



Report to: Development Services Committee

Meeting Date: February 27, 2017

SUBJECT: Class Environmental Assessment Study - Markham Road Sanitary Sewer & Fairtree Sewage Pumping Station and Forcemain Improvements

PREPARED BY: Reza Fani, Manager Development Engineering, ext: 2414
Farshed Kawasia, Senior Development Engineer, ext: 2069

RECOMMENDATION:

- 1) That the report entitled “Class Environmental Assessment Study - Markham Road Sanitary Sewer & Fairtree Sewage Pumping Station and Forcemain Improvements” be received;
- 2) That the preferred option identified through the Schedule ‘B’ Class Environmental Assessment Study for Markham Road Sanitary Sewer and Fairtree Sewage Pumping Station and Forcemain Improvements (the “Class EA Study”) , and outlined in this report be endorsed;
- 3) That staff be authorized to file the Project File Report for the Class EA Study in accordance with the Environmental Assessment Act;
- 4) That the upgrades to the existing Fairtree Sewage Pumping Station (SPS) and related infrastructure as well as construction of new sanitary sewer infrastructure be 100% funded from the benefiting developers;
- 5) That subject to the satisfactory screening of the Project File Report, the recommended option be implemented by the benefitting developers in phases as described in this report;
- 6) And that staff be authorized and directed to do all things necessary to give effect to this resolution.

PURPOSE:

The purpose of this report is to:

- inform Development Services Committee of the recommendations of the Class EA Study,
- seek Council’s endorsement of the preferred option identified through the Class EA Study,
- request authorization to file the Project File Report in the public record in accordance with the Municipal Class Environmental Assessment process, and,
- request authorization to work with the benefiting developers to implement the preferred option at their cost.

BACKGROUND:**Markham Road Sanitary Sewer**

The Markham Road sanitary sewer services a catchment area of approximately 1,000 hectares of lands. There are still a number of sites within the catchment area that will be redeveloped. The sewer conveys flows, including those from the Fairtree Sewage Pumping Station, northerly to the existing York Durham Sanitary Sewer (YDS). The location of the sewer and its catchment area are shown in Attachment A.

Fairtree Sewage Pumping Station (SPS)

The existing Fairtree Sewage Pumping Station (SPS), located at 6300 Steeles Avenue East, was constructed in 2002 to service the Villages of Fairtree subdivision. The station currently has capacity of 115 L/s and a catchment area of approximately 47 hectares, most of which have already been developed. The existing Villages of Fairtree subdivision (Phases 1, 2, 3, 5 and portion of Phase 4), west of Morningside Creek, discharges a design peak flow of 74 L/s to the Markham Road sanitary sewer by way of the Fairtree SPS.

There are two major landowners, Forest Bay Homes and Remington Group, who are assessing servicing options to develop their respective “East Village” and “Parkview” plans of subdivision located east of Morningside Creek. The East Village site proposes approximately 832 units and the Parkview site has a potential for approximately 1,878 units. Together, the two sites will have a combined equivalent population of approximately 9,200 persons generating a design sanitary sewage peak flow of approximately 125 L/s.

As part of the draft plan application for the East Village Plan of Subdivision, the developer’s consulting engineer (Masongsong Engineering and Associates) completed a functional servicing report. That report concluded that due to the existing topography of the lands within the East Village Subdivision and Morningside Creek bisecting the East Village and the existing Villages of Fairtree community, there are very few options available to provide sanitary servicing for the East Village development. Existing gravity sewers along Denison Street and Kirkham Drive, west of Morningside Creek, are neither sized to accommodate the new development, nor are they of sufficient depth to receive flows from the proposed East Village by gravity. Accordingly, the report recommended that sewage flows generated by the East Village be directed to the Fairtree SPS. Due to similar constraints, it is also recommended that the future flows from the Parkview development be directed to the Fairtree SPS.

The existing Fairtree SPS will need to be upgraded to provide an additional capacity of 85 L/s to accommodate the East Village and Parkview subdivisions.

