

## SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

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**TO:** Committee of the Whole – January 11, 2023

**AUTHOR:** Remko Rosenboom, General Manager, Infrastructure Services  
Ian Hall, General Manager, Planning and Development  
Shane Walkey, Manager, Utility Services

**SUBJECT:** WATER SYSTEM FIRE FLOW UPDATE

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### RECOMMENDATION(S)

- 1) **THAT the report titled Water System Fire Flow Update be received for information;**
  - 2) **AND THAT appropriate Bylaw(s) be brought back for consideration of amendment;**
  - 3) **AND FURTHER THAT a Budget Proposal be brought forward to the 2024 Round 2 Budget deliberations related to next steps on Fire Flow Requirements.**
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### BACKGROUND

One of the proposed actions of the draft Water Strategy is to develop a new Water Master Plan for the Sunshine Coast Regional District (SCRD) water systems, which would update and expand upon the Comprehensive Regional Water Plan that was finalized in 2013. There will be a staff report presenting the draft Water Strategy on the February 22, 2024 Committee of the Whole agenda.

The Water Master Plan will outline the required updates and replacement of current water infrastructure within the next 10 years. The first step for developing the new Water Master Plan is underway, with the completion of water system modelling and analysis to confirm where infrastructure upgrades may be required to meet engineering standards or gain operational efficiencies. While the Water Master Plan update has not yet been initiated, staff will present the preliminary results of the water system modelling as it relates to Fire Flow Analysis (FFA) as a standalone item.

#### *What is Fire Flow? How is it Determined?*

Required Fire Flow is defined as the water flow, commonly expressed in litres per second (L/s), that should be available for firefighting purposes at a given point in a water system (usually a fire hydrant) on a day that the maximum amount of water is being produced to support the community. This Maximum Daily Demand (MDD) includes the actual consumption by the community and any loss of water resulting from, for example, leaks. For the SCRD, the MDD is reached on a day with very high temperatures when water conservation regulations are in Stage 1 when there are only limited water use restrictions in place. To meet the Fire Flow Standards, besides the MDD a residual water pressure must also be present in all watermains to ensure adequate flow to all water users of the water system.

In BC, Fire Flow Standards are currently defined by the Fire Underwriters Survey (FUS) and in the Master Municipal Construction Document (MMCD) Design Guideline Manual. Different

standards are defined for different types of land use, including single-residential, multi-residential, commercial, and industrial. While these standards in itself have no legal status, local governments can decide to incorporate them in their Bylaws and as such provide them with a legal status. Most local governments in BC have incorporated these standards in their bylaws.

FFA is conducted using a software program that is calibrated using physical fire hydrant flow testing. This testing determines if the available fire flow at a certain point in a water system meets the appropriate standards.

#### *What are SCRD's Current Fire Flow Requirements?*

The Fire Flow requirements for any changes to the water systems in all the SCRD electoral areas and the District of Sechelt are included in *SCRD Subdivision Servicing Bylaw No. 320, 1987* (4.02 (a)) and *SCRD Water Rates and Regulations Bylaw No. 422, 1995* (4.1). The Fire Flow requirements included in Bylaw No. 320 dates back to 1987 when the bylaw was first adopted. Bylaw No. 320 and Bylaw No. 422 have the same Fire Flow standard.

The 2013 Comprehensive Regional Water Plan (CRWP) includes an analysis of fire flows for the Regional Water Service area only and hence excluded the water systems in North and South Pender Harbour. The CRWP considered Electoral Areas and some parts of the District of Sechelt as “rural” and thus applied a lower Fire Flow standard (30 L/s) compared to more urban residential areas such as Sechelt downtown core and most of West Sechelt (60 L/s).

This approach was supported by Design Guidelines for Rural Residential Community Water Systems (RRCWS) (2007) provincial guideline. The minimum flows noted in RRCWS are not consistent with Bylaw Nos. 320 and 422. The CRWP recommended actions to assess the risk associated with using the rural residential flow requirement of 30 L/s and if these were considered acceptable to update Bylaw Nos. 320 and 422 accordingly. This risk assessment was not completed and Bylaw Nos. 320 and 422 were not updated.

