

Request for Decision City Council



Type of Decision

Meeting Date	November 10, 2005				Report Date	November 2, 2005			
Decision Requested	<input checked="" type="checkbox"/>	Yes		No	Priority	<input checked="" type="checkbox"/>	High		Low
	Direction Only				Type of Meeting		Open	<input checked="" type="checkbox"/>	Closed

Report Title

Lake Nepahwin Sediment Plume Removal

Policy Implication + Budget Impact

☒ This report and recommendation(s) have been reviewed by the Finance Division and the funding source has been identified.

There is sufficient funding in the 2005 Capital Roads program to award this contract.

☒ Background Attached

Recommendation

THAT Dominion Divers (2003) Ltd. be awarded a contract to remove sediment from sediment plume sites for an upset cost of \$66,750.00 subject to contract agreement terms satisfactory to the General Manager of Infrastructure & Emergency Services, the City Solicitor and the City purchasing Agent.

THAT a total budget of \$96,000.00 be approved for the Lake Nepahwin sediment plume removal pilot project and that funds for said work be taken from the 2005 Capital Roads program.

Recommendation Continued

Recommended by the Department Head


Alan Stephen
General Manager - Infrastructure & Emergency Services

Recommended by the C.A.O.


Mark Mieto
Chief Administrative Officer

Date: November 2, 2005

Report Prepared By


Ronald W. Norton
Drainage Engineer

Division Review


Bob Falcioni
Director of Roads & Transportation

Background

Lake Nepahwin is a small urban lake of approximately 134 hectares in the South End of the former City of Sudbury. This lake drains an approximate 700 hectare watershed that extends from the south west by-pass to Walford Road and to the Laurentian University. A plan of the watershed is attached as Exhibit "A" to this report.

Much of this watershed is developed and includes the commercial areas of parts of Regent Street and Long Lake Road, the industrial areas of Old Burwash Road, numerous single family and multi-residential areas, the Idylwyld Golf Course and parts of Laurentian University.

There are 6 major storm sewer drainage systems which outlet to the Lake. These systems are underground pipes which accept surface drainage from roads, institutional properties, commercial industrial properties and residential properties.

The majority of these systems are 30 to 40 years old and were designed to provide for area drainage during frequent rain storms and annual snow melt conditions.

Current accepted engineering practice requires that storm sewer systems be self-cleaning with grade lines which promote water flow velocities in the pipe to convey any solids to the outlet when the pipes are flowing full. Sediment often builds up in these pipes during periods of minor rains which produce minimal flows. When major rain storms occur filling the pipes, sediment in the pipes can be brought into suspension and flushed to the outlet. Street and parking lot catch basins have sumps which intercept some of the sediment.

Over the past 30 to 40 years, within the Lake Nepahwin drainage area, silt, sand and small gravel have entered the storm sewer systems and been washed into the lake creating plumes or deltas of sediment. Many of these plumes are now visible to the eye above or below the water surface. The plume site locations are set out in the picture of Exhibit "B".

Residents have expressed concern both in the past and currently that these plumes have a negative impact on the aesthetics, fish habitat and general water quality of the lake.

The former City of Sudbury was aware of this concern and worked on various improvements to reduce the impact of this problem. In 1990, the City carried out a sediment removal operation at the

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end of the 78 inch diameter storm sewer outlet on Stewart Drive, opposite Millwood Crescent. Within this operation, storm sewer sediments were removed by a diver with an underwater vacuum. This vacuumed sediment slurry was piped to a stilling basin near the present Lady Ashley Court. The City further constructed a sediment removal tank on the Stewart Drive 78 inch storm sewer to intercept sediments flowing in the storm sewer system. The City also had a storm sewer sediment interceptor installed on the 18 inch storm sewer adjacent Ascot Estates.

During the 1990's, the City and the Region of Sudbury also agreed to adopt an accelerated catchbasin and street cleaning program for the Lake Nepahwin Tributary Area.

