

## **Appendix G:**

**Technical, Environmental, Social, and Economic Considerations for Three Timing Options for Secondary Treatment at GNPCC and NBPCC**

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# **GREATER NANAIMO POLLUTION CONTROL CENTRE**

**Figure 1. Technical, Environmental, Social and Economic aspects of Secondary Treatment Timing Options for Greater Nanaimo Pollution Control Centre**

**Technical Considerations**

Criteria	General Comments	< Options >		
		1. 2016	2. 2018	3. 2019
<b>Feasibility of engineering/construction schedule</b>	Feasibility of target date when compared to established average project timelines for design, procurement and construction of similar projects	Fast track, timelines present significant challenges that limit feasibility and likely result in cost premiums and reduced functionality	Adequate timeframe for project completion	Adequate timeframe for project completion
<b>Opportunities for innovation, optimization</b>	Innovation in the areas of process optimization, resource recovery, reduced energy consumption, flexibility, better performance require time and consideration at the design phase	Fast track timelines limit opportunities for design consideration of potential opportunities	Adequate timeline for consideration of innovation opportunities	Adequate timeline for consideration of innovation opportunities
<b>Mitigate potential climate change impacts on facility</b>	Consideration of potential climate change impacts to infrastructure	Adequate timeline to consider infrastructure impacts	Adequate timeline to consider infrastructure impacts	Adequate timeline to consider infrastructure impacts
<b>Opportunities for future expandability</b>	Analysis of opportunities for future population increases and climate change related capacity impacts required at design phase	Fast track timelines limit opportunities for consideration of expandability	Adequate timeline for consideration of expansion opportunities	Adequate timeline for consideration of expansion opportunities

**Environmental Considerations**

Criteria	General Comments	< Options >		
		1. 2016	2. 2018	3. 2019
<b>Meet Provincial MWR Standards</b>	All options meet these criteria	Achieved earliest	Achieved 2 years after Option 1	Achieved 3 years after Option 1
<b>Meet Federal WSER standards</b>	All options meet these criteria within WSER deadlines	Achieved earliest	Achieved 2 years after Option 1	Achieved 3 years after Option 1
<b>Protect the environment</b>	Implementation of secondary treatment will reduce the potential for impacts to human health and the receiving environment	Achieved earliest	Achieved 2 years after Option 1	Achieved 3 years after Option 1
<b>Improved effluent quality</b>	Secondary treatment will reduce TSS and BOD discharge concentrations	Achieved earliest	Extends primary discharge by 2 years relative to Option 1	Extends primary discharge by 3 years relative to Option 1
<b>Minimize carbon footprint</b>	Related in large part to resource recovery opportunities	Fast track schedule limits opportunities	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria

## Environmental Considerations

Criteria	General Comments	< Options >		
		1. 2016	2. 2018	3. 2019
Identify resource recovery opportunities	Possible opportunities include: heat recovery; bio-solids management; biogas generation	Fast track schedule limits opportunities	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria
Flexibility for future resource recovery opportunities	Design in flexibility for potential future opportunities	Fast track schedule limits opportunities	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria
Reduce treatment plant site impacts	Potential impacts include habitat disruption, site ecological sensitivity	Existing developed site, minimal impact anticipated	Existing developed site, minimal impact anticipated	Existing developed site, minimal impact anticipated
Minimize geotechnical concerns	Includes site suitability, stability	Existing developed site	Existing developed site	Existing developed site

## Social Considerations

Criteria	General Comments	< Options >		
		1. 2016	2. 2018	3. 2019
Construction disruption	Construction activities will create potential disruption and inconvenience for local residents. Appropriate mitigation measures are required for noise, odours, dust, and traffic	Earliest completion of construction activities. Fast track schedule may impact ability to effectively mitigate impacts	Schedule may allow design for better mitigation	Schedule may allow design for better mitigation
Disruption from ongoing operations (noise, odours, dust, traffic)	Require design for proper mitigation of potential impacts during ongoing operations	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design
Facility/site Aesthetics	Aesthetics include proper screening and integration with neighbourhood	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design
Archaeological/cultural Resources	Construction activities will require proper consideration and procedures to mitigate potential impacts to cultural artifacts	Adequate timeframe for mitigation of risks	Adequate timeframe for mitigation of risks	Adequate timeframe for mitigation of risks
Property values	Facility expansion could affect local property values. Design and construction needs to minimize potential impacts	Similar impact potential for all options	Similar impact potential for all options	Similar impact potential for all options

