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May 4, 2020

Jones Consulting Group Ltd.
229 Mapleview Drive East
Barrie, ON L4N 0W5

Attention: Ray Duhamel, MCIP, RPP
Partner

Dear Mr. Duhamel:

Re: Functional Servicing Brief – Coral Sophia Lane Housing Development
113 & 117 Bayfield Street, and 6, 8, & 12 Sophia Street East, City of Barrie
City of Barrie File No. D28–014–2017
SBA File No.: P/N 17–3103

Skelton, Brumwell & Associates Inc. (SBA) were retained by Coral Sophia Lane Housing Inc. (Coral) to prepare civil design drawings for an 8–storey multi–residential rental building at the above noted address. The property is legally described as Part of Lots 9, 10, and 11 on the East Side of Bayfield Street, Registered Plan 31, in the City of Barrie, County of Simcoe. The subject property has an approximate area of 3,729 $m^2$. The subject property is located on the northeast corner of Bayfield Street and Sophia Street East, and is also bounded by Drury Lane on the east side of the property.

The property formerly had five (5) commercial businesses on it and two (2) entrances, onto Sophia Street East and Drury Lane, respectively. Three (3) of the businesses were serviced from Sophia Street East, and the other two (2) were serviced from Bayfield Street. There is also an existing onsite storm sewer consisting of two (2) catch basins which collect onsite drainage and convey it to the existing storm sewer on Sophia Street East.

The proposed 8–storey building will include approximately 284 $m^2$ of amenity (lobby, lounge, and indoor amenity area), and one hundred and eight (108) residential units, including eight (8) one bedroom units, fifty two (52) one bedroom plus den units, fifteen (15) two bedroom units, and thirty three (33) two bedroom plus den units.

In support of the application for a Zoning By–law Amendment for the property, the City of Barrie requires a Functional Servicing Brief to be prepared in order to demonstrate that the proposed development can be accommodated by the existing municipal infrastructure and utilities within the area.

# 1.0 Water Servicing

## 1.1 Existing Water Main

City of Barrie staff provided drawings for the area, including "Sophia Street East & West, STA 0+000 to 0+180", as well as "At Sophia Street East & West, STA 0+180 to 0+370". Both drawings are dated March 14, 2002, and are part of the "Approved for Construction" drawings for Bayfield Street Resurfacing and Intersection Improvements. The drawings show the existing water, sanitary, storm, and utility infrastructure in front of the subject property.

The drawings show an existing 200 mm diameter C.I. watermain along Sophia Street East on the south side of the road, and a 300mm PVC DR 18 watermain along the east side of Bayfield Street. The water on Drury Lane stops at a property north of the site. There are existing valves at the intersection of Bayfield Street and Sophia Street East (No. V6151), in front of 113 Bayfield Street (No. V6150), and in front of #8 Sophia Street East (No. V8720). The drawing also shows an existing fire hydrant (No. H2685) teed off of the Bayfield Street watermain, at the northeast corner of Bayfield Street and Sophia Street East.

## 1.2 Hydrant Test

There are two (2) existing fire hydrants near the proposed development, including City of Barrie Hydrant H2685 located at the southwest corner of the development, and H2686 north of the proposed development. A hydrant test has been completed by Vipond to obtain boundary conditions for the development, and the results of that test are included with this report.

The hydrant test undertaken by Vipond shows that the existing watermain has a static pressure of 62 PSI at a test flow rate of 1,150 USGPM (0.073 $m^3/s$), while a fire pressure of 56 PSI was determined at a test flow rate of 1,928 USGPM (0.12 $m^3/s$).

## 1.3 Water Demand

Hubbert EME Engineering (HEME) was retained to complete sanitary and domestic water flow rate calculations for the proposed development, as summarized in their correspondence of April 28, 2020. The HEME analysis included an 80 mm diameter water line, and a 65 mm diameter water distribution pipe, which provide a flow of 140 GPM (8.8 L/s).

## 1.4 Proposed Water Servicing

The proposed water servicing will include a 100 mm diameter domestic water service with a curb stop at the property line and a 150 mm diameter fire service. Both connections will be to the existing 300 mm diameter watermain on Bayfield Street.

## 1.5 Fire Demand and Supply

The building is proposed to be serviced by a separate 150 mm diameter fire service, which will be connected to a proposed hydrant and valve to be installed on the east side of the building. The service feeding this hydrant will be connected to the existing 300 mm diameter PVC watermain along Bayfield Street, complete with a tee and valve as per City of Barrie

standards. The watermain must also be installed with tracer wire, and testing and disinfection must be completed as specified by the City of Barrie.

Based on the Fire Protection Water Supply Guideline for Part 3 of the Ontario Building Code, OFM–TG–03–199, we have estimated the fire fighting demand for the building to be 0.105 $m^3/s$ (1,664 USGPM). This determination was made in part utilizing the hydrant pressure test conducted by Vipond (and as noted in Section 1.2).

