

Thunder Bay North Harbour Sediment Management Options Evaluation



Thunder Bay North Harbour Sediment Management Options Evaluation

- ◆ For additional information, please contact:

Jamie Saunders
Program Coordinator
EcoSuperior Environmental Programs
562 Red River Road
Thunder Bay, ON P7B 1H3
Phone: 807-624-2658
Fax: 807-622-0005
Email: jamie@ecosuperior.org

Project Background

- In 1985, the International Joint Commission identified Areas of Concern (AOCs) across the Great Lakes, where environmental quality has been degraded and beneficial uses of the aquatic ecosystem have been impaired.
- Thunder Bay was identified as one such AOC, and beneficial use impairments were identified related to contaminated sediments. The Remedial Action Plan (RAP) Public Advisory Committee (PAC) has identified a need to address mercury and organic contaminants in the Thunder Bay North Harbour area.



Thunder Bay North Harbour - 1989

Enriched Organic Sediment

- Enriched Organic Sediment (EOS) is present in the study area and is up to 4 m (12 feet) thick
- The EOS is very soft, fibrous material and varies in composition across the study area
- The EOS has elevated levels of mercury and other contaminants
- Native sediment below the EOS does not show signs of significant contamination



Purpose of Study



- Over the years, numerous studies have been conducted by a variety of consultants and researchers on behalf of different stakeholders. The objectives of these studies have generally been to characterize the Enriched Organic Sediment (EOS) and assess potential methods to address contaminants in the area, in support of removing the beneficial use impairment related to the sediment and ultimately delisting the Thunder Bay Area of Concern.
- The purpose of the current project is to bring the analysis phase to a conclusion and to make concrete recommendations to move forward with Sediment Management Option (SMO).

Remedial Action Objective

- The Remedial Action Objective is to bring the average concentration of mercury within the study area to at or below local background concentrations.
- This will result in decreased risk from contaminants.



Study Process

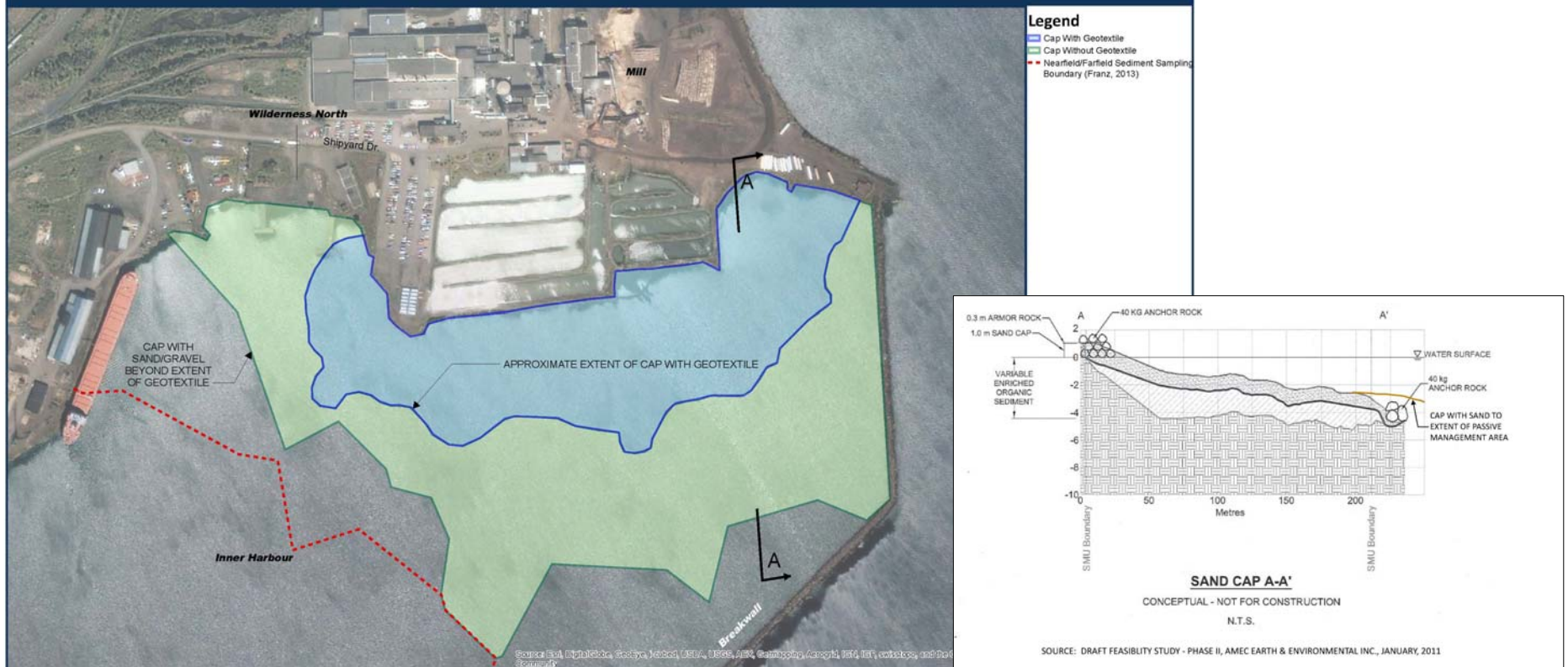
- The process being followed to complete this study is:
 - Review of background information
 - Confirmation of local conditions and pricing
 - Define alternative options
 - Develop evaluation criteria
 - Evaluate alternative options
- After evaluation, the study will recommend an option and provide further information on this option.
- After completion of this study, further consultation will be undertaken and an option for implementation will be determined.