## Social Considerations

Criteria	General Comments	< Options >		
		1. 2016	2. 2018	3. 2019
<b>Public perception</b>	Extending timeframe for achieving secondary treatment may negatively impact public perceptions. Potential tourism, recreation and related economic impacts	Minimizes potential	Extends potential impacts by 2 years relative to Option 1	Extends potential impacts by 3 years relative to Option 1
<b>Loss of beneficial site uses</b>	Existing facility is located adjacent to Neck Point Park. Integration with the park has provided reciprocal benefits	Minimal impacts anticipated	Minimal impacts anticipated	Minimal impacts anticipated
<b>Compatibility with land use zoning</b>	Existing facility is located in an area surrounded by park, school and residential	Established compatibility with existing facility	Established compatibility with existing facility	Established compatibility with existing facility

## Economic Considerations

Criteria	General Comments	< Options >		
		1. 2016	2. 2018	3. 2019
<b>Capital Cost Optimization</b>	Minimizing capital cost is most effectively carried out during the design phase	Fast track project reduces ability to consider capital cost optimization opportunities	Adequate timeline for capital cost optimization	Adequate timeline for capital cost optimization
<b>Operating cost Optimization</b>	Minimizing operating cost is most effectively carried out during the design phase. Fast tracking may result in increased capital costs	Fast track project reduces ability to consider operating cost optimization opportunities	Adequate timeline for operating cost optimization	Adequate timeline for operating cost optimization
<b>Tax rate impacts</b>	Timing of project expenditure has a significant impact on tax burden resulting from the project	Highest tax burden imposed on taxpayers	Tax burden significantly lower than Option 1	Tax burden significantly lower than Option 1
<b>Revenue Opportunities</b>	Revenue opportunities flow primarily from resource recovery opportunities	Fast track schedule limits opportunities	Adequate timeline to consider revenue generating opportunities	Adequate timeline to consider revenue generating opportunities
<b>Opportunities to secure grants and funding</b>	Currently no funding opportunities have been identified from provincial or federal sources	Shortest timeline to secure funding opportunities	Better timeline to explore funding opportunities	Best timeline to explore funding opportunities
<b>Synergies with other large treatment projects</b>	Metro Van and CRD are undertaking large secondary treatment projects as well. There may be opportunities to reduce costs for all parties through effective coordination	Fast track timeline limits opportunities	Adequate timeline to explore opportunities	Adequate timeline to explore opportunities

# **NANOOSE BAY POLLUTION CONTROL CENTRE**

**Figure 2. Technical, Environmental, Social and Economic aspects of Secondary Treatment Timing Options for Nanoose Bay Pollution Control Centre**

**Technical Considerations**

Criteria	General Comments	< Options >		
		1. 2020	2. 2025	3. 2030
<b>Feasibility of engineering/ construction schedule</b>	Feasibility of target date when compared to established average project timelines for design, procurement and construction of similar projects	Adequate timeframe for project completion	Adequate timeframe for project completion	Adequate timeframe for project completion
<b>Opportunities for innovation, optimization</b>	Innovation in the areas of process optimization, resource recovery, reduced energy consumption, flexibility, better performance require time and consideration at the design phase	Adequate timeline for consideration of innovation opportunities	Adequate timeline for consideration of innovation opportunities	Adequate timeline for consideration of innovation opportunities
<b>Mitigate potential climate change impacts on facility</b>	Consideration of potential climate change impacts to infrastructure	Adequate timeline to consider infrastructure impacts	Adequate timeline to consider infrastructure impacts	Adequate timeline to consider infrastructure impacts
<b>Opportunities for future expandability</b>	Design needs to consider potential provision of sewage treatment for new developments (i.e. Fairwinds, and expanding service area to existing neighbourhoods.	Adequate timeline for consideration of expansion opportunities	Adequate timeline for consideration of expansion opportunities	Adequate timeline for consideration of expansion opportunities

**Environmental Considerations**

Criteria	General Comments	< Options >		
		1. 2020	2. 2025	3. 2030
<b>Meet Provincial MWR Standards</b>	All options meet these criteria, although with significant timing differences	Achieved earliest	Achieved 5 years after Option 1	Achieved 10 years after Option 1
<b>Meet Federal WSER standards</b>	All options meet these criteria within WSER deadlines	Achieved earliest	Achieved 5 years after Option 1	Achieved 10 years after Option 1
<b>Protect the environment</b>	Implementation of secondary treatment will reduce potential for impacts to organisms in the receiving environment	Achieved in shortest time	Extends potential impacts by 5 years relative to Option 1	Extends potential impacts by 10 years relative to Option 1
<b>Improved effluent quality</b>	Secondary treatment will reduce TSS and BOD discharge concentrations. Significant timing differences between options	Achieved in shortest time	Extends primary discharge by 5 years relative to Option 1	Extends primary discharge by 10 years relative to Option 1
<b>Minimize Carbon footprint</b>	Related in large part to resource recovery opportunities	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria



