CITY OF YELLOWKNIFE

GOVERNANCE AND PRIORITIES COMMITTEE AGENDA

Tuesday, May 23, 2023 at 12:05 p.m.

Chair: Mayor R. Alty,
Councillor S. Arden-Smith,
Councillor G. Cochrane,
Councillor R. Fequet,
Councillor B. Hendriksen,
Councillor C. McGurk,
Councillor T. McLennan,
Councillor S. Payne, and
Councillor R. Warburton.

Item	Description
1.	Opening Statement: The City of Yellowknife acknowledges that we are located in Chief Drygeese territory. From time immemorial, it has been the traditional land of the Yellowknives Dene First Nation. We respect the histories, languages, and cultures of all other Indigenous Peoples including the North Slave Métis, and all First Nations, Métis, and Inuit whose presence continues to enrich our vibrant community.
2.	Approval of the agenda.
3.	Disclosure of pecuniary interest and the general nature thereof.
4.	A presentation from Honourable Caroline Wawzonek, Minister of Finance GNWT, regarding GNWT 2023/2024 Budget.
ANNEX A 5.	(For Information Only) A memorandum regarding whether to apply to Infrastructure Canada to seek a four (4) year Disaster Mitigation and Adaptation Fund (submarine water line replacement) project schedule extension to 2032, while advancing regulatory and design work, and continuing to seek funding assistance to meet budget shortfalls.

CITY OF YELLOWKNIFE

MEMORANDUM TO COMMITTEE

(For Information Only)

COMMITTEE: Governance and Priorities

DATE: May 23, 2023

DEPARTMENT: Public Works & Engineering

ISSUE: Administration will apply to Infrastructure Canada to seek a four (4) year Disaster Mitigation and Adaptation Fund (submarine water line replacement) project schedule extension to 2032, while advancing regulatory and design work, and continuing to seek funding assistance to meet budget shortfalls.

BACKGROUND:

Piped water supply in Yellowknife commenced in 1948 from Yellowknife Bay. In the time period between 1948 and 1968 health concerns were raised by members of the public regarding arsenic contamination emanating from the gold mines, and particularly contamination of the drinking water. In 1967, the Government of Canada, Con Mine and Giant Mine each contributed one third of the cost of the installation of the submarine water supply line. The construction of the water supply line was completed in 1969, bringing the current age of the pipe to 54 years in 2023.

In 2017, the City of Yellowknife commissioned a comprehensive engineering study (the Study) completed by AECOM Canada Ltd (AECOM) to analyze the costs and risks associated with the two options Yellowknife has for distinct drinking water sources through an evaluation matrix - the Yellowknife River and Yellowknife Bay, having estimated life cycle costs of $33M and $18.2M respectively. The recommendation was based on a robust decision matrix, which took into consideration factors such as:

- Susceptibility to raw water quality changes;
- Constructability;
- Reliability of water supply;
- Ease of operation; and
- Life cycle cost

The recommendations from the Study were presented to Council on January 15, 2018.

Dillon Consulting Ltd (Dillon) completed a third party review of the Study and reaffirmed the conclusions of the study. Both professional engineering companies recommended that the City of Yellowknife should retain the Yellowknife River as the drinking water source and schedule replacement of the submarine pipeline.

On June 11, 2018, City Council passed a motion directing Administration to submit an expression of interest to the Government of Canada's Disaster Mitigation and Adaptation Fund (DMAF) sponsored by Infrastructure Canada, the first milestone in the application process. The City of Yellowknife learned in October 2018 that the expression of interest provided the framework necessary to advance the project to the next phase of the application process. City Administration filed a full application on January 11, 2019 to meet the final deadline of the DMAF process. The final application consisted of input from various City departments, local businesses and strong letters of support from Indigenous partners such as Yellowknives Dene First Nation (YKDFN) and North Slave Metis Alliance (NSMA).

On March 13, 2019, the Government of Canada announced that Yellowknife was a successful applicant to the DMAF program and would receive funding of 75% of total project costs. The estimated project budget in 2019 was $34.5M which resulted in $25.8M (75%) of federal funding and $8.6M (25%) in City contributions. The City received a letter from the Minister of Infrastructure and Communities stating the approval of the project in principle with a project completion date of 2028.

Since the execution of the contribution agreement, the City has retained project management services and professional engineering services to advance the planning and design of the project. In April 2023, the City received the preliminary design report for the project. This report noted updated Class 4 (D) estimates of $57.0M in construction costs. The DMAF contribution agreement stipulates that project costs over and above the agreed amount will be covered by the City of Yellowknife. This results in an updated total City contribution of $31.1M, approximately a 262% increase. See table below for updated capital cost.

		DMAF	City	
2019 Capital Costs	34,482,958.00	25,862,218.50	8,620,739.50	
2023 Capital Costs	57,042,250.00	25,862,218.50	**31,180,031.50**	262%

After speaking with DMAF officials with Infrastructure Canada, the City was informed that project schedule extensions were being granted across Canada to 2032. Many DMAF applicants are seeing significant cost overruns and schedule challenges as a result.

Administration has determined that the appropriate path forward at this time is to seek a project schedule extension to 2032. This allows:

1. Additional time to advance regulatory approvals and design work.
2. Additional time to seek additional financial support from other orders of government.
3. A review of current risk data from the Giant Mine Remediation Project.
4. Revisit the evaluation matrix completed in 2018 with current data.
5. Staff the opportunity to address project complexities and technical considerations surrounding Pumphouse #1 and Pumphouse #2.

The City of Yellowknife has been very clear from the onset of the project that these costs should not be a municipal responsibility due to the consequences of historical, third party decision making. Administration has, and will continue to seek additional funding sources to cover the City's contribution amount.

COUNCIL POLICY / RESOLUTION OR GOAL:

Motion #0123-19 - Council Minutes - May 2019 (https://events.yellowknife.ca/meetings/Detail/2019-05-13-1900-Council-Meeting/f5f8e74b-e5e6-42b7-be53-ae2b010d63b0)

APPLICABLE LEGISLATION, BY-LAWS, STUDIES, PLANS:

1. AECOM – Preliminary Design Report (DM#731869) - April 2023;
2. AECOM – City of Yellowknife Potable Water Source Selection Study (DM#509277) – December 2018; and
3. Dillon Consulting - Yellowknife Potable Water Source Selection Report Third Party Review (DM#509276) – January 2018.

ATTACHMENTS:

1. Signed Letter from Director, Public Works, to MVEIRB re: inclusion of submarine pipeline in Scope of Work for Giant Mine (DM#292933) – January 2012;
2. AECOM Potable Water Source Selection Study Presentation to Municipal Services Committee (DM#509779) – January 2018;
3. Signed Letter from Mayor to Honourable Wally Schumann re: Funding for Potable Water Source (DM#544980) - January 2019;
4. Memorandum to Committee re: whether to select YK River as the City's primary source for drinking water and to proceed with replacement of the submarine pipeline - April 2019 (https://events.yellowknife.ca/meetings/Detail/2019-04-29-1205-Special-Governance-and-Priorities-Committee/7c252573-01f4-4d84-ba71-ae2b0116a95e); and
5. City of Yellowknife – Water Compensation Claim to the MVLWB (https://registry.mvlwb.ca/Documents/MV2007L8-0031/MV2007L8-0031%20-%20DIAND-GIANT%20-%20City%20of%20YK%20-%20Claim%20for%20Water%20Compensation%20(Water%20Pipeline)%20-%20Oct18-19.pdf).

Prepared: May 23, 2023; CG/cg

City of
Yellowknife

January 17, 2012

Vern Christensen, P. Eng., Executive Director
Mackenzie Valley Environmental Impact Review Board
200 Scotia Centre
Box 938, 5102-50th Ave
Yellowknife, NT X1A 2N7

RE: City of Yellowknife's Potable Water Pipeline Replacement Inclusion in Scope of Work for Giant Mine Remediation

Dear Mr. Christensen,

In September 2009, the Government of the Northwest Territories (GNWT) adopted the Guidelines for Canadian Drinking Water as part of their Water Supply Regulations and Public Health Act. The City's main drinking water source is the Yellowknife River. These guidelines require that surface water used as a drinking water source undergo a filtration process. The City's current treatment methods do not include filtration, only chlorination and fluoridation. The adoption of these guidelines as legislation compelled the City of Yellowknife (City) to move forward with the planning and design of a new water treatment plant that will satisfy the requirements in the guidelines.