Utilizing the Hazen Williams formula with a friction factor of 100, the pressure drop through the proposed fire service line was calculated to be 15.68 PSI, which provides a total residual pressure at the building of 40.32 PSI. This pressure exceeds the minimum 20 PSI required for fire fighting.

### 1.6 Booster Pumps

The need for water boosting pumps to service the upper floors of the proposed development is outside of the scope of this report. HEME will need to undertake a detailed analysis of the building internal water servicing system as part of the detailed design work for this project in order to confirm the need for, and if required, the size of, any booster pumps. This will be undertaken in support of the detailed building permit drawings.

## 2.0 Sanitary Sewage Servicing

### 2.1 Sanitary Design Flows

The City of Barrie Sanitary Sewage Collection System Policies and Design Guidelines, September 2017, identifies an average daily domestic flow of 225 litres/day/person. The subject property is currently zoned Transition Centre Commercial (C2–1). The building falls within the High Density, Apartment Dwelling of 54–300 units/hectare @ 1.67 ppu.

Based on the City of Barrie requirements, the average daily flow, $Q_{avg}$, can be calculated as:

$Q_{avg}$ = (1.67 ppu x 108 units x 225 L/day/person)
$Q_{avg}$ = 40,581 L/day = 0.47 L/s

Peak domestic sewage flows are calculated using the formula:

$$Q_p = \frac{PqM}{86.4} + IA$$

where $Q_p$ is the peak domestic sewage flow in L/s;
P is the design population, in thousands;
q is the average daily per capita domestic flow, in L/cap/day;
M is the peaking factor, calculated using the Harmon formula;
I is the unit of peak extraneous flow, in L/ha/s; and,
A is the gross tributary area, in ha.

The Peaking Factor, M, was calculated to be 4.16. The City of Barrie also utilizes an extraneous flow rate of 0.1 L/ha/s. The peak domestic residential sewage flow is calculated as:

$$Q_{pR} = \frac{(0.181 \text{ people})\ (225 \text{ L/person/day})(4.16)}{86.4} + (0.1 \text{ L/ha/s})(0.37 \text{ ha}) = 2.0 \text{ L/s}.$$

## 2.2 Existing Sanitary Main

The "Approved for Construction" drawings noted previously provide information on the existing sanitary mains in the area. The drawings show a 200 mm diameter VC sanitary sewer down the center of Sophia Street East, a 600 mm diameter A.C. trunk sewer on the north side of Sophia Street East, and a 200 mm diameter V.C. on Drury Lane.

The 200 mm diameter sewer on Sophia Street East drains from west to east, from manhole SAL03034 to manhole SAN03002 at Drury Lane. The 600 mm diameter sanitary trunk drains from east to west, from manhole SAN03002 at Drury Lane to manhole SAN01010 at the intersection of Bayfield Street and Sophia Street East.

The proposed building will be connecting to the 200 mm diameter V.C. pipe on Drury Lane approximately 5.2 m north of manhole SAN03003. Connecting at this location avoids crossing below an existing concrete box trunk storm sewer on Sophia Street East, and will reduce the impacts on traffic in the area as well.

The sanitary main at the proposed connection point has a slope of 3.2%, and would have a full flow capacity of 58.7 L/s and a full flow velocity of 1.87 m/s.

## 2.3 Sanitary Flow Rate

Hubbert EME Engineering (HEME) was retained to complete sanitary and domestic water flow rate calculations for the proposed development, as summarized in their correspondence of April 28, 2020. The HEME analysis indicates that the building will have a 200 mm diameter interior sanitary sewer at 1.0%, with a maximum discharge rate of 199 GPM (12.6 L/s) and an anticipated discharge of 139 GPM (8.8 L/s), both of which are significantly higher than the calculated rate based on the City of Barrie standards.

The proposed 200 mm diameter sanitary sewer will tie into the existing main on Drury Lane as noted previously. Based on a 1.0% slope, which is the flattest length of pipe proposed for the site, and a flow rate of 12.1 L/s, the site sanitary sewer will have a full flow capacity of 46.4 L/s and a full flow velocity of 1.48 m/s.

## 2.4 Sanitary Trunk Network

City of Barrie staff had previously been unable to provide our office with sanitary sewer design sheets for the trunk sewer along Sophia Street, for the purposes of confirming the available trunk sewer capacity.

As noted previously, the existing trunk sewer is a 600 mm diameter A.C. pipe, at a slope of 0.95%. Based on this pipe slope, the pipe would have a calculated full flow capacity of 598 L/s and a full flow velocity of 2.12 m/s.

Based on our review of the existing sanitary sewer system, as well as our flow calculations for the proposed development, we would anticipate that there is sufficient capacity within the existing sanitary sewer network to accommodate the proposed development.