In 1999, the City of Sudbury and the Region of Sudbury had a stormwater management study completed on Lake Nepahwin which concentrated on the "four corners drainage shed" and the Rumball Terrace 60 inch diameter storm sewer outfall. This report recommended the installation of 11 storm sediment interceptors on roads or adjacent parking lots at a total cost of \$500,000.00 in 1999 dollars. To date, these installations have not been made.

The report further recommended:

- Removal of accumulated snow from roadways and parking lots prior to allowing the snow to melt;
- Early removal of sediments and silt from roadways and parking lots in the spring following snow melt;
- Regular maintenance/cleaning of catch basins at a frequency, which is consistent with the accumulation of debris.

Since this report, the City of Greater Sudbury has required the installation of stormwater management control on new commercial/multi-residential developments within the watershed area including a 2005 major stormwater control pond on the newly expanded Southridge Mall development.

In February of 2005, the Department of Fisheries and Oceans advised the City that the existing sediment plumes at the six major storm sewer outlet sites were impacting fish habitat and must be removed to satisfy the requirements of the Fisheries Act.

As a first step, the City in association with the Laurentian University Lakewater ecology unit had an underwater survey completed to establish the surface profile of the 6 sediment plume locations.

From this work and additional work in establishing underwater lakebed contours, it is clear that the lake bottom drops off quickly from the majority of shoreline to depths of 13 metres plus at a distance of 30 to 40 meters from the shoreline.

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In the lakeshore coves of sites 2 and 3, sediment is both jutting above the water surface and also lying at minimal depths. In these areas, removal of this sediment may be more straight forward than other areas where the plumes may be deeper in the water.

At this point, we do not have specific information on the thickness or volume the of sediment or the bottom underlying conditions at the various plume sites. There would be a significant cost to accurately quantify the sediment volume by underwater geotechnical testing. An expenditure for this aspect would be better spent on actual sediment removal.

Engineering staff have reviewed three potential methods for removing sediment from the subject sites:

- Backhoe excavation to trucks:

Site 2 and 3 have obvious surface sediment and sediments to depths of 3 meters below surface. With a heavy duty silt curtain to contain the working area, a significant portion of the sediment could be removed with the reach of a large backhoe from shore. However, sediment outside the shoreline reach of equipment may not be removed and suspension silt may still remain on the lake bottom. There may also be problems with liquified sediment escaping truck boxes back to the lake during the loading operation and also along the route taken during in the haulage to a dump site. We have received a proposal to do site 2 for \$40,000.00 and \$65,000.00 for site 3 based on the above approach. After review, we believe this approach will not satisfy the requirements.

- Excavation on a marine barge:

For site 4, 5 and 6, a proposal has been made to utilize a backhoe mounted on a marine barge to remove the silt. A silt curtain would be installed in each case. In this process a second barge would be required to load sediment into and a dock would have to be constructed at Nepahwin Beach to facilitate offloading of sediment. A contractor has indicated that the cost to do site 4 alone would be approximately \$265,000.00. After review, we believe the above approach too expensive with some of the same drawbacks as approach one.

- Sub Cat removal method

Dominion Divers (2003) Ltd. of Winnipeg, Manitoba, have provided quotation information on the use of their specialized sediment removal equipment. Their machine called the "Sub Cat" is a submersible self-propelled crawler operating on two 32 inch wide tracks. Sediment is fed into a dredge pump by means of an adjustable 8 foot helical auger equipped with blades to break up solids. The slurry can be pumped up to 2500 feet away into enviro-filter bags. The filter-bags capture the sediment and allow the filtered water to drain out and back to the lake. The drained filter bags are loaded onto a truck for landfill disposal. Sediment can be removed at a rate of 20 to 75 cubic yards per hour. A description of the Sub-Cat is set out in Exhibit "C" to this report. A description of the enviro-filter bags is set out in Exhibit "D" of this report.

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Under this system, a 1000 cubic yard sediment plume could be removed in 20 to 50 hours depending on the density of the sediment and pumping distances.

Method Recommendation:

Based on our preliminary review of removal methods, we recommend the underwater suction pumping method over marine excavation.

Cost of Work

For budget purposes, we estimate that each site will average 1000 to 2000 cubic yards of sediment to be removed. Our estimate is also based on a conservative average hourly removal rate of 30 cu yards per working hour and filter bags with a capacity of 30 cu yards. The sub-cat works a 10 hour day @ \$3,500/day.