Part of the planning process was to review all infrastructure associated with the City's potable water system, more notably the submarine pipeline which connects the City's main pump house (Pump House #1) to the pump house at the Yellowknife River (Pump House #2). This pipeline was installed, under a federally funded project, in 1969 to address public concerns of arsenic contamination in the City's previous water source, Yellowknife Bay on Great Slave Lake. The arsenic contamination was believed to stem from the mining processes employed at Giant Mine. The pipeline is close to the end of its useful life and will need to be replaced no later than 2020.

The proposed remediation plan for Giant Mine incorporates the use of Yellowknife Bay as part the treatment process for any and all contaminated water being discharged through the diffuser into Yellowknife Bay as confirmed during the technical sessions. Based on this it is the City's belief that Yellowknife Bay should also be included in the scope of the remediation plan. As such given the public perception that Yellowknife Bay will always be threatened with arsenic

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City of
Yellowknife

contamination the City also believes that the replacement of existing submarine pipeline should also fall within the scope of the project. . Regardless of what the science says the majority of Yellowknife residents believe Yellowknife Bay will continue to be contaminated with arsenic due to historical operations and any proposed remediation processes. This is the reality of the situation. Maintaining the existing supply system and source in terms of drawing water from the Yellowknife River will alleviate and address the concerns of our residents. Therefore the submarine pipeline replacement should be a vital component of the Giant Mine Remediation Project. The capital replacement cost of the 8.0 km pipeline is valued at approximately $10 million dollars. Without financial assistance from other orders of government these replacement costs will be solely on the City to absorb. The City feels that these costs are undeserved and will place excessive financial burden on the tax base of Yellowknife.

Currently we are in the detailed design phase of the water treatment plant and associated pump house upgrades. The projected schedule is to begin construction of the main structure in the summer of 2012, with commissioning to occur sometime in 2013. At this time direction has been given to the design team to maintain the Yellowknife River as the potable water source. In addition to the pipeline replacement, there will have to be many upgrades to the various pumps that are required to transport water from the river to the new water treatment plant. These upgrades are being incorporated into the final design.

In closing the City is asking the MVEIRB to include the replacement of the submarine pipeline in the overall scope of the remediation plan for Giant Mine and believes the information provided in this letter justifies granting such a request. Should you require additional information or wish to discuss this matter in greater detail please feel free to contact me.

Sincerely,

Dennis Kefalas, P. Eng.
Director, Public Works & Engineering

cc: Honorable Mayor, Gordon Van Tighem, City of Yellowknife
Robert Long, City Administrator, City of Yellowknife

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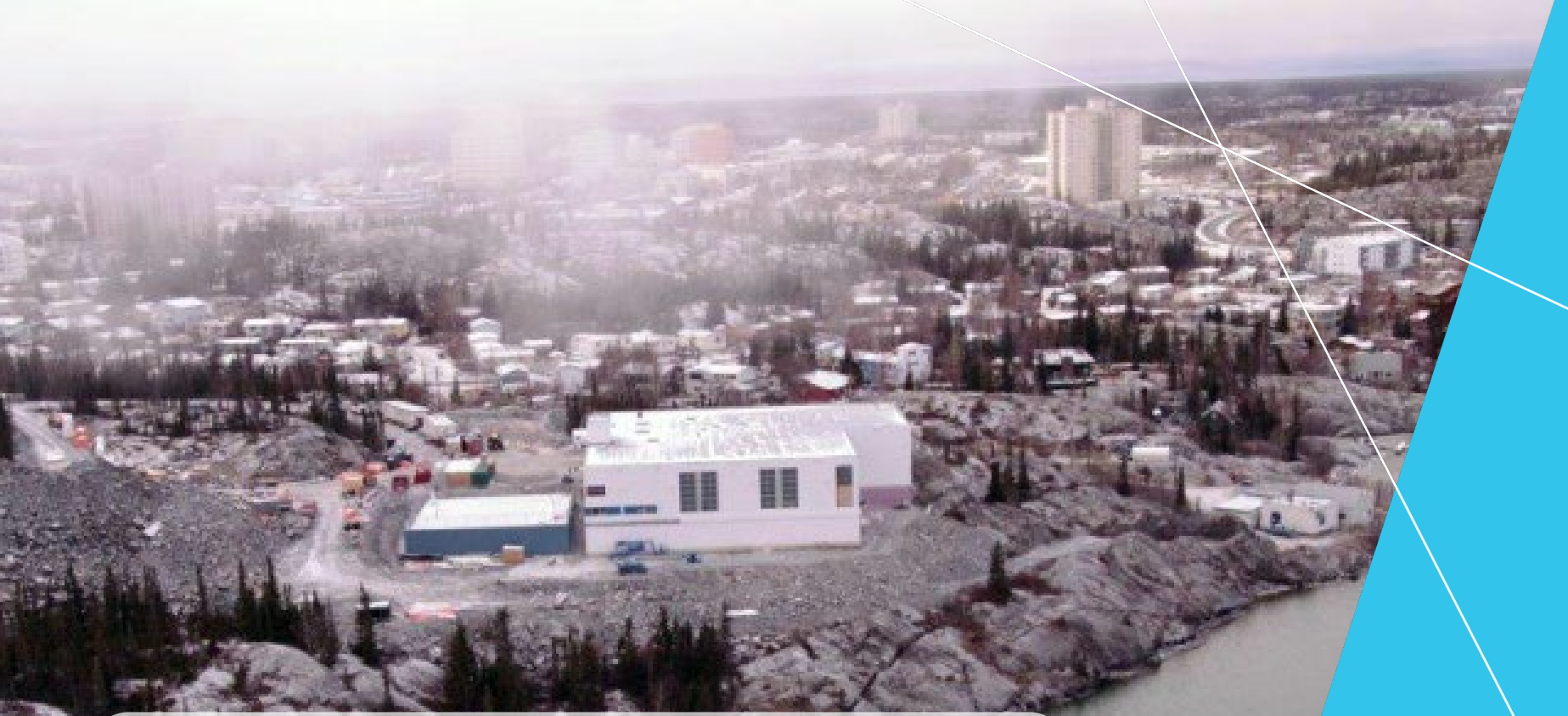


City of Yellowknife

Potable Water Source Selection Study

January 15, 2018

Cortney McCracken and David Huebert

60541637

AECOM

AECOM

Presentation Overview

- Background
- Arsenic Characterization
- Potable Water Supply System Options
- Decision Model
- Recommendation

Background

AECOM

History

- Yellowknife Bay source used prior to 1968
- Yellowknife River source 1969 to today
- Giant Mine operated 1948-1999. Remediation is underway.
- Public consultation about City's water source in 2011
- 8 km, 400m (16") pipeline is 49 years old and leaking

