

# Request for Industry Data on Water Saving

Administration met with representatives of the Building Industry and Land Development Association (BILD), the National Association for Industrial and Office Parks (NAIOP), Calgary Inner City Builders Association (CICBA), on April 2 to request data from the development industry that shows empirical evidence of which water saving measures are being leveraged in new community development and home construction, to inform the work on maximum water demand. The verbal request was followed up in writing the same day. BILD provided a response to Administration on May 9. Administration's request and BILD's response are included in this attachment.



April 2, 2024

BILD Calgary Region  
212 Meridian Road NE  
Calgary, AB  
T2A 2N6

Attention: Mr. Brian Hahn

Dear Brian Hahn,

As discussed earlier today, The City of Calgary would like to formally request submission of any data that shows empirical evidence of water saving measures being leveraged in new community development and home construction by **May 1, 2024**.

This request is pursuant to a 16 January 2024 amendment related to [Report IP2023-1264](#), carried by City Council:

*Direct Administration to report back in 2024 Q2 to the Infrastructure & Planning Committee with a detailed implementation plan, including specifics on deliverables, scope of work, by whom the work will be undertaken, resourcing, and timing, with topics to be addressed to include:*

- c. Request data from the development industry that shows empirical evidence of which water saving measures are being leveraged in new community development and home construction, to inform the work on maximum water demand.*

Thank you for your time, I look forward to your submission.

Sincerely,

A handwritten signature in black ink that reads "Black".

**Jennifer Black,**  
A/Coordinator, Growth Financial Strategies  
Growth Funding & Investment, City & Regional Planning  
The City of Calgary  
PO Box 2100, Station M, Calgary, AB, T2P 2M5  
[jennifer.black@calgary.ca](mailto:jennifer.black@calgary.ca)

**cc:** Debra Hamilton, A/GM Planning and Development Services  
Josh White, Director, City and Regional Planning  
Marcus Berzins, A/Manager, Growth Funding & Investment



April 2, 2024

CICBA Calgary  
P.O. Box 86089 Mardalooop  
Calgary, AB  
T2T 6B7

Attention: Mr. Shameer Gaidhar

Dear Shameer Gaidhar,

As discussed earlier today, The City of Calgary would like to formally request submission of any data that shows empirical evidence of water saving measures being leveraged in new community development and home construction by **May 1, 2024**.

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A/Coordinator, Growth Financial Strategies  
Growth Funding & Investment, City & Regional Planning  
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**cc:** Debra Hamilton, A/GM Planning and Development Services  
Josh White, Director, City and Regional Planning  
Marcus Berzins, A/Manager, Growth Funding & Investment



April 2, 2024

NAIOP Calgary  
600, 900 – 6<sup>th</sup> Avenue SW  
Calgary, AB  
T2P 3K2

Attention: Mr. Guy Huntingford

Dear Guy Huntingford,

As discussed earlier today, The City of Calgary would like to formally request submission of any data that shows empirical evidence of water saving measures being leveraged in new community development and home construction by **May 1, 2024**.

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**cc:** Debra Hamilton, A/GM Planning and Development Services  
Josh White, Director, City and Regional Planning  
Marcus Berzins, A/Manager, Growth Funding & Investment



May 9, 2024

Growth Funding & Investment  
City & Regional Planning  
The City of Calgary  
PO Box 2100, Station M  
Calgary, AB, T2P 2M5

Attention: Jennifer Black, A/Coordinator, Growth Financial Strategies

**Re: Development Industry Feedback on Empirical Evidence Related to Water-Saving Measures to Inform Work on Maximum Water Demand - IP2023-1264**

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Dear Jennifer,

Thank you for your April 2, 2024, letter requesting data from BILD members showing empirical evidence of water-saving measures being leveraged in new community development and home construction. We understand this request is being made pursuant to the January 16, 2024, amendment related to Report IP2023-1264, carried by City Council:

*Direct Administration to report back in 2024 Q2 to the Infrastructure & Planning Committee with a detailed implementation plan, including specifics on deliverables, scope of work, by whom the work will be undertaken, resourcing, and timing, with topics to be addressed to include:*

*c. Request data from the development industry that shows empirical evidence of which water-saving measures are being leveraged in new community development and home construction, to inform the work on maximum water demand.*

