AGLG
AUDIT REPORT
MARCH 24, 2020

AUDITOR GENERAL FOR LOCAL GOVERNMENT

ACCESSIBILITY • INDEPENDENCE • TRANSPARENCY • PERFORMANCE

LOCAL GOVERNMENT'S ROLE IN ENSURING CLEAN DRINKING WATER

TOWNSHIP OF LANGLEY REPORT #2 OF 2

MANAGING WATER SUPPLY INFRASTRUCTURE TO MEET CURRENT AND FUTURE DEMAND

An independent assurance audit carried out by the Auditor General for Local Government of British Columbia

MESSAGE FROM THE AUDITOR GENERAL FOR LOCAL GOVERNMENT

To the mayor and council of the Township of Langley,

I am pleased to present this second performance audit report on the Township of Langley's drinking water services, focusing on management of water supply infrastructure to meet current and expected future demand.

Our performance audits are independent, unbiased assessments, carried out in accordance with professional standards. They aim to determine the extent to which the area being examined has been managed with due regard to economy, efficiency and effectiveness.

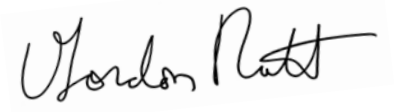
Our audit included four objectives, three of which were included in a previous report, released in August 2019. This report outlines our findings relating to asset management and managing the construction and implementation of the Township's drinking water supply infrastructure to meet your intended objectives.

In reviewing the findings outlined in this report, I was encouraged by the commitment the Township has shown to ensuring that your drinking water infrastructure will be able to meet current and future demand. The major project reviewed as part of the audit process (East Langley Water Supply project) was completed, although later than originally expected.

In addition to noting the Township's successes, this report describes some areas where there are gaps in the Township's approach to managing water supply infrastructure. It is my hope that you will find this report helpful in addressing those areas where we have identified that there is room for improvement to the Township's project management processes.

I encourage you to carefully review this report as you consider ways to strengthen your ability to continue to successfully meet the needs of your community for drinking water.

Thank you for your co-operation during the performance audit process and for your response to our findings and recommendations.



Gordon Ruth, FCPA, FCGA
Auditor General for Local Government
Surrey, B.C.

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EXECUTIVE SUMMARY

1. We conducted this audit under the authority of the *Auditor General for Local Government Act* and in accordance with the standards for assurance engagements set out by the Chartered Professional Accountants of Canada (see the "About the Audit" section for more information).

2. This is the second of two reports on this audit, focusing on the question: Did the Township of Langley manage its water supply infrastructure to meet current and expected future demand? Findings and recommendations related to the other three objectives were included in the report titled *Local Government's Role in Ensuring Clean Drinking Water, Township of Langley,* published in August 2019.

3. The overall purpose of this performance audit was to provide an objective, independent examination of the Township of Langley's drinking water services to determine if the local government provides clean and safe drinking water where and when needed.

WHAT WE EXAMINED

4. We examined a range of different factors related to the Township's asset management activities and the construction, implementation and maintenance of the Township's drinking water supply infrastructure. We examined the Township's East Langley Water Supply project, which concluded during the audit period. We examined relevant documentation and data and we held discussions with key management staff, elected officials and a range of stakeholders.

WHAT WE FOUND

5. Overall, the Township was dedicated to identifying, developing and maintaining its drinking water infrastructure to meet current and expected future demand and ensure the sustainability of its drinking water. The Township completed a major capital infrastructure project – the East Langley Water Supply (ELWS) project – and was in the process of developing its asset management program.

6. The completion of the ELWS project was significantly later than initially projected and we identified a number of areas for improvement in the Township's approach to capital project management. Changes to the Township's capital project management processes will help ensure the success of its water supply and other infrastructure projects in the future.

EAST LANGLEY WATER SUPPLY PROJECT

7. We reviewed the East Langley Water Supply (ELWS) project, which aimed to bring water from Greater Vancouver Water District supply mains to Aldergrove. The Township largely achieved its objectives of providing an additional source of water to Aldergrove and providing security of supply. The Township targeted project completion by December 2011, but did not deliver water to Aldergrove until September 2016.

8. The Township calculated that it delivered the project for $35.38 million, which was $533,781 under the Township's total allocation of $35.92 million for the project's financial life cycle. The cost was less than four estimates that were developed during the project's conceptual design.

9. The project did not have an approved baseline budget. Instead, the Township used a series of cost estimates for decision-making and allocated funds on an annual basis to cover estimated project costs. Without a baseline budget to use as a reference point, measurement of the project's financial performance is difficult.

CAPITAL PROJECT MANAGEMENT

10. The Township developed a business case for the project, which was reported to council in 2009. Subsequent cost estimates provided by design consultants provided more detailed route and cost options. The Township also prepared a project charter but did not appoint a project board or steering committee to oversee the management of the project, document the responsibilities of the project sponsor or formally develop and approve a project plan.

11. The Township chose a design-bid-build delivery method. The Township made this decision as a result of its experience with that delivery method.

12. The Township did not have a documented requirement for minimum standards of internal project reporting, for example, from the project manager to project sponsor to council.

13. The Township considered risks associated with capital projects, but did not have documented procedures, policies or protocols associated with the identification, evaluation, treatment, monitoring, or reporting of project risk. The Township kept a record of costs associated with the project (change orders, purchase orders and invoices) that tracked spending and commitments but did not forecast spending to project completion.

PROJECT PROCUREMENT

14. The Township followed its procurement policy in the initial procurement for the design, construction management, and construction of the project. However, it decided to end its agreement with the consultant after Phase 1 and awarded a contract for Phase 2 and 3 to another proponent that had responded to the original request for proposal process, based on an amended version of their original proposal. This award process was not clear or well documented and had several weaknesses.

SCHEDULING & PROJECT TIMELINES

15. The project charter identified a target project completion date of Dec. 31, 2011; however, it did not identify any major project milestones or reference an approved baseline project schedule. Progress schedules were provided by the construction contractors periodically during construction, but not every month. Although the Township monitored construction contractor progress against their contractual commitments, progress was not tracked or reported internally against a baseline project schedule.

ASSET MANAGEMENT & WATER SUPPLY INFRASTRUCTURE

16. The Township had a corporate asset management policy, a water asset management plan, a corporate strategic asset management plan, risk and criticality model and a water master plan. Some of these documents were out of date and others would benefit from enhancements.

17. The Township had a systematic preventative maintenance program customized to each type of water system infrastructure and it regularly monitored and inspected its assets. The Township also reported on major asset renewal and replacement in its annual water quality report.

Exhibit 1 – SUMMARY OF RECOMMENDATIONS

1. The Township of Langley should develop and follow minimum standards for project governance, defining:

- When to require a project board or steering committee
- Project board membership and terms of reference
- Potential participants for each project stage
- Roles and responsibilities
- Guidelines related to stage gate review process
- Evaluation processes related to project delivery method selection
- Meeting protocols defining the type and frequency of meetings, and required participants for different project phases

2. The Township of Langley should develop a documented planning procedure to identify and assess the specific staff resources required for capital projects based on the scope and complexity of each project.

3. The Township of Langley should ensure project charters are complete and kept up-to-date throughout the project.

4. The Township of Langley should consider developing a project plan template as a tool for leading projects of high-value, high risk and/or public significance.

5. The Township of Langley should broaden and formalize its approach to capital project risk management. This could include developing a policy and procedure that includes requirements for:

- Risk identification
- Risk assessment
- Monitoring and reporting of risks
- Ensuring project contingency development is tied to risk management

6. The Township of Langley should develop guidance for how project scope is defined and how project scope change is authorized and implemented.

7. The Township of Langley should develop a policy and procedure that outlines the process for development, approval, management and reporting of budgets for capital projects that includes guidance on:

- Developing and managing financial contingencies
- Establishing baseline budgets
- Engagement of external cost consultants
- Minimum standards for cost reporting against budgets
- Financial control procedures

8. For future projects, the Township of Langley should ensure it:

- Develops an appropriately detailed baseline schedule at the time of project chartering
- Defines processes for management of project schedules
- Regularly receives and reviews progress reports against the baseline schedule

9. The Township of Langley should regularly review and update its procurement policy to align with evolving procurement practices and relevant trade agreements.

10. The Township of Langley's purchasing department should monitor its procurement activities and ensure they are well documented and comply with its purchasing policies and procedures.

11. The Township of Langley should develop and implement a policy and related processes and tools to formally and systematically evaluate vendor performance.

12. The Township of Langley should define reporting requirements for capital projects to ensure that those accountable for the performance of a project receive regular and consistent status updates, including:

- Internal reporting to the project sponsor and council
- Frequency and content of reports from contract administrators

13. The Township of Langley should develop a stakeholder engagement plan and procedures for its capital projects.

14. The Township should consider developing a project close-out procedure and related checklist.

15. The Township of Langley should further develop its asset management practices for water infrastructure by:

- Reviewing and implementing relevant areas of its strategic asset management plan and five-year road map
- Updating its asset management plan and water master plan
- Reporting system performance against defined levels of service
- Aligning its long-term capital plan with long-term asset management planning

16. The Township of Langley should consider improving its tracking of infrastructure maintenance, renewal and replacement activities by internally reporting on the status of work orders relative to its maintenance schedule.

INTRODUCTION

18. This report presents the results of one of four objectives of a performance audit conducted by the Auditor General for Local Government of British Columbia (AGLG) under the authority of the *Auditor General for Local Government Act*. The audit was performed in accordance with the standards for assurance engagements set out by the Chartered Professional Accountants of Canada (see the About the Audit section for more information).

19. We conducted this audit under the audit theme "Environmental Programs and Services." Sound environmental management is of interest to all local governments and the public at large. How local governments use and manage resources for this is a growing area of challenge that affects public health and safety.

20. We initially selected the City of Kelowna and the Regional District of Okanagan-Similkameen to be included in this set of audits and later added the Township of Langley as a third auditee on this topic. These three auditees represent different forms of local government (two municipalities and one regional district), located in two different regions of the province. Some of the water systems in these jurisdictions depend on surface sources, while others depend on groundwater.

21. The overall purpose of this performance audit was to provide an objective, independent examination of the Township of Langley's drinking water services to determine if the local government provides clean and safe drinking water where and when needed.

