TO: Mayor and Council

FROM: J. A. (Jack) Hull, HJA Water Management Consulting

DATE: October 20, 2015

SUBJECT: Uplands Combined Sewer Separation Project – Pre-design

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BACKGROUND:

The provincial government's Municipal Wastewater Regulation (MSR) requires all BC municipalities to have separate stormwater and sanitary sewer systems. Compliance is mandatory for the District of Oak Bay (the District) as it is for other jurisdictions in the province, such as Burnaby, New Westminster, and Vancouver, where combined sewers currently exist. Separation of the combined sewers is an integral part of the CRD's Core Area Liquid Waste Management Plan (CALWMP) in compliance with the MSR.

The Uplands neighbourhood currently has a single pipe system to convey both sanitary sewage and stormwater flows. During heavy rainfall events, the volume of stormwater exceeds the capacity of the system and a combination of stormwater and raw sewage overflows into the ocean at the Rutland and Humber pumping stations. Separate stormwater and sanitary sewer pipes will render such overflows unlikely and will achieve compliance with the MWR.

Included in this report are key considerations and recommendations for Council decisions on moving forward with the Uplands Combined Sewer Separation Project. These include:

- A review of Bylaw No. 3891;
- The compliance approach taken by other municipal jurisdictions undergoing the same mandated initiative;
- The District's commitments under the CALWMP and
- Compliance with the Heritage Conservation Act with respect to the known and potential archaeological sites in the Uplands area and;

The District issued a Request for Proposals on March 20, 2015 for engineering services for the pre-design of the Uplands Combined Sewer Separation Project. Three submissions were received and a contract was awarded to McElhanney Consulting Services Limited (McElhanney) at the May 11, 2015 Council meeting. McElhanney divided the work into five activities. These are summarized in the following table along with the status of progress:

Table 1
Project Status

	Description	Progress Status
Activity 1	Project Start-up	Substantially complete
Activity 2	Options Development	Substantially complete
Activity 3	Options Assessment	In Progress
Activity 4	Phasing Plan for Construction Implementation	Not Started
Activity 5	Predesign Options Final Report	10% complete

McElhanney has completed the development of six possible options to separate the existing combined stormwater and sanitary sewer system. A summary of the options is provided below.

DISCUSSION:

Key Considerations:

The uplands neighbourhood has considerable topographic variation, sloping from about 58 metres elevation in the north west (Cadboro Road) to just above sea level in the south east. When the Uplands subdivision was developed a century ago, the developer installed a combined sewer in 3 metre (10 foot) wide easements at the side and rear of properties in certain locations to service the area with gravity sewers and to avoid having to construct deep sewers.

To install a second pipe, an additional 2 metre (6.5 foot) wide easement would have to be obtained. The total 5 metre (16.5 foot) easement would have to be cleared to allow for equipment access and working space. Over time the easement areas have grown over substantially. As illustrated in the attached photographs (Attachments 1), clearing a 5 metre (16.5 foot) wide easement would require the removal of mature trees, hedges, fences and other mature landscaping. Consequently, McElhanney has developed options to avoid using the existing easements.

1. PRE-DESIGN OPTIONS

McElhanney has investigated six options for each of the Humber and Rutland catchment areas. Options 1 and 2 are gravity sewer systems which avoid the existing easements and for which 5 metres has been established as the maximum practical and economic depth for trench excavation. All options will require the installation of pumps for sanitary sewage and/or stormwater flows.

Option 1 – New deeper gravity sewer system and existing combined sewer system to remain for stormwater conveyance.

In the Humber catchment, out of a total of one hundred and fifty (150) properties, twenty nine (29) properties would require sanitary sewer pumps in addition to the ten (10) that already have a pump. In the Rutland catchment, out of the two hundred thirty six (236) properties, thirty nine (39) properties would require sanitary sewer pumps in addition to the seven (7) that already have a pump.

Option 2 – New deeper gravity storm drainage system and existing combined system to remain for sanitary conveyance.

In the Humber catchment, out of a total of one hundred and fifty (150) properties, thirty two (32) properties would require stormwater pumps in addition to the seven (7) that already have a pump. In the Rutland catchment, out of a total of two hundred thirty six (236) properties, forty (40) properties would require stormwater pumps in addition to the six (6) that already have a pump.