The CRWP indicates that there are several areas where fire flows did not meet the applied standards and listed infrastructure upgrades to improve fire protection. Over the past 10 years upgrades have been completed, such as:

- Watermain upgrades, twinning, and dead-end elimination
- Pump station upgrades
- Water supply expansion
- Installation of water meters

In the CRWP and Bylaw Nos. 320 and 422, no specific Fire Flow targets are considered for multi-family, institutional, commercial, or industrial land use. Bylaw Nos. 320 and 422 only require the Fire Flow targets to be available for a period of one hour.

#### *What are the Current Fire Flow Standards?*

As indicated before, in British Columbia, the Fire Flow Standards are currently defined by FUS and the MMCD Design Guideline Manual and have no legal status unless they are incorporated in local government Bylaw. While the standards itself have been developing over the last 10 years, the most recent document listing them is in the document called *Water Supply for Public Fire Protection* published by FUS in 2020.

The current Fire Flow Standards are that at any point in a water system the MDD can be met, a residual pressure of 150 kilopascals (22 pounds per square inch (psi)) is present and the following fire flows can be provided for a period of two hours.

- single-residential, 60 L/s
- multi-residential, 90 L/s
- institutional, 150 L/s
- commercial, 150 L/s
- industrial, 225 L/s

The SCRD's 2023 FFA is the first time the water systems in the Regional Water Services have been assessed using these updated standards. This is also the first-time water model analysis have been completed for North Pender Harbour and South Pender Harbour water systems.

### *Statement of Purpose*

The purpose of this report is to introduce the preliminary water supply analysis in relation to current Fire Flow Standards and potential implications.

## **DISCUSSION**

### *Standard*

The table below summarizes the standards included in Bylaw No. 320, the CRWP, and the most current MMCD standards.

	<b>Fire Flow Standard (L/s)</b>		
<b>Land use</b>	<b>Bylaw Nos. 320 / 422<sup>1</sup></b>	<b>CRWP (2013)</b>	<b>MMCD (2023)</b>
All land use	60		
Single-residential		30/60 <sup>2</sup>	60
Multi-residential		30/60 <sup>2</sup>	90
Institutional		N/A	150
Commercial		N/A	150
Industrial		N/A	225

Notes:

<sup>1</sup> Bylaw Nos. 320 and 422 require the fire flow to be present for one hour where the CRWP and the most current standards require it to be available for two hours.

<sup>2</sup> CRWP assumed rural areas have 30 L/s of fire flow, while denser urban areas have 60 L/s.

### *Fire Flow Analysis Results*

In December 2023 staff received the preliminary findings of the water modeling analyses that include the FFA. The SCRD's consultant is currently finalizing and incorporating some comments from SCRD staff. The initial results will be presented by the consultant at the January 25, 2024, Committee of the Whole meeting. Further water modelling and data analyses will subsequently be required for some areas to confirm if they do and don't meet the current MMCD and FUS standards.

Based on the preliminary results the conclusion can be drawn that the current fire flows are not being met in a substantial part of the SCRD water systems.

As indicated earlier in this report, this FFA was completed based on a day with an extremely high-water demand. This scenario may only reflect the actual situation on one or several days per year, while for the remainder of the year for most areas fire flows should be sufficient.

#### *Implications for Firefighting Efforts*

Given that the FFA was conducted with a very extreme scenario that might only occur very occasionally, the overall ability for the fire departments to fight fires without impacting the water supply to other users of the water systems is not impacted.

If the community water use is extremely high and the fire flow at a specific fire hydrant moment would become insufficient, firetrucks can activate their pumps to pull water from hydrants instead of relying on the static pressure in that hydrant (pressure can be increased, but not water flow). Actively pulling water from hydrants impacts the water pressure in the wider vicinity and could result in other users experiencing a drop in water pressure. Alternatively, fire departments can request mutual aid, or deploy tanker trucks that shuttle water from other locations. These alternatives require time and labour.