AECOM

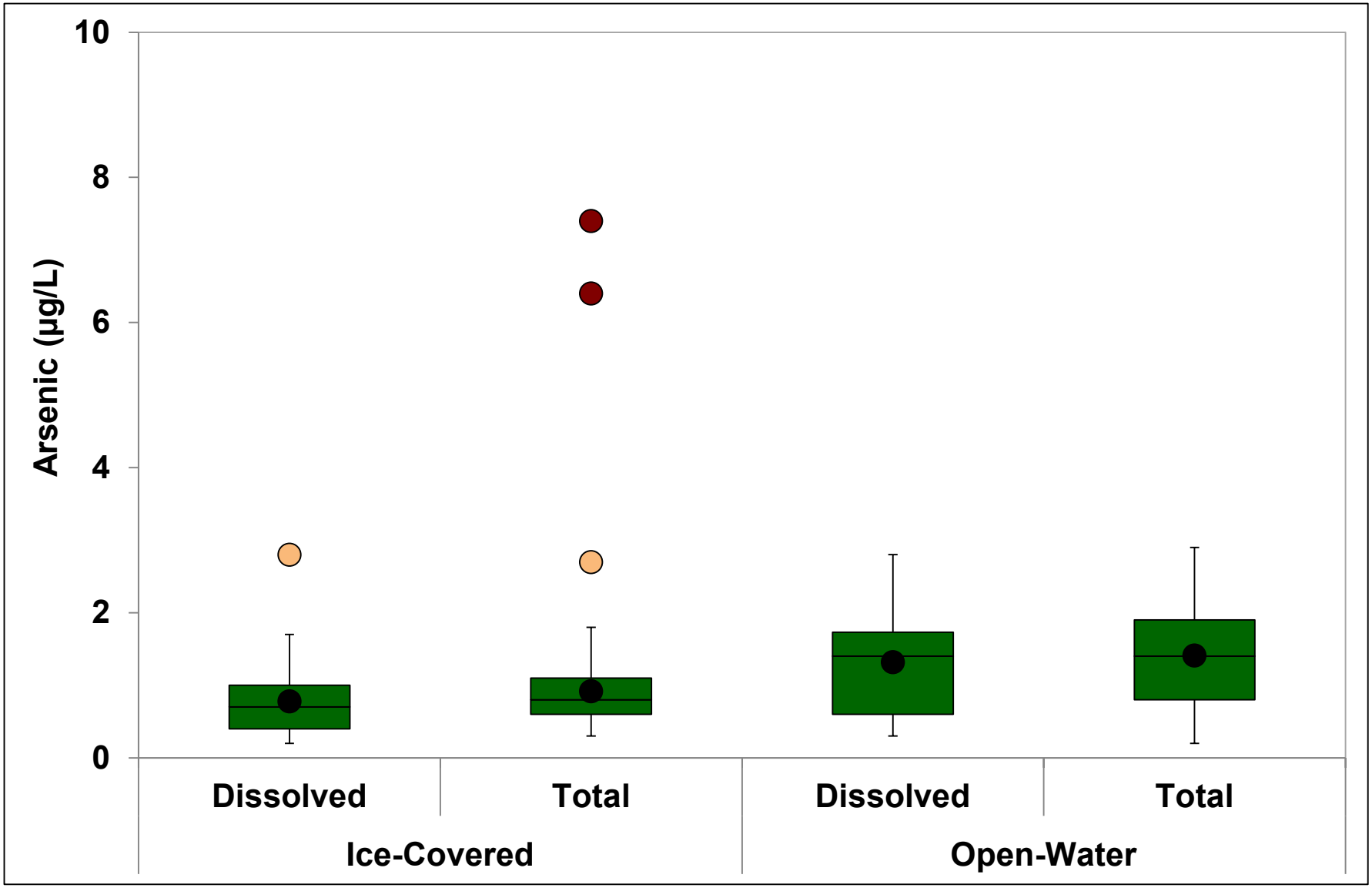
Water Quality Overview

- Both sources have low turbidity, some organics, pathogens
- Potential arsenic and antimony contamination from Giant Mine
- Arsenic
  - Erodes naturally
  - Waste product
  - Carcinogen, toxic
- Antimony
  - Present naturally and as a waste product
  - Toxic

Arsenic Characterization in Yellowknife Bay under Normal Conditions

AECOM

Surface Water Arsenic Concentration at Pumphouse #1



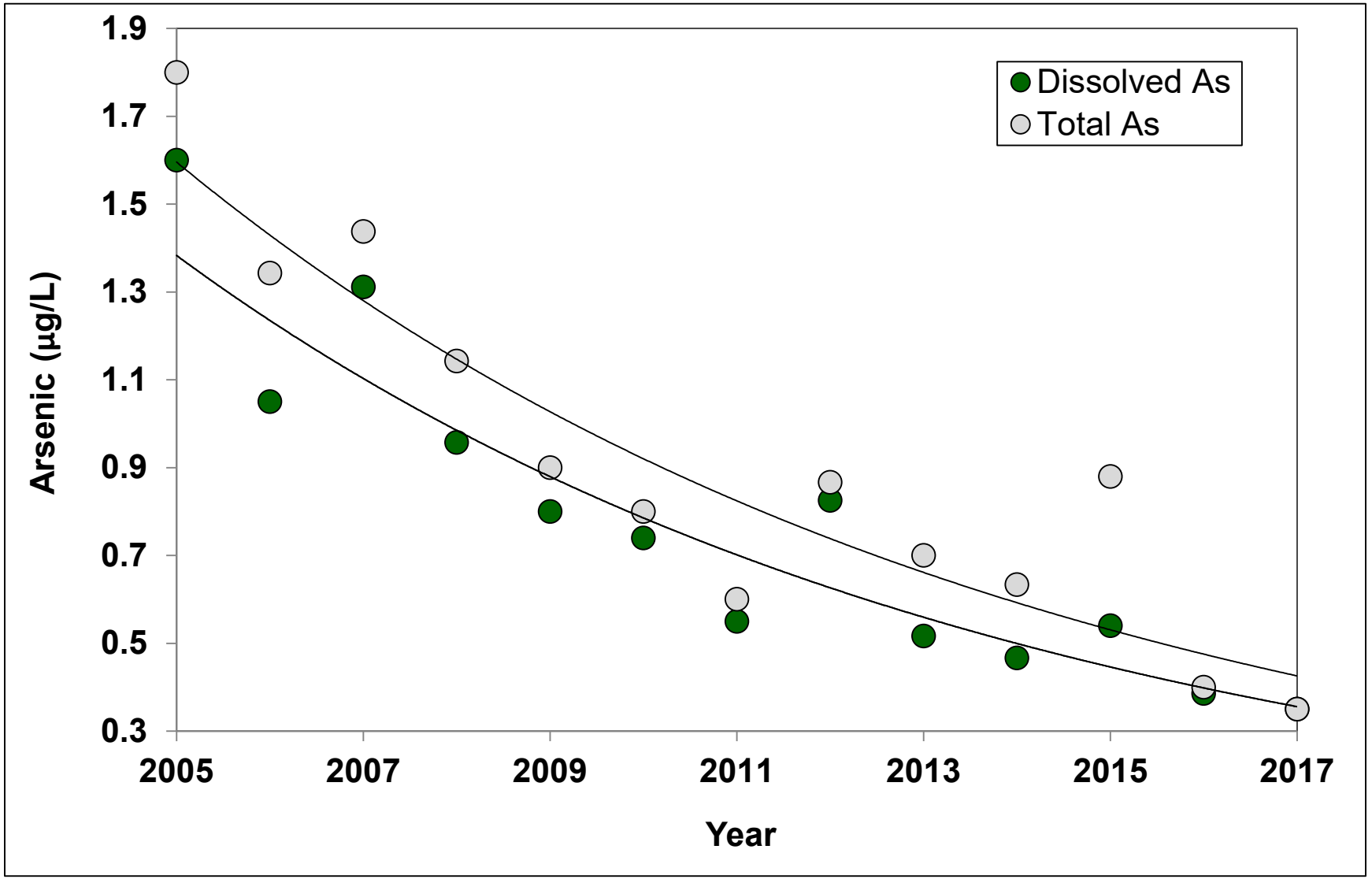
AECOM

Arsenic Limits for Normal and Storm Conditions

Parameter	Open-Water		Ice-Covered	
	Dissolved	Total	Dissolved	Total
95%ile	2.7	2.7	1.6	1.8 (2.3)
99%ile	2.8	2.8	2.3	2.4 (6.7)
95%UTL	2.8	2.9	2.1	2.7 (6.4)
High Limit	2.8	2.9	1.7	1.8
20 year return	3.3	3.4	2.4	2.6 (6.3)
100 year return	4.4	4.5	3.3	3.6 (9.1)

AECOM

Decreasing Temporal Trend in Arsenic Concentration



Arsenic Characterization in Yellowknife Bay under Upset Conditions

AECOM

Estimated Arsenic Concentration at Pumphouse#1 Intake for Short-term Upset Condition

Data Limit	Full Mixing (µg/L)	25% Mixing (µg/L)
25%ile	190	800
Median	390	1,600
75%ile	570	2,300
Upper Limit	1,100	**4,600**