Municipal Class Environmental Assessment

A Municipal Class Environmental Assessment (Class EA) is a decision making and planning process that identifies all impacts associated with a project and ensures that they

are managed or mitigated properly prior to the implementation of the project. The proposed upgrade of the Fairtree SPS requires that a Class EA be undertaken. At its meeting on September 16, 2014, Council authorized staff to carry out the Class EA, and in April 2015, staff issued a Request for Proposal (the "RFP"). The RFP was subsequently awarded to GM BluePlan, and a notice of commencement was issued to the various public agencies, neighboring residents and stakeholders of the proposed undertaking on March 24, 2016.

OPTIONS/ DISCUSSION:

Study Undertaken as a Schedule B Project of Municipal Class Environmental Assessment Process

GM BluePlan undertook the Class EA Study in accordance with the requirements of Schedule B of the Municipal Class Environmental Assessment process. This process included public and review agency consultation, evaluation of options, an impact assessment of the recommended option, and identification of measures to mitigate potential adverse effects.

Six servicing options and their variations were identified and evaluated using the following factors:

- Socio-economic;
- Cultural environment;
- Natural environment;
- Transportation; and,
- Construction costs.

The servicing options are outlined in the table below and in more detail in Attachment B to this report.

Option	Key Features
Option1: Upgrade Fairtree Pumping Station + install forcemain / gravity sewer along Steeles Avenue / Markham Road	<ul style="list-style-type: none"> - Twin forcemains on Steeles Avenue and Markham Road - Upgrade pumping station - Gravity sewer on Markham Road - Tunneling construction method
Option 2 :Upgrade Fairtree Pumping Station + install forcemain / gravity sewer along Steeles Avenue / Eastvale Drive (open cut construction)	<ul style="list-style-type: none"> - Twin forcemain on Eastvale Drive - Abandon existing forcemain - Upgrade existing pumping station - Open cut construction method (forcemain)
Option 3 :Upgrade Fairtree Pumping Station + install forcemain / gravity sewer	<ul style="list-style-type: none"> - Twin forcemains on Eastvale Drive - Abandon existing forcemain - Upgrade existing pumping station

along Steeles Avenue / Eastvale Drive (tunnel construction)	- Tunnel construction (forcemain)
Option 4(4a and 4b): Upgrade Fairtree Pumping Station + install forcemain along Kirkham Drive + (4a)- gravity sewer connection to Markham road sewer through Denison Street (4b)- gravity sewer connection to Markham road sewer through Kirkham Drive	- Twin forcemains within new road on future developed lands connecting either Denison Street or Kirkham Drive - Upgrade existing pumping station
Option 5: Maintain existing Fairtree Existing Pumping Station + Build a New Pumping Station + forcemain / gravity sewer along Kirkham Drive	- Twin forcemains within new road on future developed lands connecting either Denison Street or Kirkham Drive - Maintain existing pumping station - Build an additional new pumping station at a location adjacent to Morningside Creek
Option 6: Decommission existing Fairtree Pumping Station + Build a New Pumping Station + forcemain / gravity sewer along Kirkham Drive	- Twin forcemain within new road on future developed lands connecting either Denison Street or Kirkham Drive - Decommission existing pumping station - Build a new pumping station at a location adjacent to Morningside Creek

GM Blue Plan Assessed the System Capacity to Accommodate New Developments

As part of the evaluation of the options, GM BluePlan completed a capacity analysis of the existing sanitary sewer infrastructure to determine whether sufficient capacity exists to accommodate the new developments.

Key findings from the capacity analysis indicated that:

- The Fairtree SPS and forcemain are operating within the design capacity under existing conditions to service the existing Villages of Fairtree subdivision west of Morningside Creek, but will require upgrading to support future development; and,
- Sections of the Markham Road Sewer do not have sufficient capacity to support growth in the catchment area.

