

# Edmonton Water Integrated Resource Plan (WatIRP)

Audrey Cudrak, Director Water Treatment Plants

Mark Mathon, Director Water Distribution & Transmission

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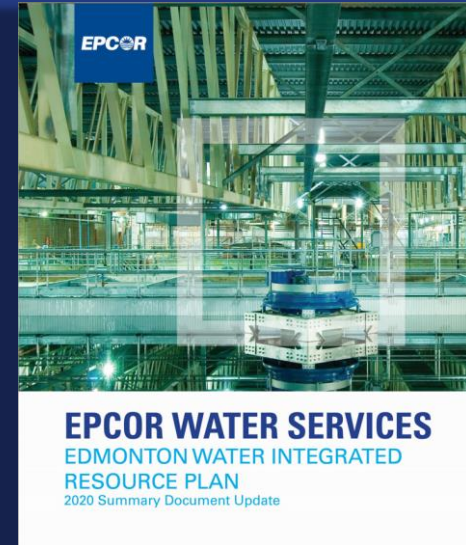
City of Edmonton Utility Committee

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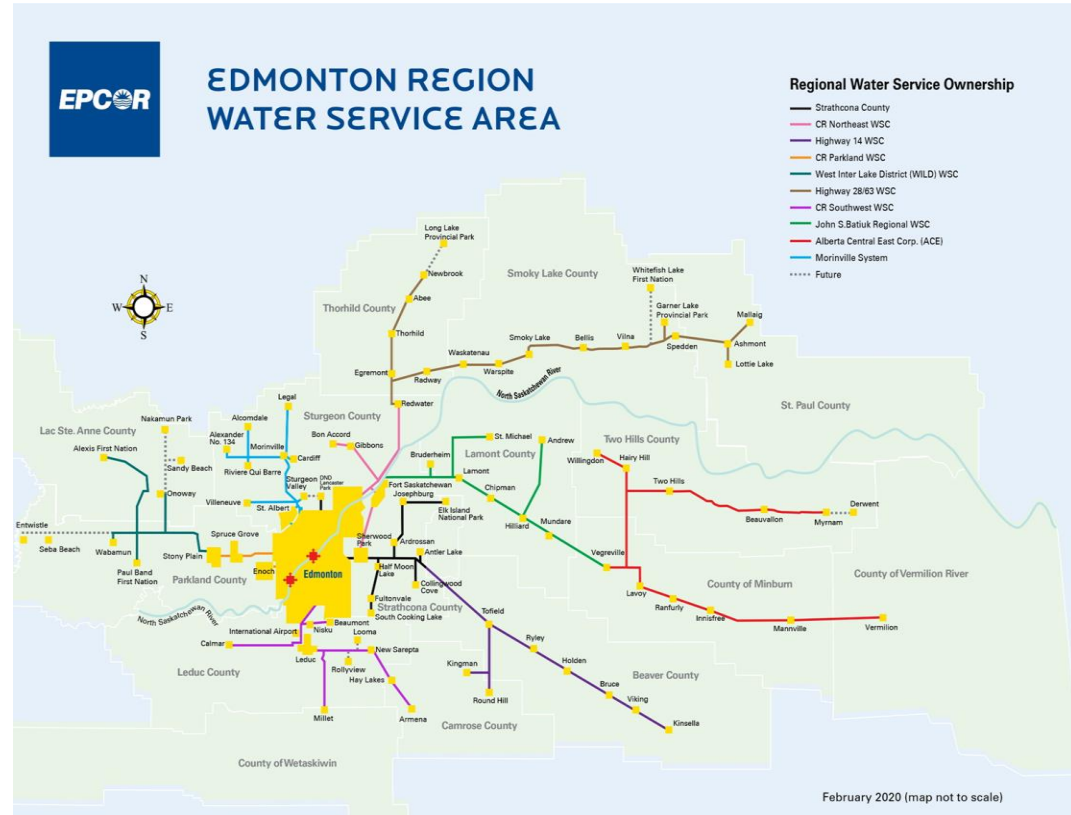
# Why We're Here Today

- Update Utility Committee on the status of our water system
- Share the principles used to develop the WatIRP
  - Risk and resilience focus
  - Less focus on growth in the short term
- Provide updates on some current initiatives
- Highlight some key projects for the next few years
- Show alignment with City objectives



