

DATE: October 30, 2019

FILE: 5340-20

TO: Chair and Members
Comox Valley Sewage Commission

FROM: Russell Dyson
Chief Administrative Officer

Supported by Russell Dyson
Chief Administrative Officer

R. Dyson

RE: Comox Valley Water Pollution Control Centre – Odour Control Measures

Purpose

To provide the results of odour dispersion modelling completed at the Comox Valley Water Pollution Control Center (CVWPCC); a preliminary review of other jurisdictions odour control standards; and provide a recommended response to complaints from neighbors.

Recommendations from the Chief Administrative Officer:

1. THAT staff complete the following work for the Comox Valley Water Pollution Control Center and report back to the sewage commission prior to finalizing the 2020-2024 financial plan:
 - a. Further research about jurisdictions in British Columbia to better inform a decision about setting an odour standard,
 - b. Additional odour sampling to build a better data, and run the new numbers through the odour dispersion model; and,
 - c. An odour control systems option analysis be completed to further inform a final recommendation prior to finalizing the proposed 2020-2024 financial plan.
2. THAT Comox Valley Regional District staff work with the Curtis Road Residents Association to draft a Good Neighbor Agreement for consideration by the Comox Valley Sewage Commission.

Executive Summary

- Staff continue to assess odour standards, perform analysis, and investigate mitigation measures and costs at the direction of the sewage commission in response to concerns expressed by the Curtis Road residents.
- There has been a significant increase in the estimated cost of covering the bioreactors, and the results of the research into odour standards set by other jurisdictions is inconclusive
- Staff are recommending that further study work, research and analysis be undertaken before recommending a path forward.
- Prior to finalizing the proposed 2020-2024 financial plan, staff propose to:
 - Expand the research into other jurisdictions to include more facilities, and a larger set of questions to gather the information required to support a recommendation for an odour standard at the CVWPCC
 - Undertake further sampling of the bioreactors to build a larger data set which will be run through the CVWPCC odour dispersion model

- Undertake a new odour control system options analysis with a wider scope, and a class C cost estimate to ensure that viable alternatives haven't been missed, and that a decision is made with better cost information.
- Report back to the sewage commission with recommendations regarding setting an odour standard for the CVWPCC and any capital improvements required to meet the standard

Recent Work and Results

- Significant study and modelling work has been completed in 2019:
 - Updated emission sampling from the CVWPCC and odour dispersion modelling to confirm the performance of the upgrades, and determine the need for further work.
 - Review of what other jurisdictions are doing in terms of odour control standards/guidelines.
 - Development of an updated Class D cost estimate for covering the bioreactors.
- The updated odour dispersion modelling concludes:
 - There has been a significant decrease in odour emissions from the CVWPCC, roughly in line with the 2016 projections.
 - Even with the improvements, there remain infrequent exceedances of five odour units (OU) at the CVWPCC property line.
 - Covering the bioreactors can be expected to keep odour concentrations at the CVWPCC property line below one OU.
- The research into what other jurisdictions are doing concludes:
 - There are no federal regulations on odour and no established odour impact criteria for the Province of British Columbia, the only province with a quantifiable guideline is the Province of Ontario which sets a limit of one OU.
 - The Capital Regional District, has adopted a five OU limit at property line for their new McLoughlin Point Plant.
 - Metro Vancouver has committed to no detectable odour at the property lines for their new Northshore Treatment Plant and the upgrade of the Northwest Langley Treatment Plant, and aims for a maximum of five OU at the property line or 'minimally detectable' at the nearest sensitive receptors for their other wastewater treatment facilities.
 - Most other (comparable by size or larger) treatment plants in BC do not have an odour standard in place. For those that utilize bioreactors, none are covered.
- The revised cost estimate from ISL Engineering for covering the bioreactors and installing the required odour control equipment is \$8.5 million for a 45 year solution

Background

- There is a history of odour complaints at the CVWPCC, including a court case and settlement in the 1990's that led to the regional district implementing significant odour control measures at that time.
- Despite the measures taken in the 1990's, odour complaints continued and in 2013 the Comox Valley Sewage Commission directed staff to undertake study work to confirm the impact and recommend further mitigation measures.
- In 2016, an odour study was completed which concluded that facility odours could be reduced by over 80 per cent by rehabilitating the existing scrubber, and covering the primary clarifiers, while the remaining 18 per cent of CVWPCC odour could be resolved by covering the bioreactors.
- The Comox Valley Sewage Commission directed that the scope predicted to reduce odour by 80 per cent be completed, and that a follow up odour study be undertaken to assess the

effectiveness of these upgrades. In 2018 this scope, along with an additional carbon polisher to further improve odour performance, was installed.