A. Costs based on 1000 cu yd per site

1000 cu yard sediment removal	3.3 days @ \$3,500.00/day - \$18,150.00	
for six site operation	\$18,150.00 x 6	\$128,900.00
Add 15% for sub-cat operational contingency		\$ 19,350.00
		\$148,250.00
Allowance for filter bags		20,000.00
Trucking 200 loads @\$250.00 to land fill		50,000.00
Sub-Cat mobilization		20,000.00
Access Cost allowance		<u>30,000.00</u>
	Sub-total	\$268,250.00
	Contingency 20%	<u>53,650.00</u>
	TOTAL	\$321,900.00

B. Costs based on 2000 cu yd per site

TOTAL	\$643,800.00
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Landfill Removed Sediment

Our plan is to place large enviro filter bags in trailer dump trucks and to pump the slurry sediment into the bags. Water will exfiltrate the bags back to the lake. Once the bag is full and water has drained from the bag, the truck will take the bag to the Sudbury landfill site for disposal. The Director of Solid Waste has agreed to facilitate the pilot project on the basis that the sediment material can be removed from the bags in a controlled area of the landfill and that the material can then be used as cover material for waste management operations. However, this approach will be monitored and should the material be problematic future work may require utilization of another receiving site. Tipping fees would not be applicable for the pilot project. Tipping fees will only be accessed (in the long term) if the sediment material is not suitable as cover material.

Analysis and Recommendation

As set out above, the cost of sediment removal is substantial. Based on many parameters such as lake bottom conditions, actual sediment volume, access and mechanical difficulties, the cost of work may escalate. The ability to obtain an accurate all inclusive price is difficult. Contractors must protect themselves from the unknown. The costs to quantify the various conditions would also be expensive. Our recommendation is to award Dominion Divers of Manitoba a limited contract with an upset limit of \$66,750.00, to deal with one sediment site and any additional work that can be accomplished within the operational upset limit as approved by the General Manager of Infrastructure & Emergency Services. The award will be subject to the development of a contract agreement with terms and conditions satisfactory to the General Manager of Infrastructure & Emergency Services, the City Solicitor, the City purchasing agent and the contractor.

The City will provide work support to Dominion Divers by providing trucking of filled filter bags to the landfill and any access related costs. The budget for this aspect of the work is \$33,250.00. Contract and project budget cost detail is attached as Exhibit "E" to this report. The total recommended budget for this pilot project is \$96,000.00.

Based on an evaluation of the pilot project, experience gained and information received, the City will be in a better position to assess additional work in 2006. The successful completion of the pilot project in 2005 will produce initial results and limit the cost of work.

There is sufficient funding in the 2005 Capital Roads program to award this contract.

Approvals

Following consultations, both the Department of Fisheries and Oceans and the Ministry of the Environment are supportive of this pilot project. A work permit from the Ministry of Natural Resources is in progress.

LEGEND

REGIONAL ROAD

LOCAL STREET

BOUNDARY OF LAKE
NEPAHWIN WATERSHED

SUB WATERSHED
BOUNDARIES

RUMBALL TERRACE
TRIBUTARY AREA

ASCOT ESTATES
TRIBUTARY AREA

EXHIBIT "A"

0m 200m 500m 1000m

LAKE NEPAHWIN WATERSHED

DATE: AUG. 1999

PROJECT No.
5007

FIGURE:

2.1



LAKE NEPAHWIN
SEDIMENT CONTROL

DENNIS CONSULTANTS
CIVIL ENGINEERS
a division of R.V. Anderson Associates Limited



