INFRASTRUCTURE SERVICES COMMITTEE

Thursday, April 20, 2017
SCRD Boardroom, 1975 Field Road, Sechelt, B.C.

AGENDA

CALL TO ORDER: 9:30 a.m.

AGENDA

1. Adoption of Agenda

PETITIONS AND DELEGATIONS

2. AECOM
- I. Chapman Lake Expansion Project – Environmental Assessment — Annex A
- **II.** Staff report **(Voting – A, B, D, E, F, Sechelt)** — pp 1 – 16

REPORTS

3. Manager, Utility Services — Annex B
Chapman Creek Flow Analysis (**Voting – A, B, D, E, F, Sechelt)** — pp 17 – 30

4. Manager, Utility Services — Annex C
Water Utility Performance Assessment Benchmarking — pp 31 – 79
(Voting – A, B, D, E, F, Sechelt)

5. Manager, Utility Services and Water and Energy Projects Coordinator — Annex D
Pender Harbour Private Side Water Leaks Status Update — pp 80 – 82
(**Voting – A, B, D, E, F, Sechelt)**

6. Manager, Solid Waste Services — Annex E
Solid Waste Workshop Next Steps **(Voting – All)** — pp 83 – 84

7. Chief Administrative Officer — Annex F
Clean Water Wastewater Fund 2016 Grants **(Voting – A, B, D, E, F)** — pp 85 – 87

8. 2017-Q1 Quarterly Report **(Voting – All)** — Annex G
pp 88 – 98

COMMUNICATIONS

9. Minister Todd G. Stone, Ministry of Transportation and Infrastructure, — Annex H
March 3, 2017 — pp 99 – 100
Regarding UBCM meeting

10. Roderick D. Dewar, Chair, BC Ferry Authority, dated March 27, 2016 Regarding Appointments to the BC Ferry Authority Board of Directors — Annex I pp 101 – 102

NEW BUSINESS

IN CAMERA

ADJOURNMENT

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – April 20, 2017

AUTHOR: Janette Loveys, Chief Administrative Officer

SUBJECT: **CHAPMAN LAKE EXPANSION PROJECT – ENVIRONMENTAL ASSESSMENT REPORT**

RECOMMENDATION(S)

THAT the report titled Chapman Lake Expansion Project - Environmental Assessment Report be received.

BACKGROUND

The SCRD applied for an amendment to its Chapman Lake Park Use Permit (PUP) on April 13, 2016 and Water Licence Amendment on April 18, 2016, to allow the installation of a gravity fed withdrawal system to provide additional water supply from Chapman Lake.

The Board was informed at the June 9, 2016, Special Infrastructure Services Committee meeting that the SCRD received formal notice from BC Parks, by letter received June 6, 2016, requiring further field investigation work in order to fully adjudicate the proposal and issue the Parks Use Permit Amendment.

In addition to the BC Parks requirement, the Ministry of Forests, Lands and Natural Resource Operations (FLNRO) formally requested by email received June 20, 2016, that a new water license application be submitted along with an Environmental Flow Needs (EFN) study as part of the Chapman Lake Water Supply Expansion project.

On January 30, 2017, the SCRD submitted the Environmental Assessment Report to BC Parks, FLNRO and our First Nations partners, shíshálh and Sḵwx̱wú7mesh Nations. The Environmental Assessment Report was on the February 16, 2017 Infrastructure Services Committee agenda.

On March 16, 2017, SCRD received comments from shíshálh Nation. On March 24, 2017, SCRD staff received comments from BC Parks and FLNRO. To date, no comments have been received from the Sḵwx̱wú7mesh Nation.

The purpose of this report is to bring forward the respective comments and response to Committee.

DISCUSSION

Attached to this cover report are the respective comments and responses in summary sections related to the Environmental Assessment Report.

At the April 20, 2017 Committee meeting, ACEOM will provide a presentation and respond to any questions of a technical nature.

BC Parks and FLNRO have asked that this summary is provided to them no laterr than May 4, 2017.

STRATEGIC PLAN AND RELATED POLICIES

This report directly links to the set of values identified in the Strategic Plan.

This project supports the SCRD Strategic Plan priority to Embed Environmental Leadership through responsible management of the region's water supply.

CONCLUSION

The SCRD submitted a PUP amendment application to BC Parks in April 2016. BC Parks has requested that additional project information as well as additional environmental studies and impact assessments be performed and submitted in order to complete their review.

Attached to this cover report are the respective comments and responses in summary sections related to the Environmental Assessment Report.

Reviewed by:			
Manager	X – D. Crosby	Finance	
GM		Legislative	
CAO	X – J. Loveys	Other	

AECOM

SCRD Chapman Lake Expansion Project

April 20, 2017

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
1		In our June 8, 2016 comments we requested additional information regarding the background and rationale for undertaking the Chapman Lake Project, as well as additional description of other water supply and demand management options considered. Demand management and development of other water sources are of interest because they will reduce future dependence on Chapman Lake water and allow greater flexibility to manage drawdown to protect values at Chapman Lake. Section 1 and 2 of the Chapman Lake EA provide additional details regarding the rationale, but description of other supply and demand management options considered and proposed for the future is still lacking. We assume this type of information is available in the Comprehensive Regional Water Plan (CRWP) (Opus Dayton Knight 2013) but request a summary of the long term source development and demand management projects that are being developed, including timelines, be provided in support of the Park Use Permit application. Also, please address if there any plans to scale back or decommission infrastructure at Chapman Lake once other sources are developed.	SCRD	Universal Metering – Rural areas to be completed in 2017 (5000 meters). District of Sechelt to be completed in 2019 (5000 meters). Groundwater Investigation - Phase 1 (identifying areas to test drill) to be completed in 2017. Phase 2 (actual test drilling) to be completed in 2018. Development of groundwater source beyond 2018 dependent on findings. Engineered Lake Storage - Investigation for acquiring site scheduled in the Comprehensive Regional Water Plan (CRWP) for 2021. Construction is undetermined. The CRWP does not contemplate scaling back or decommissioning infrastructure at Chapman Lake.
2		The following four comments (#3-6) relate to the uncertainties that exist regarding the future frequency, extent and duration of drawdown ("drawdown regime"). Uncertainty regarding drawdown regime is in turn related to uncertainties in future hydrology, climate, and downstream environmental flow needs. In a general sense, the following four comments are meant to demonstrate that important uncertainty exists regarding future drawdown regime, and thus conclusions regarding residual impacts are uncertain. Unless a specific request is made, no response is required to these comments, other than to acknowledge that future drawdown regime is uncertain.		Comments provided below.
3	**Section 2 and Appendix A**	Section 2 and Appendix A provide analyses of historical and current hydrology of the Chapman Creek watershed and how climate change may alter hydrology in the future. Our interpretation is that although existing data and climate models can be used to make predictions, important uncertainties remain regarding future hydrology and climate conditions, as outlined below.		Climate change makes it difficult to predict changes with any certainty, i.e. comment #5 to FLNRO further describes the wide range of outcomes from the models used to predict changes in precipitation from climate change.
3A		The characterization of current hydrology in the Chapman Creek watershed and its capacity to meet future water demands is primarily based on analysis of water gauge data collected in the Chapman Creek watershed 1959 to 1988. More recent data analysis is limited to data collected since 2014 when remote monitoring and management of lake levels was implemented associated with the existing Chapman Lake dam. Thus the analysis may not fully reflect more recent changes in the hydrology of the watershed since the late 1980s.		SCRD will continue to collect data from Chapman Lake to augment the data from 2014-2016. As new data is received the predicted hydrology of Chapman can be updated.

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
3B		The analysis presented suggests that uncertainties remain regarding how the Chapman Creek watershed will respond to climate change. For example, the analysis in Appendix A uses model predictions for the Metro Vancouver area extrapolated to the Sunshine Coast. To increase the potential accuracy of climate change predictions for the Chapman Creek watershed, Appendix A recommends a more detailed hydrological and hydraulic assessment of water balance in the watershed based on climate projection information, and comparison of local geographic and climate data to Metro Vancouver data to confirm the relevance of Metro Vancouver projections applied to Chapman Creek, although these analyses have not been done. We request confirmation of whether or not the more detailed hydrological analyses as recommended in Appendix A will be done.	B. Ford/SCRD	Sunshine Coast specific climate predictions are provided in repsponses below based on the tools provided by the Pacific Climate Impact Consortium. Staff are supportive of a more detailed hydrological analysis as recommended in Appendix 'A' in order to gain more information for the future. However staff have to follow process in order to gain support from the SCRD Board. Once we go through this process staff will report back to BC Parks.
4		Although there is uncertainty regarding the future hydrology of Chapman Creek, generally the predictions related to climate change are smaller snowpack, longer and drier summers, and dry conditions that will extend further into the fall. In our June 8, 2016 comments we expressed concern about the potential for increased frequency of drought, and the associated increased frequency, extent and duration of drawdown, to cause long-term changes to the water table and recharge rates of Chapman Lake. The Chapman Lake EA does not provide analysis or discussion of this issue, other than to state that the recharge rate is fast, based on the fact that the lake went from almost -3m to full pool over 4.5 days of rainfall in the fall of 2015. However, it is unclear whether rapid recharge would continue with climate change and under repeated and prolonged drought and drawdown conditions. We request further discussion of the risk that the water table could be lowered over the long-term under more frequent drought and more frequent and extended large drawdown, and the associated risk of changes to recharge rates of Chapman Lake.	B. Ford	The Pacific Climate Impact Consortium (www.pacificclimate.org) provides a tool (Plan2Adapt) that estimates various parameters that will be affected by climate change and output can be tailored to specific regions and time periods. The output for the Sunshine Coast indicates that Spring (March - May) and Fall (September - November) will experience an increase in rainfall and Summer (June - August) will experience less rain. The predicted increase in rainfall in the Fall supports the assumption that the lake will continue to fill fairly quickly. Also the model predicts higher temperatures across all seasons. This may actually increase the opportunity to recharge the water table with fewer days of frozen ground which will allow greater infiltration and recharge. Overall there is an estimated increase in rainfall that will be available to replenish the water table at the end of a dry spell.
5	**Section 5.3.6 (p. 56) and Appendix G**	The analysis of fish habitat and environmental flow needs presented in Section 5.3.6 (p. 56) and Appendix G suggests that the current operating procedure of providing a minimum of 0.2 m^3/s during low flows is adequate for rearing salmonids, but not consistently adequate for adult salmonids migrating upstream. The requirement to provide adequate flow for migrating adult salmonids in the future may increase future drawdown requirements and presents a source of uncertainty around predicting the future frequency and severity of drawdown of Chapman Lake. We are not requesting further analysis of this issue at this time other than acknowledgement that drawdowns of Chapman Lake could be larger and more frequent than assumed in the Chapman Lake EA. We are also interested in responses to additional questions raised by FLNRO regarding environmental flow needs.		See response to FLNRO's comments.

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
6		Most of the conclusions regarding the residual effects of the operation of the Chapman Lake Project (as summarized in the Executive Summary and Table 28) are based on the assumption that drawdown below -3 m would be relatively infrequent and of short duration. However, our interpretation is that important uncertainties remain around the assumption of low frequency and short duration of large drawdowns, especially in the long-term. For example, if increased drawdown is required in the future to provide adequate flows for fish, large drawdowns may be more frequent and longer lasting than predicted, leading to larger than expected residual effects on environmental components in and around Chapman Lake. This in turn suggests that the conclusions of low to moderate residual effects associated with operation of the Chapman Lake project are also uncertain, and residual effects may be larger than predicted. Monitoring during operation will be required to detect impacts and develop mitigation/adaptive management, and a plan for monitoring during operation will need to be developed (see comment #28).		SCRD needs to define the timelines for using Chapman Lake as a drinking water source + an emergency source of water during drought. An environmental monitoring plan will be prepared and submitted to the shíshálh Nation, BC Parks and FLNRO for review and comment. They will aslo require a SCRD Policy Decision.
7	**Section 6.3.1.2 (p. 69)**	Section 6.3.1.2 (p. 69) provides assessment of residual effects on soil and vegetation during operation. The assessment considers the following potential impacts: exposure of shoreline and associated increased risk of erosion and sedimentation, and additional hydrological drawdown of wetlands during drought conditions. The Chapman Lake EA concludes that long term effects are not expected "given that these events are relatively infrequent and of short duration". However, large drawdowns and associated impacts may be more frequent and longer in duration than suggested, especially in the longer-term. In addition, it is unknown whether or not multiple years of drought and large and extended drawdowns could lead to a long term lowering of the water table, which could have important impacts on vegetation. Thus it should be acknowledged that impacts are uncertain and may be greater than suggested in the Chapman Lake EA. We also request that wetland water levels and wetland vegetation be monitored during operation to detect potential impacts of drawdown and possible changes in water table	B. Ford	An environmental monitoring program will be developed and would include the monitoring of water levels in wetlands relative to lake levels to determine if drawdown effects water levels in wetland areas.
8	**Section 5.2.3 (p. 41)** **Section 6.5.1.2 (p. 77)**	The issue of sedimentation and potential for erosion, instability or bank failure of shoreline during large drawdown has not been clearly considered. For example, the analysis of sediment quality in Section 5.2.3 (p. 41) does not appear to include an analysis of sediment depth, which could influence bank stability. Section 6.5.1.2 (p. 77) states that concern has been expressed regarding instability of the deltas around major tributaries that flow into Chapman Lake, but concludes that a major movement of lake sediments is unlikely because the bathymetry of the lake is not steep in these areas. However, the potential for slope failures in other steeper areas of the lake bed does not appear to have been considered. The potential for rapid refilling of the lake during rain events to cause slope failures also does not appear to have been considered. We request additional analysis of the potential for sloughing of sediments during large or extended drawdown throughout all areas of the lake, and suggest involvement of a Geotechnical Engineer in this analysis.	K. Eskoch	A source of instability on the lake shore will be from changes in water levels however, the draw down and infilling will take place over several days. The rate of water level change is not considered fast and not expected to affect slope stability. Re-saturation of a dried shoreline in sections of steep grade could increase the potential for instability and should be monitored. The main source of erosion and sedimentation will be from the outflow of the larger creeks cutting into the lake sediments as they cut a channel to the water's edge. The other source is from wind and wave action along the shoreline which could cut away at the shore creating an over steepened slope that could slough into the lake. However, no significant wind or wave influences on the shoreline of Chapman Lake were observed during the 2016 survey. Also, any sedimentation events will be short lived and unlikely to cause any lasting effects. This concern will be addressed in the Environmental Monitoring Program.

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
9	**Section 6.5.2.2 (p. 79-80)**	Section 6.5.2.2 (p. 79-80) suggests that Dolly Varden in Chapman Lake will be resilient to potential impacts of operational drawdown on spawning because there are multiple age classes in the lake, i.e. if spawning is restricted in one year due to drought, there will be a cohort of spawners available to spawn the next year. However, drought events (even a 1:25 year drought) can occur more than one year in a row and drought events may become more frequent in the future due to climate change. Thus the potential for drawdown to negatively affect spawning may be greater than assumed in the Chapman Lake EA report. No response is required to this comment other than to acknowledge that risks of impacts to Dolly Varden are likely greater than expected and thus monitoring of Dolly Varden during operation will be required (see next comment).		See response to FLNRO's comment #6. It is acknowledged that there is uncertainty in the assessment of impact related to this project and the SCRD will be developing an environmental monitoring program to collect additional data to monitor the effect of drawing the lake down below 3 m.
10		Monitoring of the Dolly Varden population in Chapman Lake is required during operation to detect negative changes that could result from more frequent, longer and deeper drawdowns. It is not clear from the Chapman Lake EA if the data collected to date are sufficient to provide baseline to monitor changes in population over time. A monitoring plan will need to be developed prior to construction, and designed with appropriate methods and measurements that allow for detection of changes in the Dolly Varden population. The monitoring plan will identify if additional information needs to be collected pre and/or during construction. Monitoring will need to continue during operation to detect impacts and develop and implement mitigation as needed.	B. Ford	It would be counter productive to continue to collect DV population information in the same manner as was done for Whitehead (1999) and AECOM (2016). Regular gillnetting could do more to damage the population than any drought draw down scenario. Even using live capture techniques are stressful on the fish as they have to be handled to get them out of the capture device. Before committing to ongoing studies that might cause more harm than good, there needs to be a better evaluation of the actual impacts during draw down, i.e. will draw down actually restrict access to spawning areas? The proposed environmental monitoring plan could include an adaptive component that would allow for modifying the monitoring program to focus on the aspects that are being affected by operations.
11	**Section 6.5.2.1 (p. 79)**	Section 6.5.2.1 (p. 79) states that full drawdown during construction is unlikely to negatively affect Dolly Varden because 2016 observations suggest that even a full -8m drawdown will not cause complete blockage of access to spawning creeks. In addition, the assessment assumes that Dolly Varden will spawn later in the fall when construction will be complete and Chapman Lake will be refilling. These assumptions regarding access to spawning streams and spawning timing need to be tested through additional life history study to determine when Dolly Varden spawn relative to lake re- filling, and how timing may influence impacts from drawdown. For example, if spawner migration to stream spawning locations occurs prior to lake refilling, fish may have to migrate through channels in open mud flats exposing them to possible sedimentation and predation. At a minimum, monitoring of spawning access and timing should be initiated during the drawdown associated with the construction period. Better understanding of life history will help reduce uncertainty around potential impacts of drawdown during operation and will be useful for developing mitigation during operation.	B. Ford	The life history of the DV is known and we can use existing knowledge of DV to predict when they will migrate to the spawning areas. However, there are many factors that affect the specific timing for the spawning migration so it varies from year to year. As per the previous comment, direct observation of stream accessibility during the drawdown for the construction phase will be very informative.

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
12		Note that the Dolly Varden population at Chapman Lake is likely of high conservation value because it is a mono-culture headwater population of genetically isolated Dolly Varden. This type of population may be rare or even unique (additional review of existing information could determine how rare this type of population is). In addition, Dolly Varden are associated with cold water and may be at increased risk of population declines through climate change and more frequent drought events, even in the absence of artificial reservoir drawdowns. The Chapman Lake population may be particularly vulnerable as an isolated population with no incoming gene flow. All of the above increases the importance of monitoring to better understand and mitigate potential impacts of increasing frequency, duration and extent of drawdown during operation.		An environmental monitoring plan will be developed that includes assessment of the Dolly Varden population. A draft plan will be submitted to BC Parks, FLNRO and shishalh nation in early July.
13	**Section 6.4.4.2 (p. 73-74)**	Section 6.4.4.2 (p. 73-74) discusses potential residual effects on Western Toad, even though there are no known observations of Western Toads in the Chapman Lake area. However, the presented analysis can be extrapolated to aquatic breeding amphibians generally, which are common and important in the wetlands surrounding Chapman Lake. The Chapman Lake EA suggests that potential residual effects on toads during operation will be minimal even under increased drawdown because lowest water levels will occur in late summer once the majority of tadpoles have gone through metamorphosis. This will not be true for neotenous Northwestern Salamanders which spend their entire lives in the aquatic environment. Neotenous salamanders have been observed in Chapman Lake tributaries and may occur in adjacent wetlands. Northern Pacific Treefrog tadpoles and Long-toed Salamander larvae were abundant in wetlands at the east end of the lake during late August 2016 field surveys, suggesting that tadpoles remain late in the season during typical low water periods. Also, there is the outstanding question regarding the potential for multiple years of drought and large drawdowns to lead to a long term lowering of the water table in the area, which could reduce suitable habitat for amphibians. Thus uncertainty remains regarding the extent of residual effects on amphibians.		The species discussed are not at risk. While some access may be limited, our observations were that these ponds are perched even above the full lake level and may not be hydraulically connected to the lake. The monitoring program will include a component for monitoring pond levels relative to lake levels.
14		Mercury and formation of methylmercury (Sections 5.3.1.4, 6.5.1.2):		See below.
14A	**Section 5.3.1.4 (p. 47-48)**	Fish tissue sample results reported in Section 5.3.1.4 (p. 47-48) show total mercury in fish tissue was above the CCME and BC Tissue Residue Guidelines to Protect Wildlife from Mercury Toxicity in four of the five fish sampled. However, Section 5.3.1.4 states “there was no evidence during the 2016 field study to indicate that the elevated levels of mercury in the Dolly Varden of Chapman Lake was anything but natural.” We request more details explaining why the Chapman Lake EA came to this conclusion.	B.Ford	Chapman Lake has been in a park for 30 years with no industrial activity in that time period. The main source of mercury currently circulating through the system is from natural sources. Also, the elemental analysis of the rock (Table 5 of the EA report) reported mercury levels below detection in the rock sample analyzed. Suggest that soil and sediment analysis be included in the environmental monitoring program to be submitted in early July.

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
14B	**Section 6.5.1.2 (p. 76-77)**	Tissue sampling for mercury was conducted to establish a baseline for comparison to samples collected in the future because of concern that increasing drawdown may lead to elevated levels of methylmercury in the food web. High levels of methylmercury are known to be generated in newly created reservoirs, but evidence also suggests that large drawdown in established reservoirs may also lead to increases in methylmercury formation (see Azimuth 2015, cited in the Chapman Lake EA). Discussion presented in Section 6.5.1.2 (p. 76-77) suggests that methylmercury formation related to drawdown is not a problem at Chapman Lake because it is much smaller, experiences less drawdown, and has less inundation of vegetation than Carpenter Lake, the reservoir studied in Azimuth (2015). However, Carpenter Lake is only one reservoir where elevated mercury levels have been potentially linked to water level fluctuations. References in Azimuth (2015) and elsewhere (e.g. Willacker *et al.* 2016 http://dx.doi.org/10.1016/j.scitotenv.2016.03.050 document studies that included a range of waterbody sizes and conditions (including smaller reservoirs and a range of drawdown regimes). These studies repeatedly showed relationships between wa ter level fluctuations and increased mercury in fish. The 2016 tissue sample results for Chapman Lake combined with evidence in the literature suggests to us a possible link between elevated mercury levels in fish tissue and the existing drawdown regime in Chapman Lake. In addition, increasing drawdown in the future may exacerbate this problem. We recommend that fish tissue sampling be included in the monitoring program during operation.	B. Ford	The Dolly Varden population is not fished or used for human consumption. But as indicated the environmental monitoring program will include sediment and soil sampling to assess mercury content.
14C		Total mercury in the water column (which includes methylmercury) was well below water quality criteria (as reported in Section 6.5.1.2 and Appendix D). However, mercury accumulates in the sediment and this is primarily where methylmercury formation occurs. The sediments may be the source of higher than criteria levels of mercury observed in fish tissue. Analysis of metals (including mercury) in sediment should be included in future monitoring, including during the summer of construction to provide a baseline pre-operation.	B. Ford	As suggested re Comment 14a.
15		The executive summary states that the intake for the pipe will have an invert elevation of 965.1 m but the April 2016 permit application identified an invert elevation of 966 m. Please explain the change.	B. Dwynter	The diversion pipe will be full at all times for hydraulic and operational reasons, meaning the pipe installed depth needs to be below the maximum drawdown depth of 966 m. A weir is proposed at the outlet end of the pipe to maintain a minimum water level of 966 m.
16	**Section 3.2 (p. 15):**	Section 3.2 (p. 15): This section states that "in order to install the intake end of the pipe the lake may have to be drawn down below the -8m level depending on the type of coffer dam used." Has consideration been given to a possible situation where drought conditions are experienced at this time when lake is already below -8 m? The schedule for construction and choice of coffer dam used must be designed to minimize the duration of deep and maximum (-8 m) drawdown as much as possible.		Suggestion noted.

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
17	Section 5.0:	Section 5.0: The data collected during the 2016 field assessment and the details of sampling methods and sampling locations will be required to allow for comparison with future field assessments and data (i.e. to monitor environmental change and impacts). Most of this information appears to be included in the Chapman Lake EA and its appendices. Digital versions of spatial data files for sampling locations, occurrence records, Terrestrial Ecosystem Mapping (TEM), etc. will also be needed. Please confirm that SCRD has been or will be provided with digital spatial data (including TEM polygons) and any other raw data/sampling information required for future monitoring.	B.Ford	AECOM will provide SCRD with electronic files including spreadsheets, GIS, databases and reports
18	In Section 5.3.4 (p. 54)	In Section 5.3.4 (p. 54) fish habitat in south eastern stream was rated low to moderate in part due to no fish captured. Note that on August 24th Joanna Hirner observed a small fish (assumed to be Dolly Varden) in a pool associated with this stream.	B. Ford	Based on the fish sampling the north eastern stream was much more productive than the south east stream was markedly less productive than the stream on the north side, hence the lower rating
19	Section 5.4.5 (p. 60-61)	Section 5.4.5 (p. 60-61) presents the results of Terrestrial Ecosystem Mapping (TEM). The red-listed Sitka sedge/peat-mosses Fen community was identified in some polygons that overlap or are adjacent to the permit area and construction temporary use area as shown in Figure 6 (p. 14). Protecting this plant community is a priority that must be reflected in the Construction Environmental Management Plan (EMP) still to be developed as described in Section 7.0. Monitoring for changes in the Sitka sedge/peat mosses Fen community that may result from more frequent and extended large drawdowns is also a priority during the operation phase.	B.Ford	Monitoring of vegetation will be included in the environmental monitoring program. This plan will be completed by July 2017.
20	Section 6.4.4.3 Coastal Tailed Frogs	Section 6.4.4.3 Coastal Tailed Frogs: It appears no targeted surveys were conducted for Coastal Tailed Frog in Chapman Creek downstream of the Chapman Lake dam. Although not described in this report, we assume that mitigation will be designed and implemented for fish during construction at the dam outlet and immediately downstream (i.e. isolation of construction areas and salvage of fish). These mitigation measures for fish should be adapted to also protect Coastal Tailed Frog (e.g. survey efforts and methods designed to salvage tailed frog tadpoles).	D. Bates	In 2016 Dr. Bates spent the better part of a day on Chapman Lake outlet and tributary streams looking for coastal tailed frog (CTF) tadpoles. All reconnaissance was timed constrained searches kept to a maximum of 15 minutes. No CTF tadpoles were found. The habitat in the inlet and outlet streams did not provide ideal conditions for CTF. Assessment of the drying and shallow depositional reaches of the streams reduces the probability of productive CTF habitat. It is possible CTF reside in Chapman Cr and tribs further downslope where flows are maintained, streams are higher gradient and substrate includes less fines. Any channel works below the dam will be assumed to contain CTF. Affected areas will be salvaged prior to significant dewatering. Experience in other areas of CTF habitat where dewatering was planned, CTF salvage has worked best as the areas are dewatered.

BC Parks Comments from J Hirner (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
21	**Section 6.5.1.1 (p. 76)**	Section 6.5.1.1 (p. 76) includes the following statement: "If mitigation measures are not fully effective, elevated sediment levels released into Chapman Creek should have minimal impact on drinking water as there are numerous pools in the creek that will allow sediments to drop out of suspension during the approximately 17 km course from Chapman Lake to the intake at the water treatment plant." This statement does not acknowledge likely impacts of sediment release on aquatic life (fish, invertebrates, Coastal Tailed Frogs) in Chapman Creek. Prevention of any sediment releases should be a priority for environmental management during construction.	B. Ford	The Construction Environmental Management Plan (CEMP) will focus on containing and minimizing sediment release including contingencies to deal with rain storms recognizing that because the site is isolated (no road access) it will be difficult to quickly provide additional material and equipment to manage a big event. Note that CEMP will require that extra ESC materials be stockpiled on site. To be completed in July 2017.
22	**Section 6.5.2.1 (p. 78-79)**	Section 6.5.2.1 (p. 78-79) discusses de-stratification of the water column (and associated changes in temperature and dissolved oxygen) as a potential impact of full draw down to -8 m during construction. A slow rate of drawdown is presented as a measure to prevent de-stratification. De- stratification presumably could also occur during operation, especially during large drawdown events or if drawdown occurs quickly. Impacts of drawdown on stratification, temperature, and dissolved oxygen should be closely monitored during construction to help understand potential impacts and design mitigation for operation including measures to prevent rapid drawdown.		Drawing water below -3 will only occur in drought conditions and measures to significantly reduce water demand and therefore lake drawdown should be implemented. The environmental monitoring program will include collecting data on water column stratification.
23	**Section 6.5.2.2 (p. 80)**	Section 6.5.2.2 (p. 80) states that the proposed 2 m plunge pool will prevent impacts to fish that drop 8 m from dam crest to the channel below. A fisheries biologist from FLNRO consulted during our review made additional suggestions regarding design of the plunge pool: • Engineer the pool with the objective that fish enter and exit the pool safely; • Design the pool so that fish are easily directed into the deepest part of the plunge pool and are not bouncing off of the bedrock • Size and locate pool so that it contains refuge areas for fish to recover after their fall.	B.Ford	The plunge pool at the bottom of the 8 m drop as currently configured (Drawing C-101) provided those features, i.e. it is 30 m long and would be 4 m deep when water is flowing over the weir.
24	**Section 6.5.2.2 (p. 80)**	Section 6.5.2.2 (p. 80) states that intakes of the new pipe will be fitted with a trash screen with 25 mm openings, and concludes that there is a low risk of fish being negatively affected by use of this screen. Is it feasible to have a screen with hole sizes smaller than 25 mm to reduce the risk as much as possible? If it is not feasible and a 25 mm screen is used, the passage of fish through the intake pipe should be monitored. If a problem is detected (e.g. too many fish passing through the pipe into the creek below), then adaptive management procedures should be applied.	B. Ford/ B. Dewynter	Will be incorporated into the environmental monitoring program.
25	**Section 7.0 (p. 85-86)**	Section 7.0 (p. 85-86) describes the Environmental Management Plans (EMPs) that will be developed for the construction and operation phases. These plans will need to be developed in detail in advance of construction/operation, and BC Parks will require review and approval of these plans as part of the Park Use Permit. The construction plan will need to include mitigation measures as listed in Section 7.0, but some additional mitigation not listed in Section 7.0 needs to be added to the plans. This includes prevention and management of invasive plants, fuel and spill management, archaeological resource management, and socio-cultural impact management.	B. Ford	A Construction Environmental Management Plan (CEMP) and an Environmental Monitoring Program to monitor biophysical conditions in and around the lake after construction will be drafted and submitted to shíshálh Nation, BC Parks and FLNRO in July 2017 for review and comment.