We appreciate the opportunity to share information about the measures the building and land development industry has implemented to reduce water demand to inform the work on maximum water demand. We provide the following feedback received from BILD members specifically related to:

- A. Water Use during Construction and Land Development
- B. Indoor Water Use
- C. Outdoor Water Use

## Background

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In terms of providing empirical data, The City of Calgary (the “City”) should have the best information regarding empirical evidence of water-saving measures, as the City has metering data on substantially all residential dwellings' water usage since 2014. In addition, EPCOR Water Services Inc. (EWSI) issued a study in June 2021 titled Water Use Trends and Guidelines Discussion Paper (EWSI's Discussion Paper) which summarizes the changing water use trends of EWSI's residential, multi-residential, commercial, and regional customers. An important finding in the EWSI Discussion Paper was the consideration that *“Per capita (person) residential consumption has been decreasing over time and will continue to decrease in the future..”*<sup>1</sup>

Similar to the water use trends found in EWSI's Discussion Paper, the City of Calgary's consumption metrics have decreased from 2003 through 2021, illustrating the impact of water-saving measures – see Drought Resiliency Plan. Due to a focus on installing water-saving measures in new community development and new homes, we understand the consumption per capita per day as measured at the City of Calgary's two water treatment plant outlets has decreased from approximately 525 litres/capita/day (l/c/d) to around 350 l/c/d which includes residential and commercial customers as well as system water losses. In terms of city-wide average end-user residential consumption only, we understand from City Administration's March 6, 2024, presentation to BILD, that the current usage is approximately 170 l/c/d.

We understand that the larger number (i.e., 350 l/c/d), as measured at the City of Calgary's two water treatment plant outlets includes water loss, which is reported in both Chris Tse's October 2023 email to BILD and in the noted March 6, 2024, presentation to be 285 l/connection/day, and equates to a system water loss of 22%. According to City data, 88% of the water lost is through system leaks. Given that each resident uses 170 litres of water per day, the system water loss due to leaks is akin to having an extra person and a half living in your home using water. In 2022, the water lost, specifically due to leaks, amounted to approximately 31.6 billion litres. Until these system water leaks are repaired, substantial improvements in water consumption per person are limited to improvements in end-user consumption.

In the City of Edmonton, which has system water losses of approximately 5%, metered residential water consumption is currently 140 l/capita/day. According to the above-referenced EWSI Discussion Paper, *“These trends are projected to continue over the near term. [...] shows that developing neighbourhoods often have low per capita water consumption (175 L/capita/day and lower, with minimal exceptions). Low water consumption in developing neighbourhoods is attributed to a number of factors, including:*

- *Newer developments are installed with high-efficiency fixtures and appliances.*
- *In areas of high-density single- or multi-family development, smaller lot sizes lead to reduced irrigation requirements.*

*Research suggests that daily indoor per capita water use for new homes built with high-efficiency fixtures and appliances is currently 140 L/capita/day. Additional indoor reductions can be expected as future fixtures and appliances become more efficient than today's models and customer side leakage is reduced.”*<sup>2</sup>

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<sup>1</sup> <https://www.epcor.com/products-services/new-connections/Documents/2021-Water-Use-Discussion-Paper.pdf> Page 52

<sup>2</sup> <https://www.epcor.com/products-services/new-connections/Documents/2021-Water-Use-Discussion-Paper.pdf> Page 27

In the building and land development industry, numerous water-saving measures have been introduced in new community development and home construction to mitigate water demand. Here are several examples:

## **A. Water Use during Construction and Land Development**

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### **1. Construction and Installation Works**

