Making a difference...together

JUAN DE FUCA WATER DISTRIBUTION COMMISSION
Notice of Meeting on **Tuesday, January 3, 2023 at 12 pm**
Goldstream Conference Room, 479 Island Highway, Victoria, BC

For members of the **public who wish to listen to the meeting** via telephone please call **1-833-353-8610** and enter the **Participant Code 1911461 followed by #.** You will not be heard in the meeting room but will be able to listen to the proceedings.

G. Baird (Highlands)
S. Donaldson (Metchosin)
D. Grove (Colwood)
C. Harder (Langford)
K. Pearson (Sooke)
J. Rogers (View Royal)
M. Wagner (Langford)
A. Wickheim (JDF Electoral Area)

AGENDA

1. TERRITORIAL ACKNOWLEDGEMENT

2. ELECTION OF CHAIR
(Pursuant to Section 3 Bylaw No. 2888)

Election conducted by the Acting General Manager, Integrated Water Services

3. ELECTION OF VICE CHAIR
(Pursuant to Section 4 Bylaw No. 2888)

Election conducted by the Chair

4. APPROVAL OF AGENDA

5. ADOPTION OF MINUTES 3

***Recommendation**: That the minutes of the September 6, 2022 meeting be adopted.*

6. CHAIR'S REMARKS

7. PRESENTATIONS/DELEGATIONS

Delegations will have the option to participate electronically. Please complete the online application for "Addressing the Board" on our website and staff will respond with details.

Alternatively, you may email your comments on an agenda item to the Juan de Fuca Water Distribution Commission at iwsadministration@crd.bc.ca. Requests must be received no later than 4:30 p.m. two calendar days prior to the meeting.

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*To ensure quorum, advise **Denise Dionne, ddionne@crd.bc.ca** if you cannot attend.*

IWSS-297445977-9864

8. GENERAL MANAGER'S REPORT

9. COMMISSION BUSINESS

9.1. Presentation – Juan de Fuca Water Distribution Commission Orientation.....6

There is no recommendation, the presentation is for information only.

9.2. East Sooke Water Servicing Study.....19

There is no recommendation, the report is for information only.

9.3. Summary of Recommendations from Other Water Commissions 96

There is no recommendation, the summary is for information only.

9.4. Water Watch Report 98

There is no recommendation, the report is for information only.

10. WATER ADVISORY COMMITTEE APPOINTMENT OF REPRESENTATIVE [Verbal]

(Pursuant to Section 1 Bylaw No. 2541)

Recommendation: *That the Juan de Fuca Water Distribution Commission appoint the Vice Chair or another Commission representative to the Water Advisory Committee for a two-year term ending December 31, 2024.*

11. JUAN DE FUCA WATER DISTRIBUTION COMMISSION MEETING SCHEDULE [Verbal]

(Pursuant to Section 5.1 Bylaw No. 2888)

Regular meetings of the Juan de Fuca Water Distribution Commission shall be held at CRD Integrated Water Services, Goldstream Conference room, 479 Island Highway, Victoria, BC on the first Tuesday of the month commencing at 12 pm unless otherwise determined.

12. NOTICE(S) OF MOTION

13. NEW BUSINESS

14. ADJOURNMENT

Next Meeting: Tuesday, February 7, 2023

Making a difference...together

MINUTES OF A MEETING OF THE Juan de Fuca Water Distribution Commission, held Tuesday, September 6, 2022 at 12 p.m., Goldstream Conference Room, 479 Island Highway, Victoria, BC

PRESENT: **Commissioners:** G. Logan (Chair); J. Rogers (V. Chair) (EP); G. Baird; M. Hicks (EP); K. Kahakauwila; E. Logins (EP); L. Szpak; R. Wade (EP)
Staff: T. Robbins, General Manager; I. Jesney, Senior Manager, Infrastructure Engineering; S. Irg, Senior Manager, Infrastructure Water Operations; J. Van Neikerk, Senior Manager, Customer and Techical Services; L. Westinghouse, Senior Financial Advisor; D. Dionne, Administrative Coordinator (Recorder)
REGRETS: None

EP = Electronic Participation

The meeting was called to order at 12:03 pm.

1. TERRITORIAL ACKNOWLEDGEMENT

The Chair provided the Territorial Acknowledgement.

2. APPROVAL OF AGENDA

MOVED by Commissioner Kahakauwila, **SECONDED** by Commissioner Baird,
That the agenda be approved.

CARRIED

3. ADOPTION OF MINUTES

MOVED by Commissioner Baird, **SECONDED** by Commissioner Szpak,
That the minutes of the July 5, 2022 meeting be adopted.

CARRIED

4. CHAIR'S REMARKS

The Chair stated that it is with mixed feelings he would not be running for another term on council and that this would be his last meeting with the Juan de Fuca Water Distribution Commission. He thanked all the Commissioners he has worked with over his 23 years on the Commission for always operating in the best interest of the ratepayers and providing good quality water. He expressed his appreciation for how well the Commission operated as a collective in that each Commissioner was respectful of decisions made no matter which municipality or Electoral Area was affected. He also thanked staff for their incredible support over the years through many tough and courageous decisions that were made, and he stated that he is proud to have been part of that team.

5. PRESENTATIONS/DELEGATIONS

There were no presentations or delegations.

6. GENERAL MANAGER'S REPORT

6.1. Water Supply Outlook [Verbal]

T. Robbins provided a verbal update on the water supply outlook going into the fall season. He noted that coming into summer there was some concern with demand related to the cool wet spring, however with the hot dry summer demand has not been impacted as initially thought.

7. COMMISSION BUSINESS

7.1. Juan de Fuca Water Distribution Service 2023 Capital and Operating Budget

T. Robbins provided a reminder of the budget process, noting that the process has been pushed ahead this year due to the municipal elections. He provided a summary of the staff report.

Discussion ensued and staff responded to questions from the Commission:

- Water rate methodology and rate options study delayed until 2023 to allow the First Nations water rate model to be priority for 2022.
- Equipment Replacement Fund (ERF) contributions are in response to vehicle replacement costs, adjusting for the purchase of higher-priced electric vehicles.
- There are no staffing concerns regarding projects being staffed in-house rather than contracted.
- Actions being taken by staff to avoid a budget amendment.
- Wholesale rate comparisons from elsewhere would be helpful in showing what the norm is.

MOVED by Commissioner Szpak, **SECONDED** by Commissioner Kahakauwila,
The Juan de Fuca Water Distribution Commission recommends the Committee of the Whole recommend that the Capital Regional District Board:

1. Approve the 2023 Operating and Capital Budget and the Five Year Capital Plan;
2. Approve the 2023 Juan de Fuca Water Distribution Service retail water rate of $2.5466 per cubic metre, adjusted if necessary, by any change in the Regional Water Supply wholesale water rate;
3. Direct staff to balance the 2022 actual operating deficit or surplus on the 2022 capital fund transfer; and
4. Direct staff to amend the Water Distribution Local Service Conditions, Fees and Charges Bylaw accordingly.

CARRIED

7.2. Summary of Recommendations from Other Water Commissions

There is no recommendation, the item is for information only.

RECEIVED FOR INFORMATION

7.3. Water Watch Report

There is no recommendation, the item is for information only.

RECEIVED FOR INFORMATION

8. NOTICE(S) OF MOTION

There were no notices of motion.

9. NEW BUSINESS

Commissioner Hicks noted that he will also not be putting himself forward for re-election this year and he expressed his thanks stating that it has been great working with everyone on the Commission.

10. ADJOURNMENT

MOVED by Commissioner Kahakauwila, **SECONDED** by Commissioner Szpak,
That the September 6, 2022 meeting be adjourned at 12:58 pm.

CARRIED

_____
CHAIR

_____
SECRETARY

DRAFT

Juan de Fuca Water Distribution Commission

January 3, 2023

Agenda

1. Introduction
2. Service Support Staff
3. Governance Framework
4. Regional Water Supply Overview
5. Juan de Fuca Water System Overview
6. Juan de Fuca Water Service Delivery
7. CRD Departmental Programs
8. Budget(s)

Meet the team

Ted Robbins Capital Regional District CAO	**Ian Jesney** Acting General Manager, Integrated Water Services
Joseph Marr Acting Senior Manager, Infrastructure Engineering	**Natalie Tokgoz** Acting Manager, Water Distribution, Engineering and Planning
Shayne Irg Senior Manager, Water Infrastructure Operations	**Laurel Westinghouse** Senior Financial Advisor
Tanya Duthie Manager, IWS Administration	**Denise Dionne** IWS Administrative Coordinator & Commission Secretary

Governance Overview

Provincial Act & Regulation & CRD Bylaws

- *Capital Region Water Supply & Sooke Hills Protection Act 1997* – Service Establishment
- *Capital Region Water Supply & Sooke Hills Protection Regulation 1997* – Commission Establishment
- CRD Bylaw No. 2538 – Water Distribution Local Service Area Establishment Bylaw
- CRD Bylaw No. 2540 – JDF Water Distribution Commission Bylaw (Amending Bylaw 4211)
- CRD Bylaw No. 4186 – CRD Board Delegation Bylaw (Amending Bylaw 4429)
- CRD Bylaw No. 2888 – JDF Water Distribution Commission Procedural Bylaw (Amending Bylaw 4177)
- CRD Bylaw No. 2758 – Development Cost Charge Bylaw (Amending Bylaw 4249)
- CRD Bylaw No. 3889 – Water Distribution Local Service Conditions, Fees and Charges Bylaw (Amending Bylaw 4269)
- Other CRD Bylaws & Policies – Cross Connection Control, Water Conservation, Procurement (& Delegation) Policy

Governance Overview

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Governance Framework

- CRD Board – Chair Colin Plant (2023)
- Juan de Fuca Water Distribution Commission
  - David Grove, City of Colwood
  - Gord Baird, District of Highlands
  - Al Wickheim, JDF Electoral Area
  - Colby Harder, City of Langford
  - Mary Wagner, City of Langford
  - Shelly Donaldson, District of Metchosin
  - Kevin Pearson, District of Sooke
  - John Rogers, Town of View Royal
- Water Advisory Committee – Vice Chair typically represents JDF Water Distribution Commission

Regional Water Supply

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Regional Water Supply

- Greater Victoria Water Supply Area – 20,549 hectares
  - Sooke, Goldstream, Leech Watersheds
- Sooke Lake Reservoir – Primary Supply Source
- Goldstream Reservoir System – Secondary Supply Source
- Unfiltered Source Water with 3-Step Disinfection Process
  - Primary Disinfection
    - Ultraviolet light – targets parasites (Giardia & Crypto)
    - Free chlorine – targets bacteria & viruses
  - Secondary Disinfection
    - Ammonia to produce chloramine – long-lasting disinfectant residual
  - Unfiltered Raw Source Water
    - Turbidity (cloudiness) typically < 1 NTU
    - E.Coli bacteria < 20 CFU/100 mL

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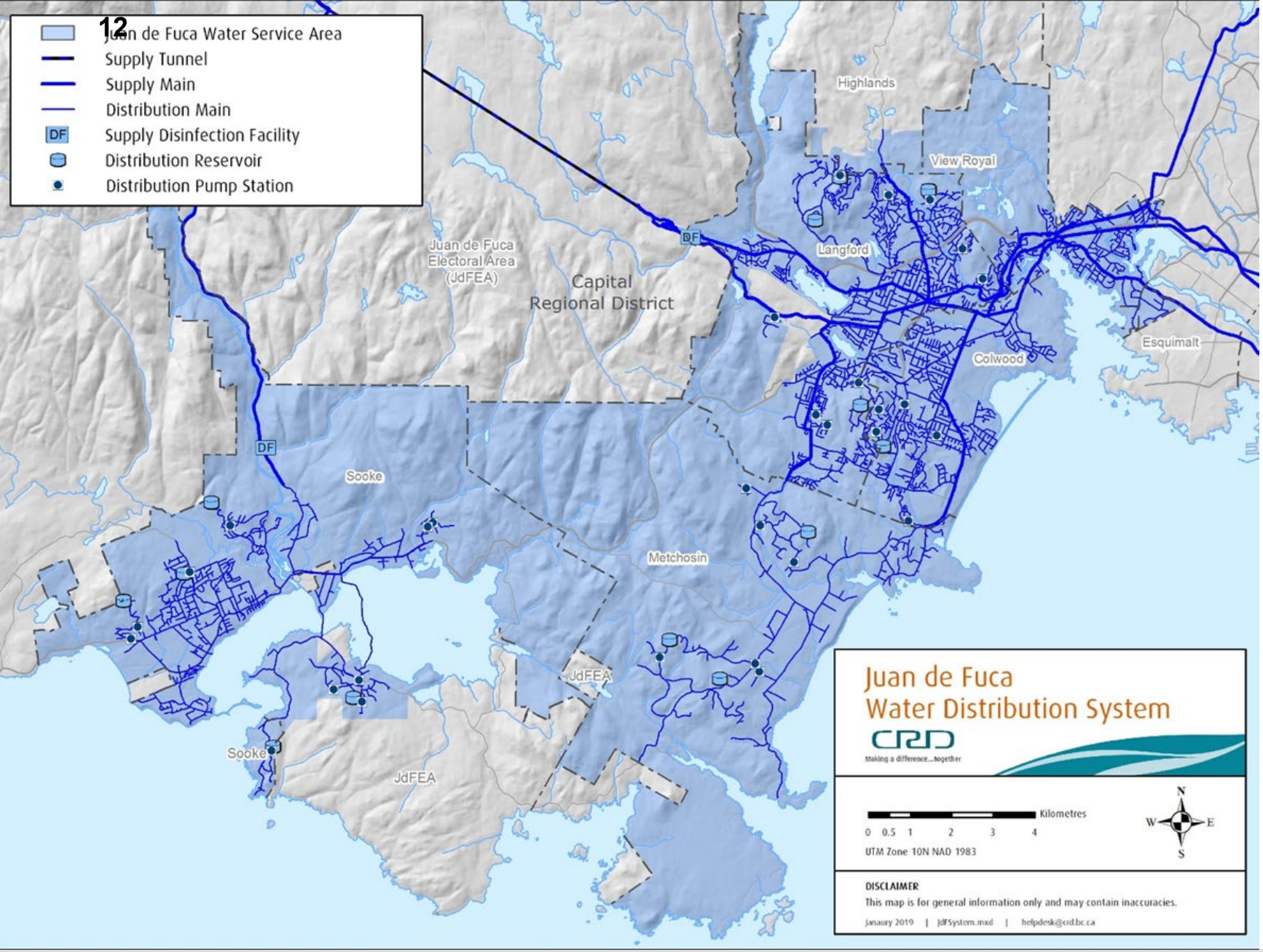

JDF Water Distribution System

- Approx. 538 km of water mains
- Range in size from 25 mm to 610 mm
  - 55% PVC
  - 29% DI
  - 16% AC
- 2,480 hydrants
- 33 pump stations
- 13 reservoirs
- Approx. 26,300 service connections

Service Overview

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CRD Departmental Programs

- **Operations & Engineering**
  - Water System Operation and Maintenance
  - Capital Project Delivery – IWS Construction Crew
  - Engineering Design & Project Management
  - System Infrastructure Planning & Asset Management
  - Emergency Response
- **Plant Maintenance & Fleet Management**
  - Preventive Maintenance Planning & Management for Operations
  - Fleet: Service Vehicles & Heavy Equipment
- **Municipal Development Referrals**
  - Liaise with Service Area Municipalities
  - Conditions for Water Service Extensions

Service Overview

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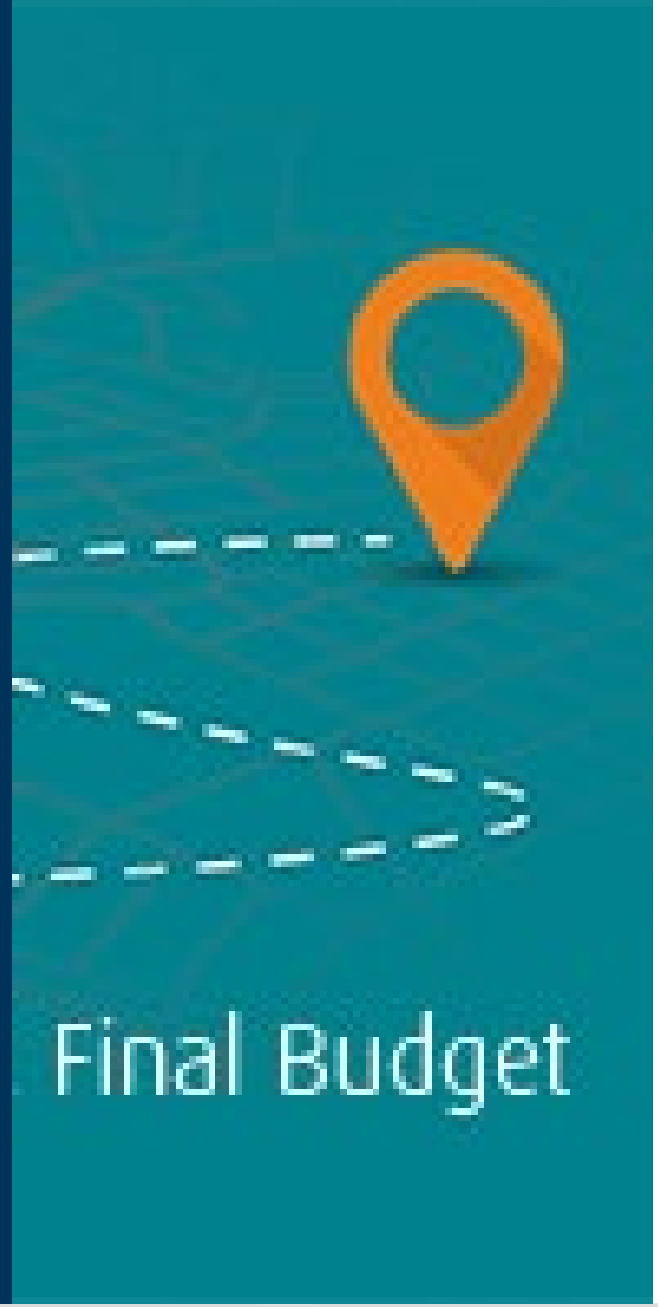
CRD Departmental Programs

- **Water Quality**
  - Water Quality Sampling, Monitoring, Reporting
- **Customer Service**
  - Field Response to Customer Concerns
  - Leaks, Pressure Issues, Meter Inquiries
- **Water Metering & Billing**
  - Meter Reading & Billing Frequency
  - Customer Base – Residential, ICI
  - Payment Options & Billing Inquiries

Budget Planning and Approval Overview



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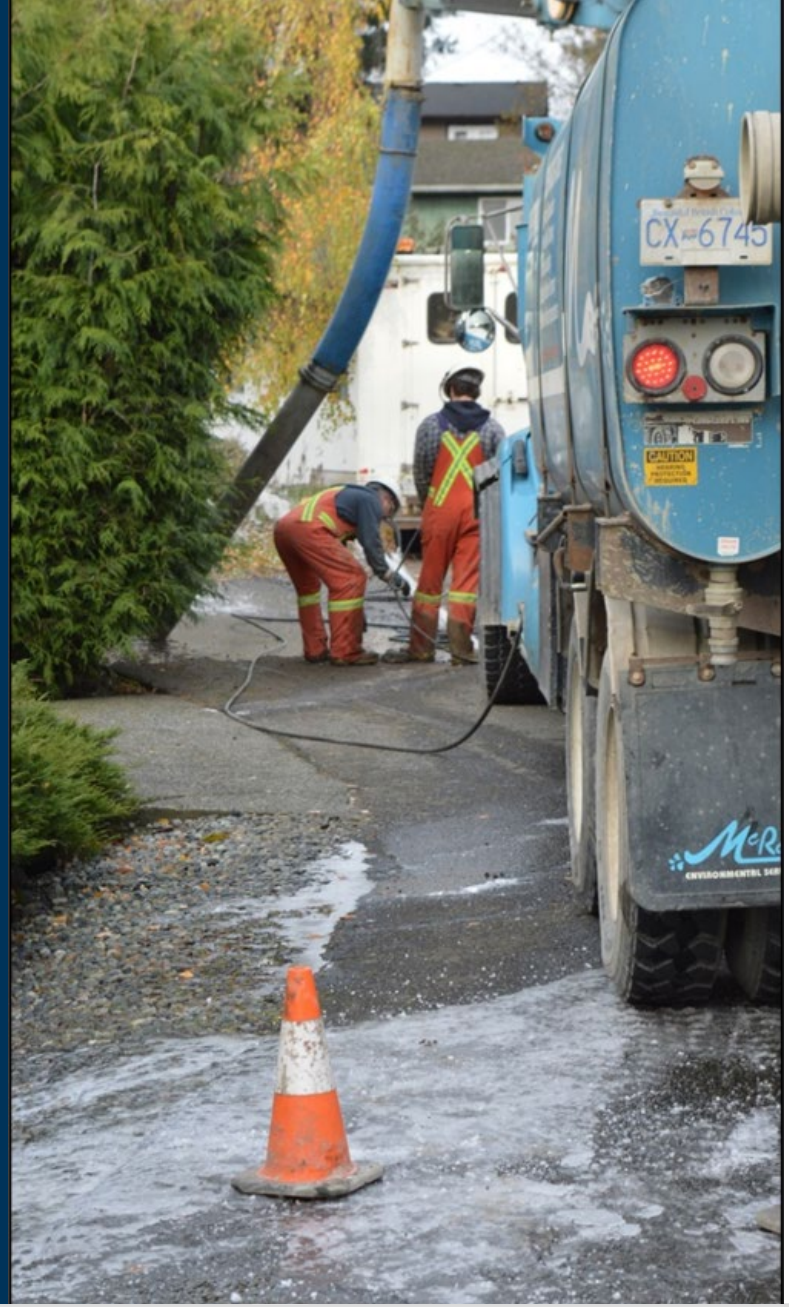
Service Budget

- Operating & Capital Budgets
  - Provides for all expenditures for Operation & Maintenance (O&M), administration of water service and capital projects
- Operating, Capital Project Lists & Supplemental budget items considered by Commission annually in September for recommendation to CRD Board
- Service Funding
  - 100% of Operating & Distribution Capital, including debt servicing, funded by sale of water
  - Development Cost Charge Capital (DCC) funded through collection of DCC funds

Budget Summaries



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Service Budget

2023 Budgets	
Total Budget	$23.97 M
Total Distribution Capital	$20.82 M
Total DCC Capital	$6.17 M
RWS – JDF Shared Capital	$0.91 M

2023 Budget Context	
Water System Operation	$7.59 M
Bulk Water Purchase	$7.09 M
Transfers to Water Capital	$7.43 M
Debt Servicing	$1.86 M
	$23.97 M

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Water Demand & Rates

- 2023 Regional Water Supply Wholesale Rate: $0.7698 / cubic metre
- 2023 Agricultural Rate: $0.2105 / cubic metre
- 2023 JDF Water Distribution Rate: $2.5466 / cubic metre
- 2023 Budget Water Demand: 9,210,000 cubic metres

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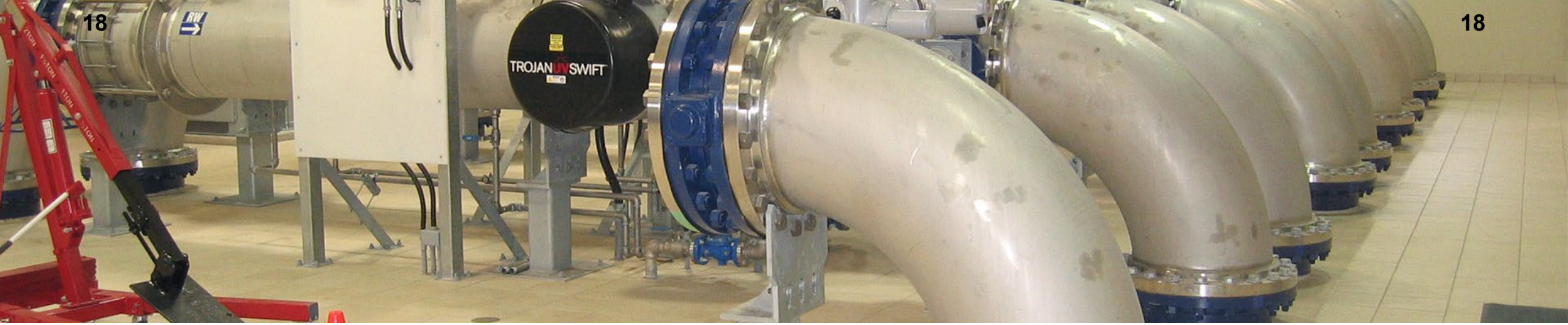

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Thank you

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Capital Regional District

CRDVictoria

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JWDC 23-01

REPORT TO JUAN DE FUCA WATER DISTRIBUTION COMMISSION
MEETING OF TUESDAY, JANUARY 3, 2023

SUBJECT **East Sooke Water Servicing Study**

ISSUE SUMMARY

To provide a summary of the East Sooke Water Servicing Study to the Juan de Fuca Water Distribution Commission (Commission).

BACKGROUND

In the summer of 2022, the Juan de Fuca Electoral Area Director provided community works funds to commission a study to investigate water servicing options to expand the Juan de Fuca Water Distribution System (JdFWS) to residents that are not serviced by JdFWS and are experiencing water supply and quality issues including Anderson Cove, Seedtree and Wilderness Mountain areas. The study was completed (attached as Appendix A) to better understand administration processes, servicing concepts and associated costs with an expansion to include un-serviced properties and the potential development of four major properties for cost sharing purposes within the District of Sooke and the Juan de Fuca Electoral Area (JdFEA) as shown on Figure 1.

In the context of the Capital Regional District (CRD) Regional Growth Strategy, water service is eligible to be extended to the areas proposed; however, the full cost of the water service extensions and the life cycle costs to the maximum extent possible should be borne by new users. If the JdFWS was expanded, a Local Area Service in both jurisdictions (District of Sooke and JdFEA) could be established and both a Service Establishment bylaw and a Loan Authorization bylaw could be used to fund the expansion. Any new required water servicing bylaws would need to be considered by the CRD Board for consistency with the Regional Growth Strategy.

Listed below are four different system expansion options that were evaluated based on limiting the proposed flows to not require significant upgrades to the existing upstream JdFWS infrastructure, including existing water mains and the Sooke River Road Disinfection Facility.

Option 1: Sooke to Anderson Cove (Figure 2)

- Modeled system expansion includes the following:
  - Properties along the route developed to existing zoning
  - Existing homes in Anderson Cove, Wilderness Mountain, and Seedtree area
  - Additional 80 single family homes for additional properties either on Gillespie Road or Seedtree Road or a combination thereof not to exceed 80 single family homes
- Estimated capital cost of $57.1 million includes:
  - 27 kilometers (km) of new water main and appurtenances
  - 2,000 cubic metre reservoir at Glinz Road and 1,200 cubic metre reservoir at Ambience Road
  - Two booster pumping stations and six pressure reducing stations
- Potential new service connections -1,270
- Estimated cost per new service connection - $45,000

Option 2: Anderson Cove to Gillespie (Figure 3)

- Modeled system expansion includes the following:
  - Existing homes along the route and a portion of the existing properties developed to current zoning (up to 200 new single family home connections)
  - Existing homes in Anderson Cove, Wilderness Mountain, and Seedtree area
- Estimated capital cost of $34.1 million includes:
  - 16 km of new water main and appurtenances
  - 1,500 cubic metre reservoir at Mount Matheson and 1,200 cubic metre reservoir at Ambience Road
  - Two booster pumping stations and two pressure reducing stations
- Potential new service connections - 500
- Estimated cost per new service connection - $68,000

Option 3: Sooke to East Sooke Road (Figure 4)

- Modeled system expansion includes the following:
  - Properties along the route developed to existing zoning
  - Existing homes in Wilderness Mountain and Seedtree area
- Estimated capital cost of $51.8 million includes:
  - 23.3 km of new water main and appurtenances
  - 2,200 cubic metre reservoir at Glinz Road and 1,200 cubic metre reservoir at Ambience Road
  - Two booster pumping stations and six pressure reducing stations
- Potential new service connections – 1,030
- Estimated cost per new service connection - $50,000

Option 4: Extension to Sooke Boundary (Figure 5)

- Modeled system expansion includes the following:
  - Properties along the route developed to existing zoning
- Estimated capital cost of $16.2 million includes:
  - 7.8 km of new water main and appurtenances
  - 1,400 cubic metre reservoir at Glinz Road
  - One booster pumping station and one pressure reducing station
- Potential new service connections - 210
- Estimated cost per new service connection - $77,000

CONCLUSION

A water servicing study for the expansion of the Juan de Fuca Water Distribution System to un-serviced areas experiencing water issues within the District of Sooke and East Sooke was undertaken. Consideration was made to expand service to properties based on existing zoning densities as well as future development and densification beyond current zoning to try and reduce the cost per connection. Results indicate that the expansion is administratively feasible but would require significant and costly infrastructure to service properties to current zoning. Any new required water servicing bylaws would need to be considered by the CRD Board for consistency with the Regional Growth Strategy.

