ATIKOKAN-TO-MINAKI WATERWAY

DETAILED ENGINEERING DRAFT
FINAL REPORT
November 1991

ATIKOKAN-TO-MINAKI WATERWAY

DETAILED ENGINEERING DRAFT FINAL REPORT

4640

NOVEMBER 1991

PREPARED BY

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4640

November 29, 1991

Atikokan-to-Minaki Waterway
P.O. Box 789
Fort Frances, Ontario
P9A 3N1

Attention: Hugh McTaggert

Dear Sir:

Re: Atikokan-to-Minaki Waterway

Please find enclosed three (3) copies of the Detailed Engineering Draft Final Report for the above captioned project.

Can you please review this report and advise this office of any required changes.

It has been a pleasure working with you, and the committee on this project and we look forward to continuing to be of service.

Yours very truly,

CUMMING COCKBURN LIMITED

P . J. Young, P. Eng.

PJY:ty

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UNDER SEPARATE COVER

- Contract Documents (for Each Site)
- Construction Drawings (30 sheets)

1.0 INTRODUCTION

Cumming Cockburn Limited was retained by the Atikokan-to-Minaki Waterway to complete the final design of navigational improvements at select locations along the Waterway route. The feasibility study (conducted by others) concluded that significant positive economic impacts could be achieved for the region and that based on low technology methods (truck and trailer portage) the project would result in a positive long term return on investment through increased tourism primarily from the Minnesota Market.

Based on these positive conclusions the Ministry of Northern Development and Mines and the member municipalities along the waterway have invested in the final design and are now poised to receive funding and proceed with construction and implementation.

The feasibility study identified nine sites requiring navigational improvements which formed the scope of work for the final design:

Atikokan River;
Tracy Rapids Portage;
Boyce Rapids;
Calm Lake Dam Portage;
Crilly Dam Portage;
Fort Frances Portage;
Dawson Portage;
Maritou Rapids; and
Long Sault Rapids.

Surveys and environmental assessments were completed by CCL at each of the sites during the spring and summer of 1991 and water levels and flows were analyzed along portions of the routes to develop the design. From this design process, complete contract documents including construction drawings and specifications were prepared for each of the sites. A procurement package has also been developed to allow the Waterway to approach Trailer Manufacturers for competitive bids to supply the trailers required for the waterway. These documents form the final product for this phase of the work. This report outlines the design process, rationale for refinement and modification of the feasibility concepts, explanation of environmental assessment and impacts, and provides estimates of construction costs and time frames.

The total cost of $1.25 M for construction and $517,000 for equipment, construction administration, supervision, and contingencies are comparable to the feasibility estimates and hence confirm the economic viability relative to capital costs. Increases are due to inflation and increased design capacity. These costs also compare favourably to the Ottawa River/Lake Timiskaming Waterway where a similar budget has been established for three by-pass sites.

Cumming Cockburn Limited wishes to thank members of the Waterway Corporation and the Ministry of Natural Resources for their assistance and guidance as well as Boise Cascade Canada for their cooperation in developing plans for Calm Lake Dam and Crilly Dam.

2.0 ENGINEERING DESIGN STANDARDS

Part of the success of the Waterway will rely on the ability to provide a consistent quality of services at the appropriate level for the intended market. Accordingly, a consistent set of standards to the greatest extent possible, has been used in the design of each by-pass. The standards chosen to provide a basic system, minimizing capital costs yet ensuring a quality design which avoids maintenance costs where possible. Exceptions where appropriate have been noted.

2.1 By-pass Roads

Generally the by-pass roads consist of a two-lane gravel surface 5.6 m (18 ft.) wide with a minimum turning radius of 30 m, corresponding to the minimum design standards of the Transportation Association of Canada for low volume roads. Grades are kept to maximum of 20% with all grades over 15% to receive a double coating of surface treatment (tar and gravel). Utilizing a 20% grade avoids expensive rock cuts and providing the surface treatment will facilitate better traction and reduce rutting.