Sediment Management Options

- Using information from previous reports, a review of available technologies and the experience of the Study Team, options were generated for evaluation:
 - Capping
 - Excavation and upland disposal
 - Dredging and upland disposal
 - Dredging and disposal in a new Confined Disposal Facility (CDF)
 - Dredging and disposal in a new CDF using the adjacent lagoons
 - Dredging and disposal in the existing Misson Bay CDF

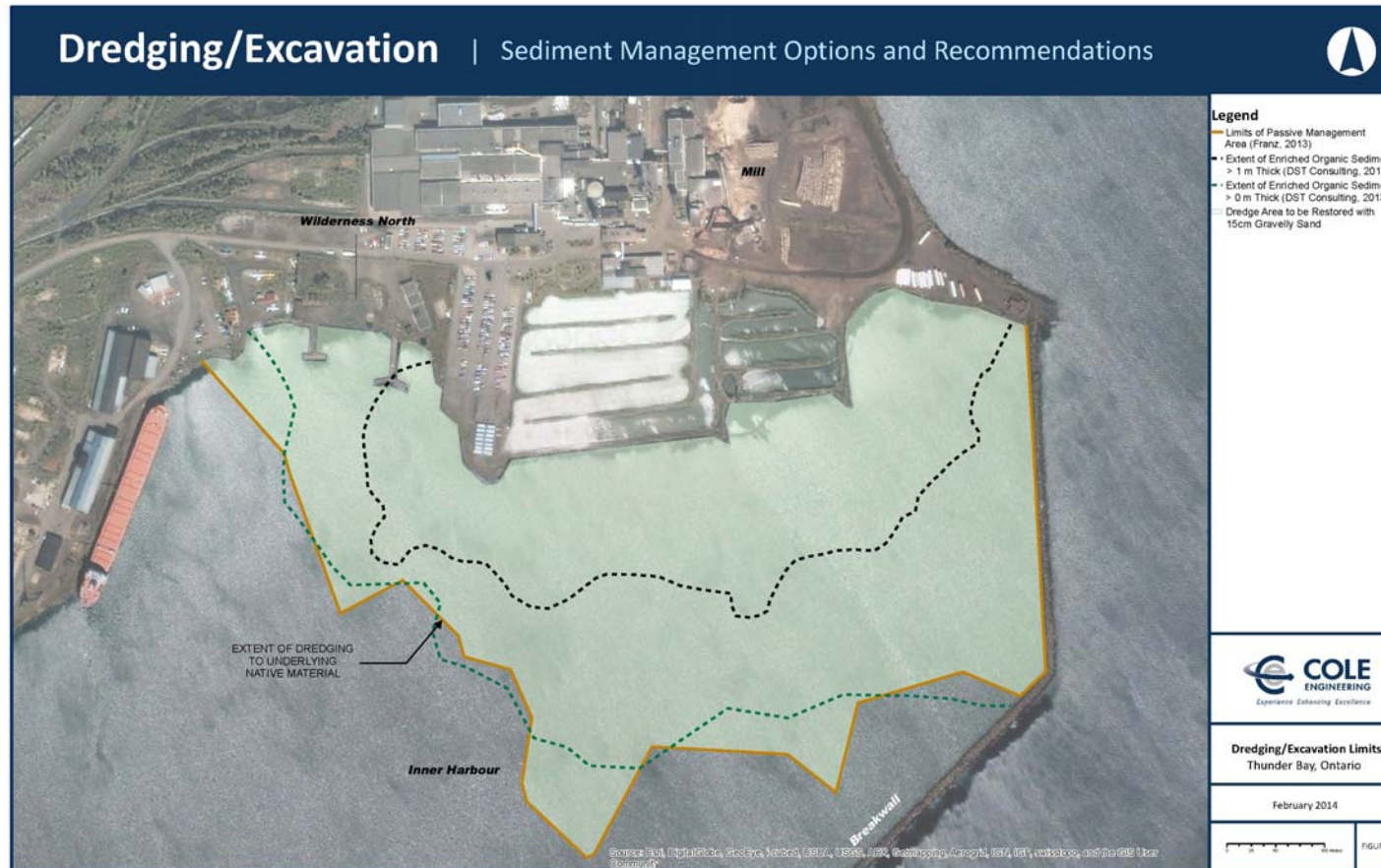
Capping

Capping | Sediment Management Options and Recommendations



- The Enriched Organic Sediment (EOS) would remain in place.
- A 1 m thick cap made of sand would be placed over the EOS.
- Geotextile would be used to support the cap where EOS is thick.

Dredging/Excavating



- To dredge the Enriched Organic Sediment (EOS), material would be removed underwater, likely using a mechanical clamshell type dredge.
- To excavate the EOS, a coffer dam would be constructed around the limits of excavation, and the water removed to allow excavation in dry conditions.
- After removal of the EOS, a 15 cm thick layer of gravelly sand would be placed to enhance fish habitat.