22. This is the second of two reports on this topic in the Township of Langley. It focuses on one of four audit objectives. Findings and recommendations related to the other three objectives were included in the report titled *Local Government's Role in Ensuring Clean Drinking Water, Township of Langley*, published in August 2019. Please see the About the Audit section for detailed information on the audit objectives and criteria.

23. In this report, we set out to answer the following question:

- Did the Township of Langley manage its water supply infrastructure to meet current and expected future demand?

24. To answer this question, we examined the Township's approach to asset management and infrastructure maintenance and replacement and focused on its development of a significant piece of drinking water infrastructure that was intended to address challenges related to the Township's groundwater supply: the East Langley Water Supply project.

25. We examined relevant documentation and data and we held discussions with key management staff, elected officials and a range of stakeholders. We also made observational visits to the Township's water utility.

26. The period covered by the audit is Jan. 1, 2016 through Dec. 31, 2018; we also reviewed documents created prior to 2016 that remained current during the audit period or were related to the Township's planning and management of the capital project we reviewed.

OUR EXPECTATIONS

27. We would expect a local government to effectively manage the water systems for which it is responsible to ensure drinking water safety and reliability over the long-term. To achieve this, we looked at whether the local government managed its infrastructure to meet current and future demands for drinking water, by:

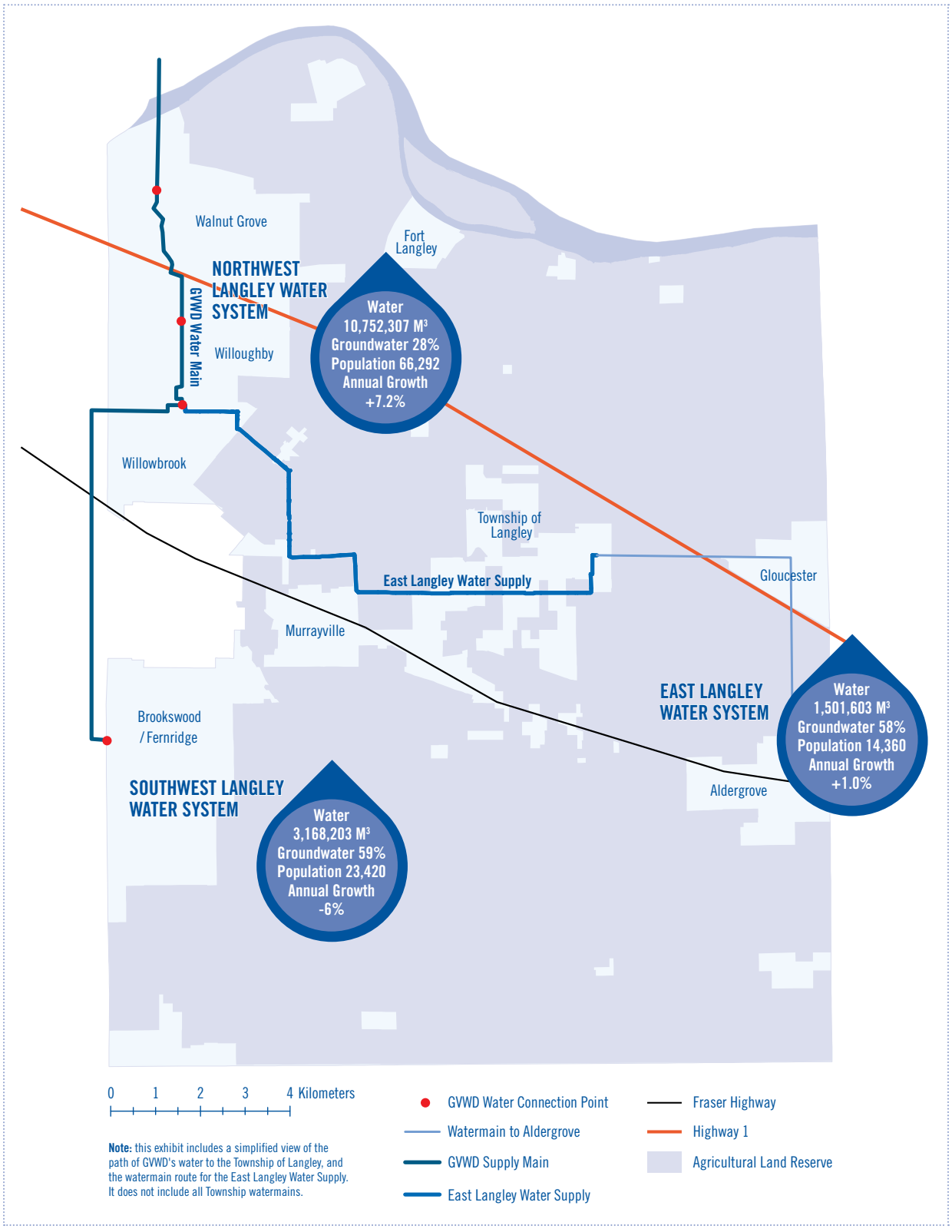
- Planning for and developing its water supply infrastructure
- Managing the construction and implementation of drinking water infrastructure projects to meet their intended objectives
- Developing a long-term asset management plan for its water supply infrastructure
- Maintaining its water supply infrastructure

28. Our examination of the Township's approach to managing the development of the East Langley Water Supply project included an assessment of the results of the project, and a review of the Township's approach to capital project management. We expected that the Township would have:

- Established clear baselines for the project's scope, schedule and budget
- Developed appropriate levels of oversight and authority for its capital project management activities
- Established and maintained oversight and reporting structures with personnel who had appropriate levels of training and experience and availability
- Documented and managed risks associated with capital projects within the local government's risk framework
- Effectively defined, developed and managed the project scope to meet the intended objectives
- Developed, approved and managed project budgets in accordance with accepted policies and procedures
- Developed, approved and monitored project and contract schedules against baselines
- Followed a well-documented, open and transparent capital procurement process
- Prepared and made available, reports that documented the progress and performance of the project relative to the established baselines
- Appropriately engaged with stakeholders during its planning and construction of capital projects

CONTEXT

Exhibit 2 – TOWNSHIP OF LANGLEY VISUAL FACTS



Note: this exhibit includes a simplified view of the path of GVWD's water to the Township of Langley, and the watermain route for the East Langley Water Supply. It does not include all Township watermains.

TOWNSHIP OF LANGLEY

29. The Township of Langley is one of 27 local governments in British Columbia's Lower Mainland, including numerous municipalities, along with the Metro Vancouver and Fraser Valley regional districts. Incorporated in 1873, the Township covers approximately 317 square kilometres, with a population of 127,290 people (2018 estimate) and a population density of 402 persons per square kilometre.

30. The Township's population grew rapidly in recent years, with annual growth rates of 3.0, 3.3 and 2.1 per cent in 2015, 2016 and 2017 respectively. This made the Township the eighth-most populous municipality in B.C., just below the City of Kelowna in population. The number of residents in the Township is projected to reach 211,000 by 2041.

31. Bounded to the south by Canada's border with the U.S.A. and to the north by the Fraser River, the Township borders the City of Langley and Surrey to the west and Abbotsford to the east. The Township also borders on Katzie, Kwantlen and Matsqui First Nations.

32. The Township is located in a coastal western hemlock zone and receives abundant rainfall and mild temperatures. Bodies of water within the Township's boundaries include the Salmon River, Upper Nicomekl River, Little Campbell River, Murray Creek, Bertrand Creek, Nathan Creek, Anderson Creek and some small lakes. Despite wetter than usual winters and springs, the Lower Fraser experienced drought level 4 (extremely dry) at times during the summer and fall of 2015 and 2017.

33. The Township of Langley local government employed a workforce of 1,595 people as of December 2018.

THE TOWNSHIP'S ROLE WITH DRINKING WATER

34. During the period covered by the audit, the Township sourced drinking water from a combination of groundwater wells that it operated, and water purchased from the Greater Vancouver Water District (GVWD). The Township operated 19 public wells, excluding wells used exclusively for park irrigation.

35. As indicated in Exhibit 3, the Township operated five distinct water systems in different locations: Northwest Langley, Southwest Langley, East Langley, Tall Timbers and Acadia.

Exhibit 3 – DESCRIPTION OF AUDITED WATER SYSTEMS

WATER SYSTEM (2018)	NORTHWEST LANGLEY	SOUTHWEST LANGLEY	EAST LANGLEY	TALL TIMBERS	ACADIA	TOTAL
Main Populations Served	Total (66,292) Walnut Grove, Fort Langley, Willoughby/ Willowbrook, Milner, Forest Knolls	Total (23,420) Brookswood-Fernridge, Murrayville, High Point	Total (14,360) Aldergrove, Gloucester Industrial Estates, Salmon River Uplands	75 homes	24 homes	approximately 104,386 served
Water Sources	Wells and GVWD	Wells and GVWD	Wells and GVWD	Wells	Wells	Wells and GVWD
Number of Township Wells	2	5	7	3	2	19
m^3 of Water Supplied (2017)	10,752,307	3,168,203	1,501,603	25,804	8,693	15,456,610
% of Water from Wells (2017)	28%	59%	58%	100%	100%	42%
Type of Water Treatment	Chlorine or sodium hypochlorite	Chlorine or sodium hypochlorite	Chlorine or sodium hypochlorite and filtration	Chlorine or sodium hypochlorite	Chlorine or sodium hypochlorite	
km of Mains						524
Infrastructure						12 pump/ booster stations 10 distribution reservoirs 1 treatment plant for East Langley water only

36. In total, the Township provided water to an estimated 104,386 people or approximately 82 per cent of its residents, mostly urban and semi-urban. In addition, approximately 5,000 private wells provided water to the remaining residents, predominantly in the community's more rural areas.

Exhibit 4 – TOWNSHIP OF LANGLEY'S WATER SYSTEMS REVENUE AND EXPENDITURES ($000)

	REVENUE	TOTAL EXPENSES	SURPLUS
2014	$20,383	$19,482	$901
2015	$26,032	$17,342	$8,690
2016	$24,137	$16,391	$7,746
2017	$25,458	$18,141	$7,317
2018	$30,258	$24,987	$5,271

Sources: Township of Langley Audited Annual Reports

37. Exhibit 4 shows revenue and expenditure information for the Township's water utility from 2014 to 2018. Staff told us that revenue and expenditure figures fluctuated mainly due to the timing of the East Langley Water Supply project.