RECOMMENDATION

There is no recommendation, this report is for information only.

Submitted by:	Natalie Tokgoz, P.Eng., Acting Manager, Water Distribution Engineering and Planning
Concurrence:	Joseph Marr, P.Eng., Acting Senior Manager, Infrastructure Engineering
Concurrence:	Ian Jesney, P. Eng., Acting General Manager, Integrated Water Services
Concurrence:	Ted Robbins, B. Sc., C. Tech., Chief Administrative Officer

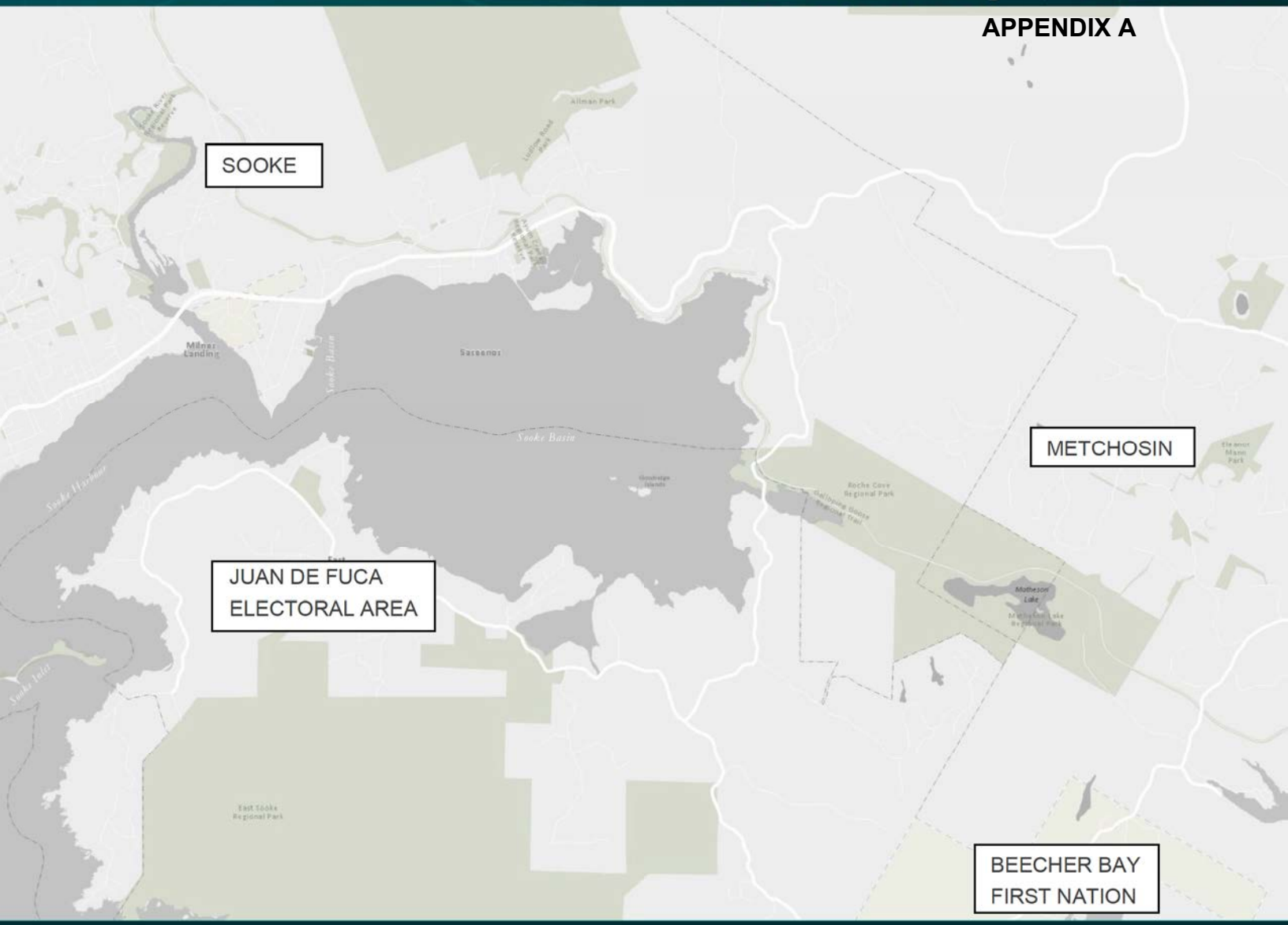
ATTACHMENTS

Appendix A: East Sooke Water Servicing Study – Final Report
Figure 1: Potential Service Area
Figure 2: Option 1 – Sooke to Anderson Cove
Figure 3: Option 2 – Anderson Cove to Gillespie
Figure 4: Option 3 – Sooke to East Sooke Road
Figure 5: Option 4 – Extension to Sooke Boundary

McElhanney

BEST MANAGED COMPANIES CANADA

APPENDIX A



East Sooke Water Servicing Study

Final Report

August 3, 2022

Mr. Ian Jesney, P. Eng., Senior Manager Infrastructure Engineering

Capital Regional District

479 Island Highway, V9B 1H7, Victoria BC

Prepared by McElhanney Ltd.

Contact
Mark DeGagné, PEng
778-560-2001
mdegagne@mcelhanney.com

Address
500 – 3960 Quadra Street,
Victoria BC Canada, V8X 4A3

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APPENDIX A

Your Challenge.
Our Passion.

The Fine Print

This report was prepared by McElhanney Ltd. ("McElhanney") for the particular site, design objective, development, and purpose (the "Project") described in this report and for the exclusive use of the client identified in this report (the "Client"). The data, interpretations and recommendations pertain to the Project and are not applicable to any other project or site location and this report may not be reproduced, used, or relied upon, in whole or in part, by a party other than the Client, without the prior written consent of McElhanney. The Client may provide copies of this report to its affiliates, contractors, subcontractors, and regulatory authorities for use in relation to and in connection with the Project, provided that any reliance, unauthorized use, and/or decisions made based on the information contained within this report are at the sole risk of such parties. McElhanney will not be responsible for the use of this report on projects other than the Project, where this report or the contents hereof have been modified without McElhanney's consent, to the extent that the content is in the nature of an opinion, and if the report is preliminary or draft. This is a technical report and is not a legal representation or interpretation of laws, rules, regulations, or policies of governmental agencies.

This report was prepared with the degree of care, skill, and diligence as would reasonably be expected from a qualified member of the same profession, providing a similar report for similar projects, and under similar circumstances, and in accordance with generally accepted engineering/planning/etc and scientific judgments, principles, and practices. McElhanney expressly disclaims any and all warranties in connection with this report.

McElhanney has relied in good faith on information provided by the Client and third parties noted in this report and has assumed such information to be accurate, complete, reliable, non-fringing, and fit for the intended purpose without independent verification. McElhanney accepts no responsibility for any deficiency, misstatements or inaccuracy contained in this report as a result of omissions or errors in information provided by third parties or for omissions, misstatements or fraudulent acts of persons interviewed.

All evaluations and conclusions stated in this report are based on facts, observations, site-specific details, legislation, and regulations as they existed at the time of the site assessment/report preparation. Some conditions are subject to change over time and the Client recognizes that the passage of time, natural occurrences, and direct or indirect human intervention at or near the site may substantially alter such evaluations and conclusions.

McElhanney will not be responsible for the independent conclusions, interpretations, interpolations and/or decisions of the Client, or others, who may come into possession of this report, or any part thereof. This restriction of liability includes decisions made to purchase, finance, or sell land or with respect to public offerings for the sale of securities.

The probable cost estimate has been prepared using the design and technical information currently available, and without the benefit of Survey, Geotechnical, or Environmental information. Furthermore, McElhanney cannot predict the competitive environment, weather or other unforeseen conditions that will prevail at the time that contractors will prepare their bids. The cost estimate is therefore subject to factors over which McElhanney has no control, and McElhanney does not guarantee or warranty the accuracy of such estimates.

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Contents

FIGURES

1. Executive Summary

The Capital Regional District (CRD) is considering system impacts due to potential expansion of the Juan de Fuca Drinking Water Distribution System (JdFWS) that may include additional properties in the District of Sooke (the District) and the Juan de Fuca Electoral Area (JdFEA). The intent of the project is to evaluate various system expansion options and associated costs to un-serviced areas within the District and the JdFEA including the following:

- Anderson Cove
- Properties along East Sooke Road to Gillespie Road
- Seedtree development
- Wilderness Mountain development
- Properties along Gillespie Road
- Properties along Sooke Road (Hwy 14) from Ludlow Road to Connie Road

Two important constraints on the study that needed to be considered are:

1. The expansion options are to be achieved without significant upgrades to the existing JdFWS
2. The expansion options are limited to reducing the pressure head on the existing JdFWS by 10m

Four different expansion options were explored in this study, providing potable water to various groupings of the above localities with the grouping populations ranging from 624 to 3,133. Consideration was to be given to the desire to add densification to four major developments increasing the service population to as high as 5,923. The four options reviewed included:

- **Option 1** – Full loop service area
- **Option 2** – South connection at Anderson Cove
- **Option 3** – North Connection at Sooke Road and Ludlow Road
- **Option 4** – Extended branch to eastern portion of the District along Highway 14

Modeling revealed (per the table below) that **expansion to include properties beyond what the existing zoning allows (Base Case) would require significant upgrades to the existing upstream JdFWS infrastructure, including that of the Sooke River Road Disinfection Facility.** Thus densification (additional services) of any properties would only be available in Option1 and would be limited to the single private development near Gillespie and East Sooke Rd and/or the existing Seedtree development.

Option	Base Case Demand (l/s)	Desired Build-out Demand (l/s)	Total Available Flow (l/s)
Option 1	54.2[1]	194.1[2]	75
Option 2	33.8[1]	155.5[2]	27
Option 3	40.8[1]	194.8[2]	48
Option 4	11.0	N/A	48

[1]Base case is the allowable connections per existing zoning but does not include any properties in the Seedtree or Wilderness Mountain developments

[2]Includes the desired build outs of the 4 major properties and the allowable connections per existing zoning for the Seedtree and Wilderness Mtn Developments.

Class D cost estimates for the four expansion options indicate the costs ranging from $16.2M (option 4) to $57.0M (option 1) with a per connection costs ranging from $44,900 (option 1) to $77,100 (option 4). No upgrades to existing water system infrastructure for Seedtree or Wilderness Mountain have been carried within these estimates (note a new reservoir is proposed at Wilderness Mountain). Individual service connections are not accounted for in the estimates.

Option	Total Estimated Capital Costs	Proposed # of Connections	Cost per Connection
Option 1	$ 57,050,000	1270	$ 44,900
Option 2	$ 34,050,000	500	$ 68,100
Option 3	$ 51,820,000	1030	$ 50,300
Option 4	$ 16,200,000	210	$ 77,100

Further model refinements could be made, if the entire JdFWS model could be incorporated into the analysis. It would be more precise to look at the entire service area model to see what maximum day demand could be delivered to the proposed service area while still maintaining an adequate level of service to the areas currently serviced in the JdFWS.

2. Introduction

2.1. BACKGROUND

The Juan de Fuca Drinking Water Distribution System (JdFWS) provides drinking water to approximately 58,000 residential and commercial customers in the District of Sooke, parts of the Juan de Fuca Electoral Area, City of Colwood, City of Langford, District of Metchosin, the Town of View Royal and parts of the District of Highlands. The JdFWS was established as a Capital Regional District (CRD) service area in 1997 and is administered by the Juan de Fuca Water Distribution Commission.

The CRD is considering an expansion of the JdFWS to include additional properties in the District of Sooke (the District) and the Juan de Fuca Electoral Area (JdFEA). The CRD would like to better understand administrative processes, delivery options, servicing concept and associated costs, prior to making any decisions related to expansion of the existing service. The CRD has retained McElhanney Ltd. to provide a study support the CRD in understanding these factors and provide the foundation for future discussion/evaluation and concept development. The study area is illustrated in the attached **Figure 1.**

2.2. SCOPE OF THE STUDY

The intent of the project is to evaluate various expansion options and associated costs to un-serviced areas within the District and the JdFEA including the following:

- Anderson Cove
- Properties along East Sooke Road to Gillespie Road
- The Seedtree Development (currently on a privately owned independent system)
- Wilderness Mountain Development (currently on a stand alone CRD Drinking Water System)
- Properties along Gillespie Road
- Properties along Sooke Road (Hwy 14) from Ludlow Road to Connie Road

This study evaluates four (4) potential expansion options using two different supply connections as depicted in the attached **Figures 1 through 4**.

- **Option 1** is a looped solution that will connect to the existing JdFWS at both ends, connecting at the terminus within the District along Highway #14 and the terminus within JdFEA near Anderson Cove.
- **Option 2** is a branch extension from the south that will connect to the existing JdFWS at the terminus within the JdFEA near Anderson Cove and run northward to Gillespie Creek.
- **Option 3** is a branch extension from the north that will connect to the existing JdFWS at the terminus within the District along Highway #14 and run south to East Sooke Rd.
- **Option 4** extends the existing JdFWS at the terminus within the District along Highway #14 and runs to the eastern boundary of the District. This is a distinct option to service District of Sooke properties along Hwy 14 only.

Fundamentals of the study included:

- Understanding of potential service population. In this exercise the District's and JdFEA's Zoning Bylaws and Official Community Plans (OCP) were reviewed and the project team met with key planning leads within each organization. We also met with key major landholders, within each jurisdiction, to evaluate interest with respect to water service and potential development densities outside those defined in the OCP.
- Review and confirmation of system modelling and design parameters
- Evaluation of establishment of a Local Area Service (LAS), considering the two separate jurisdictions (the District and JdFEA) and methodology for gaining approvals from the Ministry of Municipal Affairs.
- Development of service concepts and evaluation of associated cost to establish the financing of a LAS for the benefitting properties.

2.3. ACKNOWLEDGEMENTS

In preparation of this report, acknowledgement of the following is warranted for the generosity of time in assisting with the understanding of the water system, development in the District and the JdFEA, and process for establishing local service areas for the proposed water systems.

1. Ian M. Jesney, P.Eng., Senior Manager, Infrastructure Engineering
2. Joseph Marr, P.Eng., Manager, Water Distribution Engineering and Planning, Infrastructure Engineering, Capital Regional District
3. Iain Lawrence, MCIP, RPP, Senior Manager, JDF Electoral Area Planning
4. Jeff Carter, Director of Operations, District of Sooke
5. Brian Goble, Head of Geographic Services, District of Sooke
6. Gareth Mogg, Senior Planning Analyst, Governance and Structure, Local Government Division, Ministry of Municipal Affairs
7. David Van Ommen, Senior Planning Analyst, Governance and Structure, Local Government Division, Ministry of Municipal Affairs

3. Water Service Extension Administrative Processes

A municipality has the authority to provide services such as water and sewer to specific areas within its community through a Local Area Service (LAS). A LAS is any municipal service that is designed to benefit a particular part of the municipality and is paid for in whole or in part by local property owners through a local service tax. A LAS may be initiated either by property owners in the proposed local area (or electoral area), or by Council. Where initiated in an electoral area by a sufficient petition, the regional district electoral directors may provide consent if certain legislative requirements are met. Where initiated by Council, the proposed regional district service is subject to participating area approval either through assent voting (referendum) or an alternate approval process.

A LAS must be established by bylaw to authorize imposing local service tax to pay all or part of the cost of a local area service. The tax may be structured as a property value tax, a parcel tax, or a combination of the two. The proceeds of a local service tax may only be spent for the local area service for which it is collected. The form of the local service tax ultimately chosen must be specified in the local area service bylaw.

Technical Memorandum #1 (**Appendix A**), outlines, in detail, the legislative process for establishing a Local Area Service in a local government and regional district setting. In brief, discussions with planning analysts from the Ministry of Municipal Affairs, the preferred arrangement would be to establish the service as a CRD Service Area with both the District and the JdFEA as participants in the Service Area. In doing so, there will only need to be one set of bylaws (a Service Establishment bylaw and Loan Authorization bylaw) instead of trying to organize various bylaws for different service areas in different jurisdictions. This confirms that the establishment of a LAS in two jurisdictions is feasible.

4. Service Area and Modelling Parameters

A Base Case demand analysis scenario was completed, with the number of service connections established as the number of connections to service allowable dwellings per existing zoning (i.e., no densification rezoning) on all properties in the option area. The base case did not include any of the properties in the Wilderness Mountain or Seedtree developments.

Major property holders were consulted to discuss possible densification of properties, fostering developments that can sustain the expenditures for services like public water supply. The Desired Build-Out demand analysis scenario captures these consultations. Detailed derivation of the estimated system demands is provided in Technical Memo #2 (**Appendix B)** and has been vetted by CRD prior to proceeding with the conceptual design modeling exercise. The population estimates for the *Base Case* scenario are provided for each alternate expansion option **Table 1**.

Table 1: Option Areas and Populations

	Residential		Commercial and Industrial
	Area (ha)	Population	Area (m^2)
Option 1	801	3,133	98,042
Option 2	489	1,840	88,026
Option 3	612	2,391	56,510
Option 4	168	624	21,065

The water system demands derived from the above estimates are shown on **Table 2** below.

Table 2: Design Demands – Base Case Scenario

	Average Day Demand (l/s)	Maximum Day Demand l/s	Peak Hour Demand l/s
Option 1	21.7	54.2	75.8
Option 2	13.5	33.8	47.3
Option 3	16.3	40.8	57.1
Option 4	4.4	11.0	15.4

Seedtree has an existing privately operated water system and Wilderness Mountain has an existing CRD operated water system. Both water systems experience operational issues and the CRD has requested that the options assessment include these two areas as potential connections to the JdFWS expansion to provide them with a more reliable and consistent water supply. The demands in **Table 3** list the additional flows above the base case that were considered in the modeling (i.e., demand flows for the existing dwellings only) and the demands that were not considered in the modeling but would need to be considered to supply the allowable dwellings under existing zoning.

Table 3: Existing vs Allowable Demands – Wilderness Mountain and Seedtree

	Average Day Demand l/s	Maximum Day Demand l/s	Peak Hour Demand l/s
Seedtree Demand for existing dwellings only (included in modeled flow Table 6)	1.0	**2.3**	3.2
Seedtree Demand for allowable connections per existing zoning	3.1	7.7	10.8
Wilderness Mountain Demand for existing dwellings only (included in modeled flow Table 6)	1.7	**4.0**	5.6
Wilderness Mountain Demand for **allowable connections per existing zoning**	4.7	11.8	16.5

Additional population estimates for four of the largest properties in the study area, where developers have expressed a desire to participate in the LAS, so that the lands can be developed, are provided on **Table 4**. These have been converted to demands and added to the flow scenarios for the *Base Case* (Table 2) to produce the demands for the *Desired Build-out* scenario (**Table 5**).

Table 4: Growth Projections for Potential Development Sites

Property	Location	Property Area	Development Plan	Proposed Dwelling Units
Aragon Properties	District of Sooke	100 ha (250 acres)	Comprehensive Development including single-family and multi-family residences	2000
Property at Gillespie and Mt Matheson Road	Juan de Fuca Electoral Area (East Sooke)	75 ha (183 acres)	Subdivide into 1 ha lots with 2 dwellings/lot	150
Grouse Nest	District of Sooke	34 ha (83 acres)	Residential development	140
Beecher Bay	District of Sooke	67 ha (165 acres)	Residential development	500

Table 5 also includes Option A Wilderness Mountain and Option B Seedtree development demand flows. These represent the difference between the demand flows included in the model (i.e., existing dwellings) and the demand flows for the allowable dwellings under the existing zoning in these areas.

Table 5: Design Demands – Desired Build-out Scenario

Option	Average Day Demand l/s	Maximum Day Demand l/s	Peak Hour Demand l/s
Option 1	72.4	180.9	253.3
Option 2	56.9	142.3	199.2
Option 3	72.6	181.6	254.2
Option A - Seedtree	2.1	5.4	7.6
Option B – Wilderness Mtn	3	7.8	10.9

5. System Modeling and Conceptual System Design

Conceptual designs for each of the routing options have been development by our Team in consultation with Colquitz Engineering, who completed system modeling to develop the concepts including the requirements for the size of pipes to meet the demands, pressure reducing valves (PRVs), and preliminary locations for required reservoirs and/or booster pumping stations. These conceptual designs form the basis for the conceptual cost estimates for the various options and provide the CRD with the initial concepts for supplying water to the District and the JdFEA area. The conceptual designs will ensure that peak hour flows will be supplied throughout the extended network, and that the reservoirs will be designed per the requirements of the CRD, namely that they will be storing water for the Max Day Demand, Fire Flow, plus balancing and emergency storage.

Details of the modeling assessment are provided in Technical Memo #3 (**Appendix C)** and assume that servicing of the new area(s) is limited to that which can be delivered at the existing boundary (connection points) without any significant upstream improvements to the existing water system. In addition, the study considers that a reasonable pressure reduction at the connection node is 10m of pressure head. This value was based on consultations with the district staff and limiting pressure reductions at these nodes will ensure that the rest of the existing system will be operating within required operating pressures during maximum day demand and peak hour demand times.

The CRD supplied the flow-pressure diagrams for the two connection points as follows:

- **Appendix C - Figure 5**: features the flow-pressure diagram for the north connection located at Sooke Road and Ludlow Road. With a maximum 10m pressure drop this connection will be able to supply a maximum of 48 l/s to the system extension for the Maximum Day Demand (MDD).
- **Appendix C - Figure 6**: shows the same relationship for the south connection located on East Sooke Road near the East Sooke Volunteer Fire Department Hall (6071 East Sooke Road). The south connection will be limited to delivering 27 l/s (MDD) to the system extension
- If both connections are looped to complete Option 1 routing the combined flow into the system will be 75 l/s

The above flow values assume that sufficient storage would be constructed in the service area to accommodate the balancing and fire flow storage, and when compared to the desired build-out demand scenario (Table 5).

The demand, modeled flow, and capacity of the four expansion options are summarized in Table 6. **From Table 6 it is apparent that there is not enough excess available water in the current system to meet the *Desired Build-Out* scenario, and in all but Option 1, there is insufficient flow to meet the demands required to meet the allowable dwellings under the existing zoning.**

Table 6: Demands vs modeled vs capacity

Option	Base Case Flow Demand (l/s)	Modeled Flow (l/s)	Additional Capacity (l/s) (# of Connections)	Total Available Flow (l/s) at <10m head reduction
Option 1	54.2	69.0[1]	6.0 (80)	75
Option 2	33.8	16.0[2]	9.0 (200)	27
Option 3	40.8	52.0[3]	0 (0)	48
Option 4	11	11	N/A	48

[1]Additional modeled flow includes **Optional** demands for Wilderness Mountain, Seedtree and Anderson Cove serviced to existing number of dwellings only without any future densification.

[2]Modelled flow is for only existing dwellings with no future densification as the available flow is lower than the Base Case Demand. All existing dwellings at Wilderness Mountain, Seedtree and Anderson Cove were included in the model scenario. Another 200 dwelling units of development could be serviced to utilize all available flow, but this is still lower than the Base Case.

[3]Though only 48 l/s is available, 52 l/s is achievable with only 11m head drop at the connection point. 52.0 l/s is needed to service the optional demand of all existing dwellings in the Wilderness Mountain and Seedtree Developments.

A summary of the recommended servicing requirements from the Colquitz Technical Memo #3 is provided below:

Option 1: Full Loop of Service Area

Figure 5 illustrates the infrastructure layout for this option, and includes:

- 27km of new watermain ranging in size from 150mm to 350mm
- A 2ML reservoir at Glinz Rd and 1.15ML reservoir at Ambience Rd (Wilderness Mountain)
- 2 booster pumping stations
- 6 PRV Stations
- 5 connections to existing mains
- 180 fire hydrants
- 375 valves

Total demand for this scenario has been modelled at 69 l/s, split as 48 l/s from the northern connection in the District and 21 l/s from the southern connection at Anderson Cove. There are 1270 service connections estimated under this modeled scenario (including only the existing connections at Anderson Cove, Seedtree and Wilderness Mountain developments).

The model assumes no changes to the current Wilderness Mountain system, which is comprised of 150mm and 100mm diameter watermains, and as such this area will not be capable of delivering the required fire flow to the existing hydrant locations in this community. It is assumed that the Glinz Road reservoir would be situated on municipally owned right-of-way at the location shown on the **Figure 5.**

Under this option, there could be more available flow for an additional 80 single family homes to increase density in the area serviced (Property at Gillespie and Mt Matheson Road or Seedtree development) by the southern connection at Anderson Cove.

Option 2: South Connection at Anderson Cove

Figure 6 illustrates the infrastructure layout for this option, and includes:

- 16km of new watermain ranging in size from 150mm to 250mm
- A 1.5ML reservoir at Mount Matheson and 1.15ML Reservoir at Ambience Rd (Wilderness Mountain)
- 2 booster pumping stations
- 2 PRV Stations
- 4 connections to existing mains
- 110 fire hydrants
- 225 valves

The model simulation for this option resulted in 16 l/s of flow from the single southern connection at Anderson Cove to service existing properties only (including existing dwellings at the Seedtree and Wilderness Mountain developments). This option also includes for five water access only lots at the south end of the Sooke Basin, which are included in the demand scenario, but service pipes to them have not been costed out at this time.

An additional 200 single family home connections could be serviced in this area with the additional capacity (11 l/s) available from this southern connection. As with Option 1, existing mains in the Wilderness Mountain Area are not of sufficient size to deliver required fire flows in this community.

Option 3: North Connection at Sooke Rd and Ludlow

Figure 7 illustrates the infrastructure layout for this option, and includes:

- 23.3km of new watermain ranging in size from 150mm to 350mm
- A 2.2ML reservoir at Glinz Rd and 1.15ML Reservoir at Ambience Rd (Wilderness Mountain)
- 2 booster pumping stations
- 6 PRV Stations
- 4 connections to existing mains
- 155 fire hydrants
- 320 valves

The layout was determined from the model simulation for Option 3, which demanded 52 l/s of flow from the single northern connection at Sooke Road and Ludlow Rd to service existing properties only to current zoning densities (and only existing dwellings at the Seedtree and Wilderness Mountain developments). On this basis, 1030 service connections are assumed under for the model. As with Option 1, existing mains in the Wilderness Mountain Area are not of sufficient size to deliver required fire flows.

To be able to provide connection to all the existing dwellings at the Seedtree, and Wilderness Mountain developments, a pressure reduction of 11m was required to gain the 4 l/s above the 48 l/s otherwise available to the expanded system.

Option 4: Service to East Sook along Hwy 14

Figure 8 illustrates the infrastructure layout for this option, and includes:

- 7.8km of new watermain ranging in size from 150mm to 200mm
- A 1.4ML reservoir at Glinz Rd
- 1 booster pumping station
- 1 PRV Station
- 1 connection to the existing main at Sooke Rd and Ludlow
- 55 fire hydrants
- 115 valves

Taking 11 l/s of water from the northern connection in the District, this option delivers water to existing properties at current zoning densities (220 service connections).

There are no major development properties under this option, so no further assessment or capacity is warranted

6. Cost Estimates

The estimated costs carry contingencies consistent with generally accepted principles for conceptual designs and studies where a general contingency of 30-50% is considered reasonable due to the lack of sufficient detail in the study to produce a higher level of accuracy. In addition, inflationary and/or administrative contingencies can be added for future risks associated with the financial risks involved in long-term planning projects. This Class D estimate is based on little or no site-specific engineering but provides magnitude of order or 'ballpark' estimates and is derived from lump sum or unit costs from comparable projects of similar magnitude. This category is used in developing long term capital plans and for comparing conceptual options.

Table 7 provides a summary of the Class D estimates for each option is provided below for the total costs, as well as a unit cost for each service or parcel included in each option based on the estimated number of service connections. This is the sum of all existing parcels, plus future parcels to achieve current zoning densities, plus any additional services connection (future parcels) that maybe serviced within those major developments seeking higher densification.

Table 7: Summary of Estimated Costs

Option	Estimated Capital Cost	Total Contingencies	Total Estimated Costs	Proposed # of Connections	Cost per Connection
Option 1	$ 32,570,000	$ 24,477,500	$ 57,050,000	1270	$ 44,900
Option 2	19,400,000	14,650,000	34,050,000	500	68,100
Option 3	29,580,000	22,240,000	51,820,000	1030	50,300
Option 4	9,230,000	6,970,000	16,200,000	210	77,100

More detail on the derivation of the cost estimates is provided in **Appendix D**. There is no allowance for actual service connections provided, as the individual connections are typically borne by the homeowner and developer, and some properties, like Seedtree and Wilderness Mountain already have connections to an existing system. As mentioned previously, no upgrades to existing water systems for Seedtree or Wilderness Mountain have ben carried within these estimates.