The capacity analysis confirmed that upgrades will be required to the existing sanitary infrastructure to support new development within the Fairtree SPS catchment area and Markham Road corridor.

Upgrading Fairtree SPS and Forcemain is the Recommended Option

The evaluation of the options resulted in Option 4b being recommended as the preferred option. This option consists of the following:

- a) Upgrading the existing Fairtree SPS to provide a firm capacity of 200 L/s;
- b) Constructing a new sanitary gravity sewer and twin forcemains crossing Morningside Creek; and,
- c) Constructing new twin sanitary forcemains along the proposed Kirkham Drive extension and, a new gravity sewer along existing Kirkham Drive and connecting it to an existing gravity sanitary sewer on Markham Road.
- d) Decommissioning the existing Force Main and parts of the existing Fairtree SPS.

The recommended option was selected due to the following benefits:

- a) Elimination of infrastructure construction on Steeles Avenue East and along Markham Road;
- b) Co-ordination with, and approval by York Region will be minimal as the required new infrastructure will be restricted to only the gravity sewer crossing Markham Road;
- c) A major portion of the twin forcemains will be constructed within the proposed East Village subdivision thus eliminating disruption and inconveniences to existing residents during construction;
- d) Construction impacts on Kirkham Drive will be limited to a small number of businesses;
- e) The capital and operating costs are comparable with other options; and
- f) No requirement for an additional pumping station within East Village subdivision and thus avoiding additional property and operating cost.

Both Forest Bay Homes and Remington Group were consulted throughout the Class EA process, and both have expressed their support for the recommended option.

NEXT STEPS:**Schedule B Screening Process**

Subject to Council approval, the Project File Report will be filed on public record for a minimum 30-day review period.

During this review period, a member of the public, an interest group, or government agency may review the contents of the Project File. If they feel that significant issues have not been addressed in the Project File Report, and a higher level of assessment is required, they can request that the Minister of the Environment and Climate Change issue a Part II Order. The Minister has four options to respond to a Part II Order request. They are:

- refer the matter to mediation before making a decision;
- deny the request;

- deny the request but impose conditions; or,
- require the proponent to comply with the Part II Order.

If there are no requests for Part II Order or no objections received, then the project is approved under the Environmental Assessment Act and may proceed.

Implementation of the Recommended Option

The construction of the required upgrades to the Fairtree SPS, the twin forcemains and gravity sewer along Kirkham Drive will be constructed in two phases to coincide with the development phasing of the East Village as follows:

Phase 1:

Phase 1 will need to be designed and constructed with the first phase of the East Village subdivision. The Phase 1 works include:

- Design and construct a new sanitary sewer crossing Morningside Creek;
- Design and construct new twin forcemains crossing Morningside Creek to be operational in Phase 2;
- Design and construct new twin forcemains within East Village subdivision from Steeles Avenue to the existing terminus of Kirkham Drive, to be operational in for Phase 2; and,
- Design and construct interim upgrades to the Fairtree SPS to service Phase 1 (561 units) of East Village subdivision. The detailed design of the interim upgrades will be prepared by the developer's consultant engineer and will be submitted to City staff for review and approval.

Phase 2:

Phase 2 will need to be designed and constructed to service further phases of the East Village subdivision or the Parkview subdivision. The Phase 2 works include:

- Design and construct the ultimate upgrades to the Fairtree SPS. The detailed design of the ultimate pumping station will be prepared by the developer's consulting engineer and submitted to City staff for review and acceptance;
- Design and replace the existing sanitary sewer with a larger sewer from the existing terminus of Kirkham Drive and, connect it to the existing sanitary sewer on Markham Road; and,
- Decommission parts of the existing Fairtree SPS and the existing forcemain going west from the Fairtree SPS to Markham Road.

FINANCIAL CONSIDERATIONS:

Six options were considered as outlined under Attachment B.

- Options 1, 2, 3 & 4 include upgrading the existing pumping station.