DRINKING WATER INFRASTRUCTURE

38. Two capital projects led to significant water infrastructure changes during the period covered by the audit. In 2016, the East Langley Water Supply project connected East Langley and Salmon River Uplands Water System to water supplied by the Greater Vancouver Water District. In 2017, the Township connected the formerly private Nectar Water System into its existing system and absorbed its customers.

EAST LANGLEY WATER SUPPLY PROJECT

39. For this report we focused on the East Langley Water Supply capital project (ELWS). The ELWS project was first conceived in a 2005 engineering study that identified a commitment by the Township to upgrade the sewer to Aldergrove by 2009 and extend the water supply from the Greater Vancouver Water District (GVWD) to Aldergrove by 2012. This study identified a pipeline to bring purchased water from GVWD as the most efficient approach to deliver water to Aldergrove. The engineering study was associated with work on the Township's Aldergrove Community Plan, which identified Aldergrove downtown as a growth area to 2041.

FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY OF FINDINGS

40. We set out to determine whether – during the period covered by the audit – the Township of Langley managed its water supply infrastructure to meet current and expected future demand.

41. We previously reported on three additional objectives, which are not covered in this report:

- The Township had a governance structure and activities that supported the provision of clean and safe drinking water where and when needed
- The Township managed its drinking water supplies to meet current and expected future demand
- The Township ensured the safety and reliability of drinking water provided through its treatment and distribution systems

42. Overall, the Township was dedicated to identifying, developing and maintaining its drinking water infrastructure to meet current and expected future demand. This was part of its efforts to ensure the sustainability of its drinking water. The Township completed and made operational a major capital infrastructure project – the East Langley Water Supply (ELWS) project – and was in the process of developing its asset management program.

43. Although the Township delivered the ELWS project, its completion was significantly later than the Township had initially projected. We identified several areas where the Township's approach to capital project management should be improved, such as defining and monitoring against project baselines, gaps in written project management policies or guidelines and weaknesses in its procurement policy and one of the procurement processes we examined.

44. The following sections describe our expectations, audit findings and recommendations related to:

- The objectives and results of the ELWS project
- The Township's approach to capital project management for the ELWS
- The Township's approach to asset management and maintaining its water supply infrastructure

45. We have provided several recommendations that include the development of policies, procedures and/or guidance related to different aspects of capital project management. The Township may wish to combine these recommendations to create an overall guidance document, but we have kept them separate in this report as each is tied to a different finding. We hope that these will assist the Township in managing its major capital infrastructure projects and infrastructure assets, including those related to providing drinking water.

EAST LANGLEY WATER SUPPLY PROJECT - OBJECTIVES & RESULTS

TOWNSHIP'S OBJECTIVES FOR THE EAST LANGLEY WATER SUPPLY PROJECT

46. The Township identified that aquifers used to provide drinking water to Aldergrove had declining water levels and that the water extraction levels from the aquifers were not sustainable. The ELWS project was conceived of in an engineering study in 2005 associated with the development of the *Aldergrove Community Plan*. The study stated the Township's commitment to upgrade the sewer to Aldergrove by 2009 and the water supply by 2012.

47. The proposed project involved conveying water from Greater Vancouver Water District supply mains to Aldergrove. In December 2008, the project was identified as the top infrastructure priority for the Township during a special meeting of council.

48. The ELWS project charter identified the project objectives as "to construct a new water supply system to Aldergrove from Willoughby via Murrayville to achieve security of supply for the Aldergrove water system by Dec. 31, 2011."

49. The project included installing approximately 14 kilometres of pipeline and constructing a booster pump station. The Township divided the design of the project into three separate contracts and construction into three phases:

- Phase 1 – Installation of approximately seven kilometres of pipeline from 73rd Avenue and 204th Street to the site of a booster station in Murrayville at 52nd Avenue and 224th Street
- Phase 2 – Construction of a booster pump station in Murrayville and a pressure reducing valve station
- Phase 3 – Installation of approximately seven kilometres of pipeline from the Murrayville pump station to the pre-existing water network at 56th Avenue and 250th Street

PROJECT RESULTS

50. Measurement of project outcomes can include establishing whether the project met its intended objectives. The Township achieved the objective of providing an additional source of water to Aldergrove. Its objective to provide security of supply was also achieved. This audit did not review the overall level of performance of the ELWS.

51. The Township's objective targeted project completion by December 2011. However, the Township did not deliver GVWD water to Aldergrove until September 2016. There were a range of factors that contributed to the gap between the original target and project completion. This audit does not include an account of these factors, and instead focuses on the processes that the Township had in place for its management of the project. See Exhibit 6 for a visual representation of the key milestones within the project's timeline.

PROJECT PERFORMANCE AGAINST BASELINES

52. Measurement of project performance involves comparing of actual performance against defined and approved project baselines for scope, schedule and budget. The Township did not prepare or approve baselines for project schedule or budget; however, it identified a high-level project scope that, after further development, council approved.

Scope

53. The project scope, as defined in the ELWS project charter, was "to construct a new water supply system to Aldergrove from Willoughby via Murrayville to achieve security of supply for the Aldergrove water system. The Township delivered the scope of the ELWS project as defined in the project charter.

Schedule

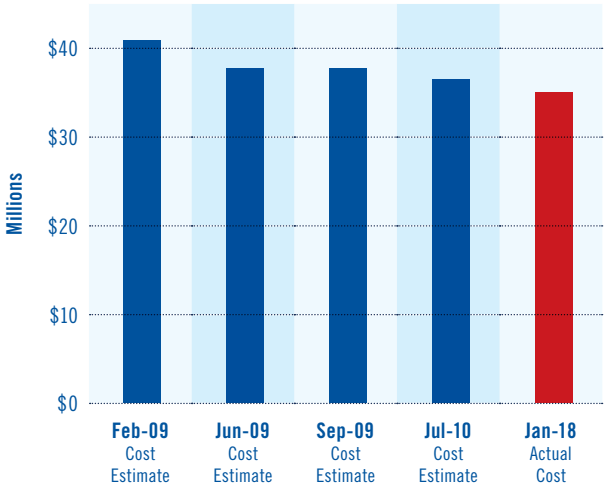
54. The Township did not prepare or approve a baseline project schedule for the ELWS project. The Township did have some planning schedules associated with construction contracts. The project experienced significant construction delay, particularly during Phase 3. As mentioned previously, completion was not achieved until September 2016.

Project Costs

55. The Township calculated that it delivered the project for $35.38 million which was $533,781 under the Township's total allocation of $35.92 million for the project's financial life cycle.

56. The ELWS project did not have an approved baseline budget. Instead, the Township used a series of cost estimates for decision-making and allocated funds on an annual basis to cover estimated project costs for each year.

Exhibit 5 – PROJECT COST PERFORMANCE RELATIVE TO ESTIMATES

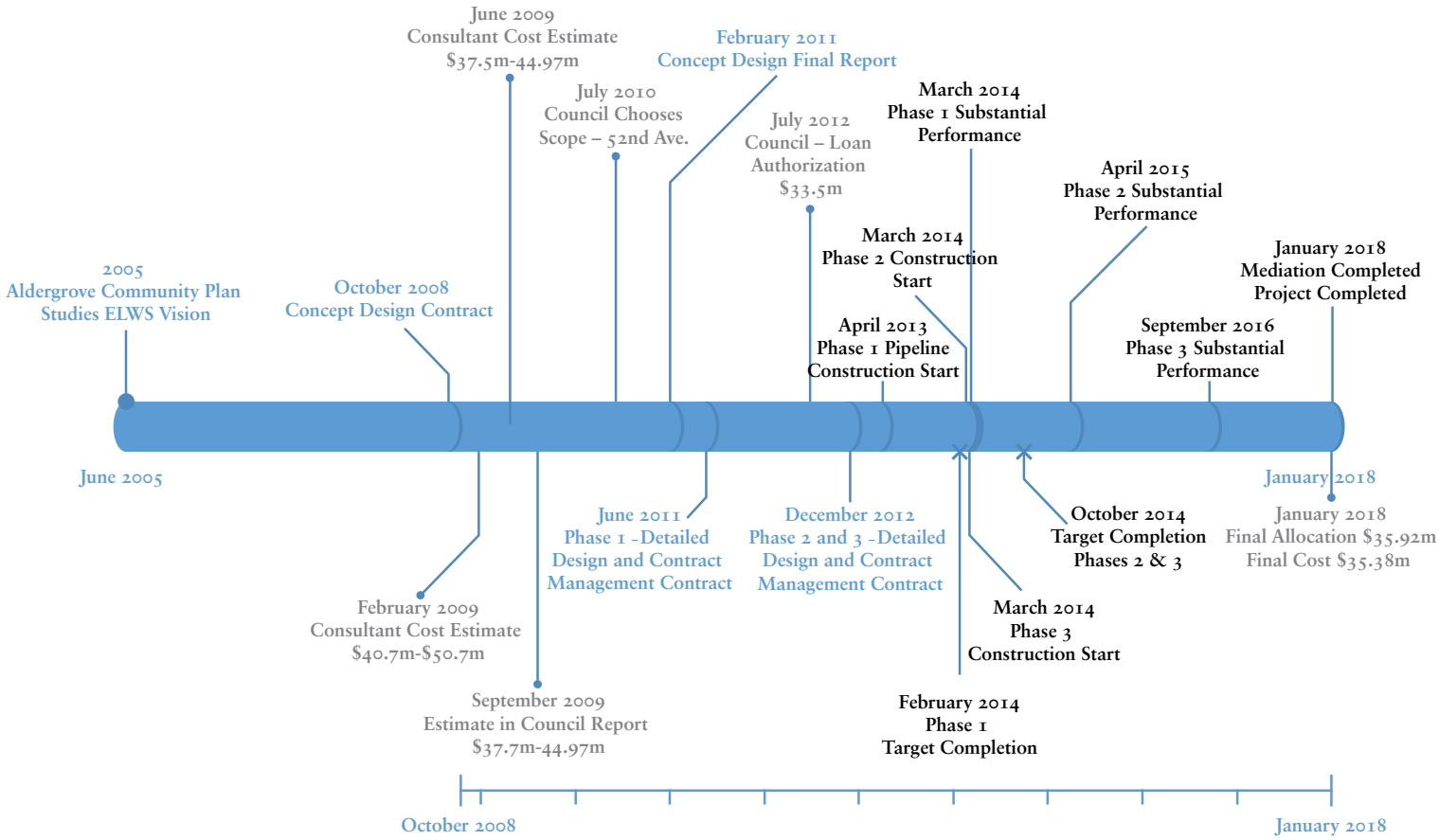


57. Cost estimates represent the forecasted cost to deliver the project. These forecasts should be compared against the approved budget throughout the life of the project to establish whether the project is expected to be delivered within budget. Without an approved baseline budget to use as a reference point, measurement of the project's financial performance is less transparent.