7. Conclusions and Recommendations

The conceptualization of water service in the East Sooke Area has determined that there are a number of challenges with providing potable water to the area, especially when considering densification beyond the current zoning allowances. The following conclusions and recommendations are provided.

1. Four servicing options were explored in this study, providing potable water to populations in East Sooke ranging from 624 to 3133 with the desire to add densification to 4 major developments increasing the service population to as high as 5,923.
2. Demands for increased density for major developments generally exceed the existing Juan de Fuca system capacity when considering existing demands in the District of Sooke and the capacity of existing infrastructure such as the Sooke River Road Disinfection Facility, which is limited to 140 l/s capacity at this time. On this basis, simulations were limited to a 10m pressure head reduction at the connection points.
3. Conceptual infrastructure sizing was determined through computer model simulations, which focussed on the Base Case scenario for population growth in the East Soke Area. Reservoirs, booster pumping stations, and pressure control valve stations were identified in terms of size and probable location for each option and are shown on **Figures 5 through 8**.
4. Cost estimates at the conceptual stage of study carry significant contingency, as limited site-specific information and investigation has been completed. Costs range from $16.2M to $57.0M with per connection costs ranging from $44,900 to $77,100. The lowest per connection cost Option is Option 1, and the lowest Capital Cost Option is Option 4.
5. Further model refinements could be made, if the entire Juan de Fuca model could be incorporated into the analysis, because this study was limited to a 10m pressure head reduction at the connection point and was based on Pressure-Flow diagrams provided by the CRD. It would be more precise to look at the entire service area model to see what maximum day demand could be delivered to the proposed service area while still maintaining an adequate level of service to the rest of the District of Sooke and surrounding areas currently serviced in the CRD's Juan de Fuca Drinking Water Distribution System

8. Closure

We thank you again for the opportunity to study the provision to expand the JdFWS to the eastern extents of the District of Sook and the Juan de Fuca Electoral Area, which is currently under serviced. We understand that there is genuine interest from existing residents and potential developers to get a high level of water service to the area, and we trust that the information contained within this report and appended documents is a practical first step in determining the potential water servicing requirements for the area with probable costs for initial discussion purposes.

Please do not hesitate to call the undersigned at your earliest convenience should you have any questions or require additional information.

Sincerely,

McElhanney Ltd.

PERMIT TO PRACTICE
McElhanney Ltd.
PERMIT NUMBER: 1003299
Engineers and Geoscientists of BC

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
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Ian Sander, PMP, PEng
isander@mcelhanney.com I 778-746-7430

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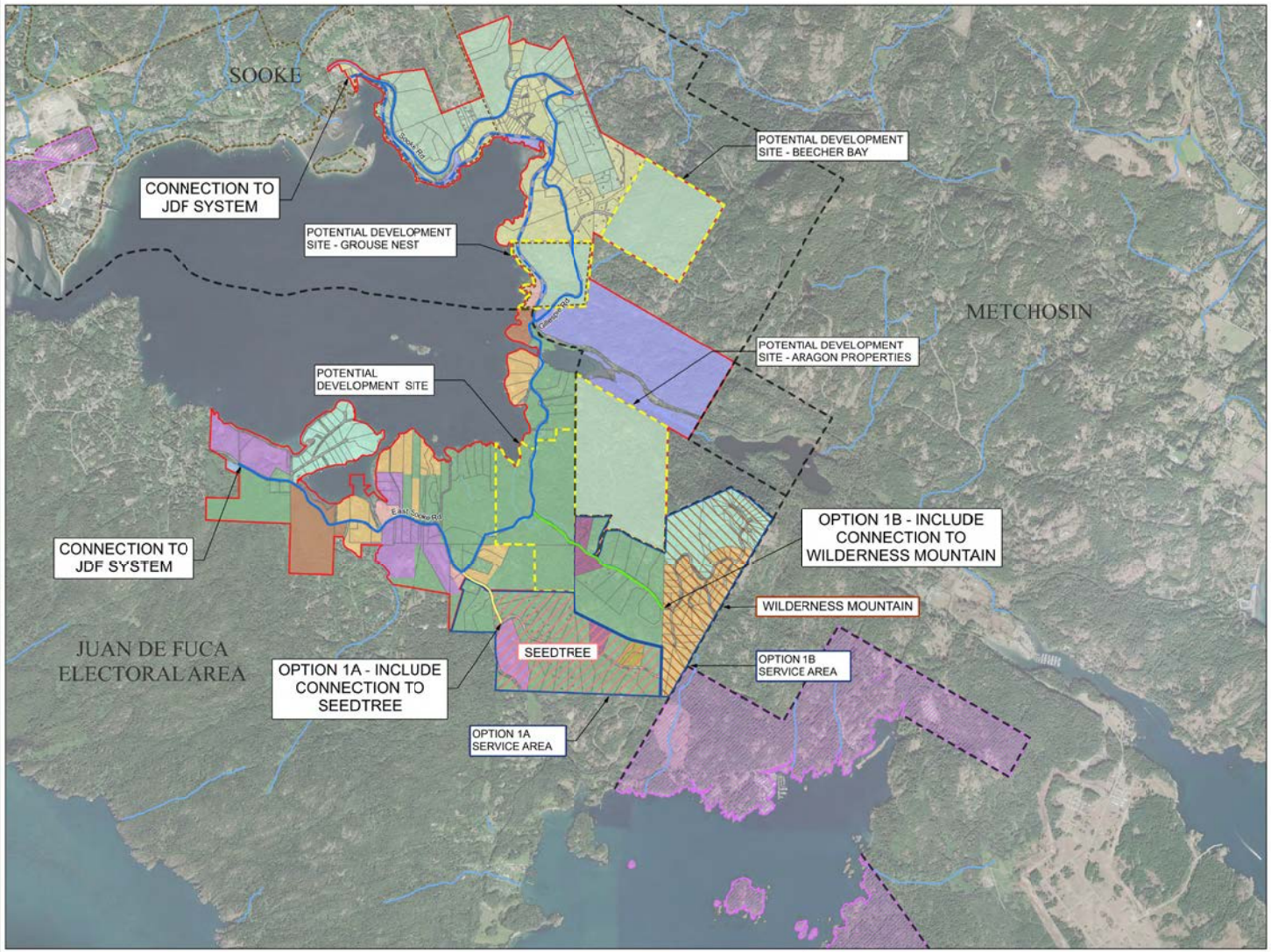
APPENDIX A

FIGURES

40

FIGURE 1



East Sooke Water Service Study

Option 1 - District of Sooke to Anderson Cove

- Proposed pipe route
- Alternate pipe route
- Option 1A pipe route
- Option 1B pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 1

0 375 750 1,500 2,250 3,000 (m)

McElhanney

CAPITAL REGIONAL DISTRICT

Notes:

Projection: NAD 1983 UTM Zone 10N
Ortho Imagery (2019)
CRD Urban Containment Boundary has been offset for visual purposes

Sources:

Capital Regional District
District of Sooke
McElhanney
ESRI

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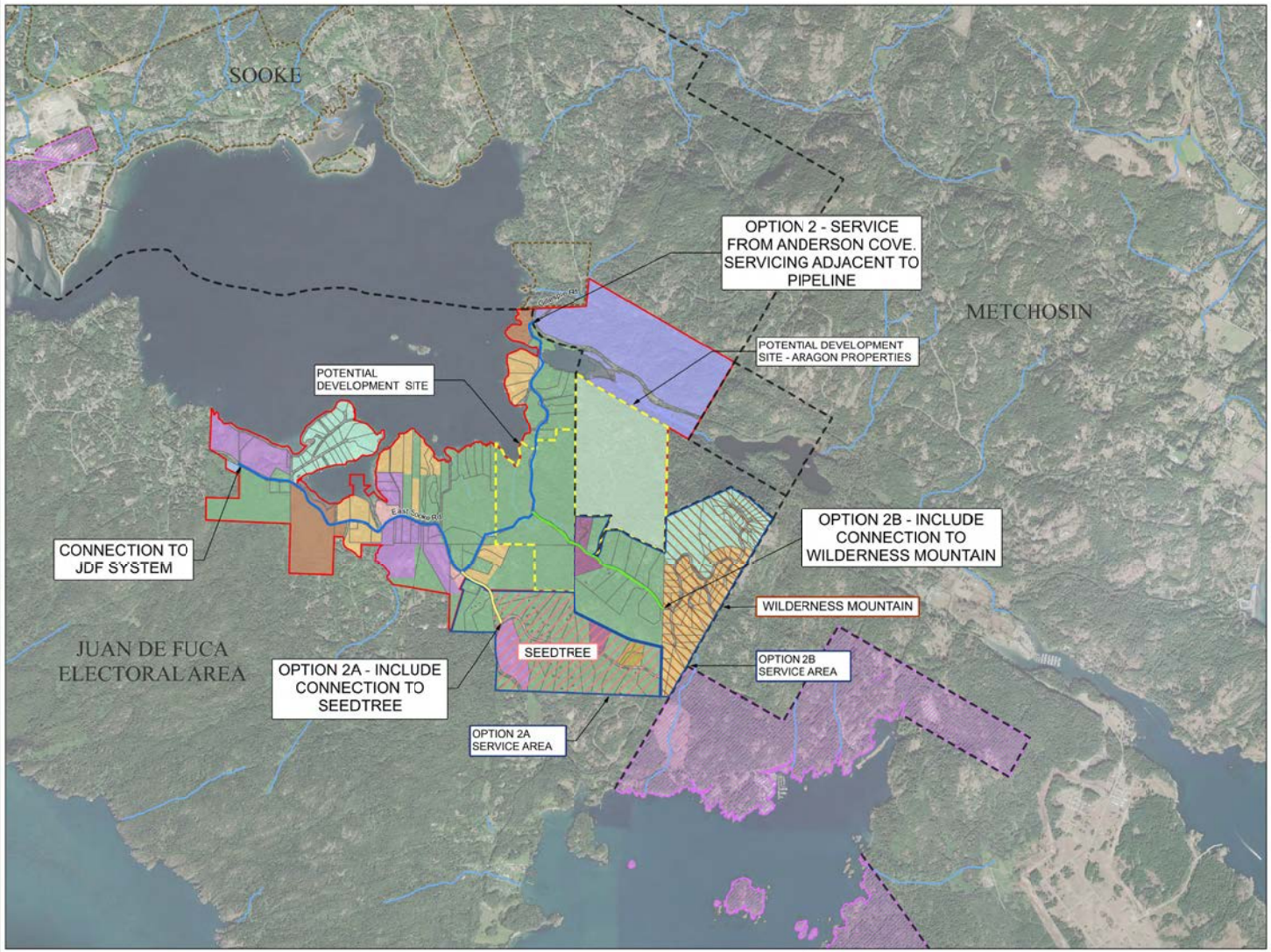
APPENDIX A

FIGURE 2



East Sooke Water Service Study

Option 2 - Anderson Cove to Gillespie Creek

- Proposed pipe route
- Option 2A pipe route
- Option 2B pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 2

0 375 750 1,500 2,250 3,000 (m)

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Notes:

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Capital Regional District
District of Sooke
McElhanney
ESRI

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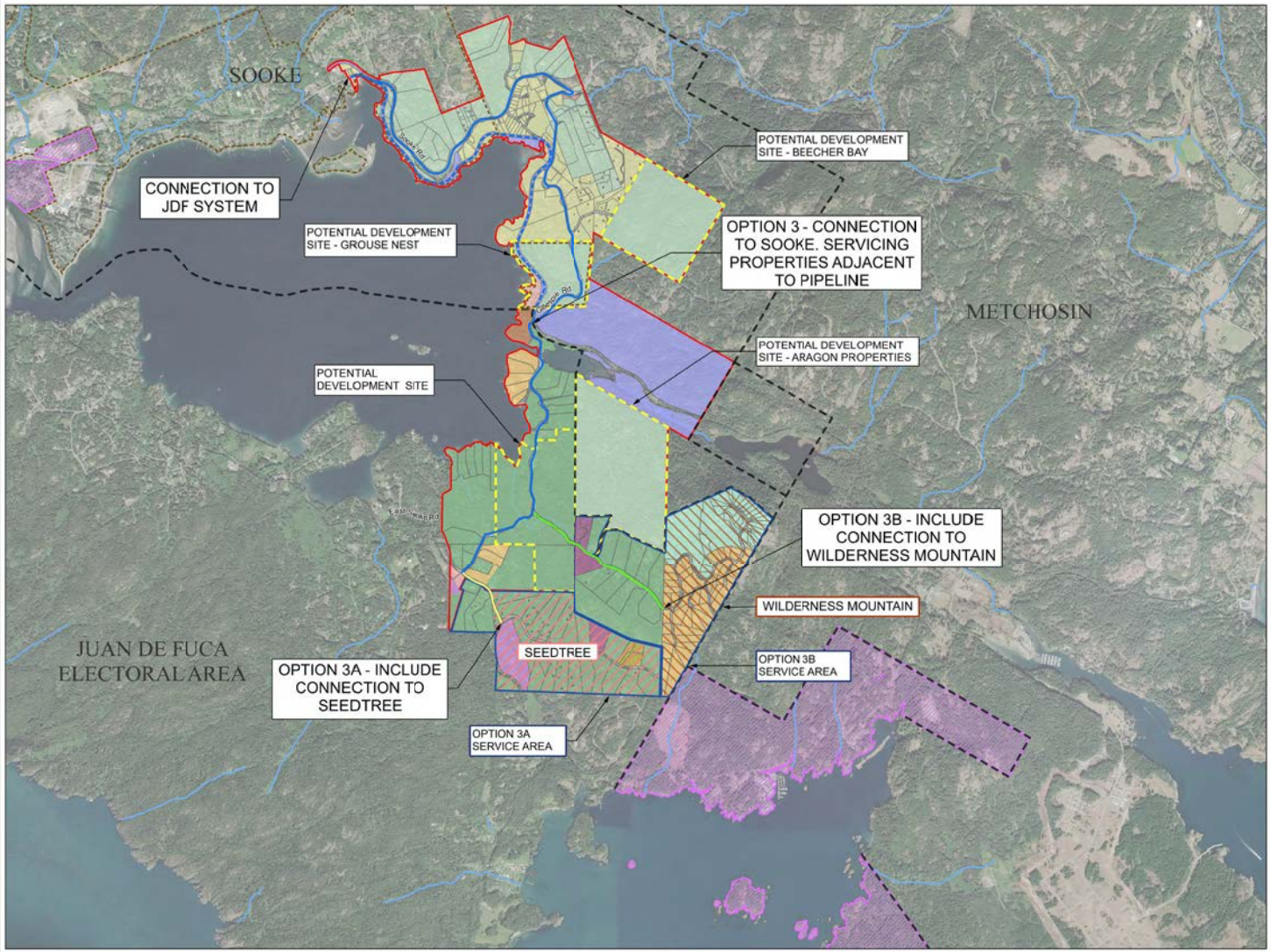
APPENDIX A

FIGURE 3



East Sooke Water Service Study

Option 3 - District of Sooke to East Sooke Road

- Proposed pipe route
- Alternate pipe route
- Option 3A pipe route
- Option 3B pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 3

0 375 750 1,500 2,250 3,000 (m)

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Sources:

Capital Regional District
District of Sooke
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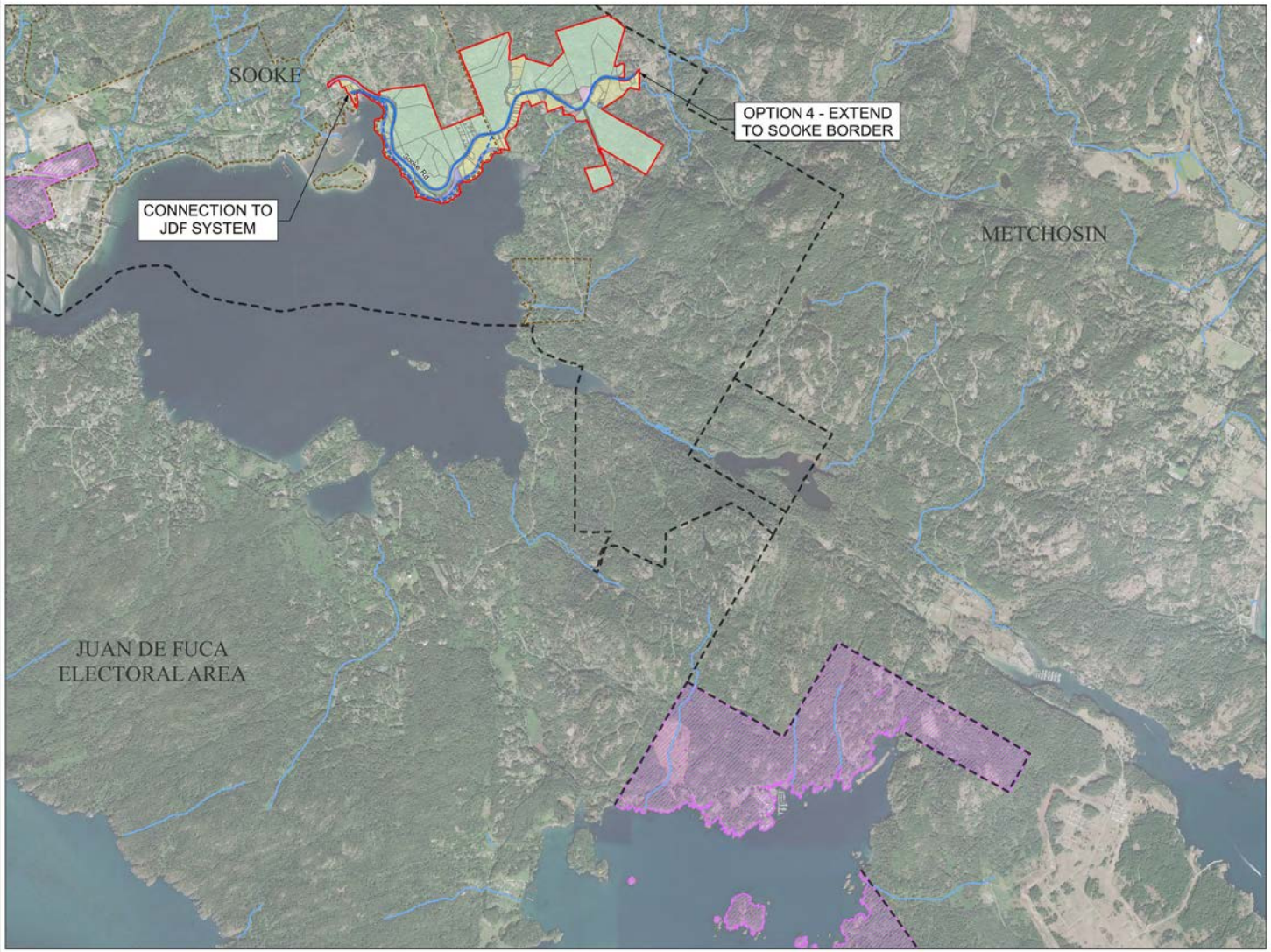
APPENDIX A

FIGURE 4



East Sooke Water Service Study

Option 4 - Extension to Eastern Sooke Boundary

- Proposed pipe route
- Alternate pipe route
- Service Area Boundary
- Optional Service Areas
- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 4

0 375 750 1,500 2,250 3,000 (m)

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Notes:

Projection: NAD 1983 UTM Zone 10N
Ortho Imagery (2019)
CRD Urban Containment Boundary has been offset for visual purposes

Sources:

Capital Regional District
District of Sooke
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ESRI

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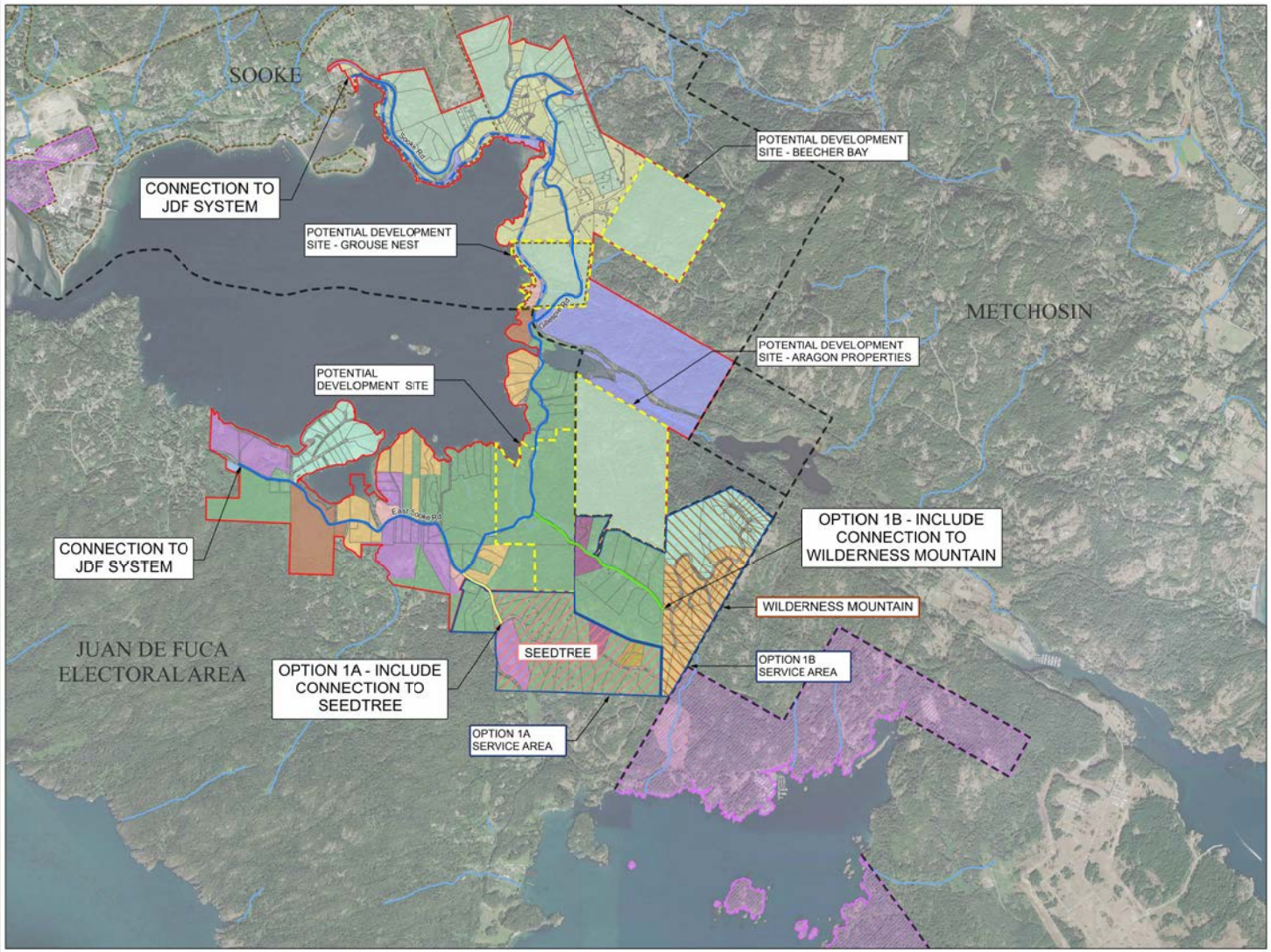
APPENDIX A

FIGURE 5



East Sooke Water Service Study

Option 1 - District of Sooke to Anderson Cove

- Proposed pipe route
- Alternate pipe route
- Option 1A pipe route
- Option 1B pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 1

0 375 750 1,500 2,250 3,000 (m)

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CAPITAL REGIONAL DISTRICT

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Sources:

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District of Sooke
McElhanney
ESRI

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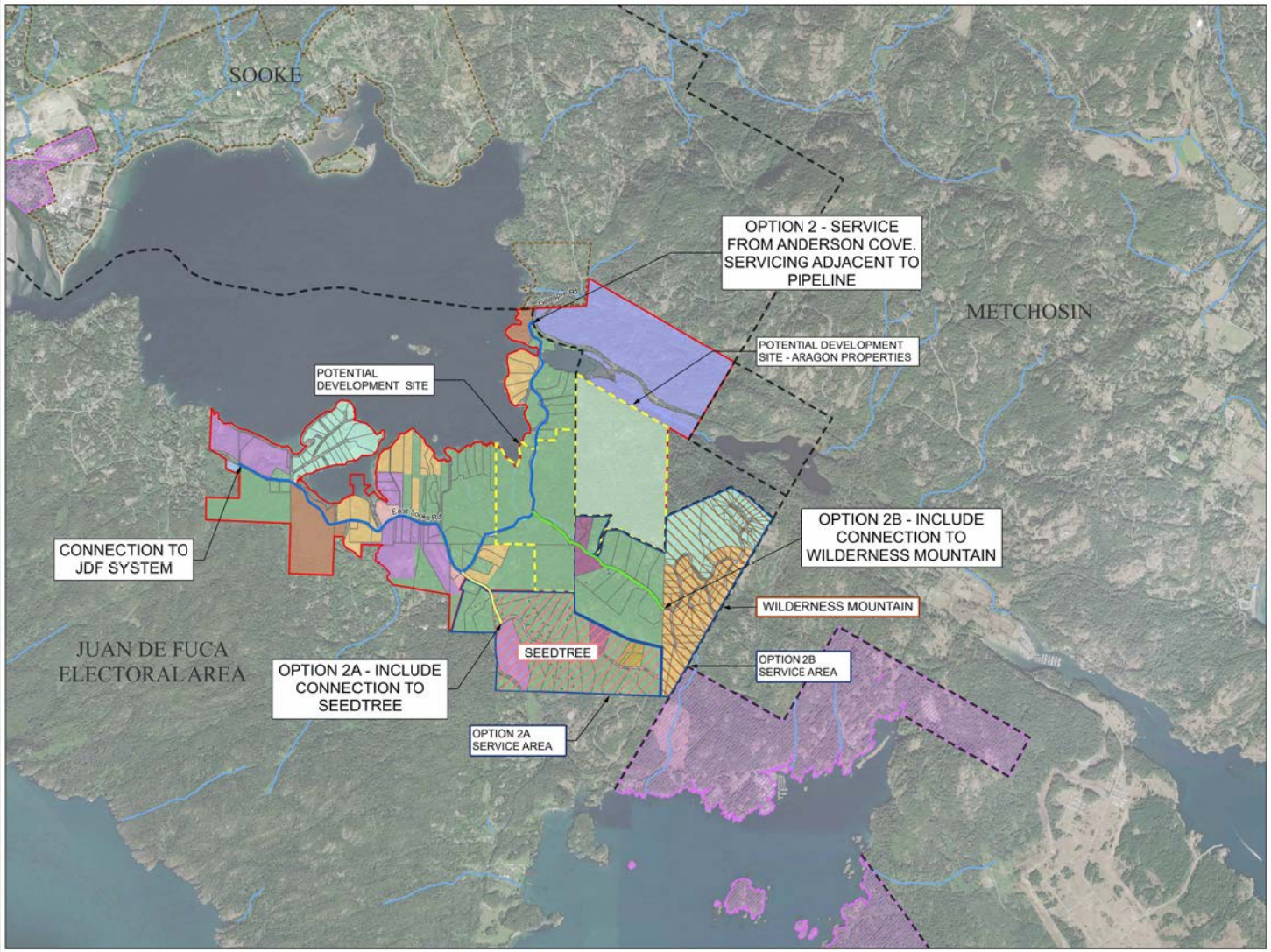
APPENDIX A

FIGURE 6



East Sooke Water Service Study

Option 2 - Anderson Cove to Gillespie Creek

- Proposed pipe route
- Option 2A pipe route
- Option 2B pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 2

0 375 750 1,500 2,250 3,000 (m)

McElhanney

CAPITAL REGIONAL DISTRICT

Notes:

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Ortho Imagery (2019)
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Sources:

