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## **SERVICING BRIEF**

**PROPOSED HILAN VILLAGE  
RESIDENTIAL SUBDIVISION  
38 CARSS STREET, ALMONTE, ONTARIO**

**Prepared For:  
Westview Projects Inc.  
18 Louisa Street, Suite 180  
Ottawa, Ontario  
K1R 6Y6**

**PROJECT #: 210864**

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## 1 INTRODUCTION

Kollaard Associates was retained by Westview Projects Inc. to complete a servicing brief in support of the approval of the proposed draft plan for a residential subdivision development in the community of Almonte, Municipality of Mississippi Mills, Ontario. For the purposes of this report, Carss Street is considered to be oriented along an east west axis. The proposed residential development is located along the north side of Carss Street at the north side of the existing town of Almonte immediately east of the Mississippi River.

The proposed residential development site consists of an about 7.4 hectare parcel of land severed from an about 8.9 hectare parcel of land. The retained about 1.5 hectare parcel contains an existing single family dwelling, is accessed from Carss Street and is outside of the scope of this letter. The subject site has a frontage of about 66 metres on Carss Street and extends north from Carss Street along the east side of the retained parcel for a distance of about 103 metres. The subject site extends an additional about 332 metres north from this point and occupies the entire space between the former Canadian Pacific Railway line on the east and the normal water level of the Mississippi River on the west.

Westview Projects Inc is proposing a residential development consisting of a mixture of single family dwellings, semi-detached dwellings and rowhouse development for a total of some 38 lots and 23 blocks. The proposed development will be serviced by municipal water and by municipal sanitary and storm sewers. It is understood that a pumping station will be required to facilitate the sanitary sewer.

This brief will summarize the servicing requirement aspects of the proposed development with respect to water and sanitary requirements and summarize the water and sanitary design intended to meet the proposed development requirements. The brief will also provide a summary of the stormwater management design.

### 1.1 Background

The retained parcel of land contains a single family dwelling which is provided with private water and sanitary services. There are no municipal sanitary, water or storm services in the immediate vicinity of the site.

There are no stormwater management facilities associated with the site. Runoff from the existing site is directed to the Mississippi River by a mixture of sheet flow and shallow concentrated flow as well as flow in an existing swale which crosses from the subject site through the retained parcel.



The proposed development has a total area of about 7.4 hectares and is presently unoccupied. The site has a total average depth between the former railway line and normal water level in the Mississippi River of about 203 metres. Of this depth an average of about 74 metres is occupied by the valley slope of the Mississippi River. The site has a width along the former railway line of about 435 metres resulting in a table land above the valley slope of about 5.2 hectares.

The table land above the valley slope is covered with a mixture of cultural meadow, thicket and woodland with a small portion used for agricultural purposes. The valley slope to the Mississippi River is densely treed. The Mississippi River adjacent the site has a well defined river channel contained within the river valley.

There is some residential development south of Carss Street and east of the former railway. It is understood that there is a current application for a residential subdivision to be located on the remaining undeveloped land between the east side of the subject site and Martin Street.

## **1.2 Proposed Development**

The proposed development will consist of a mixture of single family dwellings, semi-detached dwellings and rowhouse development. An entrance street (Street 1) will extend, parallel to the former railway, from Carss Street to the north end of the site.

A crescent (Street 2) will extend from Street 1 and travel parallel to Street 1 and the valley slope before returning at the north end of the site. The inside of the Street 2 crescent will contain 32 units and a park block (Park Block 67) which is aligned roughly with the gully at the top of the valley slope and the unmaintained Lansdowne Road allowance. 14 of the units will be north of the park block and 18 will be south of the park block. The west side of Street 2 will have a total of 22 units, 15 of which will have rear yards adjacent to the valley slope.

The proposed development will contain two additional park blocks. The first park block (Park Block 62) will be located at Carss Street between the east side of Street 1 and the former railway and will extend about 37 meters north from Carss Street. The second park block (Park Block 66) will be located at the southwest corner of the intersection of Street 2 and Street 1. The proposed property line along the south side of this park block will be in line with the north property line of the retained parcel.

## **1.3 Proposed Servicing**

The proposed development will be serviced by means of municipal water and municipal sanitary sewers. The stormwater requirements will be addressed with stormwater



management facility developed for the site which discharges to the Mississippi River to the west of the site.

The existing municipal water services will be extended from offsite and looped through the proposed development to ensure there is adequate water available and to increase the looping within the Municipal system.