<u>Option 3</u> –New pumped low pressure system for sanitary sewers collection and existing system to remain for stormwater conveyance.

Under this option all (100%) of the properties in both catchments would require sanitary sewage pumps.

<u>Option 4</u> – A new shallow gravity stormwater system with localized areas requiring municipally owned stormwater pumping stations for roadway runoff.

The McElhaney proposal included a new pumped low pressure stormwater drainage system with the existing combined system to remain for sanitary sewer conveyance. However, it became clear that pumping stormwater from the whole catchment area would not be cost effective either initially or from a lifecycle perspective. Under a low pressure stormwater system, either a large number of pumping stations would be required to capture and convey road runoff, or a parallel shallow gravity network would need to be installed, with fewer, but larger municipally owned stormwater pumping stations. Consequently, this option was not considered further. Instead, a hybrid option was developed in which a relatively shallow new gravity stormwater system would be constructed with smaller, localized areas requiring municipally owned stormwater pumping stations for roadway runoff.

In the Humber catchment, sixty five (65) properties would require a stormwater pump in addition to the seven (7) that already have a pump. In the Rutland catchment, one hundred and one (101) properties would require a stormwater pump in addition to the six (6) that already have a pump.

<u>Option 5</u> – A hybrid of shallow gravity sanitary sewer system, pumped where necessary, and existing pipe as a stormwater conveyance.

This option would include a shallow depth gravity sanitary sewer system, with smaller, isolated areas of catchment serviced by municipal pressure sewers.

In the Humber catchment, sixty (60) properties would require a sanitary pump in addition to the ten (10) that already have a pump. In the Rutland catchment, one hundred and fourteen (114) properties would require a sanitary pump in addition to the seven (7) that already have a pump.

The initial capital cost to the municipality for both options 4 and 5 is lower than for options 2 and 1 respectively. However, the number of properties requiring pumps is greater.

<u>Option 6</u> – A hybrid shallow gravity sanitary sewer system, with localized community sanitary pumping stations where necessary and the existing system as a storm drain.

In the Humber catchment, forty (40) properties would require a sanitary pump in addition to the ten (10) that already have a pump. In the Rutland catchment, ninety six (96) properties would require a sanitary pump in addition to the seven (7) that already have a pump. This option is a variation of Option 5. More municipally owned pumping stations would be constructed in order to increase the number of dwelling units serviced by gravity sanitary sewer connections compared to Option 5.

The greatest factors differentiating Options 1 and 2 from 4, 5 and 6 will likely be in the costs related to pipe depth (trench excavation and backfilling) and in the cost of additional on-site private pumping systems in the latter, shallower gravity pipe network options.

Alternative stormwater management

In addition to the six options describe above, the opportunities for on-site stormwater management on municipal property was also considered. Traffic islands, boulevards and the undeveloped Midland corridor were considered as potential locations for rain gardens for storage and attenuation of storm flows. Rain gardens provide the added benefit of filtering stormwater runoff from roads. In most cases the possible locations have mature trees, including Garry Oaks, which would have to be removed to construct rain gardens, although there is an open area on Midland Road at Lansdowne Road. (Attachment 3). It was concluded that from a stormwater management perspective, there would be insufficient attenuation or storage capacity to modify the design of the stormwater system under any of the options considered.

All of the options will be presented to the public for discussion and evaluation at the upcoming four public 'open houses' schedule for November.

2. RESPONSIBILITY FOR SEWER SEPARATION COSTS

It is standard practice in municipalities for basic infrastructure costs such as roads and sidewalks, water mains and sewers to be a common cost charged to all residents either in a utility rate or in property taxes on the basis of assessed value. For example, when a sidewalk is replaced or a sewer upgraded, the residents on the street directly benefiting from the work are not required to pay for the full cost of the work, rather it is a cost to which all property owners contribute. In the past, when combined sewers were separated in other parts of Oak Bay, the cost was shared by Oak Bay residents based on property assessment. It is assumed that this standard practice will apply to the sewer separation project in the Uplands.