Capital Regional District
District of Sooke
McElhanney
ESRI

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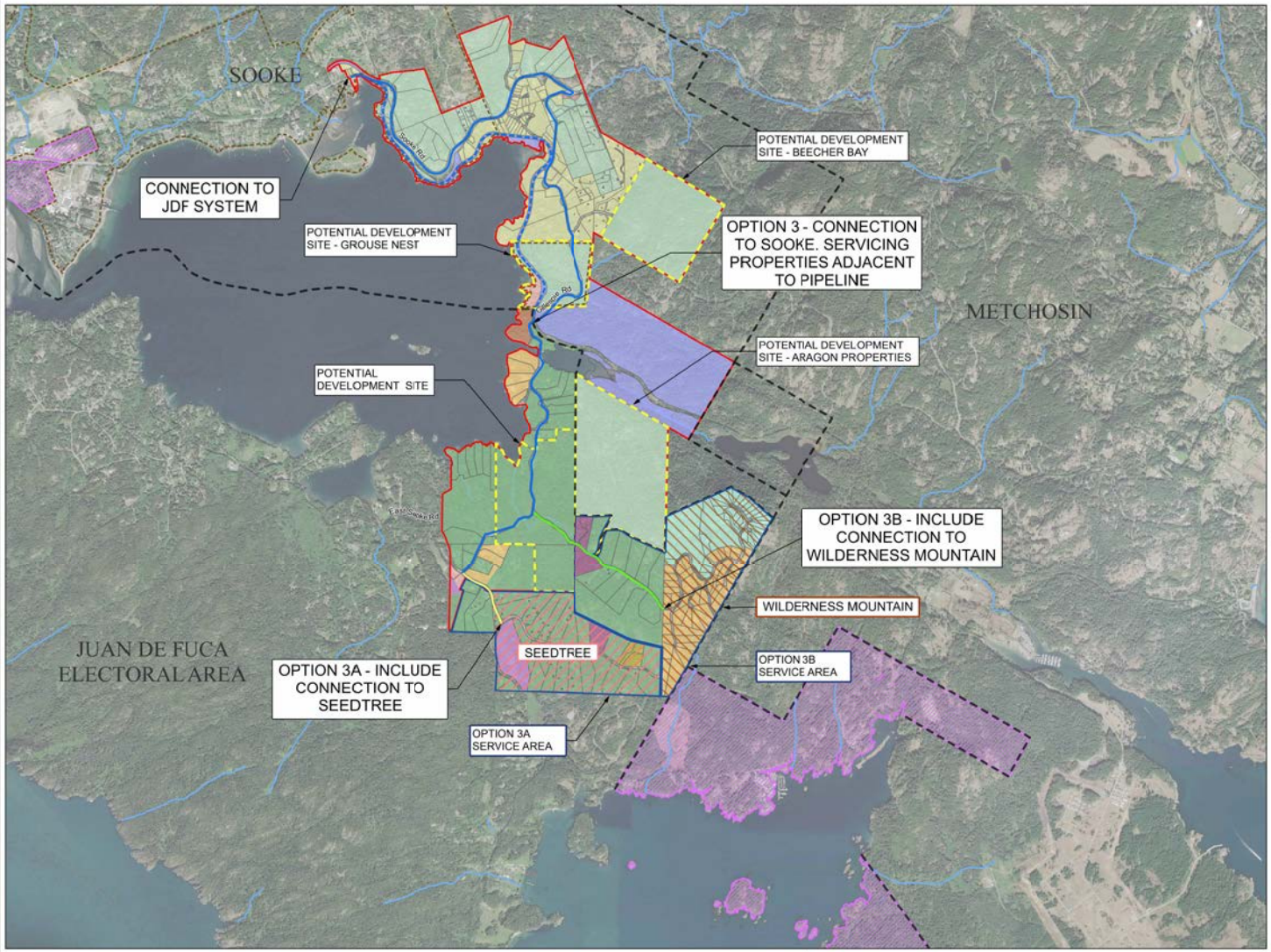
APPENDIX A

FIGURE 7



East Sooke Water Service Study

Option 3 - District of Sooke to East Sooke Road

- Proposed pipe route
- Alternate pipe route
- Option 3A pipe route
- Option 3B pipe route
- Service Area Boundary
- Optional Service Areas
- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 3

0 375 750 1,500 2,250 3,000 (m)

McElhanney

CAPITAL REGIONAL DISTRICT

Notes:

Projection: NAD 1983 UTM Zone 10N
Ortho Imagery (2019)
CRD Urban Containment Boundary has been offset for visual purposes

Sources:

Capital Regional District
District of Sooke
McElhanney
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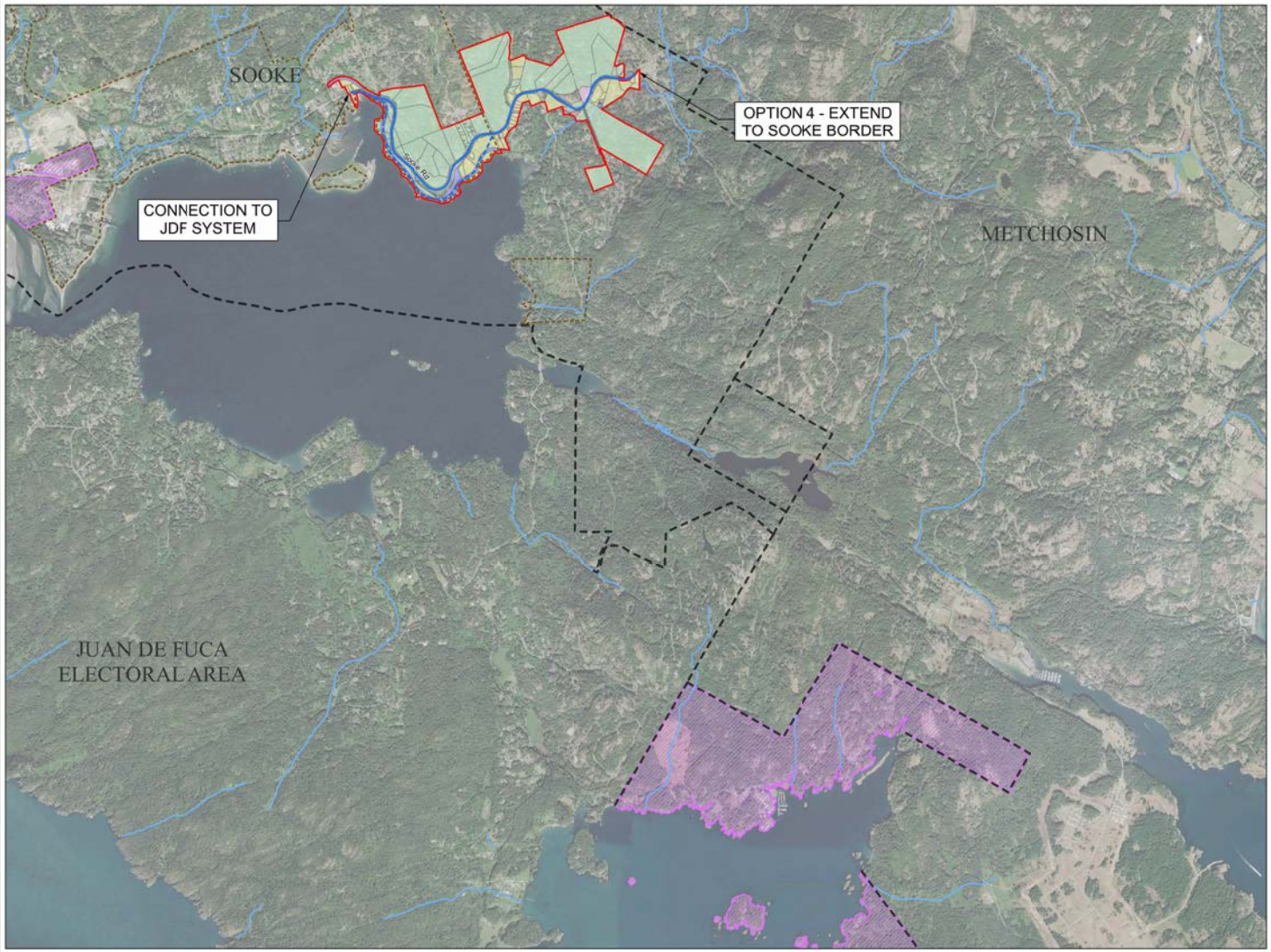
APPENDIX A

FIGURE 8



East Sooke Water Service Study

Option 4 - Extension to Eastern Sooke Boundary

- Proposed pipe route
- Alternate pipe route
- Service Area Boundary
- Optional Service Areas
- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 4

0 375 750 1,500 2,250 3,000 (m)

McElhanney

CAPITAL REGIONAL DISTRICT

Notes:

Projection: NAD 1983 UTM Zone 10N
Ortho Imagery (2019)
CRD Urban Containment Boundary has been offset for visual purposes

Sources:

Capital Regional District
District of Sooke
McElhanney
ESRI

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APPENDIX A

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APPENDIX A

Technical Memo #1

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APPENDIX A

McElhanney

Our File: 2241-21080-02

TECHNICAL MEMO

To	From
Ian Jesney, P.Eng. Senior Manager, Infrastructure Engineering Capital Regional District	Peter Ferguson, Senior Project Manager
Re	**Date**
East Sooke Water Servicing Study TM#X – Local Area Services Overview	May 20, 2022

The purpose of this memo is to provide an overview with respect to the option to fund the expansion to the East Sooke Watermain by creating a Local Area Service (LAS) as legislated under the *Local Government Act*.

1. Introduction

Services under a LAS program are provided to a localized geographic area and are typically funded by the properties benefitting from the service, with or without contribution from the municipality.

A local area service is a municipal service that is to be paid for in whole or, in part by a local service tax. Services that may be provided as local area services are services that the council considers provide particular benefit to part of the municipality.

2. LSA Procedures

A municipality must adopt a bylaw to establish a local area service, and may only do this if:

1) the service and its cost recovery methods have been proposed by petition or
2) the service and its cost recovery methods have been proposed by council initiative or
3) the bylaw has received assent of the electors

The Bylaw establishing the LAS must:

1) describe the service,
2) define the boundaries of the LAS,

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3) identify the methods of cost recovery for the service, including the form of local service tax and the portion of the costs of the service that are to be recovered by the local service tax, and
4) if applicable, identify the portion of the costs of the service that are to be recovered by a general property tax.

Petition for LAS:

(1) The persons who may petition for a LAS are the owners of parcels that would be subject to the local service tax for the service.
(2) Each page of a petition for a local area service must do the following:
  (a) describe the service in general terms;
  (b) define the boundaries of the local service area;
  (c) provide an estimate of the costs of the service;
  (d) if it is proposed that the municipality borrow for the purposesof the service and all or part of the costs of the borrowing are to be recovered by means of the local service tax, indicate
    (i) the total amount proposed to be borrowed under thebylaw,
    (ii) the maximum term for which the debentures maybe issued, and
    (iii) the portion of those costs that are to be recoveredby a local service tax;
  (e) indicate the proposed methods of cost recovery for the service, including the form of local service tax and the portion of the costs of the service that are to be recovered by the local service tax;
  (f) if applicable, indicate what portion of the costs are proposed tobe recovered by a general municipal tax;
  (g) include any other information that council requires.
(3) In order for a petition for a local area service to be certified as sufficient andvalid,
  (a) the petition must be signed by the owners of at least 50% ofthe parcels that would be subject to the local service tax, and
  (b) the persons signing must be the owners of parcels that in totalrepresent at least 50% of the assessed value of land and improvements that would be subject to the local service tax.
(4) The corporate officer must determine the sufficiency and validity of a petitionto a council and must certify this determination.
(5) The following apply for the purposes of a petition under this section:
  (a) if 2 or more persons are owners of a parcel,
    (i) they must be considered as one owner only,
    (ii) they are not entitled to petition unless a majority of them concurs, and
    (iii) unless a petition is signed by a majority of them,their signatures must be disregarded in determining whether the

petition is sufficient.

(b) a person who would be liable for a local service tax by reasonof being the holder or occupier of land held in the manner referred to in Division 8 [Tax Liability of *Occupiers]* of this Part may sign the petition as if the person were the owner;

(c) in relation to persons referred to in paragraph (b), in computing the values of the land and improvements, only theassessed value of the person's interest in them is to be used.

LAS on Council initiative – subject to petition against:

(1) If a council proposes to undertake a local area service on its own initiativeit must give notice of this intention to the owners of parcels that would be subject to the local service tax.

(2) The notice must include

(a) if the council is proposing that all or part of the costs may be waived or reduced and the amount that the property owner will be required to pay for this purpose, and

(b) a statement indicating that the council may proceed with establishing the service unless a petition against the service is presented within 30 days after notice has been given.

(3) The corporate officer must mail the notice to the applicable address as set out in the last revised assessment roll.

(4) Council may proceed with the LAS in accordance with the noticeunless it receives a sufficient petition against the service within 30 days after the second publication.

(5) If a council has been prevented from undertaking a local area service because ofa petition under this section, the council must not propose the same service on its own initiative within a period of one year after the presentation of the petition.

(6) A council may again propose a local area service on its own initiative within the period referred if theservice is varied from or less expensive than that originally proposed to be undertaken.

LAS on council initiative – subject to elector assent:

(1) If a council proposes to undertake a LSA on its own initiative thebylaw establishing the service may only be adopted with the assent of the electors in the local service area.

LAS Implementation:

The municipal council is the proponent and brings the application to the Inspector of Municipalities. The municipal council requires three bylaws to be passed each requiring two meetings.

1) LAS (also requires approval by Inspector of Municipalities before final reading)
2) Loan Authorization to borrow the money
3) Special Parcel Tax bylaw

The municipal council technically handles the contracting and undertaking of the work.
The LAS amount can include construction and engineering costs. In addition, all expenses incurred by the municipal council will be paid for within the LAS payments. The loan authorization bylaw will outline all costs and typically has a 10-20% contingency. The Loan is paid back over an agreed timeline via property tax. Typical loans are repaid over 15 years but can be as little as 5 and as many as 25 years.

- Interest and principal payments are collected once a year via property taxes.
- Interest rate is either through the municipal finance authority or a bank.
- Interest rates for municipal councils are typically in the 1% range. The loan authorization bylaw will use a higher rate to account for potential increase in rates over the timeline.
- The funds are borrowed at the start.
- The allocation of the costs to the property owners needs to establish a fair distribution of costs and be defendable to the Inspector of Municipalities. This cost allocation will be negotiated with the municipal council.

3. Consultation with Municipal Affairs

In order to understand the implementation a LAS that would include two municipal jurisdictions the Province of British Columbia, Department of Municipal Affairs was contacted with the following question:

"The water infrastructure would be located in two municipal jurisdictions – District of Sooke and Juan de Fuca Electoral Area.

The major property owners have been contacted that would receive benefit from the proposed expansion of the water infrastructure and all have stated that they would consider financially supporting this project.

We would anticipate that the LAS procedure would be implemented by a petition from those that are willing to contribute to the capital cost.

With respect to the LAS boundaries being located within two municipal tax-based areas we would understand that separate LAS's would be set up – one in each municipal jurisdiction.

Each municipal jurisdiction would be required to pass the relevant bylaws to support the establishment of the LAS boundaries and borrowing bylaws. This would also define the contribution amounts for each of the contributing properties.

In addition, the Inspector of Municipalities would be required to approve this program.

Our question for you is to have you review this proposed LAS implementation procedure and advise if the Ministry of Municipal Affairs would support this program."

The following is the response received from the Department of Municipal Affairs representative:

"To summarize the conversation we had, essentially, for what is being proposed, we would recommend establishing the service as a CRD service with both the Juan de Fuca EA and District of Sooke as participants in the service. This way there will only need to be one set of bylaws (a Service Establishment bylaw and Loan Authorization bylaw) instead of trying to organize various bylaws for different service areas in different jurisdictions."

This confirms that the establishment and implementation of a LAS in two municipal jurisdictions is feasible.

4. Closing

The development of a local service area must comply with the Provincial Regulations and be accepted by the electorate of the area in question. The above description defines the process and requirements in creating an LAS

Sincerely,
McElhanney Ltd.

Peter Ferguson, P.Eng.

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APPENDIX B

Technical Memo #2

55

APPENDIX A

Our File: 2241-21080-02

TECHNICAL MEMO

To	From
Ian Jesney, P.Eng. Senior Manager, Infrastructure Engineering Capital Regional District	Jennifer Peters, P.Eng., Senior Engineer
Re	**Date**
East Sooke Water Servicing Study TM#2 – Service Area and Modelling Parameters	December 21, 2021

The purpose of this memo is to confirm the options and the associated routing, service areas, and design data to be used to be use in the East Sooke Water Servicing Study.

1. Existing System and Supply Criteria

The Juan de Fuca Water Distribution System provides drinking water to Colwood, Langford, Metchosin, View Royal, Sooke, and parts of Highlands and the Juan de Fuca Electoral Area (East Sooke). The system consists of 15 storage reservoirs, 37 pump stations, 435km of watermains, and supplies water to approximately 58,000 customers. The Juan de Fuca Distribution System obtains its water from the Regional Water Supply System.

2. Potential Servicing Routes and Service Areas

Four potential routes were identified for this study as described in the following section. The servicing area for each option has generally been limited to properties immediately adjacent to the proposed watermain route. Additional areas to be considered for servicing that are not adjacent to the watermain (i.e. Seedtree and Wilderness Mountain) have been noted in the applicable options.

2.1. OPTION 1 – DISTRICT OF SOOKE TO ANDERSON COVE

Option 1 connects to the existing Juan de Fuca system at both ends, connecting at the existing terminus within the District of Sooke to Anderson Cove. The route follows Sooke (Highway 14), Gillespie, and East Sooke Roads, with an alternate route identified along the Galloping Goose Trail that could be considered as a future exercise. Servicing of the Seedtree Development (Option 1A) and the Wilderness Mountain

Development (Option 1B) are included as sub-options to be assessed. The route and the servicing area for this option is shown on Figure 1.

2.2. OPTION 2 – ANDERSON COVE TO GILLESPIE CREEK

Option 2 extends the existing Juan de Fuca system from Anderson Cove to Gillespie Creek. The route follows East Sooke and Gillespie Roads. Servicing of Seedtree (Option 2A) and Wilderness Mountain (Option 2B) are included as sub-options to be assessed. The route and the servicing area for this option is shown on Figure 2.

2.3. OPTION 3 – DISTRICT OF SOOKE TO EAST SOOKE ROAD

Option 3 extends the existing Juan de Fuca system from the existing terminus within the District of Sooke to East Sooke Road. The route follows Sooke and Gillespie Roads, with an alternate route identified along the Galloping Goose Trail that could be considered as a future exercise. Servicing of Seedtree (Option 3A) and Wilderness Mountain (Option 3B) are included as sub-options to be assessed. The route and the servicing area for this option is shown on Figure 3.

2.4. OPTION 4 – EXTENSION TO EASTERN SOOKE BOUNDARY

Option 4 extends the existing Juan de Fuca system from the existing terminus within the District of Sooke to the eastern boundary of the District of Sooke. The route follows Sooke Road, with an alternate route identified along the Galloping Goose Trail that could be considered as a future exercise. The route and the servicing area for this option is shown on Figure 4.

3. Design Demands

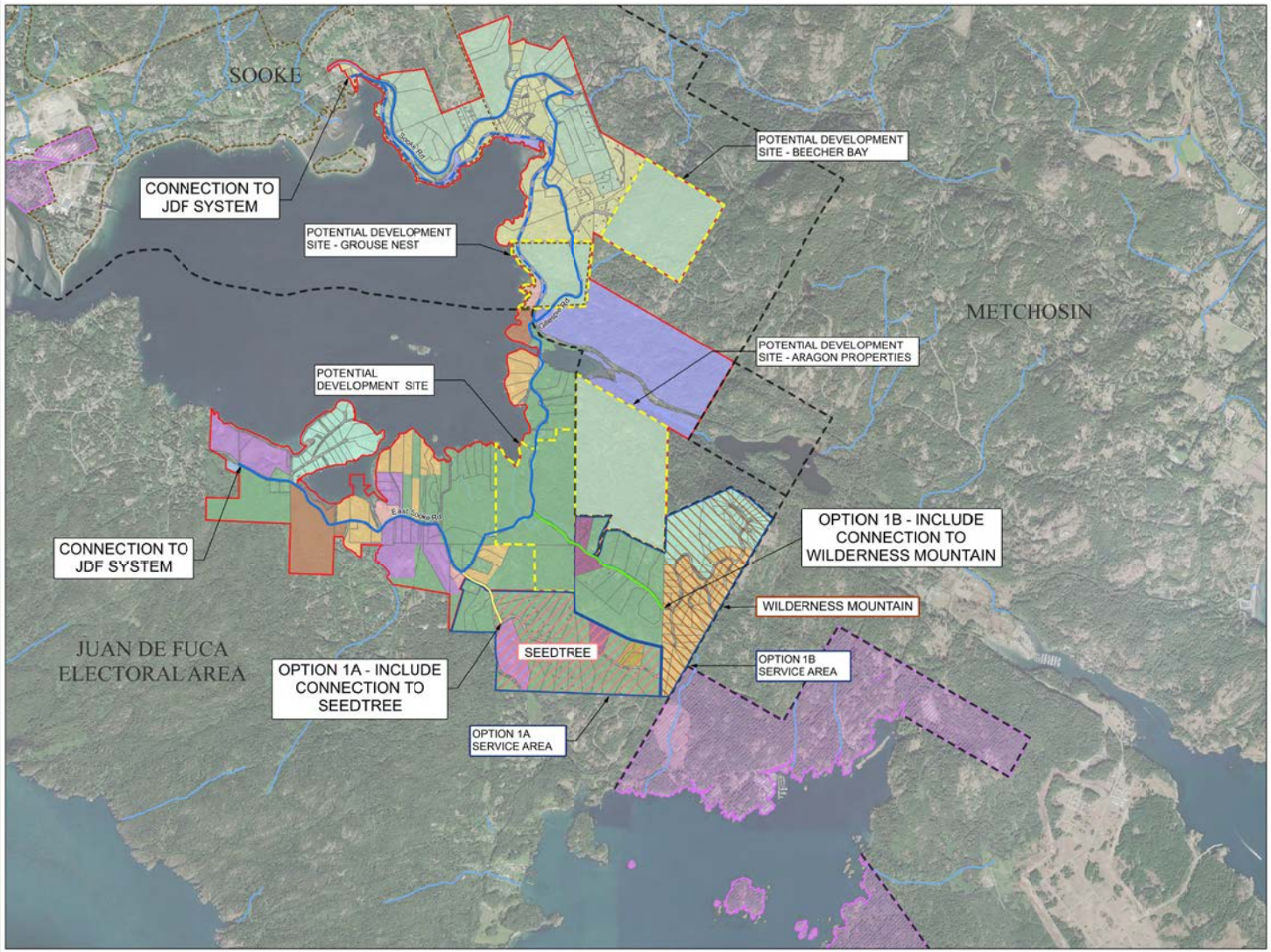
System demands for each option are presented below and are based on CRD design criteria and existing zoning to calculate a Base Case Scenario. There are, however, several large properties with development potential of higher density than what these lands are currently zoned. These speculative densities are included in the "Build-out" scenario which results in higher demands from the development potential of the area.

3.1. FLOW AND SYSTEM SIZING PARAMETERS

The following design criteria from the CRD's Engineering Specifications will be used for this study:

Residential Populations

LAND USE	DESCRIPTION	AVERAGE OCCUPANCY
Low Density	Any residential development with a gross density of less than 20 units/hectare	3.2 persons/unit
Medium Density	Any residential development with a gross density of greater than 20 units/hectare and less than 50 units/hectare	2.8 persons/unit
High Density	Any residential development with a gross density in excess of 50 units/hectare	1.8 persons/unit



East Sooke Water Service Study

Option 1 - District of Sooke to Anderson Cove

- Proposed pipe route
- Alternate pipe route
- Option 1A pipe route
- Option 1B pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 1

0 375 750 1,500 2,250 3,000 (m)

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CAPITAL REGIONAL DISTRICT

Notes:

Projection: NAD 1983 UTM Zone 10N
Ortho Imagery (2019)
CRD Urban Containment Boundary has been offset for visual purposes

Sources:

Capital Regional District
District of Sooke
McElhanney
ESRI

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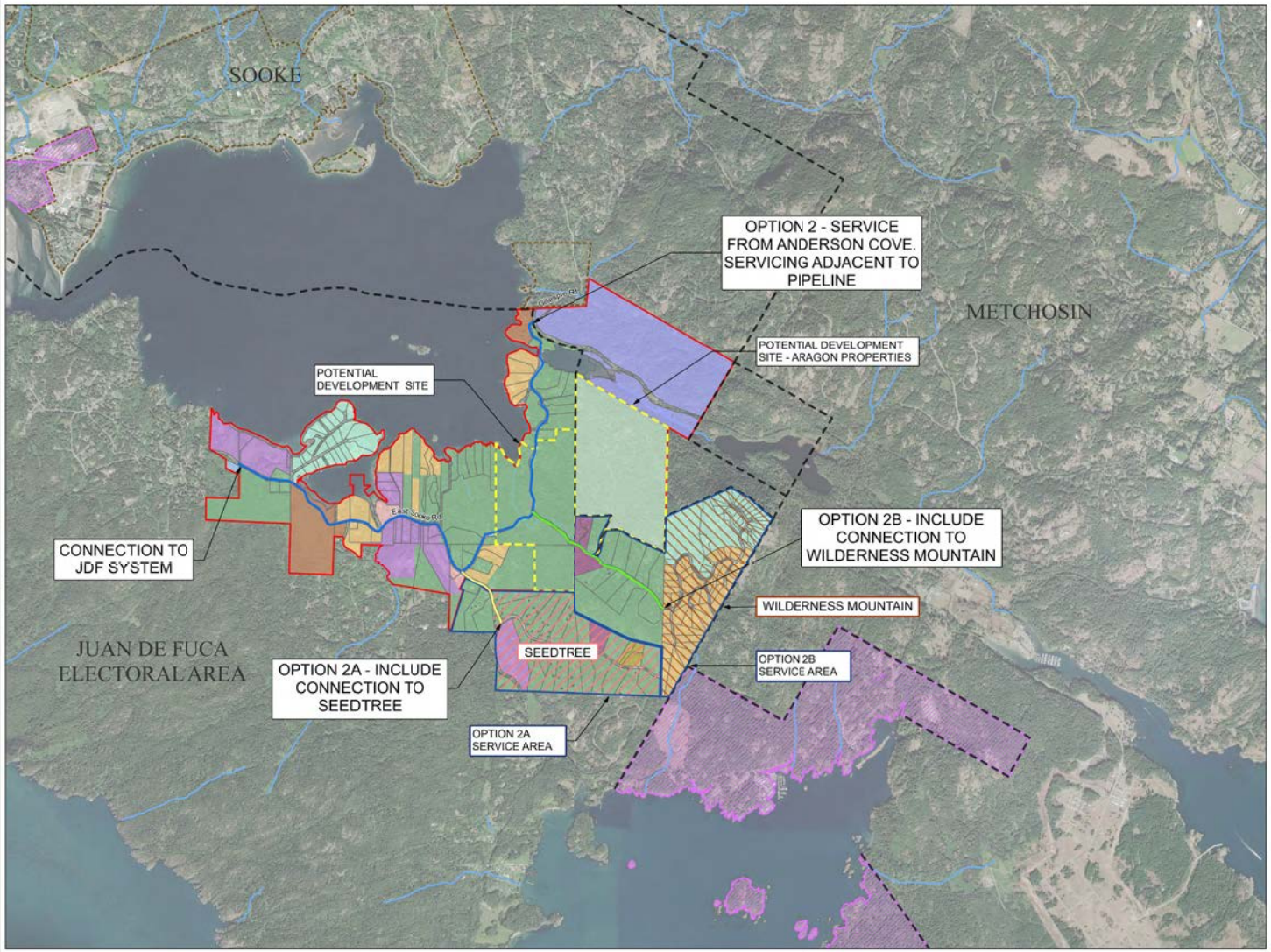
APPENDIX A



East Sooke Water Service Study

Option 2 - Anderson Cove to Gillespie Creek

- Proposed pipe route
- Option 2A pipe route
- Option 2B pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 2

0 375 750 1,500 2,250 3,000 (m)

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CAPITAL REGIONAL DISTRICT

Notes:

Projection: NAD 1983 UTM Zone 10N
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Sources:

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District of Sooke
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ESRI

