.0 Water Servicing

Based on record drawings obtained from the Town, there is a local distribution watermain on each of the four streets abutting the site. The entire watermain network in the area is well interconnected. There is a 300 mm Ø watermain on King Street as well as a 150 mm Ø watermain on Centre Street, Gage Street, and Regent Street. Based on the location of the water valve on the topographical survey and record drawings and service cards obtained from the Town, the existing school has two (2) 50 mm Ø water services from the 300 mm Ø King Street watermain with curb stops at the property line. The existing water services will be removed as they will not be sufficient to service the proposed development.

The Niagara Region Water-Wastewater Project Design Manual, the 2016 Niagara Region Water and Wastewater Master Servicing Plan Servicing Plan Update (Region Master Plan) and MECP guidelines as well as water demand criteria obtained from the Town were used to analyze the water demand from the proposed development.

The total estimated average daily flow rates, maximum day and peak demand rates required for the proposed development were estimated based on an average domestic water demand of 300 liters per capita per day, and maximum day and peak hour factors of 1.90 and 2.85, respectively. Furthermore, In accordance with the Fire Underwriters Survey, a maximum required fire flow (based on non-combustible construction and with a completely automatic sprinkler system) was calculated for the site. The table below outlines the estimated demand for the site:

Table 1 – Estimated Water Demand

	Average Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow Demand (L/s)
Proposed Site	1.22	2.31	3.46	166.67

In accordance with the Niagara Region standards, Water supply systems should be designed to satisfy the greater of peak hour demand or maximum day demand plus fire flow. As the peak rate alone is much less than the fire flow, the maximum day demand plus fire flow rate (i.e. 2.31 L/s + 166.67 L/s = 168.98 L/s (10,139 L/min) is the governing requirement.

Hydrant flow test results for all municipal hydrants within the vicinity of the site were provided by the Town and permitted for use for the purpose of this brief. The site is proposed to be serviced from the Gage Street watermain which has an available fire flow of 399.0 L/s, whereas the required flow is 168.98L/s. Therefore, it is concluded that the capacity of the existing watermain system is sufficient to support the proposed development.

In accordance with the Town Zoning By-Law and the Ontario Building Code (OBC), new domestic water services are required per property and a fire service will be required for the developments sprinkler systems. It is currently envisioned that a single 150 mm Ø water service will connect to the 150 mm Ø watermain along Gage Street, and approximately 2.0 m in front of the property line, a 100 mm Ø domestic water service will be branched off the 150 mm Ø fire service in an “h” configuration. The 150 mm Ø service will continue into the building and serve as the fire water service for the building. The 100 mm Ø domestic service will pass through a water meter chamber, as per the Town standard, located at the property line before continuing into the building water meter room below grade. A private hydrant will be branched out from the 150mm fire water service line, and will be within 45m from the Siamese connection as required by the OBC. Based on a review of the record drawings, the proposed connections to the existing watermain is physically possible but will be further investigated for potential conflicts and verified through subsurface utility engineering during the detailed design stage.

3.0 Sanitary Servicing

Based on record drawings obtained from the Town, there are four (4) sanitary sewers surrounding the site, all of which connect downstream at the intersection of Gage Street and Regent Street. There is a 450 mm Ø sanitary sewer along King Street, a 450 mm Ø sanitary sewer on Gage Street, a 200 mm Ø sanitary sewer on Centre Street, and a 200 mm Ø sanitary sewer on Regent Street. All sewers drain to Gage Street, where the 450 mm Ø Gage Street sanitary sewer west before ultimately discharging into the William Street Sewage Pumping Station (William Street SPS). Based on service cards received from the Town, the existing school has two (2) 150 mm Ø sanitary services connected to the King Street sanitary sewer. The existing services are to be removed and abandoned at the property line.

The 2016 Niagara Region Water and Wastewater Master Servicing Plan Update and sanitary demand criteria obtained from the Town was used to estimate the existing and proposed sanitary demands from the site.