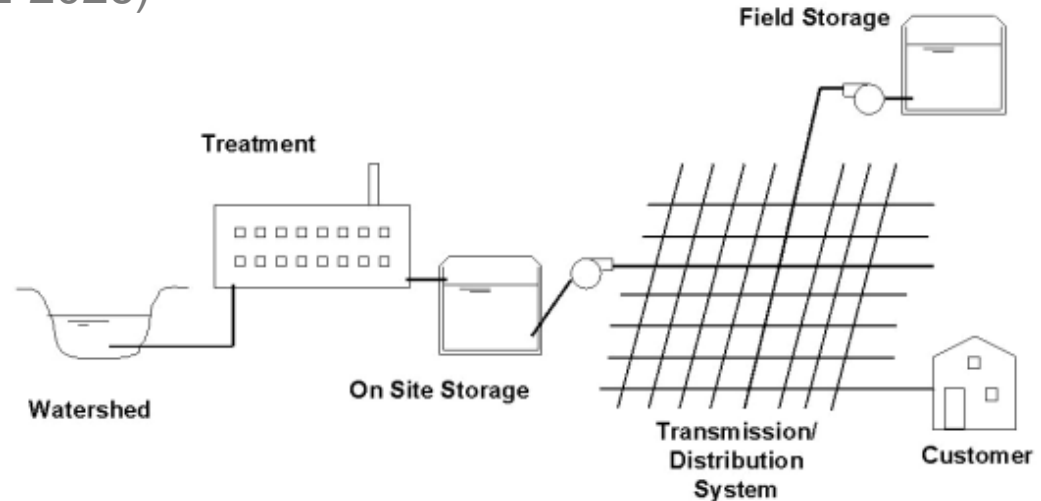
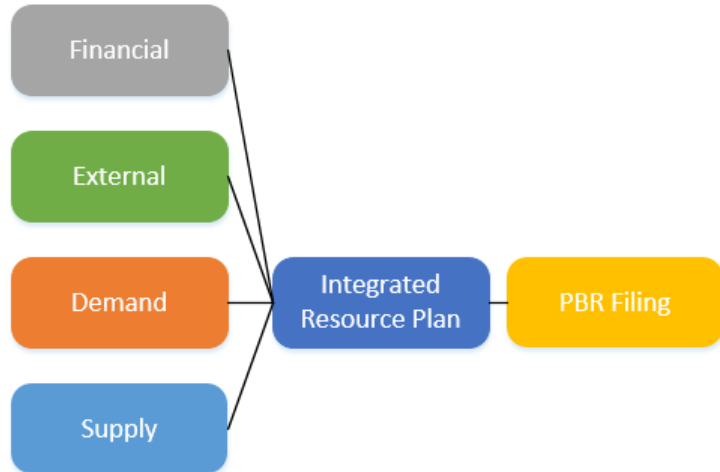
# Water System at a Glance

- North Saskatchewan River (NSR) source
- 2 water treatment plants (WTPs)
- > 4,100 km of distribution and transmission mains
- 13 reservoirs and 7 booster stations
- Average daily demand 375 ML/d
- Population served
  - Edmonton: > 900,000
  - Greater Edmonton region: > 1.3 M



# Integrated Resource Planning (IRP)

- Holistic, iterative and integrated planning process
- The uncertainty of a changing future requires EWSI to be adaptive and agile in managing internal and external risks
- 15-year horizon with primary focus on the upcoming performance based rates application (PBR 5: 2022-2026)



# External: Climate Change

**Insight:** Water quality in the NSR is expected to change with varying precipitation patterns and river flows.

- Water treatment becomes more challenging
- Elevated and sustained high colour events occurred in 2016, 2019 and 2020 that reduced WTP production and increased operational costs
- Solution: Continue building resilience in treatment process to handle variability






NSR raw water from May 2020

# External: Climate Change (con't)

**Insight:** The greatest risk to the operations of the WTPs regarding climate change is flooding of the NSR as both WTPs are located in the river floodplain.

## Edmonton WTPs Flood Plan

		PBR 4 (2017-2021)			PBR 5 (2022-2026)					PBR 6 (2027+ )			
		2019	2020	2021	2022	2023	SEP	2024	2025	2026	2027	DEC	2028+
	WTP Critical Asset Protection						END ACRP GRANT					END DMAF GRANT	
	WTP Backflow Prevention												
	WTP Embankments												

ACRP - Alberta Community Resilience Program (Provincial)  
DMAF - Disaster Mitigation and Adaptation Fund (Federal)

# External: Regulation

**Insight:** Remain engaged with our Regulators to determine how to prepare and best meet future Standards and Guidelines.