Lake Nepahwin, Sediment Sample Locations
City of Greater Sudbury

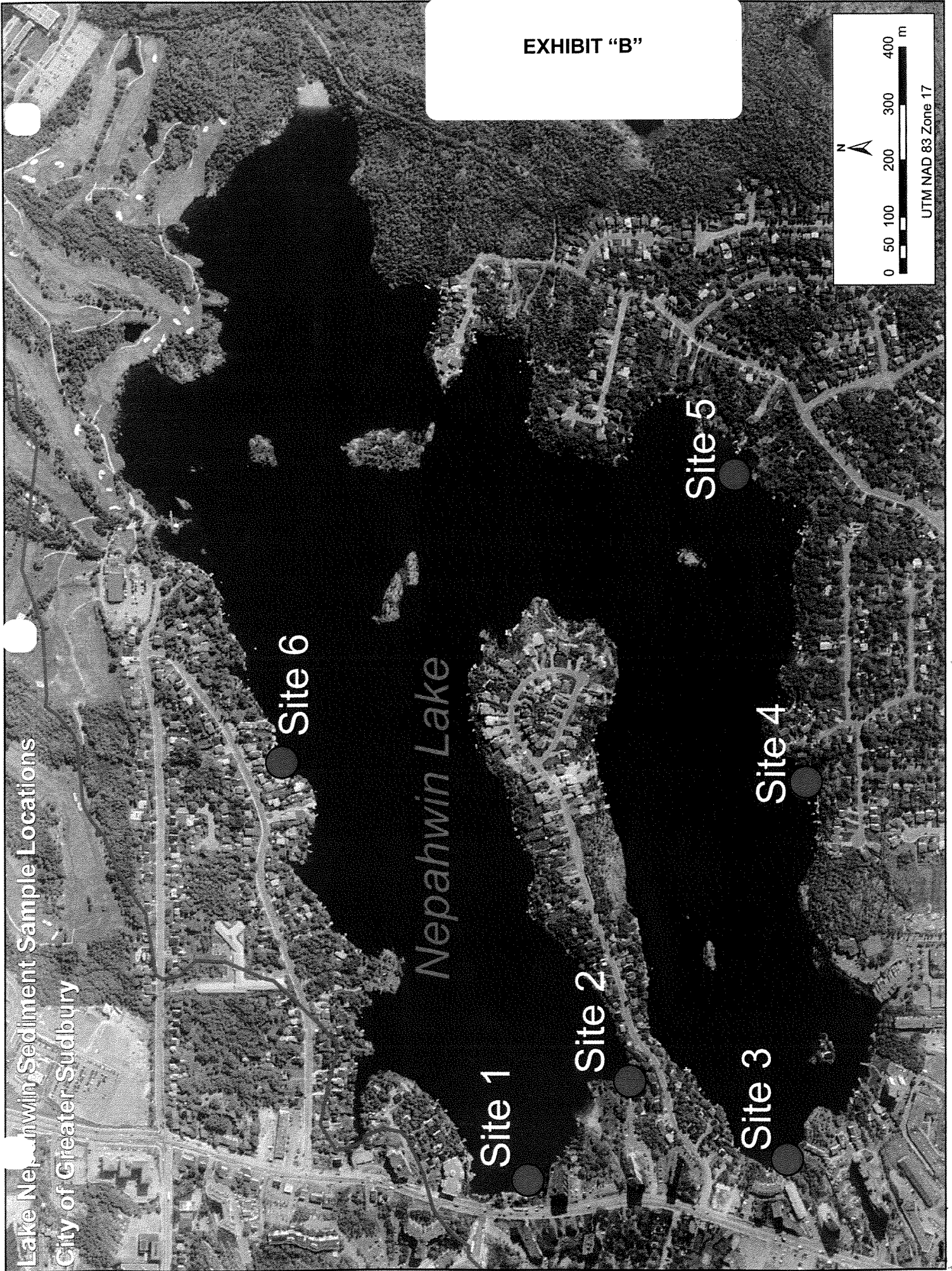
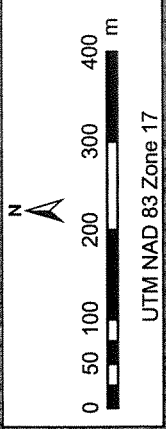
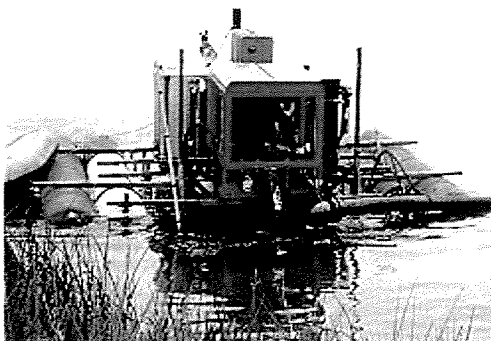