Present Policy District of Oak Bay requirement for sewer separation on private property

For several years the District has required property owners in the Uplands to separate sanitary sewer and stormwater services on private property when undertaking major renovations or building a new home. This includes replacing the connection to the existing combined sewer in the municipal road right of way. To date over twenty nine (29) or (12%) of the homes in the Rutland catchment and fifty eight (58) or (39%) of the homes in the Humber catchment have separated sewers to the property boundary. All costs associated with the sanitary and storm sewer separation and the required new (single) connection to the municipal sewer have been borne by the property owner.

Bylaw No. 3891 - Mandatory connection to a newly separated sewer

Under Bylaw 3891, 'A Bylaw for the administration and regulation of public sewers,' Section 2 subsections (3) and (4) (Attachment 2) it is mandatory for property owners to separate their combined sewer system and connect to the municipal sewers in the event that the District provides a separate sanitary and storm sewer in an area with a combined sewer. Property owners are required to complete the sewer separation '*within*

one year from the date the Engineer certifies that the new sewer main is operational.' If the owner fails to do so the District may undertake the work at the expense of the property owner. Failure to pay would result in the cost being added to the property tax account.

Connection Policies of Other Jurisdictions

Our research into the practices of four other municipalities (Vancouver, Burnaby and New Westminster and the Village of Cumberland) engaged in a combined sewer separation program revealed:

- In all cases, new homes and homes undergoing major renovations must construct separate connections to the municipal sanitary and storm sewers.
- Sewer separation is not mandated for existing homes.
- In the case of New Westminster the threshold renovation for mandatory separation is a renovation value is $100,000.
- In the case of Vancouver, not mandating existing home to separate their combined sewers is justified by the fact that on average 1% of the housing stock is replaced each year so that over the 100 year program, commenced in 1984, all of the homes will have connected to separate storm and sanitary sewers.
- Other municipalities were concerned with the high cost to property owners and the financial stress mandatory separation may cause.

Proposed Policy on Combined Sewer Separation on private property and connection to separated municipal sewers

Given the current level of funding committed by the District to the sewer separation project, of $200,000 per year, complete separation will take several decades to complete unless significant senior government funding is obtained. During that time, many of the existing homes in the Uplands may either be replaced or undergo major renovations. The current policy of requiring new homes to have separate sewers should be continued. This would include mandatory connection to the separated municipal sewers when available.
The same policy should be applied to property owners undertaking major renovations with the suggested value of a major renovation defined as $100,000 or more.

Responsibility for the cost of connecting homes with previously separated sewers.

As noted previously, property owners who have built new homes or undertaken major renovations have paid to separate their sewers on their property, terminating in a vault at the property line, and for a single pipe from the vault to the existing combined sewer either in the municipal roadway or easement. The practice of two of the three municipalities is to connect homes with separate sewers to the new separated sewers as a project cost during construction. It is proposed that the same policy be implemented by the District.

There are seven homes where the separated sewers have been connected to the existing combined sewer pipe in an existing easement. These properties will have to pump either their sanitary sewage or stormwater to the new separate sewer in the road right of way. The responsibility for the cost of connecting these properties to a new sewer in the road right of way still needs to be evaluated.

An incentive for existing property owners to separate their sewers.

As an incentive for existing homes to separate and connect, the connection cost could be borne by the project if the sewers on the private property are separated in advance of construction of the separate municipal sewer system so that the connections could be made during construction of the separate municipal sewer.

3. THE CORE AREA LIQUID WASTE MANAGEMENT PLAN

The question of mandatory sewer separation on private property has been discussed with the Ministry of Environment given its goal of eliminating combined sewer overflows. A letter summarizing the discussions was sent to the Ministry on September 18, followed by an e-mail on October 6. In its response the Ministry reiterated that sewer separation in the District of Oak Bay is a critical component of the CRD strategy. The Ministry also noted that any changes to the current commitments in Amendment No.8 of the CRD CALWMP must demonstrate compliance with Division 2 of the Municipal Wastewater Regulation in outlining the measures (deliverables and deadlines) that will be taken in order to reduce inflow and infiltration and control overflows as part of the amended CALWMP. In the current CALWMP the Uplands sewers were to be separated by the end of 2015. As the CRD expects to submit an amendment to the CALWMP early in 2016, the District's new proposal can be included in that amendment submission.