## Lead Management – 2019 Health Canada Guideline (10 µg/L to 5 µg/L)

Accelerated lead service replacement program	Underway
Addition of lead corrosion inhibitor (orthophosphate)	Commencing 2022

## Residuals Management

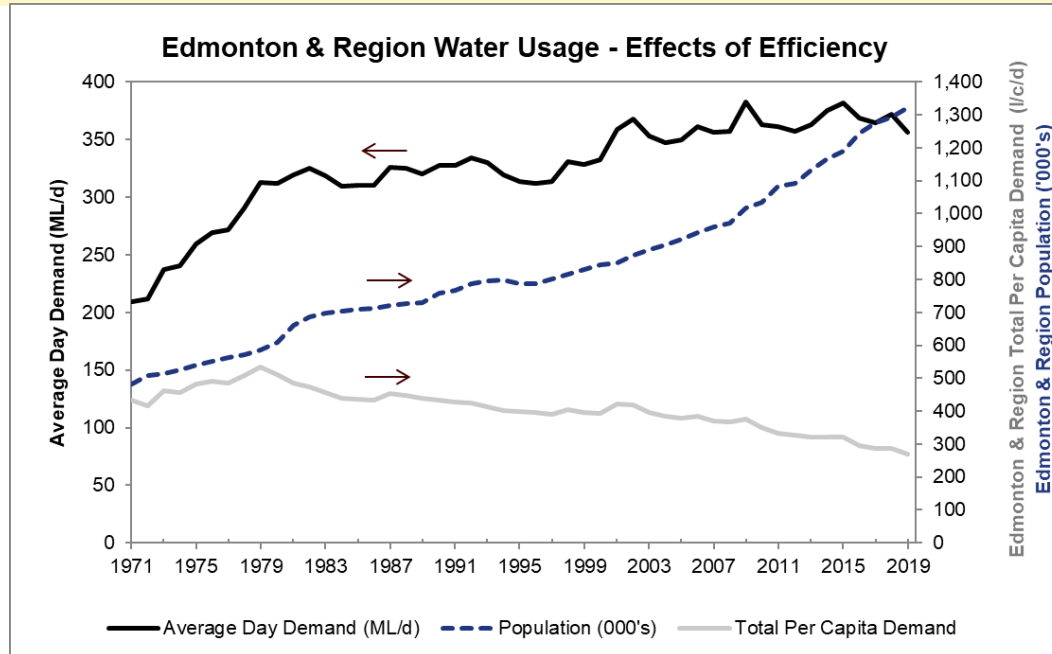
Commitment to continual improvement and impact assessment	Ongoing
Direct filtration (DF) operation in winter months	Ongoing
Deep bed filters to extend DF mode	Future (2032+)

## Aluminum – Potential future guideline

Monitor

# Demand: Water Use Trends

**Insight:** Total water demand (Edmonton + Regional) has grown due to population growth, however the impact has been reduced by declines in per person water consumption due to conservation and efficiency.