- a. New development infrastructure must undergo vigorous tests and inspections to receive Construction Completion Certification and Final Acceptance Certification from the City. That infrastructure must adhere to numerous City of Calgary regulations, standards, and Waterworks Construction specifications during the installation and commissioning of water lines. These measures include that:
  - i. The City must provide prior written approval for all products that are to be incorporated into the water distribution system. The City reserves the right to withdraw the approval of any product if, in their opinion, the product does not perform satisfactorily.
  - ii. All newly installed water pipes are subject to hydrostatic pressure and leakage testing. During the pressure testing procedure, all exposed fittings valves and hydrants are also examined for leaks. Defective pipes are replaced with new pipes, and no repair clamps are to be used to rectify defective pipes.
  - iii. The volume of water flushed from the system during the commissioning inspection of new potable water mains must be measured and documented by a developer's contractor using a stopwatch and a pitot-style gauge, or an appropriate flow meter. This information is provided to the City to support improved auditing of non-revenue potable water. Moreover, effective backflow prevention measures, like a one-way check valve or vacuum breaker, are utilized to prevent any possible water supply contamination.
- b. During construction, industry efficiently utilizes captured surface-level stormwater to support construction activities. Before resorting to potable water, industry prioritizes the depletion of all accessible ponded areas.

### **2. Efficient land use**

- a. Implementing zero lot line products in planning and development strategies to maximize space utilization and minimize water consumption.

### **3. Storm water Reuse and Parks**

- a. Adoption of stormwater reuse for irrigation in new communities, contributing to water-saving efforts. Through industry consultation, BILD members advise that stormwater reuse for irrigation can lead to 3-5 million litres of water savings per irrigated hectare.
- b. Incorporation of low-maintenance and drought-resistant landscaping in parks and open spaces minimize the need for irrigation.

## B. Indoor Water Use

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1. **High-Efficiency Fixtures and Appliances:** Installing low-flush toilets, low-flow faucets and showerheads, high-efficiency dishwashers, and washing machines can significantly reduce water usage without impacting performance. Studies have shown that these fixtures can reduce water consumption by up to 50% compared to traditional fixtures.<sup>3</sup> Industry meets or exceeds the City of Calgary's 40M2006 Water Utility Bylaw pertaining to low water use fixtures and installs the following:
  - a. **Low-Flush (or low-flow or high-efficiency) Toilets** that utilize no more than 4.8 litres of water per flush cycle. This is a significant amount as traditional high-flow toilets usually use between 13 and 25 litres per flush.<sup>4</sup>
  - b. **Low Flow Showerheads** which utilize no more than 7.6 litres per minute. For comparison, older showerheads can have flow rates as high as 20 litres per minute.<sup>5</sup>
  - c. **Low-Flow Faucets/WaterSense Faucet Aerators** utilize a maximum flow rate of 5.7 litres/minute.<sup>6</sup> In comparison, the flow rate of a standard faucet is approximately 8.5 litres/minute.<sup>7</sup>
  - d. **Energy Star-certified Washing Machines** utilize approximately 53 litres per load. This contributes to approximately 33% less water usage compared to the 75 litres per load used by a standard washing machine.<sup>8</sup>
  - e. **Energy Star-certified Dishwashers** which utilize approximately 15 litres per load. This contributes to approximately 30% less usage when compared to a standard dishwasher.<sup>9</sup> These appliances often incorporate innovative technologies like sensor-based water usage and optimized spray patterns to minimize water waste.
  - f. **On-Demand Hot Water Systems:** Installation of on-demand hot water tanks and hot water recirculation systems to reduce energy and reduce water typically wasted while waiting for water to heat up. This contributes to enhanced water conservation and overall environmental sustainability by reducing water wastage.
  - g. **Water Monitoring:** Provision of rough-in sleeves for water management systems like Moen Flo, enabling customers to monitor water use, including water flow rates, pressure, and temperature, to reduce water usage through weekly reports. Such systems can also detect leaks in the plumbing system and will shut off all water if a major leak is detected.

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<sup>3</sup> <https://www.nrel.gov/docs/gen/fy11/50133.pdf>

<sup>4</sup> <https://www.crd.bc.ca/docs/default-source/water-pdf/>

<sup>5</sup> <https://www.crd.bc.ca/education/water-conservation/at-home/indoor-water-use/bathrooms/showers>

<sup>6</sup> <https://www.allianceforwaterefficiency.org/>

<sup>7</sup> <https://alliedphs.com/blog/maximum-flow-rate-for-kitchen-faucets/>

<sup>8</sup> <https://www.ohba.ca/whats-on-tap/>

<sup>9</sup> <https://natural-resources.canada.ca/energy-efficiency/products/appliances-for-residential-use/dishwashers/13991>