- Option 5 recommends keeping the existing pumping station and adding a second pumping station in the East Village subdivision.
- Option 6 recommends decommissioning the existing station and building a brand new station in the East Village subdivision. Therefore, the capital cost of \$11.7M to \$13.2M includes a one-time decommissioning cost of \$0.5M.
- Under all options:
 - the capital cost will be 100% funded by the benefitting developers;
 - the useful life for a pumping station is 40 years;
 - the operating and maintenance (O&M) cost is \$90,000 per year per pumping station.

Option 5 will require annual O&M cost for 2 pumping stations and require the capital replacement for two stations. Option 6 will require land acquisition costs that are not known.

Table 1 outlines the financial implications for each of the six options.

Table 1

Option	Useful Life (in years)	Capital Cost (A)	Replacement Cost (B)	Annual Operating & Maintenance Cost (C)	Total Cost over 40 years D = B + (C x 40 yrs)
#1	40	\$14.3M	\$14.3M	\$0.09M	\$17.9M
#2	40	\$12.0M - \$13.0M	\$12.0M - \$13.0M	\$0.09M	\$15.6M - \$16.6M
#3	40	\$16.0M - \$17.0M	\$16.0M - \$17.0M	\$0.09M	\$19.6M - \$20.6M
#4a & b	40	\$11.1M - \$12.6M	\$11.1M - \$12.6M	\$0.09M	\$14.7M - \$16.2M
#5	40	\$8.0M - \$9.6M	\$16.0M - \$19.2M	\$0.18M	\$23.2M - \$26.8M
#6	40	\$11.7M - \$13.2M	\$11.2M - \$12.7M	\$0.09M	\$15.3M - \$16.8M

In summary, Staff recommends Option 4b (Upgrade existing pumping station + forcemain along Kirkham Drive + Connection to Markham Road through Kirkham Drive) since it has the lowest capital cost and the lowest total costs over 40 years (replacement cost and annual O&M costs) while fulfilling the technical requirements.

Option 4b

Capital Costs

The upgrades required for the recommended sanitary system, under Option 4b, will be implemented in phases as explained on page 6. The capital cost to undertake the upgrades is estimated between \$9.1M and \$10.6M (refer to Table 1 and Attachment B). The completed Fairtree SPS is anticipated to have a useful life of 40 years and therefore there will have no impact to the Lifecycle & Capital Reserve in the next 25 years.

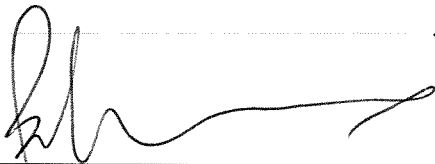
Operating Costs

The benefitting developers will be responsible for the costs to operate and maintain the Upgrades while they are under the warranty period(s). Upon completion of all necessary

City inspection(s), correction of all found deficiencies by the developer, and the expiry of all warranty period(s) of the ultimate Upgrades, the City will assume the Fairtree SPS. The annual operating and maintenance cost (O&M) is estimated to be \$90,000 (2017 Index) and will be funded through the Waterworks operating budget at the time of assumption by the City. The O&M includes utilities, labour, equipment maintenance, and disposable materials (e.g. resin required for odour control systems). The anticipated assumption date is estimated to be 2025. The timing of assumption is dependent on developer schedules and market conditions and therefore the assumption date may change.

BUSINESS UNITS CONSULTED AND AFFECTED:

This report was reviewed by Environmental Services and Finance departments, and their comments have been incorporated into this report.