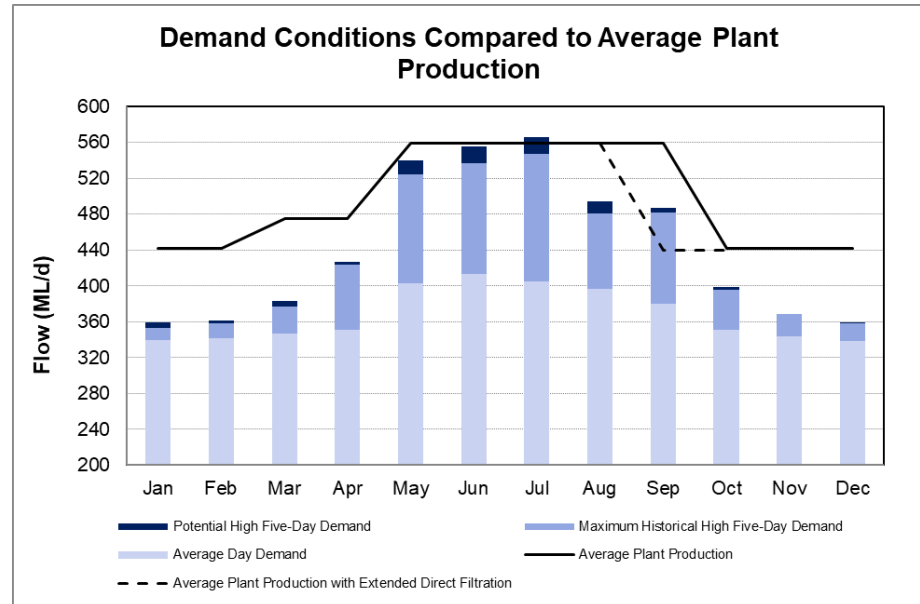




# Future Water Demand – Short Term

**Insight:** Short-term WTP upgrades are being driven operationally due to shutdown planning and resiliency requirements rather than growth in system demand.

- Average daily demands can be met in each month
- Reservoir storage and demand management can mitigate demand peaks in the short term before WTP capacity upgrades are required



# Supply: Water Treatment Plants

**Highlight:** The WTPs continue to exceed regulatory water quality requirements and meet customer demands, but they are experiencing challenges related to aging infrastructure and require additional redundancy for operational flexibility.

- Aging Water Treatment Plants:
  - Rossdale Plant 1 > 70 years, Plant 2 > 60 years
  - E.L. Smith > 40 years
- These operational challenges require rehabilitation and upgrades
- To complete the upgrades requires plant shutdowns that reduce WTP production
- Shutdowns are limited to 21 to 33 hours at the E.L. Smith WTP



Filter Underside  
Structural  
Degradation



# WTPs Short-Term Plan

**Conclusion:** Focus on operational resiliency of the E.L. Smith WTP with upgrades to allow for longer shutdowns, extend DF operation and provide green energy generation and storage for resiliency and climate change goals.

- Establish two separate treatment trains
- Resolve filter structural issues
- Proposed solar farm and battery energy storage system (BESS)



# Supply: Reservoir and Booster Stations

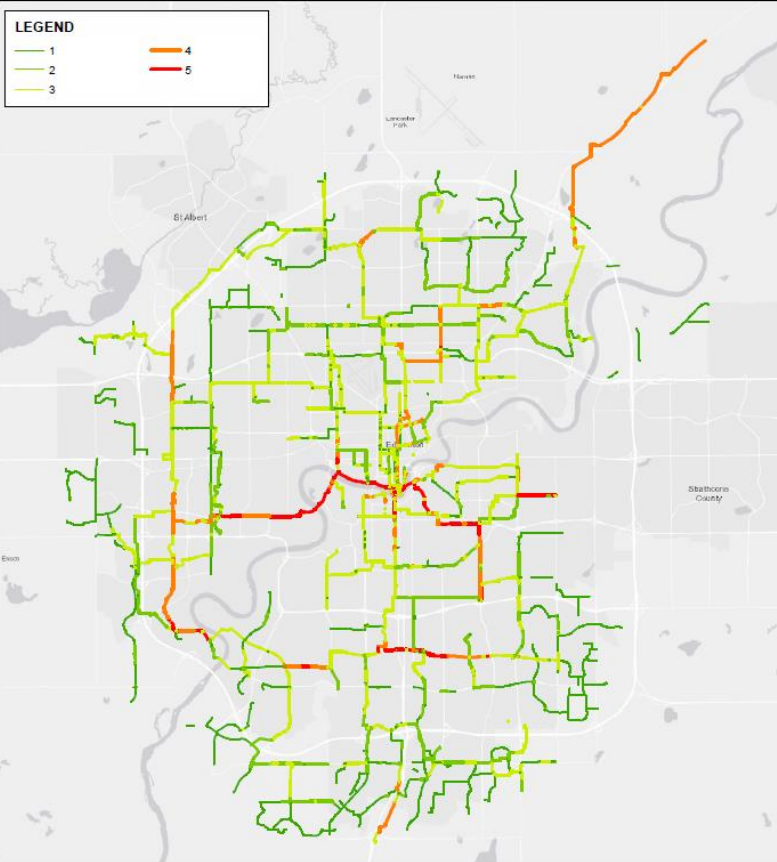
**Highlight:** The reservoirs and booster stations are an essential component of the transmission network and play an important role in maintaining service reliability.