Potable Water Supply System Options

AECOM

Water Treatment Options

- Coagulation
- Ion exchange
- Granular adsorptive media
- RO

AECOM

Water Treatment Options

- ~~Coagulation~~
- Ion exchange
- Granular adsorptive media
- RO

AECOM

Water Treatment Options

~~– Coagulation~~

~~– Ion exchange~~

– Granular adsorptive media
  - Simplest operation and residuals disposal
  - Performance at estimated upset conditions is unknown

– RO

AECOM

Water Treatment Options

~~– Coagulation~~

~~– Ion exchange~~

– Granular adsorptive media ?
  - Simplest operation and residuals disposal
  - Performance at estimated upset conditions is unknown

– RO
  - Most effective, but also most complex and expensive
  - No feasible way to dispose of residuals (brine) for Yellowknife WTP

AECOM

Water Treatment Options

~~– Coagulation~~

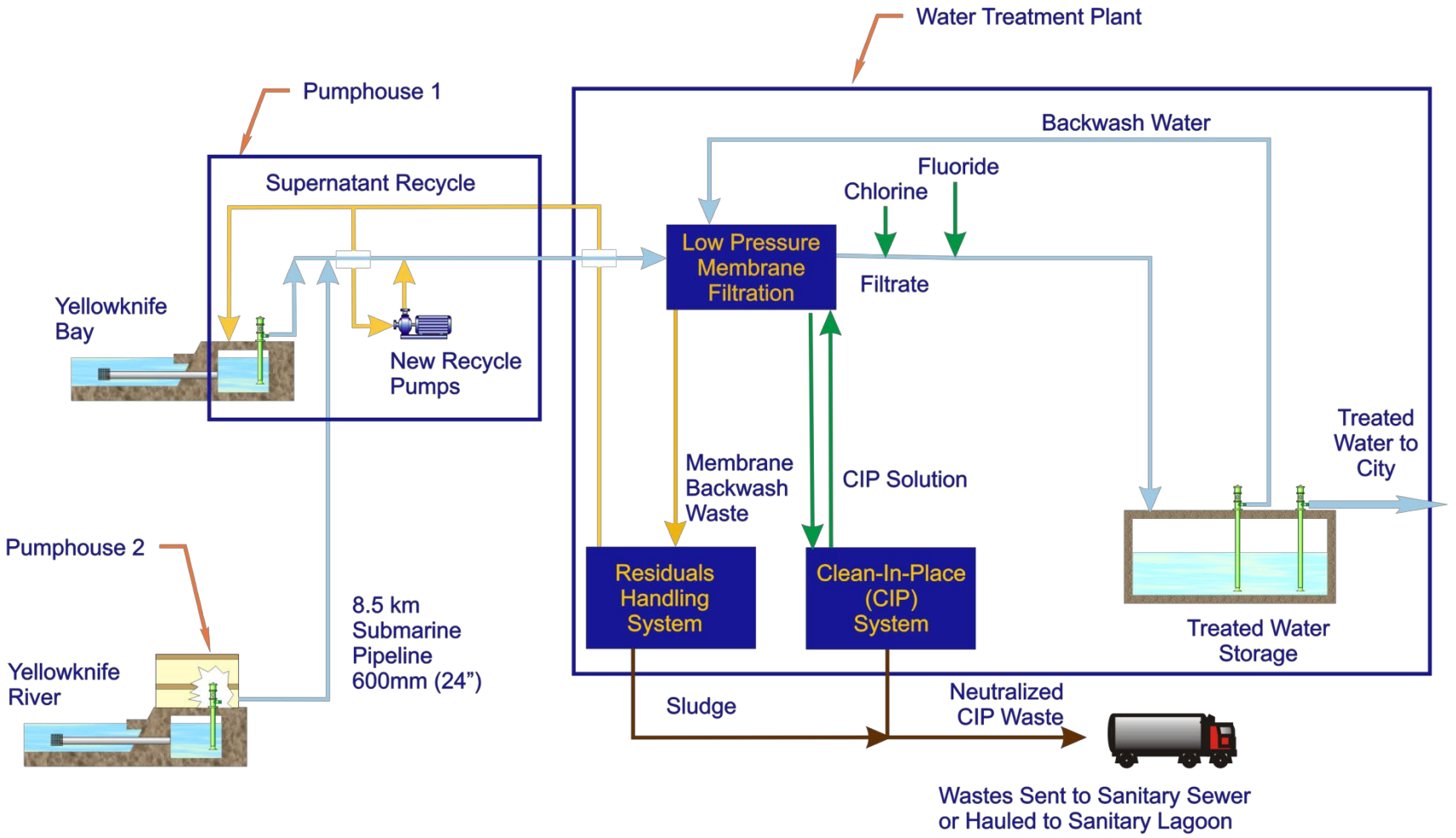
~~– Ion exchange~~

– Granular adsorptive media ?
- Simplest operation and residuals disposal
- Performance at estimated upset conditions is unknown

~~– RO~~
- Most effective, but also most complex and expensive
- No feasible way to dispose of residuals (brine) for Yellowknife WTP

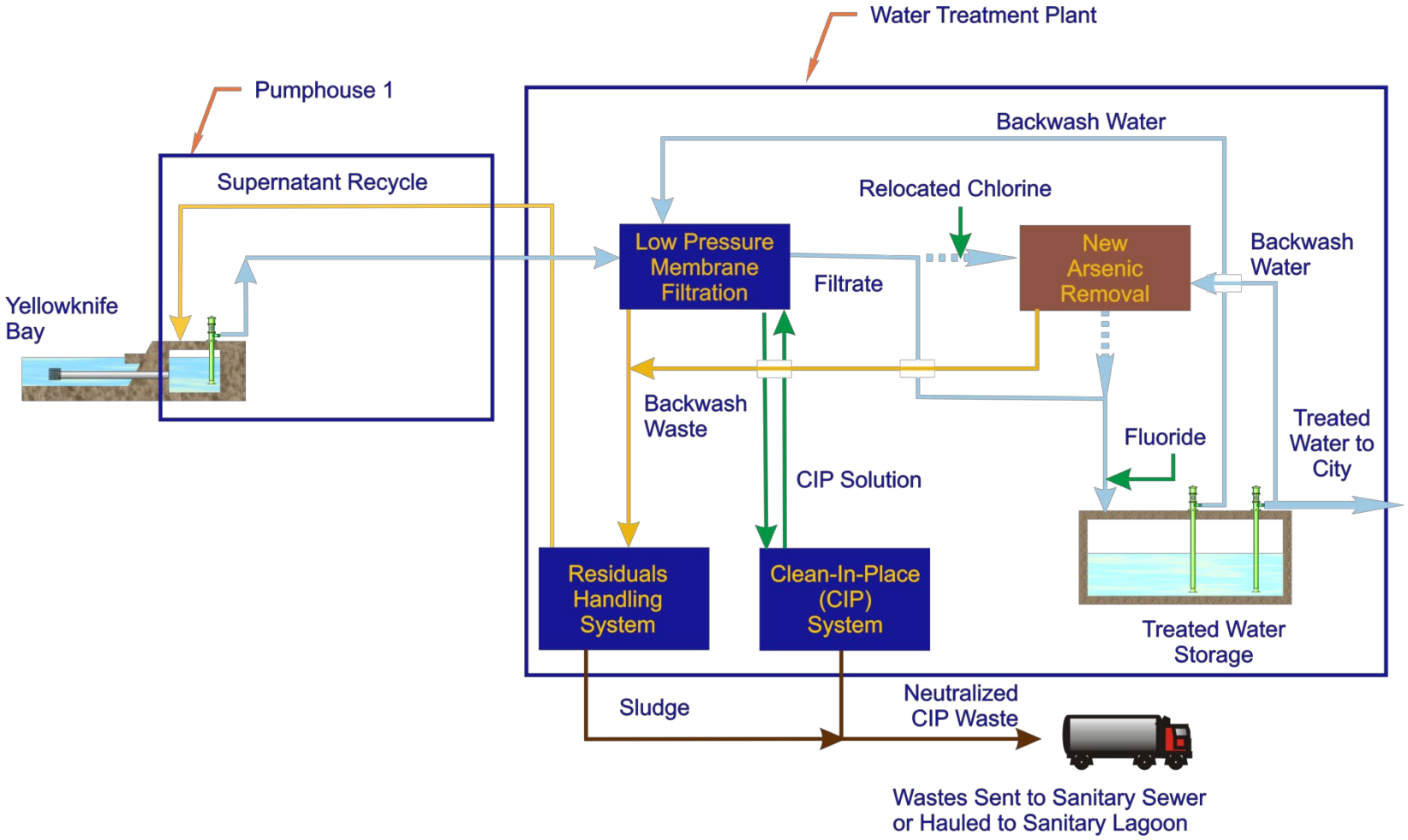
AECOM

Water Supply Option 1 – Yellowknife River



AECOM

Water Supply Option 2 – Yellowknife Bay



AECOM

Conceptual Cost Estimates

	Option 1 River Source	Option 2 Bay Source
Total Estimated Capital Cost	$27,790,000	$9,340,000
Annual Estimated O&M Cost	$300,000	$510,000
25-year Life Cycle Cost (Net Present Value)	$33,000,000	$18,200,000

