

The Regional Municipality of York

Committee of the Whole
Environmental Services
June 10, 2021

Report of the Commissioner of Environmental Services

West Vaughan Sewage Servicing Construction Support Fee Increases

1. Recommendation

Council authorize the Commissioner of Environmental Services to increase the value of the existing contract with Delcan-Geodata Joint Venture by \$12,700,511.70 for additional contract administration and site inspection services for construction of the Humber Sewage Pumping Station and West Vaughan Trunk Sewer Tunnel Phase 1.

2. Summary

This report seeks Council approval to increase existing contract fees with Delcan-Geodata Joint Venture for construction contract administration and site inspection services for the Humber Sewage Pumping Station and West Vaughan Trunk Sewer Tunnel Phase 1. Changes are required as a result of revised construction timing and extended duration along with a significantly different implementation plan than originally planned at the time of contract award in 2014.

Council approval is required as the proposed new total contract cost will exceed contingency and scope change thresholds respectively outlined in the Purchasing Bylaw.

Key Points:

- The West Vaughan Sewage Servicing Project will deliver critical infrastructure required to accommodate approved population growth within the servicing boundaries to the year 2031 and projected population growth to the year 2051
- Following a competitive bidding process, the detailed design, contract administration and site inspection services contract for the West Vaughan Sewage Servicing Project was approved by Council on [September 11, 2014](#) and awarded to Delcan-Geodata Joint Venture
- Even with the increase and changes to construction timing and duration of work, the revised contract administration and site inspection costs are well within industry ranges for this type of work and are lower than the contract administration and site inspection costs as a percent of capital for the previously completed Southeast Collector

- Estimates developed prior to the contract award indicated the entire project, including design and construction, was to be completed over a 72-month period from September 2014 through March 2021 with a single construction contract
- In 2014, the 2015 budget and 10-year capital plan were approved with revised infrastructure timing, which included the West Vaughan Sewage Servicing project
- The 2015 10-year capital plan deferred completion of the West Vaughan Trunk Sewer Tunnel Phase 1 from 2020 to 2028 and completion of the Humber Sewage Pumping Station expansion from 2020 to 2025. Phase 2 of the Tunnel was deferred beyond the current 10-year capital plan (See Attachment 1)
- The revised infrastructure completion timing has required changes to the design approach, construction scheduling and number of construction contracts
- To avoid increased design costs and to have the project ready for tender if funding was made available for an earlier construction commencement date, staff worked diligently to complete detailed design and monitored required changes to construction support services based on further potential construction timing changes
- The Humber Sewage Pumping Station is scheduled to begin construction in 2021 and be in service by 2025. The West Vaughan Trunk Sewer Tunnel Phase 1 is scheduled to begin construction in 2023 and be in service by 2028. Given these pending dates, restructuring and increases to existing contract fees for contract administration and site inspection services are now required
- The revised construction strategy allows the Region to manage risk and servicing needs in the entire Humber sewershed, while also aligning infrastructure spending more closely to growth needs in West Vaughan

3. Background

West Vaughan Sewage Servicing Project delivers critical infrastructure to provide capacity for approved and projected population growth

The West Vaughan Sewage Servicing Project includes construction of critical infrastructure including the new Humber Sewage Pumping Station to expand existing capacity and a trunk sewer from the Kleinburg Water Resource Recovery Facility to the Humber Sewage Pumping Station. Upon completion of the entire West Vaughan Sewage Servicing Project, servicing capacity will be available to accommodate growth in the West Vaughan area to 2051.

The sewer begins at the Humber Sewage Pumping Station and runs north just west of Islington Avenue to Highway 7. At Highway 7, the sewer alignment runs west to Highway 27. North of Highway 7, the alignment follows Highway 27 to Rutherford Road. At Rutherford Road, the sewer meets with the sewer branch which runs westerly to Huntington Road. North of Rutherford Road, the sewer continues north to terminate at Kleinburg Water Resource Recovery Facility (See Attachment 1).