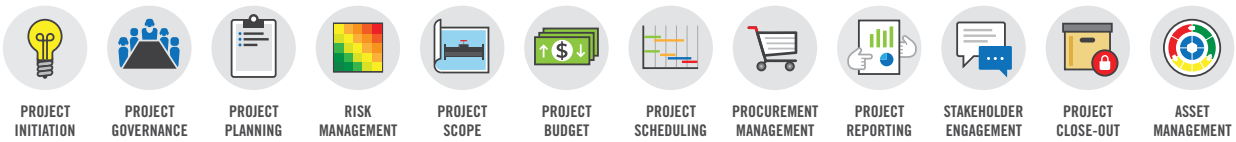
58. The Township had cost estimates for the project that ranged from $36.2 million to $40.7 million. However, it did not formally establish any of these estimates as the baseline budget for the project. In 2018, the Township calculated that it delivered the project for $35.38 million.

59. Without a baseline budget to evaluate performance, we compared the actual cost of the ELWS project with the cost estimates the Township prepared between 2009 and 2010. As identified in Exhibit 5 the project cost less than the cost estimates generated by the conceptual design consultant.

Exhibit 6 – EAST LANGLEY WATER SUPPLY PROJECT TIMELINE



CAPITAL PROJECT MANAGEMENT



PROJECT INITIATION – BUSINESS CASE DEVELOPMENT

60. Prior to starting a project, it is good practice to prepare and approve a business case that documents the economic feasibility and validity of the proposed project. The Township developed a satisfactory business case for the ELWS, which was reported to council in 2009. The business case included costs, benefits and design considerations. The business case for the project was supplemented by route and cost option reports from design consultants, which were presented to council.

PROJECT GOVERNANCE

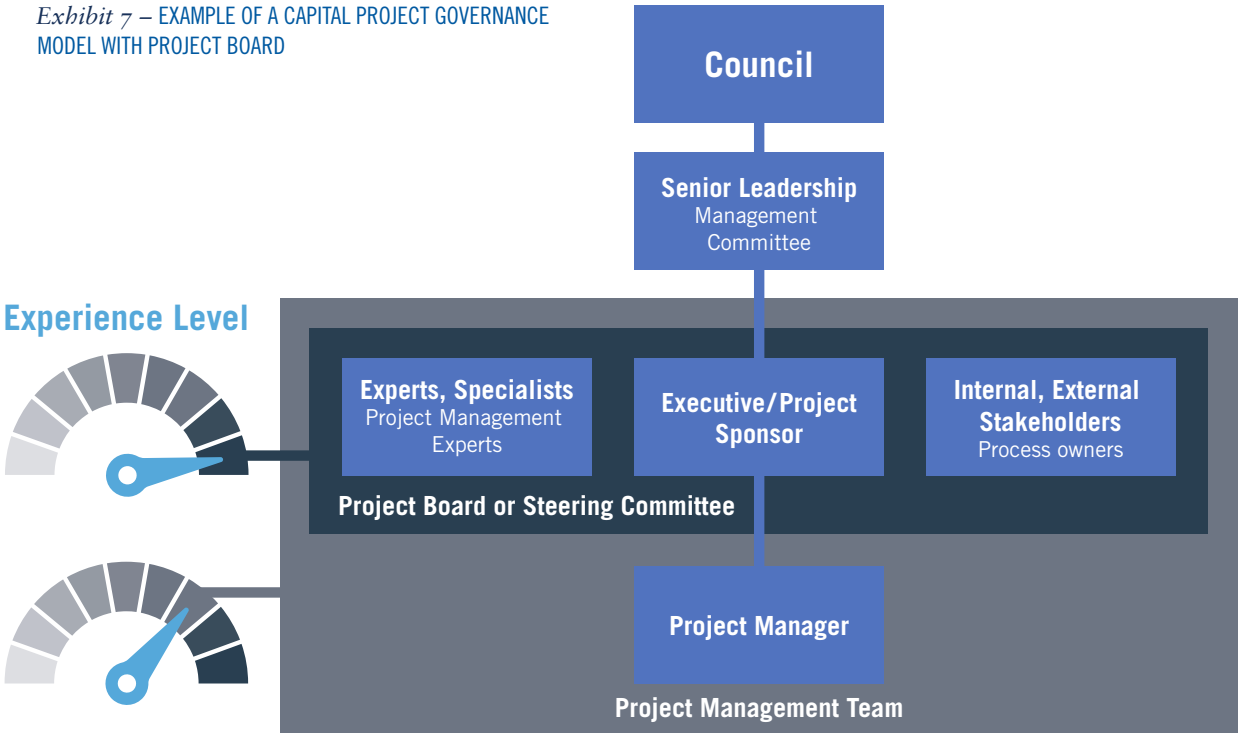
61. Project governance is the management framework that enables those accountable for a project to provide effective oversight over those responsible for its implementation. Defining and implementing an effective project governance framework is an important component of the management of capital projects. We would expect the Township to have a robust project governance structure for the ELWS project.

STRATEGIC OVERSIGHT

62. Projects that are of high-value, high-risk and/or public significance can benefit from the experienced oversight provided by a well-structured project board or steering committee. These are typically made up of the project sponsor and experienced subject matter experts or stakeholders such as specialists, process owners, legal advisers, procurement advisers and other key individuals. A project board provides operational decision-making, oversight and approval functions during the execution of the project. See Exhibit 7 for an example of a project team structure that includes a project board.

63. The Township involved staff from various departments and external legal resources to provide advice over the course of the project, but did not formally appoint a project board to oversee the management of the ELWS project. The Township also did not have a policy that defined the governance and oversight requirements of high-risk or high-value capital projects.

Exhibit 7 – EXAMPLE OF A CAPITAL PROJECT GOVERNANCE MODEL WITH PROJECT BOARD



PROJECT BOARD OR STEERING COMMITTEE

The board or steering committee is a governing body that consists of key project stakeholders and empowers them to guide the project.

- It may consist of senior representatives from the local government, including the project sponsor and various subject matter experts or practitioners such as: accountants, engineers, architects, designers or lawyers, and other internal and external stakeholders
- It is a temporary body
- It is established with a documented and approved terms of reference
- It is made up of experienced individuals able to fulfil an advisory role to the project manager

PROJECT BOARD'S ROLE

- Accountable for the success of the project
- Provides support and direction to the project manager
- Authorizes funds and provides resources for the project
- Ensures effective internal and external communication is maintained

PROJECT GOVERNANCE STRUCTURE

64. Clear definition of who is accountable and who is responsible for the project is an important component of defining the project governance structure. This process includes defining and establishing the appropriate roles, responsibility, authority and accountability structure for the project. A single point of accountability can provide clarity and consistency in decision-making for the project.

65. The Township assigned two project managers who were to be accountable for the project and defined the project sponsor along with other internal and external resources. The project team changed before the commencement of the project when the Township appointed a single project manager who reported to the project sponsor. As indicated in Exhibit 8 the project sponsor reported to the general manager of engineering and community development who in turn reported to council as necessary. However, the role and responsibilities of the project sponsor were not documented.

Exhibit 8 – THE TOWNSHIP'S PROJECT MANAGEMENT TEAM STRUCTURE

PROJECT DELIVERY METHOD SELECTION

66. Choice of the right delivery method for a project can reduce risk to a local government and can result in better cost and schedule outcomes. Each delivery method apportions risks between parties differently and has its own benefits and potential drawbacks.

67. The Township did not conduct a formal evaluation to determine the most appropriate delivery model for the ELWS project. Instead, the Township chose the project delivery method based on its experience with design-bid-build with unit pricing based on the Master Municipal Construction Documents (MMCD) Gold Edition.

PROJECT ROLES, QUALIFICATION AND TRAINING

68. Delivering successful capital projects requires that those responsible and accountable for the project have the required knowledge, experience and available time to successfully deliver the project.

69. The Township provided MMCD contract administrator training to some staff, including the project manager. However, it did not have training and development plans for its staff and did not have a set standard for required levels of training or experience for staff assuming the role of project sponsor or project manager.

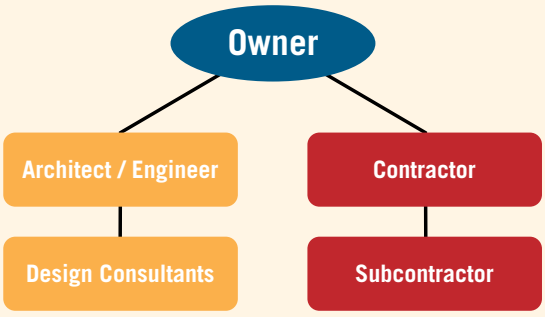
PROJECT MANAGER

70. The Township appointed a professional engineer as the project manager accountable for the ELWS project. The appointed project manager had recent experience delivering a similar but smaller project and the ELWS project was the largest project they had managed.

PROJECT DELIVERY METHODS

Capital projects can be approached through different project delivery methods, each of which offers a different set of advantages and disadvantages. Ideally, the delivery method is tailored to the unique complexities and objectives of the project in a way that apportions the risks and benefits in an arrangement suited to the local government's objectives. Choosing the best possible delivery method or methods goes a long way to creating the right conditions for the project to be completed on time and on budget.