EXHIBIT "B"



SUBCAT

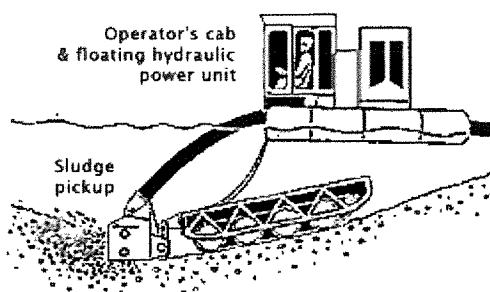


Dominion Divers Ltd.'s SUBCAT is a submersible self-propelled crawler operating on two 32-inch rubber tracks resulting in only .5 PSI ground pressure. This eliminates the danger of breaking the bottom seal of the containment area.

The unit is employed for fast, efficient and cost-effective removal of sludge, sediments, silt and sand.

The current SUBCAT is the culmination of many previous models. It has been designed and developed to work in the environment of the Precambrian shield, both above water and below.

- ✗ Sewage Lagoons
- ✗ Mine Tailings
- ✗ Paper Mills
- ✗ Lake Reclamation
- ✗ Settling Basins
- ✗ Fly Ash
- ✗ Channel Deepening
- ✗ Harbor Improvements



Sediments are fed into a dredge pump by means of adjustable 8-foot helical augers equipped with cutter blades to break up solids. The slurry can then be pumped up to 2,500 feet away into a pre-designated spoil area. There is no need to shut down or drain lagoons, ponds, or waterways during sediment removal. Sediments and sludge can be removed at the rate of 20 to 75 cubic yards an hour. The rate depends on density of material and the distance to be pumped.

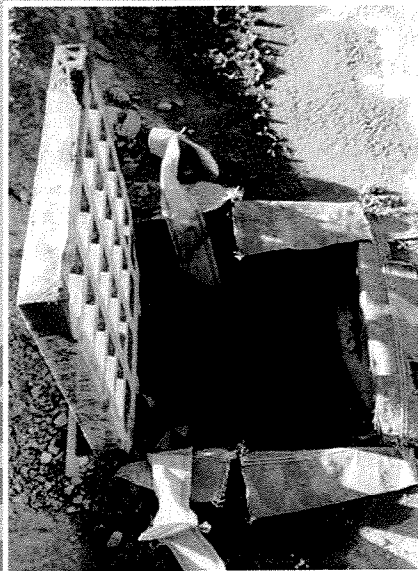
Advantage over other methods:

- ✗ Does not require drainage or shutdown of the system
- ✗ Hydraulically adjusted cutter head augers, eliminates the danger of disturbing the original bottom seal or contour
- ✗ Restores lagoon or pond to original design capacity

We have worked in numerous lagoons that have contained more than just municipal waste. Lime is used in many potable water treatment plants as part of the treatment process. The residue is pumped into the sewage lagoon where it precipitates. This combines with mud and sand that can enter the force main through ruptures and creates a solid mass that can be walked on.