## Environmental Considerations

Criteria	General Comments	< Options >		
		1. 2020	2. 2025	3. 2030
<b>Identify resource recovery opportunities</b>	Possible opportunities include: heat recovery; bio-solids management; biogas generation	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria
<b>Flexibility for future Resource Recovery opportunities</b>	Design and construct with consideration of possible future resource recovery opportunities	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria	Adequate timeframe to achieve criteria
<b>Reduce treatment plant site impacts</b>	Potential impacts include habitat disruption, site ecological sensitivity	Existing developed site, minimal impact anticipated	Existing developed site, minimal impact anticipated	Existing developed site, minimal impact anticipated
<b>Minimize geotechnical concerns</b>	Includes site suitability, stability	Existing developed site	Existing developed site	Existing developed site

## Social Considerations

Criteria	General Comments	< Options >		
		1. 2020	2. 2025	3. 2030
<b>Construction disruption</b>	Construction activities will create potential disruption and inconvenience for local residents. Appropriate mitigation measures are required for noise, odours, dust, and traffic	Schedule will allow design for minimal disruption. Need to consider potential impacts on future Fairwinds	Schedule will allow design for minimal disruption. Need to consider potential impacts on future Fairwinds	Schedule will allow design for minimal disruption. Need to consider potential impacts on future Fairwinds
<b>Disruption from ongoing operations (noise, odours, dust, traffic)</b>	Require design for proper mitigation of potential impacts during ongoing operations	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design
<b>Facility/site Aesthetics</b>	Aesthetics include proper screening and integration with neighbourhood	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design	Adequate timeframe for mitigation by design
<b>Archaeological/cultural Resources</b>	Construction activities will require proper consideration and procedures for potential impacts to cultural artifacts	Adequate timeframe to mitigate risks	Adequate timeframe to mitigate risks	Adequate timeframe to mitigate risks
<b>Property values</b>	Facility expansion could affect local property values. Design and construction needs to minimize potential impacts	Similar impact potential for all options	Similar impact potential for all options	Similar impact potential for all options

### Social Considerations

Criteria	General Comments	< Options >		
		1. 2020	2. 2025	3. 2030
<b>Public perception</b>	Extending timeframe for achieving secondary treatment may negatively impact public perceptions. Potential tourism, recreation and related economic impacts	Minimizes potential	Extends potential impacts by 5 years relative to Option 1	Extends potential impacts by 10 years relative to Option 1
<b>Loss of beneficial site uses</b>	Existing facility is located adjacent to land designated as park	Minimal impacts anticipated	Minimal impacts anticipated	Minimal impacts anticipated
<b>Compatibility with land use zoning</b>	Existing facility is located in an area surrounded by park and residential	Established compatibility with existing facility	Established compatibility with existing facility	Established compatibility with existing facility

### Economic Considerations

Criteria	General Comments	< Options >		
		1. 2020	2. 2025	3. 2030
<b>Capital Cost Optimization</b>	Minimizing capital cost is most effectively carried out during the design phase	Adequate timeline for capital cost optimization	Adequate timeline for capital cost optimization	Adequate timeline for capital cost optimization
<b>Operating cost Optimization</b>	Minimizing operating cost is most effectively carried out during the design phase. Fast tracking may result in increased capital costs	Adequate timeline for operating cost optimization	Adequate timeline for operating cost optimization	Adequate timeline for operating cost optimization
<b>Tax rate impacts</b>	Timing of project expenditure has a significant impact on tax burden resulting from the project	Highest tax burden imposed on taxpayers	Tax burden significantly lower than Option 1, but higher than Option 3	Tax burden significantly lower than Options 1 + 2
<b>Revenue Opportunities</b>	Revenue opportunities flow primarily from resource recovery opportunities	Adequate timeline to consider revenue generating opportunities	Adequate timeline to consider revenue generating opportunities	Adequate timeline to consider revenue generating opportunities
<b>Opportunities to secure grants and funding</b>	Currently no funding opportunities have been identified from provincial or federal sources	Option with shortest timeline to secure funding opportunities	Adequate timeline to explore funding opportunities	Best timeline to explore funding opportunities