Design-Bid-Build Project Delivery



STAGE GATE REVIEW PROCESS

A stage gate review is an evaluation process that focuses on transitions from one project phase or stage to another. The process results in a yes/no decision made by the stage-gate review team or project board, based on whether project activities have met set success criteria and addressed scope changes and risks. A stage gate review will evaluate whether:

- Successful accomplishment of phase objectives has been achieved
- Plans for the next project phase are in place and approved
- Risks associated with moving forward have been reviewed

The review process checks whether the project has adequately met all exit criteria for the project stage to permit advancing to the next stage.

RECOMMENDATION ONE

The Township of Langley should develop and follow minimum standards for project governance, defining:

- When to require a project board or steering committee
- Project board membership and terms of reference
- Potential participants for each project stage
- Roles and responsibilities
- Guidelines related to stage gate review process
- Evaluation processes related to project delivery method selection
- Meeting protocols defining the type and frequency of meetings, and required participants for different project phases

RECOMMENDATION TWO

The Township of Langley should develop a documented planning procedure to identify and assess the specific staff resources required for capital projects based on the scope and complexity of each project.

PROJECT SPONSOR

71. The Township appointed a project sponsor who had ten years of experience at the Township and was a professional engineer.

72. The Township's project manager and project sponsor both had education and experience related to managing construction projects. The Township told us that the project was of a scale that was at the limits of what it could deliver and it allocated more staff resources to the project than initially anticipated.

73. The Township did not have a documented procedure to evaluate whether it had sufficient staff resources available with the appropriate experience, training and available time to manage a project effectively.

PROJECT CHARTER

74. A project charter is a document that formally authorizes a project and grants a project manager authority to manage project activities. The project charter should be updated if there is any change in the information contained within it. The project charter should document the rationale for and key attributes of the project, including:

- Reasons for the project
- Project objectives
- Governance structure
- Main stakeholders
- High-level budget or cost estimate
- Roles and responsibilities
- Approval authorities
- Scope
- High-level schedule

75. The Township developed a project charter for the ELWS project in 2008. The charter included a project description, project objectives and defined key roles and responsibilities along with some stakeholders and a target completion date. In addition, the charter defined the financial authority limits of the project managers. However, the project charter did not include an approved project budget and was not signed by the project sponsor. During the ELWS project, there were changes in personnel acting in the role of both project manager and project sponsor but the project charter was not updated to reflect these changes.

RECOMMENDATION THREE

The Township of Langley should ensure project charters are complete and kept up-to-date throughout the project.

PROJECT PLAN

76. A project plan is a document used to guide the control, monitoring, execution and closure of a project. It includes baselines for scope, schedule and budget. A project plan helps to plan and control all activities and typically includes:

- Objectives and success metrics for the project
- Risks and risk management approaches
- Protocols for reporting
- Levels of authority for decision-making
- Roles and responsibilities of stakeholders
- Methods of communication between parties
- Document management standards
- Protocols for managing cost and schedule
- Any other standards that should be followed for the project

77. During the course of the ELWS project, the Township, its consultants and the MMCD construction contracts defined many of the components that would usually be included in a project plan, such as identification of project scope, some stakeholder identification, spending authority and some key project personnel.

78. However, the Township did not formally develop and approve a project plan and lacked a project plan template for use in high-value and/or high-risk projects.

RECOMMENDATION FOUR

The Township of Langley should consider developing a project plan template as a tool for leading projects of high-value, high risk and/or public significance.

RISK MANAGEMENT

79. A formal approach to managing project risk includes the documentation, identification, evaluation and reporting of risks, along with creating mitigation strategies for identified risks. The risk management process often includes producing a risk register listing identified risks in a matrix with other information including likelihood of occurrence and severity of impact should they occur. Proactive identification of project risks can also inform the process of allocating contingencies to cost estimates and provide a basis for contingency planning.

80. We would expect the Township of Langley to formally identify, report and manage project risks throughout the project, from initiation through project closure.

81. A risk-based approach to contract management includes identifying and mitigating risks associated with standard form contract terms and conditions. The Township used Gold edition (January 1996, revised April 2000) for all construction contracts. Township staff told us that the Township had, after the audit period, adopted the MMCD General Conditions Platinum edition (2009). The Township received legal advice when they made changes to the MMCD General Conditions through adoption of supplemental conditions.

82. The Township considered risks associated with capital projects, used MMCD standard form agreements to allocate risks between parties contractually and used insurance to treat some risks; however, it did not have documented procedures, policies or protocols associated with the identification, evaluation, treatment, monitoring, or reporting of project risk. The Township did not have templates for a project risk register or risk management plan and did not have a project risk register or risk management plan for the ELWS project.

83. As identified in the first AGLG report for this audit, the Township did not have a formal organization-wide process for identifying and managing risk. Instead it relied on each utility to handle risks in a decentralized way. Therefore, the Township was unable to integrate project risks into a broader organizational risk management framework.

RECOMMENDATION FIVE

The Township of Langley should broaden and formalize its approach to capital project risk management. This could include developing a policy and procedure that includes requirements for:

- Risk identification and risk assessment
- Monitoring and reporting of risks
- Ensuring project contingency development is tied to risk management

PROJECT SCOPE

84. Project scope is the definition of the work required to meet project objectives. A change in project scope will often impact the project schedule or cost to deliver the project. It is important to manage project scope by defining and controlling what is included in the project.

85. The Township's project charter defined the project scope as the construction of a new water supply system from Willoughby to Aldergrove via Murrayville, including a new water booster pump station. The Township further defined the project scope in a series of route option reports prepared by its conceptual design consultant. On Jul. 12, 2010, council approved the 52nd Avenue alignment from the East Langley Water Supply Route Options report as the official approved project scope.

86. The Township did not have documented protocols or procedures to control changes to the approved project scope; however, at a contract level, the Township managed scope in accordance with contract terms and conditions.

87. The Township delivered the approved project scope for the ELWS project.

RECOMMENDATION SIX

The Township of Langley should develop guidance for how project scope is defined and how project scope change is authorized and implemented.

PROJECT BUDGET AND FINANCIAL CONTROLS

88. Cost estimates, and the project budgets which they inform, define the financial commitments required to deliver a project's scope. Until a project is completed, a cost estimate always represents the best judgment available at the time. Quantity surveyors, professional engineers, design consultants and the development of detailed specifications can all help inform a "hard" project budget. In addition, including suitable contingency allowances can minimize the potential for cost overruns, if they are managed properly.

89. A project baseline budget is the initial budget allocated to delivery of a defined project scope within a defined project schedule. It defines the frame of reference against which the project's financial performance is measured.

THE TOWNSHIP'S APPROACH

90. Between 2009 and July 2010 the Township developed and received numerous cost estimates and route option reports from their concept design consultant. In July 2010, Township council approved the routing of the ELWS project along the 52nd Avenue route for an estimated cost of $36.2 million. On July 23, 2012, council approved the East Langley Water Supply Loan Authorization Bylaw 2012 No.4919, after receiving taxpayer consent through an alternate approval process. Township council approved the borrowing of up to $33.5 million to complete the East Langley Water Supply connection.

91. Cost escalation is the change in price of a specific product or service over time and is based on inflation, availability of resources and other factors. The elapsed time between conceptual design and construction start for the ELWS was more than two years. The Township's conceptual design consultant provided cost estimates that included a 15 per cent contingency but did not otherwise itemize escalation. The Township of Langley did not have a documented policy that guided the definition of contingencies and escalation for capital project cost estimates and budgets; instead it relied on the proposals it received to include these considerations.

92. The Township allocated funds to the project for its various phases to reconcile with the anticipated spending for each year. In 2018, the Township produced a report that identified the project fund increasing annually as funding was needed. The Township calculated that its allocation to the project fund began at $2.3 million in 2009 and was $35.92 million by time of completion in 2016. Township staff told us that they were able to reallocate funds from other water projects to this project in order to minimize the need for borrowing.

93. As mentioned previously, although council received updated cost estimates over time, the Township did not document or approve a baseline budget for the project.

FINANCIAL CONTROLS SPENDING AND PAYMENT PROCESSES

94. Monitoring and control of project costs includes processes associated with budgeting, establishing controls, measurement, forecasting and reporting. An important component of budget monitoring and control is maintenance of a live cost tracking process that forecasts spending to completion, cost at completion and compares actual performance with the project baseline.

95. The Township tracked spending and commitments against a purchase order for its construction contracts with accounting software. On a project level, the Township kept financial documentation associated with the project (change orders, purchase orders and invoices) that tracked spending and commitments but did not forecast spending to project completion.

96. The Township had accounting software, layers of approval and sign-off requirements in place and relied on unit price contracts and staff knowledge and experience to ensure accounts payable procedures were handled appropriately. The Township had some high-level documentation related to accounts payable processes; however, it did not have documented financial or construction controls.

97. We did not examine whether or not the Township's software functioned as described or whether purchase orders/change orders and other documents were signed as per the signing authority requirements.

RECOMMENDATION SEVEN

The Township of Langley should develop a policy and procedure that outlines the process for development, approval, management and reporting of budgets for capital projects that includes guidance on:

- Developing and managing financial contingencies
- Establishing baseline budgets
- Engagement of external cost consultants
- Minimum standards for cost reporting against budgets
- Financial control procedures

SCHEDULING AND PROJECT TIMELINES

98. An important part of the project planning process is the development of a project baseline schedule that lays out key milestones and time constraints for delivering the project scope. A sufficiently detailed project baseline schedule enables the evaluation of project performance by providing a reference point for comparison. Standards for the routine monitoring and reporting of project schedules enable a consistent approach to managing project schedules.

99. The ELWS project charter identified a target project completion date of Dec. 31, 2011; however, it did not identify any major project milestones or reference an approved baseline project schedule. The Township had a project schedule dating from 2008 that identified a project start date as Sept. 2, 2008, and a completion date of Oct. 12, 2015. The schedule detailed pre-construction activities for the project and broke the project down into preliminary design, detailed design and three construction phases. The schedule included task progress updated until August 2011.

100. This schedule was not aligned with the target completion date set out in the project charter and was not updated during the project. We were told that the Township used these schedules for early planning but not for tracking or analysis.