2.2 Launch Sites

A minimum width of 16 m is required to turn around at launch sites. Generally greater space is provided where possible. The ramps are a single lane with a width of 5 m and consist of precast concrete panels complete with a herring bone traction grove pattern. Public launch ramps are usually constructed 6 m wide although most existing ramps in the area vary between 3 m and 5 m. Considering the remoteness of the sites and lack of public traffic, the width is considered appropriate.

The grades for ramps vary between 12 and 15 percent, matching current industry standards with a continuation at 6 to 10% at the top allowing trailers to reach the top of the ramp prior to rear wheels leaving the concrete surface.

Marshalling piers consists of timber crib docks with floating docks off the end accounting for fluctuating water levels. Floating docks are connected to cribs by hinged pedestrian ramps. Floating docks can be disconnected in winter and pulled up the boat ramp by the truck for storage. The length of pedestrian ramps is governed by the water level variations with a maximum slope of 3 horizontal to 1 vertical at low water.

2.3 Operators Cabin

At each of the remote sites it is assumed that the operator may be stationed at the site on a long term basis. Consequently, a small one bedroom, one bathroom cabin is provided which will also serve as the administrative office. Since the operator will require bathing facilities, a plumbing and septic system has been incorporated. Where possible an electrical system is included in place of a propane system, gas powered water pump and portable generator.

Each cabin will be outfitted with telephone and marine band radio to assist in communication with the other sites, boaters, and for emergency purposes. A marine band radio should also be mounted in the truck since much of the operator's time will be spent in the truck.

2.4 Miscellaneous Equipment

At each of the remote sites, a gasoline storage tank is provided which can be used to fill the trucks, portable generators and gas powered water pumps. By having gasoline delivered, road taxes could possibly be avoided and the operation will run smoother than if the vehicle must leave the site to fill the tank.

An outhouse is provided at each site for the general public. The design incorporates a holding tank which will require annual pump-out. This will be less expensive than relocating the outhouse each time it is filled.

At each landing point a sign will be visible which identifies the site and by-pass as part of the waterway. A sample is provided in Figure 2.1. It is recommended that the waterway have the signs manufactured by a sign maker and supply them to the contractor for installation. The colour scheme for the signs as well as other facilities should be consistent, providing an identity and theme to the sites.

2.5 Vehicle and Trailer

The Waterway is intended to cater to boaters not presently on the system, primarily from Northern Minesotta. Consequently, the maximum vessel size is that which can be trailered by boaters to the waterway. This has been established as 10.4 m (34 ft.) in length with a maximum weight of 4000 kg. Due to the diversity of boats which might use the system, a hydraulically adjustable trailer has been specified. This will also prove quicker to operate then a conventional trailer since hydraulics are used to load the vessel on the trailer. With a conventional trailer, a hand winch is required while ensuring the vessel is centred over the rollers. A procurement package has been developed for hydraulic trailers and is included as Appendex III.

Between Rainy Lake and Atikokan it is anticipated that there will be a high proportion of smaller boats from local tourists camps or local seasonal residents. For this reason an inexpensive smaller trailer is also included. This will be easier to manoeuvre and improve the life span of the hydraulic trailer. From a business standpoint it is not logical to transport a $2,000 fishing boat with a $12,000 trailer.

The vehicle should be a four wheel drive (4 WD) truck with a minimum pulling capacity of 6,000 kg. It should have comfortable seating for four adults as a minimum. Investigations of potential vehicles reveals a wide variety of trucks which would be suitable. A crew-cab pick-up with 4 WD and automatic transmission appears to be most suitable. Details of potential vehicles are noted in Appendix IV.

3.0 SITE DESIGN DESCRIPTION

3.1 Atikokan River

The Economic Development Office of Atikokan was contacted to confirm the proposed location for the Atikokan Marina. The marina location, adjacent to the park at White Street, constitutes the terminus of the Waterway. Soundings were taken along the river from the mouth to the Marina, a distance of approximately 5 kilometres, and obstructions were noted.