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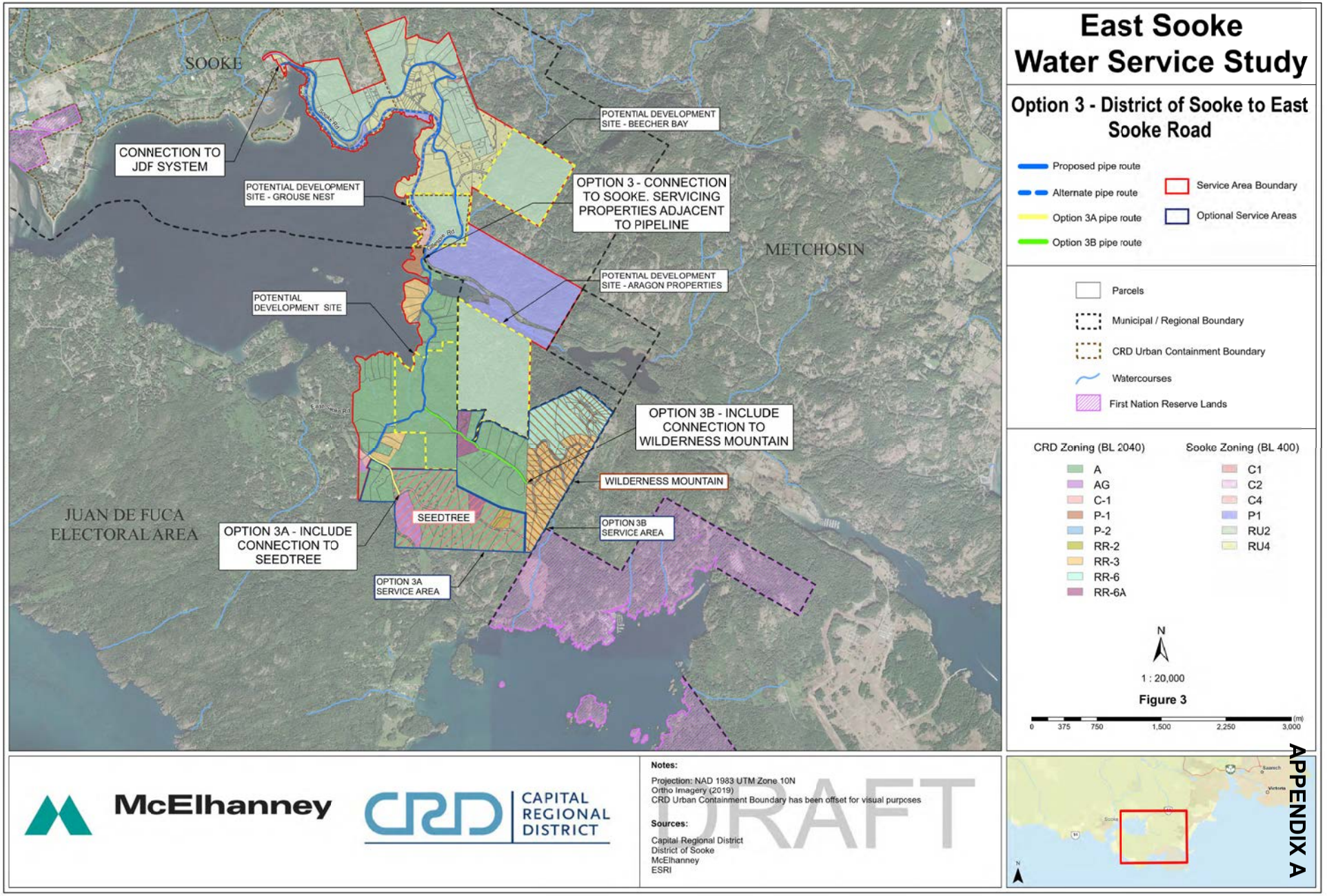
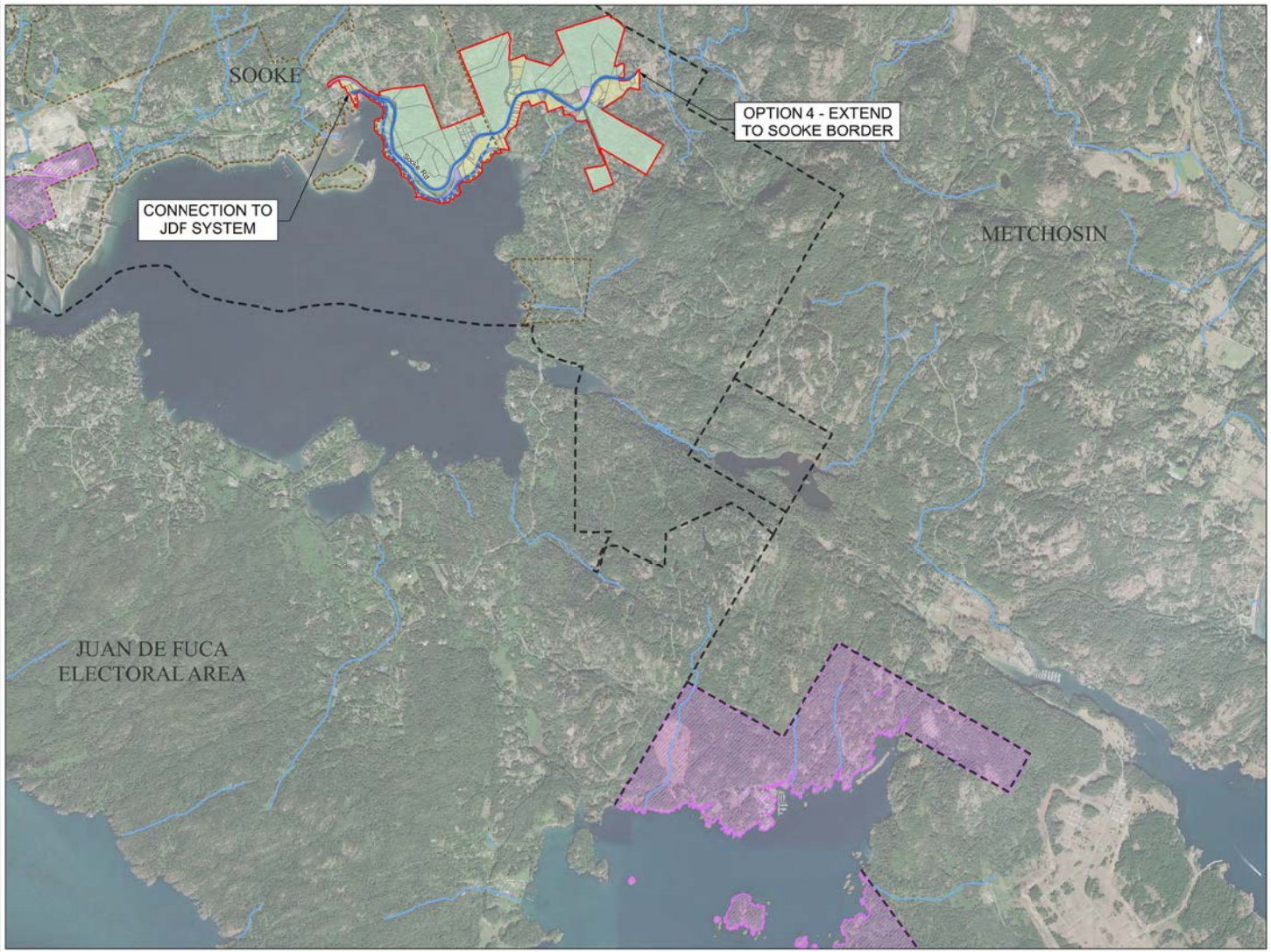
APPENDIX A


East Sooke
Water Service Study
Option 3 - District of Sooke to East Sooke Road
SOOKE
METCHOSIN
JUAN DE FUCA ELECTORAL AREA
CONNECTION TO JDF SYSTEM
POTENTIAL DEVELOPMENT SITE - GROUSE NEST
POTENTIAL DEVELOPMENT SITE
POTENTIAL DEVELOPMENT SITE - BEECHER BAY
OPTION 3 - CONNECTION TO SOOKE. SERVICING PROPERTIES ADJACENT TO PIPELINE
POTENTIAL DEVELOPMENT SITE - ARAGON PROPERTIES
OPTION 3B - INCLUDE CONNECTION TO WILDERNESS MOUNTAIN
WILDERNESS MOUNTAIN
OPTION 3B SERVICE AREA
SEEDTREE
OPTION 3A - INCLUDE CONNECTION TO SEEDTREE
OPTION 3A SERVICE AREA
Proposed pipe route
Alternate pipe route
Option 3A pipe route
Option 3B pipe route
Service Area Boundary
Optional Service Areas
Parcels
Municipal / Regional Boundary
CRD Urban Containment Boundary
Watercourses
First Nation Reserve Lands
CRD Zoning (BL 2040)
A
AG
C-1
P-1
P-2
RR-2
RR-3
RR-6
RR-6A
Sooke Zoning (BL 400)
C1
C2
C4
P1
RU2
RU4
N
1 : 20,000
Figure 3
0
375
750
1,500
2,250
3,000
(m)
McElhanney
CAPITAL REGIONAL DISTRICT
Notes:
Projection: NAD 1983 UTM Zone 10N
Ortho Imagery (2019)
CRD Urban Containment Boundary has been offset for visual purposes
Sources:
Capital Regional District
District of Sooke
McElhanney
ESRI
DRAFT
APPENDIX A



East Sooke Water Service Study

Option 4 - Extension to Eastern Sooke Boundary

- Proposed pipe route
- Alternate pipe route
- Service Area Boundary
- Optional Service Areas

- Parcels
- Municipal / Regional Boundary
- CRD Urban Containment Boundary
- Watercourses
- First Nation Reserve Lands

CRD Zoning (BL 2040)	Sooke Zoning (BL 400)
A	C1
AG	C2
C-1	C4
P-1	P1
P-2	RU2
RR-2	RU4
RR-3	
RR-6	
RR-6A	

N

1 : 20,000

Figure 4

0 375 750 1,500 2,250 3,000 (m)

McElhanney

CAPITAL REGIONAL DISTRICT

Notes:

Projection: NAD 1983 UTM Zone 10N
Ortho Imagery (2019)
CRD Urban Containment Boundary has been offset for visual purposes

Sources:

Capital Regional District
District of Sooke
McElhanney
ESRI

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APPENDIX A

Average Day Demand

Land Use	Average Day Demand
Residential	545 litres/capita/day
Commercial / Institutional	1.87 litres/day/m^2

Peaking Factors

Maximum Day	2.5 times Average Day Demand
Peak Hour	1.4 times Maximum Day Demand

Storage

Minimum Fire Storage	5,000 litres/minute for 4 hours or 1,200 m^3
Emergency Storage	50% of Average Day Demand
Total Storage Required	A plus the greater of B and C A = Equalization Storage Capacity (25% of Maximum Day Demand) B = Fire Storage (Minimum of 4 hours at 5,000 litres/minute) C = Emergency Storage (50% of Average Day Demand)

Water System Pressure Requirements

Peak Hour Demand	Minimum pressure = 414 kPa (60 psi) Maximum pressure = 276 kPa (40 psi)
Maximum Day Demand plus Fire Flow	Minimum pressure = 140 kPa (20 psi)

Velocities

Flow Criteria	Maximum Allowable Velocity
For domestic flows under peak hour conditions	1.5 m/s
For fire flows	3.0 m/s
Transmission mains	2.0 m/s

Minimum Fire Flow Requirement

	CRD[1]	MMCD Design Guidelines
Residential	4,800 l/min (80 l/s) for 2 hours	60 l/s (single-family) 90 l/s (multi-family)
Commercial / Institutional	5,000 l/min (83 l/s) for 4 hours	150 l/s

1 Fire flows to be in accordance with the municipality having jurisdiction and Fire Underwriters Survey (FUS)

MMCD criteria is included here as it is commonly used in the industry. Although the CRD fire flow specifications differ from the MMCD fire flows, it is recommended that the CRD specifications be used for this study.

3.2. SUPPLY CRITERIA

The points of connection to the existing Juan de Fuca water system are identified in the CRD's water model as JCT01321 and JCTGA2184. The following is to be used in the study's water model to represent the water supply conditions at each of the locations:

- The hydrant curves, showing the available flows and pressures at the noted junctions under average day demand (ADD), maximum day demand (MDD), and peak hour demand (PHD) conditions are included in Appendix A.
- Residual Pressure shown on the attached graphs is in metres.
- Available Flow shown on the attached graphs is in Litres/second.
- The assumed elevation of JCT01321 is 4 metres geodetic.
- The assumed elevation of JCTGA2184 is 33 metres geodetic.

3.3. FUTURE DEVELOPMENT DENSITIES

Population projections were developed for two growth scenarios:

- Base Case Scenario – based on maximum densities as per the existing zoning bylaws (Juan de Fuca Land Use Bylaw No. 2040, 1992 and Sooke Zoning Bylaw No. 600, 2013).
- Desired Build-out Scenario – based on the Base Case Scenario, with growth projections beyond current zoning based on discussions with major property owners.

3.3.1. Base Case Scenario

Table 1 lists the population densities for the residential land uses within the study area:

Table 1: Population Design Criteria as per existing Land Use / Zoning Bylaws

Zoning			Minimum Lot Size	Dwelling Units / Lot	du / ha	Pop/ha[1]
CRD Bylaw 2040 (Juan de Fuca Land Use)						
	A	Rural	4 ha	4 du + 1 accessory du	1.25	4
	AG	Agricultural	4 ha	3 du + 1 accessory du	1	3.2
	RR-2	Rural Residential 2	1 ha	2 du (SFD + accessory du or duplex)	2	6.4
	RR-3	Rural Residential 3	2 ha	2 du (SFD + accessory du or duplex)	1	3.2
	RR-5	Rural Residential 5	0.4 ha	2 du (SFD + accessory du or duplex)	5	16

	RR-6	Rural Residential 6	1 ha	2 du (SFD + accessory du or duplex)	2	6.4
	RR-6A	Rural Residential 6A	1 ha	2 du (SFD + accessory du or duplex)	2	6.4
District of Sooke Bylaw 400 (Sooke Zoning)						
	RU2	Rural	4 ha	4 du	1	3.2
	RU3	Small Scale Agriculture	4 ha	2 du	0.5	1.6
	RU4	Rural Residential	1 ha	2 du	2	6.4

1. As per CRD Engineering Specifications, 3.2 pop/du where density is less than 20 du/ha

Table 2 summarizes the total areas and residential populations for each option.

Table 2: Option Areas and Populations

	Residential		Commercial and Industrial
	Area (ha)	Population	Area (m^2)
Option 1	801	3,133	98,042
Option 2	489	1,840	88,026
Option 3	612	2,391	56,510
Option 4	168	624	21,065

3.3.2. Growth Projection for Major Property Owners

The following Table 3 is a summary of the growth projections determined from discussions with major property owners:

Table 3: Growth Projections for Potential Development Sites

Property	Location	Property Area	Development Plan	Proposed Dwelling Units
Aragon Properties	District of Sooke	100 ha (250 acres)	Comprehensive Development including single-family and multi-family residences	2000
Property at Gillespie and Mt Matheson Road	Juan de Fuca Electoral Area (East Sooke)	75 ha (183 acres)	Subdivide into 1 ha lots with 2 dwellings/lot	150
Grouse Nest	District of Sooke	34 ha (83 acres)	Residential development	140
Beecher Bay	District of Sooke	67 ha (165 acres)	Residential development	500

Each of these areas are shown on the figures presented earlier in this memo.

3.3.3. Seedtree and Wilderness Mountain Service Areas

Servicing to the existing Seedtree and Wilderness Mountain communities have been identified as optional scenarios. The design populations for these optional service areas are shown in Table 4.

Table 4: Optional Service Areas

	Residential	
	Area (ha)	Population
Seedtree (Options 1A, 2A, 3A)[1]	120	491
Wilderness Mountain (Options 1B, 2B, 3B)[2]	165	748

1. Includes properties that are outside of Seedtree, but are adjacent to the potential pipe route along East Sooke Road.
2. Includes properties that are outside of Wilderness Mountain, but are adjacent to the potential pipe route along Mt Matheson Road.

3.4. DESIGN DEMANDS

The following is a summary of the design demands for each option and growth scenario. Note that there is no Desired Build-out Scenario for Option 4 as the potential development sites are not within the proposed service area for that option. The base options exclude the Seedtree and Wilderness Mountains optional service areas as those are listed separately and can be included in the modelling of each option individually or combined as needed. Note that irrigation and agricultural water use have not been included in the design water demands for this study.

Table 5: Design Demands – Base Case Scenario

	Average Day Demand (l/s)	Maximum Day Demand l/s	Peak Hour Demand l/s
Option 1	21.7	54.2	75.8
Option 2	13.5	33.8	47.3
Option 3	16.3	40.8	57.1
Option 4	4.4	11.0	15.4

Table 6: Design Demands – Desired Build-out Scenario

	Average Day Demand l/s	Maximum Day Demand l/s	Peak Hour Demand l/s
Option 1	72.4	180.9	253.3
Option 2	56.9	142.3	199.2
Option 3	72.6	181.6	254.2

Table 7: Design Demands – Optional Service Areas

	Average Day Demand l/s	Maximum Day Demand l/s	Peak Hour Demand l/s
Seedtree (Options 1A, 2A, 3A)	3.1	7.7	10.8
Wilderness Mountain (Options 1B, 2B, 3B)	4.7	11.8	16.5

Table 8: Minimum Fire Flows[1]

Residential	4,800 l/min (80 l/s) for 2 hours
Commercial / Institutional	5,000 l/min (83 l/s) for 4 hours

1 From CRD Engineering Specifications

CLOSING

This memo outlines the information that will be utilized in the modelling of the design options for the study. Before the study can continue to the next stage (modelling), direction from the CRD is needed on the following:

- Confirmation that the design criteria presented in this memo are acceptable for this study, including fire flow criteria;
- which population scenarios should be used for the modelling exercise (Base Scenario or Desired Build-out Scenario); and,
- how the optional service areas (Seedtree and Wilderness Mountain) are to be included in the modelling exercise (individually or combined) for each option.

Sincerely,
McElhanney Ltd.

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APPENDIX A

Hydrant Curves

67

5449 Sooke Road

Legend

Facility or Station
- Disinfection Facility
- Injection
- Pump Station
- Storage Facility

Bulk Meter
- Distribution Balancing Meter
- Supply Bulk Meter

Control Valve
- Altitude Valve
- Check Valve
- Pressure Control Station

Hydrant
- <all other values>
- Piezometer
- Resilient Hydrant
- Bulk Water Station
- Hydrant
- Standpipe

System Valve
- Air Release, True
- Flush, True
- Lateral Valve, False; Valve, False
- Lateral Valve, True; Valve, True
- Valve Vault, False
- Valve Vault, True

Notes

100.8 0 50.4 100.8 Meters

NAD_1983_UTM_Zone_10N

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APPENDIX A

6071 East Sooke Road

Making a difference...together

Legend

Facility or Station
- Disinfection Facility
- Injection
- Pump Station
- Storage Facility

Bulk Meter
- Distribution Balancing Meter
- Supply Bulk Meter

Control Valve
- Altitude Valve
- Check Valve
- Pressure Control Station

Hydrant
- <all other values>
- Piezometer
- Resilient Hydrant
- Bulk Water Station
- Hydrant
- Standpipe

System Valve
- Air Release, True
- Flush, True
- Lateral Valve, False; Valve, False
- Lateral Valve, True; Valve, True
- Valve Vault, False
- Valve Vault, True

Notes

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100.8 0 50.4 100.8 Meters

NAD_1983_UTM_Zone_10N

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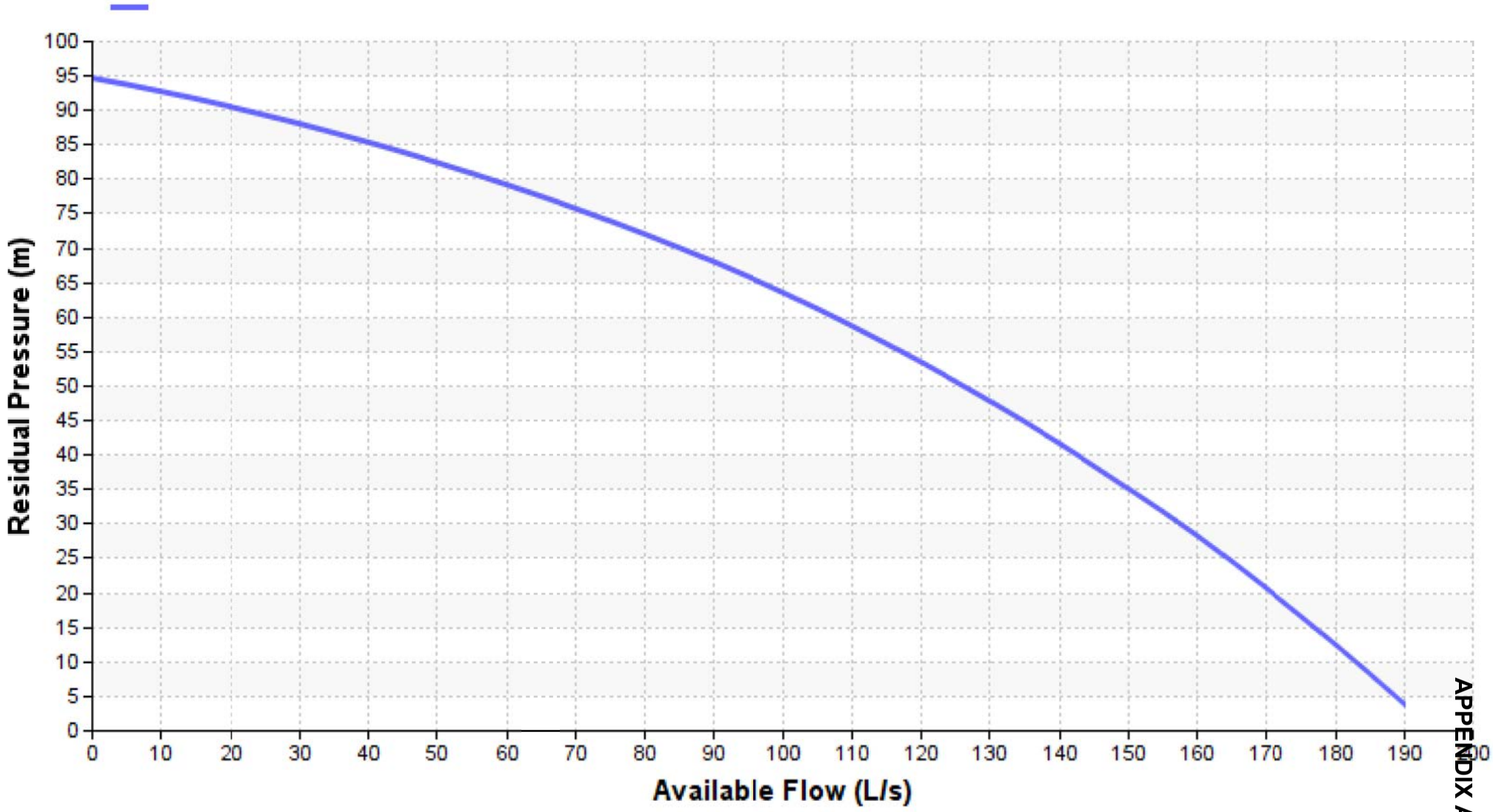
Hydrant Curve for Junction JCT01321 at ADD



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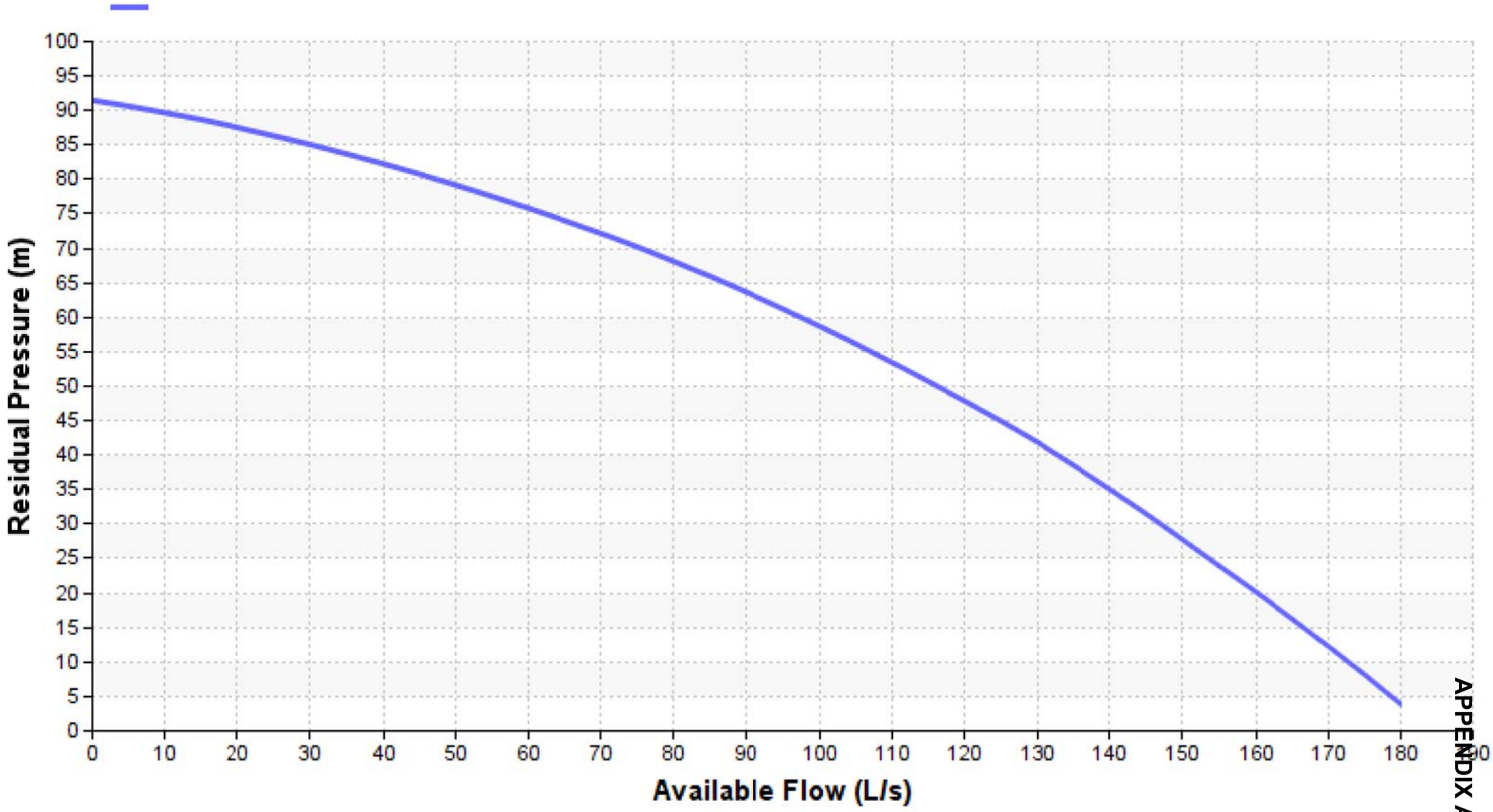
Hydrant Curve for Junction JCT01321 at MDD
Residual Pressure (m)
Available Flow (L/s)
100
95
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
190
200