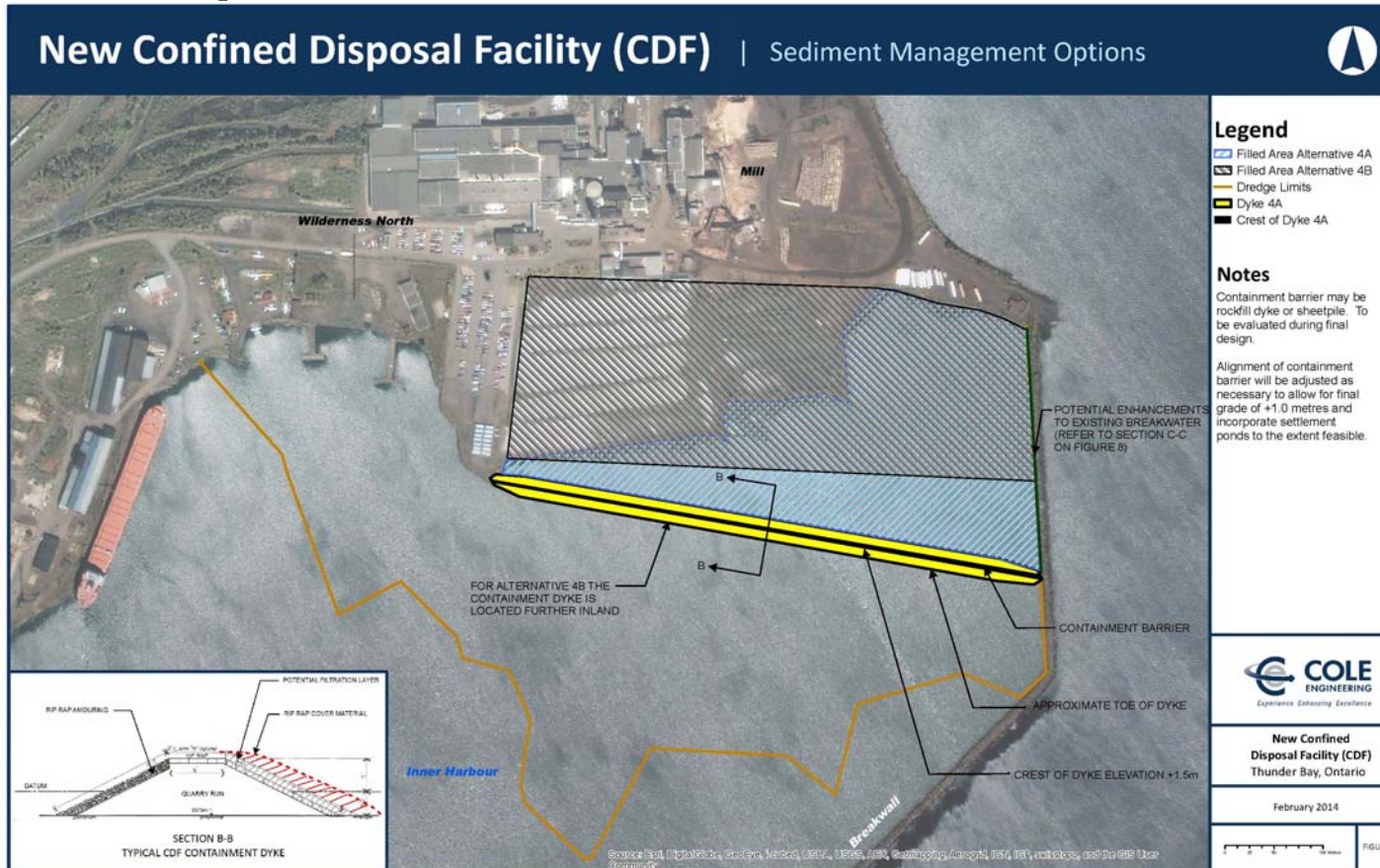
Disposal Options

- If the Enriched Organic Sediment (EOS) is removed from the North Harbour, it must be disposed of properly.
- Options for disposal of the EOS include:
 - Disposal at a landfill site
 - Disposal at a new confined disposal facility (CDF)
 - Disposal at the existing Mission Bay CDF