The road bridge at Mackenzie Avenue poses an overhead obstruction with a clearance of only 2.5 m which will prevent larger boats from reaching the marina site. Based on this fact and the narrow river width, an additional landing development was recommended at the Steep Rock Lake Dam, primarily for larger boats.

The only other overhead structure is a railway bridge having a clearance of 5.0 m. This should not obstruct any of the anticipated traffic.

To determine the extent of dredging required, water levels were analyzed to establish a low water datum. The required depth for navigation is 1.2 m below low water.

To analyze water levels, flow records were obtained from the Water Survey of Canada gauge on the Atikokan River. This information, along with survey data collected during our field investigation was input in a HEC-2 computer model. The model revealed that water levels in the river would be below those required for navigation for a significant portion of the boating season and would be made even lower at Front Street through clearing of downstream obstructions. Since mass excavation of the Atikokan River would be environmentally unsound, reinstating the old weir at Tracy Rapids was added to the scope of work to facilitate navigation in the Atikokan River. The weir was apparently unlawfully removed approximately two years ago. The elevation of the existing segments of timber crib at the weir are as high as 384.75 m while the channel invert elevation is as low as 383.25 m. The proposed weir design is a broad crested rubble mound weir with a uniform crest elevation of 384.10 m and a low flow channel elevation of 383.85 m. By providing a uniform crest elevation, the low water levels are established while minimizing the increase in high water levels. The existing and proposed water levels are illustrated in Table 3.1 following.

TABLE 3.1 WATER LEVELS OF APUNGSISAGEN LAKE TRACY RAPIDS WEIR		
	Low	High
Flow Rate (cms)	0.5	15.7
Existing water level (m)	383.52	384.14
Proposed water level (m)	384.12	384.50

The weir will result in an increase of 0.6 m for low water levels and 0.36 m for high water levels. The reduction in variability of water level results from the uniform crest height in comparison to the existing cross-section at the weir.

Based on the design low water level, seven locations were identified with less than 1.2 m of water. In each case, the area is to be dredged to 1.2 m and the banks cut back to a 1.5 horizontal to 1 vertical slope. The disturbed portion of the bank is then lined with filter cloth and rip rap to protect the native stiff clay from erosion. That portion above high water is to be re-seeded.

Local dredging activity will probably not impact the bank stability of the Atikokan river nor the aquatic habitat potential. Siltation resulting from construction activity should be minimized as much as practical but will be temporary in any event. Construction should be timed to coincide with a low flow period.

The vulnerability of the banks of the river to increased erosion, resulting from increased boating activity, will have a potentially negative impact. This could be manifested in loss of vegetated edge, riparian zone degradation, siltation, increased turbidity and sediment transport, and geomorphologic destabilization (increased width: depth ratios, aggradation, etc.). Clay soils remain in suspension for long periods of time and will travel into the lake before settling out. Microbiological production in the water column and bed of the river will adjust to a change in turbidity levels.

The proposed increase in water level (and therefore flow regimes) will effect a geomorphologic adjustment. Vegetated edges and banks will move to accommodate a larger cross sectional area for the channel.

This will also effect a water level increase in the Sawmill Bay marsh area of Apungsisagen Lake. Adjustments in vegetation communities and habitat will occur, and it is possible that the successional process of the marsh (toward a drier ecosystem) will be set back. Therefore, the marsh character of Sawmill Bay may be enhanced.

3.2 Tracy Rapids Portage

The by-pass road has been shortened to 40% of the length proposed in the feasibility study for a savings of over $50,000 in capital costs and reducing the operating costs and portage time. The first 100 m at the downstream end and 70 m near the upstream end will be surface treated with emulsified asphalt. Depending on the availability of funds it may be advisable to treat the entire length of road.

Since the site is remote, the operators cabin includes a propane system for lights, fridge, stove and hot water and a gas powered water pump with pressure tank for running water. To minimize the size of the septic bed, the washroom will be for the operator only. An outhouse at the upstream and downstream ramp is included for the general public.