BC Parks Comments from J Hirner (letter dated March 24, 2017)				
No.	**Section**	**Comments**	**Assigned to:**	**Response**
26	**Section 7.0 (p. 85-86)**	Given that the rock sample used for determining the potential for Acid Rock Drainage and Metal Leaching was weathered, the recommendations regarding further testing in Section 7.0 (p. 85-86) should be implemented.		Sample size and condition did not provide ideal results but is indicative with results suggesting the potential for excavated rock to be ARD or ML is low. This assessment will be addressed through additional sampling at start of construction and before any rock work and implementing contingency measures if lab analysis indicates ARD or ML potential.
27	**Table 28 (p. 88)**	Under 'Air Quality' in Table 28 (p. 88) 'apply dust suppression' is listed as a mitigation measure. Please provide details on what product would be used and if the proposed product poses any risks to environmental values or water quality.	B. Ford	The cost effective and most practical plan would be to use water.
28	**(sections including 6.5.2.4 [p. 81-82] and 7.0 [operation EMP, p. 86])**	Monitoring (sections including 6.5.2.4 [p. 81-82] and 7.0 [operation EMP, p. 86]): Monitoring for effects on key values during construction and operation is proposed several times in the Chapman Lake EA. We support these recommendations. A detailed monitoring plan will need to be developed prior to construction, and BC Parks will require review and approval of these plans as part of the Park Use Permit. As stated previously in these comments, the future frequency, extent and duration of drawdowns are uncertain, which means residual effects are also uncertain. Monitoring will allow for testing of assumptions regarding residual effects, detection of negative impacts, and implementation of mitigation and adaptive management to reduce negative impacts. Key effects and values to be monitored include: • Dolly Varden: spawning timing and access; population condition; tissue sampling; changes to habitat quality and quantity • Effects of drawdown on the water table and wetlands, including wetland vegetation (Sitka sedge/peat mosses [Fen]) and amphibians • Water and sediment quality, including monitoring for sloughing of exposed sediments • Aquatic vegetation	B. Ford	See response to Comment #21
29	**Section 5.3.5 (p. 55-56)**	Also related to monitoring, it is not clear that the data collected in 2016 is suitable and sufficient to allow for future comparative monitoring relative to pre-construction conditions. For example, sampling of aquatic vegetation as described in Section 5.3.5 (p. 55-56) is qualitative. Qualitative assessments tend to be hard to repeat and detect only major changes. Monitoring must be designed to be quantitative and repeatable to allow for detection of changes during operation. Using the aquatic vegetation example, long-term monitoring of cover and species composition on transects or plots would provide quantitative data. Monitoring during the construction year must be designed to provide data that can be used for the long-term monitoring plan.	B. Ford	See response to Comment #21

Chapman Lake EA Comments Provided by Water Stewardship (letter dated March 24, 2017)

No.	Section	Comments	Assigned to:	Response
1	**Section 2.1 (page 7)**	Section 2.1 (page 7) indicates that; "The current operating procedure is to maintain at least 0.3 m3/s in the creek below the water intake for the water treatment plant under normal conditions, and 0.2 m3/s under low flow conditions. The amount released from Chapman Lake is determined by the amount of flow measured at the stream flow gauge located downstream of the SCRD water intake." How will low flow releases change (increase) to accommodate adult pink salmon migration and spawning?	D. Bates	The issue is access for Pink salmon through the reach below the hatchery and then the section of river dewatered between the hatchery intake and outlet. In the past flows of around 0.20 m3/s was adequate for fish migrating through the first riffle above tide line. Bottlenecks can occur at the two reference points mentioned above and the success (based on observations in the past) is that channel changes annually has a greater influence than water volume on fish passage. The access in 2017 can not be predicted until August and channel changes that have occurred in 2016 and early 2017 can be observed. It has been proposed that ongoing monitoring of Pinks, starting in August be implemented. This will allow confirmation of the presence of barriers created by low flows. If there are issues with low flow and access through reaches there are a number of possibilities that can be considered. This includes: 1) increased pulsed flows to facilitate movement to the the reach above the hatchery; 2) termination of water diversion into the hatchery for August and September which could be problematic if hatchery is rearing; or 3) capture and transport of adults to the reach above the hatchery. Observations in 2015 documented Pink salmon movement through Reach 1 at these flows and adequate distribution of adults from the hatchery intake upstream. The strength of the 2017 Pink return is unknown. Spawning is not considered an issue at lower flows. The escapement numbers and available area for adult spawning has not been an issue in the past and is not likely to be an issue in 2017. The challenge will be adult movement to areas above the hatchery.
2	**Section 2.1 (page 7)**	Section 2.1 (page 7) indicates; "The fish hatchery located downstream of the SCRD intake also has a water licence on Chapman Creek, and it typically uses up to 0.1 m3/s of the instream flow but their water licence allows them to take a maximum of 0.28 m3/s." If the hatchery demand is increased in the future (i.e., to the fully licensed amount of 0.28 m3/s), how will this potential increase in hatchery demand be accounted for?	SCRD/ D.Bates	Suggest that SCRD have a discussion with DFO's Stock Management and SEP Biologsits to understand the long term enhancement goals of the Hatchery. The hatchery water volume in the summer allows for 0.1cms diversion which has resulted in barrier issues at low flow around the diversion reach. Details need to be sorted out including targets for Chapman at the hatchery.
3	**Section 2.2 (page 8)**	Section 2.2 (page 8) states; "Chapman Lake watershed is just 8.6 km2 (13%) of the entire watershed captured by Station 08GA060 of 64.5 km2". Estimated flows into Chapman Creek in tables 1 and 2 were based on this Chapman Lake watershed area. However, Section 5.2.1 (page 36) indicates that the catchment area of the lake is 6.58 km2 which equates to roughly 10% of the watershed captured by Station 08GA060 and would alter the calculations in tables 1 and 2, thereby reducing the total available water in Chapman Lake from June 1 to Sept 30. Please explain the difference between the definitions of watershed area and catchment area for Chapman Lake.	B. Ford	The 8.6 km2 is considered the corrected estimate of watershed area and is based on our calculation using GIS. The 6.58 km2 was the area provided in the Whitehead 1999 report.

Chapman Lake EA Comments Provided by Water Stewardship (letter dated March 24, 2017)				
No.	**Section**	**Comments**	**Assigned to:**	**Response**
4	**Section 2.3 (page 10)**	Section 2.3 (page 10) states; "The current project to access additional water from Chapman Lake was developed to address this short fall over the short term, while additional sources of drinking water were developed." Please define "short term" in this case. What additional sources of drinking water are being developed?	SCRD	SCRD's Comprehensive Regional Water Plan dated June 2013 identified that SCRD would develop plans for an alternative water supply over the next 10 years (short term) (i.e. by 2023). This includes groundwater investigation which is currently underway.
5	**Section 2.4**	Section 2.4 states; "The predicted values used here are not expected to be reached until 2050", indicating that the estimated 19% reduction in rainfall is not expected to be reached until 2050, but what about potential incremental reductions in rainfall in the next 10 to 20 years? How will potential incremental reductions in rainfall in the next 10-20 years reduce the available water during the low flow months?	B. Ford	Recent review of the Plan2Adapt tool on the Pacific Climate Impacts Consortium website (pacificclimate.org/analysis-tools/plan2adapt), predicts the average change in precipitation on the Sunshine Coast for the period of 2020 - 2039 will be an overall increase in annual precipitation of 4%, however, the summer precipitation is expected to decrease by an average 7%. The predicted range for change in summer precipitation using the 10th and 90th percentile indicates a range from an increase of 9% to a decrease of 17%. The Plan2Adapt tool also indicates that the annual rate of decrease in summer precipitation will be slower through the mid 2020s and then will increase through to the 2050s to reach the estimated 19% reduction. The same tool predicts that there will be a steady increase in rainfall in the fall (September - November) and spring (March through May) as a result of climate change. While variability in predicted changes is high, the average reduction in summer precipitation would suggest that the lake will normally be full at the beginning of June with reduced summer rains increasing the potential that the lake will draw down to -3 or lower but fall rain events will refill the lake through October.
6	**Section 6.5.2.3 (Pages 80, 81)**	Section 6.5.2.3 (Pages 80, 81), "Summary of Residual Effects" indicate that most effects are expected to be low because lake drawdown is only expected to happen infrequently. The confidence in these ratings is only 'Moderate' due to the uncertainty in the frequency of drought conditions that will require a drawdown of 8m. It is also stated that "Any effect on the Dolly Varden population in a drought year would be offset by spawning the following year." Given the aforementioned uncertainty in the frequency of drought conditions, isn't it possible to have consecutive drought years which would indicate that the effects on the DV populations would not be offset? What would be the impacts to the DV population over consecutive drought years?	B. Ford	Dolly Varden live up to 8 years in Chapman Lake. It would be unlikely that there would be back to back droughts and even more unlikely that there would be 3 consecutive years of drought. Even after 2 years of poor spawning conditions there would be sufficient numbers of DV to spawn and maintain the population. Also, as above, climate models predict increased rainfall in the the fall months which may still provide fish the opportunity to access spawning areas. An environmental monitoring program will be developed to further assess the effects of drawdown on Dolly Varden.
7	**Section 7 (page 85)**	Section 7 (page 85), The Emergency Management Plan (EMP) should also include the proposed monitoring and follow-up measures provided in section 6.5.2.4.	B.Ford	A construction environmental management plan and an ongoing (post construction) environmental monitoring program will be developed.
8	**Executive Summary (page ix) and Table 28 (page 89)**	There are discrepancies between the 'Geographic Extent' and 'Overall Impact' ratings for Aquatic resources in the table presented in the Executive Summary (page ix) and Table 28 (page 89). Please make the appropriate corrections.	B.Ford	The version in the executive summary should be used as it provides a more conservative evaluation
9	**Page 80;**	Page 80; "The project should not result in any change in the populations of Dolly Varden in Chapman Lake or downstream in Chapman Creek." How will AECOM be able to detect a change in the DV fish population based on the information collected thus far? What methods will be used to monitor change in the DV population over time?	B.Ford with plan approved by SCRD	An environmental monitoring program as described previously will include recommendations for on going assessment of the Dolly Varden population in the lake. The plan is expected to be submitted in July 2017.

Chapman Lake EA Comments Provided by Water Stewardship (letter dated March 24, 2017)				
No.	**Section**	**Comments**	**Assigned to:**	**Response**
10	**Section 6.5.2.4**	Section 6.5.2.4 recommends a study during construction to confirm the findings of the Chapman Lake EA and assess fish and fish habitat around the lake and in the tributaries, including fish access as well as follow-up monitoring of the indicators of effects of the project on fish and fish habitat. We agree that further monitoring should be conducted throughout the project to adequately assess and mitigate any potential impacts to fish and fish habitat.		A construction environmental management plan will be developed and a draft version will be submitted to shíshálh Nation, BC Parks and FLNRO in early July 2017.
11		We have mentioned in our previous comments of September 16, 2016, that we are concerned about how the lake drawdown will impact the water table. Is it possible that the water table could be permanently lowered as a result of combined impacts from lake drawdown and multiple years of drought conditions? Is there potential for prolonged lowering of the water table as a result of this project?	B. Ford with input from Hydrogeologist	We don't consider this to be a likely scenario as climate models predict that summer months will be drier and fall, winter and spring months will be wetter therefore there will be more water to recharge the landscape. Winters are expected to be warmer so there will be less snow and more rain. If this is the case there will be fewer days when the ground is frozen and water will be more able to infiltrate the soils and recharge the water table. The environmental monitoring program will include monitoring of water levels in wetlands

AECOM

SCRD Chapman Lake Expansion Project
April 20, 2017

shíshálh Nation comments from email to SCRD dated March 16, 2017

No.	Section	Comments	Assigned to:	Response
General Statement		Regarding the proposed Water Supply Expansion Project in Chapman Lake, we require written assurances about when the drawdown will be deployed, and how ongoing monitoring and protections of cultural and environmental resources will be ensured. Specifically:		
1		Management: The *shishalh* Nation requires written assurance by the SCRD that the additional drawdown will only be deployed once the SCRD declares Stage 4 restrictions, ***not*** to prevent Stage 4 restrictions. The additional drawdown must not be to facilitate increased growth, development and water consumption. This Water Supply Expansion project should not be leveraged to increase quantity to facilitate increased development and subdivisions. Its purpose needs be clarified: to support existing infrastructure and communities on the coast with water flow, to ensure local communities don't run out of water for emergency and environmental flows. **A written assurance about the purpose of the project and when the additional drawdown capacity will be deployed is required**.	SCRD	SCRD Policy Decision - staff to bring forward report
2		Timing: We are concerned about the safety of the upstream migration of the 2017 Pink salmon return. In the event proposed works would result in low flow during the Pink salmon spawning and migration, we require the SCRD to have a plan and procedures in place to mitigate the situation or ensure any stranded fish are transported upstream of area previously identified as high risk of stranding or present barriers to migration at low flows. We require the SCRD to work in collaboration with fisheries personnel in our Resource Management Department to develop a response and mitigation plan in the event upstream adult pink salmon movement and spawning becomes an issue.	SCRD/D. Bates	Partial response provided in response to comment #1 from the Water Stewardship. There does need to be a contingency plan for dealing with the 2017 pink salmon return if construction takes place in 2017. A minimum flow of 0.2 cms is required for access. This could change depending on channel morphology changes caused by high flows. It would be prudent that the SCRD work with the FN and DFO to develop a plan. Dave Bates had the discussion with FN that it might make more sense to have DFO facilities take additional eggs in 2017 at Puntledge or Qualicum and then transplant into Chapman. These island hatcheries are the source of the Chapman Pinks. Then if volume must be lowered to facilitate construction, a year class impact could conceivably be compensated for by a transplant. Againe the need for discussion with FN.
3		Ongoing Planning: We require continued discussions and specific actions to reduce water demand for residential use, and improve water supply. This includes continuing to research alternate sources of water, and engaging in Growth Management Planning. We need to work together for safety and quality of the potable water supply and in jointly assuming the responsibility and authority for the attaining and maintaining of the highest possible safety and quality standards for the potable water supply.	SCRD	SCRD Policy Decision - staff to bring forward report.
4		Baseline environmental data and ongoing monitoring: We need to see a written commitment from the SCRD to continue updating the baseline environmental assessment data, in order to better understand the current health of the lake and the surrounding environment. This baseline data will assist in understanding the impacts, benefits, and possible mitigation from the intensification of use of Chapman Lake as a water source. Information might include, for example, limnology, bathymetric, and hydrographic data, as well as updated surveys for vegetation, fish and wildlife. We would also like to work collaboratively between technical staffs to develop a plan and process for ongoing environmental and archaeological monitoring. An environmental monitoring plan should be developed in order to understand what the long-term effects of increased seasonal/drought condition drawdown might be. Monitoring should include key fish, vegetation, and amphibian populations.	SCRD	SCRD Policy Decision - staff to bring forward report.

shíshálh Nation comments from email to SCRD dated March 16, 2017				
No.	**Section**	**Comments**	**Assigned to:**	**Response**
5		Specific Plans: We understand in this preliminary stage detailed plans have not yet been developed. Please provide copies of environmental protection plans for the construction activities, camp management plans, etc. when available. In addition, please provide a draft of the Restoration/Revegetation Plan for the construction area and exposed shoreline, when it is developed. Salvage and replanting of existing native species should be considered as part of the revegetation planning.		SCRD staff will provide Environmental Protection Plans prior to construction.

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – March 16, 2017

AUTHOR: Shane Walkey, Manager, Utility Services

SUBJECT: **CHAPMAN CREEK SUMMER FLOW ANALYSIS**

RECOMMENDATION(S)

THAT the report titled Chapman Creek Summer Flow Analysis be received.

BACKGROUND

The purpose of this report is to provide data on Chapman Creek summer flows in 2015 and 2016.

The following resolution was adopted at the February 23, 2017 regular Board meeting:

081/17 ***Recommendation No. 1*** *Chapman Lake Water Supply Expansion Project Environmental Assessment Report*

THAT the report titled Chapman Lake Water Supply Expansion Project Environmental Assessment Report be received;

AND THAT a report on the 2015 and 2016 Chapman Creek flow measurement data from below the intake be brought to a future Infrastructure Services Committee meeting.

Rates of flow are measured in Chapman Creek in order to ensure sufficient volume of water is available for human use, fire protection and for healthy stream ecology, with a particular focus on fish.

Chapman and Edwards Lakes supply the water that flows down Chapman Creek. In the drought prone months when Chapman Lake water stops flowing over the control weir, the SCRD manages the water flow from the two lakes to the creek.

Creek flow is monitored at the Chapman Creek Monitoring Station (CMS), which is downstream of the Chapman Water Treatment Plant (CWTP) intake. The SCRD does not extract any water downstream of the CWTP.

DISCUSSION

Chapman Creek Monitoring Station

The creek flow varies due to storage, rainfall, operator adjustments and weather. Reviews of the low summer flow on salmonid habitat and passage in Chapman Creek were conducted by FSCI Biological Consultants and reports were provided to the SCRD in 2015 and 2016. The

2016 report was included in the Chapman Lake Water Supply Expansion Project Environmental Assessment. The 2015 report is attached for information. The reports confirm the target of 200 L/s at the CMS as it provides adequate habitat.

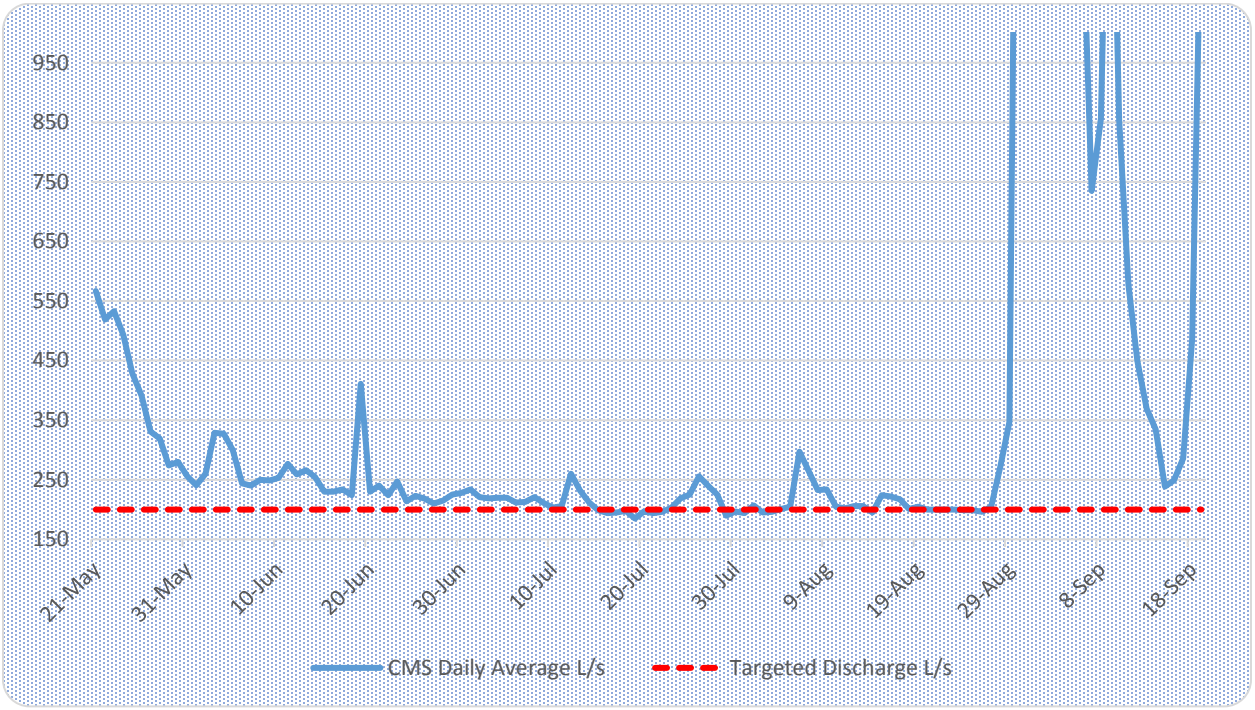

Figure 1. 2015 Chapman Creek Daily Average Flow at CMS

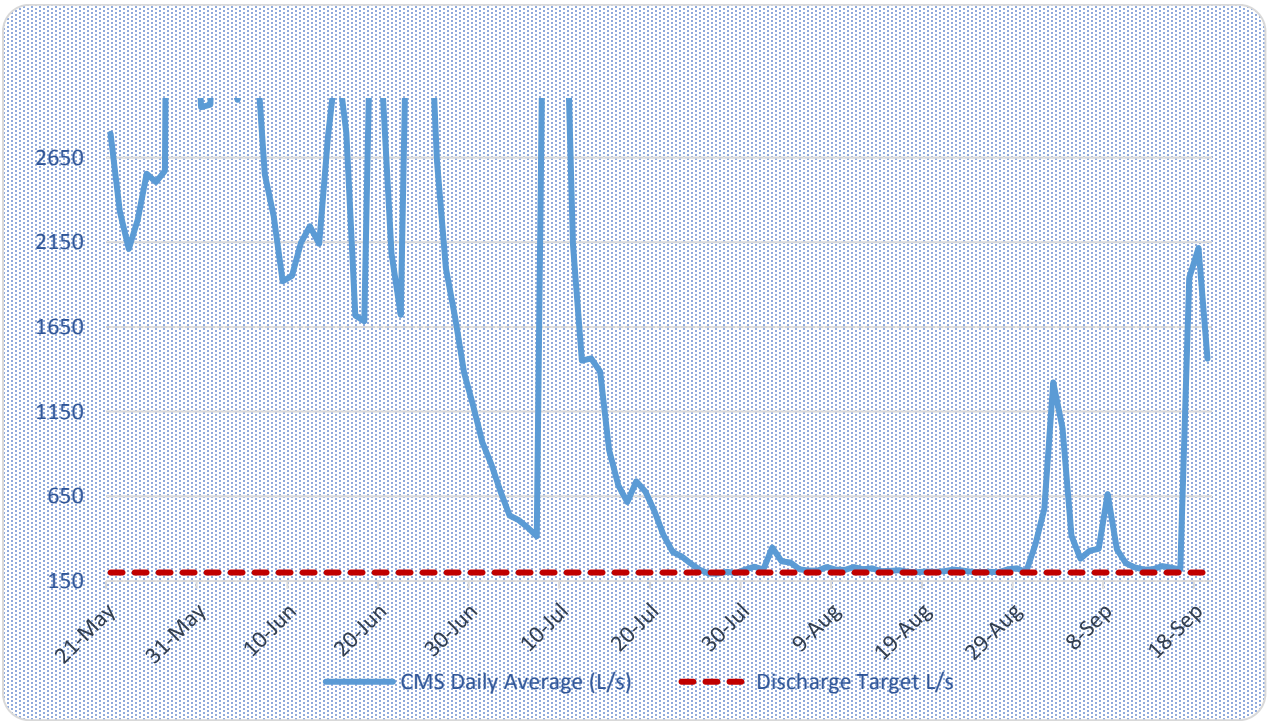

Figure 2. 2016 Chapman Creek Daily Average Flow at CMS

The CMS is continuously monitored and maintained and in the fall of 2015 the monitoring equipment was calibrated. The recalibrated equipment had an adjustment factor to the creek flow for 2016 compared to 2015.

The minimum recorded summer flow in Chapman Creek met the 200 L/s target 86% of the time in 2015 and 98% of the time in 2016. The daily average flow for the days that didn't meet 200 L/s was 195 L/s for both 2015 and 2016.

STRATEGIC PLAN AND RELATED POLICIES

Strategic Plan – Embed Environmental Leadership: Protect drinking water quality by maintaining watershed health.

We Envision – Water Stewardship: Included as an action item to protect community drinking watersheds is the "*need to complete and adopt a plan to mitigate risks to water quality in the Chapman Creek Drinking Watershed*" and "*to complete and adopt risk assessments and plans to mitigate risks to water quality in all other community drinking watersheds."*

CONCLUSION

Rates of flow are measured in Chapman Creek in order to ensure sufficient volume of water is available for human use, fire protection and for healthy stream ecology, with a particular focus on fish.

Creek flow is continuously monitored at the CMS, downstream of the Chapman Water Treatment Plant intake. The creek flow varies due to storage rainfall, operator adjustments and weather. Biologist reports in 2015 and 2016 confirm 200 L/s as the target flow at the CMS.

The minimum recorded summer flow in Chapman Creek met the 200 L/s target 86% of the time in 2015 and 98% of the time in 2016. The daily average flow for the days that didn't meet 200 L/s was 195 L/s for both 2015 and 2016. The report is presented for information.

Attachments:

1. FSCI Biological Consultants 2015 Report

2. Correspondence from Remko Rosenboom, Manager Water Authorizations, Ministry of Forests, Lands and Natural Resource Operations, dated April 4, 2017 regarding Clarification of Environmental Flow Needs and Sensitive Stream Protection under the *Water Sustainability Act.*

Reviewed by:			
Manager	X- S. Walkey	Finance	
GM		Legislative	
CAO	X. J. Loveys	Other	

FSCI Biological Consultants

December 6, 2015 Our File No.: FSCI-15-0034

Mr. Dave Crosby
Sunshine Coast Regional District
1975 Field Road
Sechelt, BC V0N 3A1

Re: Preliminary review of low summer flow on salmonid habitat/passage in Chapman Creek

Dear Mr. Crosby:

As requested we reviewed the change in available anadromous fish habitat and upstream passage in Chapman Creek at low to moderate late summer flows. This review, which is based on limited field data and professional opinion, was completed in response to concerns raised about possible detrimental effects of low summer flows on rearing juvenile salmonids, specifically Coho salmon, Steelhead and Cutthroat trout and migrating adult Pink, Chum and Coho salmon. As stated above, the focus was the period of low flows that occur in August and September, as the regional water demand on Chapman Creek increases.

In order to provide a "snapshot" and opinion on low flow impacts to fish and fish habitat for SCRD management, habitat was surveyed in late summer and early fall at three flows: <0.2 (0.12), 0.42 and 0.90 cubic metres per second (cms). Instream flows were determined using data from the WSC station below the SCRD intake and it was assumed that no significant water inputs occur below the WSC station in the anadromous section (below the Cabin Pools) of the mainstem.

A modified fish habitat assessment (Johnston and Slaney, 1996[1]) was completed at each target flow. The assessment was conducted from the upper extent of anadromous fish distribution (aluminum footbridge-Cabin Pools) downstream to the Highway 101 bridge at Brookman Park. The total length of stream surveyed during each assessment was approximately 3.5 km.

Throughout this length, the area of accessible and useable mesohabitat (pools, riffles and glides) was determined. The assessment crew also noted the distribution of adult salmon helping formulate an opinion on both fish access and quality on rearing/spawning habitats at the target flows. It should be noted that the individuals(s) conducting the assessment have many years (15-20+) experience working on Chapman Creek.

Results of the habitat assessments were predictable. Habitat at low flow provides the least available area, although the quality of habitat was considered high. Rearing

[1] Johnston, N.T. and Slaney, P.A. 1996. Fish Habitat Assessment Procedures. Watershed Restoration Technical Circular No 8., BC Ministry of Environment, Lands and Parks, Victoria, BC.

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juvenile salmonids were observed throughout the entire stream length and measured water temperature within an acceptable range (18^{o}C) when measured mid-day. The density of juveniles appeared to be greater in the upper reaches, although this based on crew observation and not quantitative data. There was no indication that the lower flow (0.12 cms) had any detrimental affect on rearing salmonids.

Typically, south coast streams and rearing population size is driven by low summer stream flow. It is assumed that this is also true in Chapman Creek. In reviewing low flow records I found that Chapman Creek, has reached low flows less than 0.2 cms (as low as 0.1 cms) but for short periods of time. While lower flows may occur, and on occasion may be unavoidable, it is my opinion that the population will be better protected at the managed release flow of 0.22 cms. This managed discharge should only be allowed to drop under extenuating circumstances after consultation and approval by regulatory agencies, thus ensuring continued protection of the rearing salmonid population in Chapman Creek.

In order to defend this managed minimum release (0.22 cms), additional information on population status and size would be beneficial. Therefore, I recommend that:

1. During the low flow period (summer only), that the SCRD consider collecting standing stock data from Chapman Creek targeting anadromous salmonids. Monitoring over a series of low water events will help provide a level of "comfort" that lower managed water release (0.22 cms) does protect rearing salmonids, and

2. Water temperature is monitored at select locations through the rearing length of the mainstem. This could be important if low water events extend through the warmer months (July/August). While physical space may be adequate, hot weather coupled with low water may reduce available physical space by creating thermal zones unsuitable for rearing.

The following graphs/photos show the amount/characteristics of measured habitat during the survey dates and the predicted areas available at a range of low to moderate flows (0.12 to 0.9 cms) (Figure 1 and 2) and an example of the habitat at low flow (Figure 3 and 4).

While low flows appear to be adequate to protect rearing salmonids, there is an issue with adult salmonid migration during the low flow period. The assessments identified three locations where adult passage may be hampered at low flows (Figure 5). These locations are:

- Upstream of the highway 101 bridge. This riffle is constructed of deposited, transient materials that in low waters provide a barrier to upstream passage. This riffle is mobile and changes yearly.

- The section of stream between the hatchery outflow and intake. This stream section has lower flows because of the diversion of flows for the operation of the hatchery. There is a significant reduction in stream flow in this area during summer, that creates passage problems for adult salmonids.

- The riffle/weir immediately upstream of the intake. This riffle was constructed in the 1990's to prevent continual head cutting of the channel and protect valuable spawning substrates and rearing habitats upstream. The riffle functions as designed and have provided valuable stable habitats upstream. It can slow upstream movement of adult salmonids under low summer flows, but adults do eventually move through at low flows.

Observations made during the fall found that while upstream movement of salmonids was hampered at flows approx. <0.2 cms that as water levels increased to 0.4 cms, adult salmonids were able to navigate the lower reaches.

The question of exactly what low water impacts are on adult salmonids has been posed. Typically low water periods occur in August and September. The species impacted the most is Pink salmon and to a lesser extent enhanced and introduced Chinook salmon. Pink salmon are an odd year return and should only be a concern during these peak return years (next is 2017). The Chinook salmon is introduced and will also have problems accessing upstream reaches during the lowest flows in September. More important local species, Chum and Coho Salmon typically do not start to migrate in large numbers until the end of September into December when stream flows are greater and access is not considered an issue.

Adult fish were observed moving at lower water conditions as the river comes up. At flow approaching 0.4 cms Pink salmon were observed migrating upstream and distributing accordingly. As a result an adaptive management approach for water release may be appropriate. Flow augmentation should target Pink salmon and include:

- Noting the period of movement for Pink salmon and a communication agreement with the local salmonid enhancement group. This group could provide important information on the observed number of adults holding and waiting for water levels to rise. Information regarding return timing and numbers of fish holding should be conveyed to the SCRD;

- Planned water release at predetermined times during the migration "window". Water release should be pulsed where water releases result in an increase in flow from a managed low of 0.22 cms to 0.4 cms for a set period of time (4-hrs). More than one pulsed release may be required with the goal of pushing or coaxing adults upstream through the most critical sections of river that hamper migration at low flow. Water pulses would be planned through the night on flood tides.

All pulsed flow data should be documented including duration and volume. The goal is to develop a manageable system that, under extreme conditions can be used to move fish upstream to the hatchery (assuming they have enough water to hold adults) or above the hatchery to the upper reaches.

In summary, the results of our preliminary low flow review suggest rearing juvenile salmonids have access to good stable rearing habitat. While juvenile salmonid needs are met, the low flow appears to hamper upstream migration of at least 2 species of adult salmon, namely Pink and Chinook. Pink salmon are the most abundant and should be considered a greater concern. Chinook while present represent a much smaller escapement number and appear to be sustained through introduction and hatchery

augmentation. Increasing water flow to adequately support migration of larger Chinook may not be feasible, but increasing flows for encouraging Pink salmon migration may be realistic. Increased flow release for Pink salmon should be considered only during peak return years (odd years) using pulsed release (i.e. 0.22 to 0.4 cms) over a short preset period that can be repeated (4-hr duration) at night and on a flood tide.

I trust this information will assist you and welcome the opportunity to discuss in detail the above approach. If you would like to meet please let me know as soon as possible.