- Since that work was completed delegation presentations have been made by the Curtis Road Residences Association (CRRA) voicing their concerns that the improvements have not resolved odours from the plant.

Prepared by:

K. La Rose

Kris La Rose, P.Eng
Senior Manager of Water/
Wastewater Services

Concurrence:

M. Rutten

Marc Rutten, P.Eng
General Manager of
Engineering Services

Stakeholder Distribution (Upon Agenda Publication)

Curtis Road Residents Association	✓
-----------------------------------	---

Background/Current Situation

There is a history of odour complaints at the CVWPCC, including a court case and settlement in the 1990's that led to the regional district implementing significant odour control measures at that time. Despite the measures taken in the 1990's, odour complaints continued and in 2013 the Comox Valley Sewage Commission directed staff to undertake study work to confirm the impact and recommend further mitigation measures.

In 2016, an odour dispersion modelling study was completed which concluded that facility odours could be reduced by over 80 per cent by rehabilitating the existing scrubber, covering the primary clarifiers and installing an activated carbon polisher, while the remaining 18 per cent of CVWPCC odour could be resolved by covering the bioreactors. Since the completion of the dispersion modelling study the scrubber has been rehabilitated, the primary clarifiers have been covered, and a carbon polisher was installed.

Following completion of the capital upgrades for odour control in 2018, further dispersion modelling has been completed to better understand the impact the upgrades have made on reducing odour emissions from the plant and are described in further detail in the sections below.

2019 Odour Dispersion Modelling Results

The objective of completing odour dispersion modelling at the CVWPCC is to determine the off-site odour levels generated from the CVWPCC, the full report by RWDI dated October 16, 2019 is provided as Appendix A. The same 2014 meteorological data from the 2016 study was utilized in the 2019 study to provide a direct comparison of the results.

In addition, updated odour emission sampling was completed on the bioreactors and at the inlet and outlet of the scrubber and polisher in 2019. The odour sampling methodology and results are provided as part of Appendix A. The bioreactors were sampled a total of three times in 2019, once in June and twice in September. The sampling in June 2019, incorrectly sampled the bioreactors by only sampling at one place in the bioreactors and a sample in the effluent channel, not accurately reflecting the odour concentrations within the bioreactors, and as such updated sampling was completed in September.

The sampled results that were used for the dispersion modelling were the September, 20 2019 results which were taken in the evening to try and best represent the time of day when odour complaints are the greatest. A summary of the bioreactor sampling results are provided in Table No. 1 below.

Table No. 1: Bioreactor Sampling Results in OU

	August 2016	June 18, 2019	September 4, 2019	September 20, 2019
Bioreactor Outlet	574		108	282
Bioreactor Middle	366		198	475
Bioreactor Inlet	3566	1045	1892	5061
Bioreactor Outlet			181	318
Bioreactor Middle			236	492
Bioreactor Inlet		2485	2918	5142
Effluent Channel		3514	-	-
Average	1,502	2348*	922	1962

**Although inlet measurements were higher for the September samples, the average for the June is higher, and not representative of bioreactor emissions because RWDI did not measure the middle and outlet portions of the tanks.*

Using the September 20, 2019 sampling results, three scenarios were modelled with the intent to develop an improved understanding on odours from the plant. The scenarios are as follows:

1. Current configuration now that upgrades are complete (status quo).
2. Current configuration with stack removed (per CRRRA request).
3. Current configuration but with the bioreactors covered.

Scenario two was removed as the preliminary modelling clearly showed a continued benefit of keeping the stack. Results in the two scenarios further reviewed were the current configuration and current configuration with the bioreactors covered. Table No. 2 below summarizes the odour units at each sensitive receptor for the two different scenarios.

Table No. 2: Maximum Predicted OU at Sensitive Receptors Based on 10 Minute Averaging Period

Sensitive Receptor	2016 OU Prior to 2018 Upgrade	OU with Current Configuration	OU with Bioreactors Covered
1	5.45	1.33	0.32
2	6.8	5.01	0.37
3	5.9	3.75	0.35
4	8.5	6.12	0.38
5	11.1	4.95	0.40
6	10.6	4.74	0.41
7	10.0	4.17	0.48
8	9.7	2.94	0.59
9	4.57	3.35	0.38
10	5.22	3.28	0.40
11	6.54	2.55	0.45
12	15.6	6.27	0.47
13	-	3.71	0.51
14	-	7.18	0.50
15	-	2.91	0.59
16	-	4.40	0.57
17	-	6.41	0.42
18	-	1.53	0.32

As can be seen from the table above the upgrade work completed in 2018 significantly reduced predicted odour levels at the sensitive receptors. Covering the bioreactors is predicted to reduce odour levels to below one OU, largely eliminating odour at the sensitive receptors.