101. Based on the comparison of actual completion date and scheduled completion date for Phase 3, the final construction phase, the East Langley Water Supply project experienced a significant construction delay. The Township did not measure the progress of the ELWS Project against a project baseline and the Township did not have a documented protocol in place that defined how capital project schedules should be managed, or how progress against a baseline schedule should be tracked, forecast and reported.

102. Oversight of construction contracts includes the monitoring and reporting of progress against the contract schedule to measure contractor performance against their contractual commitments and to measure construction progress against the project schedule.

103. The Township's construction contracts required contractors to submit a progress schedule relative to a contract schedule monthly, or as necessary. Progress schedules were provided by the construction contractors periodically during construction, but not every month. Although the Township monitored construction contractor progress against their contractual commitments, progress was not tracked or reported internally against a baseline project schedule, as the Township did not have one.

RECOMMENDATION EIGHT

For future projects, the Township of Langley should ensure it:

- Develops an appropriately detailed baseline schedule at the time of project chartering
- Defines processes for management of project schedules
- Regularly receives and reviews progress reports against the baseline project schedule

PROJECT PROCUREMENT

104. Capital procurement is the process of acquiring, constructing or significantly improving capital assets using sources outside the local government. Procurement can be a complex function, guided by numerous policies and statutes.

105. In undertaking capital projects, we would expect the Township of Langley to have processes in place that reflect principles of transparency and accountability for the spending of public funds and that lead to the selection of approaches with due regard for economy, efficiency and effectiveness. Having clear policies and procedures for procurement and following these procedures through the course of each procurement can assist local governments in meeting these objectives.

PROCUREMENT POLICY

106. Effective procurement is based on the principles of fairness, openness and transparency. When using public funds to buy services or goods, procurement processes must be conducted prudently, with integrity, consistent with the local government's policies and able to withstand the test of public scrutiny.

107. A comprehensive procurement policy – one that lays out all of a local government's applicable policies as well as relevant laws – is central to ensuring that the procurement function, staff and stakeholders follow the proper procedures and rules.

TRADE AGREEMENTS

Our provincial and federal governments have entered into several domestic and international trade agreements that could affect local governments.

Some of these agreements include procurement-related obligations based on the principles of non-discrimination, openness and transparency and reflect a commitment to the effective management of public resources.

It is important to seek legal advice on how trade agreements may affect your procurement planning and make sure your procurement policies reflect these requirements.

Examples of trade agreements that may be relevant to local governments:

AGREEMENT	EFFECTIVE DATE
NWPTA New West Partnership Trade Agreement	07/01/2010
CFTA Canadian Free Trade Agreement	07/01/2017
CETA Canada–European Union Comprehensive Economic and Trade Agreement	09/21/2017

108. In addition to a procurement policy, some local governments have formalized procurement procedures, a documented series of steps to be followed as a consistent approach to accomplish specific results in procurement. Together, policy and procedures contribute to an overall procurement program; they empower the people responsible for the procurement process with the direction and consistency they need to be successful.

109. In the absence of such guidance, local governments may be inconsistent in how procurement work is carried out. This could lead to the appearance of arbitrary and unfair procurement actions and a resulting loss of confidence on the part of vendors and taxpayers.

110. The Township of Langley had a documented procurement policy in place during the period covered by the audit. The procurement policy was broken down into two sections: Procurement Policy – Council (03-500 – Rev. April 2006, Est. 1998), and Procurement Policy – Administrative (03-500 - Est. April 2006).

111. The Township's procurement policy included reference to some purchasing processes, change orders, and methods of acquisition, and included information related to the procurement of capital projects. It also included authority limits and signing requirements for contracts and escalating approval requirements for spending based on dollar value. It did not refer to the Township's dispute resolution process or a requirement to publish notifications on BC Bid for directly awarded contracts.

112. The Township's procurement policy referred to trade agreements as of 2006, when it was last revised. However, in the years since then additional trade agreements have come into effect. The policy also did not identify a range of requirements related to competitive bidding and some delegated authority limits and council reporting requirements did not align with or reference the lowest level threshold as defined by trade agreements.

TRADE AGREEMENTS AND SOLICITATION PERIODS

113. Local government procurement activities may be subject to conditions set by domestic and international trade agreements. A local government's obligations under trade agreements are triggered when a procuring entity contemplates a procurement at or above specified dollar value thresholds.

114. The Township's procurement policy did not provide specific guidance related to which procurement activities are subject to international trade agreements or the required length of tender periods as defined in international trade agreements. Staff told us that the Township tended to assign a three-week tender period for complex projects and extended this period when there were questions. The Township also extended the tender period if the tender was missing some specifications or drawings.

RECOMMENDATION NINE

The Township of Langley should regularly review and update its procurement policy to align with evolving procurement practices and relevant trade agreements.

PROCUREMENT FOR THE EAST LANGLEY WATER SUPPLY PROJECT

115. The Township engaged in several procurement processes for the design, construction management and construction of the ELWS. These are listed in Exhibit 9.

Exhibit 9 – PROCUREMENTS FOR THE EAST LANGLEY WATER SUPPLY PROJECT

PROCUREMENT	PROJECT PHASE	CONTRACT DATE
SOQ[a] + RFP[b]	Conceptual Design	Jan 2007 – Oct 2008
SOQ + RFP	Detailed Design Phase 1	Oct 2010 – June 2011
Award	Detailed Design Phase 2/3	Dec 2012
Open Tender	Phase 1 Pipeline	April 2013
Open Tender	Phase 2 Pump Station	March 2014
Open Tender	Phase 3 Pipeline	March 2014

[a] Statement of Qualifications
[b] Request for Proposal
Note: this exhibit does not include a complete list of the procurement activities undertaken by the Township for the ELWS project.

CONCEPTUAL DESIGN AND DETAILED DESIGN PHASE 1 PROCUREMENT

116. The Township completed a prequalification process for the detailed design Phase 1 contract, through which it identified five pre-qualified firms eligible to receive Requests for Proposals (RFPs). All five firms identified in the process submitted proposals.

117. Staff told us that the Township had also used a prequalification process to shortlist qualified firms for an RFP that led to the conceptual design procurement, prior to the detailed design. The Township did not have documentation for this prequalification process due to its retention window of seven years; however, BC Bid records identify that the Township ran a prequalification process in January of 2007 that appeared to align with the procurement process. The Township invited four organizations to submit proposals for the conceptual design and received two proposals.

PROPOSAL EVALUATION

118. For both RFP processes, the Township disclosed its evaluation criteria; however, it did not disclose the weightings associated with each criterion. The Township used an evaluation team to review consultant proposals and had a template for documenting the evaluation.

119. The New West Partnership Trade Agreement, which came into effect on Jul. 1, 2010, requires that criteria and weightings be published for RFPs and requests for Statements of Qualifications (SOQs). The Township's procurement policy and detailed design procurements for the East Langley Water Supply project were not aligned with this requirement.

120. For its subsequent construction contracts, the Township tendered the project phases on BC Bid and relied on its detailed design and construction management consultants to provide recommendations for construction contract awards. This process included reference requirements, bid evaluation, analysis and recommendations.

WEAKNESSES IN THE TOWNSHIP'S PROCUREMENT PROCESS

121. In November 2012, before the successful proponent for the design and construction procurement had completed Phase 1 of the three-phase project, the Township decided not to continue its agreement with this consultant for Phases 2 and 3.

122. In December 2012, the Township awarded the Phase 2 and 3 detailed design and contract administration contract to another proponent that had responded to the May 2011 RFP process, based on an amended version of their original proposal. This award process was not clear or well documented and had the following weaknesses:

- The proponent was provided the opportunity to amend its proposal submission, while other respondents from the earlier process were not provided this opportunity
- The Township did not document which part of the procurement policy or RFP was used to make the award; therefore, it is not clear whether the Township followed its procurement policy when awarding the contract
- In our opinion, the RFP process appeared to conclude when the Township awarded the first contract, because the RFP did not contemplate the right or privilege to cancel or change the scope of work in the final contract and to continue operating pursuant to the RFP; therefore the Township used an RFP process that was no longer active to award the contract
- As this type of process would typically be defined as a direct award, we would expect the Township to follow its procurement policy related to the sole sourcing of goods or services. The Township did not seek council approval for this award, which is required by their own policy when sole sourced goods or services exceed $100,000

123. The processes used for this procurement could expose the Township to unnecessary risks and should be carefully considered in future procurement activities.

RECOMMENDATION TEN

The Township of Langley's purchasing department should monitor its procurement activities and ensure they are well documented and comply with its purchasing policies and procedures.

VENDOR PERFORMANCE EVALUATION

124. Oversight of vendor performance includes a set of activities: monitoring, evaluating, correcting (if required) and reporting on whether performance objectives were met

as per the contract terms. A good vendor performance program helps protect a local government's interests and provides transparency of its expectations, evaluation criteria and intended outcomes for both parties. An effective vendor performance program shares lessons learned to continuously improve processes and tools and address issues that may otherwise prevent the program from being successful.

125. The Township encountered performance issues related to several of its vendors involved in the project. The Township addressed these issues and resolved its concerns but did not have a vendor performance assessment process to help ensure value for money was received from its vendors. Township staff told us that the Township was considering developing such a process.

RECOMMENDATION ELEVEN

The Township of Langley should develop and implement a policy and related processes and tools to formally and systematically evaluate vendor performance.

PROJECT REPORTING

126. Project status reporting refers to the production of a regular formal report on progress relative to the project plan. Its purpose is to provide a consistent status update at regular intervals during the project to stakeholders and those responsible and accountable for the project. Consistent and regular delivery of project status reports is an important component of effective project communication. Regular reporting provides management with information needed to control and manage emerging risks. Project reports also serve as a record of the history of the project and can be used as part of an evaluative process to improve future performance.

127. The Township's project manager received daily construction reports for each construction contract and progress payment information from its contractors; however, the project manager was not required to and did not prepare written project reports for the project sponsor and management. The Township did not have a documented requirement for minimum standards of internal project reporting, for example, from the project manager to project sponsor to council.