Internal sanitary services will be provided by means of sanitary sewers directing flow by gravity to a sanitary lift station to be located in Park Block 2. The sanitary lift station will discharge to the existing municipal sewer system by means of a triplex pump system and force mains.

## 2 SANITARY SERVICES

The sanitary sewers for the proposed development have been designed using the City of Ottawa Sewer design guidelines as amended.

As previously indicated, the proposed development will consist of a mixture single family dwellings, semi-detached dwellings and rowhouse development. There is also potential for 3 apartment building blocks to be constructed at the northeast corner of the site. As such this potential has been included in the analysis.

As previously indicated, there are no municipal sanitary sewers within the adjacent Carss Street or within proximity to the site which would facilitate the connection to the municipal system by means of a gravity sewer.

The proposed sanitary sewer within the development will consist of 250 mm diameter SDR 28 gasketed pipe. The pipe will be placed a minimum of 2.1 metre below the surface of the street and will discharge by gravity to a sanitary lift station to be located in Park Block 66. A the sanitary lift station will pump the sanitary sewage to the existing municipal system by means of a force main.

### 2.1 Municipal Connection

Preliminary Plans for the Union Street North Rehabilitation indicated that the rehabilitation will include the extension of the existing 300 mm diameter municipal gravity sanitary sewer along Union Street North to about 69 m north of Stephen Street. 66% milestone submission drawings for the proposed Union Street North Rehabilitation (Union Street Plans) indicate that a new gravity sanitary sewer will be installed along Union Street beginning at about 77 metres north



of Stephen Street and ending at the Carss Street intersection. This gravity sewer is to be extended along Carss Street and into the proposed development discharging into the proposed sanitary lift station.

The Union Street Plans show that a sanitary force main will be installed during the rehabilitation of Union Street and will extend to the extension of the existing gravity sewer about 69 m north of Stephen Street. It is understood that the developer is responsible for the design of the force main. It is understood that the proposed sanitary works will be completed prior to the completion of the servicing works for the proposed development.

## 2.2 Sanitary Demand

The sanitary flow from the proposed development was calculated as follows:

### Proposed Subdivision (Residential)

Total domestic pop:

Single Family Dwellings (37)	x 3.1 ppu:	= 125.8
Semi-detach and Duplex (30)	x 2.7 ppu:	= 81
Rowhouse (townhome) (25)	x 2.7 ppu:	= 67.5
*Apartment Block (57 units)	x 2.1 ppu:	= <u>119.7</u>
Total:		= 394

\*The 57 apartment units represents three 19 unit apartment buildings. It is noted that each apartment building would be constructed in place of 3 rowhouse units. The units from both the rowhouses and the apartment building have been included in the calculation.

$$Q_{\text{Domestic}} = 394 \times 350 \text{ L/person/day} \times (1/86,400 \text{ sec/day}) = 1.596 \text{ L/sec}$$

$$\text{Peaking Factor} = 1 + \frac{14}{4 + (394/1000)^{0.5}} \times 1 = 4.02 \text{ - maximum 4.0}$$

$$Q_{\text{Peak Domestic Development}} = 1.596 \text{ L/sec} \times 4 = 6.38 \text{ L/sec}$$

### Infiltration

$$Q_{\text{Infiltration}} = 0.33 \text{ L/ha/sec} \times 3.3 \text{ ha} = 1.09 \text{ L/sec}$$



Total Peak Sanitary Flow from Development =  $6.38 + 1.09 = 7.47$  L/sec

#### Proposed Flows from Offsite

It is understood that there are additional lands north and east of the proposed Hilan Village development site that are within the village boundaries. As such there is a potential for future offsite development. It is understood that this potential future offsite development may connect to the proposed sanitary sewer system within the Hilan Village development. It is also understood that the municipality is anticipating the installation of a sanitary sewer along the north end of Union Street and along Carss Street that may flow by gravity to the sanitary sewer system within the proposed development. A review of the adjacent offsite area available for potential future development indicates that the total offsite area appears to be similar in size to the area of the proposed development.