The availability of Fire Flow is one of the factors used to determine the Fire Underwriter Survey rating of fire departments. The current ratings for the fire departments are based on the assessment of the current water systems by the Fire Underwriter Survey. This rating is one of the aspects considered by home insurance companies when determining the insurance rates for property owners in a specific area.

#### *Implications for Infrastructure Upgrade Planning*

Insufficient fire flow and residual water pressures in an area is the result of the water distribution infrastructure not being adequate for the land use as per the current Official Community Plan (OCP).

Increasing the fire flow can only be done through infrastructure upgrades such as upsizing or twinning watermains, increasing treated water reservoir capacity, upgrading of water sources, and the installation of booster pumps and valves. The required infrastructure upgrades to address certain insufficient fire flow can only be established by further site/area specific water modelling and engineering design work.

#### *Implications for Proposed Developments*

The Planning Division of the SCRD and District of Sechelt refer all development applications to SCRD Utility Services for review of proposed water infrastructure. Applications for developments include those for subdivisions, rezoning and OCP amendments and may include a variety of development types (e.g., single-family, multi-family, mixed-use etc.). One of the objectives of this review is to confirm the adequacy of fire flows for proposed developments. This often requires water modelling to be completed at the expense of the developer.

Hitherto modelling was completed using the old SCRD water model and the standards used in 2013 CRWP, including the application of rural residential standard for Electoral Areas and parts of District of Sechelt which are lower than the standard included in the Bylaws Nos. 320 and 422.

In the CRWP, no specific targets were set for commercial and industrial land use. Consequently, over the last 10 years, subdivisions have been approved that are not meeting Bylaws Nos. 320 and 422, nor the more recent and stringent FUS and MMCD guidelines.

Staff are currently reviewing development applications requiring water infrastructure upgrades based on the CRWP-standards. Staff are also aware of several proposed developments that have not been referred yet to SCRD Utility Services that will require water infrastructure upgrades. Some of the current and pending applications might require more substantial infrastructure upgrades to meet the standards included in Bylaws Nos. 320 and 422, let alone FUS and MMCD. As noted in Bylaw 422 (4.2) “The cost of the extension of the system will be borne by the person or agency requiring it”, this is the developer.

The SCRD is committed to developing and implementing a plan to address the current Fire Flow Deficiencies in such a way that any future developments will meet the current standards. Being aware of the need for more housing, the SCRD will do this in an expedited manner.

### *Implications for Building Permit Issuance*

FFA information has potential impacts to the issuance of building permits. However, the determination of “adequate” water for firefighting relies on local government bylaws and there are exemptions and alternatives that would need to be considered. More details about this item will be described in a future Board report.

### *Options*

Updating Bylaws Nos. 320 and 422 in an expedited manner is required to ensure that all currently proposed developments meet the current Fire Flow Standards. This is also required to ensure that any required water infrastructure upgrades related to development are being funded by the developers and not by the participants of the water services areas. This funding model aligns with that currently included in Bylaw No. 320.

Staff are already working on updating the entirety of bylaws Bylaw Nos. 320 and 422, however, more work is required before they can be presented to the Board. This is currently anticipated for later in 2024. The updated Bylaw No. 320 will include an updated latecomer provision to allow developers or the SCRD to recover costs for excess capacity beyond what is required for the initially installed water infrastructure.

As time is of the essence to update the fire flow related provisions in these bylaws to provide clarity and consistency, staff recommend bringing forward amended versions of these bylaws to a Board meeting late January or early February for the Board’s consideration.

Given the magnitude and scale of the newly identified deficiencies in fire flows using the most recent standards, staff are suggesting developing a separate plan instead of waiting for the completion of more comprehensive Water Master Plans for each service area. Staff suggest developing a separate Fire Flow Action Plan (FFAP) that outlines and prioritizes the areas of concern a recommended area specific approach. Possible approaches that will be considered will include but are not limited to:

- realign the zoning with the available fire flows,
- recommend covenants to be put in place to ensure adequate fire protection for any development on a property,
- infrastructure upgrades,
- identification of zones with sub-standards fire flows.