RECOMMENDATION TWELVE

The Township of Langley should define reporting requirements for capital projects to ensure that those accountable for the performance of a project receive regular and consistent status updates, including:

- Internal reporting to the project sponsor and council
- Frequency and content of reports from contract administrators

STAKEHOLDER ENGAGEMENT

128. Understanding how a project will affect people, organizations and other layers of government enables better project outcomes by proactively identifying risks and opportunities for improvement. In addition, ongoing engagement and communication activities with stakeholders can increase the public's sense of ownership of a project. We would expect the Township to engage stakeholders appropriately during the planning and construction of the East Langley Water Supply project.

129. The Township obtained public input during the preliminary design stages of the project. The Township held two open houses in November 2009 with more than 140 people participating, and 91 feedback forms were received. The public provided feedback on the three route options and this was summarized and presented to council in March 2010.

130. The Township hired a consultant to assist with its public information sessions prior to the construction phases of the project. A Phase 1 information session was held in October 2013 and a Phase 2 and 3 information session was held in March 2014. During construction, the Township communicated with residents along the route impacted by construction via direct mail and in person.

131. The project scope was to install approximately 14 kilometres of pipeline, which included crossing watercourses and going through residential and rural areas. This route had the potential to impact a range of stakeholders, including private land owners, businesses, watershed groups and road users.

132. In Phase 3 of the project, during the installation of a pipeline under Michael's Brook, the streambed collapsed, introducing material into the creek upstream from a salmon hatchery. The Township's environmental consultants worked with regulators, and its contractors and consultants to restore the streambed. The Township's environmental consultants reported the restoration work complete in October 2014. We did not audit whether the creek had been sufficiently remediated.

133. Although the Township received environmental impact assessments for the ELWS project, these reports did not fully identify and document risks to all stakeholders. The organization operating the hatchery had not been consulted during the planning phases prior to the construction of the East Langley Water Supply project and was not made aware that construction was to occur under the creek upstream on adjacent properties.

134. The Township did not produce a stakeholder engagement plan for the East Langley Water Supply project. The Township did not have a public engagement policy or procedure associated with capital projects.

RECOMMENDATION THIRTEEN

The Township of Langley should develop a stakeholder engagement plan and procedures for its capital projects.

PROJECT CLOSE-OUT

135. Project close-out is the process of ensuring all activities are completed and finalized at the end of a project. This includes ensuring the deliverables identified in the project plan have been completed. Project close-out steps include: reporting, approvals, release of resources, archiving project documentation, ensuring warranties are in place, and transitioning to operations. Procedural guidance related to the steps required to close out a project help ensure that a consistent approach is followed.

136. The Township did not have a documented procedure or checklist to guide project close-out.

RECOMMENDATION FOURTEEN

The Township should consider developing a project close-out procedure and related checklist.

ASSET MANAGEMENT AND WATER SUPPLY INFRASTRUCTURE

137. Local governments finance, build and maintain capital assets to deliver services. Asset management supports the identification and management of risks associated with aging infrastructure. A structured approach to asset management can lead to improved capital investment planning and financing, reduced life cycle costs of service delivery, more effective and reliable services and enhanced value of long-term community investments. We would expect the Township of Langley to have developed a long-term asset management plan for its water utility facilities; however, as of the end of 2018, the Township's program for its water utility was not up-to-date or complete, as described below.

138. The Township developed a Corporate Asset Management Policy (03-839 - Est. June 2014, Rev. March 2018) that communicated council's commitment to asset management. In addition, the Township developed a *Water Asset Management Plan* (AMP, 2009) and a corporate *Strategic Asset Management Plan* (SAMP, 2017). The Township had also developed a risk and criticality model to assist with determining system risks based on asset condition. The 2017 SAMP outlined a plan for future development of the Township's asset management program.

WATER MASTER PLAN

139. In 2008, the Township developed a *Water Master Plan*, which included calibrated hydraulic and demand models for the water system (2008-2031) and modelled service and safety parameters such as water storage, velocity, pressure, fire flows, average daily demands and peak demands. The *Water Master Plan* forecasted the impact of predicted growth and development levels on water supply infrastructure and recommended the Township make a total of 115 capital improvements by 2031. The *Water Master Plan* has not been updated since 2008. The Township's software recorded individual work orders for infrastructure maintenance and improvements; however, the Township had not tracked and reported which of these recommended improvements had been made since 2005. Staff told us that the Township was in the process of updating the *Water Master Plan*.

WATER ASSET MANAGEMENT PLAN

140. The Township had the *Water Asset Management Plan* (AMP, 2009) for water supply infrastructure, which was informed by the *Water Master Plan* and included five-year capital financial projections. The *Water Asset Management Plan* was developed to be a living document that required regular review and updates to reflect changes to management processes and levels of service. In addition, the plan identified a list of improvement actions to be completed. However, the plan had not been updated since 2009. We were told that the Township had engaged a consultant to complete an update.

LEVELS OF SERVICE

141. Asset management is a process of continuous improvement where measurement of results involves defining service standards, or levels of service. Setting appropriate service levels requires an understanding of the assets and the finances required to sustain the level of service. The Township's AMP included customer core values and was based on current and suggested levels of service, but these were not fully developed or made operational. The AMP identified the need to develop a set of corporate key performance measures, which had not yet been completed. Consequently, the Township could not measure its service performance progress against the target level of service. Staff told us that the Township planned to pilot the draft level of service for another utility and then transfer learnings to the water utility.

STRATEGIC ASSET MANAGEMENT PLAN

142. The Township had conducted a self-assessment using Asset Management British Columbia's *Asset Management for Sustainable Service Delivery* framework and as a result developed the comprehensive *Strategic Asset Management Plan and Five-Year Road Map* (SAMP, 2017). The SAMP assessed key assets – facilities, utilities, fleet, transportation, parks and recreation – and contributed to the Township's asset management practice by establishing new objectives and strategies for improvement. However, the SAMP identified numerous shortcomings such as inefficiencies in the co-ordination and execution of asset management practices, and concerns related to data collection.

CAPITAL FINANCIAL PLANNING

143. It is important to understand the costs associated with the asset life cycle, including the cost of capital, operations, maintenance and asset renewal costs. Inclusion of these factors in financial planning is crucial to avoid large, unplanned expenses. We would expect the Township to align capital financial plans with asset management plans.

144. The Township established a capital reserve to fund its renewal and replacement of assets and a capital reserve council policy to affirm its commitment to increasing annual contributions to the fund. However, the SAMP determined that the reserve was insufficient to fund future asset replacement. The Township recognized the need to address this sustainability gap and staff told us they planned to develop and align a long-term capital plan, long-term financial plan and long-term asset management plan.

CAPITAL ASSET INVENTORY MAINTENANCE

145. We expected the Township to have maintained its water supply infrastructure. The Township had a systematic preventative maintenance program customized to each type of water system infrastructure, and, as we reported in the previous report on the Township, it regularly monitored and inspected its assets. The Township also reported on major asset renewal and replacement in its annual water quality report.

146. The Township used information systems to help monitor maintenance of its water supply infrastructure including tracking the completion of work orders. However, it did not generate reports that summarized work order completion or non-completion status, nor why work orders were closed. We did not audit whether the Township's actual capital maintenance was aligned with its renewal or replacement models or plans, and the Township had not completed this type of assessment or tracked how many of the capital improvements identified in the AMP had been completed.

147. The Township was testing a risk assessment tool, the *Risk and Criticality Model: Water Sewer, Drainage and Transportation*, to inform condition assessments of buried water system assets. The Township was using this tool to support its assessment of risk areas for prioritizing the repair and replacement of its drinking water infrastructure.

RECOMMENDATION FIFTEEN

The Township of Langley should further develop its asset management practices for water infrastructure by:

- Reviewing and implementing relevant areas of its strategic asset management plan and five-year road map
- Updating its asset management plan and water master plan
- Reporting system performance against defined levels of service
- Aligning its long-term capital plan with long term asset management planning

RECOMMENDATION SIXTEEN

The Township of Langley should consider improving its tracking of infrastructure maintenance, renewal and replacement activities by internally reporting on the status of work orders relative to its maintenance schedule.

ABOUT THE AUDIT

148. The office of the AGLG complies with the independence requirements, other ethical requirements and rules of professional conduct of the Chartered Professional Accountants of British Columbia applicable to the practice of public accounting and related to assurance engagements and the standards of conduct of the BC Public Service.

149. This audit was performed in accordance with the standards for assurance engagements set out by the Chartered Professional Accountants of Canada in the CPA Handbook—Assurance and Value-for-Money Auditing in the Public Sector, ps 5400, ps 6410, ps 6420 and Canadian Standard on Assurance Engagements 3001—direct engagements. Additionally, the AGLG applies Canadian Standards on Quality Control, CSQC 1.

OBJECTIVE

150. The overall purpose of this performance audit was to provide an objective, independent examination of the local government's drinking water services to determine if the local government provides clean and safe drinking water where and when needed. This report focused on the audit objective related to whether the local government managed its drinking water supply infrastructure to meet current and future demand.

PERIOD COVERED BY THE AUDIT

151. The audit covered the period of Jan. 1, 2016 through Dec. 31, 2018. Where relevant materials were developed or events occurred prior to this period – specifically related to the planning and construction of the East Langley Water Supply project - we included them in our examination. We completed our examination work in September 2019.

AUDIT SCOPE AND APPROACH

152. The overall audit included:

- A review of the Township of Langley's governance of its drinking water operations
- Its management of drinking water supply and water conservation activities
- The development, management and maintenance of its water supply infrastructure
- Its preparedness for future drinking water requirements

153. This report covers the aspects of the audit related to the Township's asset management activities and the construction, implementation and maintenance of the Township's drinking water supply infrastructure to meet its intended objectives. We examined the Township's East Langley Water Supply project, which concluded during the audit period and did not review other capital projects that the Township undertook.

154. For our findings and recommendations related to other aspects of the audit, see our first report for the Township of Langley on this audit topic on our website.

AUDIT CRITERIA

155. Performance audit criteria define the expectations against which we assessed the local government's performance. We identify our criteria before we begin assessing a local government. We intend them to be reasonable expectations for the local government's management of the area being audited in order to achieve expected results and outcomes.