Engineering design and construction support services contract awarded to Delcan-Geodata Joint Venture in 2014

Following a competitive bidding process, the detailed design, contract administration and site inspection services contract for the West Vaughan Sewage Servicing Project was awarded to Delcan-Geodata Joint Venture on September 11, 2014 for \$26,960,620.33, excluding HST. The next lowest bidder submitted a total cost of \$42,090,839.46. Since 2014, additional design changes and change requests from the Region have increased the contract by \$2,126,139.31 to a new total of \$29,086,759.64, excluding HST.

The original plan assumed delivery of the West Vaughan Sewage Servicing Project through a single construction contract. Estimates developed prior to contract award, indicated the entire project design and construction was to be completed over a 72-month period from September 2014 through March 2021, with a two-year warranty period following completion. The following milestones were developed based on the limited information available at the time:

- 100% design completion - March 27, 2017
- Construction tender award - June 30, 2017
- Construction completion - March 31, 2021
- End of two-year warranty - March 31, 2023

Based on these milestones, the original schedule identified (absent of any detailed design information) the duration of the entire construction period to be 3.75 years.

Approved 2015 capital budget deferred construction completion timing for West Vaughan Sewage Servicing Project

In late 2014, Environmental Services adjusted its 10-year capital plan to align infrastructure completion more closely with development timing. As presented in the 2015 budget approved by Council at its meeting on February 26, 2015, the Capital Plan decreased by \$680 million, mainly by deferring completion of several projects including West Vaughan Sewage Servicing.

The 2015 10-year capital plan deferred completion of the Humber Sewage Pumping Station expansion from 2020 to 2025 and West Vaughan Trunk Sewer from 2020 to 2028. Phase 2 of the Tunnel was deferred beyond the current 10-year capital plan. The Humber Sewage Pumping Station is required earlier to accommodate growth in the entire sewershed and minimize risk in the system. Due to revised construction timelines and to accommodate approved population growth within servicing boundaries to the year 2031 and projected population growth to the year 2051, changes to design approach, scheduling, and number of construction contracts were required as follows:

1. Humber Sewage Pumping Station - construction to be completed by 2025
2. Tunnel Phase 1 - western, central and southern tunnel segments to be completed by 2028
3. Tunnel Phase 2 - northern tunnel segment to be completed beyond 2034

Following construction completion deferral, staff worked diligently to complete detailed design and maintain a state of project readiness for tender

Following construction completion deferral, staff evaluated approaches to manage disruption to the design schedule. As part of the capital deferral, staff committed to Council to continue with all preconstruction activities unabated should fiscal circumstances change. To avoid increases in design costs due to labour escalation from the deferral, and potentially higher costs to complete design under a separate design procurement, staff continued to advance the design and planned to re-establish project construction support service requirements at a time when schedule timing was more certain.

Staff worked diligently with Delcan-Geodata Joint Venture to complete design, property acquisition and permitting and have the project ready to be tendered if funding was made available for an earlier construction commencement date. Detailed design for the Humber Sewage Pumping Station and Tunnel Phase 1 is now complete. The Humber Sewage Pumping Station contract is planned to be tendered in 2021. At this time, it is appropriate to restructure and increase existing contract fees for contract administration and site inspection services based on the final design and implementation plan.