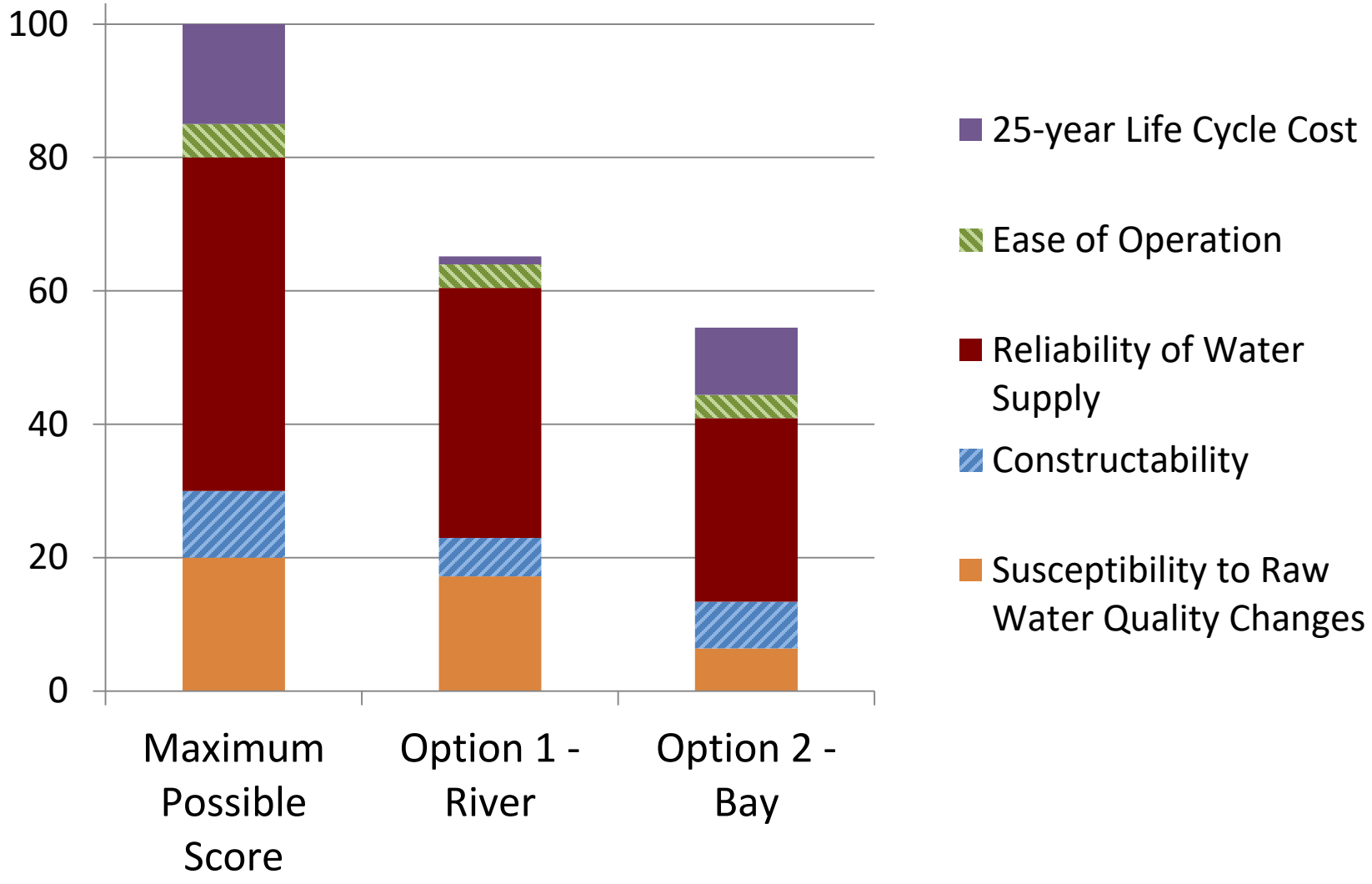
Decision Model Evaluation

AECOM

Decision Model Criteria

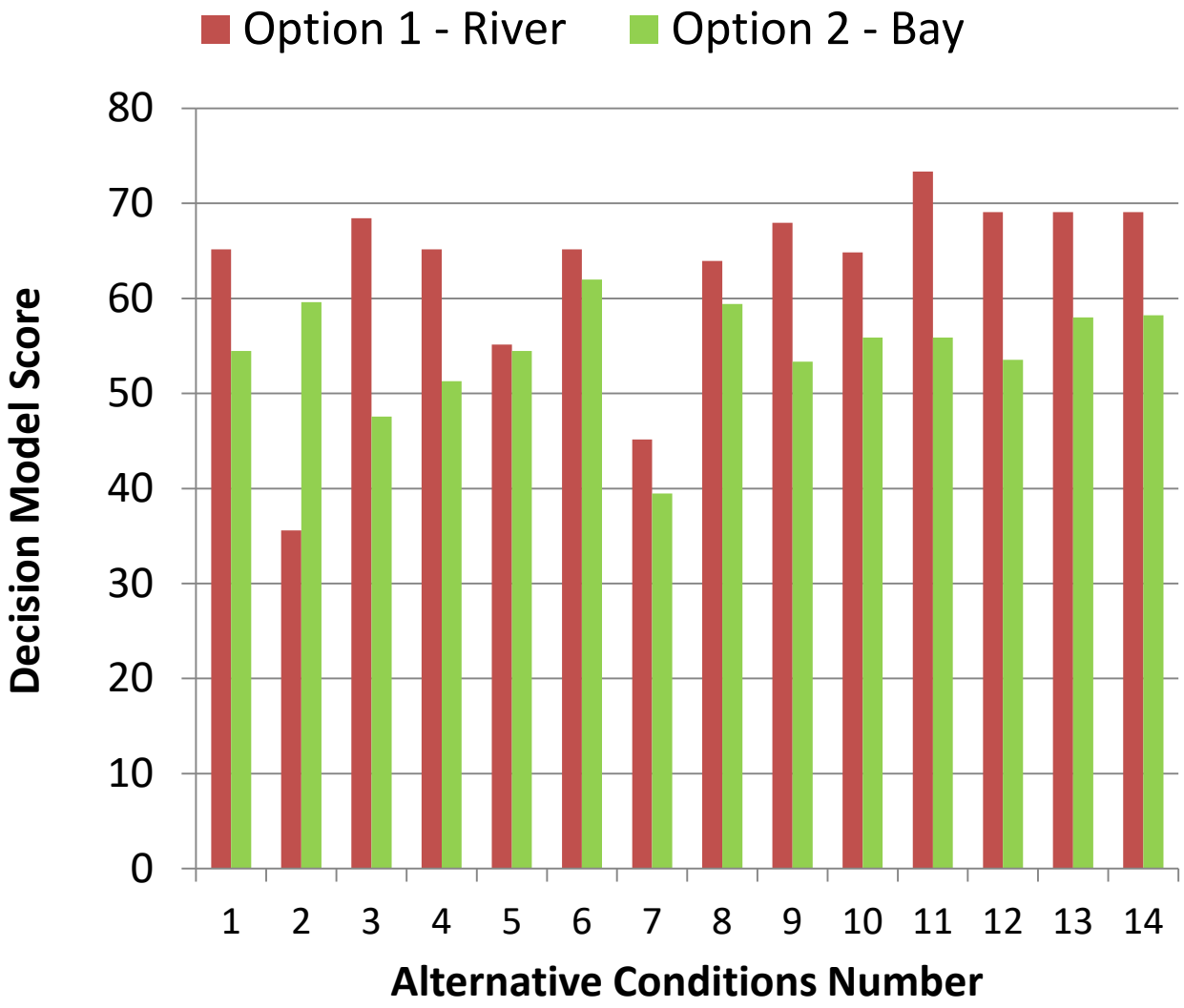
Criteria	Weight	Sub-criteria	Sub-weight	Overall Weight
Susceptibility to Raw Water Quality Changes	20%	Arsenic	80%	16%
		Organics	20%	4%
Constructability	10%	Schedule	25%	2.5%
		Ease of Construction	50%	5%
		Impact on Existing Operation	25%	2.5%
Reliability of Water Supply	50%	Infrastructure Failure	50%	25%
		Process / Operation / Monitoring Failure	50%	25%
Ease of Operation	5%	Ease of Operation	100%	5%
25-year Life Cycle Cost	15%	20-year Life Cycle Cost	100%	15%