RECOMMENDED BY:

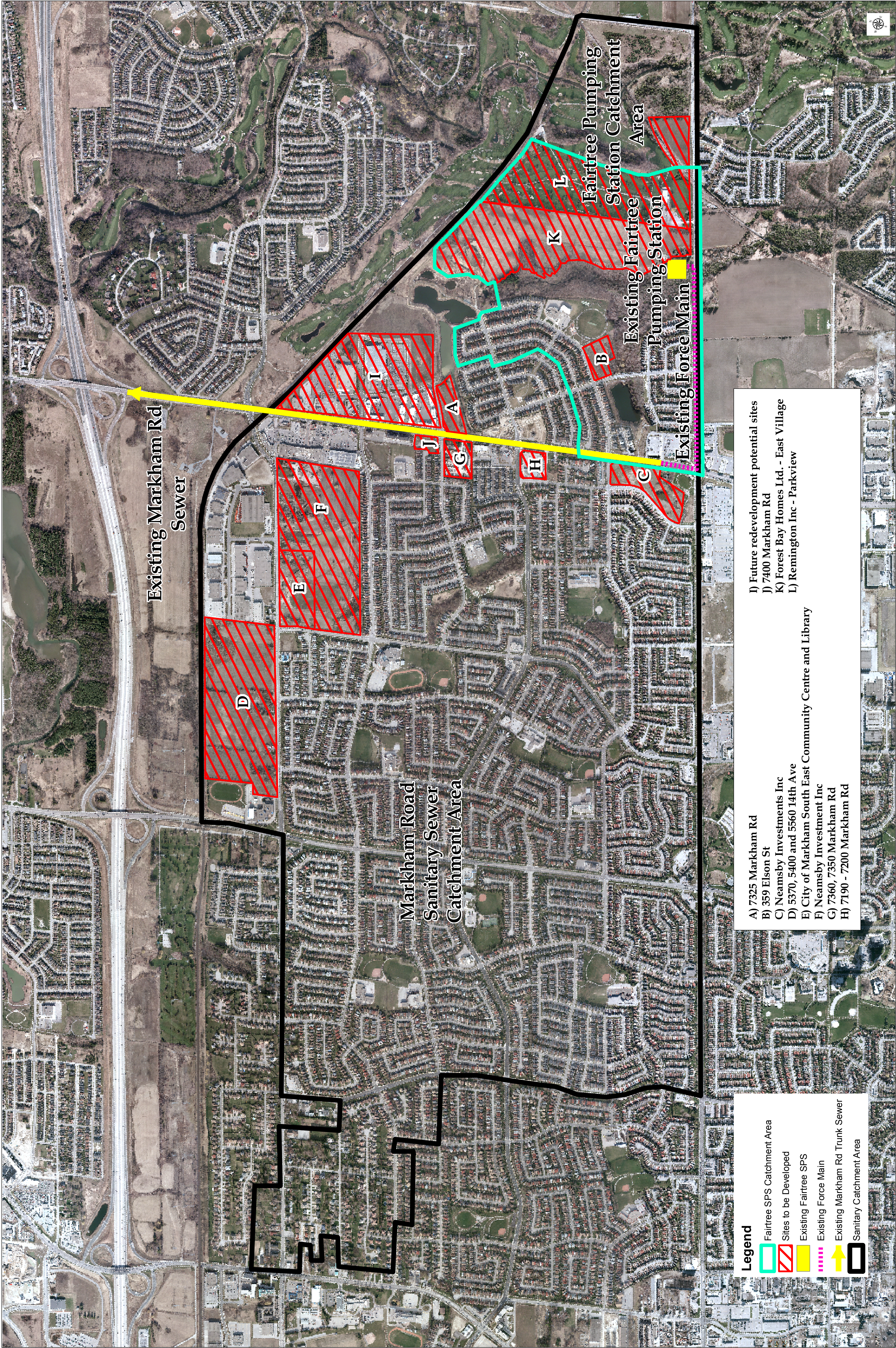
Brian Lee, P.Eng.
Director of Engineering



Jim Baird, M.C.I.P., R.P.P.
Commissioner, Development
Services

ATTACHMENTS:

- Attachment A – Markham Road sanitary sewer catchment area and redevelopment areas
- Attachment B – Class EA Options
- Attachment C – Recommended Alignment of forcemain and sanitary sewer