4. THE HERITAGE CONSERVATION ACT

McElhanney's sub-consultant, Golder Associates (Golder) prepared an archaeological overview assessment. The archaeological consultant undertook a field reconnaissance to identify areas of archaeological potential, has documented previously known sites, and prepared a background report outlining the First Nations history of settlement in the area. A version of the report that does not include specific archaeological site location information will be available to the public. Golder has also identified areas of archaeological potential within the project area and recommends an Archaeological Impact Assessment in areas with archaeological potential prior to the start of construction.

A meeting was held with the senior staff at Provincial Archaeological Branch responsible for administering the Heritage Conservation Act. Ministry staff recommended that a Section 14 Heritage Inspection "Blanket" permit is the best option for the District, as it allows for a number of proponents (Oak Bay and private property owners) to be included in the permit. Property owners would also be signatories to the blanket permit in addition to the District. A blanket permit does not absolve private property owners from full responsibility for protection of archaeological sites that may be present on their property. A Technical Memorandum from Golder entitled 'Uplands Combined Sewer Separation Project: Archaeological Guidelines' which provides details of responsibilities and procedures will be available to the public on the District's web site.

5. PUBLIC ENGAGEMENT

Four public open houses are being arranged, two in North Oak Bay and two in South Oak Bay. The dates are:

- **Saturday November 7: 2pm – 5pm,**
  Location: Neighbourhood Learning Centre, Oak Bay High School

- **Tuesday November 10: 5pm – 8pm**
  Location: Royal Victoria Yacht Club

- **Friday November 20: 5pm – 8pm**
  Location: Uplands Campus

- **Saturday November 21: 2pm – 5pm**
  Location: Uplands Campus

These meetings will inform Oak Bay residents on the project, and provide an opportunity to understand the six options being considered for each catchment area. Story Boards will address the following:

- Why is the District undertaking the Uplands Combined Sewer Separation Project?
- What are combined sewers and combined sewer overflows?
- Who pays for the separation of the municipal sewers in the Uplands area?
- What are property owner responsibilities?
- What are property owner responsibilities under the Heritage Conservation Act?
- What are the six options under consideration and what are the approximate costs?

“Story Boards” will also show homes already with separated sewers to their property boundary and homes with pumps for the Humber and Rutland catchment areas.

Information will be provided on the Heritage Conservation Act.

Oak Bay citizens will have an opportunity to provide written comments at the meetings and for the following weeks leading up to December 4, the cut-off date for public comment. All information will be available on the District website. A report will be brought to Council January 2016 summarizing public comment and recommending an option.

FINANCIAL IMPACT:

Cost estimates for each option will be presented to council in January.

RECOMMENDATIONS:

It is recommended that the District:

1. Amend Bylaw 3891 to mandate sewer separation for new homes and connection to the separated municipal sewers when available; to mandate sewer separation for homes undergoing major renovations, based on a value of $100,000 or greater, and connection to the separated municipal sewers when available and to update Schedule "A" 'Fees and Permits' of the bylaw to reflect current costs and that it be updated annually.
2. Include the cost of connecting properties with sewers separated prior to the municipality separating the combined sewers, in the cost of the sewer separation construction contracts.
3. Obtain blanket Heritage Inspection Permits covering the municipal rights of way and adjacent property owners, as the project proceeds to construction.

