Treatment Options Summary - Dawson Wastewater Treatment Project

Information Categories	Mechanical Plant	Facultative Lagoon	Aerated Lagoon
Land Area	0.15 Acres	80 Acres	10 Acres
Land Type	Permafrost-free, level and stable ground	Permafrost-free, level and stable ground	Permafrost-free, level and stable ground
Presence of Local Permafrost	Unlikely – testing required	Most likely – testing required	Unlikely - testing required
Odours	No offensive odours at fence line	Odours present at 100 ft	No odours at 100 ft
Seasonality	Equipment must be adjusted to accommodate differences in seasonal flows.	Adaptable to seasonal flows.	Adaptable to seasonal flows.
Complexity	• Screening systems into building • Complex piping and pumping systems in building • Aeration Tanks and blowers • Disinfection system in building • Odour Control Systems	• Several lift stations required	• Several lift stations • Screening systems • Small building • Air blower in building • Disinfection system in building
Lifespan	20- 30 years Capacity may be exceeded after twenty years due to population growth and other factors Pumps and piping require replacement during this period due to the corrosive environment. Control systems also become obsolete.	20-30 years Capacity may be exceeded after twenty years due to population growth and other factors. Liners also require replacement.	20-30 years Capacity may be exceeded after twenty years due to population growth and other factors. Liners also require replacement.

Information Categories	Mechanical Plant	Facultative Lagoon	Aerated Lagoon
Infrastructure Cost Considerations Many factors need to be considered when calculating the cost of each of these systems. The following is a list of some of the major cost factors required for the infrastructure of each of the options	• Installation and maintenance of air pumps and ultraviolet lamps • Facility building • Items needing major maintenance	• Length of forcemain and effluent pipes • Providing freeze protection to forcemain and effluent pipes • Construction of access road • Elevation of location • Small facility building	• Length of forcemain and effluent pipes • Providing freeze protection to forcemain and effluent pipes • Installation and maintenance of air pumps and ultraviolet lamps • Construction of access roads • Elevation of locations • Small facility buildings
Distance from Lift station to Treatment Plant	Next to screening plant	Existing Pipe: 4600m New Pipe: 900m	**Dome Road:** Existing Pipe: 2300m New Pipe: 700m **South Bench:** Existing Pipe: 2300m New Pipe: 1900m **Callison 'C':** Existing Pipe: 1100 New Pipe: 2900m
Distance from Treatment Plant to Discharge Location	Next to discharge location	1000m	**Dome Road:** 3200m **South Bench:** 4500m **Callison 'C':** 4300m
Offsite Infrastructure	All infrastructure is on site.	New lift station forcemain.	**All Locations:** New lift stations and forcemain

Information Categories	Mechanical Plant	Facultative Lagoon	Aerated Lagoon
Overall Project Costs City of Dawson staff, Mayor and Council and Yukon Government continue to work together to assess the potential costs of the options under review and the potential impacts on Dawson residents. Once the Request for Proposal process closes for a mechanical solution a more thorough costs analysis can be finished. This information will be shared with Dawson residents at another public info session in approximately two months.	Projected Costs for the proposed mechanical plant will not be known until the Request for Proposal process closes. A detailed cost analysis will be shared with Dawson residents once a thorough cost comparison has been carried out.	Facultative lagoons are very large and the proposed location in Dawson is a long distance from the existing screening plants. These factors will contribute to higher capital costs. Operation and maintenance costs are generally lower as no mechanical equipment is required to maintain the lagoon. In Dawson, freeze protection of the forcemain and effluent pipes (including heating of water and insulation) will increase the capital and operation and maintenance costs of the facultative lagoon. To date freeze protection methods and the associated costs have not been considered in detail.	Aerated lagoons are much smaller, and even though they require more mechanical systems the capital costs for this type of lagoon are generally lower. Operation and maintenance costs tend to be higher than those for facultative lagoons due to the maintenance requirements of a more complex mechanical system. In Dawson, freeze protection of the forcemain and effluent pipes (including heating of water and insulation) will increase the capital and operation and maintenance costs of the aerated lagoon. To date freeze protection methods and the associated costs have not been considered in detail.
Environmental Considerations	• The mechanical plant option would begin wastewater treatment approximately two years before a lagoon could be operational. • Requires frequent sludge removal to ensure plant performance, hence lowest volume of sludge will be removed at any one time.	• A lagoon facility will take longer to construct. There is potential for repercussions from the Courts including costly interim measures or fines should Dawson choose a lagoon. • Requires least frequent sludge removal and disposal to ensure lagoon performance, hence large volumes of sludge will be removed at any one time.	• A lagoon facility will take longer to construct. There is potential for repercussions from the Courts including costly interim measures or fines should Dawson choose a lagoon. • Requires somewhat frequent cycle for sludge removal to ensure lagoon performance, hence lower volumes of sludge would be removed at any one time.

Information Categories	Mechanical Plant	Facultative Lagoon	Aerated Lagoon
Public Health Considerations All the options will meet the new, higher standards for wastewater effluent as recommended by the Canadian Council of Ministers of the Environment. This is not a federal requirement; rather the City of Dawson and YG have agreed to meet these higher standards before they are mandated. The safety considerations of each option will be carefully examined and the appropriate mitigation measures will be implemented for the selected treatment solution.	• Discharges back through existing outfall, downstream from community wells. • Building will be designed as a post-disaster building. • Power back up sources will be provided.	• Discharges into the Klondike River via a drainage area (dredge pond). • Testing will be done at the drainage area and at the river to make sure the effluent meets the Water License standards.	• Discharges back through existing outfall, downstream from community wells.
Land Use issues	• YG land has been secured for the potential plant. • The site is on and next to the existing, old screening plant. • The building would have to comply with the City of Dawson development bylaws. A requirement of the Request for Proposal is that the building must fit into Dawson's heritage requirements.	• The land identified is adjacent to Tr'ondëk Hwëch'in land. Future decisions about the use of this land may be impacted by a facultative lagoon. There are neighbours to this site as well. • Some right-of-way and placer claim land acquisition issues at proposed facultative site.	• The three sites identified vary with respect to neighbours, but all the areas are near other users, and this must be taken into account during planning. • Quartz & placer claim land acquisition issues at proposed aerated sites.

Please contact Catherine Harwood for questions and concerns regarding this project.
Catherine Harwood, Project Leader Highways and Public Works, Catherine.harwood@gov.yk.ca