Attachment B- Summary of the Evaluation of Servicing Strategies

Servicing Strategy Options		Evaluation Factors			
	Technical	Financial	Legal / Jurisdictional	Environmental	Socio / Cultural
Option 1	<ul style="list-style-type: none">Maximizes use of existing infrastructure - uses existing forcemainMeets capacity for future growthModest financial and scheduling risk , assuming tunnel construction methodProvides good access to forcemain and sewer	<ul style="list-style-type: none">Estimated capital cost of \$14.3 millionEstimated replacement cost of \$14.3 millionEstimated operations and maintenance costs of \$90,000Useful life 40 years	<ul style="list-style-type: none">Requires additional City of Toronto and York Region coordination for sewer and forcemain within rights-of-wayYork Region has indicated that it is opposed to this option because of the impacts on Markham Road	<ul style="list-style-type: none">No significant environmental impacts anticipated	<ul style="list-style-type: none">Potential traffic impacts to residents who regularly commute along Markham RoadPotential impact on local residents who use Markham Road to access local homes and businessesPotential impact on Eastvale and Denison residents who may experience spillover traffic resulting from Markham Road delays
Option 2	<ul style="list-style-type: none">Abandons existing forcemainMeets capacity for future growthScheduling risks generally high resulting from challenge to avoid conflicts with utilitiesAdditional stormwater feature crossing may require mitigation	<ul style="list-style-type: none">Estimated capital cost of between \$12.0 and \$13.0 millionEstimated replacement cost of between \$12.0 and \$13.0 millionEstimated operations and maintenance cost of \$90,000Useful life 40 years	<ul style="list-style-type: none">Likely requires wider easement on Steeles Avenue between the pumping station and Eastvale to accommodate twin forcemainAlignment will require infrastructure within the City of Toronto right-of-way from the pumping station to Eastvale Avenue	<ul style="list-style-type: none">No significant environmental impacts anticipated	<ul style="list-style-type: none">Road construction on Eastvale and Denison will result in significant conflicts posed by local residents whose homes directly front both roadsPotential traffic, safety, dust and noise impacts along Eastvale and Denison where several homes front both roads
Option 3	<ul style="list-style-type: none">Abandons existing forcemainMeets capacity for future growthScheduling risks generally high resulting from challenge to avoid conflicts with utilitiesMinimal impact of stormwater feature as a result of tunneling	<ul style="list-style-type: none">Estimated capital cost of between \$16.0 and \$17.0 millionEstimated replacement cost of between \$16.0 and \$17.0 millionEstimated operations and maintenance costs of \$90,000Useful life 40 yearsReplacement of existing forcemain results in some inefficiencies	<ul style="list-style-type: none">Likely requires wider easement on Steeles Avenue between the pumping station and Eastvale to accommodate twin forcemainAlignment will require infrastructure within the City of Toronto right-of-way from the pumping station to Eastvale Avenue	<ul style="list-style-type: none">No significant environmental impacts anticipated	<ul style="list-style-type: none">Road construction on Eastvale and Denison will result in conflicts posed by local residents whose homes directly front both roads, although tunneling (as opposed to open cut method) will somewhat limit the community impacts
Option 4 (4a- portion of twin forcemains through Denison Street) (4b- entire twin forcemains through Kirkham Drive)	<ul style="list-style-type: none">Abandons existing forcemainNo sections on City of Toronto and York Region right-of-way will limit the need for coordinationMeets capacity for future growthModest financial and scheduling risk , assuming improvements are made simultaneously to planned Remington collector road	<ul style="list-style-type: none">Estimated capital cost of between \$11.1 and \$12.6 millionEstimated replacement cost of between \$11.1 and \$12.6 millionEstimated operations and maintenance costs of \$90,000Useful life 40 yearsReplacement of existing forcemain results in some inefficiencies	<ul style="list-style-type: none">Minimal coordination required with other jurisdictions as a majority of the improvements would be undertaken on private land or within local right-of-way	<ul style="list-style-type: none">No significant environmental impacts anticipated, although this option will require up to two crossings of Morningside Creek (two crossings for Denison; one crossing for Kirkham)	<ul style="list-style-type: none">Construction will result in potential access and mobility for only a limited number of businesses along Kirkham or DenisonNo sections on City of Toronto and York Region ROW will result in the need for minimal coordination
Option 5	<ul style="list-style-type: none">Existing pumping station to remain and an additional pumping station to be constructed to the east of Morningside CreekNo sections on City of Toronto and York Region right-of-way will limit the need for coordinationMeets capacity for future growth within pumping stations and forcemains; however does not	<ul style="list-style-type: none">Estimated capital cost of between \$9.6 and \$8.0 millionEstimated replacement cost of between \$9.6 and \$8.0 millionRequires costs associated with acquiring propertyEstimated operations and maintenance costs of \$180,000 for two (i.e. existing and new) pumping stations	<ul style="list-style-type: none">Minimal coordination required with other jurisdictions as a majority of the improvements would be undertaken on private land or within local right-of-way	<ul style="list-style-type: none">No significant environmental impacts anticipated	<ul style="list-style-type: none">Construction will result in potential access and mobility for only a limited number of businesses along Kirkham or DenisonNo sections on City of Toronto and York Region ROW will result in the need for minimal coordination (except as it relates to location of new pumping station)