Any recommended rezoning of properties can be incorporated in the Official Community Plan process that is currently underway. Budget Proposals for the highest priority infrastructure upgrades would be presented as part of the 2025 budget process. The Fire Flow Action Plan would then be integrated in the new Water Master Plans and presented to the Board in 2025.

*Deploying an Interim Approach towards ongoing developments*

Until we understand how and which Bylaws need to be updated to include the current Fire Flow Standards and the Fire Flow Action Plan has been developed, an interim approach is required for the review of development applications.

Phase 1 of this approach applies until the required Bylaw amendments are completed. Phase 2 covers the period from the Board's adoption of those bylaws until the adoption of the FFAP by the Board.

*Interim Approach - Phase 1*

The developed interim approach considered several factors, including:

- the need within the community for more housing to be developed;
- the approval status of the proposed development;
- the existing funding model where developers fund any infrastructure upgrades required for that development; and,
- the benefit for future landowners (residential, commercial, or industrial) of those developments being built to the most current Fire Flow Standards.

The table below presents the Interim Approach - Phase 1 which is currently being implemented by staff.

<b>Status and type of application</b>	<b>Meet standards as per the updated Bylaw Nos. 320 and 422</b>	<b>Meet standards as per current MMCD and FUS</b>	<b>Interim-approach – Phase 1</b>
Developments for which proposed infrastructure upgrades are still under review by the SCRD	Yes	Yes	Review to proceed
		No	Review to pause
	No		Review to pause
Developments for which proposed infrastructure upgrades have been approved by the SCRD and final development approval has not been issued yet by the SCRD, MOTI or DOS	Yes	Yes	No action
		No	Water system approval suspended
	No		Water system approval suspended
Developments that received final development / construction approval and have water infrastructure upgrades approved	N/A		Letter of advice sent to development Engineer

As per this approach, about 25 letters were sent to developers of developments that have the review of their water system upgrades paused as the proposed development is in an area that does not meet the current Fire Flow Standards.

About five developers have had their issued approvals of their proposed water system upgrades suspended. Further review of those developments is required to confirm if the proposed water infrastructure would be sufficient to meet the current Fire Flow Standards and those developments will have sub-ideal fire flow protection or to avoid that the current service participants of those will have to fund any infrastructure upgrades required for those developments.

As per the Interim Approach - Phase 1, staff informed the Approving Officers from the Ministry Transportation and Infrastructure and the District of Sechelt of this interim approach and requested them to not approve any subdivisions and other development related permits that are not meeting the current Fire Flow Standards. Under the *Land Title Act* the Approving Officer can decide to not approve a subdivision for a variety of reasons, including it not meeting applicable Regional District bylaws. Approval of other development applications including OCP amendments, development permits, and rezoning applications is requested to be paused.

For developments only requiring a building permit, the Building Officials have the discretion to require additional onsite infrastructure upgrades to ensure that the required fire flows within the development are being met.

#### *Interim Approach - Phase 2*

At the January 25, 2024 Committee of the Whole meeting staff will present the process that will be implemented for any proposed development until the above mentioned Fire Flow Action Plan is developed and approved by the Board.

#### *Organizational and Intergovernmental Implications*

The proposed interim approach would apply to all proposed developments within the SCRD, District of Sechelt and shíshálh Nation Government District that might require water infrastructure upgrades and are therefore referred to the SCRD Utility Services Division.

The development and implementation of a Fire Flow Action Plan is currently not considered as part of the work planning for the Infrastructure Services Department for the upcoming years.

Staff are also considering that the implementation of both phases of the interim approach will require substantial staff time, from both operational staff and leadership for the Utility Services and Planning Divisions. Staff also anticipate a substantial additional amount of engagement with developers who haven't applied yet for a review of their proposed water systems and will now be required to do more infrastructure upgrades than they were expecting to be required.