Hydrant Curve for Junction JCT01321 at PHD



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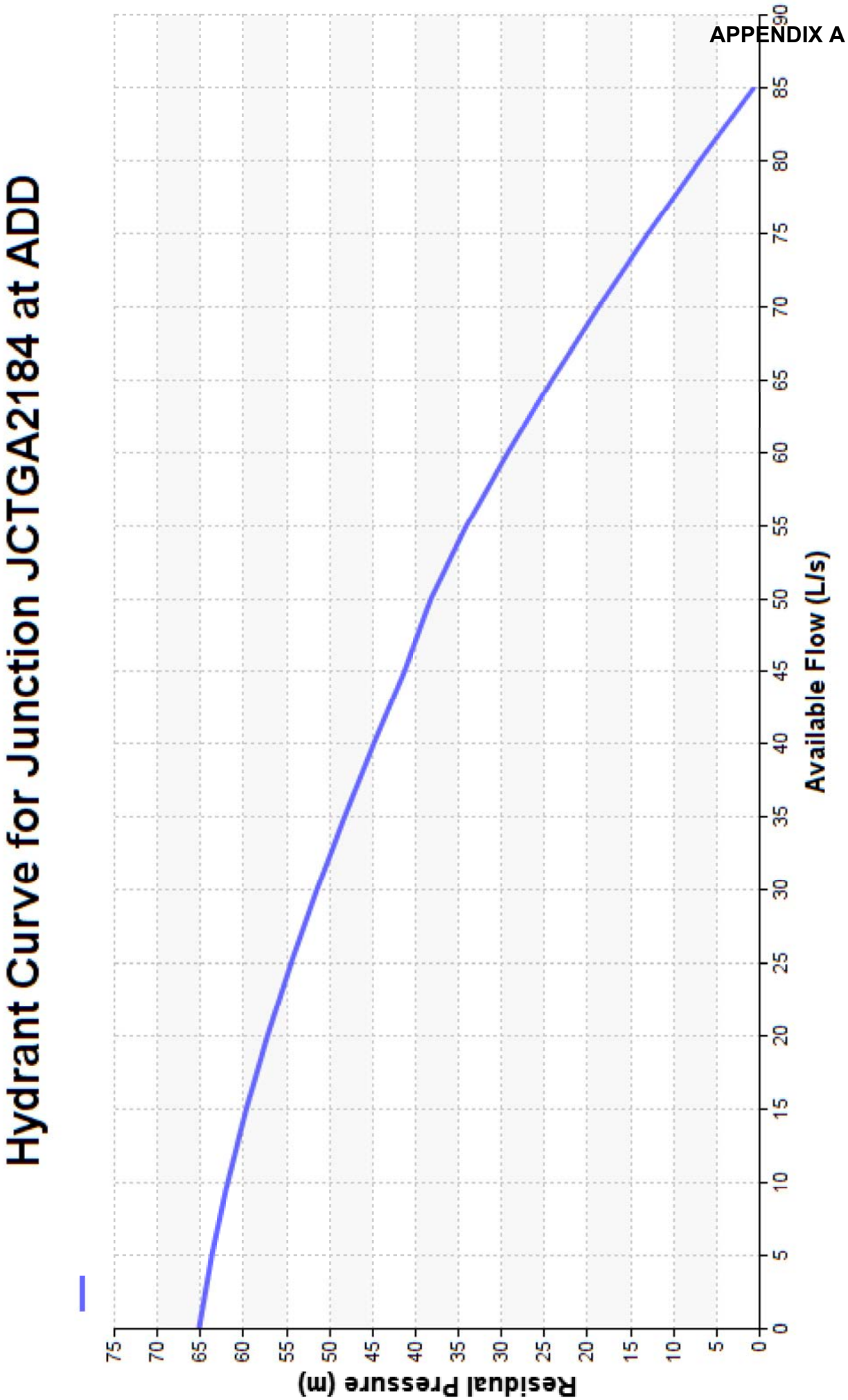
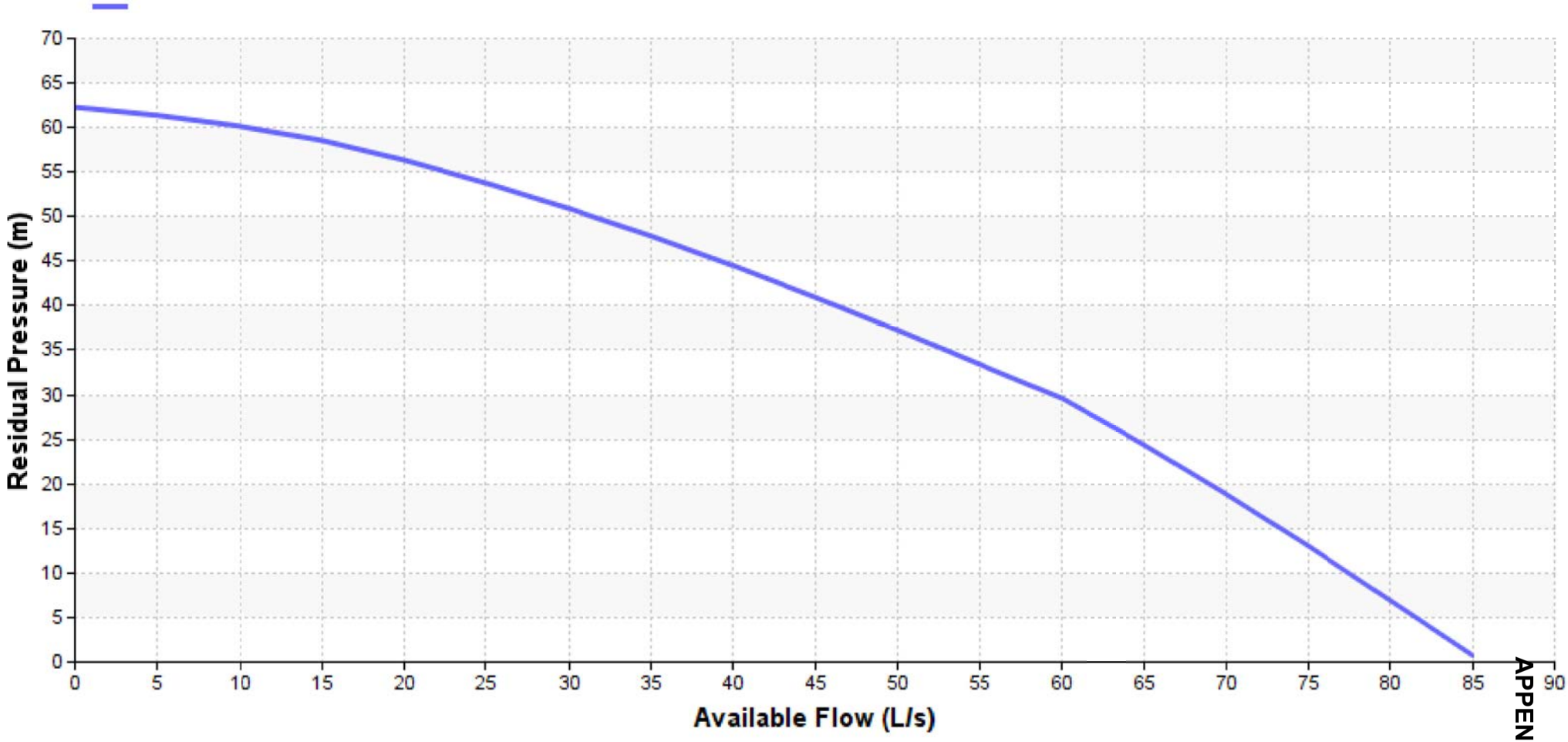


73

Hydrant Curve for Junction JCTGA2184 at MDD



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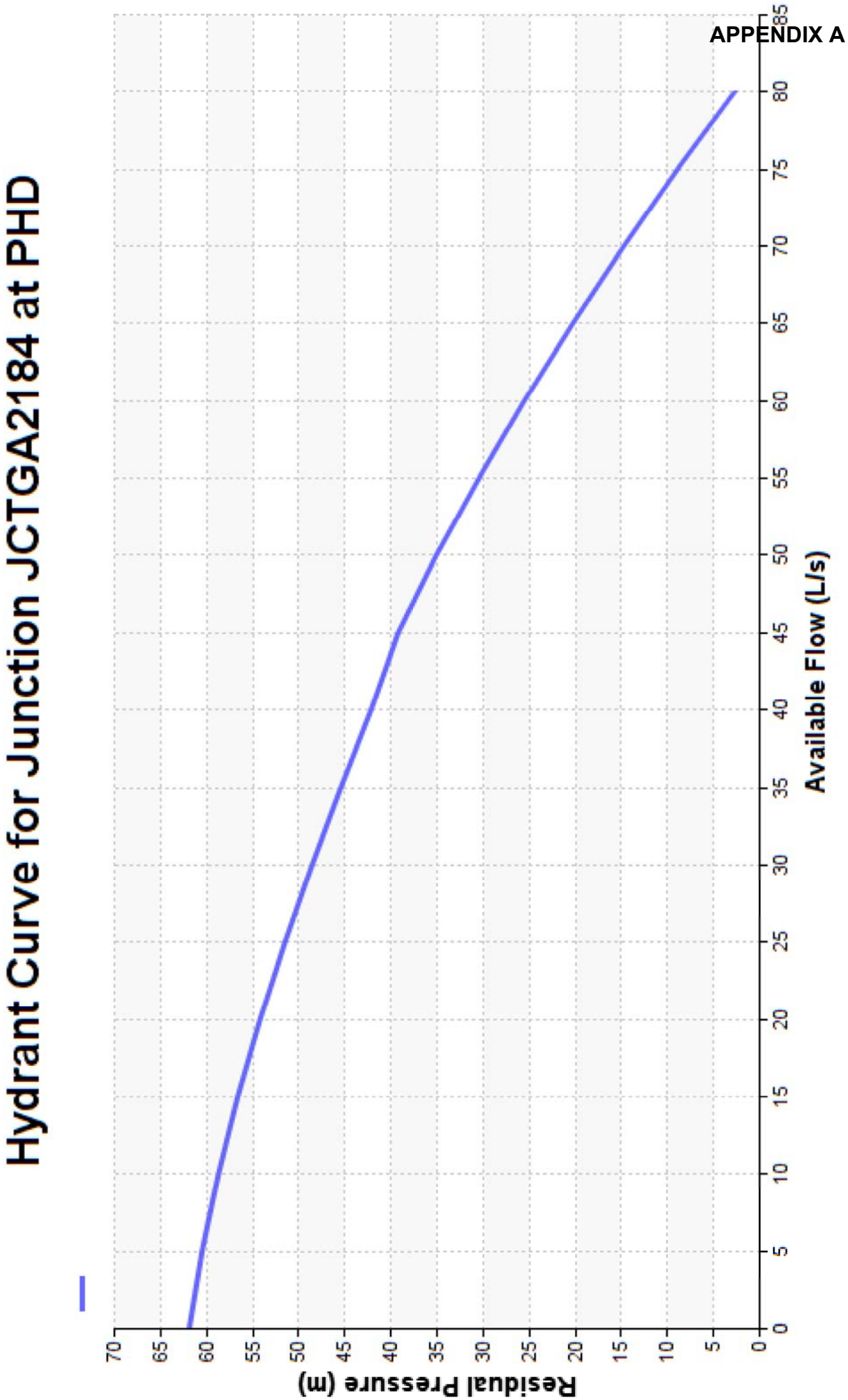
Hydrant Curve for Junction JCTGA2184 at PHD
Residual Pressure (m)
Available Flow (L/s)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85

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APPENDIX C

Technical Memo #3

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APPENDIX A

COLQUITZ ENGINEERING LTD.
4115 Elwood Avenue
Victoria, BC V8Z 5J9
(778) 749-1114

TECHNICAL MEMORANDUM

August 5, 2022

RE: EAST SOOKE WATER SERVICING STUDY
Water Supply Review
Project Number: 407.007

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1. SERVICING

This technical memorandum outlines the water system infrastructure to service each of the four options as described in Section 1.0 of this report. This infrastructure takes into consideration the following:

- Understanding the supply limitations of the existing water systems in Sooke and East Sooke.
- The design criteria generally as outlined in the CRD's *Engineering Specifications and Standard Drawings, July 2009*.
- Land-use and potential development of the properties within the study area.

This proposed infrastructure to service these areas should be considered preliminary and suitable for program planning purposes. In some cases, land acquisition is likely required (e.g. land for reservoirs) and discussions with property owners has not taken place.

2. EXISTING SYSTEM SUPPLY

Supply of water to the study area is from the existing Juan de Fuca distribution system in Sooke (Options 1, 3 and 4), and from East Sooke (Options 1 and 2).

The Sooke connection point for the purpose of this study is at the Sooke Road and Ludlow Road intersection. At this point there are twin 200 mm diameter watermains, which provide additional supply capacity compared with the single 200 mm diameter watermain which terminates 180 m further to the east. This connection is from the 95 m (nominal) pressure zone.

The East Sooke connection is at East Sooke Road at the East Sooke Volunteer Fire Department Hall (6071 East Sooke Road). This connection is to the 95 m (nominal) pressure zone, and not the 110 m pressure zone in the area, which has a limited supply from the relatively small Copper Mine Pump Station.

The CRD provided *Available Flow versus Residual Pressure* curves for these two connection points for the max day demand (MDD) scenario, are illustrated on Charts 1 and 2 below.

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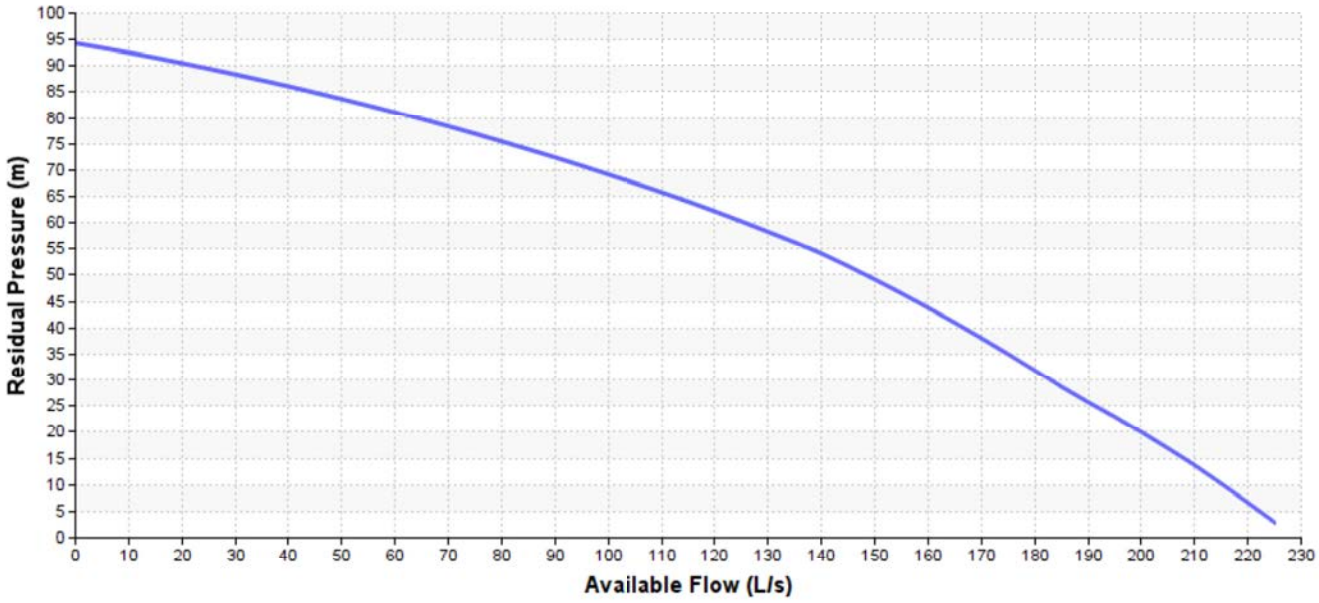

Chart 1: Sooke Connection Available Flow versus Residual Pressure Curve – MDD Scenario
Provided by the CRD February 16, 2022

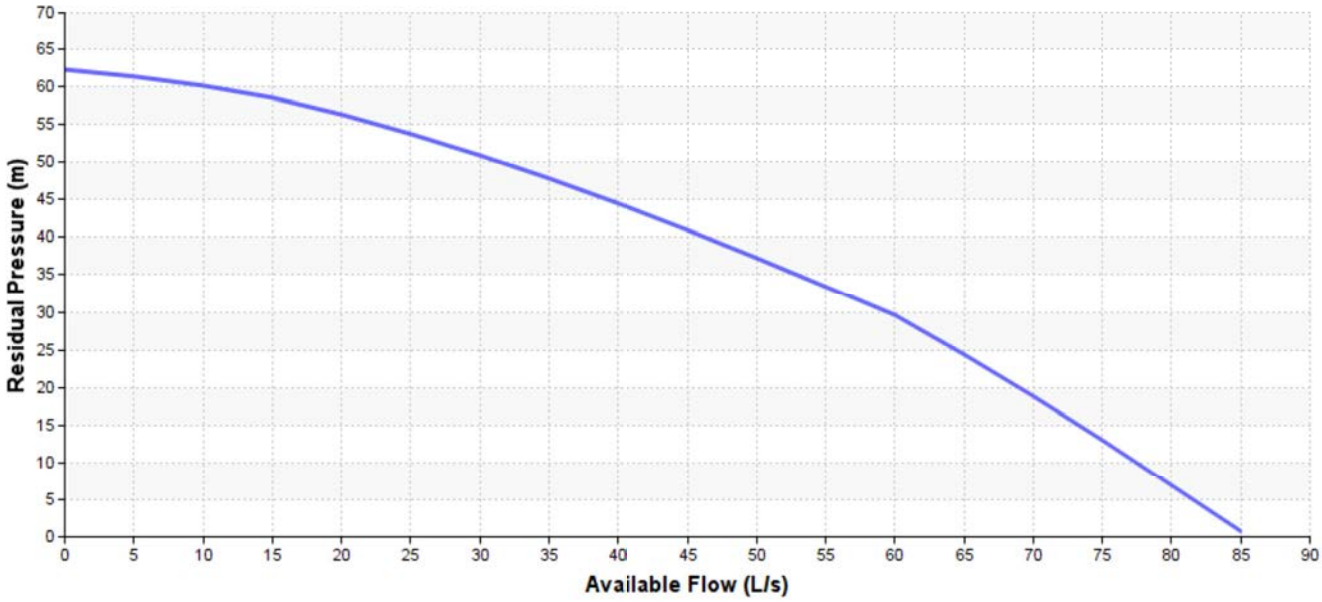

Chart 2: East Sooke Connection Available Flow versus Residual Pressure Curve – MDD Scenario
Provided by the CRD December 20, 2022

Through discussions with the CRD, it was determined that demands in the study area that resulted in an existing system pressure drop greater than approximately 10 m would be unacceptable. Therefore, the maximum demand that can be supplied from each of the connection points are approximately as follows:

- Sooke connection maximum demand (10 m or pressure drop) – 48 L/s (Options 3 and 4)
- East Sooke connection maximum demand (10 m or pressure drop) – 27 L/s (Option 2)
- Total maximum demand – both connection (10 m or pressure drop) – 75 L/s (Option 1)

Assuming adequate storage is provided within the study area infrastructure for balancing storage to provide peak hour demand and fire flow protection storage, these values can be considered the MDD that can be serviced without upgrades to the existing infrastructure. In comparing these values with the MDD values for the "Desired Build-out", it is apparent that "Desired Build-out" can not be serviced unless there are significant existing system upgrades.

For the Sooke connection, in order to provide significantly more supply, upgrades likely will be required back to Sooke River Road, a distance of approximately 3.4 km. To provide significantly more supply from the East Sooke connection, upgrades would likely be required to one of the transmission mains under Sooke Harbour as well as the watermain along East Sooke Road. Additionally, the Sooke River Road Disinfection Facility may also require upgrades to accommodate the additional demands. The full extent of offsite upgrades required to accommodate the "Desired Build-out" demands is beyond the current scope of work for this study.

3. DESIGN CRITERIA

The design criteria used when developing the proposed infrastructure is generally as outlined in the CRD's *Engineering Specifications and Standard Drawings, July 2009*.

The domestic demands are as outlined in the Design Demand section above. The level of development used to calculate the demands for each of the scenarios is summarized in Table 6 below.

Table 6: Distribution of Demands

Option	Demands
Option 1	• Anderson Cove, Wilderness Mountain, Seedtree – Existing only • Other properties in service area – Assume development to existing zoning (base case) • The major developments (4) – Distribute remaining available supply evenly based on lot area (i.e. all developments will have the same units/ha density).
Option 2	• Anderson Cove, Wilderness Mountain, Seedtree – Existing only • Other properties in service area – Existing lots only • The major developments (2) – Distribute remaining available supply evenly based on lot area (i.e. all developments will have the same units/ha density).
Option 3	• Wilderness Mountain, Seedtree – Existing only • Other properties in service area – Assume development to existing zoning (base case) • The major developments (4) – Distribute remaining available supply evenly based on lot area (i.e. all developments will have the same units/ha density).
Option 4	• All - Assume development to existing zoning (base case)

Notes:
- The major developments are Beecher Bay, Grouse Nest, Aragon Properties, and the property at Gillespie Road and Mt. Matheson Road, as outlined on Figure 1.

The modelling was completed using an extended period simulation (EPS) with a distribution pattern as shown on Chart 3 below. The peaking factors shown are the factors applied to the average day demand (ADD) for each hour of the day.

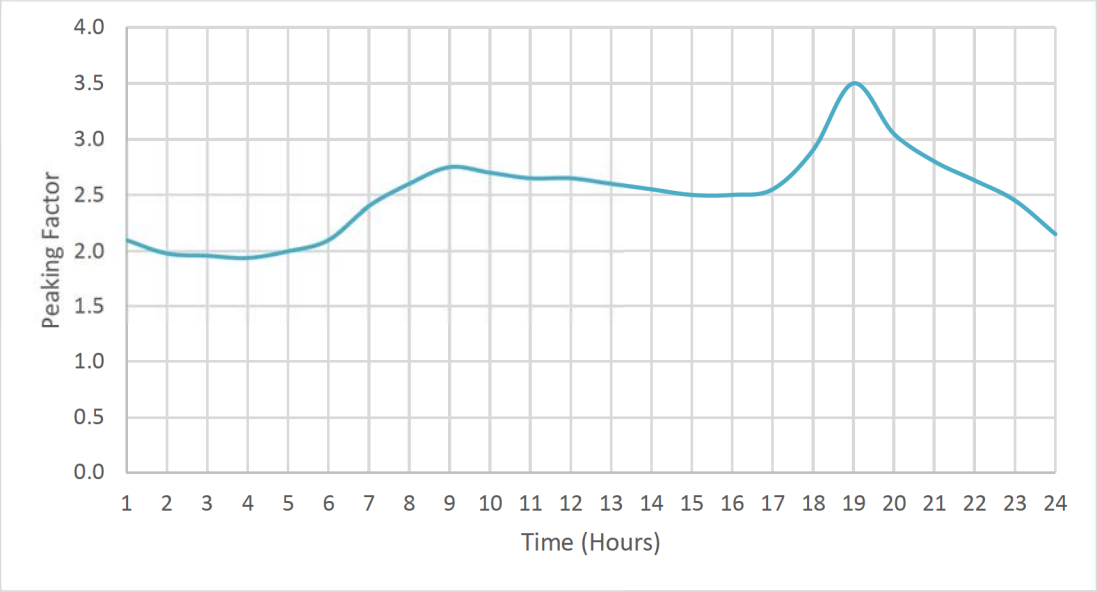

Chart 3: Domestic Demand Peak Factors

The fire flow demand used in the analysis is 80 L/s plus MDD. If multi-family or major institution, commercial or industrial facilities are planned, then additional storage and potentially fire pump stations may be required.

The reservoir volumes are based on the Equalization Storage volume (25% of MDD), plus the greater of Fire Storage (4 hours at 5.0 m^3/min, 1200 m^3) or Emergency Storage (50% of ADD). In all cases the Fire Storage criteria governed.

The minimum pressures at the frontage of each lot is 276 kPa (40 psi), with 414 kPa (60 psi) the target minimum pressure during domestic demands. It is understood that for some lots, particularly those with significant elevation differences, a private booster pump will be required to service the higher elevations. For the fire flow demand scenario, the minimum water system pressure is 140 kPa (20 psi).

Where the above design criteria can not be met, this is noted below.

4. OPTION SERVICING

4.1 Option 1 – District of Sooke to Anderson Cove

The proposed servicing for Option 1 is illustrated on Figure 5.

Key components of the servicing infrastructure for Option 1 are as follows:

- Reservoir on Glinz Lake Road with a top water level (TWL) of approximately El. 144 m. A reservoir at this level will provide approximately 400 kPa pressure at the frontage of the Beecher Bay development property (end of Nagle Road – El. 100 m) and supply (minimal pressure) to the Aragon development property

(panhandle off Mt. Matheson Road – El. 120 m). Further investigation is required to identified land availability in this area.

- Expansion of the existing Ambience Reservoir to 1,400 m^3 (existing 248 m^3) to meet the reservoir design criteria. The majority of this required volume is to meet the fire flow criteria which is four hours at 5.0 m^3/min (1,200 m^3). Considering that the water system in the vicinity can not deliver a fire flow of 5.0 m^3/min, it may be appropriate to reduce the required reservoir expansion volume until the watermains in the vicinity are upgraded.
- Pump station on Sooke Road and dedicated reservoir supply line to the Glinz Reservoir.
- Pump station on Mt. Matheson Road and dedicated reservoir supply line to the Ambience Reservoir.
- Distribution main from the end of the existing watermain on Wilderness Place to the end of Seedtree Road. This watermain will require obtaining a right-of-way from private property owners. Additionally, the terrain is very steep (contours indicate slopes to 50%) and likely significant bedrock. Drilling for the installation of this watermain may be appropriate.
- A pressure reducing valve station on Gillespie Road near East Sooke Road to supply the water system in the East Sooke Area with adequate fire flows.

This option utilizes the existing watermains in the Wilderness Mountain area, which are 150 mm and 100 mm in diameter. As a result, adequate fire flow is not provided in the Wilderness Mountain area, including the east end of Seedtree Road and Mt. Matheson Road. Additionally, there is inadequate fire flows at the end of Anderson Cove Road, which raises to El. 52 m.

The infrastructure as shown provides adequate supply to full build-out to the existing zoning only. For this option as shown, the full capacity of the East Sooke supply is not utilized (demand of 21 L/s compared with 27 L/s available). To fully utilize the East Sooke supply, the area serviced by the East Sooke supply will have to be expanded from what is shown. This expansion could be to service additional properties on Gillespie Road or Seedtree Road, which are supplied by the Sooke connection for this option. To expand the area serviced by the East Sooke supply, an additional booster pump station is required. If the East Sooke supply was fully utilized, approximately 80 additional single-family units could be serviced.

4.2 Option 2 – Anderson Cove to Gillespie Creek

The proposed servicing for Option 2 is illustrated on Figure 6.

Key components of the servicing infrastructure for Option 2 are as follows:

- Reservoir on Mt. Matheson Road with a top water level (TWL) of approximately El. 126 m. A reservoir at this level will provide supply (minimal pressure) to the Aragon development property (panhandle off Mt. Matheson Road – El. 120 m). There is no land available on the Mt. Matheson Road allowance for this reservoir and therefore property would need to be acquired. Alternatively, the reservoir could be located on the Aragon development property, though this has not been modelled.
- Expansion of the existing Ambience Reservoir to 1,400 m^3 (existing 248 m^3) to meet the reservoir design criteria.
- Pump station on East Sooke Road at Gillespie Road and dedicated reservoir supply line to the Mt. Matheson Reservoir. This pump station is to include a pressure reducing valve to back feed the East Sooke area with fire flow.
- Pump station on Mt. Matheson Road and dedicated reservoir supply line to the Ambience Reservoir.

- Distribution main from the end of the existing watermain on Wilderness Place to the end of Seedtree Road.

This option has the same inadequate fire flows as outlined for Option 1.

The infrastructure as shown provides adequate flow to the existing properties and units only. Unlike the other options which use the base case scenario (full development to existing zoning), Option 2 demands are for the existing land-use (existing number of units). The demands are based on one single-family unit per existing lot, with the exception of the Seedtree area where a number of lots have multiple units and therefore each existing unit was accounted for.

There is additional capacity for approximately 220 more single-family units beyond the existing land-use for this option.

It should be noted that there are five properties on the south side of Sooke Basin, east of Anderson Cove, that appear to have water access only. These lots have been considered in the demand calculations, but watermains to service these properties have not been considered. This is the same approach taken when considering these properties for Options 1 and 3. The connection(s) for these properties will not have an impact on the infrastructure sizing in the vicinity.

4.3 Option 3 – District of Sooke to East Sooke Road

The proposed servicing for Option 3 is illustrated on Figure 7.

Key components of the servicing infrastructure for Option 3 are as follows:

- Reservoir on Glinz Lake Road with a top water level (TWL) of approximately El. 144 m. A reservoir at this level will provide approximately 400 kPa pressure at the frontage of the Beecher Bay development property (end of Nagle Road – El. 100 m) and supply (minimal pressure) to the Aragon development property (panhandle off Mt. Matheson Road – El. 120 m).
- Expansion of the existing Ambience Reservoir to 1,400 m^3 (existing 248 m^3) to meet the reservoir design criteria.
- Pump station on Sooke Road and dedicated reservoir supply line to the Glinz Reservoir.
- Pump station on Mt. Matheson Road and dedicated reservoir supply line to the Ambience Reservoir.
- Distribution main from the end of the existing watermain on Wilderness Place to the end of Seedtree Road.
- A pressure reducing valve station on Gillespie Road near East Sooke Road to supply the water system in the East Sooke area and western portion of the Seedtree area.

This option has the same inadequate fire flows as outlined for Option 1.

The infrastructure as shown provides adequate supply to full build-out to the existing zoning only. The peak demand from the Sooke connection for this option is 52 L/s resulting in a pressure drop of approximately 11 m, slightly greater than the maximum demand of 48 L/s for a pressure drop of 10 m for this connection.

4.4 Option 4 – Extension to Eastern Sooke Boundary

The proposed servicing for Option 4 is illustrated on Figure 8.

Key components of the servicing infrastructure for Option 3 are as follows:

- Reservoir on Glinz Lake Road with a top water level (TWL) of approximately El. 144 m. The maximum frontage elevation serviced by this reservoir is approximately El. 80 m, therefore a reservoir with a TWL of El. 120 m

would be adequate if land was available. The total watermain length could be reduced by approximately 200 m for the lower reservoir, assuming land is available adjacent to the road.

