# Appendix B

# Technical Memorandum #2 – Evaluation Criteria

Region of Waterloo

# New Dundee Water Supply System – Iron and Manganese Upgrades Class Environmental Assessment

## Technical Memorandum #2

Evaluation Criteria

FINAL

Prepared for:

Region of Waterloo



arva

**RVA 194591**

August 25, 2020

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**Attention: Kaoru Yajima**

Dear Mr. Yajima:

**Re:** Technical Memorandum #2
New Dundee Water Supply Iron and Manganese Upgrades Class Evaluation Criteria Review – FINAL

Please see enclosed Technical Memorandum #2 as the second submittal for the New Dundee Water Supply Iron and Manganese Upgrades Class Environmental Assessment (EA).

Yours very truly,

**R.V. ANDERSON ASSOCIATES LIMITED**


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Process Designer

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Encls.

# Technical Memorandum #2

## Evaluation Criteria

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# 1.0 Introduction

The Region of Waterloo has embarked upon a Class Environmental Assessment (EA) for the New Dundee Water Supply System in the Community of New Dundee, in the Township of Wilmot, in accordance with the requirements of the *Municipal Class Environmental Assessment* which is an approved process under the *Ontario Environmental Assessment Act*.. The New Dundee Water Supply facility is located on 156 Alderview Dr. in the Township of Wilmot.

The Region is completing this EA to address water treatment upgrades that have been identified based on anticipated changes to the Ontario Drinking Water Standards (ODWS). In June 2019, Health Canada issued the *Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese*, which established an aesthetic objective of 0.02 mg/L. It can be noted that aesthetic objectives are intended to address non-health related items such as odour, taste, and colour. To be in line with Health Canada recommendations, it is anticipated the provincial objective for manganese will be reduced from 0.05 mg/L to 0.02 mg/L, with a design operating objective of 0.015 mg/L. The New Dundee Well Supply System was identified for potential treatment upgrades in order to consistently meet the anticipated new standard.

In September 2019, the Region retained R.V. Anderson Associates Limited (RVA) to complete the Class Environmental Assessment for the Iron and Manganese Treatment Upgrades.

This technical memorandum is provided to select the evaluation criteria. The selected evaluation criteria will be used to evaluate alternative treatment solutions and alternative residual management solutions for the New Dundee Water Supply System, which will be discussed in Technical Memorandum #3. The criteria will also be used to evaluate the alternative design concepts for the preferred solution in Technical Memorandum #4.

# 2.0 Evaluation Criteria

The following four categories are proposed for the evaluation of alternate solutions as part of Phase 2 of the Class EA and for evaluation of alternative design concepts as part of the Phase 3 of the Class EA:

- Technical
- Natural Environmental
- Social
- Financial

The highest scoring solution or design for the technical category represents the best performance. The highest scoring solution for the natural environmental, social, and financial categories represents the least impact or cost.

To produce an overall score for each alternative solution/design, the scores from each category will be added together. It is proposed that each category carry an equal weighting of 25%.

Each of the primary categories was subdivided into specific criteria that will be used to inform its overall score. It is proposed that individual criterion within each category be equally weighted.

The criteria to be considered for each of the four categories are described in detail in the following sections.

## 2.1 Technical Criteria

The technical criteria reflect those engineering considerations that relate to the design, functionality and feasibility of the proposed solutions or design concepts. These criteria are meant to evaluate how well the design solves the project goal originally outlined by the Region.

- **Provides Reliable Service**
  The solution/design should provide a reliable supply of drinking water that meets the Ontario Drinking Water Standards (ODWS). Consideration should be given to redundancy, reducing the potential for water quality upsets, minimizing operational complexity, and minimizing the risk for mechanical breakdown.

- **Meets Existing and Future Needs**
  The solution/design should provide treatment for the New Dundee Wells to meet existing treatment requirements and anticipated future aesthetic objectives for manganese.

- **Aligns with Existing and Planned Infrastructure**
  The solution/design should optimize the existing infrastructure investments, including structures and equipment. Consideration should be made for replacing assets nearing the end of their service life and optimizing the integration of recommendations with the existing water supply system. The solution or design should also consider streamlining the treatment approach based on other Regional facilities for ease of operation.

  The solution/design should not limit the flexibility to undertake future upgrades and improvements at the New Dundee Wells, or at a potential treatment facility for the New Dundee Wells.

- **Aligns with Existing and Future Land Use**
  The solution/design should minimize potential impacts to existing land uses and adjacent lands. Considerations should be made for compatibility with surrounding land use under existing and anticipated future conditions.

- **Aligns with Approval and Permitting Process**
  The solution/design should minimize the complexity and time spent to obtain approvals from various regulatory agencies.

- **Manages and Minimizes Construction Risks**
  Construction of the solution/design should minimize the complexity of construction with respect to various considerations including, but not limited to manpower, staging, construction laydown areas, special equipment, energy, and schedule. The solution/design should also maximize the ability to maintain the water supply from the New Dundee Wells during construction either through staging or minimizing the duration of construction.

- **Ability to Adapt to Climate Change**
  The solution/design should promote resiliency to fluctuating weather events such as extreme temperatures, high precipitation, flooding, and high wind gusts.