We used the following criteria to assess the local government:

AUDIT CRITERIA		LINES OF ENQUIRY AND AUDIT CRITERIA
Audit Objective 1	Reported on in first audit report	
Audit Objective 2	Reported on in first audit report	
Audit Objective 3	The local government managed its water supply infrastructure to meet current and expected future demand	**1.** Water Supply Infrastructure **1.1.** The local government developed a long-term asset management plan for its water supply infrastructure **1.2.** The local government planned and developed its water supply infrastructure (natural and engineered) **1.3.** The local government managed the construction and implementation of drinking water infrastructure projects to meet its intended objectives **1.4.** The local government maintained its water supply infrastructure (natural and engineered)
Audit Objective 4	Reported on in first audit report	

SUMMARY OF LOCAL GOVERNMENT COMMENTS

Township of Langley
Est. 1873

February 24, 2020 File No. 0400-60-031

Mr. Gordon Ruth
Auditor General for Local Government
201 - 10470 – 152 Street
Surrey, BC V3R 0Y3

Dear Mr. Ruth:

Re: Local Government's Role in Ensuring Clean Drinking Water – Audit Report #2 of 2

The Township of Langley (Township) was advised in August 2017 that the Auditor General for Local Government (AGLG) was undertaking an audit of the Township's water utility. The Township was selected based on risks, potential relevance of findings to other local governments and the size, geographic location and complexity of the Township's water supply system. The overall goal of the audit was identified as providing an objective and independent examination of drinking water services in the Township of Langley, to determine whether clean and safe drinking water is being provided to the users on the Township's system.

The Township is in receipt of the AGLG's proposed final audit report #2 on "Local Government's Role in Ensuring Clean Drinking Water". This report is #2 of 2 and focussed on one of the four audit objectives, specifically: Managing water supply infrastructure to meet current and future demand.

The proposed audit report was received by Mayor and Council at the Special Closed meeting on January 27, 2020 where Council directed staff to undertake a comprehensive review of the Report, including its recommendations and provide comments within the 45 day review period.

In response to the recommendations provided in the proposed audit report, the Township has prepared an action plan which is attached to this letter. The Township appreciates the AGLG efforts to help ensure clean drinking water across the province and specifically, AGLG staff efforts in completing this audit of the Township's management of water supply infrastructure to meet current and future demand.

Yours truly,

Mark A. Bakken
ADMINISTRATOR

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TOWNSHIP OF LANGLEY ACTION PLAN

AGLG RECOMMENDATION	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBILITY	TARGET DATE
MANAGING WATER SUPPLY INFRASTRUCTURE TO MEET CURRENT AND FUTURE DEMAND				
RECOMMENDATION ONE The Township of Langley should develop and follow minimum standards for project governance, defining:	The Township will look to further develop and expand on its 'Capital Project Procedure' document related to project governance especially for complex projects and projects over a certain size/threshold.	Staff time.	Engineering Division	TBD
› When to require a project board or steering committee	See above.			
› Project board membership and terms of reference	See above.			
› Potential participants for each project stage	See above.			
› Roles and responsibilities	See above.			
› Guidelines related to stage gate review process	See above.			
› Evaluation processes related to project delivery method selection	See above.			
› Meeting protocols defining the type and frequency of meetings, and required participants for different project phases	See above.			
RECOMMENDATION TWO The Township of Langley should develop a documented planning procedure to identify and assess the specific staff resources required for capital projects based on the scope and complexity of each project.	Project teams are built based on specific project needs and internal resourcing. The Township will consider development of a formal planning procedure document for projects over a certain size/threshold.	Staff time.	Engineering Division	TBD
RECOMMENDATION THREE The Township of Langley should ensure project charters are complete and kept up-to-date throughout the project.	Project charters will be developed, monitored and kept current for projects, especially for projects of size and/or complexity exceeding a pre-determined threshold.	Staff time.	Engineering Division	Underway and ongoing
RECOMMENDATION FOUR The Township of Langley should consider developing a project plan template as a tool for leading projects of high-value, high risk and/or public significance.	This is already being done on a case by case basis and through the Township's 'Capital Project Procedure' document; however, a standard template could be developed and utilized for projects exceeding a pre-determined threshold.	Staff time.	Engineering Division	TBD
RECOMMENDATION FIVE The Township of Langley should broaden and formalize its approach to capital project risk management. This could include developing a policy and procedure that includes requirements for:	Risk management is currently considered on a project by project basis and contingencies are built into project budgets and schedules. Formal policies related to capital project risk management will be considered.	Staff time.	Engineering and Finance Divisions	TBD
› Risk identification	See above.			
› Risk assessment	See above.			
› Monitoring and reporting of risks	See above.			
› Ensuring project contingency development is tied to risk management	See above.			

AGLG RECOMMENDATION	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBILITY	TARGET DATE
MANAGING WATER SUPPLY INFRASTRUCTURE TO MEET CURRENT AND FUTURE DEMAND *continued*				
RECOMMENDATION SIX The Township of Langley should develop guidance for how project scope is defined and how project scope change is authorized and implemented.	Project scope and scope change is managed internally via internally developed procedures and policy, and externally via contracts (typically MMCD contracts). The Township will look at developing and expanding internal procedures for projects of size and/or complexity that exceed a pre-determined threshold.	Staff time.	Engineering Division	Ongoing
RECOMMENDATION SEVEN The Township of Langley should develop a policy and procedure that outlines the process for development, approval, management and reporting of budgets for capital projects that includes guidance on:	A formal document to provide guidance on the process for development, approval, management and reporting of budgets will be considered along side a project plan template as per recommendation four.	Staff time.	Engineering Division	TBD
❱ Developing and managing financial contingencies	See above.			
❱ Establishing baseline budgets	See above.			
❱ Engagement of external cost consultants	See above.			
❱ Minimum standards for cost reporting against budgets	See above.			
❱ Financial control procedures	See above.			
RECOMMENDATION EIGHT For future projects, the Township of Langley should ensure it:	Project timing needs are varied and schedules are often dependant on multiple factors including budget approval, regulatory agency permitting, development needs, land requirement considerations, contractor availability and other factors outside of the Township control. Schedules are typically set via contract with construction contractors and managed according to the terms of the contract.	No new resources needed.	Engineering Division	Ongoing
❱ Develops an appropriately detailed baseline schedule at the time of project chartering	See above.			
❱ Defines processes for management of project schedules	See above.			
❱ Regularly receives and reviews progress reports against the baseline schedule	See above.			
RECOMMENDATION NINE The Township of Langley should regularly review and update its procurement policy to align with evolving procurement practices and relevant trade agreements.	A regular review and update of the Township's procurement policy to be undertaken.	Staff time and legal input.	Finance Division	2020

TOWNSHIP OF LANGLEY ACTION PLAN

AGLG RECOMMENDATION	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBILITY	TARGET DATE
MANAGING WATER SUPPLY INFRASTRUCTURE TO MEET CURRENT AND FUTURE DEMAND *continued*				
RECOMMENDATION TEN The Township of Langley's purchasing department should monitor its procurement activities and ensure they are well documented and comply with its purchasing policies and procedures.	Monitoring of the Township's procurement activities to ensure they are well documented and comply with its purchasing policies and procedures is an ongoing effort.	Staff time.	Finance Division	Ongoing
RECOMMENDATION ELEVEN The Township of Langley should develop and implement a policy and related processes and tools to formally and systematically evaluate vendor performance.	The Township will explore the development and implementation of a policy and related processes and tools to formally and systematically evaluate vendor performance.	Staff time.	Finance and Engineering Divisions	TBD
RECOMMENDATION TWELVE The Township of Langley should define reporting requirements for capital projects to ensure that those accountable for the performance of a project receive regular and consistent status updates, including:	Internal reporting to project sponsors, etc. occurs regularly with frequency depending on project size and complexity. A formal document to provide guidance on reporting will be considered along side a project plan template as per recommendation four.	Staff time.	Engineering Division	TBD
› Internal reporting to the project sponsor and council	See above.			
› Frequency and content of reports from contract administrators	See above.			
RECOMMENDATION THIRTEEN The Township of Langley should develop a stakeholder engagement plan and procedures for its capital projects.	Stakeholder engagement is currently considered on a project by project basis and is dependant on potential impacts to stakeholders. A formal plan and procedures document could be considered for projects meeting pre-determined thresholds.	Staff time.	Engineering and Corporate Administration Divisions	Ongoing and TBD
RECOMMENDATION FOURTEEN The Township should consider developing a project close-out procedure and related checklist.	Review and improvements to the Township's 'Capital Projects Procedures' document will be considered in conjunction with checklist.	Staff time.	Engineering Division	TBD

AGLG RECOMMENDATION	STEPS TAKEN	RESOURCES NEEDED	RESPONSIBILITY	TARGET DATE
MANAGING WATER SUPPLY INFRASTRUCTURE TO MEET CURRENT AND FUTURE DEMAND *continued*				
RECOMMENDATION FIFTEEN The Township of Langley should further develop its asset management practices for water infrastructure by:	Asset management is a continuous process at the Township of Langley. The Township is developing the water asset management program by updating the water asset management plan and integrating it along with the Asset Management Policy and the Water Master Plan. The Township is also integrating its Risk and Criticality model with current data on watermain breaks and the leak detection program.	Staff time.	Engineering Division	TBD
› Reviewing and implementing relevant areas of its strategic asset management plan and five-year road map	See above.			
› Updating its asset management plan and water master plan	See above.			
› Reporting system performance against defined levels of service	See above.			
› Aligning its long-term capital plan with long term asset management planning	See above.			
RECOMMENDATION SIXTEEN The Township of Langley should consider improving its tracking of infrastructure maintenance, renewal and replacement activities by internally reporting on the status of work orders relative to its maintenance schedule.	The Township is reviewing the current level of service and work management practices including a review of current workflows and the current procedures for collecting and reporting on work related data as part of its continuous improvement process. This review would include establishing KPIs for both work management processes and the major asset systems.	Staff time.	Engineering Division	Underway

AGLG CONTACT INFORMATION

STAY CONNECTED WITH THE AGLG

The AGLG welcomes your feedback and comments. Contact us via email *info@aglg.ca*, our website at *www.aglg.ca* or follow us on Twitter @*BC_AGLG.*

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