Decision Model Results



AECOM

Sensitivity Analysis



AECOM

Recommendation

– Yellowknife River is the higher rated option
  - River LCC = $33.0 million
  - Bay LCC = $18.2 million
  - Bay option includes risk that treatment process may not produce safe potable water in the event of berm failure at Giant Mine

Thank You!

Yellowknife Potable Water Source Selection Study
January 15, 2018
Cortney McCracken and David Huebert
60541637

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CITY OF YELLOWKNIFE
OFFICE OF THE MAYOR

January 10, 2019

Honourable Minister Wally Schumann
Minister of Infrastructure
PO Box 1320
Yellowknife, NT X1A 2L9

Dear Mr. Schumann,

RE: Yellowknife Potable Water Source

The City of Yellowknife is requesting financial support from the Government of the Northwest Territories for the replacement of our capital city's potable water source. The submarine pipeline that provides potable water to the City's water treatment plant from the Yellowknife River was originally installed in 1969 and has reached the end of its useful life. Replacement costs are significant and the City is seeking support from other orders of government, given the history, scope, magnitude and importance of this essential infrastructure.

In 2017, the City of Yellowknife commissioned a comprehensive engineering report completed by AECOM Canada Ltd to analyze the costs and risks associated with the two options Yellowknife has for distinct potable water sources through an evaluation matrix - the Yellowknife River and Yellowknife Bay, having estimated life cycle costs of $33M and $18.2M respectively. This report was also put under scrutiny of a third party review completed by Dillon Consulting Ltd.

Both professional engineering companies recommended that the City of Yellowknife should retain the Yellowknife River as the potable water source and schedule replacement of the submarine pipeline right away.

It has been well documented that the reason for this high-cost asset is to protect Yellowknife's water supply from the historic and legacy impacts that mining activities have had on our natural environment. Despite extensive lobbying by the City during the environmental assessment process, the mandate of the Giant Mine Remediation Project does not include the off-site consequences of historic mine activities. This means the City of Yellowknife is left on its own to seek a constructive solution for the replacement of this significant essential infrastructure, to ensure safe and reliable water supply for the City and Yellowknives Dene First Nation and one that does not leave our residents with the significant cost of replacing this potable water infrastructure.

The City of Yellowknife and our residents are facing increased pressures from external sources. In 2015, our water treatment plant was commissioned at a cost of approximately $30M due to changes in territorial legislation (*Public Health Act*). The current situation with our potable water source is a direct impact of Giant Mine. The City's water licence is expiring in 2022, and renewal efforts have been initiated. Early discussions indicate the potential for more stringent regulations regarding municipal sewage treatment, which could impose further costs on Yellowknife and NWT communities in the future.

Taking these pressures into consideration, along with other cost of living increases such as increasing electrical and fuel costs, the City of Yellowknife requires additional funding to help offset direct cost impacts to the municipality and our residents. We are exploring a range of funding options, including those at the federal level, but have yet to receive any indications of support. This is an urgent issue for our community and the Yellowknife region.

We are able to provide all documentation and research completed to date to support the City's current position regarding our clean drinking water source. I look forward to discussing this matter further with you to explore how the GNWT can support Yellowknife.

Sincerely,

Rebecca Alty
Mayor of Yellowknife

cc:
Michael McLeod, Member of Parliament for Northwest Territories
Honourable Alfred Moses, Minister of Municipal and Community Affairs
Yellowknives Dene First Nation Chiefs
Yellowknife Members of the Legislative Assembly
Sheila Bassi-Kellett, City Administrator

(DM#544712)

CITY OF YELLOWKNIFE

MEMORANDUM TO COMMITTEE

COMMITTEE: Special Governance and Priorities

DATE: April 29, 2019

DEPARTMENT: Public Works & Engineering

ISSUE: Whether to select the Yellowknife River as the City of Yellowknife's primary source for drinking water, and proceed with the replacement of the submarine water line.

RECOMMENDATION:

That:

1. Council select the Yellowknife River as the City of Yellowknife's primary source for drinking water;
2. Council authorize the Mayor and City Administrator to enter into a contribution agreement with the Government of Canada for a maximum federal contribution of $25,862,218 (75% of the anticipated project budget) for the replacement of the submarine drinking water supply line through the Disaster Mitigation and Adaptation Fund (DMAF);
3. The City of Yellowknife is responsible for the remaining 25% of the project budget; and
4. Council direct Administration to seek funding for the City's obligation of 25% of the project budget.

BACKGROUND:

Piped water supply in Yellowknife commenced in 1948 from Yellowknife Bay. In the time period between 1948 and 1968 health concerns were raised by members of the public regarding arsenic contamination emanating from the gold mines, and particularly contamination of the drinking water. In 1967, the Government of Canada, Con Mine and Giant Mine each contributed one third of the cost of the installation of the submarine water supply line. The construction of the water supply line was completed in 1969, bringing the current age of the pipe to 50 years in 2019.

In 2017, the City of Yellowknife commissioned a comprehensive engineering study (the Study) completed by AECOM Canada Ltd (AECOM) to analyze the costs and risks associated with the two options Yellowknife has for distinct drinking water sources through an evaluation matrix - the Yellowknife River and Yellowknife Bay, having estimated life cycle costs of $33M and $18.2M

respectively. The recommendation was based on a robust decision matrix which took into consideration factors such as:

- Susceptibility to raw water quality changes;
- Constructability;
- Reliability of water supply;
- Ease of operation; and
- Life cycle cost.

The recommendations from the Study were presented to Council on January 15, 2018.

On January 18, 2018, Dillon Consulting Ltd (Dillon) completed a third party review of the Study. Both professional engineering companies recommended that the City of Yellowknife should retain the Yellowknife River as the drinking water source and schedule replacement of the submarine pipeline right away.

On June 11, 2018, City Council passed a motion directing Administration to submit an expression of interest to the Government of Canada's Disaster Mitigation and Adaptation Fund (DMAF) sponsored by Infrastructure Canada, the first milestone in the application process. The City of Yellowknife learned in October 2018 that the expression of interest provided the framework necessary to advance the project to the next phase of the application process. City Administration filed a full application on January 11, 2019 to meet the final deadline of the DMAF process. The final application consisted of input from various City departments, local businesses and strong letters of support from Indigenous partners such as Yellowknives Dene First Nation (YKDFN) and North Slave Metis Alliance (NSMA).

On March 13, 2019, the Government of Canada announced that Yellowknife was a successful application to the DMAF program and would receive funding of $25,862,218.00, which represents 75% of the total project costs. The City received a letter from the Minister of Infrastructure and Communities stating the approval of the project in principle.