## 2.2 Natural Environmental Criteria

Natural environmental criteria evaluate the degree to which the solution/design impacts the natural environment, with emphasis on those sensitive areas that are most critical to human or ecological functions and are most likely to be disturbed. An ideal solution/design should have the least amount of ecological impact.

- **Protects Environmental Features**
  The solution/design should protect sensitive natural features and regulated areas such as Environmentally Sensitive Areas and Areas of Natural or Scientific Interest. Potential impacts related to construction and operations should be minimized for terrestrial and aquatic habitats/features, vegetation, wetlands, wood lots, and steep slopes.

- **Protects Wildlife and Species at Risk**
  The solution/design should minimize impacts to wildlife (including species at risk) and the identified habitat for these species. The habitat includes nesting sites, hibernation areas, foraging areas, areas of wildlife travel, and migratory paths.

- **Protects Groundwater, Streams and Rivers**
  The solution/design should protect groundwater and respect the Clean Water Act requirements. Impacts on GRCA regulated floodplains should be minimized.

- **Minimizes Climate Change Impacts**
  The solution/design should minimize greenhouse gas emissions and negative impacts on the landscape which may alter the ecosystems' ability to remove carbon dioxide from the atmosphere.

## 2.3 Social Criteria

Social criteria represent the effect a solution or design will have on the local human environment. Overall, the solution/design should have a positive effect on the functioning of the community without imposing an economic burden or altering the community's sociocultural fabric.

- **Minimizes Impacts to Residents Related to Noise, Odour, Traffic, and Aesthetics**
  The solution/design should minimize noise, odour, and truck traffic affecting the community during operation of the New Dundee Water Supply facility.

  The solution/design should minimize its visual profile where possible, and otherwise attempt to match the architectural patterns and landscape of the surrounding residential area.

- **Minimizes Impacts to Businesses**
  The solution/design should not disrupt commerce in the local community, nor should it reduce the competitiveness of local businesses.

- **Manages and Minimizes Construction Impacts**
  The construction of the solution/design should minimize impacts to surrounding areas due to significant noise, air pollution, traffic or visual disturbances.

- **Protects Cultural Heritage Features**
  The construction or operation of the solution/design should minimize potential impacts to historical, cultural, and architecturally significant features.

- **Protects Archaeological Features**
  The solution/design should minimize potential impacts to archaeological features.

- **Protects Health and Safety**
  The solution/design should minimize potential health and safety risks for the public and Operations and Maintenance staff.

## 2.4 Financial Criteria

Financial factors quantify the cost of the solution to the Region over its service life. All costs should be minimized.

- **Provides Low Lifecycle Costs**
  The solution/design should minimize the capital, operating, and maintenance (life cycle) costs over a 50-year period.

# 3.0 Scoring Method

It is proposed that a graphical-numerical scoring method, as shown in **Table 3.1** be used to evaluate the criteria within the four main categories, with quantitative analysis provided for backup as required. Preference for an alternative solution or design is indicated by the direction and colour of the arrow, as well as the magnitude of the numerical score. A double blue arrow represents an optimal option and a double orange arrow represents a poor alignment with the criteria objective. **Table 3.2** below gives an example of the five possible scorings and their meanings relative to each other.

**Table 3.1 – Numerical Scoring and Graphic**

|  |  |  |  |  |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Low Alignment with Criteria | Not Well Aligned with Criteria | Somewhat Aligned with Criteria | Well Aligned with Criteria | Very Well Aligned with Criteria |

Each major category will be assigned a single score based on the combined scores of the various criteria. The scores for the categories are then combined into an overall score to provide a final assessment of the alternative solutions/designs.

The scoring will be qualitative with assumptions supporting the rationale described. For the 'Provides Low Lifecycle Cost' criteria that cannot be evaluated qualitatively, calculations will be included in the appendix.

A workshop will be held with the consultant and Region staff to finalize the scoring for the short- listed alternative solutions. Another workshop will be completed to finalize the scoring for the alternative design concepts.

A sensitivity analysis will be conducted to determine if modifications to category weightings would have an impact on the identification of the preferred alternative. Category weightings can also be adjusted based on feedback received through the Public Consultation Centres regarding aspects of the project that the public has identified as important.

# 4.0 Conclusion

The criteria outlined in the previous sections will be used to inform evaluations of the proposed alternative solutions identified in Phase 2 and the alternative design concepts during Phase 3 of the Study.

As part of the Municipal Class EA process, following the completion of the draft Technical Memorandum #3, a public consultation centre will take place to present the preliminary preferred treatment, the preliminary preferred residual management alternative and a preliminary short list of locations being considered for the treatment facility. These will be presented to receive input from the public.

Once the preferred solution has been confirmed, alternative design concepts for the identified solution will be developed and evaluated in Technical Memorandum #4. A public consultation centre will be held to present and obtain input on the preliminary preferred design.

# 5.0 References

Health Canada, Guidelines for Canadian Drinking Water Quality: Guideline Technical Document- Manganese, Health Canada, Ottawa, ON, 2019.

Municipal Engineers Association, Municipal Class Environmental Assessment Manual, Oakville, ON, 2015.

*Ontario Environmental Assessment Act,* R.S.O 1990, c. E. 18, 1990