Existing Odour Framework in Canada

In the absence of a regulated odour limit for wastewater treatment plants in British Columbia, the CRRRA has requested that the Comox Valley Sewage Commission commit to the an odour standard at the CVWPCC.

Provinces in Canada have varying protections in place in terms of odour frameworks based on greater or lesser degrees of subjectivity. Attached as Appendix B to this report is a discussion on the various odour frameworks in Canada completed by RWDI.

The only quantifiable guideline within Canada is from Ontario. The Ontario Ministry of Environment, Conservation and Parks requires that a 10 minute odour-based standard of one OU is exceeded less than 0.5 per cent of the time (approximately 44 hours per year).

Manitoba has set two guidelines for odour, two OU at residential locations and seven OU at industrial locations. However these values are used for the assessment of potential impacts from new facilities only and are not an enforcement tool to be used once the facility is in operation.

Quebec also has guideline odour units limits (one OU at the 98th percentile, five OU at the 99.5th percentile), but the guideline limits are for specific sectors which include composting and biogas but don't specifically mention wastewater treatment plants.

Voluntary Odour Standards at Wastewater Treatment Plants in BC

Provided as Appendix C to this report is a summary of odour control mechanisms at 13 wastewater treatment plants in British Columbia. Although this list is not exhaustive, contact with ten of the largest population centers in BC was made to develop an improved understanding of odour control within their jurisdictions and if any voluntary odour standard has been adopted.

Of the 13 wastewater treatment plants contacted, only two have voluntarily adopted an odour standard. Table No. 3 below provides a summary of the standards that wastewater treatment have voluntarily adopted.

Table No. 3: Voluntary Odour Standards at Wastewater Treatment Plants in BC

Wastewater Treatment Plant	Voluntary Odour Standard
Capital Regional District - McLoughlin Point (Under Construction)	<ul style="list-style-type: none"> • Five OU at property line.
Metro Vancouver	<ul style="list-style-type: none"> • Try to stay within range of five OU at property line and minimally detectable at the nearest sensitive receptor for existing facilities. • No detectable odours at the property line for the new Northshore Treatment Plant and the upgraded Northwest Langley Treatment Plant

Capital Cost Estimates for Covering the Bioreactors

In parallel with dispersion modelling completed by RWDI, ISL Engineering developed a Class D cost estimate for covering of the bioreactors.

The bioreactors are aerated resulting in significant air flow that would need to be treated. The current odour control system is at its capacity and any future air flow would require construction of a new odour control system, including ducting, and air treatment technology. It is not possible to tie-in the existing bioreactors to the existing odour control system.

Summarized in Table No. 4 below are Class D cost estimates for two different configurations for covering the bioreactors. Both options include adding a chemical scrubber and an activated carbon filter for the treatment of the air off the bioreactor and venting air through the existing stack. The only difference between the two options were the sizing of the polisher and scrubber to treat odorous air. Option 1 is expected to cover plant requirements to 2044, where Option 2 is expected to cover plant requirements to 2066.

Table No. 4: Class D Cost Estimate for Covering Bioreactors

Component	Option 1	Option 2
General Requirements	\$1,260,000	\$1,320,000
Bioreactors and channel covers	\$1,020,000	\$1,020,000
Piping	\$967,000	\$967,000
Bioreactors Concrete Epoxy Coating	\$800,000	\$800,000
New Chemical Scrubber	\$647,500	\$754,000
New Activated Carbon Polisher	\$862,500	\$1,005,000
Electrical	\$150,000	\$180,000
Subtotal	\$5,707,000	\$6,037,000
Engineering and Contingencies (40 per cent)	\$2,283,000	\$2,415,000
Total (excluding GST)	\$7,990,000	\$8,452,000

Depending on the outcomes of the Liquid Waste Management Planning process, treatment upgrades at the CVWPCC could be varied, however as upgrades occur at the CVWPCC, space for adding further odour control systems may be limited. For a modest increase in capital cost, Option 2 provides almost double the lifetime of odorous air handling at the facility.

Good Neighbor Agreement

At the September Comox Valley Sewage Commission meeting, the CRRRA presented a draft Good Neighbor Agreement that they want the Comox Valley Sewage Commission to approve. The proposed agreement includes nine principles aimed at minimizing impact from sewage service operations on the surrounding community:

1. Odour
2. Visual stigma
3. Groundwater
4. Noise
5. Light pollution
6. Local emergency plan
7. Communications protocol
8. Complaint management
9. Access to information

While the precise terms would require further analysis and negotiations, many of these items are already in place or in progress, and none raise any significant red flags with staff, with the exception of setting an odour standard, which would require the Comox Valley Sewage Commission to approve covering of the bioreactors.