- Pump station on Sooke Road and dedicated reservoir supply line to the Glinz Reservoir.

The infrastructure as shown provides adequate supply to full build-out to the existing zoning.

5. SUBMISSION

We submit this technical memorandum for inclusion with your submission to the Capital Regional District. We trust that this report meets your requirements at this time. If further information is required, please contact the undersigned.

Prepared by:

COLQUITZ ENGINEERING LTD.
Permit Number: 1002144

Aug 5, 2022

Jeff Howard, P.Eng.
Water Resources Engineer

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Revision History

Revision #	Date	Status	Revisions	Author
0	February 7, 2022	DRAFT	Submitted for discussion	J. Howard
1	March 2, 2022	DRAFT	Submitted for discussion	J. Howard
2	April 4, 2022	DRAFT	Submitted for discussion	J. Howard
3	April 21, 2022	DRAFT	Submitted for discussion	J. Howard
4	May 5, 2022	DRAFT	Submitted for client review	J. Howard
5	May 12, 2022	DRAFT	Submitted for client review	J. Howard
6	August 5, 2022	FINAL	Submitted for acceptance	J. Howard

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APPENDIX D

Cost Estimates

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APPENDIX A

Cost Estimate

McElhanney

East Sooke Servicing Study

Option 1					
Item	Description	Unit	Quantity	Rate	TOTAL COST $
1	**Watermains**				
1.01	150mm Watermain	Lineal Meters	4,240	$600.00	$2,544,000
1.02	200mm Watermain	Lineal Meters	11,920	$650.00	$7,748,000
1.03	250mm Watermain	Lineal Meters	2,720	$850.00	$2,312,000
1.04	300mm Watermain	Lineal Meters	5,650	$950.00	$5,367,500
1.05	350mm Watermain	Lineal Meters	3,020	$1,000.00	$3,020,000
1.06	Hydrants	Each	180	$7,500.00	$1,350,000
1.07	Valves	Each	375	$1,500.00	$562,500
1.08	Allowance for Rock Removal	Cubic Metres	6,200	$150.00	$930,000
	Subtotal for Task				$23,834,000
2	**Reservoirs**				
2.01	Glinz Reservoir	Cubic Meters	2,000	$1,000	$2,000,000
2.02	Ambience Reservoir	Cubic Meters	1,150	$1,000	$1,150,000
	Subtotal for Task				$3,150,000
3	**Pump Station**				
3.01	Sooke (47 L/s @ 66 m)	Lump Sum	1	$2,000,000	$2,000,000
3.02	Mt. Matheson (11 L/s @ 165 m)	Lump Sum	1	$2,000,000	$2,000,000
	Subtotal for Task				$4,000,000
4	**PRV Stations**				
4.01	Manzer - 200mm	Lump Sum	1	$250,000	$ 250,000
4.02	Gillespie North - 200mm	Lump Sum	1	$250,000	$ 250,000
4.03	Gillespie at Mt. Matheson - 200mm	Lump Sum	1	$250,000	$ 250,000
4.04	Gillespie South - 300mm	Lump Sum	1	$300,000	$ 300,000
4.05	Mt. Matheson - 200mm	Lump Sum	1	$250,000	$ 250,000
4.06	Seedtree - 200mm	Lump Sum	1	$250,000	$ 250,000
	Subtotal for Task				$1,550,000
5	**Connections to Existing**				
5.01	Sooke	Lump Sum	1	$12,000	$ 12,000
5.02	East Sooke	Lump Sum	1	$10,000	$ 10,000
5.03	Mt. Matheson	Lump Sum	1	$ 5,000	$ 5,000
5.04	Ambience	Lump Sum	1	$ 5,000	$ 5,000
5.05	Wilderness Place	Lump Sum	1	$ 5,000	$ 5,000
	Subtotal for Task				$37,000
	Tasks Subtotal (rounded to nearest $10,000)				**$32,570,000**
	CRD Administration and Operations	10%			$3,257,000
	Engineering	15%			$4,885,500
	General Contingency	40%			$13,028,000
	Contingency for Inflation	10%			$3,257,000
	Subtotal				$24,427,500
	Land Acquisition Cost				
	Allowance	Lump Sum	1		$ 50,000
	Subtotal for Task				$50,000
	TOTAL				**$57,050,000**

Number of connect/parcels served	1270
Charge per parcel	$44,900.00

APPENDIX A

Cost Estimate

McElhanney

East Sooke Servicing Study

Option 2					
Item	Description	Unit	Quantity	Rate	TOTAL COST $
1	**Watermains**				
1.01	150mm Watermain	Lineal Meters	2,600	$600.00	$ 1,560,000.00
1.02	200mm Watermain	Lineal Meters	12,060	$650.00	$ 7,839,000.00
1.03	250mm Watermain	Lineal Meters	1,320	$850.00	$ 1,122,000.00
1.04	Hydrants	Each	110	$7,500.00	$ 825,000.00
1.05	Valves	Each	225	$1,500.00	$ 337,500.00
1.06	Rock Removal Allowancw	Cubic Metres	3,600	$150.00	$ 540,000.00
	Subtotal for Task				$12,223,500
2	**Reservoirs**				
2.01	Mt. Matheson Reservoir	Cubic Meters	1,500	$1,000	$ 1,500,000
2.02	Ambience Reservoir	Cubic Meters	1,150	$1,000	$ 1,150,000
	Subtotal for Task				$2,650,000
3	**Pump Station**				
3.01	East Sooke (21 L/s @ 55 m)	Lump Sum	1	$2,000,000	$2,000,000
3.02	Mt. Matheson (7 L/s @ 170 m)	Lump Sum	1	$2,000,000	$2,000,000
	Subtotal for Task				$4,000,000
4	**PRV Stations**				
4.01	Mt. Matheson - 200mm	Lump Sum	1	$250,000	$ 250,000
4.02	Seedtree - 200mm	Lump Sum	1	$250,000	$ 250,000
	Subtotal for Task				$500,000
5	**Connections to Existing**				
5.01	East Sooke	Lump Sum	1	$ 10,000	$ 10,000
5.02	Mt. Matheson	Lump Sum	1	$ 5,000	$ 5,000
5.03	Ambience	Lump Sum	1	$ 5,000	$ 5,000
5.04	Wilderness Place	Lump Sum	1	$ 5,000	$ 5,000
	Subtotal for Task				$25,000
	Tasks Subtotal (rounded to nearest $10,000)				**$19,400,000**
	CRD Administration and Operations	10%			$1,940,000
	Engineering	15%			$2,910,000
	Contingency	40%			$7,760,000
	Contingency for Inflation	10%			$1,940,000
	Subtotal				$14,550,000
	Land Acquisition Cost				
	Property Purchase and Legal Fees	Lump Sum	1		$ 100,000
	Subtotal for Task				$100,000
	TOTAL				**$34,050,000**

Number of connect/parcels served	500
Charge per parcel	$68,100.00

APPENDIX A

Cost Estimate

McElhanney

East Sooke Servicing Study

Option 3					
Item	Description	Unit	Quantity	Rate	TOTAL COST $
1	**Watermains**				
1.01	150mm Watermain	Lineal Meters	4,240	$600.00	$2,544,000
1.02	200mm Watermain	Lineal Meters	7,660	$650.00	$4,979,000
1.03	250mm Watermain	Lineal Meters	2,720	$850.00	$2,312,000
1.04	300mm Watermain	Lineal Meters	5,650	$950.00	$5,367,500
1.05	350mm Watermain	Lineal Meters	3,020	$1,000.00	$3,020,000
1.06	Hydrants	Each	155	$7,500.00	$1,164,500
1.07	Valves	Each	320	$1,500.00	$480,000
1.08	Allowance for Rock Removal	Cubic Metres	5,250	$150.00	$787,500
	Subtotal for Task				$20,654,500
2	**Reservoirs**				
2.01	Glinz Reservoir	Cubic Meters	2,200	$1,000	$2,200,000
2.02	Ambience Reservoir	Cubic Meters	1,150	$1,000	$1,150,000
	Subtotal for Task				$3,350,000
3	**Pump Station**				
3.01	Sooke (50 L/s @ 66 m)	Lump Sum	1	$2,000,000	$2,000,000
3.02	Mt. Matheson (11 L/s @ 165 m)	Lump Sum	1	$2,000,000	$2,000,000
	Subtotal for Task				$4,000,000
4	**PRV Stations**				
4.01	Manzer - 200mm	Lump Sum	1	$250,000	$ 250,000
4.02	Gillespie North - 200mm	Lump Sum	1	$250,000	$ 250,000
4.03	Gillespie at Mt. Matheson - 200mm	Lump Sum	1	$250,000	$ 250,000
4.04	Gillespie South - 300mm	Lump Sum	1	$300,000	$ 300,000
4.05	Mt. Matheson - 200mm	Lump Sum	1	$250,000	$ 250,000
4.06	Seedtree - 200mm	Lump Sum	1	$250,000	$ 250,000
	Subtotal for Task				$1,550,000
5	**Connections to Existing**				
5.01	Sooke	Lump Sum	1	$ 12,000	$ 12,000
5.02	Mt. Matheson	Lump Sum	1	$ 5,000	$ 5,000
5.03	Ambience	Lump Sum	1	$ 5,000	$ 5,000
5.04	Wilderness Place	Lump Sum	1	$ 5,000	$ 5,000
	Subtotal for Task				$27,000
	Tasks Subtotal				**$29,580,000**
	CRD Administration and Operations	10%			$2,958,000
	Engineering	15%			$4,437,000
	Contingency	40%			$11,832,000
	Contingency for Inflation	10%			$2,958,000
	Subtotal				$22,190,000
	Land Acquisition Cost				
	Property Purchase and Legal Fees	Lump Sum	1		$ 50,000
	Subtotal for Task				$50,000
	TOTAL				**$51,820,000**

Number of connect/parcels served	1030
Charge per parcel	$50,300.00

APPENDIX A

Cost Estimate

McElhanney

East Sooke Servicing Study

Option 4					
Item	**Description**	**Unit**	**Quantity**	**Rate**	**TOTAL COST $**
1	**Watermains**				
1.01	150mm Watermain	Lineal Meters	1,640	$600.00	$984,000
1.02	200mm Watermain	Lineal Meters	6,130	$650.00	$3,984,500
1.03	Hydrants	Each	55	$7,500.00	$412,500
1.04	Valves	Each	115	$1,500.00	$172,500
1.05	Allowance for Rock Removal	Cubic Metres	1,750	$150.00	$262,500
	Subtotal for Task				$5,816,000
2	**Reservoirs**				
2.01	Glinz Reservoir	Cubic Meters	1,400	$1,000	$1,400,000
	Subtotal for Task				$1,400,000
3	**Pump Station**				
3.01	Sooke (8 L/s @ 54 m)	Lump Sum	1	$2,000,000	$2,000,000
	Subtotal for Task				$2,000,000
4	**PRV Stations**				
4.01		Lump Sum		$250,000	$ -
	Subtotal for Task				$0
5	**Connections to Existing**				
5.01	Sooke	Lump Sum	1	$ 12,000	$ 12,000
	Subtotal for Task				$12,000
	Tasks Subtotal				**$9,230,000**
	CRD Administration and Operations	10%			$923,000
	Engineering	15%			$1,384,500
	Contingency	40%			$3,692,000
	Contingency for Inflation	10%			$923,000
	Subtotal				$6,920,000
	Land Acquisition Cost				
	Property Purchase and Legal Fees	Lump Sum	1		$ 50,000
	Subtotal for Task				$50,000
	TOTAL				**$16,200,000**

Number of connect/parcels served	210
Charge per parcel	$77,100.00

APPENDIX A

Contact
Mark DeGagné, PEng
778-560-2001
mdegagne@mcelhanney.com

FIGURE 1

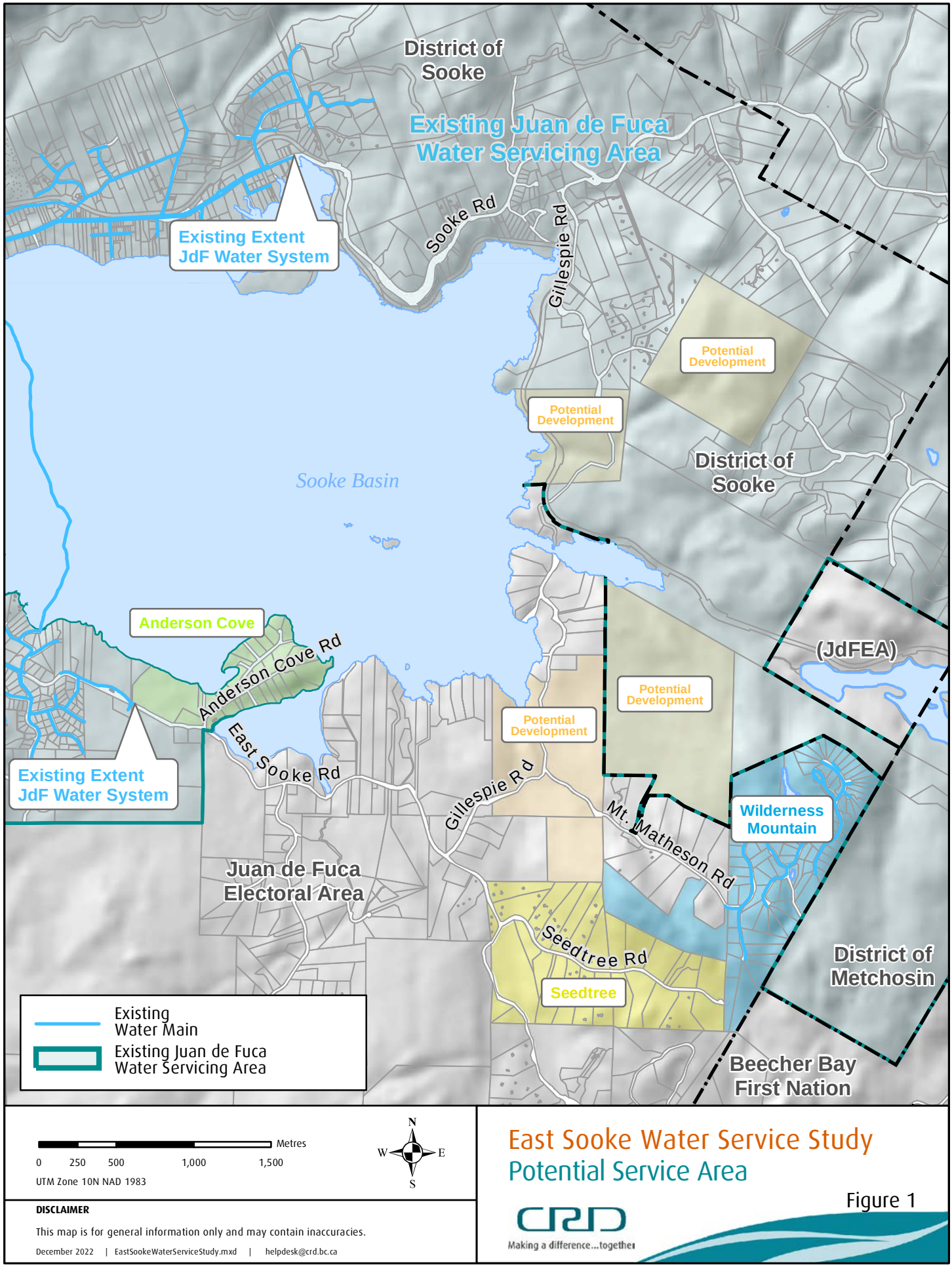
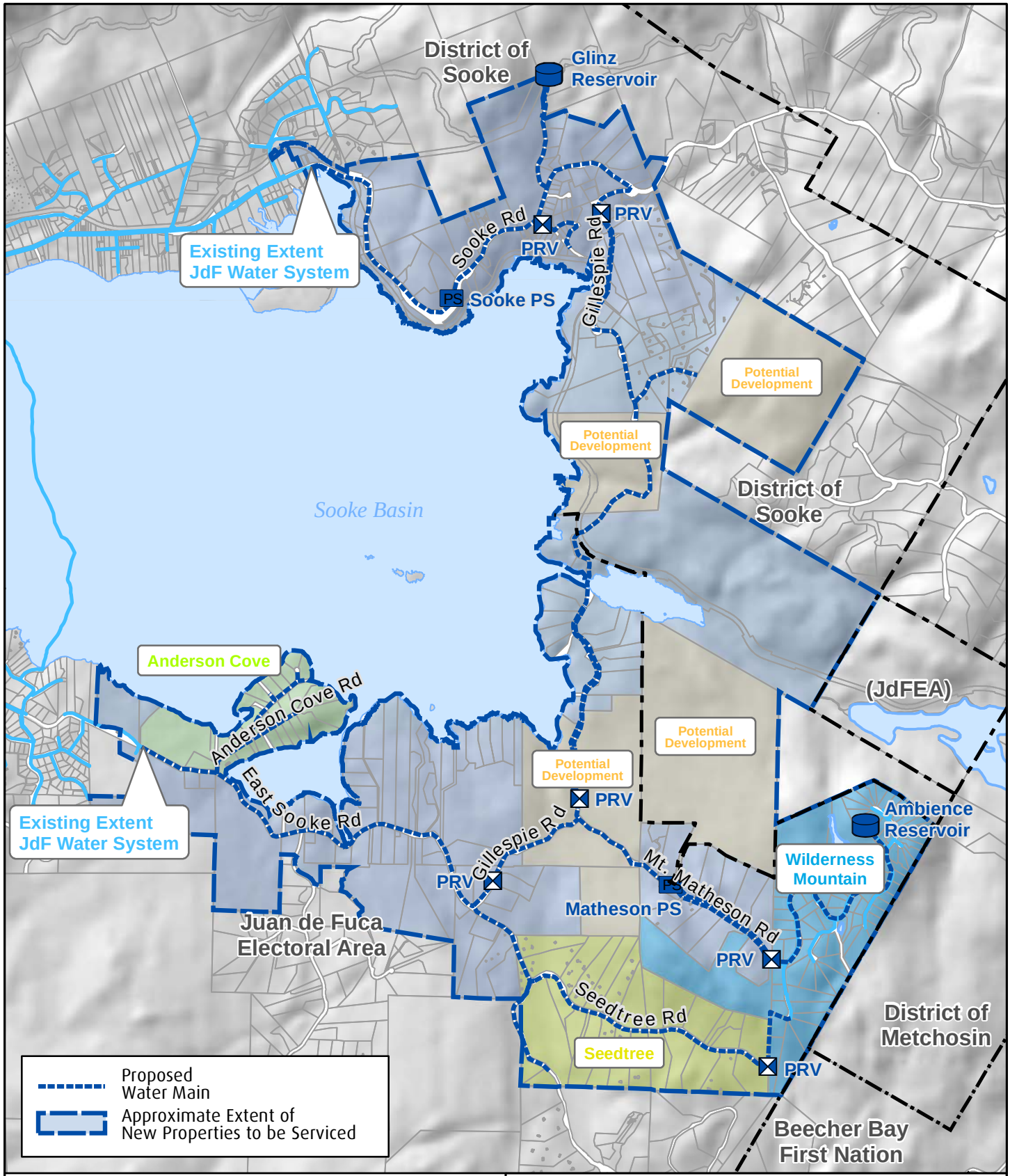

District of Sooke
Existing Juan de Fuca Water Servicing Area
Existing Extent JdF Water System
Sooke Rd
Gillespie Rd
Potential Development
Potential Development
Potential Development
Potential Development
Potential Development
Sooke Basin
District of Sooke
Anderson Cove
Anderson Cove Rd
East Sooke Rd
Existing Extent JdF Water System
Gillespie Rd
Mt. Matheson Rd
Wilderness Mountain
(JdFEA)
Juan de Fuca Electoral Area
Seedtree Rd
Seedtree
District of Metchosin
Beecher Bay First Nation
Existing Water Main
Existing Juan de Fuca Water Servicing Area
Metres
0 250 500 1,000 1,500
UTM Zone 10N NAD 1983
N
W E
S
DISCLAIMER
This map is for general information only and may contain inaccuracies.
December 2022 | EastSookeWaterServiceStudy.mxd | helpdesk@crd.bc.ca
East Sooke Water Service Study
Potential Service Area
Figure 1
Making a difference...together

FIGURE 2



Metres
0 250 500 1,000 1,500
UTM Zone 10N NAD 1983

N W E S

DISCLAIMER

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East Sooke Water Service Study
Option 1 - Sooke to Anderson Cove

Figure 2

Making a difference...together

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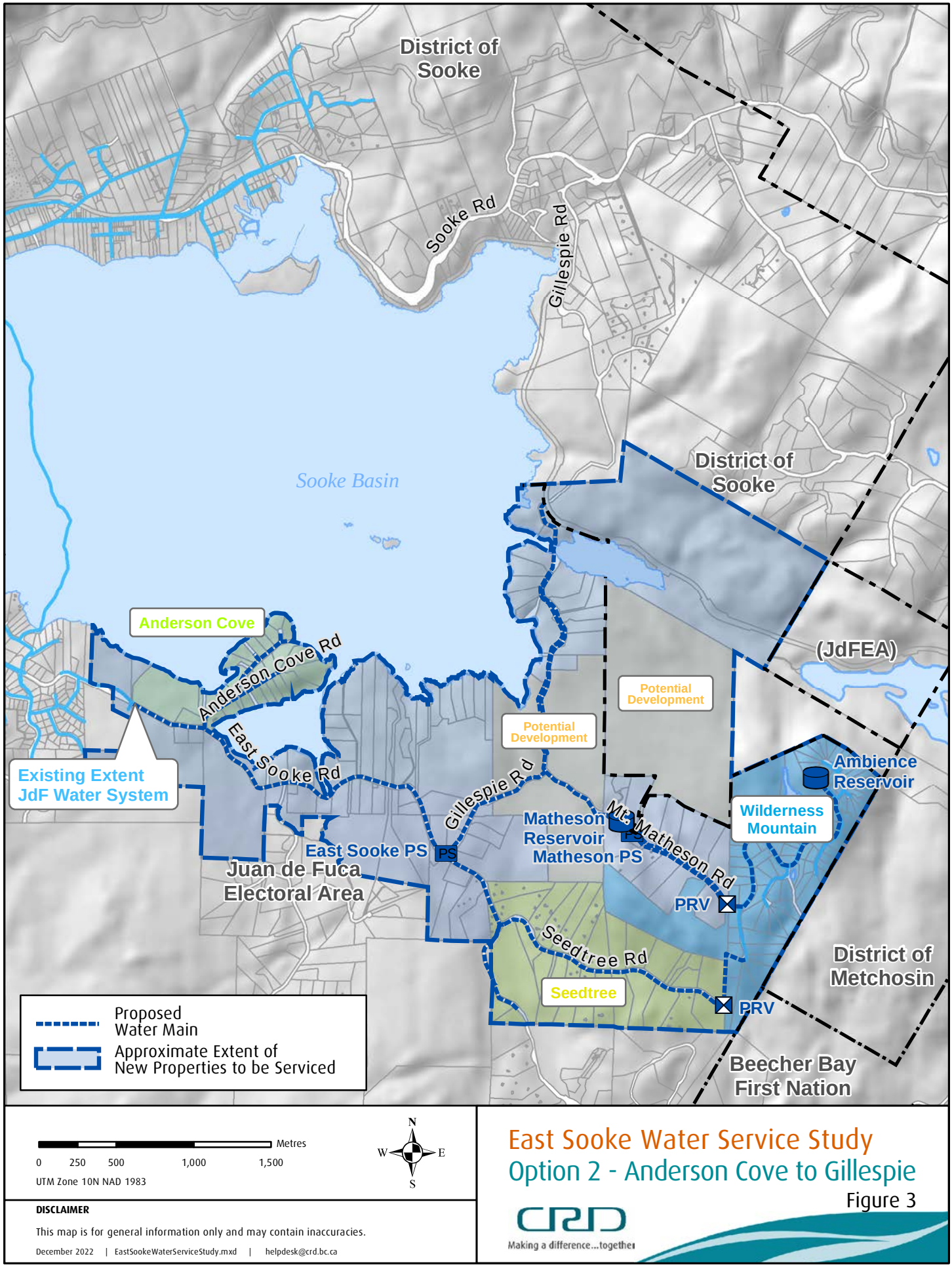
FIGURE 3



DISCLAIMER

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East Sooke Water Service Study
Option 2 - Anderson Cove to Gillespie

Figure 3

Making a difference...together

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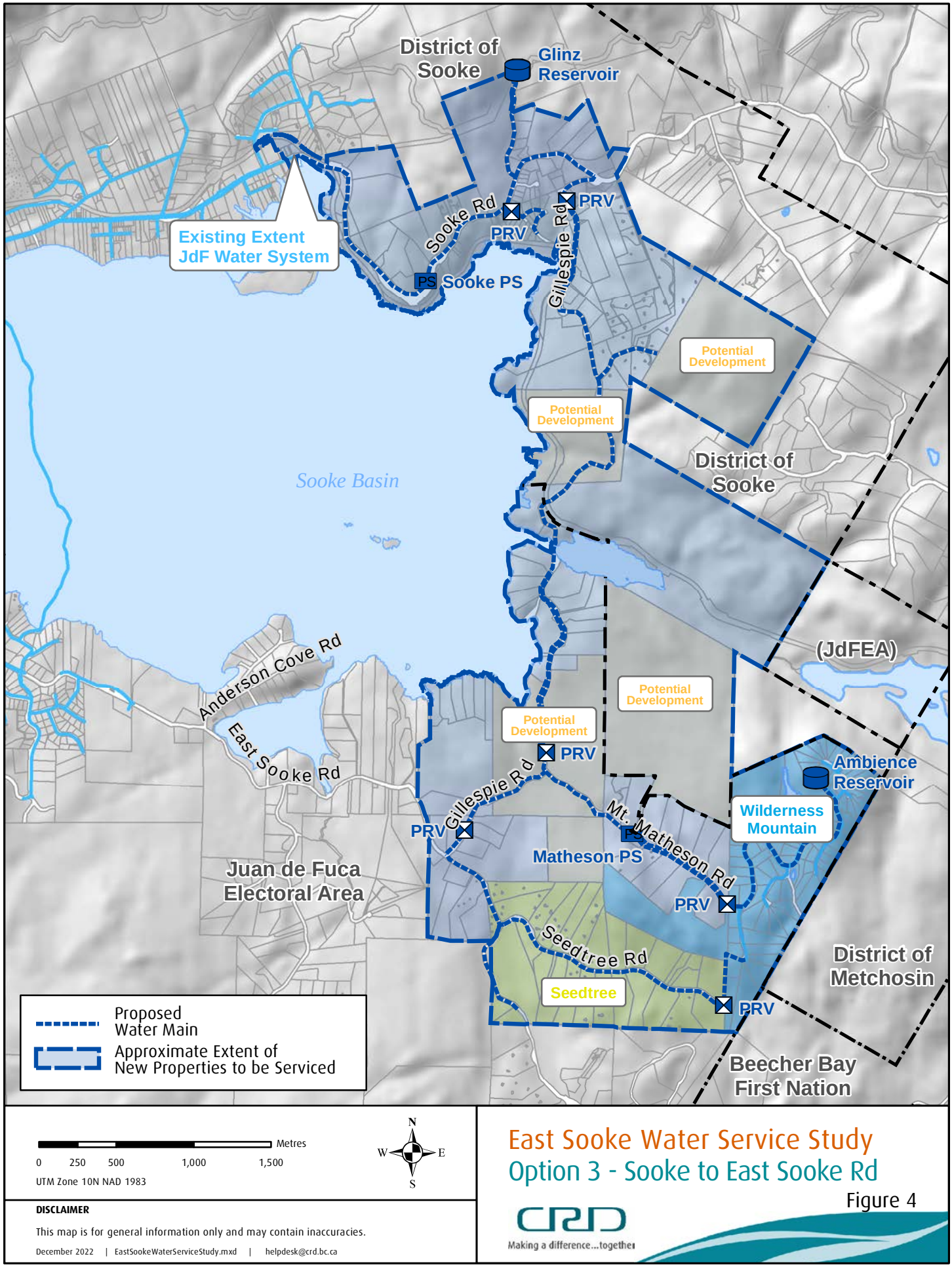
FIGURE 4



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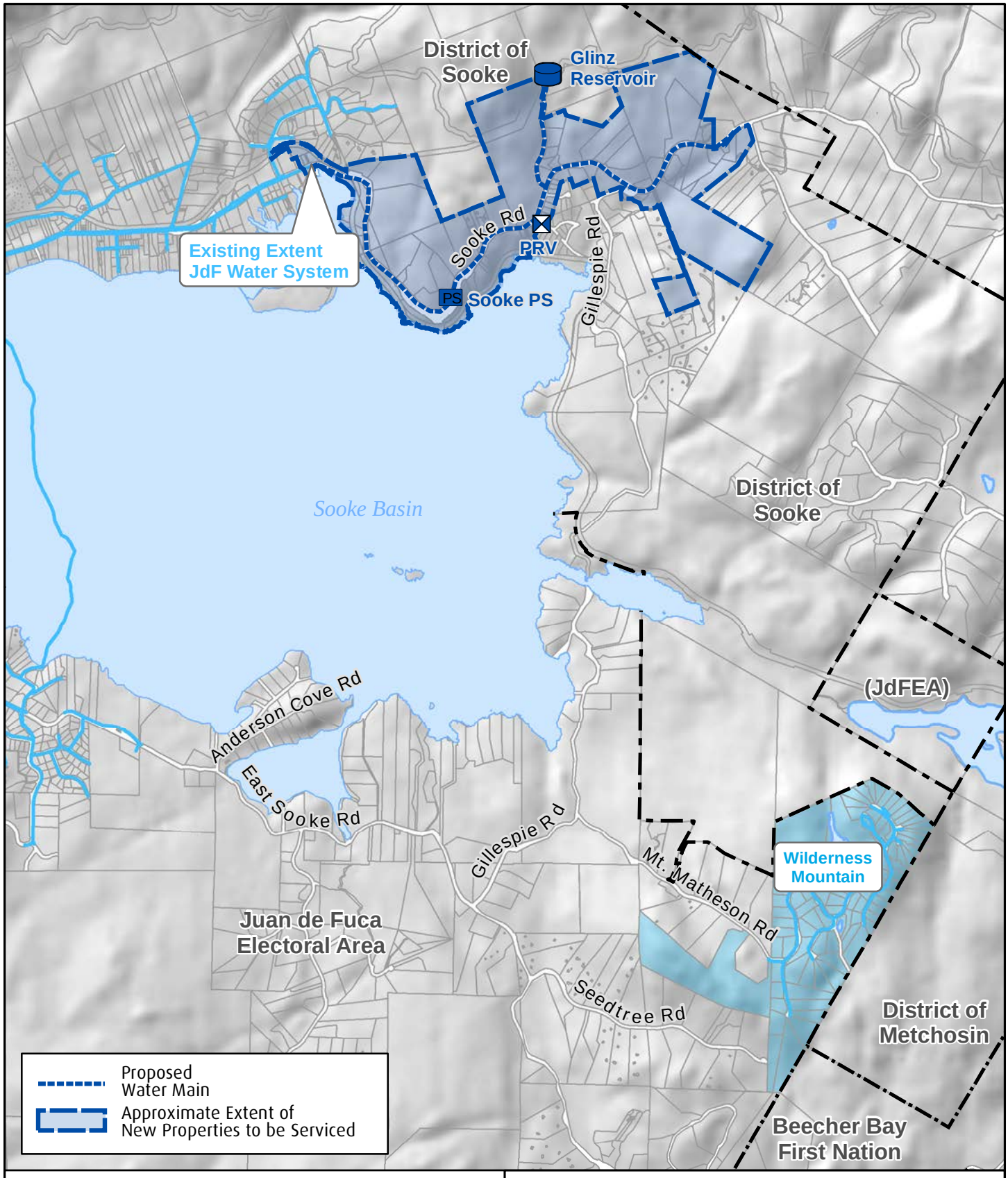
East Sooke Water Service Study
Option 3 - Sooke to East Sooke Rd

Figure 4

Making a difference...together

FIGURE 5



DISCLAIMER

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December 2022 | EastSookeWaterServiceStudy.mxd | helpdesk@crd.bc.ca

East Sooke Water Service Study
Option 4 - Extension to Sooke Boundary

Figure 5

Making a difference...together

Making a difference...together

SAANICH PENINSULA WATER COMMISSION
Thursday, September 22, 2022 at 9:30 AM

MEETING HOTSHEET (ACTION LIST)

The following is a quick snapshot of the FINAL **Saanich Peninsula Water Commission** decisions made at the meeting. The minutes will represent the official record of the meeting.