Sincerely

D. Bates, PhD, RPBio (#405)
Biologist

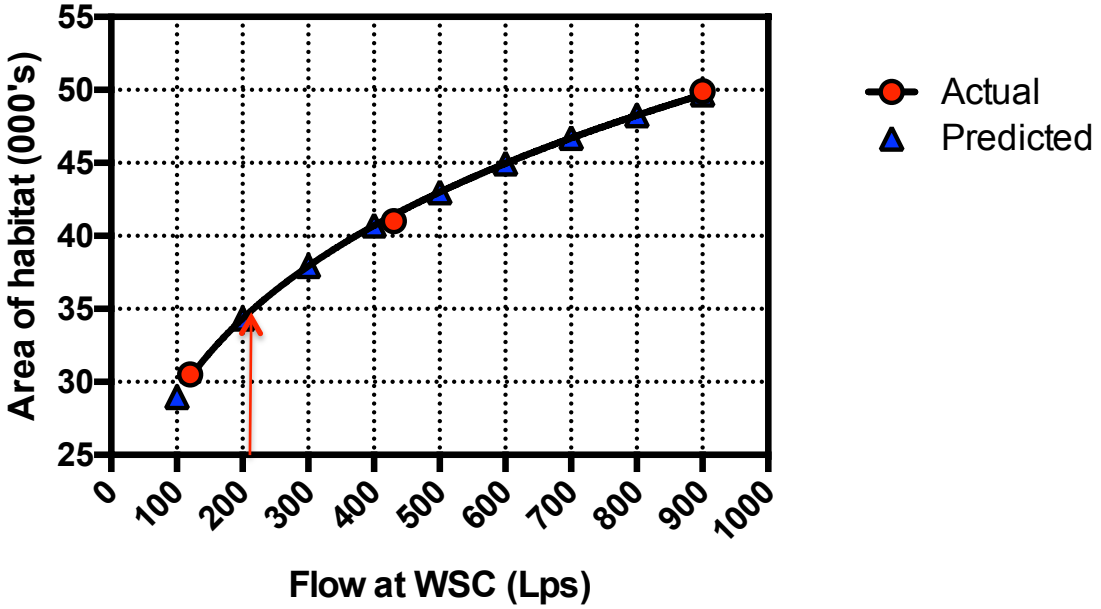

Figure 1: *The estimated total available habitat area in the anadromous length of Chapman Creek at three target flows. The predicted available habitat is also shown using the relationship of the three flows. The minimum release is highlighted.*

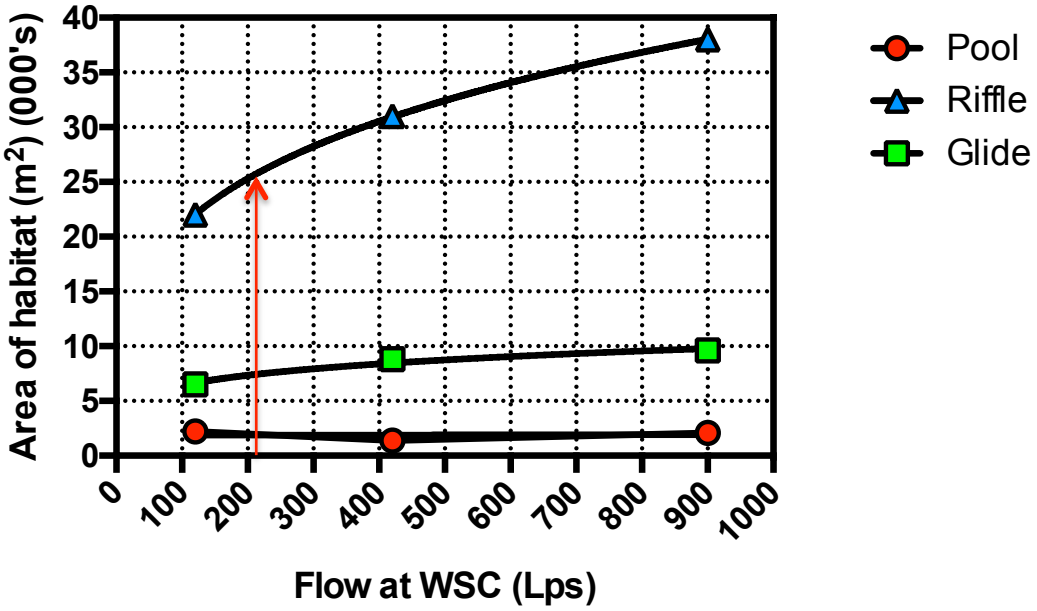

Figure 2: *The estimated total available mesohabitat (pools, glides, riffles) areas in the anadromous length of Chapman Creek at three target flows. The minimum release is highlighted.*

Figure 3: *Example of habitat in Chapman Creek at low flows. The flow is approximately 0.12-0.20 cms and the available rearing habitat found in the upper reaches above the hatchery intake.*

Figure 4: *Examples of the area below between the hatchery intake and Brookman Park where low flows impede adult salmon passage, The problem can affect Pink salmon migrating into Chapman Creek during September.*

Figure 5: *Photo showing the lower reach of Chapman Creek. Three areas were identified as potential problem riffles that may restrict upstream movement of returning adult Pink salmon. The problem is most evident during stream flows <0.2 cms.*

April 4, 2017 File: 2005157

Janette Loveys
Chief Administrative Officer
Sunshine Coast Regional District
1975 Field Road
Sechelt, BC V0N 3A1

Dear Janette,

Re: Clarification Regarding Environmental Flow Needs and Sensitive Stream Protection Under the Water Sustainability Act

Following our conversation on March 8, 2017, I would like to provide you with some additional information to clarify the difference in the provincial legislative framework with the implementation of the *Water Sustainability Act* regarding environmental flow needs and sensitive stream protection.

Environmental Flow Needs

On February 29, 2016, the *Water Sustainability Act* (WSA) replaced the provincial *Water Act*. The WSA brings a formal requirement that a decision maker must consider and thereby determine the environmental flow needs (EFN) of a stream when making a decision on new surface water license applications and use approvals (see Section 15 in the WSA). EFN in relation to a stream is defined in the WSA as "the volume and timing of water flow required for the proper functioning of the aquatic ecosystem of the stream." This new legal requirement is further supported by an Environmental Flow Needs Policy which, among other information on this topic, can be found at: www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-policies/environmental-flow-needs.

In relation to Chapman Creek, this means that any new surface water authorization application to divert water from the creek requires consideration and determination of the Chapman Creek EFN as part of the surface water authorization adjudication process.

Sensitive Stream Protection

Chapman Creek is one of fifteen sensitive streams that were originally designated under the *Fish Protection Act* and are now maintained under the WSA *(*See Schedule B of the *Water Sustainability Regulation).* This sensitive stream designation provides additional legislative authority for decision makers to consider impacts on fish populations and fish habitat at risk from damage to the aquatic ecosystem before approving new licenses, amendments to licences or issuing approvals for work in and about a stream.

…/2

Ministry of Forests, Lands and Natural Resource Operations
Water Authorizations
South Coast Natural Resource Region
Suite 200, 10428 - 153 St
Surrey BC V3R 1E1
Phone: (604) 586-4400
Fax: (604) 586-4444

According to Section 17 of the WSA, a decision maker may grant an application in relation to a sensitive stream only if they are satisfied that any adverse impact, resulting from granting the application, on the sustainability of any protected fish population of the sensitive stream is likely to be insignificant. Furthermore, Section 18 of the *Water Sustainability Regulation* states that a decision maker considering an application for an authorization in respect of a sensitive stream may require applicants to provide additional information on fish and fish habitat, flow, design of proposed works, proposed mitigation measures to protect fish habitat, etc.

In relation to Chapman Creek, this means that any new surface water authorization application to divert water from the creek requires the decision maker to consider the potential adverse impacts to the sustainability of the Chapman Creek fish populations and ensure the implementation of any mitigation or compensation measures to minimize these potential impacts.

Please let me know if you have any questions or need any further clarification.

Sincerely,

Remko Rosenboom
Manager Water Authorizations

Cc: Dave Crosby, Manager of Utility Services, Sunshine Coast Regional District
Lise Galand, Senior Aquatic Ecologist, Ministry of Forests, Lands and Natural Resource Operations

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – April 20, 2017

AUTHOR: Shane Walkey, Manager, Utility Services
Bobby Rebner, Operations Support Technician

SUBJECT: **WATER UTILITY PERFORMANCE ASSESSMENT BENCHMARKING**

RECOMMENDATION(S)

THAT the report titled Water Utility Performance Assessment Benchmarking - Update be received.

BACKGROUND

The purpose of this report is to provide an update to the Board on this project and to outline some findings and lessons learned from this exercise.

In 2013, the SCRD contracted with AECOM Canada Ltd. to conduct a management level utility performance assessment of the Regional Water Utility, based on the work that they did with the National Water Benchmarking Program.

At the July 7, 2016 Infrastructure Services Committee meeting, staff presented a 'Status Update' report for this project identifying that it had been delayed due to several factors including competing priorities as well as available resources to collect and submit the volume of data necessary to satisfy the requirements of the exercise.

DISCUSSION

The objective of performance benchmarking is to assist Utilities Services Department to manage, monitor and improve operational performance. Through the comparison of key performance indicators (KPI) it can help determine if operational and capital requirements are meeting industry averages.

The success of performance assessments and benchmarking requires the compilation and analysis of quantitative data taken from a utility's accounting and work order management system. Throughout the data collection exercise with AECOM, it was identified that the SCRD lacked the granularity of data required to make accurate comparisons within certain metric categories. This resulted in numerous categories being given an 'estimation factor' and observations and recommendations within the report that included caveats about data consistency and accuracy.

Because successful benchmarking is dependent on high quality and consistent data, Staff have determined that the final report provided by AECOM identifies areas that need improvement before benchmarking is used to guide decision making at this time.

Since collaborating with AECOM on this project and working through the data collection exercise, the SCRD has implemented several new (and more modern) software solutions. During the configuration processes of these new systems, staff are identifying areas of opportunity in data collection and reporting which would support future internal benchmarking programs and comparisons.

Staff acknowledge the benefits that can be achieved from benchmarking and will continue to review data and results on a regular basis with a focus on working towards the establishment of an internal benchmarking program.

Financial Implications

This project had a budget of $25,945 and total costs incurred were $22,480.

Timeline for next steps or estimated completion date

Staff will continue to work together in developing and configuring software systems and processes that support detailed data collection and the ability to report on management level KPIs.

STRATEGIC PLAN AND RELATED POLICIES

N/A

CONCLUSION

The SCRD has received the final report of AECOM's Water Utility Benchmarking Performance Assessment for the Regional Water Service Area. Due to data collection challenges associated with historical software systems and gaps in data requirements, many of the observations and recommendations included in the report were based on estimates.

Staff are proceeding with configuring new software systems that will enable the collection of accurate baseline values that will better support future internal benchmarking initiatives and decision making for the utility.

Attachment:

1. SCRD Benchmarking Report

Reviewed by:			
Manager	X. S. Walkey	Finance	
GM		Legislative	
CAO	X. J. Loveys	Other	

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List of Tables

Appendices

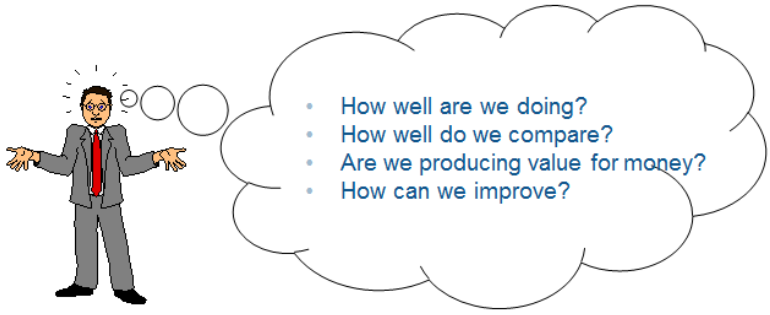
1. Background

The objective of benchmarking is to assist utilities to manage, monitor and improve operational performance. This benchmarking assessment completed for the SCRD will assist operations staffs compare their water system operational performance with a peer group of water utilities across Canada. Metric benchmarking, the comparison of key performance indicators (KPI), can help determine if operating costs and operational activities such as water main cleaning and hydrant inspections are meeting the industry standard and best management practices, or whether may need to be made to improve these levels of services.

In addition to helping operations staff identify performance improvement opportunities, the benchmarking assessment will provide the SCRD water board and the public with objective quantitative data to confirm that the SCRD water operations are providing value for money. Quantitative metrics can also help identify where increased funding or resources are required to increase levels of service or maintenance activities.

Prior to the completion of this assessment SCRD staff completed the data collection exercise. Because utilities differ in terms of their organizational structure and accounting, getting comparable data for benchmarking can be a challenge. The water system infrastructure and operating data collected for this project is in line with the National Water and Wastewater Benchmarking Initiative (NWWBI) rigorous data collection requirements. These requirements included definitions for each data parameter to ensure apples to apples comparison between utilities. Where estimates need to be made to adjust the data to the definitions, notes are provided and the estimation factor is taken into account during the data analysis. This methodology is key as successful benchmarking requires high quality consistent data based on consistent definitions.

This report was initiated and completed at the request of the Sunshine Coast Regional District (SCRD). The report was prepared for the purpose of summarizing and communicating to the SCRD the results of a Water Utility Benchmarking Assessment.



You can't improve what you don't measure

2. Introduction to Benchmarking Utility Performance

2.1 The NWWBI Utility Management Model

The management level utility performance assessment used in this assessment is based upon the national standards that have been firmly established through the National Water and Wastewater Benchmarking Initiative (NWWBI), and more recently through the Canadian Standards Association's Technical Guide for Performance Improvement for Small and Medium Sized Water Utilities (CSA 4010).

AECOM designed the NWWBI methodology with input and assistance from the National Research Council of Canada and a number of leading Western Canadian water and wastewater utilities in 1997. The partnership has since grown to include more than 50 of Canada's most progressive municipal and regional water, wastewater, and stormwater utilities from coast to coast. By following a time tested and proven benchmarking methodology in a very detailed and precise manner, a robust information base now provides feedback regarding all key utility performance measures.

The NWWBI Utility Management Model that was developed in the late 1990s and has stood the test of time well. The model has proven to be a robust framework to conduct performance measurement in a very meaningful and tangible manner. At the heart of the utility management model are the seven key utility goals that have been accepted within the Canadian public water sector. The seven goals are presently stated as:

NWWBI Utility Management Model: Seven Key Utility Goals

Goal 1 – Provide reliable service and infrastructure.

Goal 2 – Ensure adequate capacity

Goal 3 – Meet service requirements with economic efficiency.

Goal 4 – Protect public health and safety.

Goal 5 – Provide a safe and productive workplace.

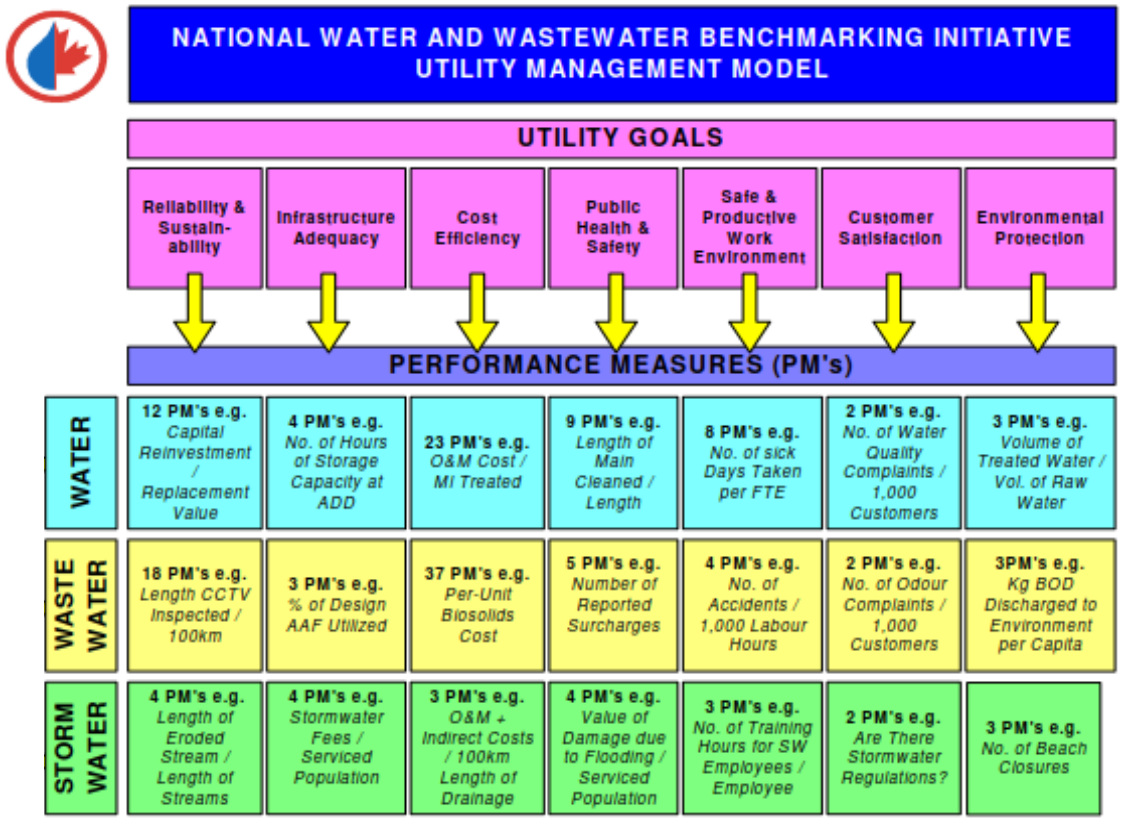
Goal 6 – Have satisfied and informed customers.

Goal 7 – Protect the environment.

The seven goals are worded very generally recognizing the fact water utilities need to orient their own utility goals in association with the utility management model through discussions with key stakeholders such as politicians, regulatory agencies, customers, etc. In general, this is not a one-time effort. Rather, the process should incorporate regular checks to ensure that activities will address the owner's needs and priorities. It is immediately apparent that the goals tend to compete with one another for funding and resources in order to improve. For example, to improve public health through more advanced water treatment, the cost to customers must increase. Individual utilities will have different priorities in terms of goal attainment, thus it is never a case of "what is the right answer", but rather where is the balance between water rates and the desired level of goal attainment in the six other goals. This re-emphasises the simple fact that in order to manage anything, you must measure.

At the highest level, performance measurement and metric benchmarking is a tool that can help utility managers communicate with stakeholders. In the longer term, benchmarking can help Utility Managers to achieve continuous performance improvement. If used regularly and effectively, performance measurement and trend analysis can

assist managers in shifting to a proactive management philosophy based on continuous improvement. Further, by monitoring trends in key business functions, managers can take proactive steps to avoid and resolve issues in the operating environment.



2.2 Local Factors and Analysis of KPIs

Local factors are the descriptors of the operating environment in which a utility must function and define the rationale for differences in performance between utilities. While a metric performance measure can identify a potential problem or success, the local factors can trace a path to either an identifiable deficiency in the system, or conversely, to an inherent characteristic of the system that accounts for the difference. Local factors that affect metric benchmarking that cannot be changed include climate and topography.

It is important to consider these local factors when analyzing the KPIs. For example, high cost does not always indicate low efficiency: a high cost utility may be operating in a particularly unfavourable environment or with higher than average levels of service. Similarly, increasing costs do not necessarily indicate that a utility is becoming less efficient. The cost increase may be as a result of increased energy rates, or due to increased chemical usage in response to more stringent water quality standards. Likewise, decreasing costs do not necessarily indicate that a utility is becoming more efficient: it may be that the utility is spending less on maintenance than is sustainable over the longer term. The key is to assess the metric results in combination with the knowledge of the local factors.

3. SCRD Comparative Utility Performance

3.1 The SCRD Utility in Context

All water utilities are inherently different, with a number of factors distinguishing one utility from another, both quantitatively and qualitatively. Similar characteristics will be shared by a number of utilities, but no two utilities will have the same combination of descriptors. In order to compare the performance of a utility with the group, it is necessary to place the utility in context with factors such as size of the system and the age of the infrastructure.

The following Utilities are included in water system comparison, however due to the confidentiality agreement of the National Water and Wastewater Benchmarking Initiative, the specific infrastructure and operating data from these utilities cannot be named.

Table 3-1 Peer Groups (in alphabetical order)

Water Utilities	Water Distribution Systems	Water Treatment Plants
City of Abbotsford, BC	City of Abbotsford, BC	Buffalo Pound WTP, SK
City of Brandon, MB	City of Brandon, MB	City of Brandon, ON
City of Branford, ON	City of Branford, ON	City of Brantford, ON
City of Kamloops, BC	City of Kamloops, BC	City of Greater Sudbury – Wanipitei, ON
City of Kelowna, BC	City of Kelowna, BC	City of Red Deer, AB
City of Port Moody, BC	City of Port Moody, BC	Halifax Regional Water Commission - Lake Major, NS
City of Prince George, BC	City of Prince George, BC	Region of Durham – Oshawa, ON
Collingwood Public Utilities, ON	Collingwood Public Utilities, ON	Regional Municipality of Halton – Burlington, ON
District of Squamish	District of Squamish	Regional Municipality of Halton – Oakville, ON
District of West Vancouver	District of West Vancouver	
Resort Municipality of Whistler	Resort Municipality of Whistler	

The following subsections will show the SCRD water system infrastructure data and the data of the utilities in the peer comparison group.

3.1.1 SCRD Water Utility Peer Group

Table 3-2 shows the key system data for the 10 water utilities that are included the peer group for the Water Utility system key performance indicator comparisons (Section 3.2). The 'Water Utility' category includes all infrastructures in the water system including the raw water intake or well, treatment plants and linear water distribution systems.

The SCRD is the third smallest water utility in the peer group with a service population of approximately 25,000 people and 10,500 service connections.

Table 3-2 SCRD Water Utility and the Peer Group

	Population	Number of service connections	Average Day Water Demand (ML/d)
City 1	18,727	7,247	11
City 2	24,566	10,044	11
SCRD	24,624	10,500	14
City 3	28,809	12,906	15
City 4	34,000	13,411	13
City 5	42,119	12,630	25
City 6	51,282	14,195	21
City 7	62,405	24,962	50
City 8	68,077	16,766	42
City 9	86,000	24,087	51

3.1.2 SCRD Water Distributions Peer Group

Table 3-3 shows the distribution of the 10 water distribution system that are included the peer group for the 'Water Distribution' system key performance indicator comparisons (Section 3.3). The SCRD system is in the middle of the group when sorted based on system length. However, it is notable that the SCRD system has a much longer distribution network (km of pipe length) compared to other utilities with a similar population. This will affect the level of effort to maintain the system and should be considered when analyzing the key performance indicators that are normalized on population or length.

Table 3-3 SCRD Water Distribution System and the Peer Group

	Length (km)	Population served	Length of pipe (m) / population served	Number of valves	Number of service connections	Average age of water mains	Area of System (km^2)	% metered	Total Storage Capacity (ML)	# of Pump Stations	Total HP of al Pump Stations (Hp)
City 1	119	36,000	3.3	1281	13,411	36	199	0%	12	3	1,781
City 2	130	18,727	6.9	2107	7,247	26	1,470	0%	19	4	680
City 3	157	24,566	6.4	1640	10,044	28	1,080	100%	12	4	910
City 4	169	28,809	5.9	2113	12,906	22	1,080	0%	23	9	1,320
City 5	275	51,282	5.4	2805	14,195	43	2,160	100%	18	5	1,020
SCRD	**320**	**24,624**	**13.0**	**3144**	**10,500**	**30**	**na**	**na**	**29**	**4**	**620**
City 6	332	42,119	7.9	4342	12,630	39	2,770	100%	24	10	1,786
City 7	417	68,077	6.1	3852	16,766	28	3,450	97%	59	17	3,130
City 8	485	97,499	5	4053	30,960	38	3,620	0%	40	4	3,075
City 9	558	62,405	8.9	6896	24,962	38	4,400	10%	64	17	6,151

3.1.3 SCRD Water Treatment Peer Group

The SCRD Chapman Water Treatment Plant began operation in 2004. The treatment process consists of clarifying by dissolved air flotation, dual media filtration and disinfection. Disinfection is achieved with UV as the primary disinfection followed by chlorine as the secondary disinfection.

The NWWBI splits the WTPs into different treatment categories for the comparison of all metric KPIs that are affected by the level of treatment. The categories are as follows:

- ***Disinfection*** – a treatment system with only disinfection (primarily wells).
- ***Conventional filtration*** – a treatment plant with coagulation, flocculation and clarification prior to filtration and disinfection.
- ***Direct filtration*** – a treatment plant with coagulation and flocculation prior to filtration and disinfection.
- ***Membrane filtration*** – a treatment plant with ultrafiltration (membranes) as part of the process.

The Table 3-4 shows the distribution of the 10 water treatment plants that are included the selected peer group for the Water Treatment Plant key performance indicator comparisons (Section 3.4). All of the plants listed are conventional filtration plants as per the definitions above. The SCRD water treatment system is the smallest of the comparable water treatment plants.

Table 3-4 SCRD Water Treatment Plant and the Peer Group

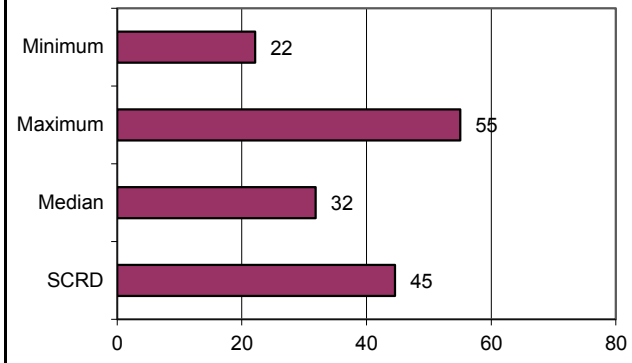
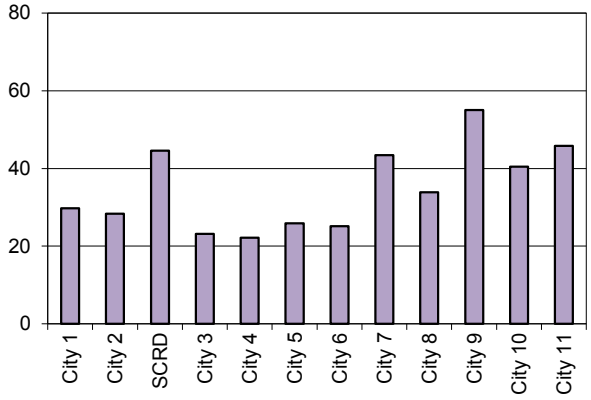
	Total treated water volume (ML/yr.)	Population served	Average day demand (ML/d)	Maximum day demand (ML/d)	Peak hour demand (ML/d)	Original construction date	Year of last major expansion	Raw water pumps total (hp)
SCRD	**5,000**	**25,000**	**14**	**25**	**na**	**2004**	**2004**	**120**
WTP 1	7,510	51,000	21	30	55	1905	1975	700
WTP 2	9,740	53,000	27	34	43	1971	2012	1,300
WTP 3	12,060	97,000	33	42	79	1930	2011	1,500
WTP 4	na	104,000	39	66	na	1998	na	1,400
WTP 5	15,200	na	42	84	84	1953	2013	2,100
WTP 6	16,350	126,000	45	68	na	1981	2014	2,500
WTP 7	16,590	186,000	45	63	na	1928	2014	3,300
WTP 8	28,510	na	78	119	132	1935	2004	4,600
WTP 9	33,970	260,000	93	146	na	1955	1989	7,440

3.2 Water Utility Key Performance Indicators

Table 3-5 provides a list of the key performance indicators for the Water Utility systems.

Table 3-5 Water Utility Index of Key Performance Indicators

GOAL 1: Provide Reliable Service and Infrastructure
No KPIs for Water Utility
GOAL 2: Ensure Adequate Capacity
2.1 Number of Hours of Treated Water Storage Capacity at Average Day Demand
GOAL 3: Meet Service Requirements with Economic Efficiency
3.1 Cost of Water Quality Monitoring / Population Served
3.2 Total Operating Cost to Provide Water / ML Treated
3.3 Total Cost to Provide Water / Population Served 3.4 Water Charge for a Typical Size Residential Connection Using 210 m^3 / Year (2015)
GOAL 4: Protect Public Health and Safety
No KPIs for Water Utility
GOAL 5: Provide a Safe and Productive Workplace
5.1 Distribution of O&M Staff
GOAL 6: Have Satisfied and Informed Customers
6.1 Number of Water Customer Complaints / 1,000 People Served
GOAL 7: Protect the Environment
7.1 Cost of Water Conservation Program / Population Served
7.2 Number of Days of Water Restrictions
7.3 Per Capita Average Day Residential Consumption (L/cap/d)
7.4 Total Per Capita Average Day Consumption (L/cap/d)

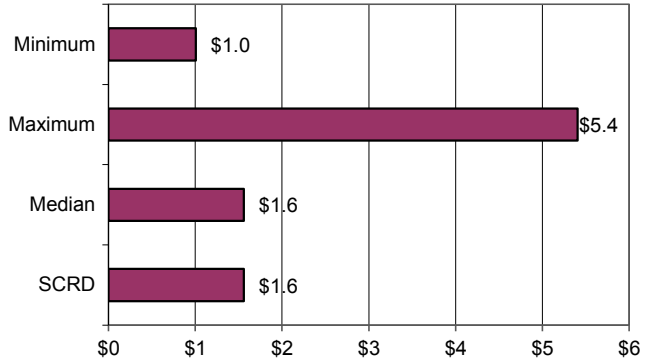
WATER UTILITY GOAL 2: Ensure Adequate Capacity		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
2.1 Number of Hours of Treated Water Storage Capacity at Average Day Demand (Water Distribution & Integrated Utilities)		
● The SCRD system has the Highest number of hours of treated water storage capacity at average day demand compared to the peer group. ● The SCRD system has total of 26 ML of storage capacity, including 16 ML of storage at the WTP and 10 ML within the linear system.		

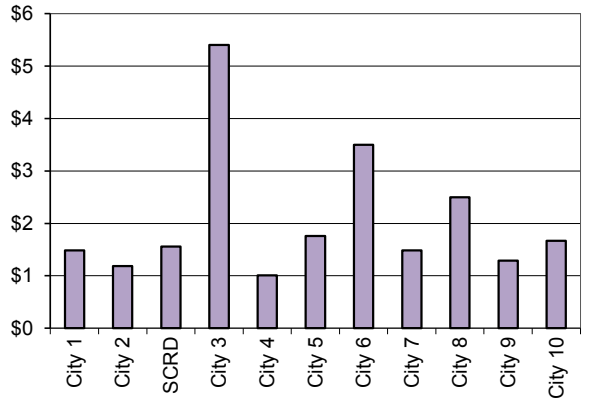
WATER UTILITY GOAL 3: Meet Service Requirements with Economic Efficiency

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

3.1 Cost of Water Quality Monitoring / Population Served (Water Distribution & Integrated Utilities)

- The SCRD's cost of water quality monitoring is the same as the group median.
- Actual cost of water quality monitoring in 2014 was approximately $55,000.