Servicing Strategy Options	Evaluation Factors				
	Technical	Financial	Legal / Jurisdictional	Environmental	Socio / Cultural
	address capacity constraints within sewer on Markham Road <ul style="list-style-type: none">Some delivery risk by constructing a new pumping station on a new site	<ul style="list-style-type: none">Useful life 40 yearsReplacement of existing forcemain results in some inefficienciesLong term maintenance cost will be high due to two sanitary pumping station			
Option 6	<ul style="list-style-type: none">Existing pumping station to be decommissioned and an additional pumping station to be constructed to the east of Morningside CreekNo sections on City of Toronto and York Region right-of-way will limit the need for coordinationMeets capacity for future growthModest delivery risk - with sewer crossing Morningside Creek and constructing a new pumping station on a new site	<ul style="list-style-type: none">Estimated capital cost of between \$11.2 and \$12.7 millionEstimated replacement cost of between \$11.2 and \$12.7 millionRequires costs associated with acquiring propertyEstimated operations and maintenance costs (\$90,000)Decommission existing pumping station (estimated cost is \$500,000)Useful life 40 yearsReplacement of existing forcemain results in some inefficiencies	<ul style="list-style-type: none">Minimal coordination required with other jurisdictions as a majority of the improvements would be undertaken on private land or within local right-of-way	<ul style="list-style-type: none">No significant environmental impacts anticipated, although this option will require up to two crossings of Morningside Creek (two crossings for Denison; one crossing for Kirkham)	<ul style="list-style-type: none">Construction will result in potential access and mobility for only a limited number of businesses along Kirkham or DenisonCoordination with the City of Toronto and York Region may be required along a small section of Steeles Avenue where future plans exist to widen it to six lanes

Rating System Legend

High	Most Preferred
Medium	Moderately Preferred
Low	Least Preferred



City of Markham

Schedule "B" Class Environmental
Assessment Markham Road
Sanitary Sewer & Fairtree Sewage
Pumping Station and Forcemain
Improvements