Since the potential total off site area appears to be similar in size to the proposed development the flow from the proposed development was doubled.

$$Q_{\text{Peak offsite}} = Q_{\text{Peak Domestic Development}} = 6.38 \text{ L/sec}$$

$$Q_{\text{infiltration offsite}} = Q_{\text{Infiltration Development}} = 1.09 \text{ L/sec}$$

Total peak sanitary sewer flow to the Sanitary pump station.

$$Q_{\text{peak}} = 2 \times 6.38 + 2 \times 1.09 = 14.94 \text{ L/sec}$$

#### Sanitary Sewer Mains

The proposed sanitary sewers will consist of 250 mm diameter PVC SDR35 pipe. The location of the sewer mains is indicated on the site servicing drawings as well as the plan and profile drawings. The first section of each gravity sewer main will be installed with a minimum slope of 1% to ensure minimum velocity within the pipes. Detailed sewer design sheets will be completed during submission for subdivision approval. It is noted that the minimum allowable slope for a 250 mm diameter pipe is 0.44% resulting in a flow capacity of 39 L/s. This is well in excess of the expected maximum flow of 7.5 L/sec calculated above. As such calculations for the capacity and velocity of each individual sewer pipe section has not been completed at this time.

#### Sanitary Force main

It is anticipated that the pump station will receive a peak flow of 14.94 L/sec rounded to 15 L/sec. The force main will consist of 2 nominal 100 mm diameter PVC DR 25 Pressure Class 165



pipe. The triplicate pumps in the lift station will be connected to one of the two pipes. The second pipe is installed for redundancy.

It is anticipated that the sanitary force mains installed during the development will connect to the force main stub at the intersection of Union Street and Carss Street as shown on the plan and profile drawing. It is understood that the Municipality of Mississippi Mills will be upgrading the sanitary sewer along Union Street. The exact connection point is therefore not known at this time. It is understood that this work will likely be completed in the year 2024.

#### Pump Station Design Capacity

The sanitary lift station will consist of a pre-engineered pump station with an expected internal diameter of 2.5 metres. The station will have a depth of about 6.0 metres and will be equipped with three identical submersible pumps. The pump station will be designed to have a firm capacity equal to the design peak flow rate into the pump station. That is each of the three pumps should have a capacity of one half of the design peak inflow or 7.5 L/sec.

Each pump will be connected to one of two force mains which will be used to convey the sanitary discharge from the pump station to the gravity sewer along Union Street. The sanitary pumps will be designed to discharge one half of the peak sanitary demand at a minimum vertical head of 15 metres and a force main length of 500 metres. The force main will consist of PVC DR25 class 165 kPa pressure pipe.

### **3 WATER SERVICES**

#### **3.1 Watermain and Connection**

Preliminary Plans for the Union Street North Rehabilitation indicated that the rehabilitation will include the extension of the municipal water main along Union Street North. 66% milestone submission drawings for the proposed Union Street North Rehabilitation (Union Street Plans) indicate that the proposed watermain extended along Union Street will consist of a 300 mm diameter PVC Class 235 (DR18) watermain which will be capped in the west bound lane of Carss Street. It is understood that the proposed works will be completed prior to the completion of the servicing works for the proposed development.

The 2018 Master Plan indicates that the proposed watermain all Carss Street extended from Union Street North to the Mississippi River will consist of a 300 mm diameter PVC watermain. The proposed development will be serviced by means of this 300 mm diameter PVC water main which will be extended from the above noted 300 mm PVC watermain. It is considered that the proposed cap will be replaced with a 300 x 300 x 300 diameter tee. A valve will be installed





immediately east of the tee and the 300 mm watermain will be extended past the east edge of the Union Street North Road allowance and capped. The 300 mm watermain will be extended along Carss Street to the proposed development entrance and will be fitted with a 300 x 300 x 200 tee connection. The Carss Street extension of the tee will be fitted with a valve immediately past the tee and will be capped at the west side of the proposed road allowance. Mechanical joint restraints will be used at the tee connections.

The proposed development will be serviced with a 200 mm main will be extended from the T connection along Street 1 of the development and stubbed near the north property line of the development. A 200 mm watermain will be looped around the Street 2 crescent and will be connected to the 200 mm watermain installed in Street 1 at 2 locations. A 200 mm watermain stub will be extended up the unopened Lansdowne Road allowance to 6 metres beyond the east edge of Street 1 road allowance to facilitate a future connected to the watermain along Mitcheson Street completing a loop in the municipal system.

### 3.2 Residential Water Demand

The water demand for the proposed development was calculated based on the City of Ottawa Water Distribution Design Guidelines as follows:

Residential Average Daily Demand = 350 L/c/d.

From above, the estimated number of persons in the proposed development is 394

- Average daily demand of 350 L/c/day x 394 persons = 110,320 Litres/day or 1.28 L/s
- Maximum daily demand (factor of 2.5) is 1.28 L/s x 2.5 = 3.2 L/s
- Peak hourly demand (factor of 2.2) = 3.2 L/s x 2.2 = 7.0 L/s

It is noted that a flow rate of 7.0 L/s will result in a marginal drop in pressure in the proposed water main within the development.