Disposal at Landfill

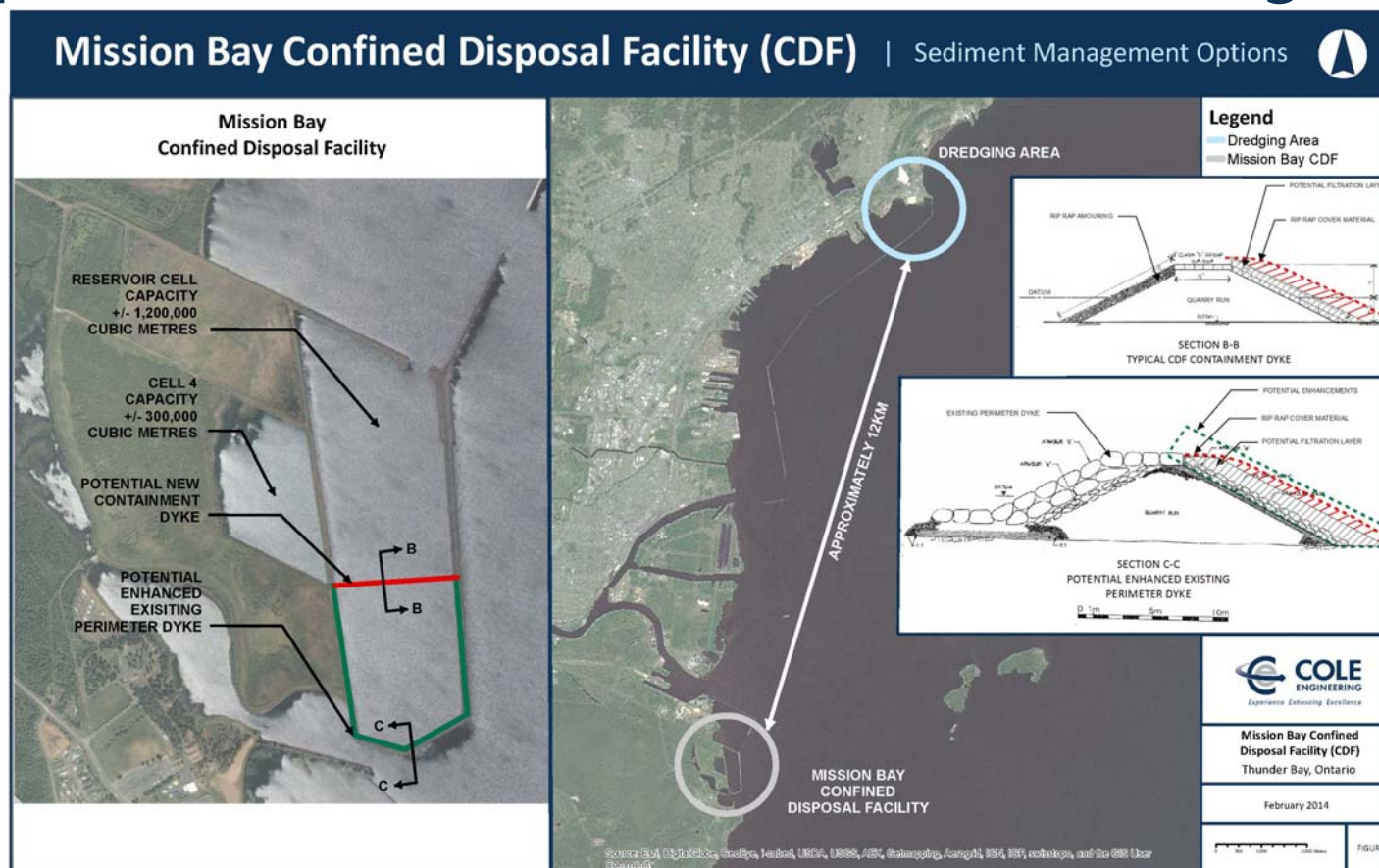
- In order for the Enriched Organic Sediment (EOS) to be disposed of at a landfill site, it must be dewatered to be classified as a solid waste.
- The dewatering process may require management of the water removed from the EOS. If required, after treatment, this water could be discharged to the City's sanitary sewer system.
- Dewatered EOS would be trucked to an approved landfill.

Disposal at a New CDF



- A new Confined Disposal Facility (CDF) would be constructed. To reduce the footprint of the new CDF, it could utilize the existing adjacent lagoons. Enriched Organic Sediment (EOS) within the footprint of the new CDF would remain in place.
- EOS outside the new CDF would be dredged and placed in the new CDF.
- After several years of consolidation, the new CDF would be capped. The new CDF could ultimately be used as parkland, recreational space or marina uses.