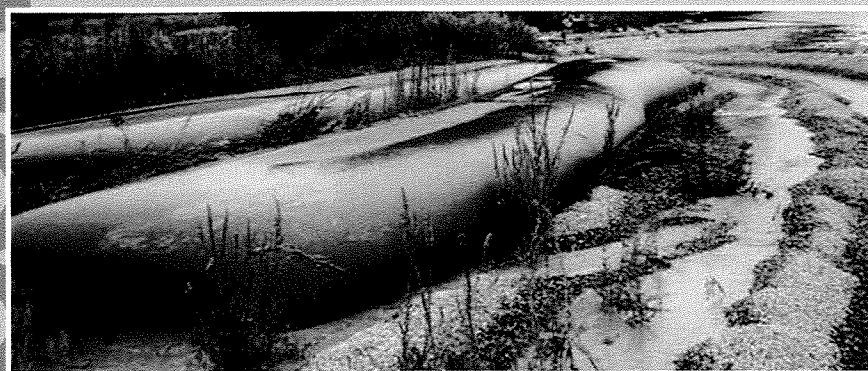
Silt & Sediment

Terrafix Silt Sack Catch Basin Filter



Silt Sack is a sediment control device used to prevent silt and sediment from entering your drainage system by catching the silt and sediment while allowing water to pass through freely. Siltsack can be used as a primary or secondary sediment control device to prevent failure of your drainage system due to clogging. It must be maintained on a regular basis to function properly. Silt sack is available in both high-flow or regular flow.

Terrafix Envirobags for Dewatering



Installation

To install, simply insert the discharge hose into the corner opening of the bag, and secure it with a clamp. The bags are typically supplied in 3.5m widths by 5, 10 and 15 m lengths. Discharge capacities up to 2000 gal/min are easily handled with the large sized Envirobag. Custom sizes are also available to meet specific discharge capacities. Terrafix Envirobags are made of durable nonwoven geotextiles that are UV stabilized and also resistant to puncture and tearing.

During filling it is important to monitor the Envirobag. Avoid overfilling which could lead to rupturing of the Envirobag.

TYPICAL SPECIFICATIONS

Grab Tensile, N	825
Mullen Burst, kPa	2600
Tear Strength, N	510
Filtration Opening Size, μm	90
Permeability, k (cm/sec)	0.27
Elongation at Break, %	70

Terrafix Envirobags provide effective environmental protection for dewatering applications. Terrafix Envirobags are designed to contain silt, sand and other fines while allowing water to filter out. Compared to other techniques such as sedimentation ponds, Envirobags are more cost effective and offer superior performance in the protection of wetlands.

Lake Nepahwin Sediment Removal Pilot Project**A. Basics of contract with Dominion Divers (2003) Ltd.**

(1)	<u>Stage 1</u> Mobilization of the sub-cat equipment to and from Sudbury	\$19,213.00
(2)	<u>Stage 2</u> 7 operational days of sub-cat employment	\$24,500.00
(3)	Filter bag allowance	\$ 6,000.00
(4)	Contingency	<u>\$13,037.00</u>
	TOTAL of A	\$62,750.00

B. Additional City Costs

(1)	Transport of filter bags to landfill	\$16,250.00
(2)	Site access cost allowance	\$10,000.00
(3)	Contingency	<u>\$ 7,000.00</u>
	TOTAL of B	\$33,250.00

TOTAL PILOT PROJECT BUDGET	<u>\$96,000.00</u>
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Request for Decision City Council



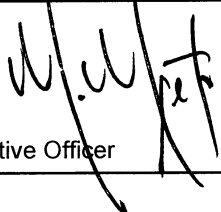
Type of Decision									
Meeting Date	November 9, 2005				Report Date	October 31, 2005			
Decision Requested	<input checked="" type="checkbox"/>	Yes	<input type="checkbox"/>	No	Priority	<input checked="" type="checkbox"/>	High	<input type="checkbox"/>	Low
	Direction Only				Type of Meeting	<input checked="" type="checkbox"/>	Open	<input type="checkbox"/>	Closed

Report Title
Meeting Dates - City Council and Priorities Committee

Policy Implication + Budget Impact
<p>This report and recommendation(s) have been reviewed by the Finance Division and the funding source has been identified.</p> <p>Policy Implications:</p> <p>The Municipal Act, 2001 requires the City to provide notice to the public of its intention to pass certain by-laws, the holding of certain required public meetings and of other matters. Schedule "A" of the City of Greater Sudbury's By-law 2003-2 as amended, sets out the form, manner and times the Notice shall be given, unless specified by the Municipal Act, 2001, another Act or a regulation or if Council directs that other public notice is to be given.</p> <p>Financial Impact:</p> <p>There is no financial impact associated with this Report.</p>
Background Attached