Attachment C -
Recommended Alignment

Existing Infrastructure

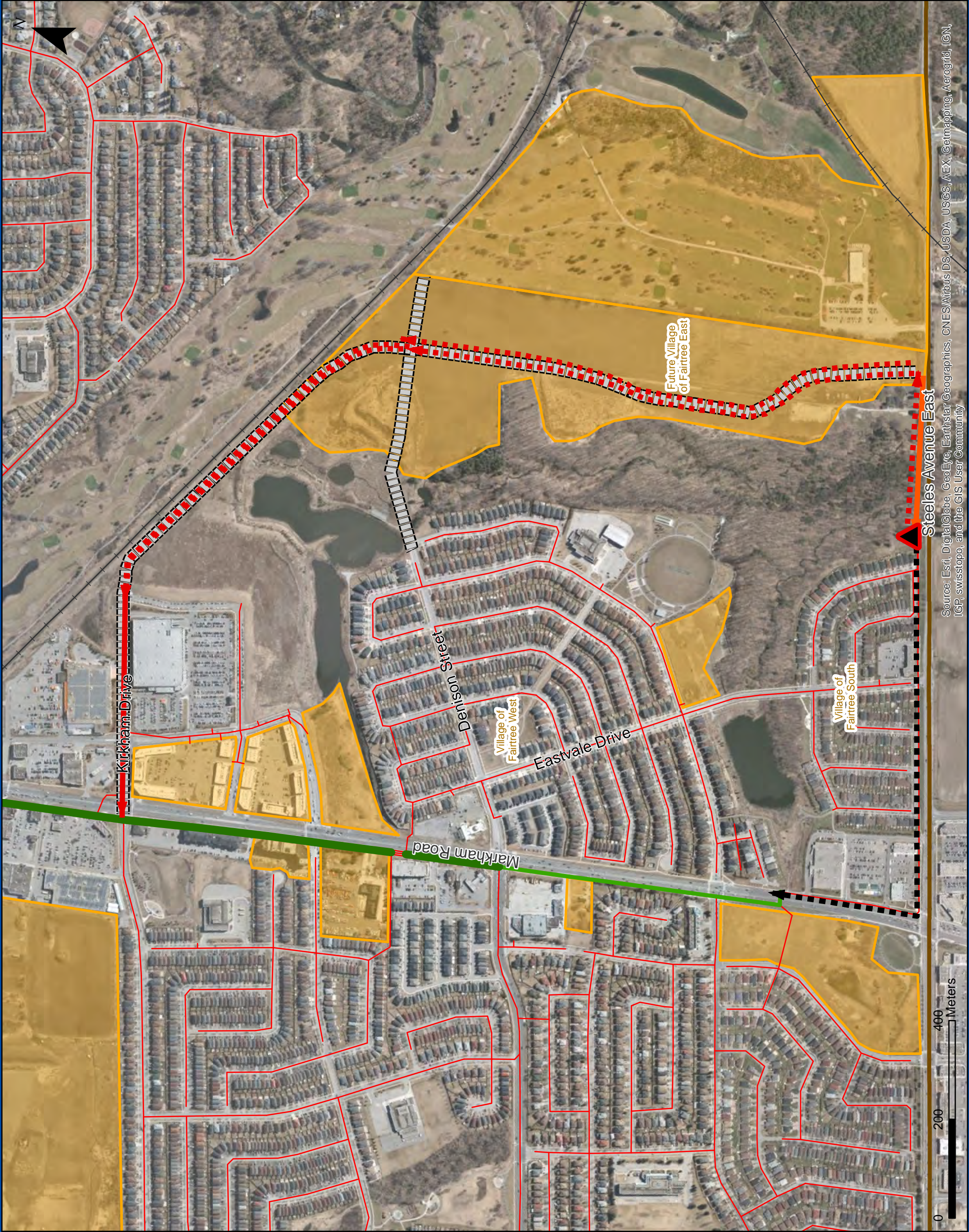
- Fairtree SPS
- Existing Sewers
- 450mm Markham Road Sewer
- 900mm Markham Road Sewer
- Existing Forcemain (to be abandoned)

Proposed Infrastructure

- Proposed Upgraded SPS
- Proposed Forcemain
- Proposed Gravity Sewer
- Proposed Creek Crossing by Gravity Sewer
- Proposed Road for Planned Subdivision
- Planned Growth- 2031



714080-84-VWV
January 2017
Data Source: City of Markham, York Region, ESR
Scale: 1:7,543 | NAD 1983 UTM Zone 17N



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community