The total estimated average sewage flow rates are based on 275 liters per capita per day, which is then peaked using Harmons Peaking Factor, and added together with an infiltration flow of 0.286 liters per hectare per second to get the total peak discharge from the site. The table below outlines the estimated demand for the site:

Table 2 – Estimated Sanitary Demand

	Peak Flow (L/s)
Existing Site (School)	0.60
Proposed Site	4.58
Infiltration	0.47
Total Net Sanitary Peak Flow Increase	3.98
Total Proposed Sanitary Peak Flow	5.05

With respect to capacity of the municipal sanitary sewer system, the site located in the William Street SPS catchment. Furthermore, based on a review of the 2016 Water and Wastewater Master Servicing Plan and the recent upgrades completed at the William Street SPS, the sanitary sewers system is adequately designed for future growth and does not identify any sanitary capacity constraints. The Region Master Servicing Plan shows the sewers in the Town that discharge to the William Street SPS and downstream of the site, are operating at less than 85% full currently and will continue to operate at less than 85% full based on the 2041 population, during wet weather flow conditions. Additionally, the Region Master Servicing Plan states that the William Street SPS and associated forcemain have surplus capacity based on the anticipated 2041 population.

In accordance with the Town Zoning By-Law, a new sanitary service is required for the site, and in accordance with the Regional sewer use by-law, a maintenance access manhole will be provided near the property line for the site. The manhole will be located at the northeast corner of the building. The sanitary service for the site will be 150 mm Ø and can be connected to the existing 450 mm Ø sanitary sewer on Gage Street. Based on a review of the record drawings, the proposed connection to the existing sanitary sewer appears to be constructable but will be further investigated for potential conflicts and verified through subsurface utility engineering during the detailed design stage.

4.0 Storm Servicing

Based on record drawings obtained from the Town, there are two (2) storm sewers available to service the site; a 500 Ø storm sewer starting at the intersection of Centre Street and Regent Street, and there is a 525 mm Ø storm sewer starting at the intersection of Gage Street and Regent Street. Secondly, the existing site has four (4) minor systems which drain to different outlets; the first system conveys a majority of the site via overland flow to the aforementioned 525 mm Ø on Gage Street, the second controls the southern extents of the site via two (2) catchbasins located on site which connect to the 500 mm Ø storm sewer, the third systems drains a portion of the King Street frontage to roadside ditches along King Street, and the fourth conveys a portion of the existing school roofs to the site sanitary service and ultimately to the 450 mm Ø sanitary sewer on King Street. The two (2) storm sewers and King Street roadside ditches ultimately discharge to the One Mile Creek, and the sanitary sewer discharges to the William Street SPS, as discussion in Section 3.0 of this brief. The catchbasins, and accompanying service to the storm sewer, as well as the sanitary service are to be removed and abandoned at the property line.

Based on the Town Engineering Standards and the MECP Stormwater Management Planning and Design Manual 2003, the site will need to meet water quantity and quality criteria in the post-development condition.

In order to meet the water quantity criteria, the post development peak flow rates during the 2-year to 100-year design storms must not exceed the pre-development flow rates for the same storm events. The City of St. Catherines IDF curves shall be used and lastly the minor system is to be designed for

the 2-year storm event and the major systems are to be designed for the 100-year storm events. In order to meet this criteria, it is anticipated that an underground stormwater management (SWM) facility will need to be constructed within the landscaped area of the proposed development located close to the Gage Street and Regent Street intersection. The SWM tank will provide the maximum detention volume required to control the runoff from the proposed 2-year to 100-year design storms to less than the pre-development 2-year peak discharge rate. The SWM system would connect to the 525 mm Ø Gage Street storm sewer and be controlled via an orifice device located on private property such that the peak flows in the post-development condition serve to meet the existing 2-year peak flow being directed to the same storm sewer in the pre-development conditions. Catchbasins and area drains will be located throughout the site to capture and convey the surface drainage to underground piping, which will all be designed to convey the 100-year design storm, and ultimately be directed to the SWM system. A control manhole will be installed at the property line, with access provided through a grated manhole cover at grade. Additionally, upstream of the control MH, the tank will be provided with a grated access cover as well which will serve as an emergency spillover to the roadway in the event the capacity of the tank is exceeded (i.e., events the 100-year design storm are exceeded). Additionally, it is anticipated that a portion of the proposed site frontage along King Street may not be able to be captured by surface drains, due to various existing trees which are to remain in the post-development conditions and the inability for gravity draining systems to adequately reach the furthest extents of the site, and as such it is proposed to have a small portion of the King Street frontage drain overland to the roadside ditches. As the existing site conditions also included a portion of the site draining to the roadside ditches, the post-development drainage area will be designed such that the runoff during the 2-year through 100-year design storms leaving the site will not exceed the pre-development flows for the same storms to King Street. The SWM detention tank will be specified and designed during the detailed design stage of the project.