- Life Cycle / Reliability:
  - Aging reservoirs require capital funds for condition inspection and rehabilitation to ensure reliability
- Growth:
  - New reservoirs are planned in the future (2027 and beyond)



Papaschase Reservoir

# Supply: Water Transmission Mains



**Highlight:** Transmission investment focuses on supporting future growth, as well as reducing system risk and increasing system reliability and resiliency.

## ■ Life Cycle / Reliability:

- Risk ranking allows EPCOR to focus on the highest risk mains in the transmission system (red) for proactive rehabilitation or replacement

## ■ Growth:

- Continued investment in transmission extensions where required



# Supply: Transmission (cont'd)

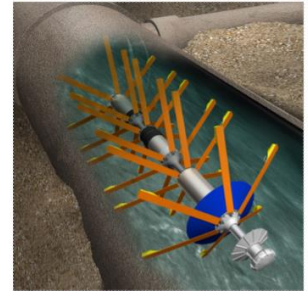
- A new transmission inspection capital program is proposed for PBR 5
  - Proactive inspection of highest risk mains
  - Targeted rehabilitation or replacement to increase remaining life and maintain system integrity

## SmartBall®



leak and air pocket detection

## PipeDiver®



pipe wall assessment

**xylem**  
Let's Solve Water

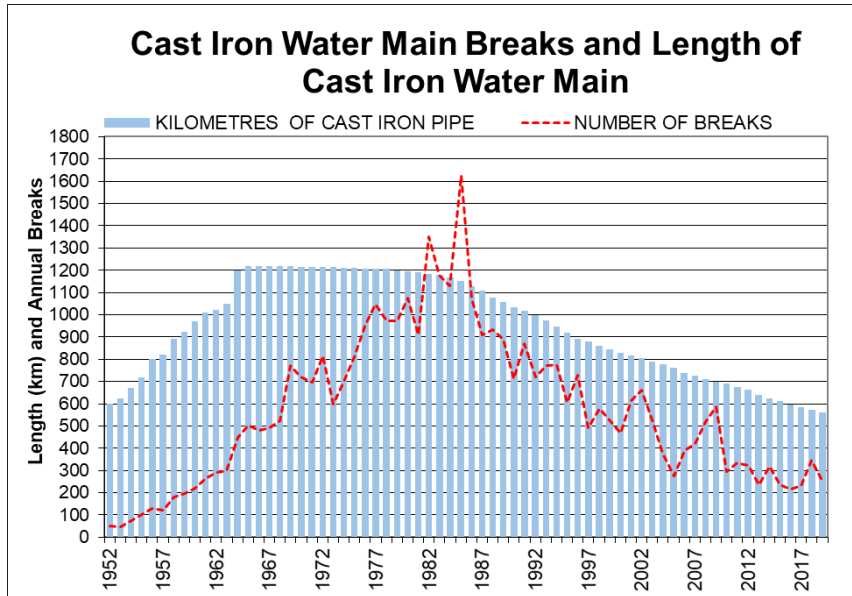
Source: Xylem, 2020. Presentation given to EPCOR on April 28, 2020 “EPCOR Northside Pipeline Condition Assessment.”

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# Supply: Water Distribution Mains

**Highlight:** Distribution investment reflects growth and life cycle / reliability requirements. Refocus from reactive cast iron replacement to a risk-based targeted approach.



- Life Cycle / Reliability:
  - Risk-based approach for prioritizing investment
- Growth:
  - Continue distribution system improvements to meet greenfield and infill growth objectives

# Capital Plan Highlights

## WHAT IS RESILIENCE?

"Resilience is the ability to cope with, and recover from, disruption, and anticipate trends and variability in order to maintain services for people and protect the natural environment, now and in the future."

Resilience Task and Finish Group,  
Summary Report 2015, adopted by Ofwat

- Projects are balanced to:
  - Minimize risk (and increase reliability, resiliency and sustainability)
  - Meet or exceed regulatory/HSE requirements
  - Achieve efficiency/performance improvements
  - Manage future growth