### 3.3 Fire Flow

The master servicing plan indicates that the watermain along Union Street will be updated to a 300 mm diameter watermain. In addition, the master servicing plan indicates that this 300 mm watermain will be extended along Carss Street to the Mississippi River.

The City of Ottawa provides the following guidance with respect to the calculation of the fire flow for private property in urban areas: “The requirements for levels of fire protection on private property in urban areas are covered in Section 7.2.11 of the Ontario Building code. If



this approach yields a fire flow greater than 9,000 L/min then the Fire Underwriters Survey method shall be used to determine these requirements instead”.

The City of Ottawa design guidelines indicate that the maximum fire demand for a rowhouse block may be capped at 10,000 L/min provided that the backs of the rowhouse units are further than 10 m apart.

Since the proposed development will be serviced by a watermain indicated to be updated in the Master Servicing Study it is considered appropriate to use the Guidance provided in the City of Ottawa Water Distribution design manual and accompanying technical bulletins for the calculation of the fire demand.

Fire flow protection requirements were calculated in accordance with City of Ottawa Technical Bulletin ISTB-2021-03. That is: "The requirements for levels of fire protection on private property in urban areas are covered in the Ontario Building Code (OBC). If this approach yields a fire flow greater than 9,000 L/min then the Fire Underwriter's Survey methodology shall be used. The fire flow requirements calculated using the OBC are 6300 L/min, or 105 L/s. Since this demand is less than 9,000 L/min the OBC calculation will be used.

### 3.4 Fire Hydrant Spacing

The proposed development will consist of a mix of single family and multifamily residential. The maximum recommended fire hydrant spacing by the Fire Underwriters Survey for multifamily residential is 90 m and for single family residential is 180 metres. The Fire Underwriters Survey further provides additional guidance in the table titled "Standard Hydrant Distribution" which provides the number and spacing of hydrants based on fire flow demand. Using the Standard Hydrant Distribution table with a fire flow requirement of 6000 L/sec, the average area per hydrant is 14,000 m<sup>2</sup>. The next flow increment is 8000 L/sec with an average area per hydrant of 13,000 m<sup>2</sup>. Since the design flow requirement of 6300 L/sec is greater than 6000 L/sec an average area per hydrant of 13,000 m<sup>2</sup> was used to determine the hydrant spacing.

City of Ottawa Water Distribution Guidelines indicate that the maximum spacing between fire hydrants for single family residential units where the lot frontage is less than 15 metres is 110 metres and where greater than 15 metres is 125 metres. The actual lot frontage of the proposed development ranges from about 8 metres to greater than 15 metres.

The hydrants will be spaced at a maximum of 110 metres apart with most of the hydrants being spaced between 90 and 100 metres apart. In all cases the maximum service area per hydrant is limited to less than 9,000 m<sup>2</sup> which is much less than the average recommended area per hydrant.



### **3.5 Sufficiency of Existing Municipal System.**

Kollaard Associates requested boundary information from the Municipality of Mississippi Mills with respect to the available water supply and pressure at the proposed connection points. It is understood that this information is not accurately available as Mississippi Mills is upgrading the existing system. The upgrades will be completed as the proposed residential subdivision becomes developed. The Municipality of Mississippi Mills has stated that there will be sufficient water supply and pressure once the upgrades to the system are complete.

## **4 STORMWATER DESIGN**

The stormwater design for the proposed development is provided in the report prepared by Kollaard Associates Inc.: *Hilan Village Conceptual Stormwater Management Plan dated Rev 2 – October 13, 2023*.

The stormwater management facility will consist of a system of storm sewers which will convey the stormwater runoff to hydrodynamic stormwater treatments units which will provide an enhanced level of treatment for the runoff. The discharge from the treatment units will be directed by means of a combination of constructed and existing open channels or swales on the Mississippi River Valley Slope. The constructed and existing water courses will extend from the developed area of the site to the normal water level of the Mississippi River. The open channels will be designed to prevent erosion of the valley slope and to minimize the impact of the discharge on the Mississippi River.

The stormwater management facility has been designed to provide quality control in accordance with criteria provided by the Mississippi Valley Conservation Authority (MVCA).