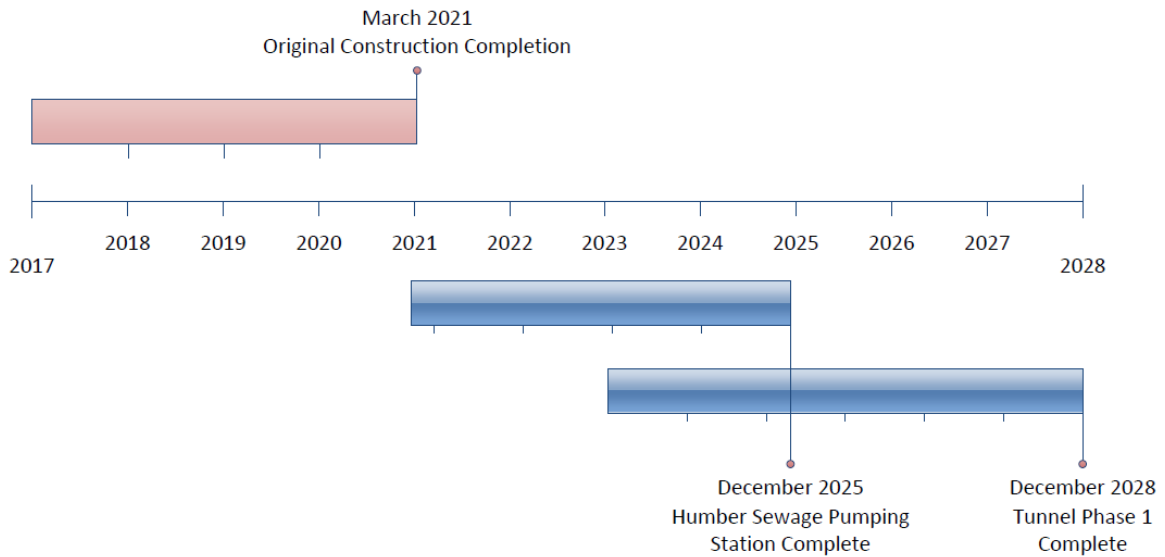
4. Analysis

Revised construction sequencing and design advancement requires extended construction duration

The detailed design, contract administration and site inspection services contract for the West Vaughan Sewage Servicing Project was awarded in 2014 on the basis of a single construction contract being delivered over 3.75 years from 2017 to 2021. Since 2014, detailed design of the project has advanced to provide an informed and achievable construction duration estimate, reflecting the complete project scope, complexity, and delivery strategy, including the requirement for deferred completion of the works (i.e. 2025 for the Humber Sewage Pumping Station and 2028 for the Tunnel Phase 1).

The plan to phase the construction contracts sequentially will help meet servicing objectives and will also extend the duration of construction when compared to completing the work for both contracts in parallel. This approach will allow the Humber Sewage Pumping Station to be completed three years earlier, which is critical for growth and service reliability in the entire sewershed, beyond the West Vaughan servicing area. As shown in Figure 1, construction of the Humber Sewage Pumping Station will begin in 2021 and be in service by 2025 for a construction duration of approximately four years. The Tunnel Phase 1 work is scheduled to begin in 2023 and be in service by 2028 for a construction duration of approximately five years. Given the two-year overlap between the contracts and additional time, the combined construction duration is approximately seven years.

Figure 1
West Vaughan Sewage Servicing Construction Contract Timeline



Duration of the Tunnel Phase 2 construction contract is not considered at this time as contract administration and site inspection services will be procured separately by the Region when the actual construction timeframe is set in the future.

Extending construction duration from 3.75 to 7 years requires additional effort for contract administration and site inspection services

Since construction completion was deferred in 2014, the Region and Delcan-Geodata Joint Venture team have assessed options to amend design and construction services to suit revised timelines and implementation plans. This assessment included evaluating costs for contract administration and site inspection services for both the Humber Sewage Pumping Station and Tunnel Phase 1 based on the new construction sequencing.

The 2014 Terms of Reference specified full-time construction support staffing for the duration of a single construction contract for the entire works at a fee of \$12.7 million over 3.75 years. This was to be accomplished with three tunnel drives undergoing simultaneous construction. Due to the revised timing and sequencing, construction support will now take place over a period of seven years. This is an increase in total construction duration by 3.25 years. Two additional years for sequencing of Humber Sewage Pumping Station and Phase 1 Tunnel construction as seen in Table 1 plus 1.25 years now that the tunnel drives cannot be completed simultaneously. This increase to the construction duration would cost an additional \$12,700,511.70 making the new total cost \$41,487,271.34 excluding HST. This is lower than the total cost submitted by the next lowest bidder (\$42,090,839.46) in 2014.

Table 1
Contract Administration and Site Inspection Fee Increases

Construction Changes	Additional Years	Fee Increase (\$ million)
Sequencing of Two Contracts	2	\$6.5
Change in Tunnel Drive Approach	1.25	\$4.0
Escalation due to Time Delay		\$2.2
Total	3.25	\$12.7

Regional staff expended a significant amount of time negotiating with Delcan-Geodata to establish fair costs for the revised construction sequencing and duration in order to find value for the Region. Staff focussed on the following to ensure an optimized outcome:

- Efficient staffing of contract administration and site inspection personnel based on level of activity on each contract
- Site inspection staffing for specific construction activities when needed rather than the full duration of construction
- Ensuring ancillary support services during construction aligned with timing and effort required rather than dedicating full time personnel for the full duration of construction

Including escalation, the resources-optimized approach requires an additional estimated \$12.7 million more than the original contracted fees for contract administration and site inspection. Staff believes this represents good value to deliver construction services required for the West Vaughan Sewage Servicing Project. See Table 1 for the breakdown.