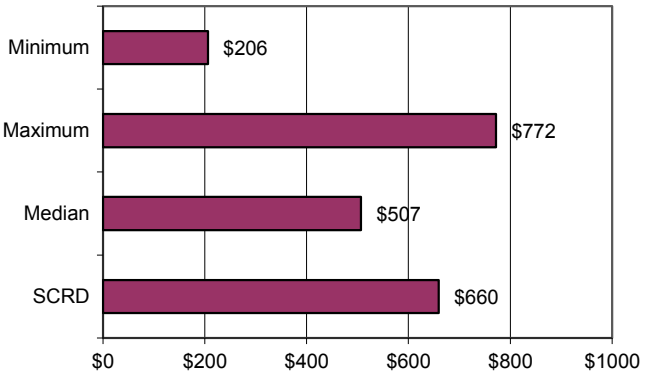


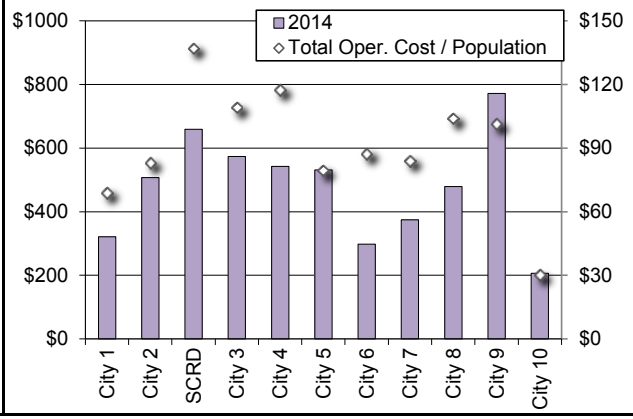


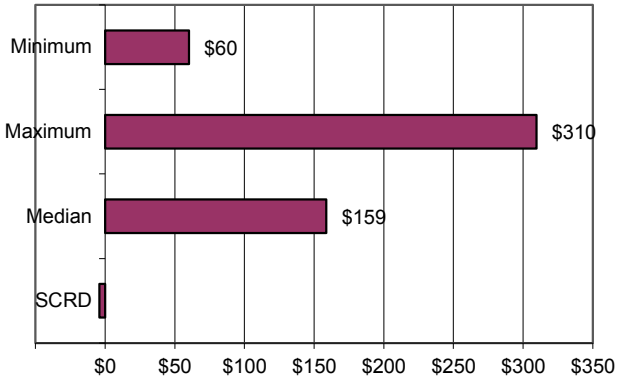
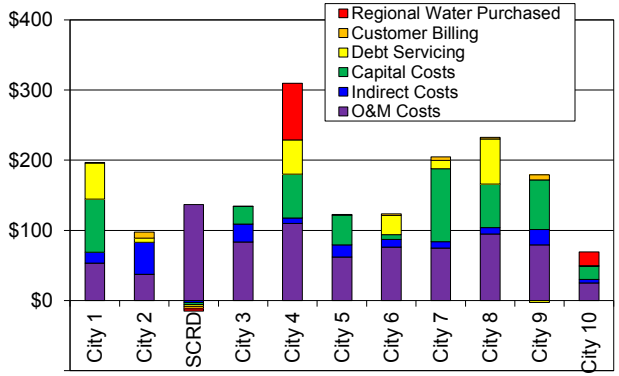
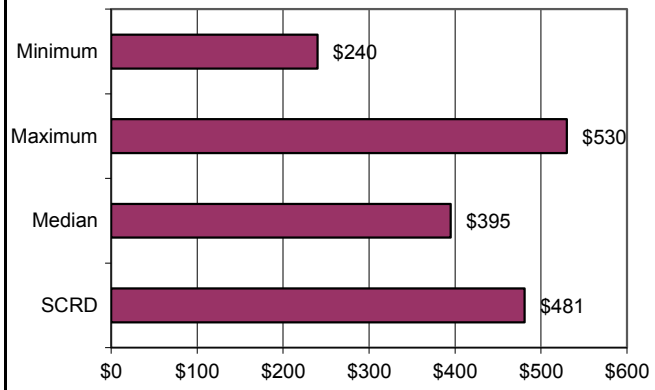
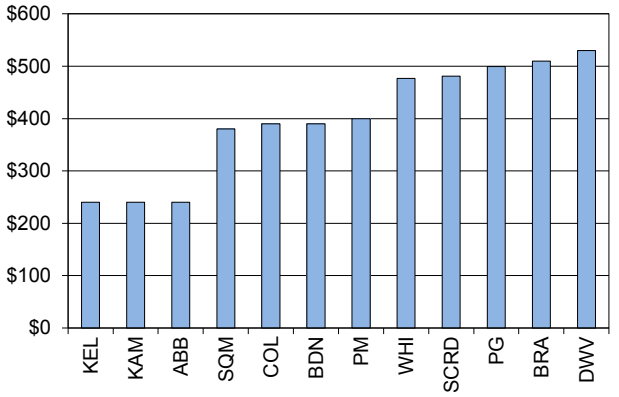
3.2 Total Operating Cost to Provide Water / ML Treated (Water Distribution & Integrated Utilities)

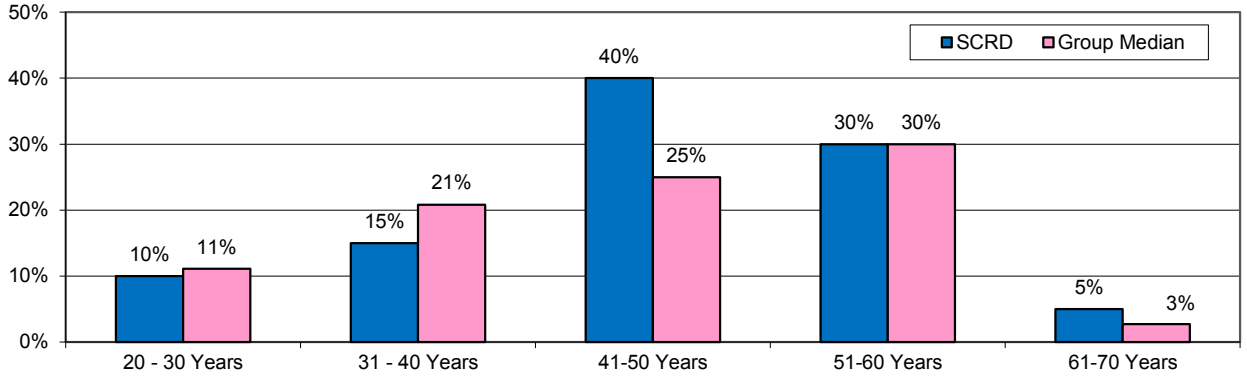
- The SCRD's total cost to provide water is the median of the group.
- Total Operating Cost includes O&M costs and indirect costs but excludes debt and capital costs.

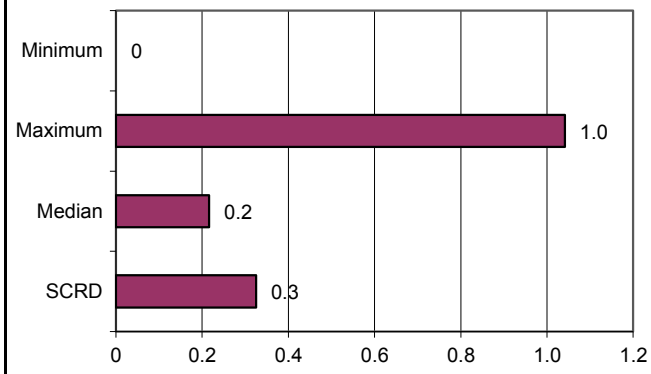
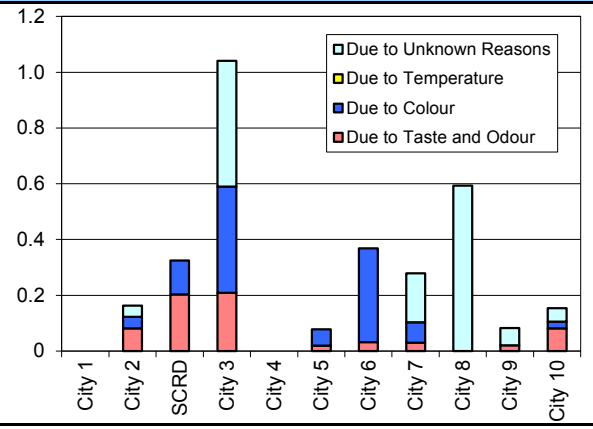
► Confirm whether these other costs were truly zero or not reported values.





WATER UTILITY GOAL 3: Meet Service Requirements with Economic Efficiency		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
3.3 Total Cost to Provide Water / Population Served (Water Distribution & Integrated Utilities)		
● No data provided by the SCRD for customer billing, debt servicing or capital costs as this is a new KPI for the NWWBI since the datasheets were issued to the SCRD.		
3.4 Water Charge for a Typical Size Residential Connection Using 210 m^3 / Year (2015 Water Distribution & Integrated Utilities)		
● SCRD water rates are between the median and the maximum of the peer group.		

WATER UTILITY GOAL 5: Provide a Safe and Productive Workplace	
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX MEDIAN GRAPHS**
5.1 Distribution of O&M Staff (Water Distribution & Integrated Utilities)	
• SCRD has a fairly even distribution of O&M staff by age group	

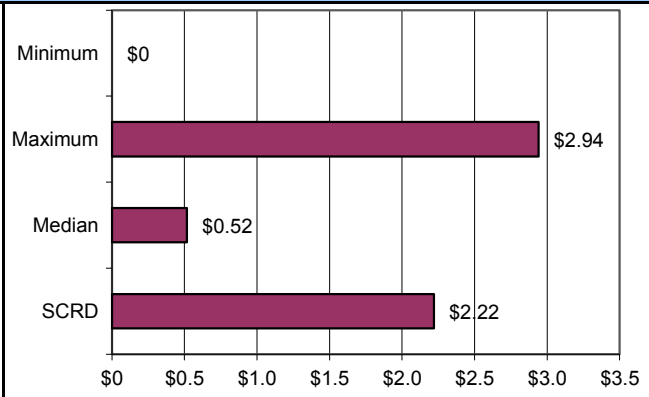
WATER UTILITY GOAL 6: Have Satisfied and Informed Customers		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
6.1 Number of Water Customer Complaints / 1,000 People Served (Water Distribution & Integrated Utilities)		
● The SCRD had slightly higher than the median value for number of customer water quality complaints. ● The 8 complaints were split between 'taste and odour', 5 complaints and 'colour', 3 complaints. ► Review multi-year complaint trend, if 2014 value is typical or if number of complaints are often higher than further investigation may be warranted.		

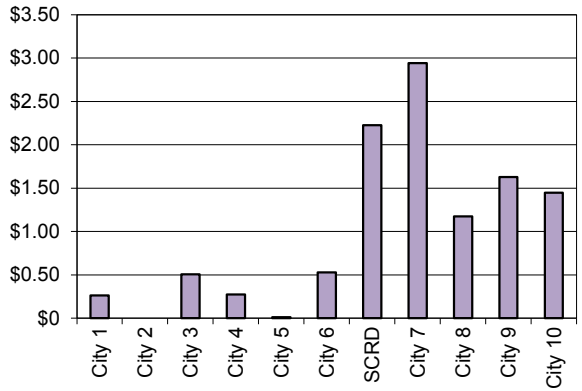
WATER UTILITY GOAL 7: Protect the Environment

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

7.1 Cost of Water Conservation Program / Population Served (Water Distribution & Integrated Utilities)

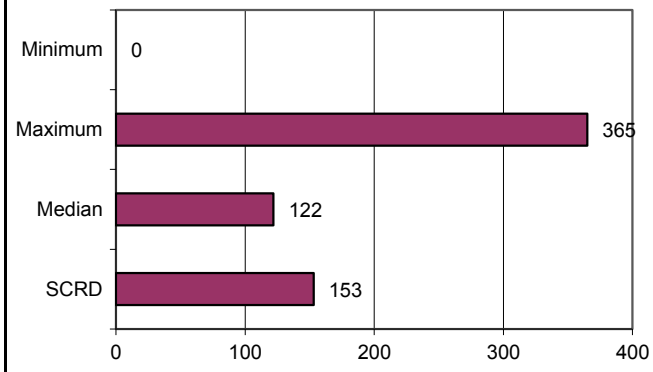
- The SCRD's cost of water conservation programs is among the highest of the peer group.
- SCRD's total cost of water conservation in 2014 was approximately $55,000.
- Annual report states demand management programs have been in place since 2001. SCRD has an ambitious goal to reduce water demand by 33% from 2010 levels by 2020.

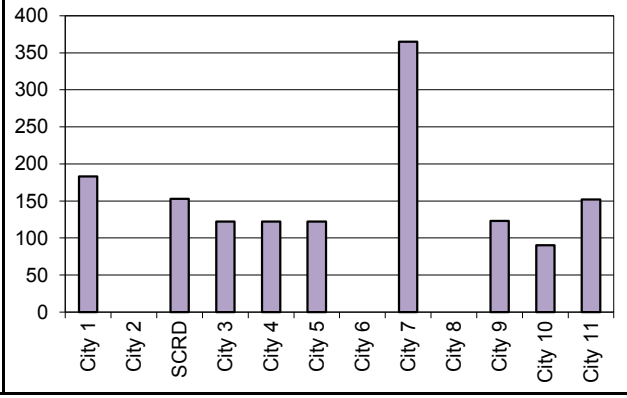




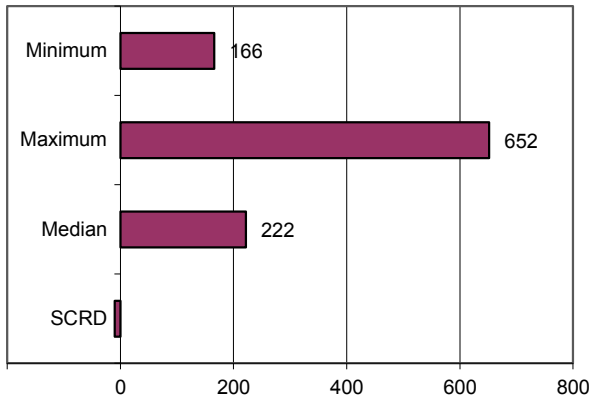
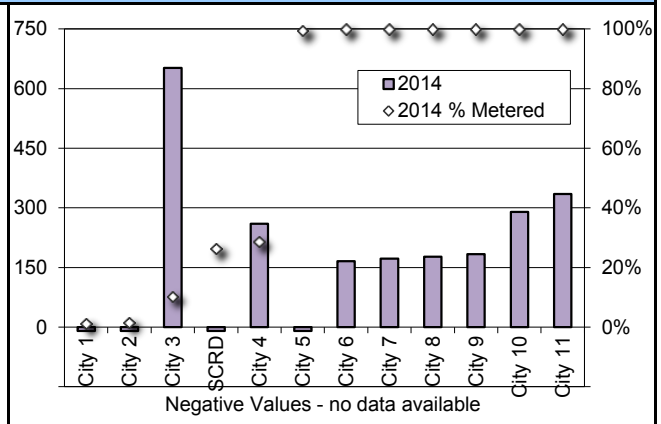
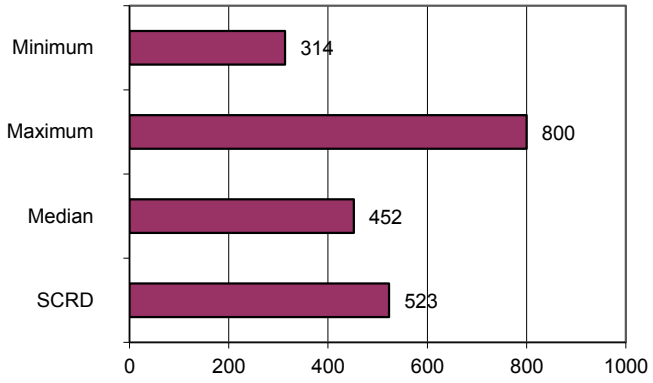
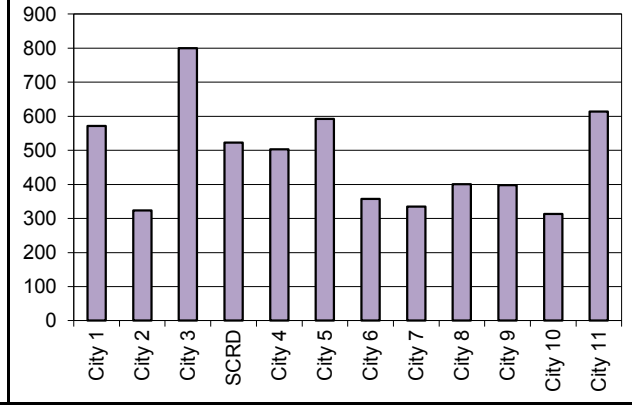
7.2 Number of Days of Water Restrictions (Water Distribution & Integrated Utilities)

- The SCRD has slightly higher than the median value for water restrictions.
- Mandatory water restrictions are in place from May 1 to Sept 30. There are four stages of water restrictions depending on reservoir levels.





WATER UTILITY GOAL 7: Protect the Environment

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS
7.3 Per Capita Average Day Residential Consumption (L/cap/d) (Water Distribution & Integrated Utilities)		
● The SCRD is not metered therefore it is not possible to disintguish between ICI and residential consumption within the SCRD.		
7.4 Total Per Capita Average Day Consumption (L/cap/d) (Water Distribution & Integrated Utilities)		
● Total water consumption within SCRD is above the group median at 523 L/capita/day. ►Review year to year consumption along with water conservation initiatives to measure success of each program. ► Review baseline consumption data when establishing future rates following the installation of residential meters.		

3.3 Water Distribution Key Performance Indicators

Table 3-6 provides a list of the key performance indicators for the Water Distributions systems.

Table 3-6 Water Distribution System Index of Key Performance Indicators

GOAL 1: Provide Reliable Service and Infrastructure
1.1 Number of Main Breaks / 100 km Length
1.2 Percentage of Hydrants Inspected
1.3 Percentage of Inoperable or Leaking Hydrants
1.4 Number of Emergency Service Connection Repairs & Replacements / Total Number of Service Connections
1.5 Number of Unplanned System Interruptions / 100 km Length
1.6 Total Number of Customer Days without Service / Total Number of Service Connections
1.7 Percentage of Main Replaced
1.8 Capital Reinvestment / Replacement Value
GOAL 2: Ensure Adequate Capacity
No Water Distribution System KPIs for this Goal
GOAL 3: Meet Service Requirements with Economic Efficiency
3.1 Number of O&M FTEs / 100km Length
3.2 Total Number of FTEs / 100 km Length
3.3 Pump Station O&M FTEs / 1,000 Total Pump Station Hp
3.4 Total O&M Cost ('000) / km Length
3.5 Pump Station O&M Cost ('000)/ Total Pump Station Hp
3.6 Pipes O&M Cost ('000) / km Length
3.7 Metering O&M Cost / Number of Meters
3.8 Pump Station Energy Consumed ('000) / Total Pump Station Horsepower
3.9 Cost of Fire Hydrant O&M / Number of Fire Hydrants
GOAL 4: Protect Public Health and Safety
4.1 Cumulative Length Cleaned as % of System Length
4.2 Average Value for Turbidity (NTU)
4.3 Total Number of Days with Coliform Occurrences
4.4 Average Value for THM

GOAL 5: Provide a Safe and Productive Workplace
5.1 Number of O&M Accidents with Lost Time / 1,000 O&M Labour Hours
5.2 Lost Hours Due to Accidents / 1,000 Labour Hours
5.3 Number of Sick Days Taken per O&M Employee
5.4 Total Available O&M Hours / Total Paid O&M Hours
5.5 Total Overtime O&M Hours / Total Paid O&M Hours
GOAL 6: Have Satisfied and Informed Customers
6.1 Number of Water Pressure Complaints / 1,000 People Served
GOAL 7: Protect the Environment
No Water Distribution System KPIs for this Goal

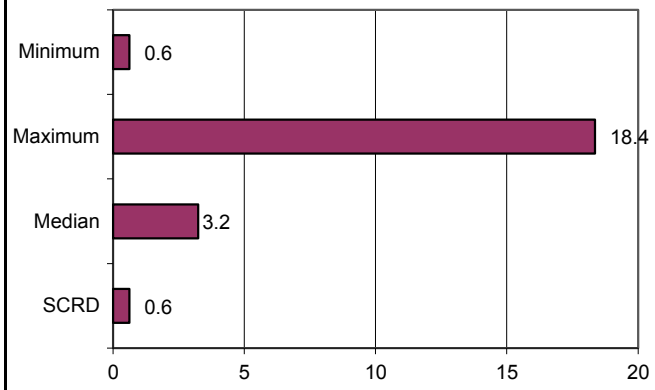
WATER DISTRIBUTION SYSTEM GOAL 1: Provide reliable and sustainable infrastructure

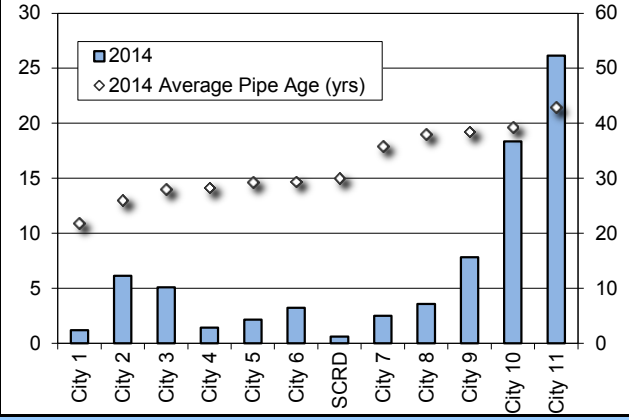
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

1.1 Number of Main Breaks / 100 km Length (Water Distribution & Integrated Systems)

- The District had the lowest number of main breaks / 100km compared to the peer group in 2014.
- The actual number of main breaks in 2014 was 2, both in small diameter (50 mm) lines.
- A general of NWWBI trend has shown that systems with a higher average age have a higher number of main breaks. The SCRD system has an average pipe age of 30 years and has less than the group median value for main breaks. However, it was noted in the datasheets that this is an estimate.

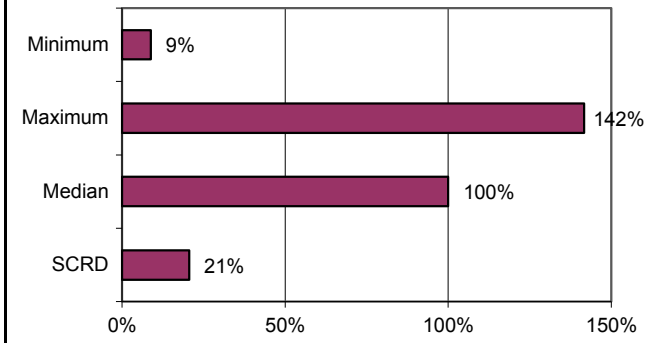
► Reviewing multi-year data to confirm low number of main breaks. Continue to work on Asset Management to confirm asset inventory, pipe age and pipe material in order to project long term replacement

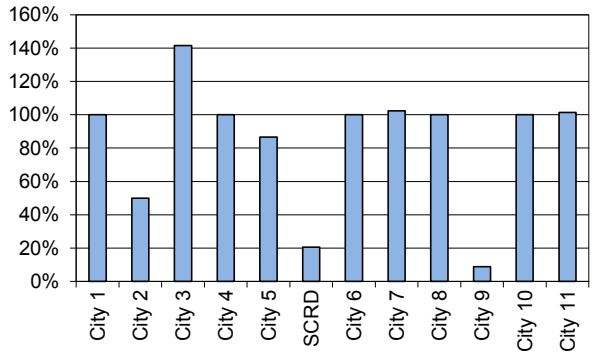




1.2 Percentage of Hydrants Inspected (Water Distribution & Integrated Systems)

- The District had the second lowest number of % of Hydrants inspected in the comparison group.
- The SCRD inspected approximately 1/5 of its hydrants in 2014.
- Lower frequency of hydrant inspection does not appear to be affecting hydrant reliability (refer to next metric).



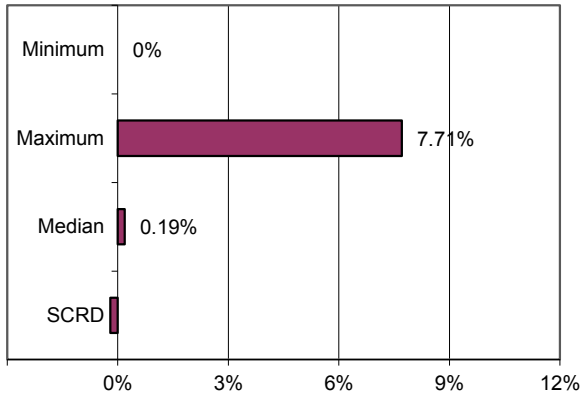


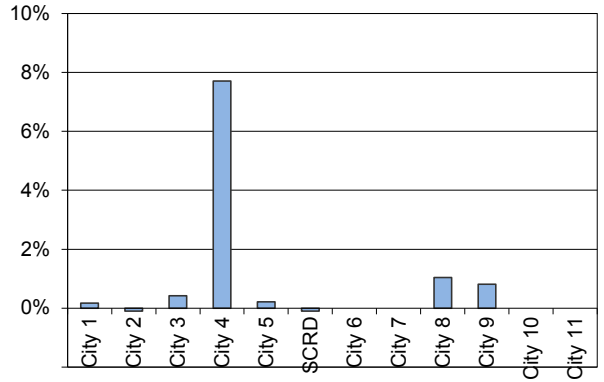
WATER DISTRIBUTION SYSTEM GOAL 1: Provide reliable and sustainable infrastructure

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

1.3 Percentage of Inoperable or Leaking Hydrants (Water Distribution & Integrated Systems)

- "No data" for recorded leaking or inoperable hydrants. This is not currently tracked, but may be in the future with the implementation of a CMMS.
- Total number of hydrants in the SCRD system is 1,067.



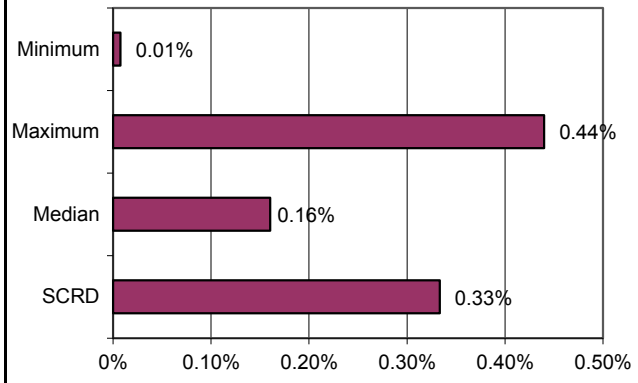


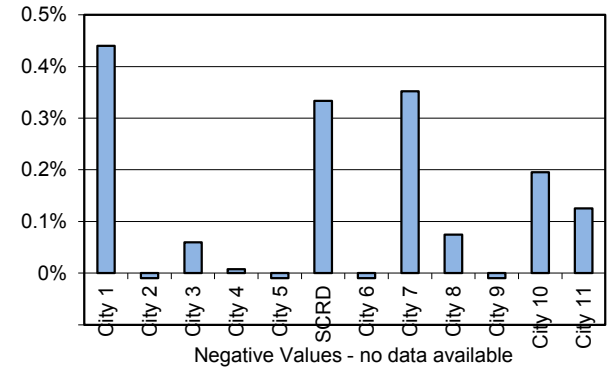
1.4 Number of Emergency Service Connection Repairs & Replacements / No. of Service Connections (Water Distribution & Integrated Systems)

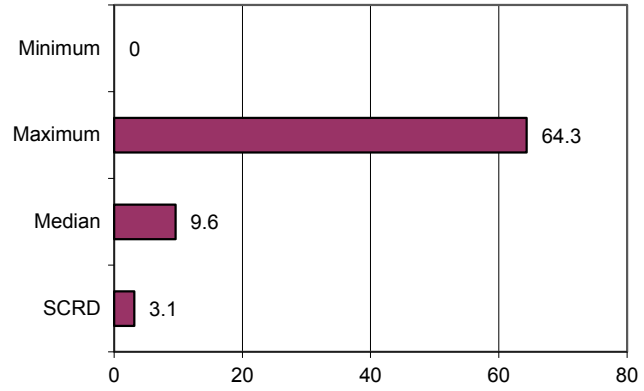
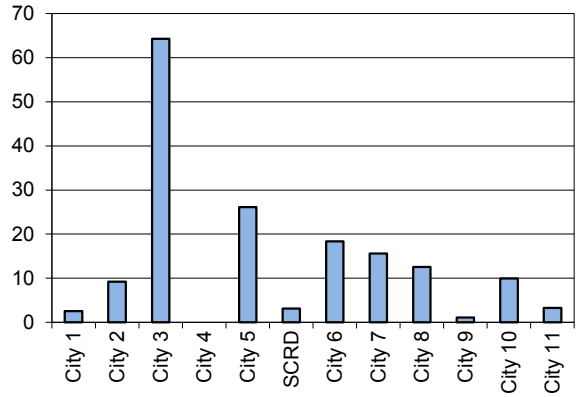
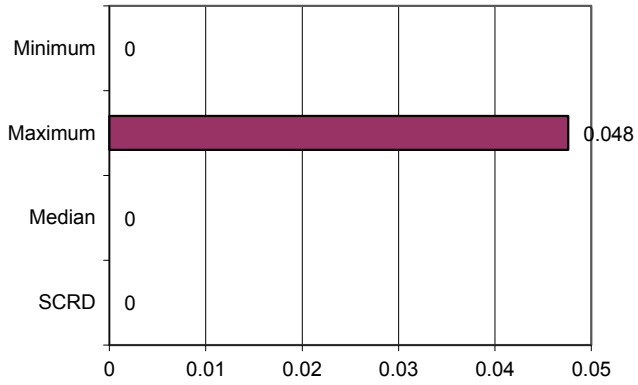
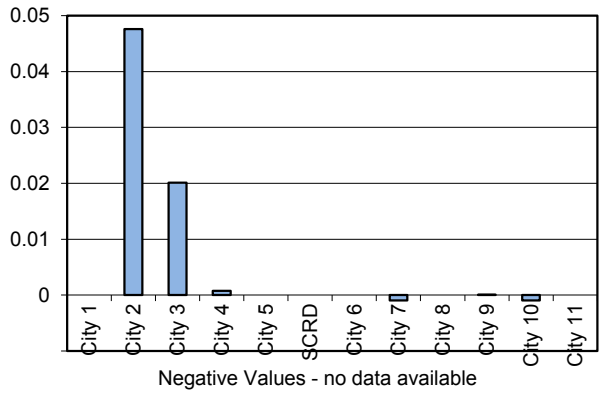
- Higher than average number of emergency service connection repairs and replacements compared to the peer group.
- Total number of emergency service connection repairs and replacements in 2014 was 35.

► Review multi-year data to confirm whether 2014 was typical or an outlier. If typical investigate causes and trend.

► Continue to work on Asset Management to confirm service connection asset inventory, age of connection and material in order to project long term replacement requirements.





WATER DISTRIBUTION SYSTEM GOAL 1: Provide reliable and sustainable infrastructure		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
1.5 Number of Unplanned System Interruptions / 100 km Length (Water Distribution & Integrated Systems)		
● Lower than median number of unplanned system interruption compared to peer group. ● Estimatedl number of system interruptions in 2014 was 10. ● Low number of interruptions is an indicator of a reliable system.		
1.6 Total Number of Customer Days without Service / Total Number of Service Connections (Water Distribution and Integrated Systems)		
● No customer days without service in 2014, similar to five other systems in the peer group. ● The results of this KPI also indicate a reliable and robust system.		

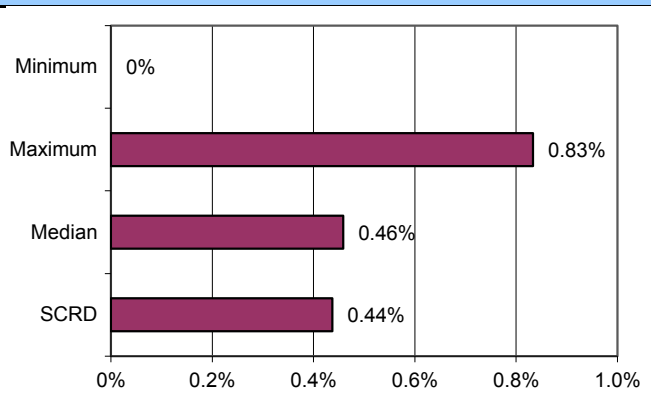
WATER DISTRIBUTION SYSTEM GOAL 1: Provide reliable and sustainable infrastructure

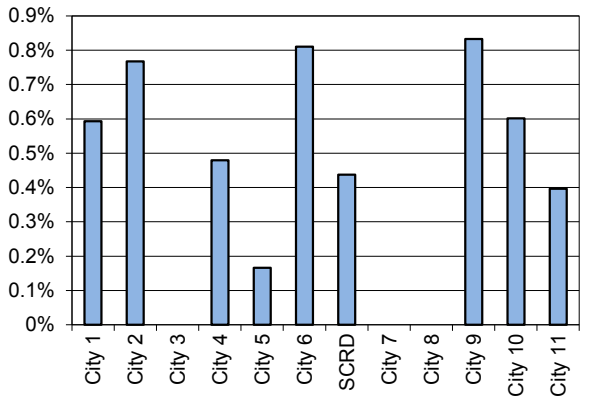
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

1.7 Percentage of Main Replaced (Water Distribution & Integrated Systems)

- Percent of main replaced similar to the median of the group.
- 1,412 m of water main replaced in 2014.

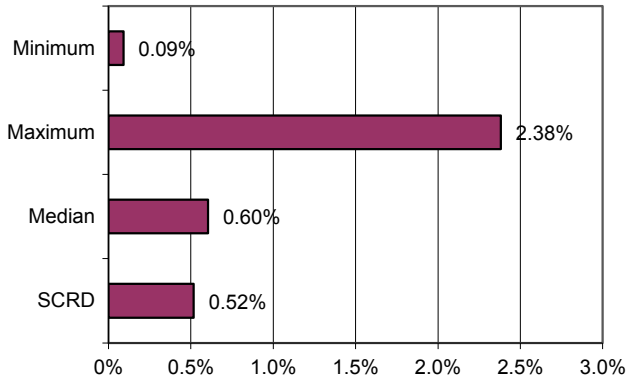
► Recommend the SCRD continue to work on asset management to update pipe inventory by age and material to develop long term reinvestment strategy.