## 3.0 Stormwater Management

### 3.1 Floodplain Mapping

This project requires a Stormwater Management Report be completed to address a floodplain analysis among other stormwater related issues. To that end we have downloaded a copy of the City of Barrie's "Sophia Creek Watershed & Mulcaster Drainage Area Environmental Assessment Update" (Draft) report from the City of Barrie website.

Figure #5 – Drainage System Deficiencies (Sheet B South of Peel Street) of the report shows that the regulatory flood line limit extends to the west side Clapperton Street, and drainage is conveyed generally to the south. The project site is outside of the regulatory limit as shown on Figure 5 from the City of Barrie report, therefore a floodplain analysis is not required.

### 3.2 Existing Storm Sewers

The site has an existing internal storm sewer system complete with two (2) catch basins and outlets to Sophia Street East. The existing system collects runoff from part of the site, as well as some external drainage from No. 12 Drury Lane to the north. The existing storm sewer system will be removed as part of the site development as it conflicts with the proposed building.

The City of Barrie drawings noted previously show an existing 3000 mm x 1800 mm concrete trunk storm sewer along Sophia Street East, draining from east to west. The trunk sewer originates at the intersection of Peel Street and Sophia Street East, and it collects and conveys flow from Sophia Creek to Bayfield Street. The trunk sewer size is reduced to a concrete 1650 mm diameter sewer flowing south along Bayfield Street and eventually outletting into Kempenfelt Bay.

The existing trunk storm sewer also has a 600 mm diameter bypass sewer at Bayfield Street, which connects to an existing 1650 mm x 1500 mm box sewer flowing west towards Toronto Street, and eventually south to Kempenfelt Bay. The drawings also show a 525 mm diameter concrete storm sewer running from north to south along Bayfield Street, and connected to the existing 1650 mm diameter concrete storm sewer south of Sophia Street East.

We understand through pre–consultation with the City of Barrie that the proposed development requires stormwater management works to meet the Ministry of the Environment, Conservation and Parks (MECP) "Enhanced" level of protection, as well as phosphorous loadings and water balances to meet the Lake Simcoe Region Conservation Authority (LSRCA) Technical Guidelines for Stormwater Management.

A more detailed analysis of the proposed development, including an investigation of Low Impact Development (LID) techniques, Water Balance calculations, stormwater conveyance, and Phosphorous Loading analysis, is included under separate cover.

## 4.0 Roadways & Sidewalks

A site visit was undertaken on December 15, 2017, and a review of Google Street View imagery dated September 2017 and May 2015 was used to review the existing road and sidewalk conditions. A 1.75 m wide concrete sidewalk currently exists on the east side of Bayfield Street, and there is also a 1.20 m wide concrete sidewalk along the north side of Sophia Street East, approximately 0.90 m off the back of curb. There is no sidewalk on either side of Drury Lane.

The sidewalks along Bayfield Street and Sophia Street East appear to be in good condition and should not require replacement with the exception of the sidewalk through Water service connections on Bayfield St the entrances on Sophia St., but only if it is disturbed during the removal and demolition process. There is no existing sidewalk along Drury Lane, and no sidewalk is currently proposed for Drury Lane. The development focuses pedestrian access to both Bayfield Street and Sophia Street East. In addition, there is no pedestrian access along Drury Lane, only vehicle access is provided. The Drury Lane right–of–way (ROW) is approximately 10 m in width, and sidewalk construction on this street would represent a significant expense to the City of Barrie that would not be funded by Development Charges.

There is curb and gutter along Bayfield St. which appears to be in good condition. There is a combination of curb and gutter and barrier curb along the north side of Sophia along with three (3) existing entrances. One (1) of the entrances is through the curb and gutter, while the other two (2) are within the barrier curb. As these entrances will be removed the curb will be replaced through the entrances. There are two (2) existing entrances onto Drury Lane.

A visual inspection of the asphalt on Bayfield Street and Sophia Street East shows the asphalt to be generally in good condition with some minimal cracking noted. The asphalt on Drury Lane in the vicinity of the proposed entrance appears to be in good condition also with minimal cracking noted, while the asphalt at the intersection of Drury Lane and Sophia Street East is in poor condition.

The asphalt, sidewalk, and curb on Bayfield Street, Sophia Street East, and Drury Lane near the proposed development will require replacement in areas that are to be excavated as part of the proposed site servicing works.

## 5.0 Utilities

Preliminary plans will be sent to Alectra Utilities, Enbridge, Bell, Rogers, and Canada Post for commencement of their respective designs for this proposed development. We have not been made aware of any issues with regards to providing utilities to the proposed development. We also note that various utilities are already in place on Bayfield Street and Sophia Street East, and as such, no issues are anticipated for providing utilities to the proposed development.

We trust that the enclosed information is satisfactory. Should you require any further information, please do not hesitate to contact our office.

Yours truly,

Skelton, Brumwell & Associates Inc.

Per:


Matt Bertram, P. Eng.
Project Engineer

MJB/sld

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