## C. Outdoor Water Use

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1. **Xeriscaping and Drought-Resistant Landscaping:** Xeriscaping or drought-tolerant landscaping designs minimize the need for irrigation by using native plants and efficient irrigation systems such as drip irrigation. Research indicates that properly implemented xeriscaping can reduce outdoor water usage by up to 50-75%.<sup>10</sup> Industry is minimizing outdoor water usage by:
  - a. The utilization of natural prairie-style landscapes with drought-resistant trees, shrubs, fescue sod, and naturalized channels and ponding areas for stormwater collection.
  - b. Increasing topsoil depth to 300mm leads to more rainwater retainment, requiring less hand/sprinkler watering for lawns.
  - c. The utilization of mulch conserves soil moisture by minimizing evaporation and stabilizing soil temperature, reducing water usage for irrigation.
2. **Rainwater Harvesting:** Collecting rainwater from rooftops and storing it for later use in irrigation or non-potable water applications can significantly reduce reliance on municipal water supplies. Studies have shown that rainwater harvesting systems can capture a substantial amount of water, supplementing a home's water supply when there is water scarcity due to drought or population growth that strains the existing water supply. Industry has been increasing use of rainwater for irrigation purposes, including rain barrels on individual lots.
3. **Smart irrigation systems:** Using weather-based or soil moisture-based irrigation controllers ensures that outdoor landscapes receive water only when needed, minimizing overwatering and water waste. Research has shown that smart irrigation systems can reduce outdoor water usage by up to 50%.<sup>11</sup> The industry has been utilizing the following measures to reduce outdoor water usage:
  - a. Installation of flow sensors, pressure regulating sprinklers, and smart irrigation systems to optimize water usage and detect irregularities. The systems may take longer to water an area but use water more efficiently and effectively resulting in less water being used.
  - b. Strict adherence to standards, specifications, and procedures for irrigation system design, installation, and monitoring, including pressure testing, water meter installations, and City approval processes as part of the Construction Completion Certificate and Final Acceptance Certificate.

## Summary

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Addressing the challenges of water demand and water conservation is crucial in ensuring affordable, vibrant, and prosperous residential communities in Calgary. Calgary must be competitive and affordable to attract and maintain investors, increase jobs, increase tourism, and maintain or increase standards of living for Calgarians.

The water-saving measures implemented by the building and land development industry, as illustrated above, demonstrate a concerted effort to reduce water demand. Backed by EWSI's Discussion Paper and bolstered by empirical evidence from the City of Calgary's residential

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<sup>10</sup> <https://education.nationalgeographic.org/resource/xeriscaping/>

<sup>11</sup> [What Is Smart Irrigation? - HydroPoint](#)

metering data, these industry measures significantly contribute to lowering maximum water demand in new community development. This proactive approach fosters long-term sustainability and resilience in water resource management and design, ensuring a more efficient and responsible utilization of our vital water resources.

To aid in informing the work on maximum daily demand and right sizing the water infrastructure design parameters for new community developments, we believe it would be beneficial for us to jointly propose to Council engaging an industry expert to undertake a comprehensive third-party empirical analysis using the current measurement data similar to the EWSI Discussion Paper. This collaboration could ensure that infrastructure design parameters are finely tuned for efficiency and effective deployment of precious capital, showcasing empirical evidence of water-saving measures implemented in new community development and home construction. Such data would significantly contribute to our efforts in understanding and addressing maximum water demand design metrics.

We trust this information proves useful and look forward to continuing to work with the City of Calgary to promote and advance sustainable water resource management. Together we can maximize service from existing infrastructure to new homeowners and new home renters while also reducing the volume of water treated and distributed. In keeping with long-term efficiency, housing affordability and environmental stewardship goals we share, this will reduce operating costs and, as Chris Tse noted in his October 2023 email to BILD, delay or eliminate unnecessary capital investments for growth, all of which will reduce the costs included in new homes and lower bills to existing and future water utility ratepayers.

Best Regards,



Brian R. Hahn  
CEO, BILD Calgary Region

cc: Tim Keane, GM Planning and Development Services  
Debra Hamilton, Director, Community Planning  
Matthew Sheldrake, A/Director, City and Regional Planning  
Marcus Berzins, A/Manager, Growth Funding & Investment