The already substantial current workload of the Utility Services and the substantial leadership involvement required to address the identified fire flow deficiencies can be considered a risk to the successful management of this and other water supply related files. To reduce these implications on other projects, staff are considering requesting additional staff capacity for the development of the FFAP, which includes additional communication with development community. The associated Budget Proposal will be presented for consideration at Budget 2024 Round 2.

Once the FFAP is approved by the Board, staff will assess the resource requirements for implementation and will bring any potential staff resource requests forward as part of the 2025 budget process.

Both the SCRD and District of Sechelt are initiating the process of OCP renewal in 2024. Updating OCPs would likely result in proposed land use changes which would impact required fire flows in certain areas, OCP renewal and the development of a Fire Flow Action Plan would need to be a mutually informative process.

The Planning Division will be impacted with some additional file management, coordination and referral requirements associated with support leading up to and toward the creation of a Fire Flow Action Plan. It is difficult to assess the impacts on current development processing, though this will inevitably result in delays in the processing of those files impacted.

### *Financial Implications*

There is currently no budget to develop the recommended Fire Flow Action Plan. The associated budget proposal and that for the suggested additional staff resources for the development of the FFAP will be presented at 2024 Budget Round 2.

### *Timeline for next steps*

Budget Proposals for the development of the FFAP and the proposed staffing position will be presented at the 2024 Budget Round 2 meeting.

Staff suggest bringing forward appropriate Bylaw(s) for consideration of amendment amended.

Following the inclusion of the budget associated with the development of the FFAP in the 2024-2028 Financial Plan, staff will initiate the tendering process for the development of the FFAP. Staff anticipate that the development of such a plan could take 5-7 months to complete from the date the associated contract is awarded. Based on the completed FFAP, staff will update its requirements for water infrastructure upgrades for all impacted developments.

Staff have initiated a process to align the development of the FFAP and the SCRD and District of Sechelt OCPs. Staff will also present the final findings of the FFA to the Fire Departments on the Coast.

Staff will invite impacted developers to meetings to clarify the situation and answer any questions they might have.

### *Communications Strategy*

A comprehensive communication plan is being developed to support all the fire flow related activities and will consider communication with developers as with the general public. An initial news release is being prepared to share and clarify the implications of the preliminary findings of the FFA with the community.

Staff will continue to engage with the impacted developers to provide them with updates on the status of their application.

## **STRATEGIC PLAN AND RELATED POLICIES**

N/A

## CONCLUSION

The first step for developing a new Water Master Plan is underway with the completion of water system modelling and analysis to confirm where infrastructure upgrades may be required to meet engineering standards or gain operational efficiencies. Staff will be bringing forward the initial results of the water system modelling as it relates to Fire Flow Analysis to the Board at the January 25, 2024 Committee of the Whole meeting.

Based on the preliminary results, the conclusion can be drawn that the current Fire Flow Standards are not being met in a substantial part of the SCRD water systems. Until appropriate Bylaw(s) have been brought back for consideration of amendment, an interim approach is required for the review of development applications.

The recommended approach will impact each proposed development differently, some projects will not be impacted, while others could face delays in the review of their application or an extended suspension of their water system approval. Given the magnitude of the fire flow deficiencies it is likely that most of the developments in areas with insufficient fire flows would require additional water infrastructure upgrades above those currently considered.

The substantial current workload of the Utility Services Division and the substantial leadership involvement required to address the identified fire flow deficiencies can be considered a risk to the successful management of this and other water supply related files.

The development and implementation of a Fire Flow Action Plan is currently not considered as part of the work plan for the Infrastructure Services Department for the upcoming years. A budget for the development of the Fire Flow Action Plan is required along with staffing positions that will be presented at the 2024 Budget Round 2 meeting.

Reviewed by:			
Manager	X – J. Jackson	CFO/Finance	X-T.Perreault
GM		Legislative	X-S. Reid
CAO	X – D. McKinley	Risk Management	X – V. Cropp