Conclusions

The odour control upgrades undertaken at the CVWPCC in 2018 were effective at reducing odours at the CVWPCC. However, odour complaints persist, and revised odour dispersion modelling and a review of mandatory and voluntary standards across Canada and BC suggest that odour at sensitive receptors near the CVWPCC are likely still unacceptably high.

However, covering the bioreactors is significantly more expensive than previously estimated, more work could be done to confirm whether or not there are other opportunities for reducing odour at the CVPWCC, and there are more questions than answers about how other jurisdictions in BC are managing odour around their facilities.

Staff propose to:

- Expand the research into other jurisdictions to include more facilities, and a larger set of questions to gather the information required to support a recommendation for an odour standard at the CVWPCC
- Undertake further sampling of the bioreactors to build a larger data set which will be run through the CVWPCC odour dispersion model
- Expand the odour control system options analysis to include a wider scope, and include class C cost estimates to ensure that all possible options are considered, and a decision is made with better cost information.
- Report back to the sewage commission with recommendations regarding setting an odour standard for the CVWPCC and any capital improvements required to meet the standard

Policy Analysis

At its May 14, 2019 meeting, in response to the delegation made by the CRRA on April 16, 2019, the Comox Valley Sewage Commission approved the following recommendation.

THAT odour dispersion modelling be completed to understand the odour impacts to the surrounding community following the completion of odour control capital upgrades in 2018 and that the modelling include both with and without the tall stack at the Comox Valley Water Pollution Control Centre;

AND FINALLY THAT the results of the odour dispersion modelling study be reported back to the Comox Valley Sewage Commission to inform the discussion on the next steps for odour control work at the Comox Valley Water Pollution Control Centre.

At its June 11, 2019 meeting in response to the second delegation made by the CRRA on May 14, 2019, the Comox Valley Sewage Commission approved the following recommendation.

THAT staff be directed to investigate and assess options for setting an odour standard for the Comox Valley Water Pollution Control Center.

At its September 17, 2019 meeting in response to a delegation made by the CRRA on September 17, 2019, the Comox Valley Sewage Commission approved the following recommendation.

THAT the information presented by Jenny Steel, Curtis Road Residents Association, regarding their proposed "Good Neighbour Agreement" and request that the Sewage Commission/CVRD approve and implement the agreement be received.

Options

The Comox Valley Sewage Commission has the following options:

1. Accept staff's recommendation to undertake further research, study work and analysis before recommending a path forward.
2. Commit to a defensible odour standard at the CVWPCC and direct staff to undertake any required capital upgrades to achieve the standard.

Covering the bioreactors is significantly more expensive than previously estimated, more work could be done to confirm whether or not there are other, less expensive opportunities for reducing odour at the CVPWCC, and there are more questions than answers about how other jurisdictions in BC are managing odour around their facilities. Before committing to such a large expense at the CVWPCC, staff recommend that further work be performed to confirm the appropriate path forward. As such, only option 1 is recommended.

Financial Factors

The most recent capital cost estimate of \$8.5 million for covering of the bioreactors and associated odour control infrastructure is up significantly from the \$3 million estimated by the same engineering firm in 2016.

The upcoming 2020-2024 financial plan will include projections for required municipal requisition amounts over the five year plan, but it is certain that an increase in municipal requisitions above those previously approved will be required starting in 2023.

Legal Factors

There is a long history of odour complaints at the CVWPCC, including a court case and settlement in the 1990's that led to the regional district implementing significant odour control measures at that time. While BC has yet to implement an odour regulation applicable to wastewater treatment facilities, the regulatory landscape in Canada has changed significantly since then.

Regional Growth Strategy Implications

None.

Intergovernmental Factors

The Comox Valley Sewerage Service is governed by the Comox Valley Sewage Commission whose membership includes representation from the Town of Comox, the City of Courtenay and the Department of National Defence.

Interdepartmental Involvement

The Engineering Services branch is leading this work with support from Legislative Services.

Citizen/Public Relations

The outcome of the November 2019 Comox Valley Sewage Commission meeting will be communicated to the local residents in the next newsletter. Working with the External Relations department, Engineering Services staff will consult with the CRRA to develop a draft Good Neighbor Agreement and associated communications protocol.

Attachments: Appendix A – “Odour Assessment Report, RWDI Air Inc., October 16 2019”

Appendix B – “Existing Odour Framework in Canada, RWDI Air Inc., August 9, 2019”

Appendix C – “Summary of Odour Control at Select Wastewater Treatment Plants in BC, CVRD Staff, October 9, 2019”

Appendix D – “Wastewater Treatment Plant Bioreactor Odour Control Study, ISL Engineering and Land Services, October 10, 2019”