Upgrading the existing access road (presently a winter road) has also been included in the scope of work to reduce operational costs and improve logistics in a number of ways:

- the need for a boat for the operator is avoided, reducing-capital, maintenance, and storage costs;
- routine or emergency maintenance on truck and trailer is greatly simplified - (the viability of the waterway relies on minimizing "down time");
- supplies such as gasoline, propane tanks, and food can be readily obtained, and outhouse pump-out is simplified;
- maintenance of the by-pass road would be easier to accomplish.

The existing access road was surveyed and construction detail prepared for a 3.1 kilometre single lane access road. Turn-out areas are incorporated where appropriate to permit passing.

The launch sites will result in localized shoreline disturbances in Dog Bay and on the Seine River below Tracy Rapids. Positive environmental impacts may result from structural habitat provided by docks, and flow will not be affected. Direct, untreated runoff from surfaces used by portage vehicles may contribute pollutants such as oil.

No negative impacts from sewage are expected. The septic field will be designed according to OMOE specifications and will only be used by the operator. Public outhouse effluent will be removed from the site.

The proposed upstream launch site is approximately 150 m from a Bald Eagle nest, which puts the site within the secondary management zone (200 m) laid out in the Bald Eagle Habitat Management Guidelines (OMNR Wildlife Branch) under the Ontario Endangered Species Act. The secondary zone "should extend 200 m from the nest". In this zone, "land use activities that result in significant changes in the landscape, such as clear cutting, land clearing, (road construction, pipeline construction, hydro rights-of-way) or (any) major construction should be prohibited". Construction may disturb Eagle activity during nesting season, particularly if free access is allowed closer to the nest. Consequently construction activity should be carried out after fall migration or prior to nesting in the spring. The constraints will likely be outlined in the MNR approval.

The ecological subunits identified along the proposed access road route and by-pass road are common locally, regionally and provincially. Most of the vegetation there is already disturbed by its current use as a winter road. Localized hydrological and concomitant biological adjustments could occur if the road or ditches impede wetland flow but adequate ditches and culverts should minimize this occurrence.

Weir reconstruction is not expected to result in negative impacts to flow regime since water levels are predicted to remain the same, controlled hydraulically downstream. However, there may be localized impacts of flow distribution immediately below the weir structure. The proposal will result in concentration of low flows.

3.3 Boyce Rapids

Boyce Rapids were surveyed in May and soundings taken. Low flow analysis indicates that water levels on Perch Lake can be as low as Calm Lake which is 382.2 m. Additionally, under low flow situations, the vertical drop through Boyce Rapids is reduced from 400 mm to 100 mm. This was verified during a site inspection in September.

The river was modelled using HEC-2 computer model to determine low water elevations and modify the soundings accordingly. At low water, a number of areas were found to provide less than 1.2 m of depth. These have been marked on the plans and the proposed channel was then modelled to determine the effect of dredging on water levels. It is proposed to place some of the material back in the river out of the boat channel to maintain the same cross-sectional area and hence water levels upstream. It is proposed that the material be graded to a suitable size and depth to be most productive to the existing fish population. It is estimated that approximately 70% of the cobbles and boulders will be relocated. The remaining 30% will be placed on the banks above the high water mark.

Details of the types of materials to be kept in the river and the exact locations for replacement would be specified by the Consultant in conjunction with MNR staff during construction

Depending on the length of channel and the direction of current, a 15 m to 20 m wide channel is preferred. The majority of dredging work proposed is excavation of cobble and large boulders, however, at the upstream end a bedrock shelf must be removed. Because of the short length of the bedrock outcrop (10 m) and the costs of drilling and blasting, a 12 m wide channel has been specified in the area.

Proposed dredging in the channel may result in adjustments of bed materials in some areas. Shallow margins at the river's edge will be extended out as the main thalweg channel is deepened. Velocity in the deep and shallow microhabitats will be altered with concomitant changes in deposition of fines and transport of gravels. If the surface area of shallow edges increases, there may be an increase in nursery habitat.