Costs for contract administration and site inspection services for West Vaughan Sewage Servicing are lower than Southeast Collector Trunk Sewer Project

The Southeast Collector Trunk Sewer Project, completed in 2017, is a useful comparator in the analysis of construction support fees as both projects have a similar scope of work. Table 2 summarizes the cost for contract administration and site inspection services in relation to each project’s capital cost. The estimate for contract administration and site inspection services as a percentage of capital costs for the West Vaughan Sewage Servicing Project is 7.9%, which is less than the 10.9% for the Southeast Collector Trunk Sewer Project and represents good value to the Region.

Table 2
Comparison with Southeast Collector Trunk Sewer Project

Project	Capital Cost (\$ million)	Contract Administration and Site Inspection Services Cost (\$ million)	Contract Administration and Site Inspection Services percent of Capital
Southeast Collector*	\$405	\$44.3	10.9%
West Vaughan Sewage Servicing**	\$320	\$25.4	7.9%

*Southeast Collector Trunk Sewer Project major contracts included: Construction: \$336.4M, Segments: \$28.9M, Tunnel Boring Machines: \$36M, Haul Roads: \$4.5M

**West Vaughan Sewage Servicing capital cost includes West Vaughan Tunnel Phase 1 and Humber Sewage Pumping Station and is based on 90% detailed design cost estimates for this infrastructure.

5. Financial

The total estimated construction cost for the Humber Sewage Pumping Station and Tunnel Phase 1 is \$320 million. With total engineering services increased to \$41,787,271.34, this represents an engineering fee of 13% of the construction cost, well within an acceptable range for services on construction projects of this magnitude and is good value to the Region. Considering this fee also includes the design for the Tunnel Phase 3, this further increases the value to the Region.

The recommended contract fee increases are summarized in Table 3. There is sufficient budget and Capital Spending Authority in the approved 2021 Environmental Services' 10-year capital plan to accommodate the construction services fee increase.

Table 3
Contract Summary

Description	Cost (\$), excluding HST
Existing Total Contract	\$29,086,759.64
Additional Contract Administration and Site Inspection for Humber Sewage Pumping Station and Tunnel Phase 1*	\$12,700,511.70
Revised Total Contract	\$41,787,271.34

* Contract administration and site inspections services for Tunnel Phase 2 are not included as these services will be procured separately by the Region when the construction timeframe is set.

6. Local Impact

The West Vaughan Sewage Servicing Project's objective is to provide sustainable and cost-effective sewage servicing solutions for communities in the West Vaughan area to accommodate approved population growth within servicing boundaries to the year 2031 and projected population growth to the year 2051.

By adopting the recommendation in this report, the Region will meet the project objective while addressing the challenges associated with the deferred and extended construction timelines.

7. Conclusion

Due to the construction completion deferral and the changed project delivery approach resulting in multiple contracts and a longer construction duration, a new contract fee structure is required to extend contract administration and site inspection fees. To achieve the targeted project milestones with construction completion for the Humber Sewage Pumping Station by 2025 and West Vaughan Trunk Sewer Tunnel Phase 1 by 2028, it is recommended that the Commissioner of Environmental Services be authorized to restructure and increase the existing contract with Delcan-Geodata Joint Venture by \$12,700,511.70, including escalation, for a new revised contract value of \$41,787,271.34, excluding HST.

For more information on this report, please contact Mike Rabeau, Director, Capital Planning and Delivery at 1-877-464-9675 ext. 75157. Accessible formats or communication supports are available upon request.

Recommended by:



Erin Mahoney, M. Eng.

Commissioner of Environmental Services

Approved for Submission:



Bruce Macgregor

Chief Administrative Officer

May 21, 2021
Attachment (1)
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