Due to the proximity of the site to the Mississippi River, there are no quantity control restrictions with respect to controlling the post development runoff rate or runoff volume directed from the development to the river. The post-development quantity control design is intended to ensure that the proposed stormwater facility can accommodate all flows arising from the design storms without impact to the adjacent offsite areas and without negatively impacting the proposed dwellings within the development. The quantity control design is also intended to insure that the discharge from the storm sewer system will have no long term negative impact to the Mississippi River valley slope.



## 4.1 Stormwater Design Summary

### *Quantity*

The proposed stormwater management design has been completed to accommodate runoff generated on the offsite area extending east of the former railway to Martin Street and extending north from Carss Street to the unopened Lansdowne Road allowance. This runoff currently is directed by means of 2 culverts crossing through the former railway bed to an existing swale which crosses the site. The existing swale crosses the site, flows parallel to Carss Street for a short distance then crosses the retained parcel to discharge into the Mississippi River.

The proposed development will eliminate the portion of the existing swale which crosses the site. As such the proposed stormwater facility will be designed to collect the discharge from the culverts and accommodate it within the storm sewer system. This flow will be combined with internal flows and treated by means of a hydrodynamic oil and grit separator located within Block 68 of the development. Discharge from this treatment unit will be directed by means of a storm sewer to an open channel along Block 68 which is located between the rear of the lots adjacent to the retained parcel and the retained parcel.

Runoff from catchment areas which include the Street 2 crescent will be collected by means of storm sewers along Street 2, a portion of Street 1, and storm sewers within Park Block 67. These sewers will direct the runoff to a hydrodynamic oil and grit separator to be located at the gully at the top of the valley slope adjacent to Park Block 65. Discharge from this treatment unit will be directed to a proposed open channel. This open channel will extend from the outlet of the treatment unit to the top of slope where it will discharge into an existing channel.

The open channels will be constructed with a bottom width ranging from 0.5 to 1.0 metres and will have side slopes ranging from 3H:1V to 2H:1V. The bottoms of the open channels will consist of bedrock or of a coarse gravel and geotextile liner protected by large size riprap. The side slopes of the open channel will be protected by a geotextile liner and large size riprap. The riprap will be placed to ensure that the individual pieces of riprap are protected from horizontal displacement by interlocking with the adjacent riprap. The channels will be designed to resist erosion resulting from the flows generated during a 100 year storm event.

Riprap ranging in size from about 10 kg to 100 kg will be placed at select locations along the side slopes of the existing channel receiving the discharge from the constructed channel in Park Block 65. The riprap will be placed at locations not currently protected by natural rock formations and bedrock.



### *Quality*

The proposed storm sewer system will discharge to the open channels through stormwater treatment units designed to meet the required quality control standards. In addition, potential pollutants will be reduced at the source by best management practises. Coarse pollutants will be partially removed by sedimentation within the catch basin and maintenance hole sumps. Stormwater treatment to 80 percent total suspended solids removal will be provided by Hydrodynamic vortex separators such as the CDS treatment unit designed to treat 100 percent of the flow generated during a quality control storm event.

## **5 EROSION AND SEDIMENT CONTROL**

An erosion and sediment control plan will be prepared and implemented at least equal to the stated minimum requirements and to the satisfaction of the Municipality of Mississippi Mills and the Mississippi Valley Conservation Authority, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current best management practices for erosion and sediment control.



## 6 CONCLUSIONS

The water and sanitary demands for the proposed development will be met by municipal services.

The sanitary requirements will be met with an onsite gravity sewer system which will direct the sanitary flows to a sanitary lift station in Park Block 66. The sanitary lift station will be designed to accommodate the flows from the proposed development and adjacent future development.

The sanitary lift station will consist of a pre-engineered pump station complete with triplex pumps discharging to the municipal gravity sewer system along Union Street.

The residential water demand will be met by the installation of 200 mm diameter PVC watermains looped to the existing municipal system along Union Street and Mitcheson Street. The proposed loop will add redundancy to the municipal system and ensure that the water supply to the proposed development is not from a single feed.

Stormwater management will be completed by providing treatment by means of hydrodynamic oil grit separation units. The storm water management system will be designed to accommodate the design storms with no negative impact to the surrounding areas or proposed dwellings. The outlet channels will be designed to ensure the Mississippi River Valley slope is protected from erosion.

Erosion and sedimentation shall be controlled during development.

We trust that this brief provides sufficient information for your present purposes. If you have any questions concerning this brief please do not hesitate to contact our office.

Sincerely,  
Kollaard Associates, Inc.



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Steven deWit, P.Eng.