COUNCIL POLICY / RESOLUTION OR GOAL:

Council Goal #4: Community Sustainability

Motion #0208-18 That Council direct Administration to submit an Expression of Interest (EOI) to the Disaster Mitigation and Adaptation Fund (DMAF) to provide financial support for:

- Water Intake Line replacement costs;
- A Greenhouse Gas Mitigation Assessment;
- Flood and arsenic hazard mitigation through natural infrastructure improvements;
- Creation of a Community Benefits plan.

APPLICABLE LEGISLATION, BY-LAWS, STUDIES, PLANS:

1. *Northwest Territories Public Health Act*; and
2. City of Yellowknife Potable Water Source Selection Study (December 6, 2017).

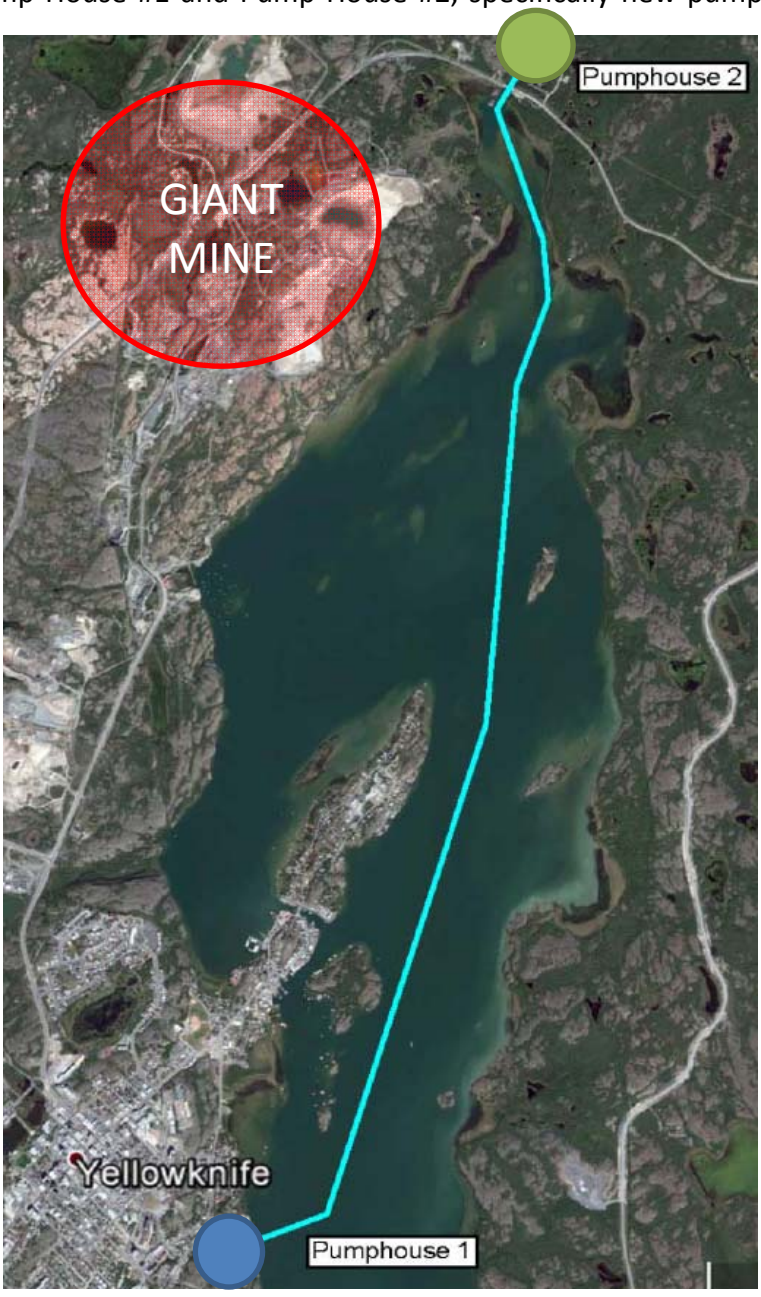
CONSIDERATIONS:

YELLOWKNIFE RIVER OPTION

Technical Considerations

The Study (2017) completed by AECOM identified the Yellowknife River as the primary drinking water source. The Study evaluated both water source options against a detailed and robust decision matrix process. A third party review completed by Dillon, confirmed the recommendation of the Study to retain the Yellowknife River as the primary drinking water source.

Retaining the Yellowknife River as the City's primary source of drinking water requires the replacement of the submarine water line that connects the Water Treatment Plant to Pump House #2 at the Yellowknife River, as the water line has reached the end of its useful life. It will also require facility upgrades at both Pump House #1 and Pump House #2, specifically new pumps to accommodate the new water line.



The replacement of the submarine water line also means that additional arsenic treatment processes are not required at the Water Treatment Plant. This removes the requirement for a process that would add complexity for Operators, as well as higher annual operation and maintenance costs. Additionally, it is difficult to test the ability of arsenic treatment processes to remove arsenic at the abnormally high concentrations that would occur during upset limit conditions, which calls into question the effectiveness of arsenic treatment during an extreme event.

Financial Considerations

The replacement of the submarine water line has the highest capital cost implications compared to Yellowknife Bay option, with total life cycle costs estimates of $33M, as detailed in the Study. However, this presents lower annual operation and maintenance costs because there is no complex addition to the water treatment process, which would be required for the Yellowknife Bay option. It effectively maintains the operations at both Pump House #1 and Pump House #2 that the City currently operates.

The acceptance of the DMAF contribution requires the City of Yellowknife to fund the remaining 25% of the project costs, and will need commitment from City Council via motion and subsequently inclusion in the City's budget process. Administration will continue to seek other streams of funding from other orders of government and government programs to cover City's obligations under the DMAF contribution agreement.

The announcement of the City's success in obtaining DMAF funding of $25,862,218.00 significantly lessens the impact on the capital reserve fund. Not only is the Yellowknife River the preferred and recommended water source, the DMAF funding contribution now makes this the most cost effective option.

Key Stakeholder Support

The City of Yellowknife provides clean drinking water to YKDFN communities of Ndilo and Dettah. The City has received strong letters of support from both partner communities to retain the Yellowknife River as the primary drinking water source for all three communities, and to replace the aging water line infrastructure. These letters of support were instrumental in the success of the DMAF application process.

YELLOWKNIFE BAY OPTION

Technical Considerations

The Study (2017) completed by AECOM identified the Yellowknife River as the primary drinking water source rather than Yellowknife Bay. The evaluation matrix and respective weighting criteria favoured the Yellowknife River in all alternative scenarios with the exception of one. A scenario that heavily weighted life cycle costing over all other criteria ranked Yellowknife Bay over the Yellowknife River source. However, cost cannot be the determining factor when choosing a community's drinking water source.

Choosing Yellowknife Bay over the river source would require the addition of an arsenic treatment component to the City's water treatment process. Aside from capital cost expenditures, an arsenic treatment process adds both complexity and higher operational and maintenance (O&M) costs to the

City's current operations. It would require additional certification, testing, regular testing and maintenance to ensure functionality in the case of an event, all adding to higher cost of operation.

As previously mentioned, it is difficult to test the ability of arsenic treatment processes to remove arsenic at the abnormally high concentrations that would occur during upset limit conditions, which calls into question the effectiveness of arsenic treatment during an extreme event.

Financial Considerations

Strictly from a capital cost perspective, the Yellowknife Bay source option, and accompanying arsenic treatment, is the lowest cost option but also has annual operational costs that are estimated to be 67% higher than the Yellowknife River option. Typically there is funding from other orders of government available for the capital cost expenditures for projects, but no allocations for additional O&M costs associated with projects. Operation and maintenance costs of large capital projects are arguably the most difficult for municipalities to bear.

The success and magnitude of the DMAF funding contribution has effectively made the Yellowknife Bay water source option, and associated arsenic treatment process, the higher cost option. The DMAF funding is specifically allocated for the replacement of the submarine water supply line and cannot be re-profiled to other projects.

The selection of Yellowknife Bay as the primary water source would require the City of Yellowknife to decline the DMAF contribution and search for funding to advance the installation of an arsenic treatment process.

OTHER CONSIDERATIONS

Environmental

As per the agreement in principle (AIP) with the Government of Canada, the project will need to undergo an environmental site assessment (ESA) process under the *Mackenzie Valley Resource Management Act*. The City of Yellowknife will complete the ESA and will use it as a guiding document for the entire project to ensure compliance with all environmental and regulatory requirements.