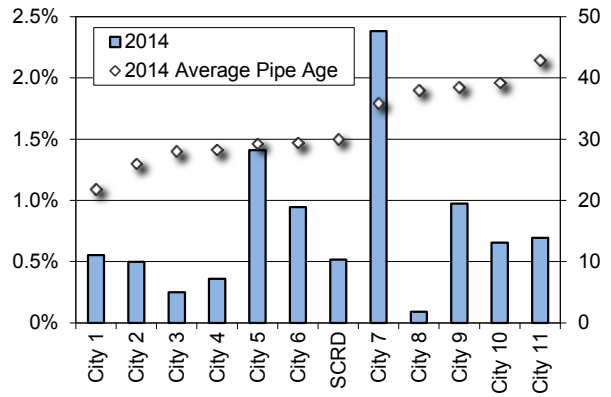




1.8 Capital Reinvestment / Replacement Value (Water Distribution & Integrated Systems)

- Capital reinvestment just below median value and 0.52%.
- Capital reinvestment included $696k for water main replacement.
- SCRD data for 1 year only instead of 5 year average



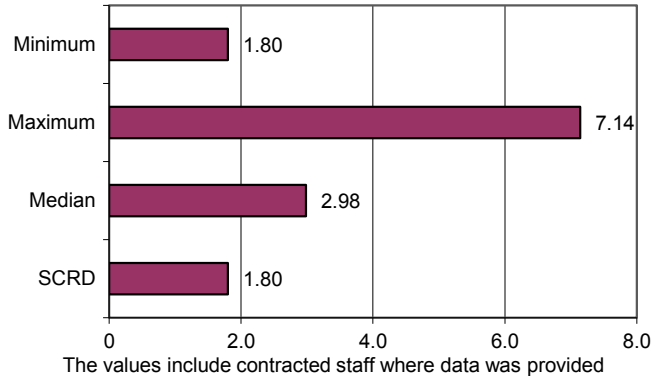


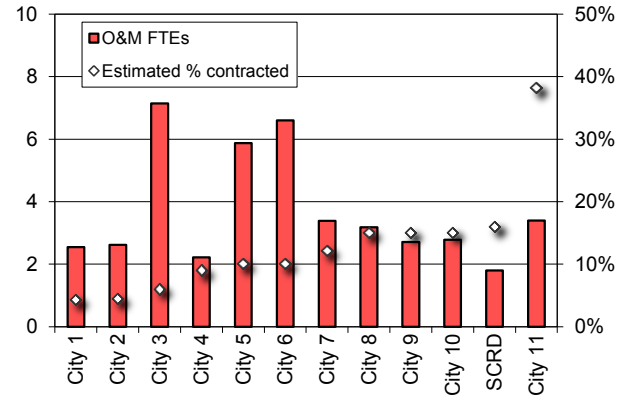
WATER DISTRIBUTION SYSTEM GOAL 3: Meet Service Requirements with Economic Efficiency

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

3.1 Number of O&M FTEs / 100km Length (Water Distribution & Integrated Systems)

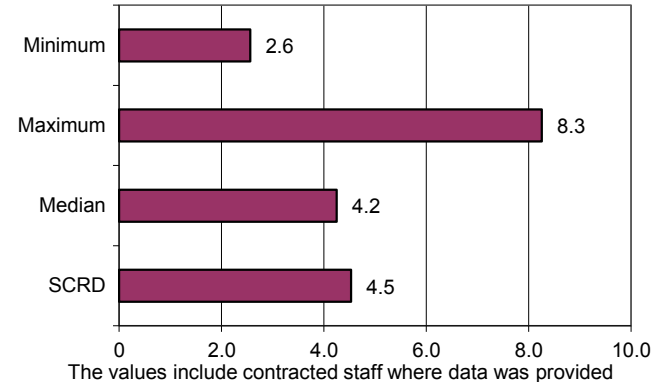
- The SCRD had the lowest number of full time equivalent (FTE) operations and maintenance (O&M) staff amongst the peer group.
- Actual number of O&M FTEs in 2014 was 6.5.

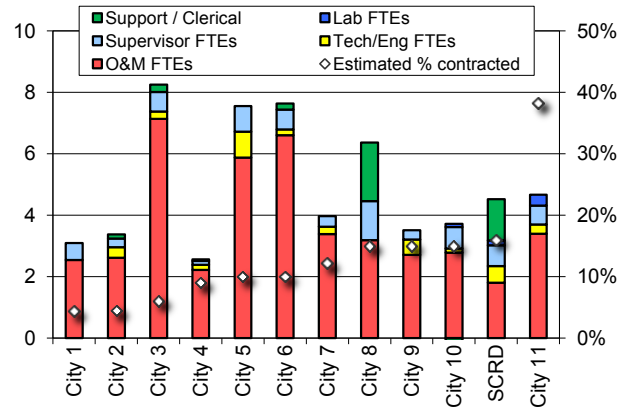




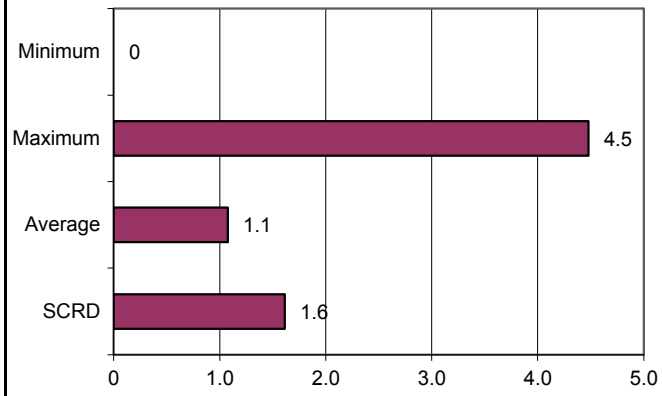
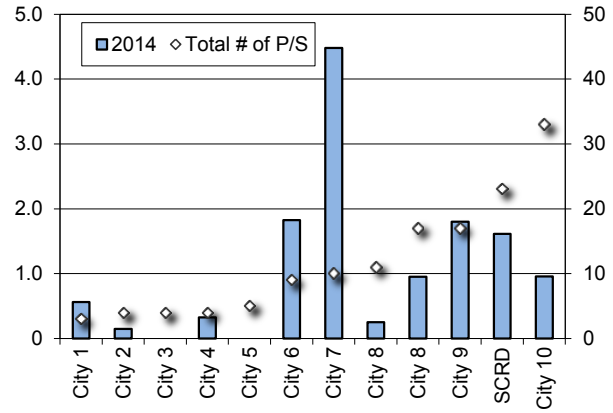
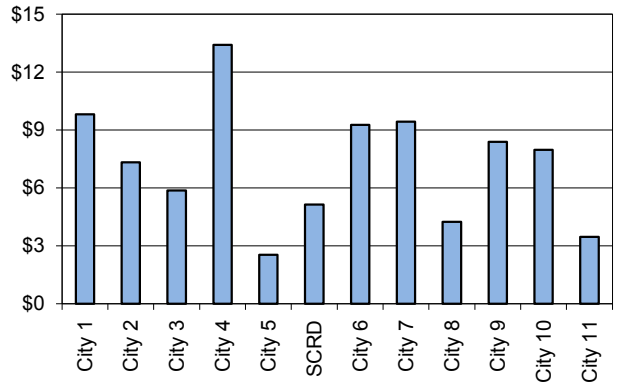
3.2 Total Number of FTEs / 100 km Length (Water Distribution & Integrated Systems)

- The total number of SCRD FTEs working in the distribution system is just slightly above the median of the peer group.





WATER DISTRIBUTION SYSTEM GOAL 3: Meet Service Requirements with Economic Efficiency

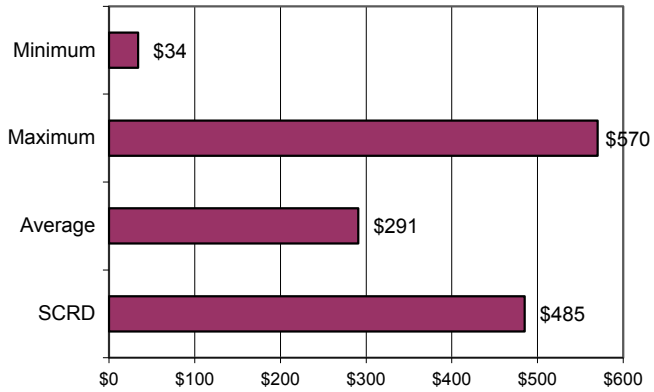
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS
3.3 Pump Station O&M FTEs / 1,000 Total Pump Station Hp (Water Distribution & Integrated Systems)		
● The SCRD has more than the average O&M staff dedicated to work on the collection system. ● The actual number of O&M FTEs working on the pump stations is 0.5 FTEs.		
3.4 Total O&M Cost ('000) / km Length (Water Distribution & Integrated Systems)		
● Lower than median value operating and maintenance cost compared to the peer group. ● Wages make up 63% of O&M cost for the distribution system, which is typical of a water distribution system. ► Review year to year SCRD O&M costs to confirm trend.		

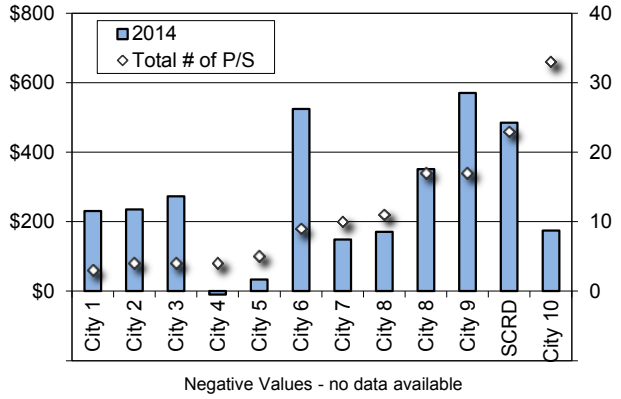
WATER DISTRIBUTION SYSTEM GOAL 3: Meet Service Requirements with Economic Efficiency

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

3.5 Pump Station O&M Cost ('000)/ Total Pump Station Hp (Water Distribution & Integrated Systems)

- The pump station O&M cost are approximately 66% higher than the average for the peer group, however SCRD O&M costs for the pump stations are not tracked in the accounting system, and the cost allocation between pipes and pump stations was estimated by the SCRD.

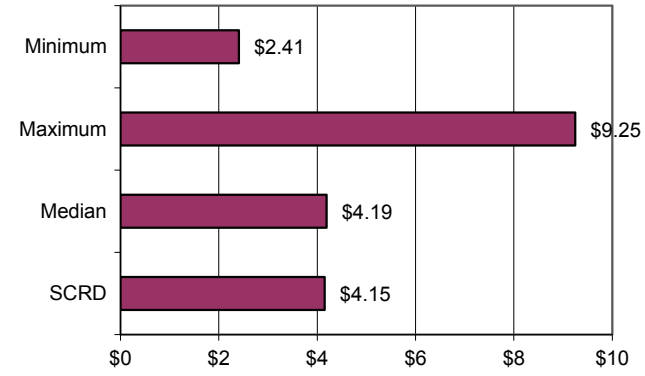


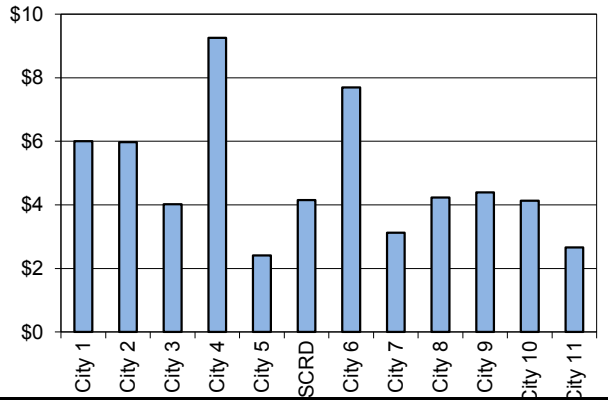


Negative Values - no data available

3.6 Pipes O&M Cost ('000) / km Length (Water Distribution & Integrated Systems)

- Pipes O&M (including reservoirs, valves and hydrants) costs are just below the group median.
- Actual O&M cost for the linear system were approximately $1.6 M in 2014.





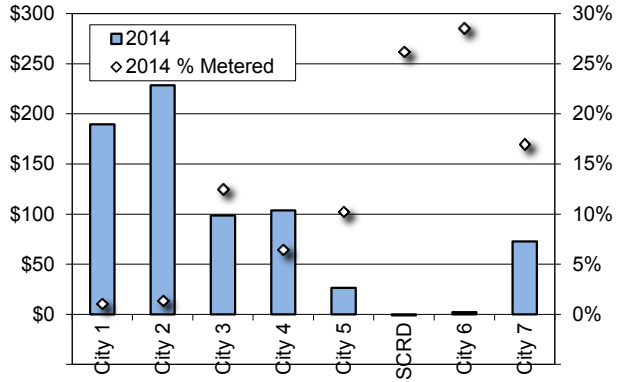
WATER DISTRIBUTION SYSTEM GOAL 3: Meet Service Requirements with Economic Efficiency

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

3.7 Metering O&M Cost / Number of Meters (Water Distribution & Integrated Systems with Partial Metering)

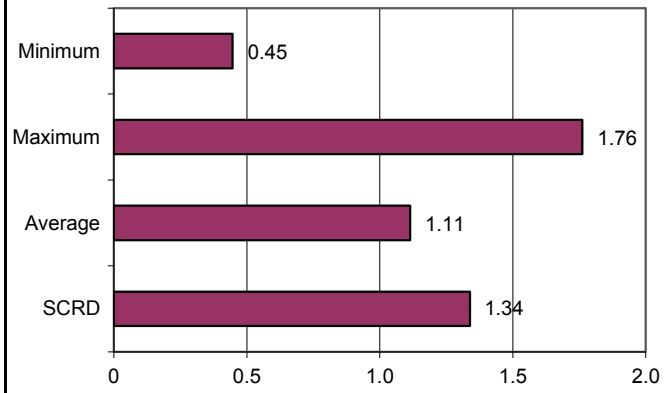
- Data for SCRD is not comparable as most service connections are not metered.
- Apporimately 2,750 meters have been purchased but not all of these are being read on a regular basis.

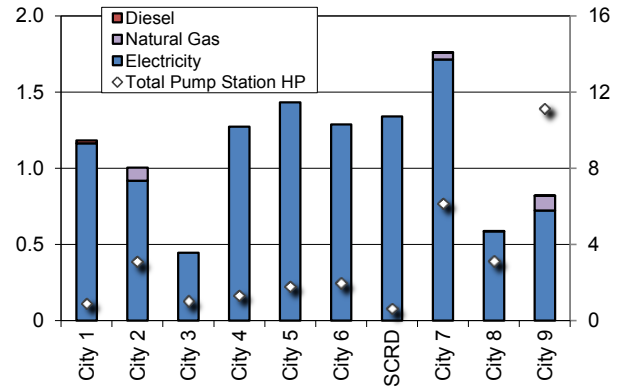
► Continue to monitor metering O&M costs as meter installation program continues in the coming years. Confirm plan for additional metering O&M cost as meter installation program is implemented.

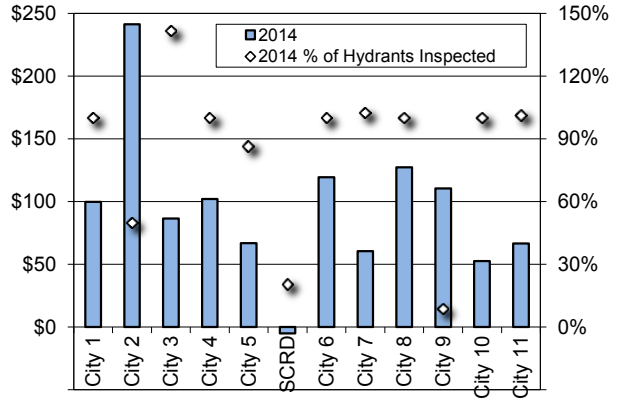


3.8 Pump Station Energy Consumed ('000) / Total Pump Station Horsepower (Water Distribution & Integrated Systems)

- The SCRD pump station energy consumption is 21% above the average of the group.
- It was noted that this energy consumption includes the energy associated with the well pumps.





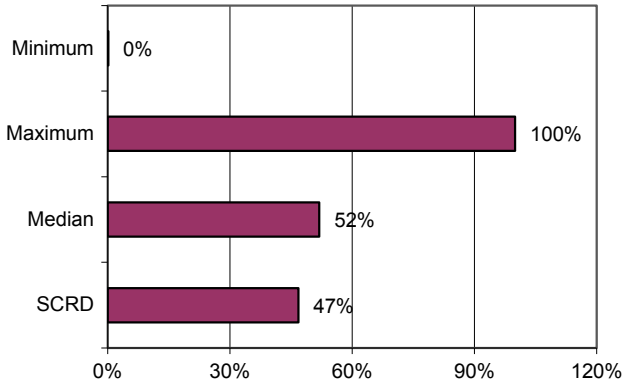
WATER DISTRIBUTION SYSTEM GOAL 3: Meet Service Requirements with Economic Efficiency		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
3.9 Cost of Fire Hydrant O&M / Number of Fire Hydrants (Water Distribution & Integrated Systems)		
● Only $596 was reported for fire hydrant O&M in 2014. However, it was reported elsewhere in the datasheet that the SCRD completed 220 hydrant PM inspections and 330 hydrant teardowns. Therefore "no data" shown on graphs. ► It has been noted that O&M expenses related to fire hydrants O&M are tracked via multiple activity codes assigned to work orders. However, as the current data does not align, confirm that staff are aware of this coding and using it. Reassess fire hydrant O&M costs in the future with a year of more accurate data.		

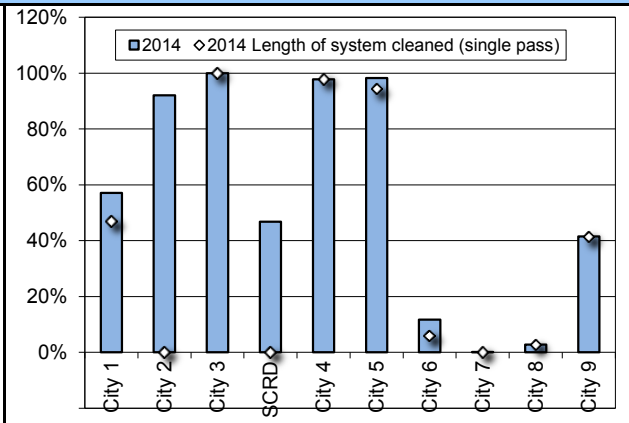
WATER DISTRIBUTION SYSTEM GOAL 4: Protect Public Health and Safety

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

4.1 Cumulative Length Cleaned as % of System Length (Water Distribution & Integrated Systems)

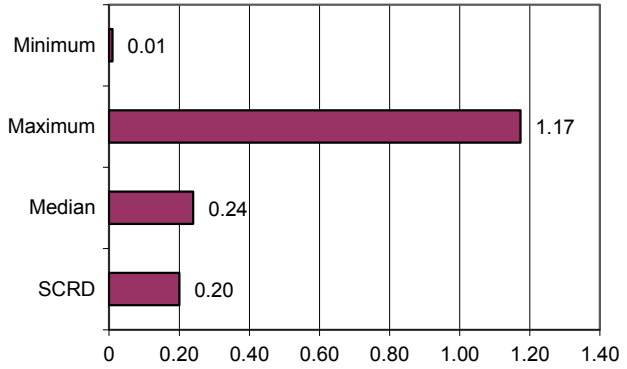
- The SCRD cleaned slightly less than the median value for the water main cleaning.
- 150 km of water main cleaned by unidirectional flushing.

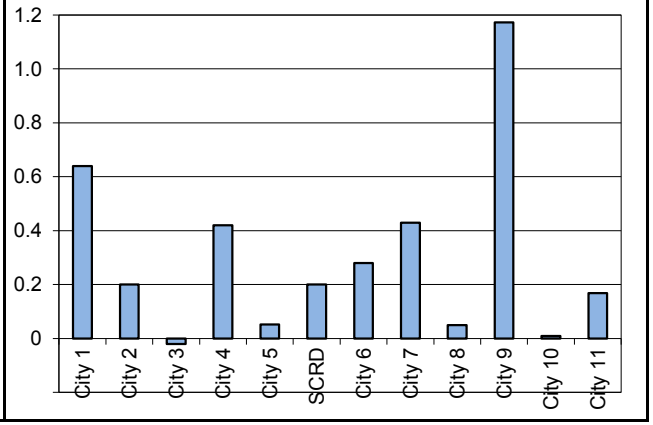




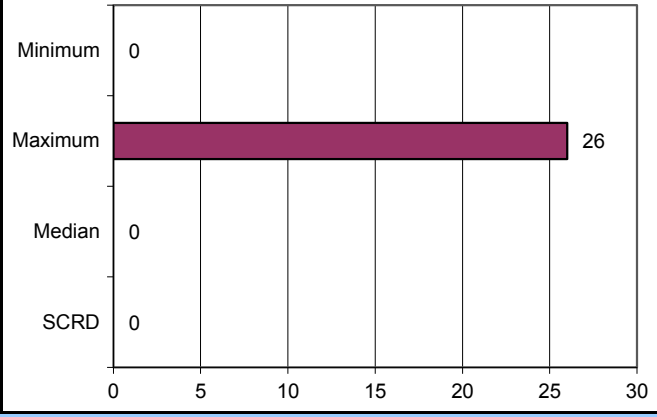
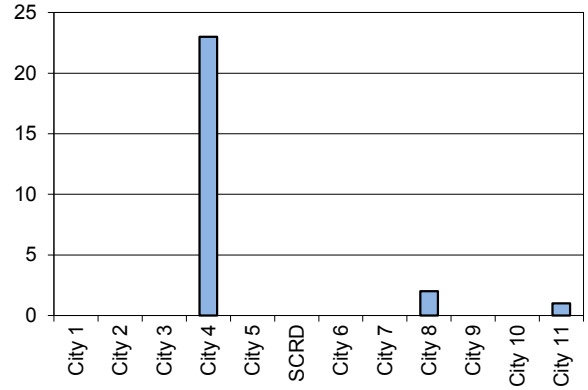
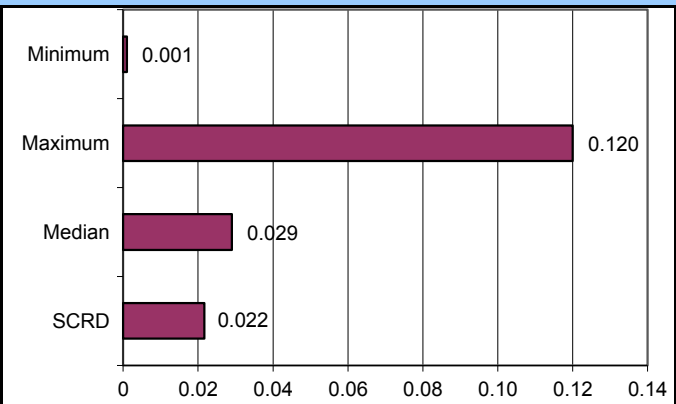
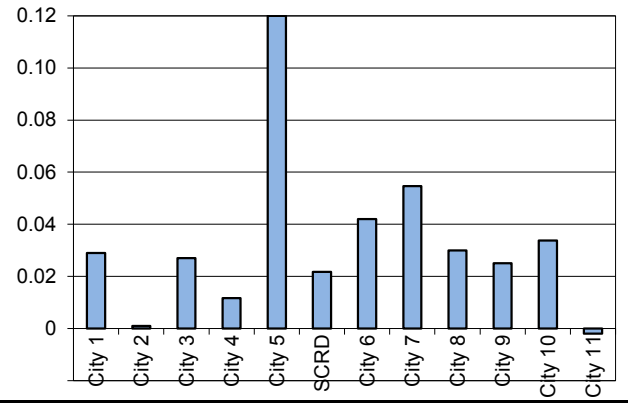
4.2 Average Value for Turbidity (NTU) (Water Distribution & Integrated Systems)

- Average value of turbidity typical compared to the peer group.
- Zero days above the group target for turbidity of 1 NTU.





WATER DISTRIBUTION SYSTEM GOAL 4: Protect Public Health and Safety

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS
4.3 Total Number of Days with Coliform Occurrences (Water Distribution & Integrated Systems)		
● Total number of days with coliform occurrences is above the group median. ● 7 recorded occurrences of total coliform and zero recorded occurrences of fecal coliform. ► Review year to year trend to confirm whether 2014 data typical of positive total coliform occurrence. If high number of positive total coliform samples is typical investigate further.		
4.4 Average Value for THM (Water Distribution & Integrated Systems)		
● Below average value for THMs. ● Concentration range between 9 to 34 micrograms per liter below the group target of 100.		

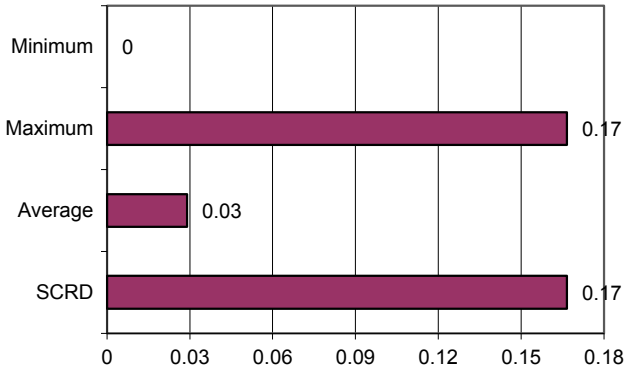
WATER DISTRIBUTION SYSTEM GOAL 5: Provide a Safe and Productive Workplace

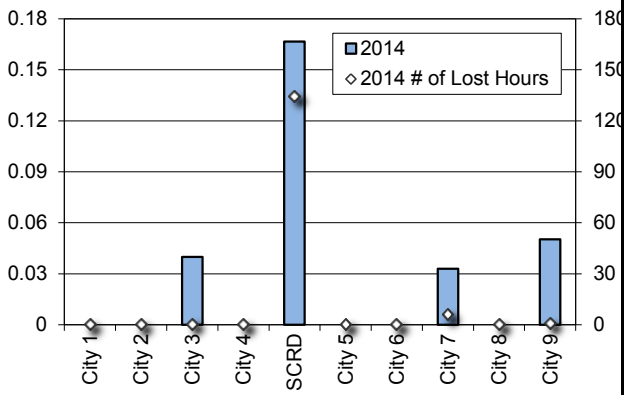
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

5.1 Number of O&M Accidents with Lost Time / 1,000 O&M Labour Hours (Water Distribution & Integrated Systems)

- High number of accidents relative to the peer group. However, the normalized value can increase with just one accident in a smaller utility with less staff.
- Two accidents in 2014.

► Review multiple years of data to determine if accident numbers are typical year to year. If so, consider increasing safety training and investigate causes for accidents.

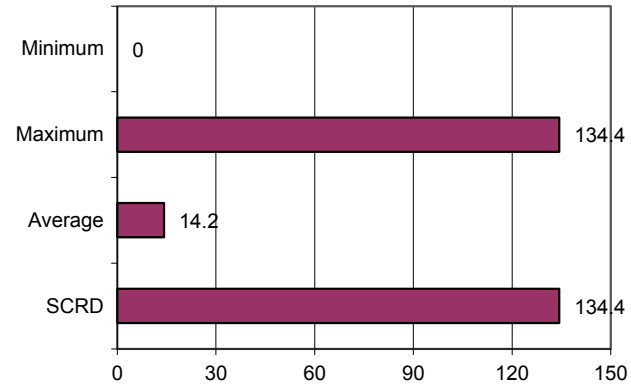


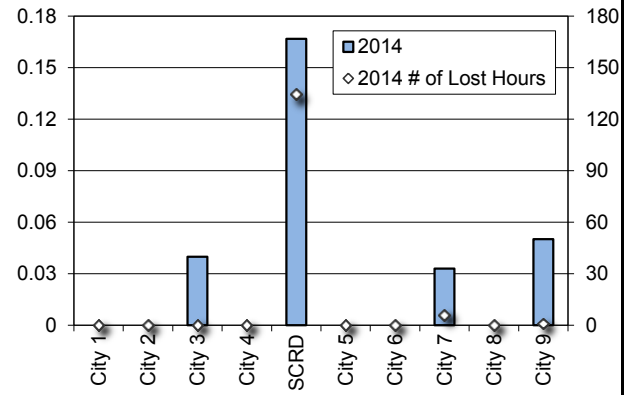


5.2 Lost Hours Due to Accidents / 1,000 Labour Hours (Water Distribution & Integrated Systems)

- High number of hours lost due to accidents relative to the peer group.
- 1612 hours lost due to accidents in 2014.

► Review multiple years of data to determine if accident numbers are typical year to year. If so, consider increasing safety training and/or investigate causes for accidents.



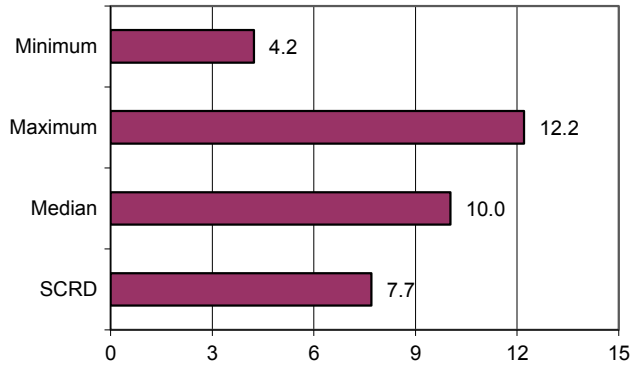


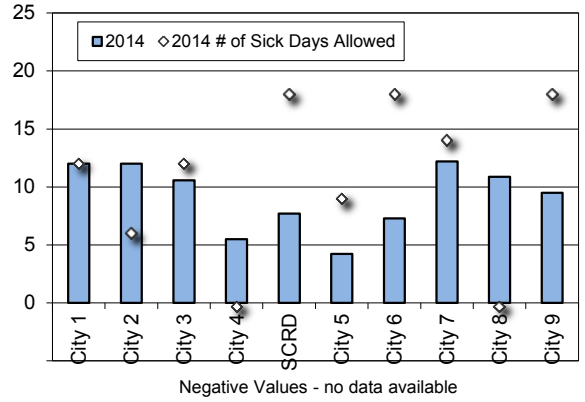
WATER DISTRIBUTION SYSTEM GOAL 5: Provide a Safe and Productive Workplace

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

5.3 Number of Sick Days Taken per O&M Employee (Water Distribution & Integrated Systems)

- Sick days taken per O&M FTE in 2014 was lower than median but in the typical range.
- SCRD sick days allowed is among the highest in the group (18 days), but does not appear to be causing staff to take more sick time than required.