3. ADOPTION OF MINUTES

That the minutes of the May 19, 2022 meeting be adopted.

CARRIED

7. COMMISSION BUSINESS

7.1. Saanich Peninsula Water Service 2023 Capital and Operating Budget

The Saanich Peninsula Water Commission recommends that the Capital Regional District Board:

1. Approve the 2023 operating and capital budget;
2. Approve the 2023 Saanich Peninsula bulk water rate of $1.1439 per cubic metre, and the Agricultural Research Station water rate of $1.1791 per cubic metre, adjusted if necessary by any changes in the CRD Regional Water Supply wholesale water rate;
3. Direct staff to balance the 2022 actual revenue and expense on the transfer to capital reserve fund;
4. Direct staff to update carry forward balances in the 2023 Capital Budget for changes after year end; and,
5. Direct staff to amend the Bulk Water Rates Bylaw accordingly.

CARRIED

Motion Arising: That lengthening the one-year term for membership is considered when the review of the Supplementary Letters Patent for the Saanich Peninsula Water Supply Commission is conducted.

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REGIONAL WATER SUPPLY COMMISSION
Wednesday, September 28, 2022 at 11:30 AM

MEETING HOTSHEET (ACTION LIST)

The following is a quick snapshot of the FINAL **Regional Water Supply Commission** decisions made at the meeting. The minutes will represent the official record of the meeting.

3. ADOPTION OF MINUTES

That the minutes of the July 20, 2022 meeting be adopted.

CARRIED

7. COMMISSION BUSINESS

7.1. Regional Water Supply Service 2023 Capital and Operating Budget

The Regional Water Supply Commission recommends that the Capital Regional District Board:

1. Approve the 2023 Operating and Capital Budget and the Five Year Capital Plan;
2. Approve the 2023 wholesale water rate of $0.7698 per cubic metre;
3. Approve the 2023 agricultural water rate of $0.2105 per cubic metre;
4. Direct staff to balance the 2022 actual revenue and expense on the transfer to the water capital fund; and
5. Direct staff to amend the Water Rates Bylaw accordingly.

CARRIED

File No. 902-03

CAPITAL REGIONAL DISTRICT - INTEGRATED WATER SERVICES

Water Watch

Issued December 28, 2022

Water Supply System Summary:

1. Useable Volume in Storage:

Reservoir	December 31 5 Year Ave		December 31/21		December 25/22		% Existing Full Storage
	ML	MIG	ML	MIG	ML	MIG	
Sooke	88,856	19,548	92,727	20,400	67,008	14,742	72.3%
Goldstream	7,834	1,724	9,825	2,162	8,441	1,857	85.1%
Total	96,690	21,272	102,552	22,561	75,449	16,599	73.5%

2. Average Daily Demand:

For the month of December	102.2 MLD	22.49 MIGD
For week ending December 25, 2022	105.0 MLD	23.10 MIGD
Max. day December 2022, to date:	120.8 MLD	26.59 MIGD

3. Average 5 Year Daily Demand for December

Average (2017 - 2021) 99.0 MLD [1] 21.79 MIGD [2]

[1]MLD = Million Litres Per Day [2]MIGD = Million Imperial Gallons Per Day

4. Rainfall December:

Average (1914 - 2021): 293.8 mm

Actual Rainfall to Date 138.8 mm (47% of monthly average)

5. Rainfall: Sep 1- Dec 25

Average (1914 - 2021): 735.9 mm

2022 417.7 mm (57% of average)

6. Water Conservation Action Required:

To avoid possible leaks this spring, now is the time to winterize your sprinkler system.
Visit our website at www.crd.bc.ca/water for more information.

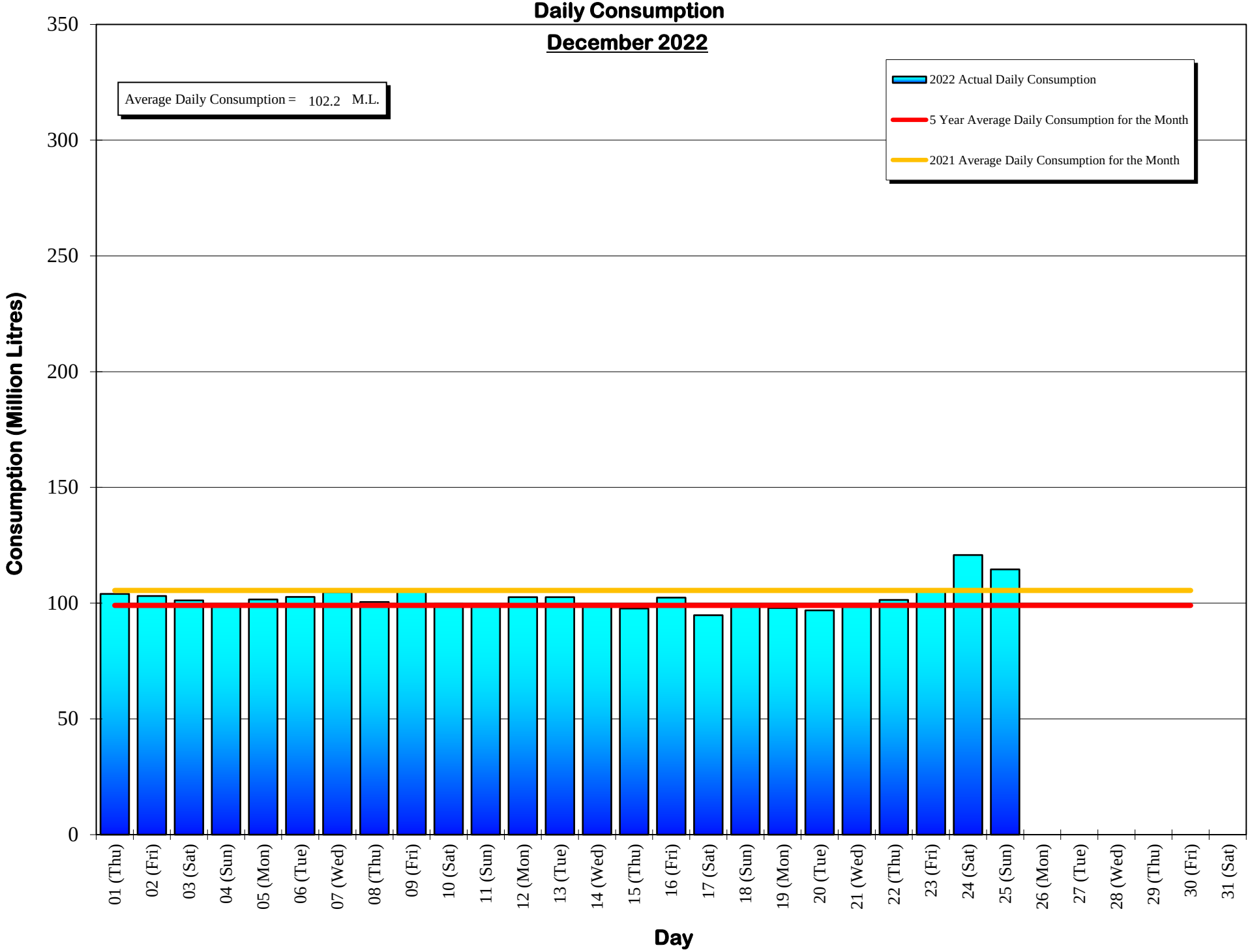
If you require further information, please contact:

Ian Jesney, P. Eng.
Acting General Manager, CRD - Integrated Water Services
or
Glenn Harris, Ph D., RPBio
Senior Manager - Environmental Protection

Capital Regional District Integrated Water Services
479 Island Highway
Victoria, BC V9B 1H7
(250) 474-9600

Daily Consumption

December 2022



Daily Consumptions: - December 2022

Date	Total Consumption (ML) [1.]		Total Consumption (MIG) [2.]	Air Temperature @ Japan Gulch High (°C)	Air Temperature @ Japan Gulch Low (°C)	Weather Conditions	Precipitation @ Sooke Res.: 12:00am to 12:00am Rainfall (mm)	Snowfall [3.] (mm)	Total Precip.
01 (Thu)	104.0		22.9	1	-3	Sunny / P. Cloudy	0.0	0.0	0.0
02 (Fri)	103.1		22.7	3	-2	Cloudy / Showers	4.6	0.0	4.6
03 (Sat)	101.2		22.3	3	0	Cloudy / Showers	2.3	0.0	2.3
04 (Sun)	99.1		21.8	3	-1	Sunny / P. Cloudy	0.0	0.0	0.0
05 (Mon)	101.6		22.3	2	0	Sunny / P. Cloudy	0.0	0.0	0.0
06 (Tue)	102.7		22.6	3	1	Cloudy / Showers	5.3	0.0	5.3
07 (Wed)	104.8		23.1	5	2	Sunny / P. Cloudy / Showers	0.8	0.0	0.8
08 (Thu)	100.5		22.1	5	1	Sunny / P. Cloudy / Showers	11.7	0.0	11.7
09 (Fri)	105.5		23.2	4	0	Cloudy / Rain	21.6	0.0	21.6
10 (Sat)	99.7		21.9	7	4	Cloudy / Showers	7.9	0.0	7.9
11 (Sun)	99.4		21.9	7	2	Cloudy / P. Sunny	0.0	0.0	0.0
12 (Mon)	102.6		22.6	4	0	Cloudy / P. Sunny	0.0	0.0	0.0
13 (Tue)	102.6		22.6	4	1	Sunny / P. Cloudy	0.0	0.0	0.0
14 (Wed)	99.6		21.9	5	-1	Sunny / P. Cloudy	0.0	0.0	0.0
15 (Thu)	97.7		21.5	2	-1	Sunny / P. Cloudy	0.0	0.0	0.0
16 (Fri)	102.4		22.5	3	-1	Sunny / P. Cloudy	0.0	0.0	0.0
17 (Sat)	94.8	<=Min	20.9	2	0	Cloudy / Showers	1.0	0.0	1.0
18 (Sun)	98.7		21.7	1	-6	Cloudy	0.0	0.0	0.0
19 (Mon)	97.9		21.5	-5	-6	Cloudy / Flurries	0.0	20.2	2.0
20 (Tue)	96.9		21.3	-1	-6	Cloudy / Flurries	0.0	121.7	12.2
21 (Wed)	98.6		21.7	-4	-9	Cloudy / P. Sunny	0.0	0.0	0.0
22 (Thu)	101.4		22.3	-5	-10	Cloudy / P. Sunny	0.0	0.0	0.0
23 (Fri)	105.0		23.1	1	-5	Cloudy	0.0	0.0	0.0
24 (Sat)	120.8	<=Max	26.6	5	0	Rain	59.2	0.0	59.2
25 (Sun)	114.6		25.2	3	2	Cloudy / Showers	10.2	0.0	10.2
26 (Mon)									
27 (Tue)									
28 (Wed)									
29 (Thu)									
30 (Fri)									
31 (Sat)									
TOTAL	2555.2 ML		562.13 MIG				124.6	142	138.8
MAX	120.8		26.59	7	4		59.2	122	59.2
AVG	**102.2**		22.49	2.3	-1.5		5.0	6	5.6
MIN	94.8		20.86	-5	-10		0.0	0	0.0

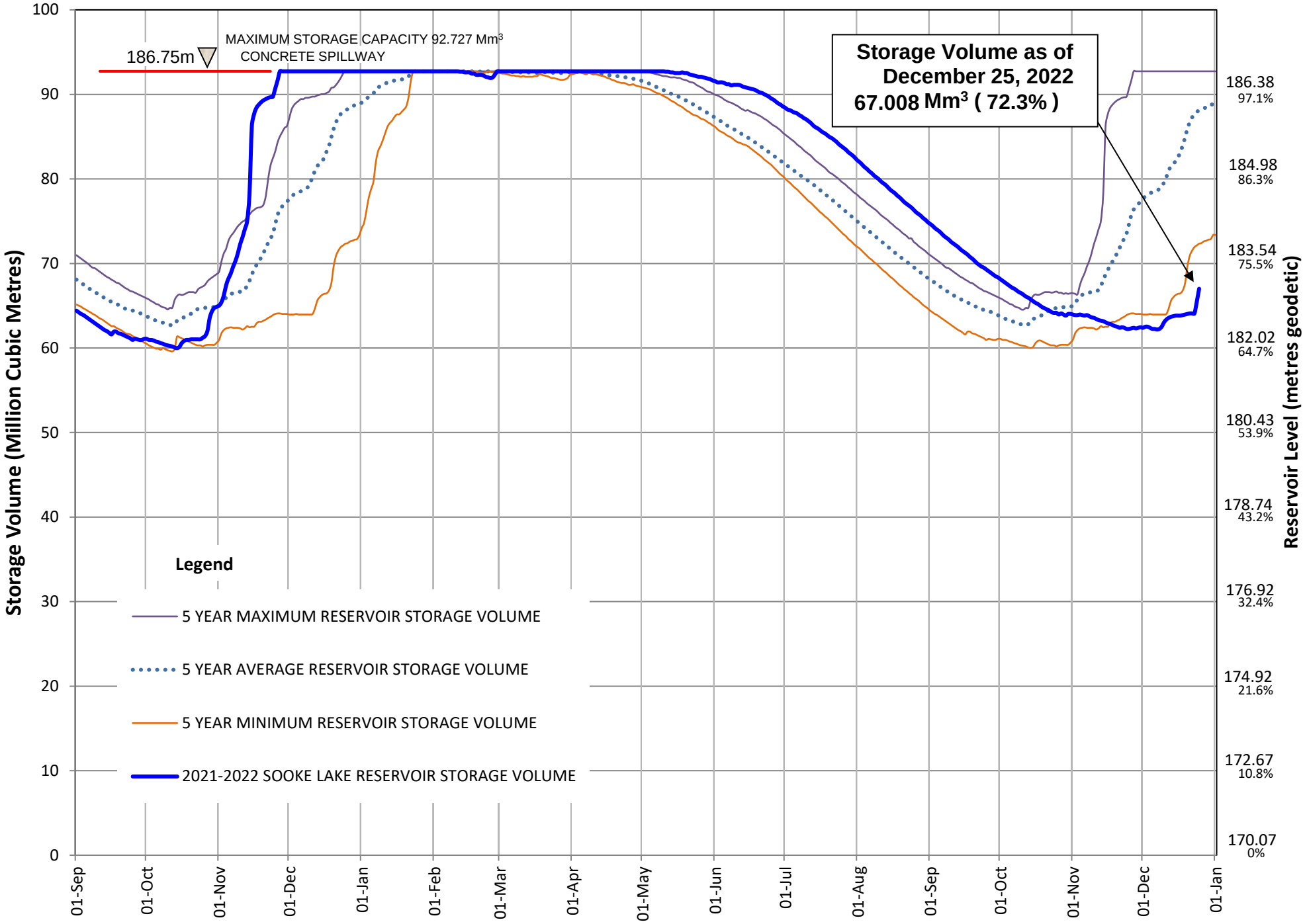
1. ML = Million Litres 2. MIG = Million Imperial Gallons 3. 10% of snow depth applied to rainfall figures for snow to water equivalent.

Average Rainfall for December (1914-2021)	293.8 mm
Actual Rainfall: December	138.8 mm
% of Average	47%
Average Rainfall (1914-2021): Sept 01 - Dec 25	735.9 mm
Actual Rainfall (2022): Sept 01 - Dec 25	417.7 mm
% of Average	57%

Number days with precip. 0.2 or more
12

Water spilled at Sooke Reservoir to date (since Sept. 1) = 0.00 Billion Imperial Gallons
= 0.00 Billion Litres

SOOKE LAKE RESERVOIR STORAGE SUMMARY
2021 / 2022



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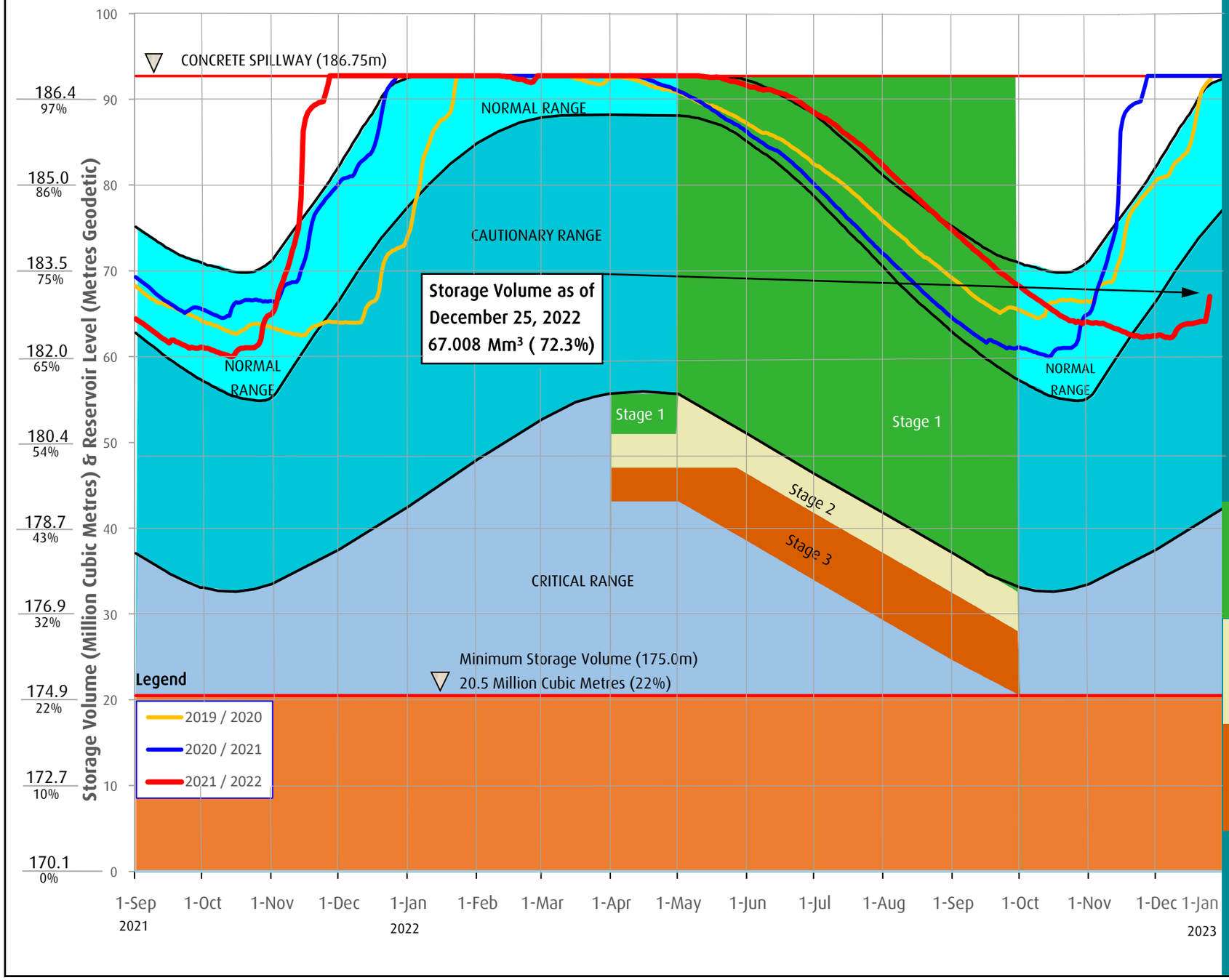
Sooke Lake Reservoir Storage Level
Water Supply Management Plan



FAQs

How are water restriction stages determined?

Several factors are considered when determining water use restriction stages, including,

1. Time of year and typical seasonal water demand trends;
2. Precipitation and temperature conditions and forecasts;
3. Storage levels and storage volumes of water reservoirs (Sooke Lake Reservoir and the Goldstream Reservoirs) and draw down rates;
4. Stream flows and inflows into Sooke Lake Reservoir;
5. Water usage, recent consumption and trends; and customer compliance with restriction;
6. Water supply system performance.

The Regional Water Supply Commission will consider the above factors in making a determination to implement stage 2 or 3 restrictions, under the Water Conservation Bylaw.

At any time of the year and regardless of the water use restriction storage, customers are encouraged to limit discretionary water use in order to maximize the amount of water in the Regional Water Supply System Reservoirs available for nondiscretionary potable water use.

Stage 1 is normally initiated every year from May 1 to September 30 to manage outdoor use during the summer months. During this time, lawn watering is permitted twice a week at different times for even and odd numbered addresses.

Stage 2 Is initiated when it is determined that there is an acute water supply shortage. During this time, lawn water is permitted once a week at different times for even and odd numbered addresses.

Stage 3 Is initiated when it is determined that there is a severe water supply shortage. During this time, lawn watering is not permitted. Other outdoor water use activities are restricted as well.

For more information, visit www.crd.bc.ca/drinkingwater

CRD
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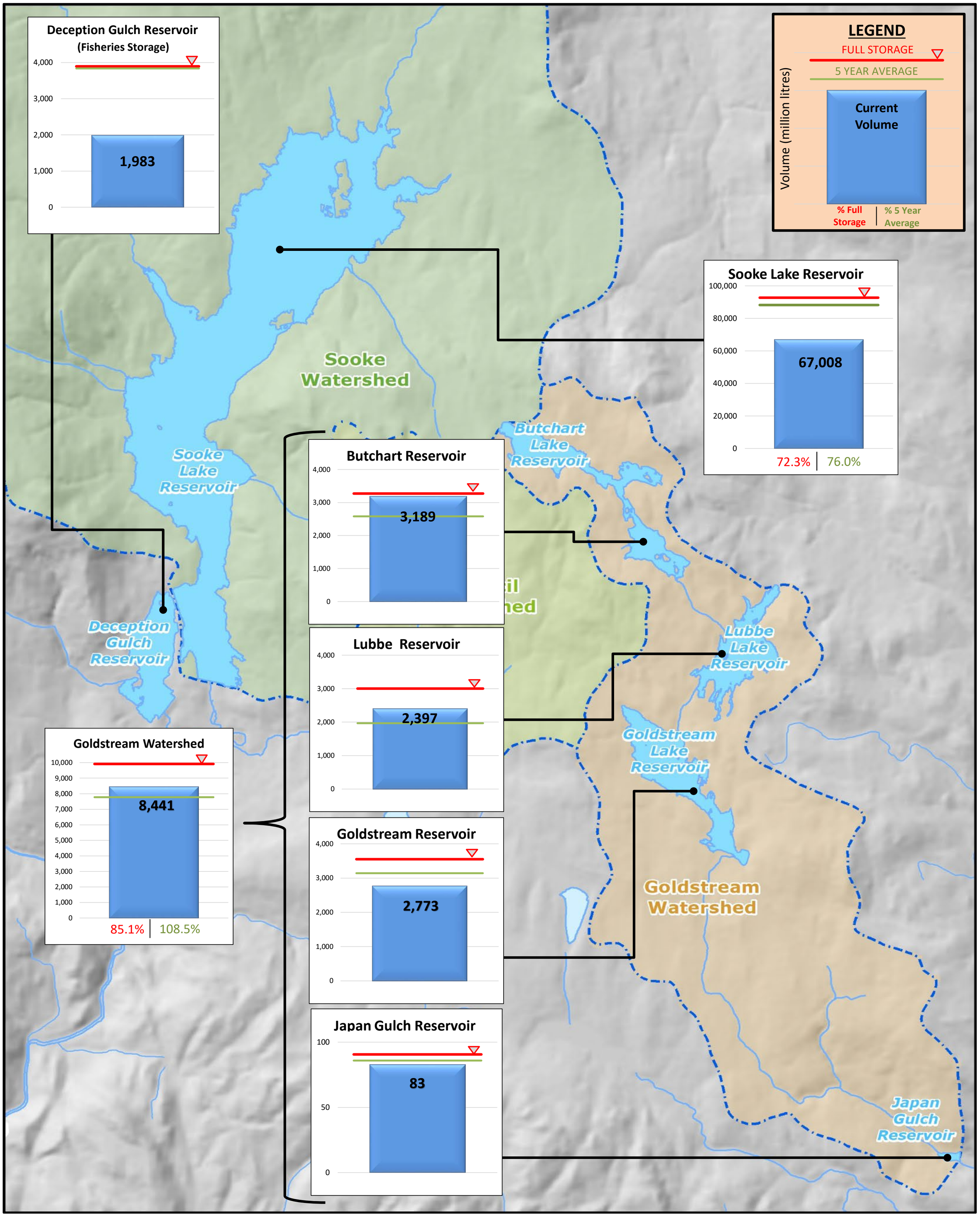
Capital Regional District Integrated Water Services

Making a difference...together

Useable Reservoir Volumes in Storage for December 25, 2022



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