Public Consultation

There will be several opportunities for public engagement throughout the various stages of the project. As the planning process for the project advances, the City will highlight various milestones where public involvement will be sought.

Legislative

The City of Yellowknife has a public and legal duty under the *Public Health Act* to provide safe and clean drinking water to the residents of Yellowknife, Ndilo and Dettah. The replacement of the submarine water line maintains the Yellowknife River as the drinking water source. It is upstream of any major industry or presence of contamination

Tentative Milestones

The DMAF funding horizon extends to the 2027-2028 calendar year; however City Administration has developed a tentative schedule and anticipates a final project completion date of 2023. This tentative

schedule is subject to change as the planning, design and regulatory processes move forward with work commencing in 2019.

ALTERNATIVES TO RECOMMENDATION:

That:

1. Council select the Yellowknife Bay as the City of Yellowknife's primary source for drinking water and direct Administration to seek funding opportunities to add an arsenic treatment component as part of the City's water treatment process; and

2. The City decline a funding agreement with the Government of Canada to replace the submarine water line.

RATIONALE:

Due to the age of the asset, the City of Yellowknife has included the water line replacement as part of the capital planning process. The City has two choices, retain the Yellowknife River as the primary water source while using Yellowknife Bay as an emergency source, or change the primary water source to Yellowknife Bay, which would require arsenic treatment processes to be installed in the water treatment plant.

After the completion of a comprehensive engineering report, and third party review in 2017-18, it was recommended to retain the Yellowknife River as the City's drinking water source and therefore replacement of the submarine water line. Detailed in the report is a robust evaluation matrix that compared and evaluated each water source against several criteria such as susceptibility to raw water quality changes, constructability, reliability of water supply, ease of operation and life cycle costs.

Having received direction from Council, the City has successfully received federal funding account of 75% of the total project costs through the Disaster Mitigation and Adaptation Fund, requiring the City of Yellowknife to account for the remaining 25%. The funding received has been identified and approved specifically for the replacement of the submarine drinking water line, and retention of the Yellowknife River as the City's primary water source. Choosing a different water source option would forego this funding opportunity and the City would need to seek funding sources for the Yellowknife Bay option.

Additionally, the City provides safe and clean drinking water for our neighbouring communities of Ndilo and Dettah. The Yellowknives Dene First Nation (YKDFN) have provided strong letters of support for the replacement of the submarine water line, as well as the North Slave Metis Alliance (NSMA). Our Indigenous partners have played a key role in Yellowknife receiving this federal funding allocation and have expressed that this is the only option for consideration.

ATTACHMENTS:

Letter of Approval In Principle, Government of Canada (DM#554184).

Prepared: MARCH 25, 2019; CG/
Revised: APRIL 10, 2019; CG/dmg

Minister of Infrastructure
and Communities

Ministre de l'Infrastructure
et des Collectivités

Ottawa, Canada K1P 0B6

Her Worship Rebecca Alty
Mayor
City of Yellowknife
4807 - 52 Street, P.O. Box 580,
Yellowknife, Northwest Territories X1A 2N4

MAR 0 7 2019

Dear Madam Mayor:

I am pleased to inform you of the approval in principle of the Flood Hazard Mitigation for the Yellowknife Region: Securing Our Water Source and Enhancing Our Ecological Assets to Address Environmental Risks Resulting from Climate Change Project (the Project). This approval is given following the successful review of your Project under the terms and conditions of the Disaster Mitigation and Adaptation Fund (DMAF).

Federal funding of the Project from the DMAF will be up to 75 percent of the total eligible project costs, to a maximum federal contribution of $25,862,218 under this program. Federal funding from all sources cannot exceed 75 percent of the Project's total eligible costs.

With this approval in principle, eligible costs as determined under the terms and conditions of the DMAF and incurred as of the date of this letter will be eligible for federal reimbursement subject to the timely execution of a contribution agreement. If a contribution agreement is not signed, the Government of Canada will not reimburse any costs incurred. Once signed, the contribution agreement represents the final federal approval of the Project.

As we move to the contribution agreement stage, the following conditions will also apply:

- Expenditures incurred prior to the date of this letter, as well as any and all expenditures related to contracts signed prior to the date of this letter, are ineligible for reimbursement with the exception of costs incurred to complete the greenhouse gas assessment which are eligible for a period of up to twelve months prior to the project approval in principle date;

- Private land acquisition expenditures related to natural infrastructure projects are eligible under the following conditions: that the land acquisition is not the only

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project component; that the City of Yellowknife submits a justification, acceptable to Canada, for the need to acquire land as an integral aspect of the project; the City of Yellowknife demonstrates that the land will be used as natural infrastructure; that the City of Yellowknife demonstrates how the land will remain protected in perpetuity; and the City of Yellowknife provides an attestation that the price is at, or below, fair market value;

- The City of Yellowknife must complete the land acquisition process for the Project before any funding related to the construction of the specific project component requiring land acquisition can be provided by the Government of Canada;

- The City of Yellowknife will satisfy the Government of Canada with respect to the competitive and transparent tendering process to be established;

- Regardless of the outcome of any of the project tendering processes, all ineligible costs, cost increases or overruns, and any costs related to the ongoing operation and maintenance of the Project, will be the responsibility of the City of Yellowknife;

- The City of Yellowknife agrees to work with Infrastructure Canada (INFC) to jointly communicate Canada's funding commitment as soon as possible and to invite Canada to participate in future media announcements or events related to the project's progress and, where appropriate, to produce and erect temporary signage at each of the project sites acknowledging the federal government's contribution to the Project in accordance with the signage guidelines to be provided by the Government of Canada;

- Prior to signing a contribution agreement, the City of Yellowknife will provide the Government of Canada with evidence that all project funding, other than the federal contribution, has been secured;

- The City of Yellowknife and the Government of Canada will work to complete the negotiation of a contribution agreement in a timely manner and to this end the City of Yellowknife will provide cash flows by fiscal year for all project components, a clear indication of how the Project will contribute to one or more of the program outcomes and benefits as well the indicators that will be used to report on the outcomes and benefits at the Project's substantial completion;

- Canada has determined that there is an environmental assessment requirement for this Project under the *Mackenzie Valley Resource Management Act*. No site preparation, vegetation removal or construction can occur and Canada will not pay eligible capital costs until environmental assessment requirements as outlined in the Agreement are met and continue to be met, when applicable. A letter specifying requirements will follow;

- Canada has determined that there is a legal obligation to consult with Aboriginal groups under section 35 of the *Constitution Act, 1982* for this Project. No site

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preparation, vegetation removal or construction can occur and Canada will not pay eligible capital costs until Aboriginal consultation and accommodation requirements are met and continue to be met, when applicable as determined by Canada. A letter specifying requirements will follow;

- A greenhouse gas emissions assessment must be completed to Canada's satisfaction in accordance with the *Climate Lens General Guidance* and submitted to Canada, prior to Canada paying any claims for the project;

- The City of Yellowknife will report on community employment benefits provided to at least three of the federal target groups (apprentices, Indigenous peoples, women, persons with disabilities, veterans, youth, new Canadians, or small-medium-sized enterprises and social enterprises); and

- The City of Yellowknife is also encouraged to consider the economic development and employment opportunities of the local and affected first nations in the construction of the project.

Due to the competitive nature of DMAF, changes to the scope of the Project require careful review and approval by Canada. In addition, I note that the project application you have submitted specifies that project construction is planned to get underway in October 2020 and be completed in October 2023. As your Project is being approved in principle on the basis of this information, please notify my officials, in writing, should you expect delays of more than six months in either the start or completion date. The Project must be completed prior to the end of the program (March 31, 2028), including submission of claims for eligible expenditures.

My officials will contact you shortly to move forward with the negotiation of the Contribution Agreement.

Thank you for your collaboration to date and I look forward to continuing to work together to conclude a contribution agreement for this project in a timely fashion.

Yours sincerely,

Honourable François-Philippe Champagne, P.C., M.P.
Minister of Infrastructure and Communities