Recommendation
<p>That Council direct staff to proceed with the notice and public meeting requirements necessary to amend the Procedure By-law to change the following meeting dates:</p> <ul style="list-style-type: none"> City Council from the second and fourth Thursdays of every month, to the second and fourth Wednesdays of every month Priorities Committee from the second and fourth Wednesdays of every month, to the first and third Wednesdays of every month <p>And that the City Solicitor prepare the necessary by-law.</p>
Recommendation Continued

Recommended by the Department Head
 Caroline Hallsworth Executive Director of Administrative Services

Recommended by the C.A.O.
 Mark Mieto Chief Administrative Officer

Title:
Date:

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Report Prepared By

A. Haché

Angie Haché
City Clerk

Division Review

Name
and Title

Executive Summary:

This report proposes changes to the meeting dates of City Council and the Priorities Committee as described in the Procedure By-law. It recommends the City Council meetings be held on the second and fourth Wednesdays of the month and Priorities Committee meetings be held on the first and third Wednesdays of the month.

Background

One of the recommendations contained within Thom Mowry's report entitled "Priorities Committee: A Governance Discussion Paper" was that Council adopt a revised meeting schedule, so as to have the Priorities Committee meet on the first and third weeks of every month, in the "off" week to Council. This model provides a better balance in developing and managing agendas.

Staff has drafted a tentative meeting schedule for 2006 which incorporates this recommendation. The draft schedule of meeting dates is attached as an appendix for the information of Council.

The City of Greater Sudbury's Notice By-Law requires that any changes to the Procedure By-Law be advertised and that a public meeting be held prior to passage of the revisions. Should Council so direct, staff will advertise the proposed changes to the Procedure By-Law and a public meeting will be scheduled as part of the Council meeting of November 29, 2005. Following the public meeting, the By-law will be presented to Council for ratification.

SCHEDULE OF MEETING DATES - 2006

City Council Meetings Begin at 7:00 p.m.	Priorities Committee Meetings Begin at 7:00 p.m.	Planning Committee Meetings Begin at 5:30 p.m. except July and August - Meeting Time to be Determined
Wednesday, January 11, 2006 Wednesday, January 25, 2006	Wednesday, January 4, 2006 Wednesday, January 18, 2006	Tuesday, January 17, 2006 Tuesday, January 31, 2005
Wednesday, February 8, 2006 Wednesday, February 22, 2006	Wednesday, February 1, 2006 Wednesday, February 15, 2006	Tuesday, February 14, 2006
Wednesday, March 15, 2006 Wednesday, March 29, 2006	Wednesday, March 8, 2006 Wednesday, March 22, 2006	Tuesday, March 7, 2006 Tuesday, March 21, 2006
Wednesday, April 12, 2006 Wednesday, April 26, 2006	Wednesday, April 5, 2006 Wednesday, April 19, 2006	Tuesday, April 4, 2006 Tuesday, April 18, 2006
Wednesday, May 10, 2006 Wednesday, May 24, 2006	Wednesday, May 3, 2006 Wednesday, May 17, 2006	Tuesday, May 2, 2006 Tuesday, May 16, 2006
Wednesday, June 14, 2006 Wednesday, June 28, 2006	Wednesday, June 7, 2006 Wednesday, June 21, 2006	Tuesday, June 6, 2006 Tuesday, June 20, 2006
Wednesday, July 12, 2006	No Meeting	Tuesday, July 4, 2006
Wednesday, August 9, 2006	No Meeting	Tuesday, August 1, 2006
Wednesday, September 13, 2006 Wednesday, September 27, 2006	Wednesday, September 6, 2006 Wednesday, September 20, 2006	Tuesday, September 5, 2006 Tuesday, September 19, 2006
Wednesday, October 11, 2006 Wednesday, October 25, 2006	Wednesday, October 4, 2006 Wednesday, October 18, 2006	Tuesday, October 3, 2006 Tuesday, October 17, 2006
Wednesday, November 15, 2006 Wednesday, November 29, 2006	Wednesday, November 8, 2006 Wednesday, November 22, 2006	Tuesday, November 7, 2006 Tuesday, November 21, 2006
Wednesday, December 6, 2006 (Inaugural) Wednesday, December 13, 2006	No Meeting	No Meeting