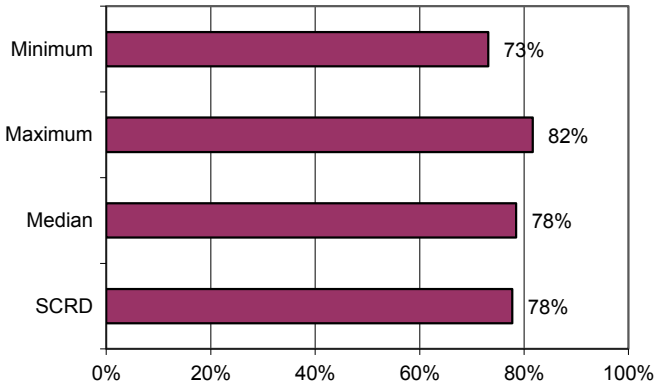


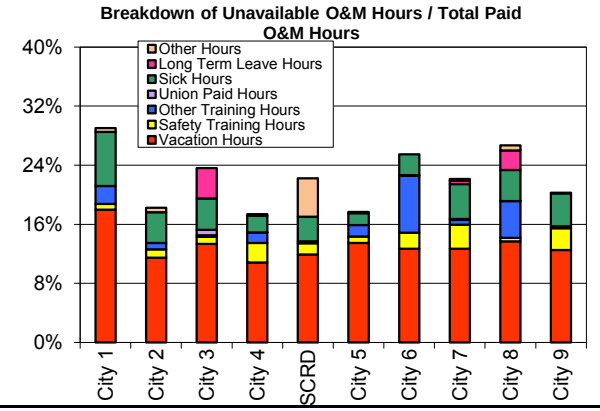


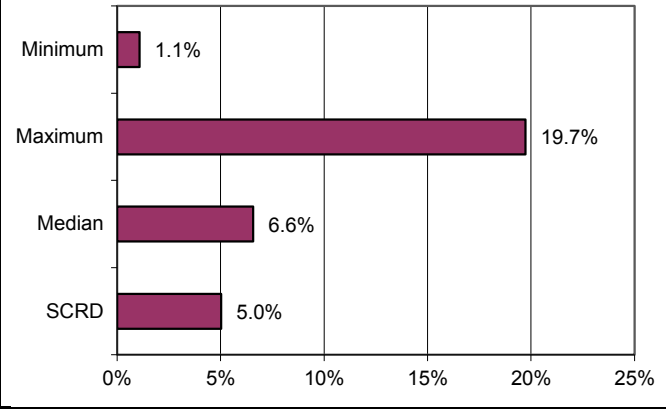
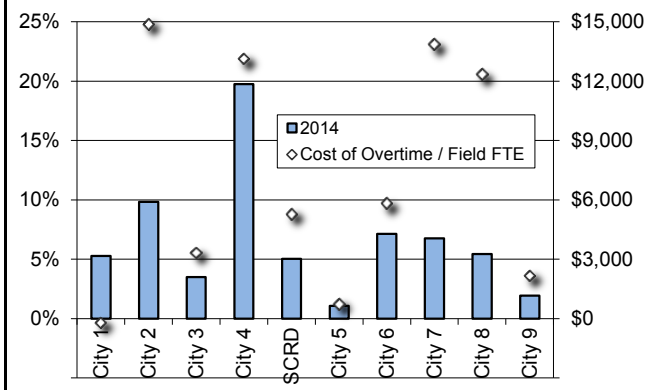
Negative Values - no data available

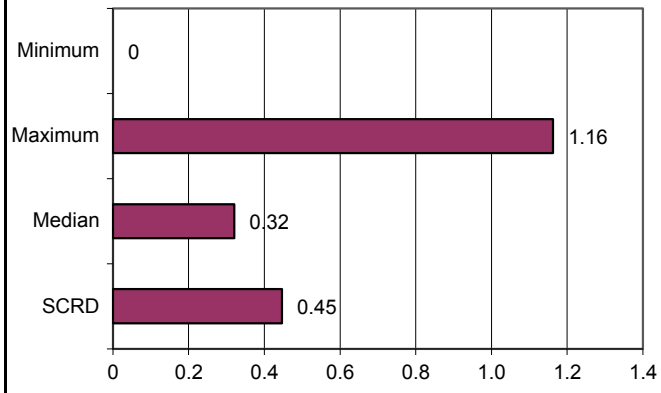
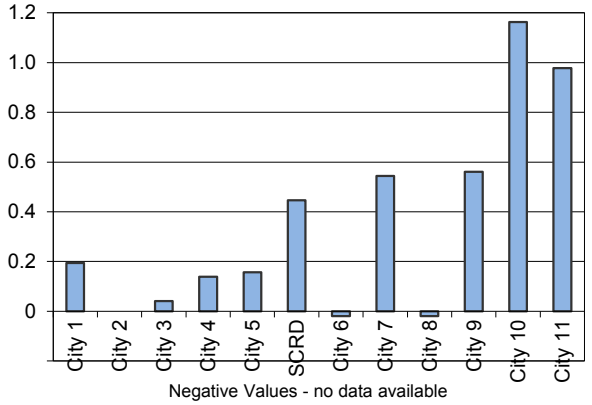
5.4 Total Available O&M Hours / Total Paid O&M Hours (Water Distribution & Integrated Systems)

- Total available hours as a percent of total paid hours is typical compared to the peer group.
- ► Confirm what is being included in "Other" hours as it is higher than all other utilities. If this is accident hours, confirm whether staff are paid by SCRD or whether salary is covered by WorkSafe BC or insurance.





WATER DISTRIBUTION SYSTEM GOAL 5: Provide a Safe and Productive Workplace		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
5.5 Total Overtime O&M Hours / Total Paid O&M Hours (Water Distribution & Integrated Systems)		
● Total overtime hours just under the median of the peer group, but in the typical range. ● In 2014 there was 1,039 overtime hours at a cost of approximately $30,000. ► Review year to year comparison of overtime, if 2014 is typical continue to monitor year to year.		

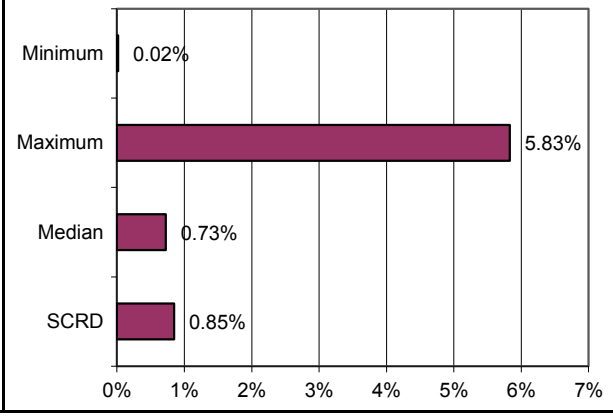
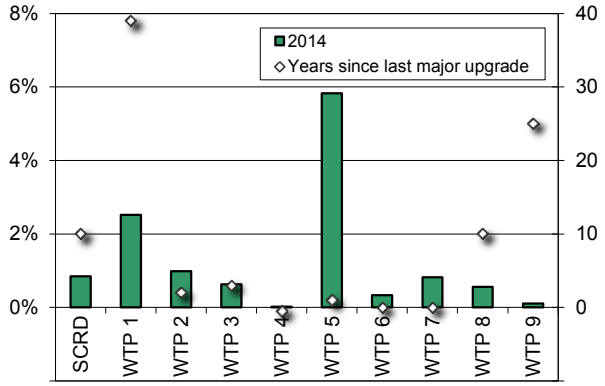
WATER DISTRIBUTION SYSTEM GOAL 6: Have Satisfied and Informed Customers		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
6.1 Number of Water Pressure Complaints / 1,000 People Served (Water Distribution & Integrated Systems)		
● Number of water pressure complaints just above the median value. ● Actual number of complaints is 12. ● It has been noted that the majority of customer complaint end up related to the PRV on the customer side of the service connection. ► Continue to monitor pressure complaints. ► Consider some public communication to educate the public on trouble shooting water issues on the customer side of the service connection before contacting the Regional District.		

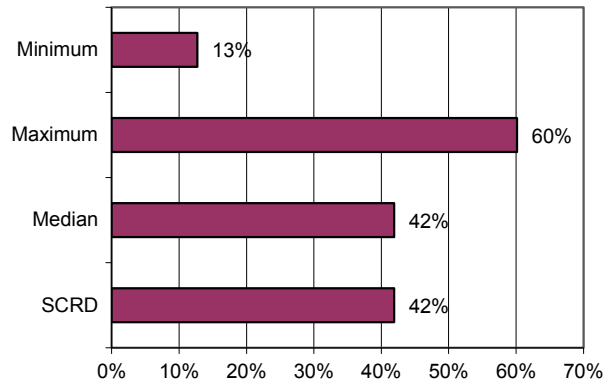
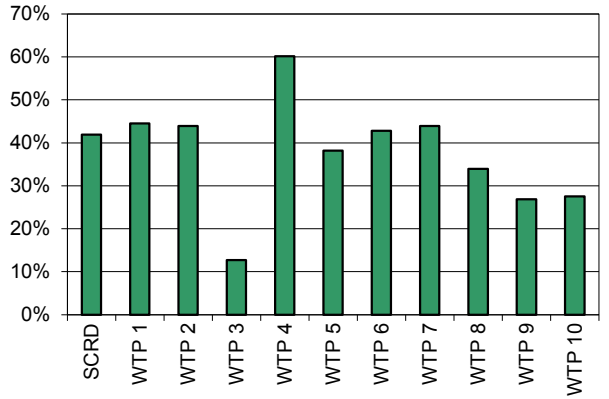
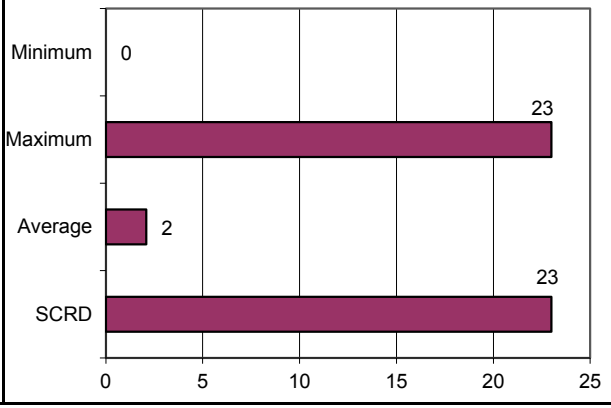
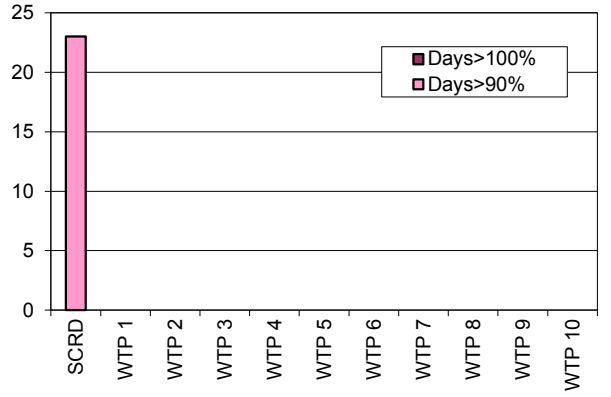
3.4 Water Treatment Key Performance Indicators

Table 3-7 provides a list of the key performance indicators for the Water Treatment systems.

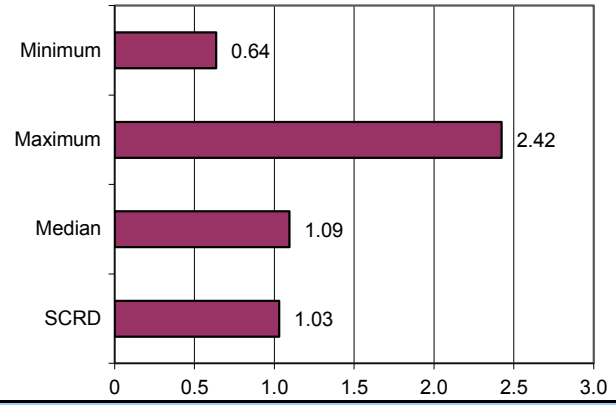
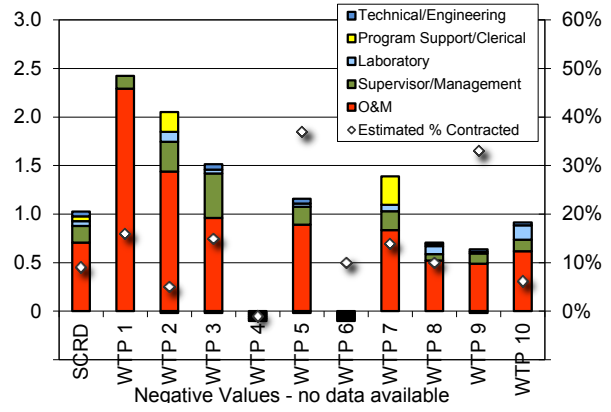
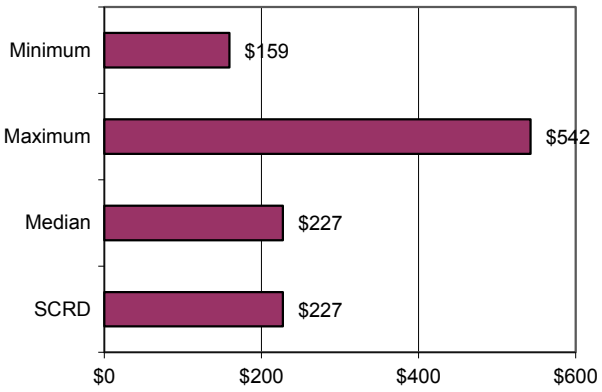
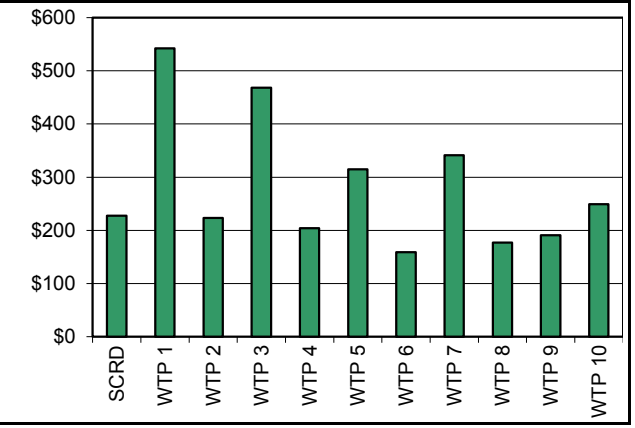
Table 3-7 Water Treatment Index of Key Performance Indicators

GOAL 1: Provide Reliable Service and Infrastructure
1.1 Five (5) Year Running Average Capital Reinvestment / Replacement Value
GOAL 2: Ensure Adequate Capacity
2.1 Average Day Demand / Existing Water Licence Capacity
2.2 Number of Days the Plant Operated at > 90% Capacity
GOAL 3: Meet Service Requirements with Economic Efficiency
3.1 Total FTEs/ 1,000 ML Treated
3.2 O&M Cost / ML Treated
3.3 Energy Consumed in kWh / ML Treated
3.4 Chemical Cost / ML Treated
GOAL 4: Protect Public Health and Safety
4.1 Average Annual Treated Water Turbidity (NTU)
4.2 Number of Total Coliform Occurrences in Treated Water
4.3 Treated Water Nitrates (mg/L)
GOAL 5: Provide a Safe and Productive Workplace
5.1 Number of O&M Accidents with Lost Time / 1,000 O&M Labour Hours
5.2 Number of Lost Hours due to O&M Accidents / 1,000 O&M Labour Hours
5.3 Number of Sick Days Taken per O&M Employee
5.4 Total Available O&M Hours / Total Paid O&M Hours
5.5 Total Overtime O&M Hours / Total Paid O&M Hours
GOAL 6: Have Satisfied and Informed Customers
6.1 Percentage of Water Wasted During Treatment Process
GOAL 7: Protect the Environment
No Water Treatment KPIs for this Goal

WATER TREATMENT PLANT GOAL 1: Provide Reliable Service and Infrastructure		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX MEDIAN GRAPHS**	**GROUP GRAPHS**
1.1 Five (5) Year Running Average Capital Reinvestment / Replacement Value		
● Higher than median value for capital reinvestment. ● Actual reinvestment cost in 2014 was $53,535 and capital replacement value of the treatment plant is approximately $6.3M. ● Original infrastructure was built in 1993, Chapman WTP constructed in 2004, and Egmont WTP completed in 2012. ► Consider long term reserves planning for mechanical replacement cycle at 20 - 25 year expected service life, 2024 for Chapman WTP.		

WATER TREATMENT PLANT GOAL 2: Ensure Adequate Capacity		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
2.1 Average Day Demand / Existing Water Licence Capacity		
● Average day demand over the existing water license flow same as the median value for the peer group. ● Maximum day demand 27 ML/d compared with the water licence maximum flow 33.4 ML/d, but water license is for 12,196 ML per year.		
2.2 Number of Days the Plant Operated at > 90% Capacity		
● The SCRD operated more days above 90% than any other WTP in the peer group. ● The Chapman WTP operated 23 above 90% Capacity.		

WATER TREATMENT PLANT GOAL 3: Meet Service Requirements with Economic Efficiency

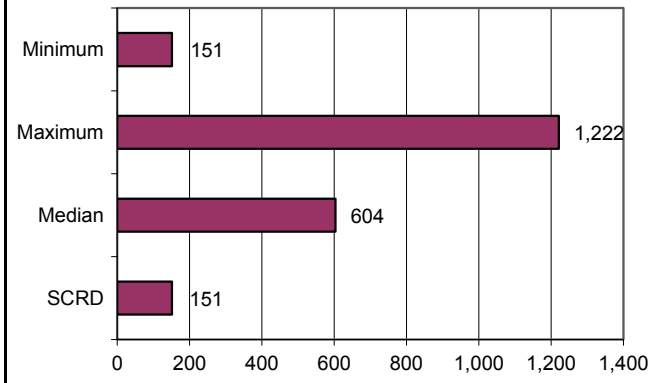
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS
3.1 Total FTEs/ 1,000 ML Treated		
● The total full time equivalent (FTEs) staff at the SCRD WTP are similar to the group median, with similar distribution between O&M and other categories of FTEs. ● Actual number of O&M FTEs in 2014 was 4.3.		
3.2 O&M Cost / ML Treated		
● The SCRD WTP operating and maintenance costs are the median of the peer group. ● Actual O&M cost in 2014 was approximately $1.1 M. ● The largest O&M costs are wages (~ 50 %) and chemical (~20 %).		

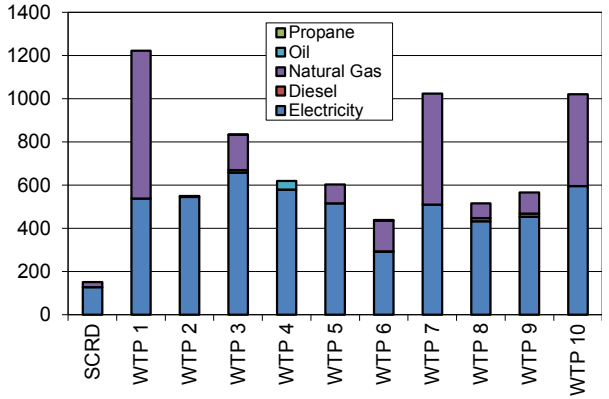
WATER TREATMENT PLANT GOAL 3: Meet Service Requirements with Economic Efficiency

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX AVERAGE GRAPHS	GROUP GRAPHS

3.3 Energy Consumed in kWh / ML Treated

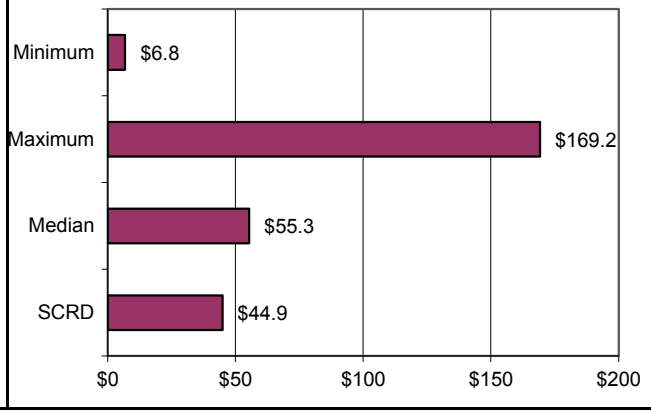
- Normalized energy consumption is the lowest of the peer group.
- Electricity was the largest type of energy consumed in 2014, actual electricity consumption was 640,027 kWh at a cost of approximately $74k.
- The SCRD has the lowest raw water pumping requirements of the group.

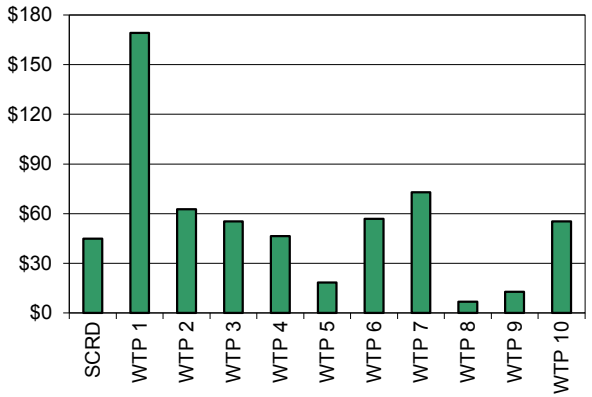


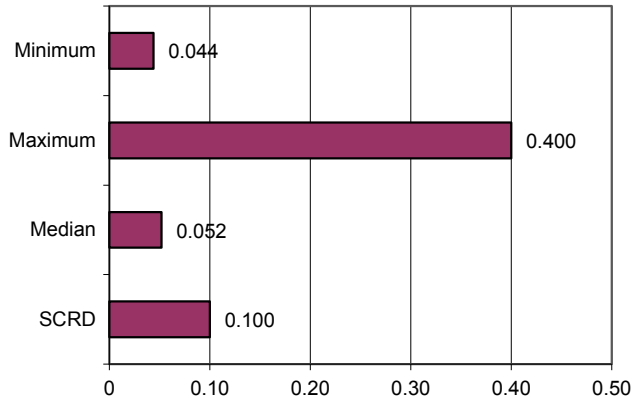
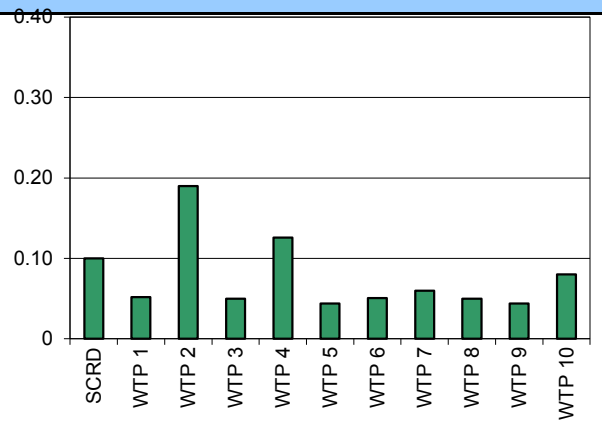
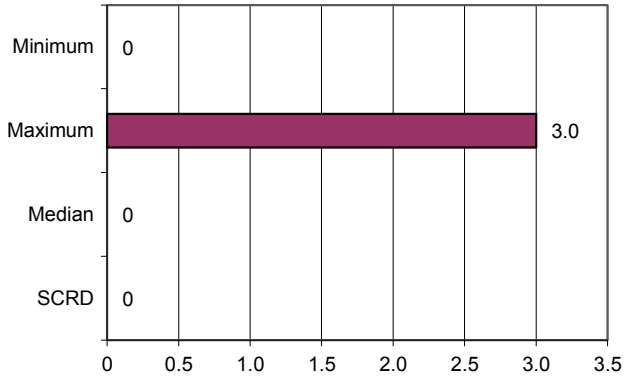
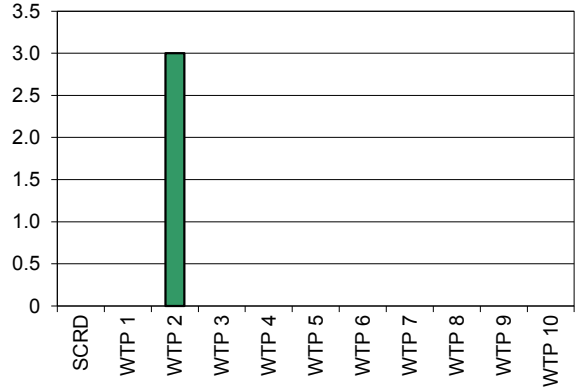


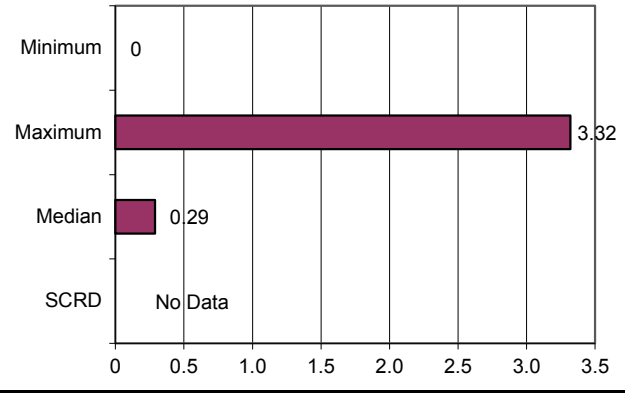
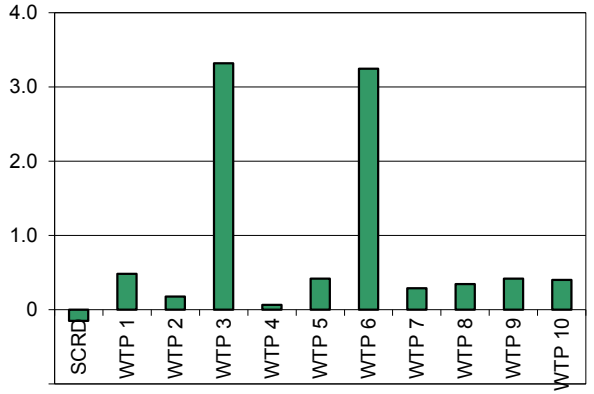
3.4 Chemical Cost / ML Treated

- Normalized chemical costs are below the group median.
- The SCRD Water Treatment system uses gas chlorine, polyaluminum chloride, soda ash and polymer.
- Chemical cost in 2014 were approximately $225,000.





WATER TREATMENT PLANT GOAL 4: Protect Public Health and Safety		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
4.1 Average Annual Treated Water Turbidity (NTU)		
● The SCRD average annual treated water turbidity is above the peer group median value. ● The SCRD average value reported for 2014 was 1.0		
4.2 Number of Total Coliform Occurrences in Treated Water		
● There were no positive total coliform occurrences in the SCRD treated water in 2014.		

WATER TREATMENT PLANT GOAL 4: Protect Public Health and Safety		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX AVERAGE GRAPHS**	**GROUP GRAPHS**
4.3 Treated Water Nitrates (mg/L)		
● The SCRD did not report a value for Nitrates concentration in the treated water.		

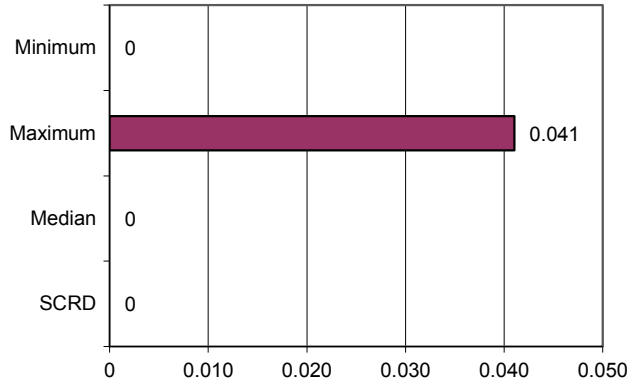
WATER TREATMENT PLANT GOAL 5: Provide a Safe and Productive Workplace

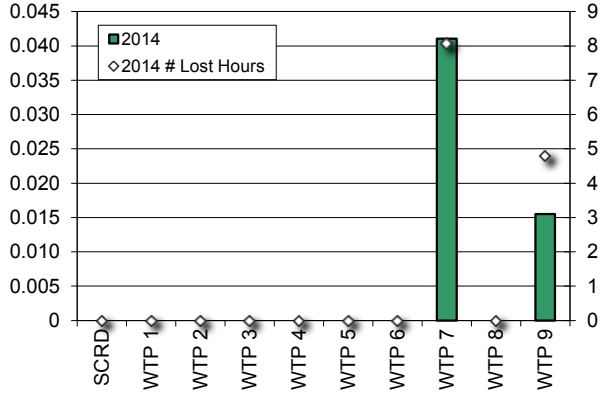
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX MEDIAN GRAPHS

5.1 Number of O&M Accidents with Lost Time / 1,000 O&M Labour Hours

- The SCRD WTP reported no accidents in 2014.

► Check multiple years of data, confirm that low accident rates are typical.

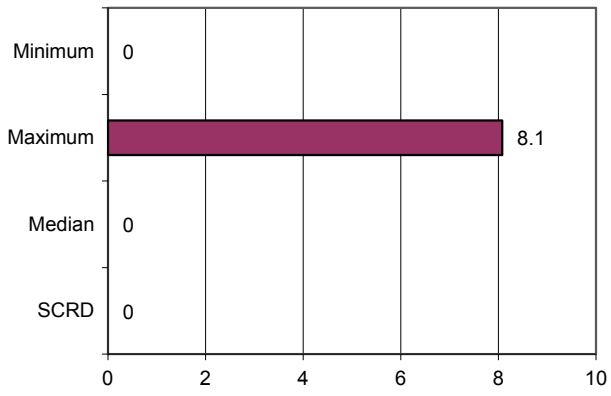


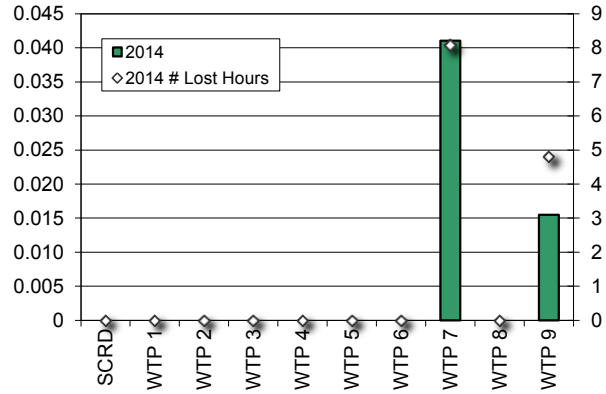


5.2 Number of Lost Hours due to O&M Accidents / 1,000 O&M Labour Hours

- The SCRD WTP reported no lost time due to accidents in 2014.

► Check multiple years of data, confirm that low accident rates are typical.



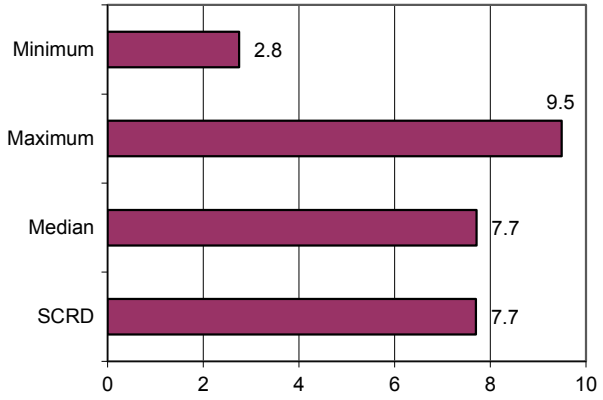


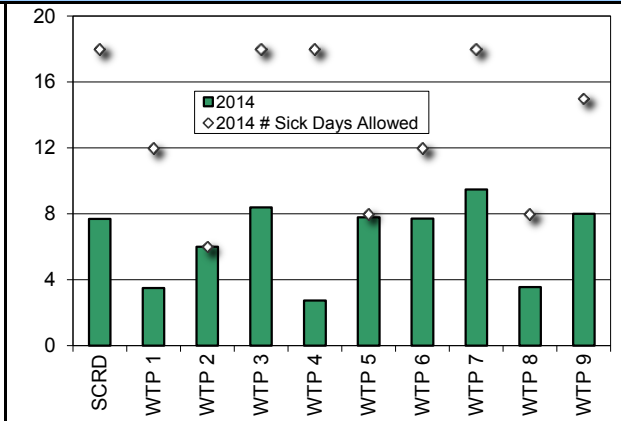
WATER TREATMENT PLANT GOAL 5: Provide a Safe and Productive Workplace

SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	MIN MAX MEDIAN GRAPHS

5.3 Number of Sick Days Taken per O&M Employee

- Number of sick days below the median compared to peer group.
- In 2014, O&M employees took an average of 7.7 sick days each.