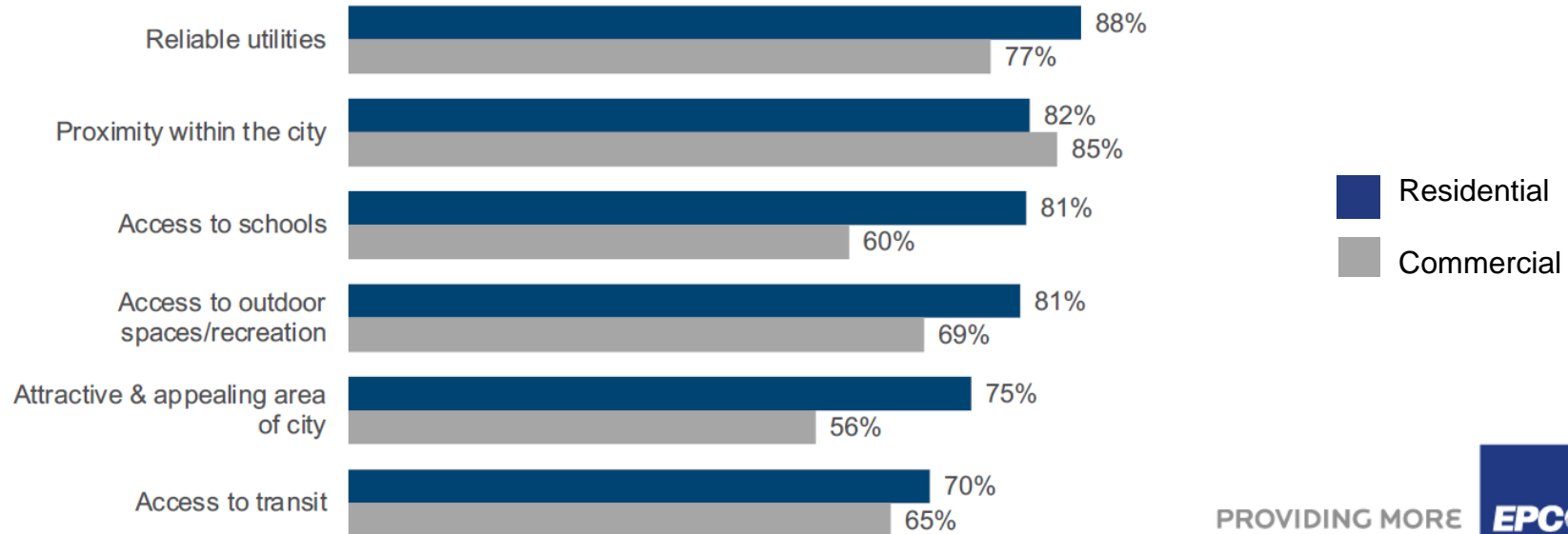


# City Plan Alignment

City Plan Value	How we Align	City Plan Value	How we Align
<b>Value: Live.</b> Expand infrastructure for redevelopment and intensification in priority growth areas.	<input checked="" type="checkbox"/> Infill Fire Protection Program, Risk Based Renewal Program, Transmission Mains & Appurtenances Program	<b>Value: Thrive.</b> Integrate the perspectives on Indigenous peoples through community engagement and reduce barriers to participation.	<input checked="" type="checkbox"/> Engagement work associated with E.L. Smith and Rossdale Plant Upgrades along with Flood Protection for WTPs
<b>Value: Live.</b> Align the capital and operation budget with growth priorities and budget planning.	<input checked="" type="checkbox"/> Network Private Development Transmission Mains, QE2/ 41 Ave. Transmission Main Crossing	<b>Value: Preserve.</b> Improve flood resilience through ongoing risk management, infrastructure planning and operation, financial analysis and stakeholder engagement.	<input checked="" type="checkbox"/> Integrated Watershed Management Strategy and Source Water Protection Plan, Watershed Monitoring Program, Climate Change Adaptation Strategy, Flood Protection for WTPs
<b>Value: Live.</b> Manage the impacts of climate change on assets in the design, maintenance and retrofit of buildings and infrastructure.	<input checked="" type="checkbox"/> Flood Protection for Water Treatment Plants, Solar Power and BESS at E.L. Smith WTP	Manage and protect the watershed and water supply to maintain the quality of Edmonton's drinking water supply.	

# Stakeholders Focus on Reliability

Edmontonians highly value the reliability of their utilities when assessing their community as a good place to live. Reliability is the #1 driver for residential customers and the #2 driver for businesses.



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# In Summary

- Short-term capital priority focuses on resiliency and reliability of existing water infrastructure
- Adapt to future uncertainties:
  - Changing river quality and flood protection of the WTPs
  - Upcoming regulations
  - Evolving customer water use
  - Population growth
- Continue to optimize risk-based asset management to drive operational improvements and prioritize capital planning
- Monitor and manage growth as required

# Questions?

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