In order to meet the water quality criteria, the site will need to provide a long-term removal of 70 % of total suspended solids (TSS) for all runoff leaving the site. Runoff from roof sources and pervious surfaces which aren't susceptible to vehicular loading are generally considered to be clean from the perspective of being a source for TSS as it is only exposed to minor airborne particles. As a majority of the site is either landscaped areas or roof surfaces, no pre-treatment will be proposed for these areas. As for the impervious surfaces surrounding the proposed building, these areas are required to be treated to achieved 70 % TSS removal. In order to do this, oil grit separators and goss traps in catchbasins are proposed to be utilized for all runoff captured in these areas, prior to being directed to the underground SWM detention tank. to draining to Tank 2 drains landscape areas and the building roof, therefore no pre-treatment is required. All oil grit separators will be designed during the detail design to achieve a minimum of 70% TSS removal.

In order to achieve the stormwater management criteria outlined above a storm service will be required to service the site. The storm service for the site will be a minimum 150 mm Ø and connected to the existing 525 mm Ø storm sewer on Gage Street. The service will connect into a control manhole at the property line of the site, which will be located at the northwest corner of the building. Based on a review of the record drawings, the proposed connection to the existing storm sewer appears to be

constructable but will be further investigated for potential conflicts and verified through subsurface utility engineering during the detailed design stage.

5.0 Utilities

Various utility companies including Bell Canada, Cogeco Data Services, Enbridge Gas Distribution, Canada Post and Niagara-on-the-Lake Hydro have been contacted, informing of the proposed development and requesting the availability of existing infrastructure available to service the site. Based on the responses received from the individual utility companies, the surrounding streets appear to contain the necessary utilities to service the proposed site, provided some upgrades/system improvements may be required. This will be confirmed during the design stage by the respective utility design consultants.

6.0 Conclusion

With respect to water servicing for the site, it is anticipated that a 100 mm Ø domestic and 150 mm Ø fire service will serve to meet the domestic and fire requirements for the site. The proposed connection to the existing water system on Gage Street appears to be constructable, but will be confirmed at the detailed design stage. Furthermore, hydrant flow tests provided by the Town indicated that the Gage Street watermain can provide sufficient capacity to support the proposed development.

With respect to sanitary servicing for the site, it is anticipated that a 150 mm Ø sanitary service will serve to meet the sanitary discharge requirements for the site. The proposed connection to the existing sanitary system on Gage Street appears to be constructable, but will be confirmed at the detailed design stage. Furthermore, a review of the 2016 Water and Wastewater Master Servicing Plan shows that there are no sanitary capacity constraints associated with the William Street SPS downstream of the site.

With respect to storm servicing for the site, it is anticipated that a minimum 150 mm Ø storm service will serve to meet the stormwater management requirements for the site. The proposed connection to the existing storm system on Gage Street appears to be constructable but will be confirmed at the detailed design stage. Secondly, since the post development peak storm discharge rate will be controlled through SWM to less than the estimated peak discharge rate from the existing site, it can be concluded that the existing storm system will not be negatively impacted by the development. Lastly, with respect to water quality, all runoff from impervious areas will be treated via oil grit separators prior to discharging to the Town's storm sewer.

We trust that this report satisfies the requirements of the Town of Niagara-on-the-Lake with respect to the subject development. Should you have any questions, please do not hesitate to contact the undersigned.

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