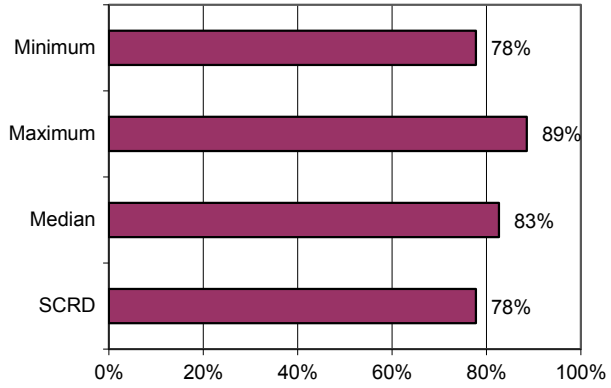


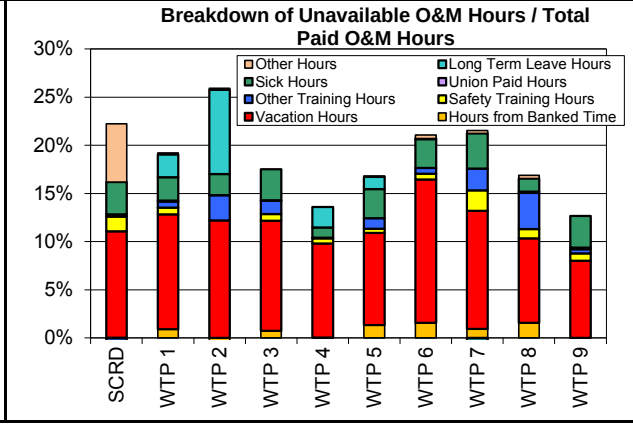


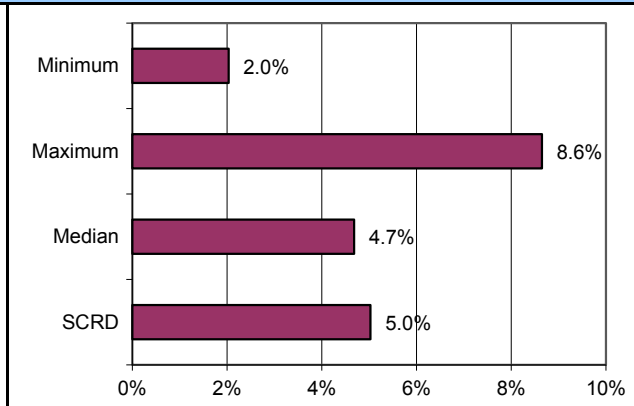
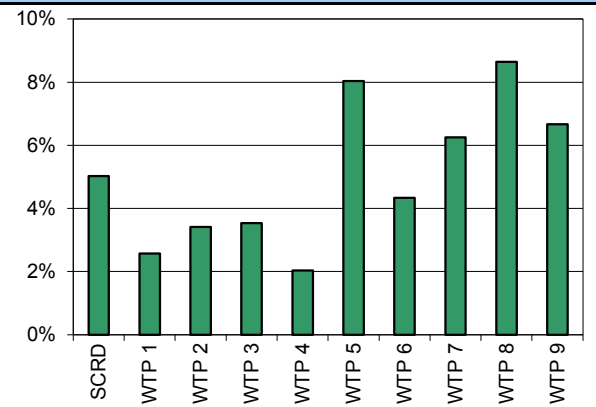
5.4 Total Available O&M Hours / Total Paid O&M Hours

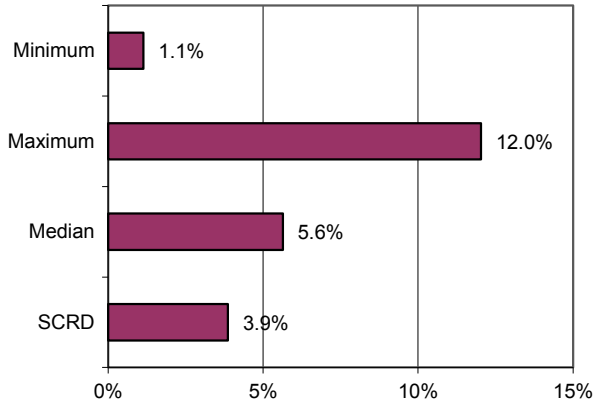
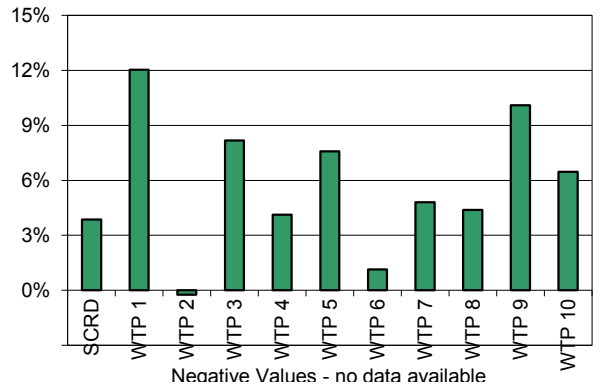
- Total availability for the SCRD O&M staff was 78%, below median of 83% for the peer group.

► Confirm what is included in "Other" unavailable hours.





WATER TREATMENT PLANT GOAL 5: Provide a Safe and Productive Workplace	
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX MEDIAN GRAPHS**
5.5 Total Overtime O&M Hours / Total Paid O&M Hours	
● Total overtime hours relative to total paid hours is slightly higher than the median of the peer group. ● Actual number of overtime hours was 693 hrs at a cost of approximately $20k.	 

WATER TREATMENT PLANT GOAL 6: Protect the Environment		
SCRD 2014 PERFORMANCE OBSERVATIONS AND RECOMMENDATIONS	**MIN MAX MEDIAN GRAPHS**	
6.1 Percentage of Water Wasted During Treatment Process		
● The SCRD WTP operations produce less than the median value of water wasted from the treatment process. ● Acutal volume of wastewater produced in the WTP process 57.6 ML in 2014.		

4. Observations and Recommendations

The SCRD water system was assessed based on the methodology and data from the National Water and Wastewater Benchmarking Initiative for the 2014 calendar year. Overall the assessment showed that the SCRD water system is being operated according to best management practices for water systems. Summarized in Table 4-1 are the areas where the SCRD appears to be exceling compared to the peer comparison group and in Table 4-2 the areas that should be investigated to determine if improvements or optimization are possible.

Table 4-1 Water System Areas of Superior Performance

AREAS OF SUPERIOR PERFORMANCE		
Goal	**Key Performance Indicator**	**System Result**
1. Provide reliable and sustainable infrastructure	Number of main breaks / 100 km length	*Water Distribution:* The SCRD had the lowest number of main breaks in the peer group of water systems 2014.
	Number of unplanned system interruptions / 100 km length	*Water Distribution:* The SCRD had lower than average number of system interruptions, indicating a high level of service for system reliability.
	Total number of customer days without service / total number of service connections	*Water Distribution:* No customer days without service in 2014 also indicated a reliable and robust operation.
3. Meet service requirements with economic efficiency	Total operating cost ('000) / 100 km length	*Water Distribution:* The SCRD operations and maintenance costs are lower than the peer group median suggesting economic efficiency. Recommend continuing to monitor cost in combination with levels of service to ensure funding is adequate for preventative maintenance activities to ensure reliable infrastructure in the long term.
	Energy consumed in kWh / ML treated	*Water Treatment:* The SCRD WTP utilizes the least amount of normalized energy in the peer group of WTPs, less than a third of the median value.
	Chemical cost / ML treated	*Water Treatment:* The SCRD WTP normalized chemical costs are lower than the peer group of WTPs.
5. Provide a safe work environment	Total overtime O&M hours / total paid O&M hours	*Water Distribution:* Lower than average overtime hours worked, may be a result of preventative maintenance.
	Number of field staff hours lost due to accidents / 1000 field labour hours	*Water Treatment:* There were zero accidents in 2014 that resulted in lost time.
	Number of field staff accidents / 1000 field labour hours	Water Treatment: There were zero accidents in 2014 that resulted in lost time.
7. Protect the Environment	Percent of water wasted during treatment process	*Water Treatment:* The SCRD WTP is designed and operated in a way that produces less than average wastewater, therefore maximizing the use of raw water taken from the environment.

Table 4-2 Water System Areas for Investigation and Potential Improvement

AREAS FOR INVESTIGATION AND POTENTIAL IMPROVEMENT		
Goal	**Key Performance Indicators**	**Result and Recommendation**
1. Provide reliable and sustainable infrastructure	Number of days the plant operated at greater than 90% capacity	*Water Treatment:* The Chapman WTP operated 23 days above 90% capacity. Recommend confirming system capacity with future peak demand projections and ensure long term plans are in place to meet water demands.
	Infrastructure inventory	*Water Distribution:* It was noted that pipe age is an estimate and pipe materials were not provided. It is recommended that asset inventories are updated as this data will be increasingly important as the infrastructure ages in order to plan funding requirement for future system refurbishment and replacement.
	Percent of hydrants inspected	*Water Distribution:* The SCRD inspected approximately 20% of their hydrants in 2014, compared with a typical inspection rate of 100% for other utilities. Recommend confirming whether current inspections targets are adequate for long term reliability. If necessary, increasing inspection frequency and funding for this work item in the future.
	Number of emergency service connection repairs and replacements	*Water Distribution:* Higher than average number of emergency service connection repairs and replacements. Recommend reviewing multi-year data to confirm whether 2014 was typical. If typical investigate causes and continue to work on asset management to confirm service connection asset inventory, age of connections and pipe materials in order to project future replacement requirements.
3. Meet service requirements with economic efficiency.	Cost of fire hydrant O&M / number of fire hydrants	*Water Distribution:* Cost of fire hydrant O&M does not align with reported fire hydrant O&M tasks performed. Work orders (WO) do exist for fire hydrant O&M but perhaps staff are not using WO system correctly, consider additional communication with staff on WO coding.
5. Provide a Safe and Productive Workplace	Number of O&M accidents with lost time	*Water Distribution:* Higher number of accidents than the peer group in 2014. Recommend reviewing multi-year data to determine if this is a trend, if so, consider increasing safety training.
	Total available O&M hours	*Water Treatment:* Lower than average available time for field staff at 78% available time as a percent of total paid time. Investigate source of "Other Hours" which accounts for ~10% of unavailable time.
6. Have Satisfied and informed customers	Number of water customer complaints / 1,000 people served	*Water Utility:* Higher than average number of customer complaints regarding water quality. Recommend investigating multi-year trend for water quality complaints and cause for reduced water aesthetics (taste, odour and colour).

	Number of water pressure complaints / 1,000 people served	*Water Distribution:* Higher than group medan number of customer complaints regarding water pressure. Recommend investigating multi-year trend for water pressure complaints and consider increasing public communication to educate the public on trouble shooting water issues on the customer side of the service connection as notes indicate these were the bulk of the issues in 2014.

In summary, the SCRD exhibits excellent performance compared to the peer group in a number of areas. These areas include system reliability, economic efficiency and protection of the environment. These are achievements that the SCRD staff can take pride in.

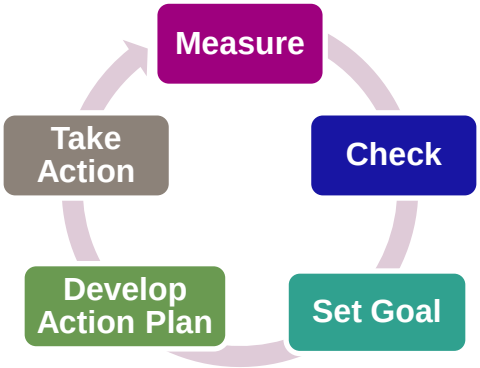
To maximize the use of this baseline benchmarking assessment it is recommended that the SCRD continue the benchmarking journey and undertake the following activities:

(1) **Ask Questions and Investigate** – The first step to utilizing benchmarking results is to take some time to dig a little deeper and to answer the questions that come from looking at the data. For example (i) Is this data correct? (ii) Is the data typical, or was 2014 an outlier because of extenuating circumstances (storms/construction etc.) (iii) Are there other local factors that affect this result to explain why the SCRD is different from other utilities (i.e. is the water source especially difficult to treat?) (iv) Is each KPI result acceptable to the SCRD or should action be taken to make changes it in the future.

(2) **Communicate Results** – Review the benchmarking results with internal SCRD operations staff. Celebrate the successes together! Work through the lower performance activities together, and collaborate to explain the differences, and brainstorm ideas to make operational changes if needed. Equally important, communicate the results with senior management and/or councils. While the actual metrics that are discussed in detail with the operations staff versus senior management may be different, there are benefits in the sharing of information in all directions. The comparison of management level KPIs can help council understand how the utility compares to others and helps plan for future funding requirements, especially if additional funding is being requested or will be needed in the future.

(3) **Develop Internal Benchmarking Program** – As part of this project AECOM will provide the SCRD with a spreadsheet to use for the SCRD's internal benchmarking purposes. Reviewing data and benchmarking results on a regular basis is a best management practice. The frequency of the reviews can vary from utility to utility, however it is recommended that an internal benchmarking review be completed at least once a year. The SCRD can start small with a select few number of KPIs, as the chance of continuing with the program is better if the task is not too onerous, especially at smaller utilities where there are less staff.

(4) **Set KPI Targets** – Now that baseline values have been documented for each KPI, the SCRD can set a utility specific target for the metrics included in the internal benchmarking program. AECOM can provide group targets that have been set by the NWWBI group, however many of the KPIs are affected by local factors and current operating practices and should be reviewed on a utility specific basis.



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SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – April 20, 2017

AUTHOR: Shane Walkey, Manager, Utility Services
Raphael Shay, Water & Energy Projects Coordinator

SUBJECT: **PENDER HARBOUR PRIVATE SIDE WATER LEAKS STATUS UPDATE**

RECOMMENDATION(S)

THAT the report titled Pender Harbour Private Side Water Leaks Status Update be received for information.

BACKGROUND

The purpose of this report is to provide an update on the identification and resolution of leaks on private properties as part of the Universal Water Metering Program. The first water meters were installed in the North and South Pender Harbour water systems and these systems are the first to go through the private side water leak resolution process.

DISCUSSION

Process

Staff have historically identified 60 to 70 leaks on private properties every year on all water systems. Staff's ability to detect private side water leaks has grown with the regional water metering project. Water meters are capable of detecting continuous water use, which is a consumption pattern that indicates the likelihood of a leak.

Accounts with continuous water use are flagged during meter reads and staff communicate with the property owners using notices accompanied by educational material. The property owners repair leaks themselves or with the assistance of a plumber. In some incidents, with significant water leakage, staff will visit a property to assist with locating a leak.

Leaks & Water Savings

In January 2017, a first round of 145 notices were sent to Pender Harbour properties with possible private side leaks and followed up via phone or in person with the most significant leaks. Since the first round notices were sent out in January, 101 likely additional leaks have been identified and these property owners have been notified.

In total, private side leaks have been detected on 17.5% of the 1,404 accounts in the Pender Harbour area. Staff anticipate the identification of many new leaks at this time of year as seasonal properties have their water and irrigation systems activated.

North Pender System

- 43 properties were notified in January;

- 14 leaks have been resolved yielding estimated water savings of 137.4m^3/day*;
- 7 property owners are in contact with staff and have committed to fixing leaks;
- 22 properties have been notified but continue to have a leak notification on their account;
- 31 likely additional leaks have been identified and notified since January.

South Pender System

- 102 properties were notified in January;
- 36 leaks have been resolved yielding estimated water savings of 121.5m^3 /day*;
- 11 property owners are in contact with staff and have committed to fixing leaks;
- 55 properties have been notified but continue to have a leak notification on their account;
- 70 likely additional leaks have been identified and notified since January.

* The estimates for daily water savings were done by calculating the difference between water consumption at a property during a leak and consumption after a leak is resolved. Seasonal changes in consumption as well as lack of information on timing of repair influence the accuracy of the estimates.

Operational Implications

North Pender System - Garden Bay Pumping Station

The average daily water pumped through the North Pender System is 647m^3 /day. Savings of 137.4m^3 /day represents a reduction of 21%.

South Pender System - South Pender Harbour Water Treatment Plant

The average daily water pumped through the South Pender System is roughly 1,286m3 /day. Savings of 121.5m^3 /day represent a reduction of 9%.

STRATEGIC PLAN AND RELATED POLICIES

The SCRD Strategic Plan has a priority to Embed Environmental Leadership.

The Comprehensive Regional Water Plan has the objective or reducing water use by 33% from 2010 levels by 2020. This is principally to be accomplished via the Universal Metering Program.

The We Envision Regional Sustainability Plan (2012) has a water consumption reduction target of 33% relative to 2010 levels by 2020.

CONCLUSION

Water meters have enabled the SCRD to identify likely leaks on private properties. 17.5% of properties have water consumption patterns that indicate a potential leak. The estimated savings from repaired leaks thus far is 137.4m^3 per day in the North Pender System and

121.5m^3 per day in the South Pender System. These savings result in less water being pumped and treated at SCRD facilities. This report is presented for information.

Reviewed by:			
Manager	X. S. Walkey	Finance	
GM		Legislative	
CAO	X. J. Loveys	Other	

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee - April 20, 2017

AUTHOR: Robyn Cooper, Manager, Solid Waste Services

SUBJECT: **SOLID WASTE WORKSHOP NEXT STEPS**

RECOMMENDATION(S)

THAT the report titled Solid Waste Workshop Next Steps be received;

AND THAT the Board supports in principle to implement solid waste programs, services and policies that/which:

i) extend the life of the Sechelt Landfill
ii) prevent organic material from being disposed as garbage

AND FURTHER THAT the Board supports the following as short-term priorities and that staff will bring forward reports to future Infrastructure Services Committees:

i) Curbside Recycling
ii) Future of Sechelt Landfill
iii) Green Waste
iv) Illegal Dumping
v) MMBC
vi) Organics Diversion Strategy
vii) South Coast Recycling
viii) SWMP Plan Review

BACKGROUND

A special Infrastructure Services Committee Meeting was held on March 2, 2017.

The Special ISC consisted of a solid waste workshop. The workshop objective was to engage in an open dialogue on the future of solid waste management on the Sunshine Coast.

The workshop was facilitated by the CAO and included a presentation given by the Manager, Solid Waste Services and financial information on solid waste provided by the General Manager, Corporate Services/Chief Financial Officer.

After the presentation, a discussion was held to help identify short-term and long-term priorities for solid waste. Short-term was defined as now until 2019 and Long-term was defined at 2019-2024.

The minutes from the Special ISC were adopted at the March 23, 2017 Board meeting.

The purpose of this report is to develop recommendations based on the short-term priorities that were identified at the Special ISC.

DISCUSSION

Based on time-constraints, the specific programs, policies or services for each short-term and long-term priority were not identified. However, there was agreement that the over-arching priority is to extend the life of the Sechelt Landfill and this should include preventing organic material from being disposed as garbage.

Timeline for next steps

Based on the short-term priorities identified, reports will be brought forward to future ISC meetings as summarized in Table 1.

Table 1: 2017 Report Schedule for Short-term priorities

Short-term priority	2017 Report Schedule
Green Waste	Q3
Illegal Dumping	Q3
MMBC	Q3
Organics Diversion Strategy	Q3
South Coast Recycling	Q3
Curbside Recycling	Q4
Future of Sechelt Landfill	Q4
SWMP Plan Review	Q4

STRATEGIC PLAN AND RELATED POLICIES

This report is in support of the key strategic priority of Embed Environmental Leadership and the Solid Waste Management Plan.

CONCLUSION

A special Infrastructure Services Committee Meeting was held on March 2, 2017.

As part of the meeting, a discussion was held to help identify short-term and long-term priorities for solid waste. The specific programs, policies or services for each short-term and long-term priority were not identified. However, there was agreement that the priorities should result in extending the life of the Sechelt Landfill and should include preventing organic material from being disposed as garbage.

Staff are preparing reports on each short-term priority to be brought forward to a future ISC in 2017 as outlined in this report.

Reviewed by:			
Manager	X – R. Cooper	Finance	
GM		Legislative	
CAO	X – J. Loveys	Other	

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – April 20, 2017

AUTHOR: Janette Loveys, Chief Administrative Officer

SUBJECT: CLEAN WATER AND WASTEWATER FUND 2016 GRANTS

RECOMMENDATION(S)

THAT the report titled Clean Water and Wastewater Fund 2016 Grants be received;

AND THAT the North Pender Harbour [365] water main upgrades (Garden Bay Road and Claydon Road/Lane) project in the amount of $1,650,000 funded $1,369,500-CCWF Grant and $280,500-Capital Reserves be approved;

AND THAT the South Pender Harbour [366] water main upgrades (Francis Peninsula Road) project in the amount of $1,650,000 funded $1,369,500-CCWF Grant and $280,500-Capital Reserves be approved;

AND THAT the Canoe Road [389] Replacement of Septic Field System project in the amount of $75,000 funded $62,250-CCWF Grant and $12,750-short-term borrowing be approved;

AND THAT the Merrill Crescent [390] Replacement of Septic Field System project in the amount of $65,000 funded $53,950-CCWF Grant and $11,050-short-term borrowing be approved;

AND FURTHER THAT the 2017-2022 Financial Plan be amended accordingly.

BACKGROUND

The purpose of this report to seek approval and inclusion in the 5 Year Financial Plan for the Canoe Road WWTP - Replacement of Septic Field System, Merrill Crescent WWTP - Replacement of Septic Field System and the North and South Pender Harbour Water Systems Water Main Upgrades.

421/16 THAT Planning and Community Development Committee recommendation No. 8 of November 10, 2016 be received, adopted and acted upon as follows:

Recommendation No. 8 *Clean Water and Wastewater* Fund – *2016 Grant Applications*

THAT the report titled Clean Water and Wastewater Fund – 2016 Grant Applications be received;

421/16 cont. AND THAT applications be submitted to the Clean Water and Wastewater Fund for the following projects for the November 23, 2016 grant program intake:

- Canoe Road WWTP - Replacement of Septic Field System
- Merrill Crescent WWTP - Replacement of Septic Field System
- North and South Pender Harbour Water Systems Water Main Upgrades;

AND THAT if the applications for funding are successful, the SCRD's share of the eligible and ineligible project costs be funded as follows:

- Canoe Road WWTP: Short Term Debt
- Merrill Crescent WWTP: Short Term Debt
- North and South Pender Harbour Water Systems - Water Main Upgrades:

CARRIED

DISCUSSION

The SCRD Board approved the grant submissions in November 10, 2016 to the Clean Water and Wastewater Fund (CWWF).

On March 22, 2017, the SCRD was informed that all 3 grants were approved. As this was during the 2017 budget process, staff verbally informed the Board at the March 23, 2017 Corporate and Services Committee.

At that time, staff indicated that a report would need to come forward to include the projects in the 2017 Financial Plan.

In and around the same time, the SCRD was notified of material changes to the timelines for implementation for the Chapman Lake Expansion Project. The capital construction for the project will not occur in 2017 as originally planned.

The CAO and Infrastructure Services staff have been meeting to reevaluate and make changes to the 2017 work plan with the key objective of realigning the resources and ensure the effective use of divisional capacity. Staff have also identified some projects which can be implemented with external resources will have the added benefit of contributing to the Sunshine Coast economy.

Staff are confident that with the realignment of resources that all the approved grant funding projects can be carried out successfully, on time and on budget.

STRATEGIC PLAN AND RELATED POLICIES

This report directly links to the set of values identified in the Strategic Plan.

Strategic Priority: Ensure Fiscal Sustainability

Strategic Priority: Embed Environmental Leadership through the responsible management of the regions' water supply.

CONCLUSION

The SCRD Board approved the grant submissions in November 10, 2016 to the Clean Water and Wastewater Fund.

On March 22, 2017, the SCRD was informed that all 3 grants were approved. As this was during the 2017 budget process, staff verbally informed the Board at the March 23, 2017 Corporate and Services Committee.

This report is seeking to approve and include the capital projects in the 5 Year Financial Plan.

Reviewed by:			
Manager	X – S. Walkey X – D. Crosby	Finance	X – T. Perreault
GM		Legislative	
CAO	X – J. Loveys	Other	

SUNSHINE COAST REGIONAL DISTRICT STAFF REPORT

TO: Infrastructure Services Committee – April 20, 2017

AUTHOR: Janette Loveys, CAO, GM Infrastructure Services

SUBJECT: **INFRASTRUCTURE SERVICES DEPARTMENT QUARTERLY REPORT**

RECOMMENDATION(S)

THAT the report titled Infrastructure Services Department Quarterly Report be received for information.

BACKGROUND

The purpose of this report is to provide an update on activities in the Infrastructures Services Department to the end of the 2017 first quarter.

Utilities Division [365, 366, 370]

PROJECTS - CAPITAL WORKS

- **Water main replacement program**
  - Pool Road
    - Staff are awaiting the development of one property to complete this work
  - Mason Road
    - Design complete, Health permits still required
  - Nor-West Bay Road
    - Design and permits have been received, construction proposed to be undertaken in May.
  - Reed Road
    - Water line route is currently being surveyed.
  - South Pender Harbour
    - Grant application was successful, RFP for design and survey under development.
  - North Pender Harbour
    - Grant application was successful, RFP for design and survey under development.
  - Soames Point twinning
    - The water main has been installed, tie in and testing is required. Chlorination structure is still to be built.
  - Eastbourne
    - A RFP for construction and maintenance of the water system is under development.

- **Waste Water**
  - Canoe Road
    - Grant application successful, RFP under development.
  - Merrill Crescent
    - Grant application successful, RFP under development.
  - YMCA/Langdale
    - A trial study commenced in February. The two plants were connected with a pump line from Langdale plant to YMCA plant. The preliminary results are hopeful and further analysis and testing is required.
  - Square Bay
    - A RFP for a design build was issued and closes on April 28. Design and construction will begin after the project is awarded.

Universal Metering Phase 2 Electoral Areas:

Rural Metering Project – Installation Progress Summary						
Area	**Egmont/ Cove Cay**	**Halfmoon Bay**	**Roberts Creek**	**Elphinstone**	**West Howe Sound**	**Total**
Completed Installs	80	1261	809	424	155	2729
Total to Complete	88	1381	1124	1349	796	4738
Percentage Complete	91%	91%	72%	31%	19%	58%

Groundwater Investigation Study Phase 1:

Staff held a kick-off meeting on January 27, 2017 with consultant, Waterline Resources Inc., to discuss phase 1 of the Groundwater Investigation study between Secret Cove and Langdale. The main purpose of this initial meeting was to review existing hydrogeology information and narrow down the focus to 3 to 5 locations within the existing water service area. The group reviewed Waterline's online GIS mapping system and identified areas of interest that warranted further investigation. Team members eliminated several areas based on groundwater potential, water quality concerns, and engineering factors. Subsequent to this meeting Technical Memo #1 was issued by the consultant on February 20, 2017 which summarized four areas of interest that Waterline would be focusing on. These areas are East Porpoise Bay, Selma Park, Elphinstone, and Soames Point.

On March 27, 2017 staff attended a field survey with the consultant to review several locations within the study area to confirm the viability of the locations identified in Technical Memo #1. The following potential sites were visited: two sites in East Porpoise Bay, two

sites in Selma Park, three sites in Elphinstone and one site in Soames Point. As a result of this field work, the consultant will be identifying in priority the sites that should be considered for test drilling which would be phase 2 of this study. Technical Memo #2 is anticipated to be received sometime in mid-April 2017.

Well Protection Plan

In October, 2016 the Regional District retained Associated Environmental Consultants Inc. (Associated) to complete a Well Protection Plan for the Chaster, Granthams, Soames, Langdale and three Eastbourne wells. The objectives of the Well Protection Plan include identifying hazards that may threaten the quality of the groundwater source, rank the hazards according to risk, and develop recommendations to either reduce the chance that the hazards will occur or mitigate the risk if hazards are unavoidable. Associated has also provided rough estimates and timelines for the recommended work.

On January 25, 2017 Associated submitted a first Draft of the Well Protection Plan. The Draft Plan was shared with Vancouver Coastal Heath and was reviewed by both SCRD and VCH staff. Comments from both staffs were compiled and submitted to Associated on February 16, 2017. Associated submitted a revised Draft Plan on March 15, 2017 and staff are currently reviewing the Plan. Following the submission of the Final Well Protection Plan, Associated will be hosting an open house to present the Plan to the public.

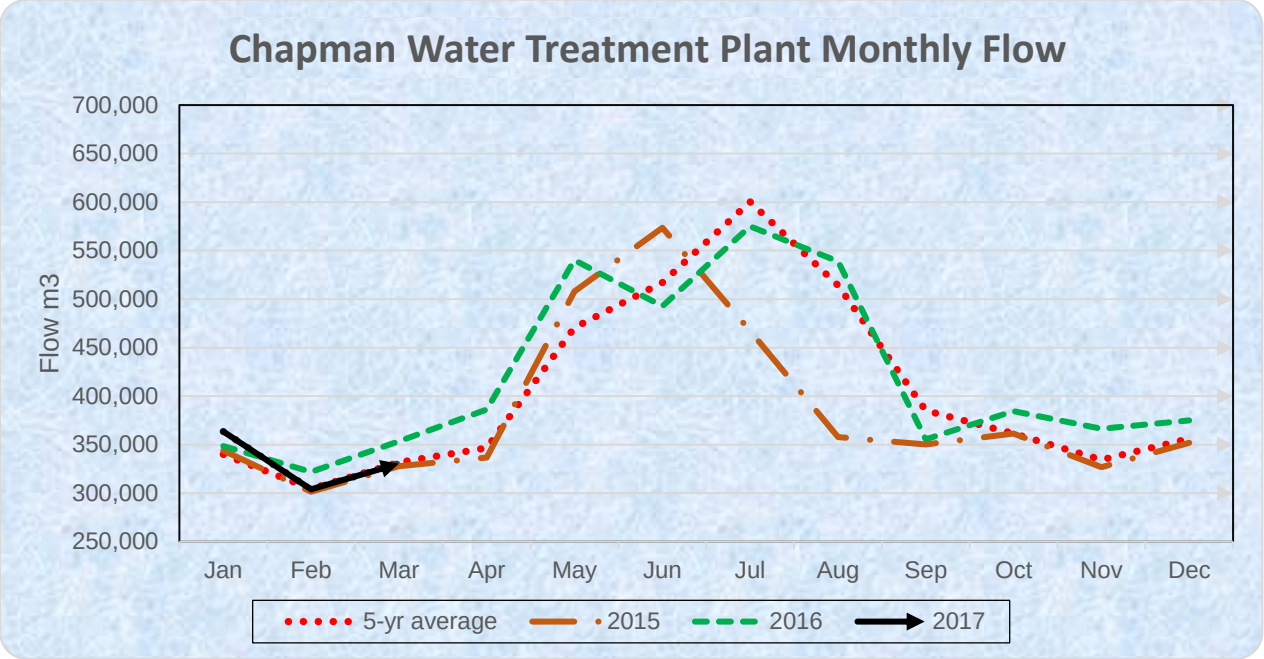
OPERATIONS

Statistics - Water

WATER DISTRIBUTION SYSTEM

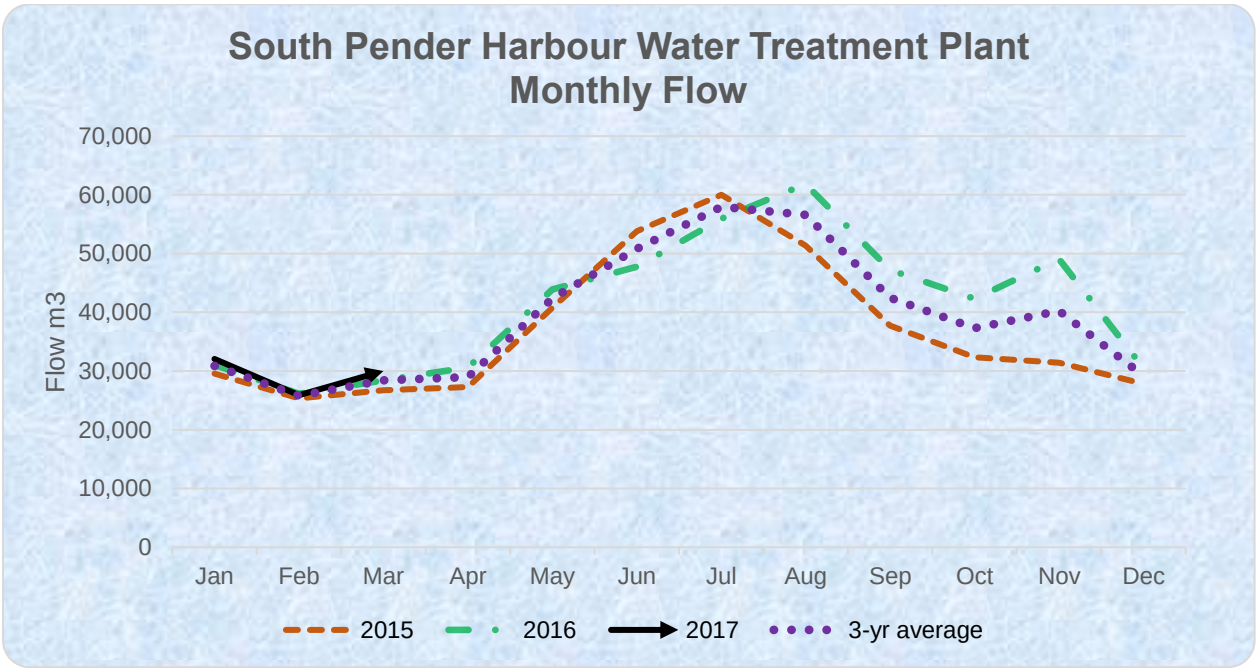
CHAPMAN WATER TREATMENT PLANT

In the first quarter, the Chapman Creek Water Treatment Plant produced and supplied 997,886m^3, a 2% increase over the five year average.