Disposal at the Mission Bay CDF



- Dredged Enriched Organic Sediment (EOS) would be placed in the existing Mission Bay Confined Disposal Facility (CDF), owned by the Port Authority.
- Enhancements to the existing CDF may be required to contain contaminants in the EOS.
- After several years of consolidation, the EOS would be capped.

Evaluation Criteria

- The evaluation of options will consider the following criteria:
 - Environmental effectiveness and permanence
 - Short term impacts
 - Implementability
 - Community support
 - Land use benefits
 - Sustainability
 - Cost

Pros and Cons of SMOs

Alternative	Pros	Cons
Capping	<ul style="list-style-type: none"> • Lowest cost alternative • Reduces exposure to EOS • Can create aquatic habitat • Short timeframe for implementation 	<ul style="list-style-type: none"> • Potential negative effect on local property values • Increase in truck traffic when importing cap material • Loss of open water in Harbour • Ongoing monitoring of effectiveness and maintenance of cap required • Difficult to implement due to geotechnical characteristics of EOS
Excavation and Disposal at Landfill	<ul style="list-style-type: none"> • Removes EOS from the site ensuring elimination of exposure • No long-term monitoring required • While construction is difficult, standard construction methodologies can be used • Maintains open water in Harbour 	<ul style="list-style-type: none"> • Expensive • Excavated material needs to be dewatered which results in large volumes of water to be treated • Increase in truck traffic when transporting material to landfill • Depletes local landfill capacity • Relies on access through adjacent properties
Dredging and Disposal at Landfill	<ul style="list-style-type: none"> • Removes EOS from the site ensuring elimination of exposure • While construction is difficult, standard construction methodologies can be used • No long-term monitoring required • Maintains open water in Harbour 	<ul style="list-style-type: none"> • Most expensive • Dredged material needs to be dewatered which may result in large volumes of water to be treated • Increase in truck traffic when transporting material to landfill • Depletes local landfill capacity
Dredging and Disposal at New CDF	<ul style="list-style-type: none"> • Low cost alternative • Reduces exposure to EOS • Provides opportunities to make the waterfront more usable and improve local property values • Creates additional harbour potential • Does not deplete local landfill capacity 	<ul style="list-style-type: none"> • Loss of open water in Harbour • Increase in truck traffic when importing CDF material • New CDF will require long-term monitoring and maintenance • A future owner/operator has not been identified for the new CDF • Relies on access through adjacent properties
Dredging and Disposal at New CDF using adjacent lagoons	<ul style="list-style-type: none"> • Low cost alternative • Reduces exposure to EOS • Provides opportunities to make the waterfront more usable and improve local property values • Creates additional harbour potential • Does not deplete local landfill capacity 	<ul style="list-style-type: none"> • Loss of open water in Harbour • Increase in truck traffic when importing CDF material • New CDF will require long-term monitoring and maintenance • A future owner/operator has not been identified for the new CDF • Relies on access through adjacent properties
Dredging and Disposal at Mission Bay CDF	<ul style="list-style-type: none"> • Low cost alternative • Removes EOS from the site ensuring elimination of exposure • While construction is difficult, standard construction methodologies can be used • Maintains open water in Harbour • Does not rely on access through adjacent properties 	<ul style="list-style-type: none"> • Long-term monitoring is required at the Mission Bay CDF • Does not create additional harbour potential • Depletes existing CDF capacity by +/- 30%

Next Steps

- The Study Team will evaluate the identified options and consider comments received from this Public Meeting along with those received from Aboriginal groups, PAC and other stakeholders in order to recommend an option.
- Further consultations with, and input from, the public, PAC, Aboriginal groups and other stakeholders will be used to finalize an option for implementation.
- The table below presents upcoming major milestones related to the project. Scheduling is subject to funding.

Milestone	Activity Duration	Timeline
Option Selected	-	Year 0
Design and Permitting Land Acquisition	2 Years	End of Year 2
Tender	0.5 Years	Mid – Year 3
Construction	3 Years	Mid- Year 6
Project Verification and Close-out	0.5 Years	End of Year 7