Respectfully submitted,

Jack Hull, Project Manager
HJA Water Management Consulting

Source of Funds/I concur with the recommendation

for Patricia Walker

Patricia Walker, Municipal Treasurer

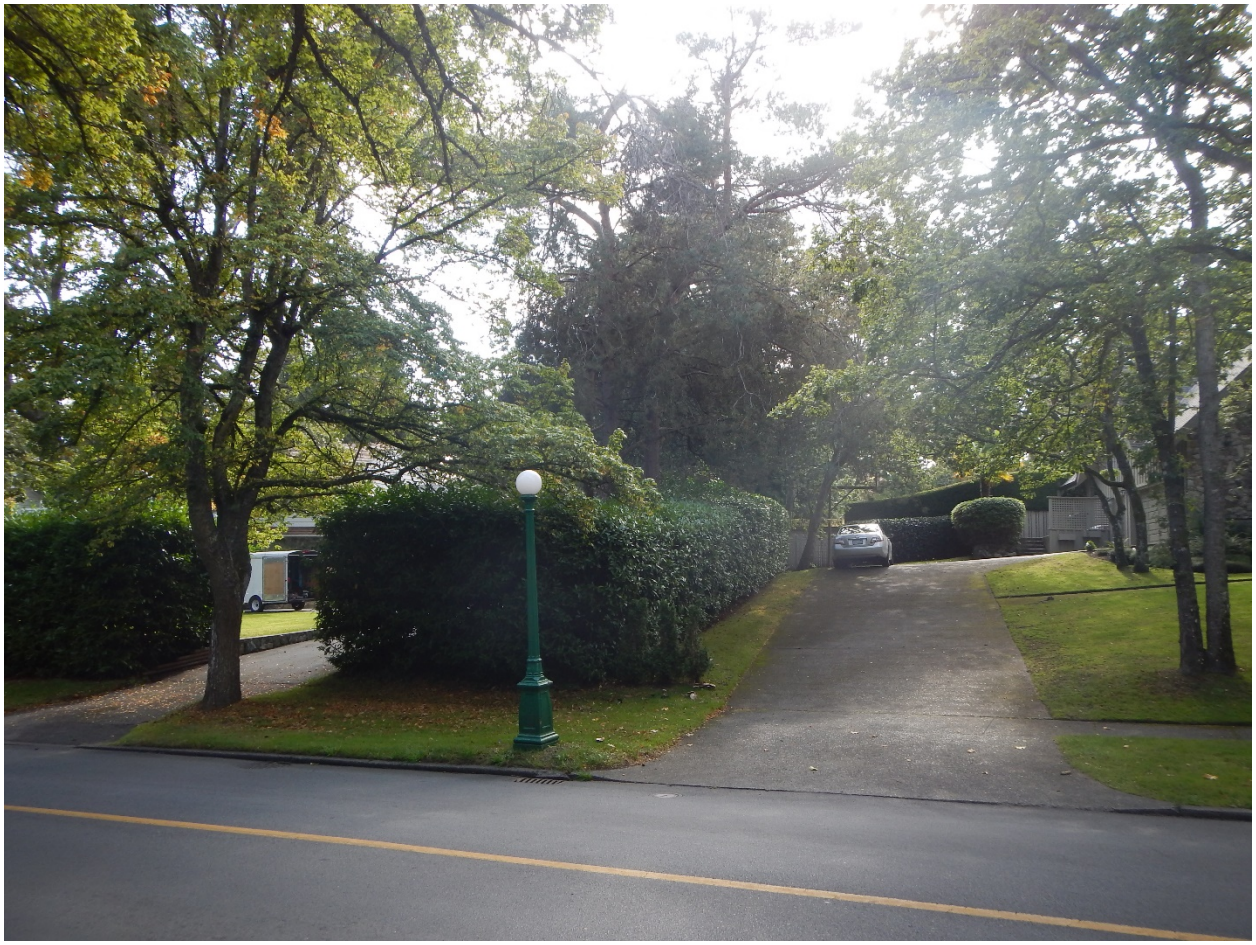
I concur with the recommendation

Helen Koning, Chief Administrative Officer

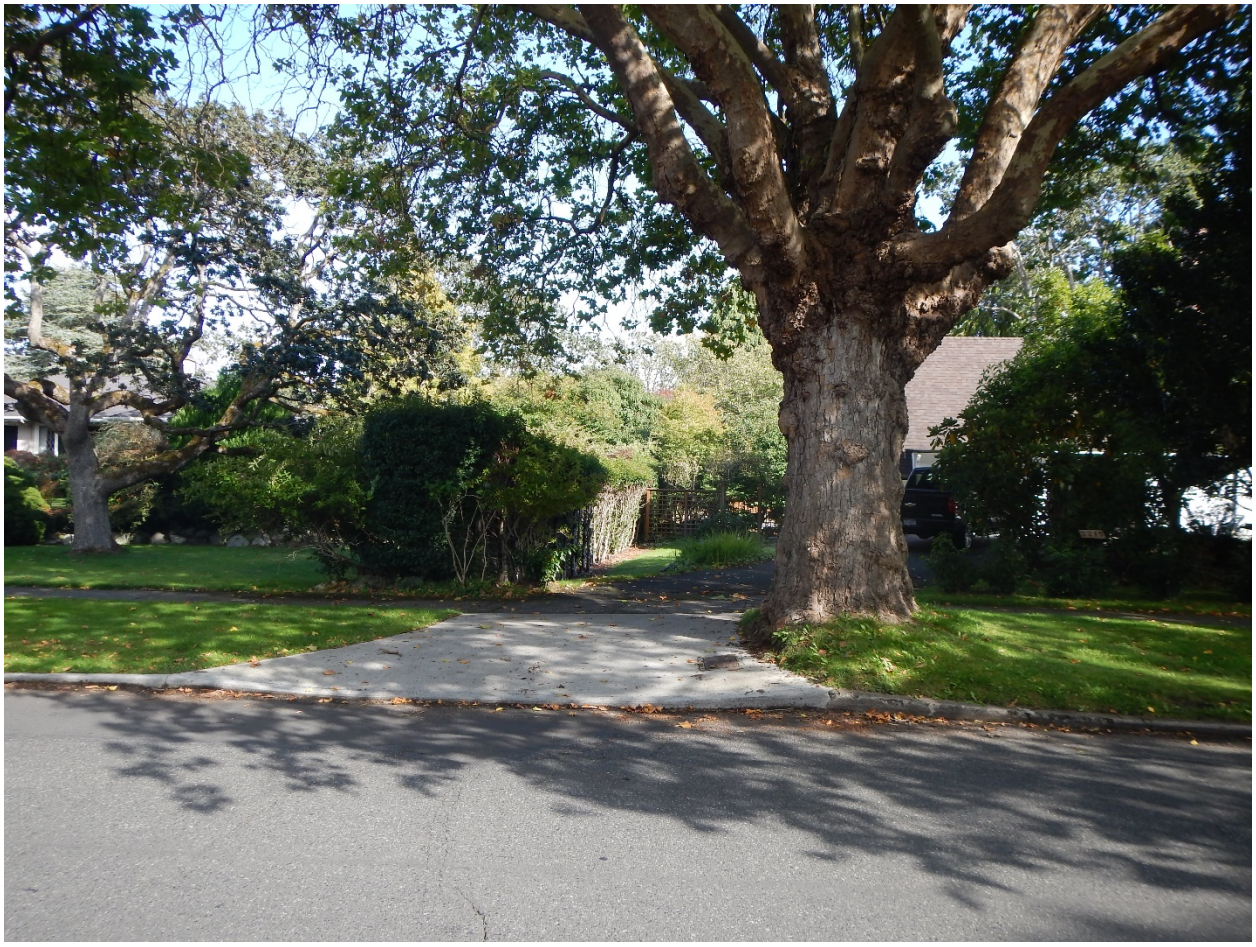
ATTACHMENT 1

Examples of existing easement locations in the Humber and Rutland catchments

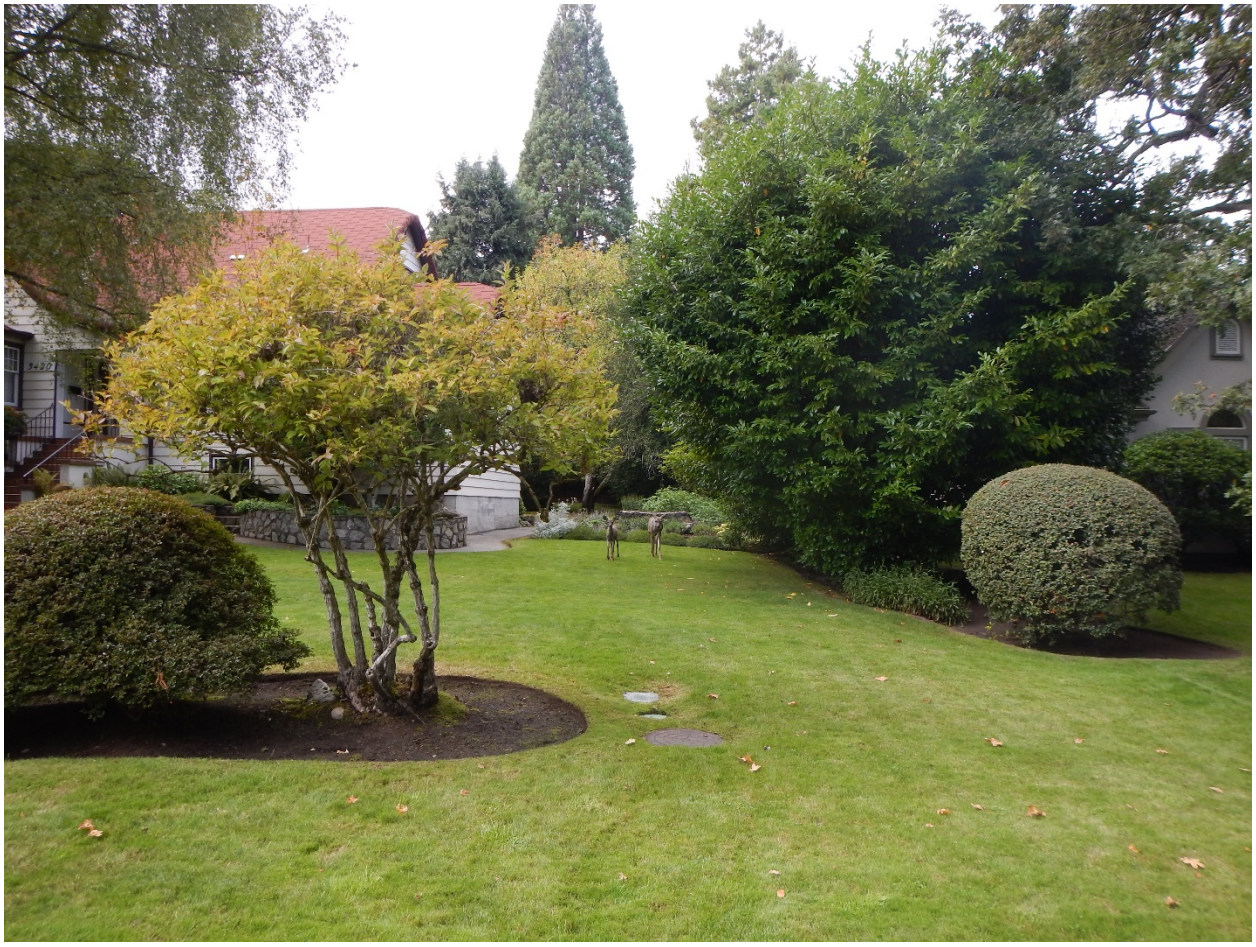
Humber Catchment
Existing Easement at 3490/3460 Beach Drive



Humber Catchment
Existing Easement at 3215/3235 Midland Road



Existing Easement at 3420/3430 Upper Terrace



Existing Easement at 2450/2470 Lansdowne

ATTACHMENT 2

Bylaw 3891, 'A Bylaw for the administration and regulation of public sewers,'
Section 2 subsections (3) and (4)

(3) Where the Municipality has on its own initiative installed or is installing a new sewer main the purpose of which is to separate an existing combined sewer system into individual storm sewer and sanitary sewer systems an owner whose property was previously served by the said combined sewer and whose property was connected to the combined sewer by a combined lateral, shall within one year from the date the Engineer certifies that new sewer main is operational, separate the combined lateral serving the property into individual storm sewer and sanitary sewer laterals and make the necessary connections to the public sewer.

(4) In the event of the owner failing to apply and pay all required fees for the necessary connection to the public sewer within sixty (60) days after being notified in writing by the Engineer to do so, without limiting any other recourse or remedy available to the Municipality the Engineer may cause the Municipality, by its workers or others, to have the required work completed at the expense of such owner including but not limited to the fees set out in Schedule "A", the invoice for which if unpaid on the 31st day of December next ensuing shall be added to and form part of the taxes payable in respect of the property served by the connection as taxes in arrears.

*(**Bylaw 4333, adopted Dec. 11/06)*

ATTACHMENT 3

Potential Locations for On-site Rainwater Management

Traffic Island Beach Drive/Midland Road

Midland Undeveloped Road Right of Way at Lansdowne Road