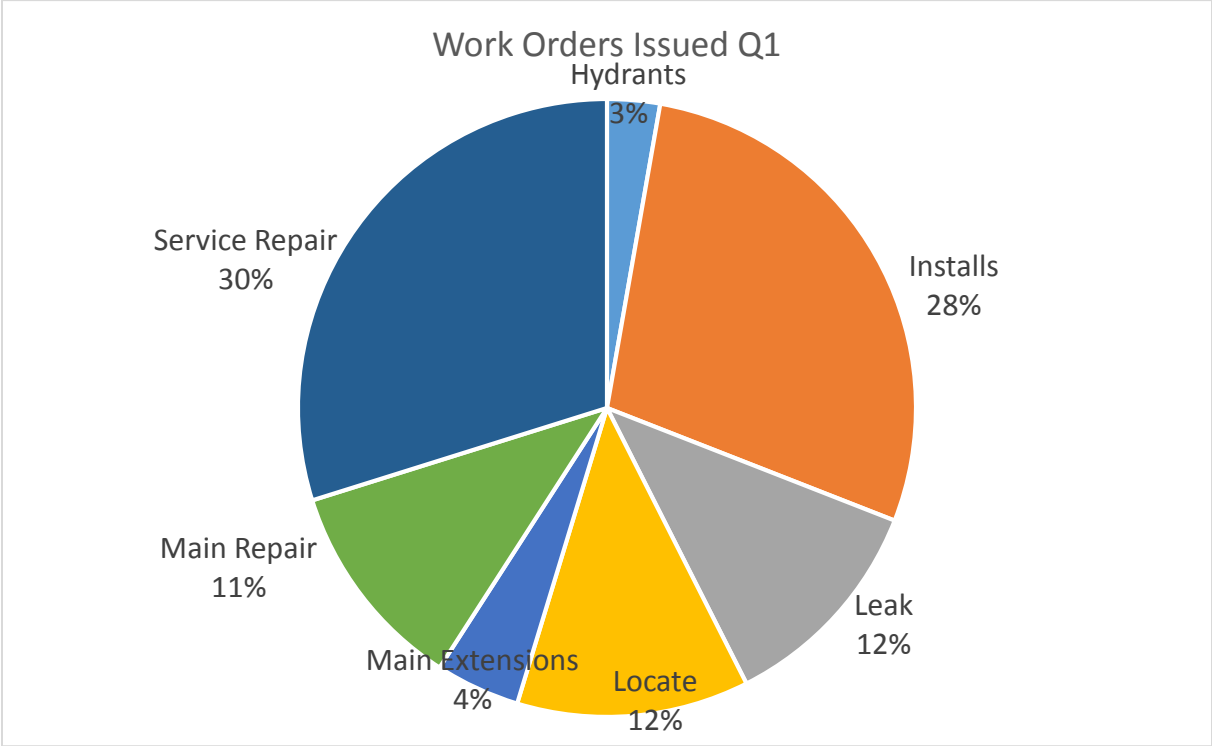


SOUTH PENDER WATER TREATMENT PLANT

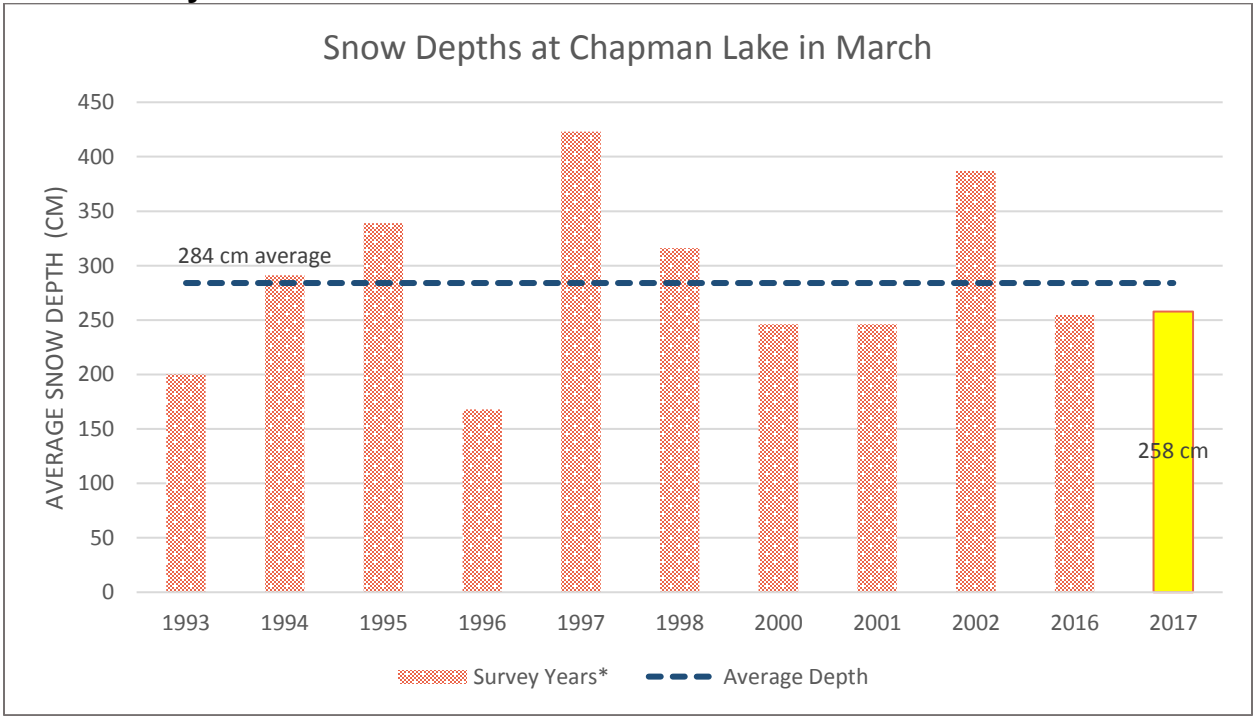
In the first quarter, the South Pender Water Treatment Plant produced and supplied 87,972 m^3, a 2.7% increase from last year.



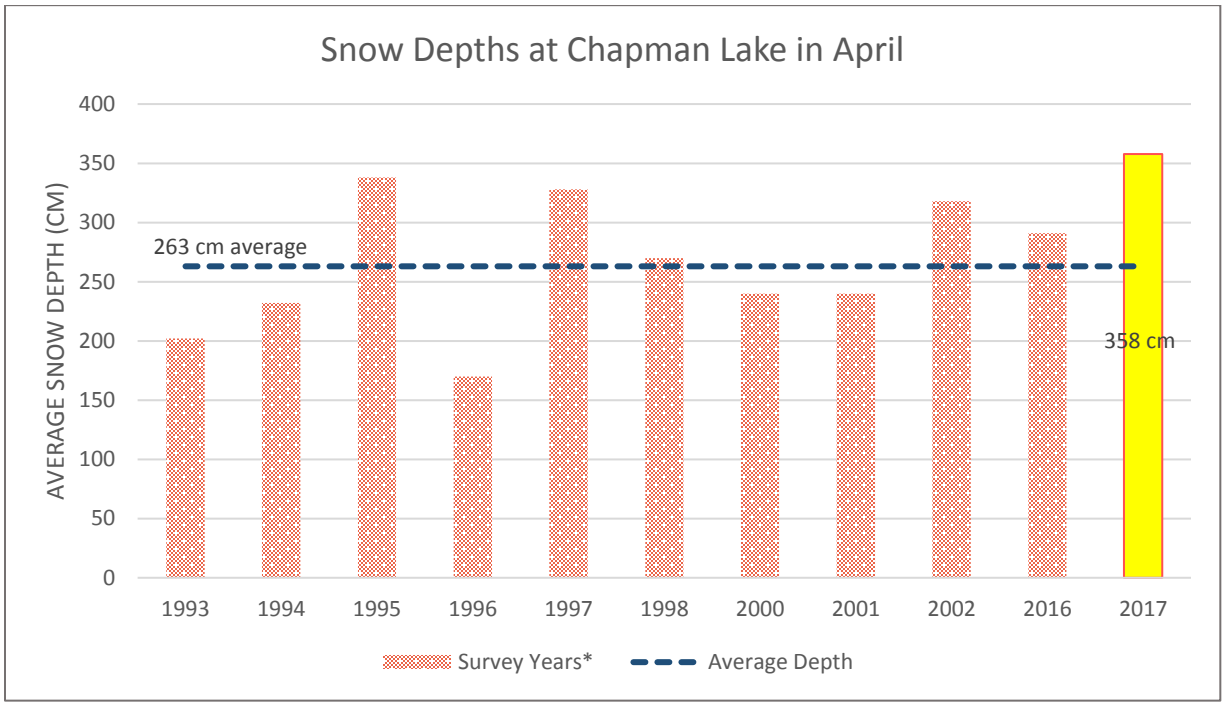
Work Orders Issued for the Q1 2017



Snow Survey Results



*Snow depth March 2017 is 26 cm lower than the average for March based on historic survey results.
1999 data was excluded due to inclusive results



*Snow depth April 2017 is 95 cm greater than average for April based on historic survey results.
1999 data was excluded due to inconclusive results.

Edwards Lake

For Edwards Lake there is no snow survey information prior to the 2015-2016 snow year but snow depths are up for both months compared to 2016 results.

March: 161 cm (2016); 171 cm (2017)
April: 208 cm (2016); 255 cm (2017)

Transportation and Facilities [310, 312, 345, 350]

PROJECTS

Transit

Snow Day service on February 3rd and 4th resulted in schedule adjustments and some extra service hours used. Many customer inquiries were answered but no service complaints were received related to snow impacts. Staff attended the Roberts Creek Transitions Fair on February 16th to provide an information table and answer any questions for parents of adult children who may begin using the HandyDART service. Staff also attended Sechelt Seniors Fair on March 3rd to provide an information table and answer questions regarding HandyDART service.

BC Ferries has been able to maintain the same “core” schedule since December, including the recent period with hourly ferry service, and this has allowed the transit Rider’s Guide to remain unchanged. Only minor transit schedule changes will occur to accommodate the summer season ferry beginning June 22nd. A co-promotion with SAC

and GACC began April 7th, allowing a bus pass to be used for entry on designated days in April, May and June; additional marketing activities are planned to raise the awareness of transit prior to September. Several internal administrative changes are underway, to streamline process in preparation for expansion. While three year budgets from BC Transit are still delayed, the one-year AOA has been received.

Fleet Maintenance

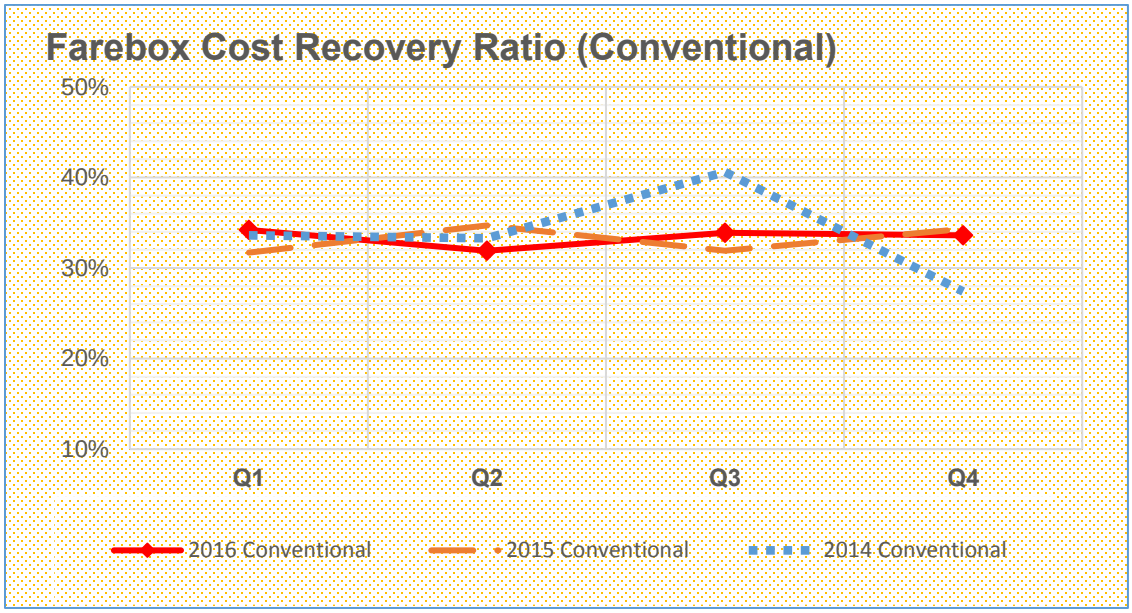
In December and January, two transit buses were exchanged with Whistler Transit to allow the electronic collection of passenger boarding data for expansion schedule planning. The BC Transit audit for the Commercial Vehicle Inspection Program was passed in February, with only minor issues requiring some correction.

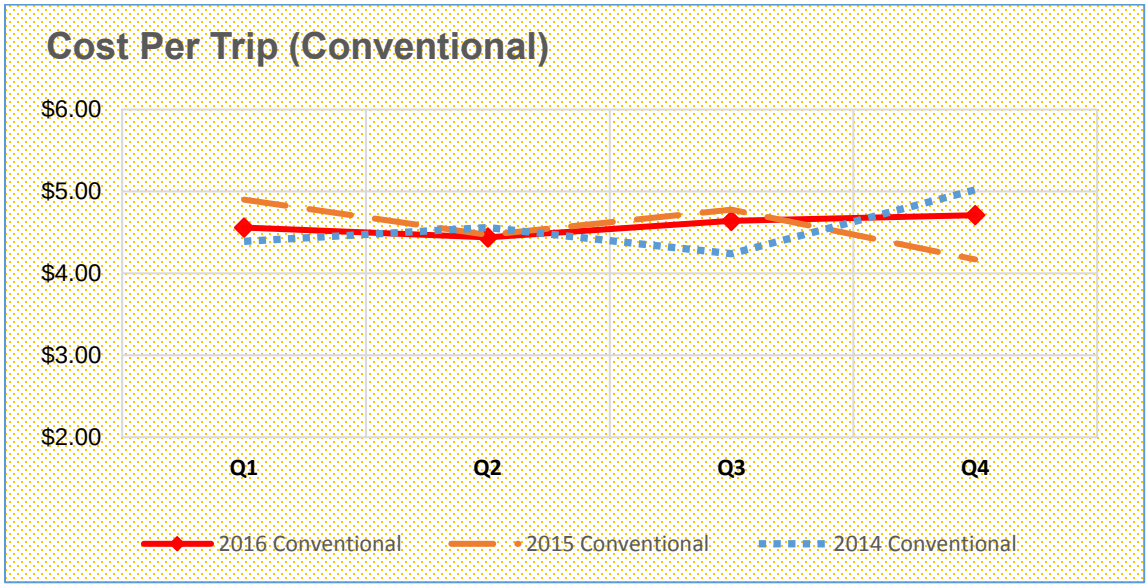
Major vehicle work completed has included two full transmission rebuilds and four major engine/driveline maintenance packages completed in addition to daily repairs and preventive maintenance program service. Small community buses continue to have repairs earlier than anticipated (across the BC Transit network), and BC Transit has now moved up the RFP date for a replacement of these units. BC Transit is significantly behind on refurbishing buses – it was hoped to have new colours by September to accompany expansion, but this is becoming tentative. Work has begun on preparing the Mason Road yard to accommodate expansion buses planned to arrive in August.

Recent software changes have temporarily lengthened the amount of time needed to enter mechanic service data, while billing of BC Transit has been delayed; BC Transit is being updated regularly.

OPERATIONS

Statistics – Transit





**2017 Q1 data from BC Transit not available at time of report.*

Solid Waste [350, 351, 352, 353, 355]

PROJECTS

Organics Diversion Strategy
Work on the Organics Diversion Strategy has commenced including site visits to the recycling depots, Salish Soils compost facility, Sechelt Landfill and Pender Harbour Transfer Station. Public engagement will be conducted in conjunction with the SCRD's Community Dialogues scheduled for May. The draft Organics Diversion Strategy including a summary of the public feedback is projected to be presented at the July 20, 2017 ISC.

Stewardship Plan Updates
There are several stewardship plans undergoing updates in 2017 including the plans for printed paper & packaging (RecycleBC, formerly MMBC), lamps and lighting equipment (Light Recycle), paint and household hazardous waste (Product Care) and major appliances (MARR). Solid Waste staff will be reviewing the proposed plan updates and providing feedback to the agency administering each stewardship plan. Copies of the feedback will be provided to the Board via Directors Reading File.

Feedback was submitted in Q1 to RecycleBC.

RecycleBC will be hosting consultation sessions for local government currently scheduled for November 15 and 16, 2017. Additionally, effective March 28, 2017 MMBC formally changed their name to RecycleBC.

Technical Working Groups for the AVICC Solid Waste Sub-Committee
The Waste Reduction Coordinator has been participating in a Communications Technical Working Group that is preparing an AVICC-wide illegal dumping campaign.

The Manager, Solid Waste Services has been participating in a Solid Waste Technical Working Group that is supporting the review of solid waste statistics for AVICC communities.

BC Product Stewardship Council
The British Columbia Product Stewardship Council (BCPSC) is a coalition of regional districts, provincial agencies, and trade organizations that contributes to the success of extended product stewardship (EPR) in BC. The SCRD is a member of BCPSC.

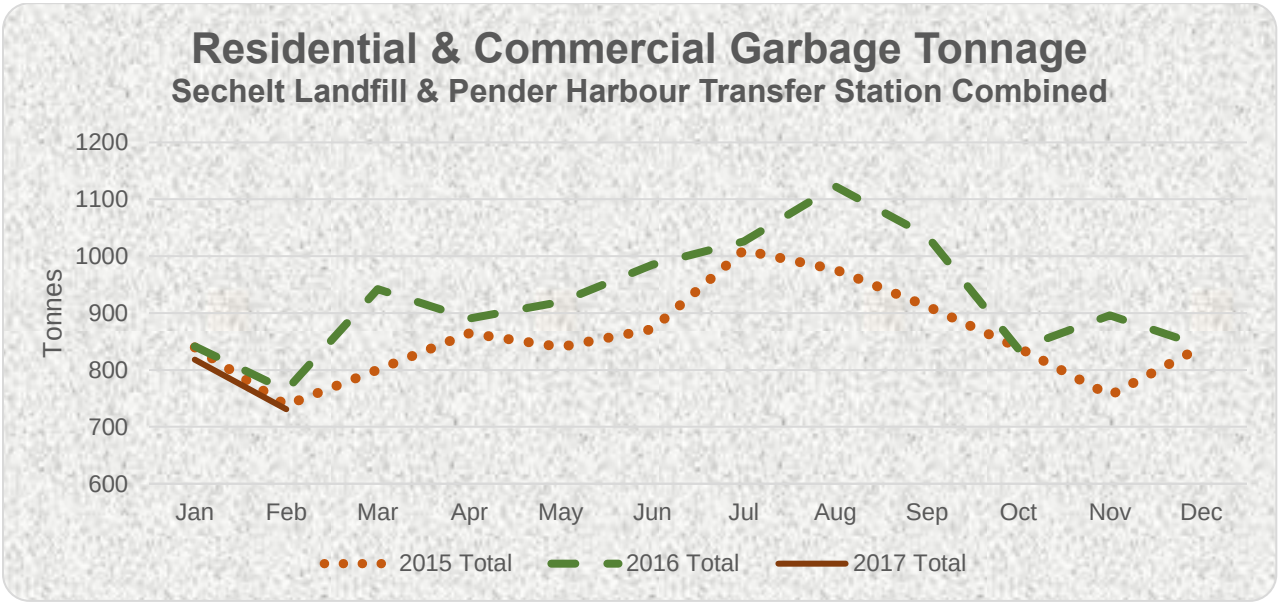
In 2017, one of the strategic priorities of the BCPSC is to meet monthly (historically, met quarterly) and to invite stewardship agencies to present their program to the group.

The BCPSC has recently created a working group for barriers and challenges to rural servicing of stewardship programs. The Manager, Solid Waste Services is part of this working group. The terms of reference are being developed.

Annual Reporting to the Ministry of Environment
The 2016 Ministry of Environment annual environmental monitoring and operations reporting for the Sechelt Landfill and Pender Harbour Transfer Station was completed and submitted to MoE.

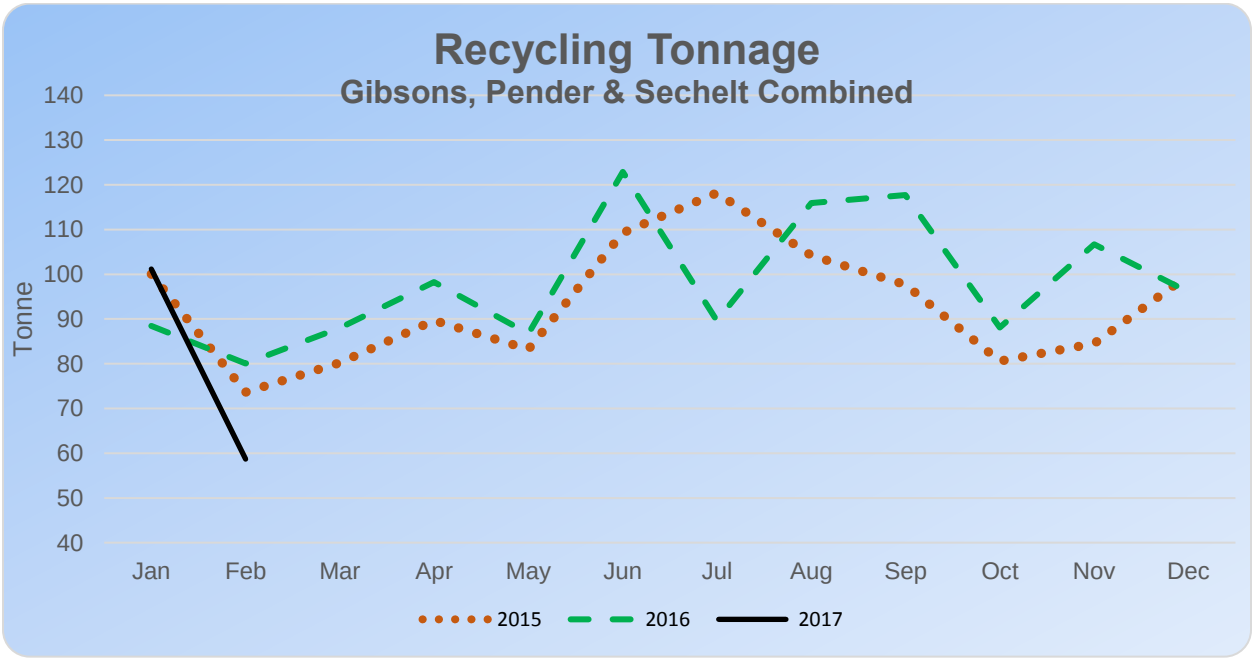
OPERATIONS

Statistics - Landfill



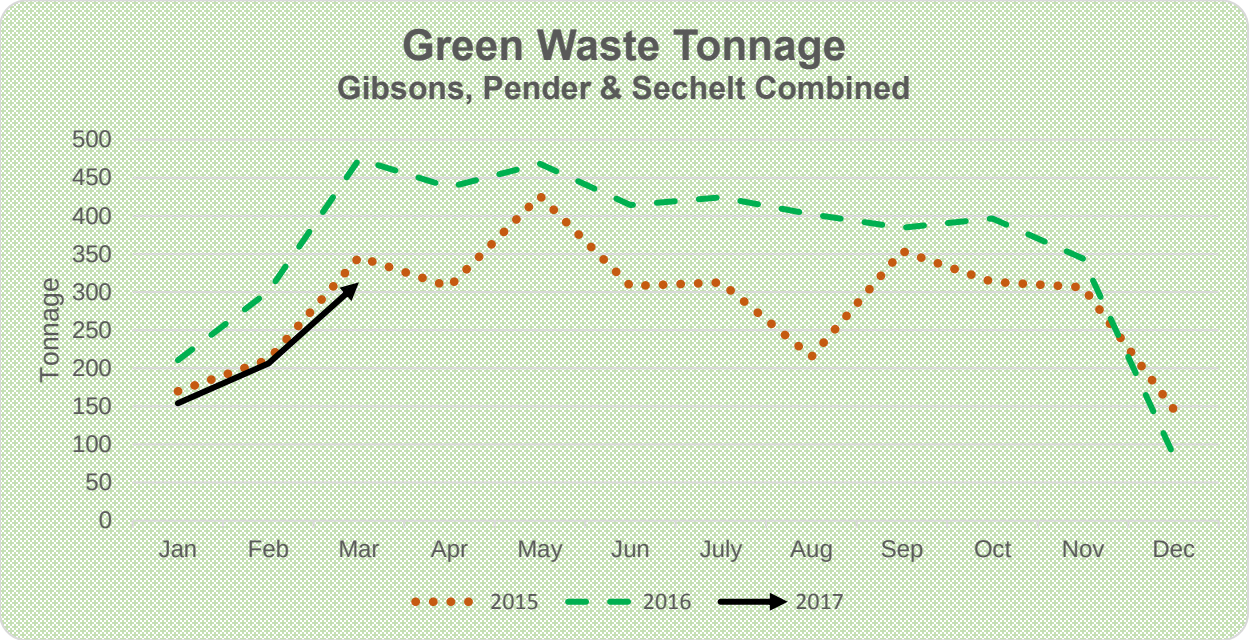
**Does not include other landfilled items such as construction waste, asbestos or furniture.*

Statistics - Recycling



** Data provided by RecycleBC (formerly called MMBC) and is updated as data is received.*

Statistics - Green Waste



**Combined totals for Sechelt Landfill, Pender Harbour Transfer Station, Town of Gibsons Green Waste Facility and residential self-haul at Salish Soils.*

Infrastructure Community Events/Outreach

Date	Community Event	Topic
January 17, 2017	Roberts Creek Water Metering Open House (Area D)	Water Meters
January 16, 2017	Roberts Creek Community Info Fair (HandyDART)	Transit
February 22, 2017	Elphinstone Water Metering Open House (Area E)	Water Meters
March 3, 2017	Sechelt Elder Care Fair (HandyDART)	Transit
March 15, 2017	New Square Bay Wastewater Treatment Plant neighbourhood meeting	Wastewater
March 16, 2017	New Square Bay Wastewater Treatment Plant neighbourhood meeting	Wastewater

Reviewed by:			
Manager	X – R. Cooper X – S. Walkey X – D. Crosby X – G. Dykstra	Finance	
GM		Legislative	
CAO	X – J. Loveys	Other	

BRITISH COLUMBIA

March 3, 2017

Patrick Brabazon, Chair
Powell River Regional District
4675 Marine Avenue, Suite 202
Powell River BC V8A 2L2

Reference: 260657

Garry Nohr, Chair
Sunshine Coast Regional District
1975 Field Road
Sechelt BC V0N 3A1

Dear Chair Brabazon and Chair Nohr:

Re: Thank You

I am writing to thank you for taking the time to meet with me at the 2016 Union of British Columbia Municipalities (UBCM) convention in Victoria. I am glad we had the opportunity to discuss the Coastal Ferry Act and BC Ferries; funding for pedestrian and cycling upgrades along Padgett Road; improved road conditions and speed safety on Savary Island; funding for a drainage assessment of areas along the coast; your interest in additional funding towards highway improvements in the Powell River Area; the Public Transit Infrastructure Fund; and BC Ferry services assessments and taxation.

The yearly UBCM gathering is a valuable chance for our government to come together with local representatives from around B.C. and look at ways we can work collaboratively to meet the unique needs of our province's communities. It is a privilege to find out more about the important progress being made by local leaders like yourself on transportation issues in your community, and I appreciate the opportunity to identify the steps we can take to help build on this work and deliver on our ministry's commitment to providing the safest, most reliable transportation network possible.

I understand BC Ferries will be looking at ways to improve on-time performance on the Langdale-Horseshoe Bay route. The ministry has also had discussions with BC Ferries regarding service levels. The company continues to work with the Ferry Advisory Committees to examine where it might make sense to add sailings or alter the existing schedule.

.../2

Ministry of Transportation and Infrastructure

Office of the Minister

Mailing Address:
Parliament Buildings
Victoria BC V8V 1X4

Finally, ministry staff will contact you directly regarding drainage maintenance and flooding in your area, as well as Padgett Road, and Steamship Road/Tucker Bay Road.

I look forward to continuing to work together to ensure British Columbians have their voices heard, so that we can make a difference for generations to come.

Thank you again for taking the time to meet with me.

Sincerely,

Todd G. Stone
Minister

Copy to: Grant Main, Deputy Minister

Deborah Bowman, Assistant Deputy Minister
Transportation Policy and Programs Department

Lindsay Kislock, Assistant Deputy Minister
Partnerships Department

Kevin Richter, Assistant Deputy Minister
Highways Department

B.C. Ferry Authority

OFFICE OF THE CHAIR

British Columbia Ferry Services Inc.
500 – 1321 Blanshard Street
Victoria, BC V8W 0B7

Tel (250) 978-1502
Fax (250) 978-1953

March 27, 2017

Ms. Barb Desjardins, Chair
Capital Regional District
P.O. Box 1000
625 Fisgard Street
Victoria, BC V8W 2S6

Mr. John Lefebure, Chair
Cowichan Valley Regional District
175 Ingram Street
Duncan, BC V9L 1N8

Mr. Garry Nohr, Chair
Sunshine Coast Regional District
1975 Field Road
Sechelt, BC V0N 3A1

Mr. Greg Moore, Chair
Metro Vancouver Regional District
4330 Kingsway
Burnaby, BC V5H 4G8

Mr. Jack Crompton, Chair
Squamish Lillooet Regional District
P.O. Box 219
1350 Aster Street
Pemberton, BC V0N 2L0

APPOINTMENTS TO THE
B.C. FERRY AUTHORITY BOARD OF DIRECTORS

I am writing on behalf of the B.C. Ferry Authority to advise you that the review of the nominations to the Board of Directors received from the Appointment Areas is now complete.

It is my pleasure to announce that the following nominees have been appointed to the Board of B.C. Ferry Authority, effective April 1, 2017:

- Sandra Stoddart-Hansen
  Southern Mainland Appointment Area
  Term ending March 31, 2020

- Susan Mehinagic
  Southern Vancouver Island Appointment Area
  Term ending March 31, 2020

The B.C. Ferry Authority was privileged to receive nominations of a high standard, and we thank you for the effort that you put into ensuring this was the case for your appointment area. In selecting those nominees to be appointed, the Authority was mindful of the need to ensure that members of the Board, collectively, satisfy the skills and experience profile contained in the Authority's by-laws. The appointments have been made to ensure that this requirement continues to be met.

.../2

We appreciate your assistance with this nomination process and extend to you, your Board, administrators and staff, our sincere thanks for working with us to make our appointment process effective.

Sincerely,

Roderick D. Dewar
Chair, Board of Directors
B.C. Ferry Authority

cc: Cynthia Lukaitis, Vice President & Corporate Secretary
Janette Loveys, Chief Administrative Officer, Sunshine Coast Regional District
Lynda Flynn, Chief Administrative Officer, Squamish-Lillooett Regional District
Carol Mason, Chief Administrative Officer, Metro Vancouver Regional District
Brian Carruthers, Chief Administrative Officer, Cowichan Valley Regional District
Robert Lapham, Chief Administrative Officer, Capital Regional District