3.4 Calm Lake Dam

The by-pass route at this site utilizes the access road for the dam. Road improvements consist of ditching and culverts to maintain a sound road base and emulsified asphalt on the steep grade at the upstream site. The downstream site has been relocated from that suggested in the feasibility study to shorten the route by 450 m and reduce capital costs.

Upstream of the dam, a highly visible safety boom will be installed to replace the old log booms. This boom will consist of fluorescent orange floats complete with warning signs and grab lines between.

Shorelines will be negatively impacted in those localized areas in which ramps are proposed. The timber cribs and docks will likely have positive impacts on aquatic habitat, particularly as cover and structural habitat. Uncontrolled road drainage may contribute some silt and pollutants as runoff. Structural habitat diversity will increase as a result of the ramps and piers. Impacts will be very localized and unlikely to expand in the future. Therefore, they are not seen as incremental degradation.

Terrestrial impacts will likely be insignificant since the proposed works are very confined geographically, and will occur on disturbed sites.

3.5 Crilly Dam

A new road will be constructed from the upstream site at the dam to a downstream ramp immediately below the dam resulting in a by-pass route only 200 m long. The maximum grade is 15% with the majority between 10 and 13%. The route recommended in the feasibility study was approximately 3300 m long and included a section using highway 11 which would add to the risk of accident associated with the operation.

Immediately adjacent to the downstream ramp is a stockpile of blast rock which will be used as fill for the road and downstream site. Downstream water levels vary by 2.0 metres, so a longer dock and ramp are required. Guide posts have been included on the shoulder at the top of the bank. These posts are similar to those used in park settings and do not conform to Ministry of Transportation specifications for a public road. They provide a partial measure of safety.

Environmental impacts are similar to those at Calm Lake Dam with very localized aquatic disturbances at the ramp sites but providing increased habitat diversity.

3.6 Fort Frances

The upstream site for this by-pass will be the ramp presently being constructed at the municipal marina. The downstream ramp is adjacent to the sewage treatment plant at the end of McIrvine Road. The existing ramp is too narrow and too short and will consequently be removed. Water levels at the site vary by as much as 5 m requiring a ramp 39 m long at the existing grade of 13%. Providing a ramp at a steeper grade would make it shorter by 5 m but may result in silting of the ramp.

Since the water level varies so substantially, a fixed dock is not practical. The best solution is a sectional floating dock which is designed to lay on the concrete ramp when the water is low. The dock would be anchored against the current with concrete anchors and chains. The anchors should be far enough upstream that only drastic fluctuations in water levels would cause the chain length to require adjusting to minimize the uplift force on the anchor.

Provision has been made for a future widening of the ramp and an additional dock. An additional 3.0 m width would provide a two lane ramp 9.1 m wide. The downstream dock could be supported against the current by vertical steel H piles - a more costly but perhaps better system than the anchor chains.

The docks should be pulled up the ramp in winter to be protected against ice damage during breakup. The anchor chains should be long enough that they can be tied to shore without moving the anchors during winter.

Because Fort Frances will be a focal point along the waterway, provision is made for parking of vehicles with trailers. This will require expansion of the existing parking area to accommodate 12 vehicles with trailers. Due to anticipated higher traffic and because this site is in an urban area, the roadway and parking area will be paved. This will reduce maintenance costs and facilitate the marking of parking spaces. Sod and trees will complement the landscaping.

3.7 Manitou and Long Sault Rapids

Soundings were taken in May, 1991 and data collected from the flow gauge at Manitou Rapids from the U. S. Geological Survey. This information was used to develop a model of the river using the HEC-2 computer model. Low water elevations were established and it was found that no dredging will be required.

A plan showing the soundings and proposed route through the rapids was developed.

3.8 Dawson Portage

This portion of the waterway represents a branch of the waterway not on the main east-west route. It is also the most remote and unaccessible by-pass site on the Waterway. Slightly different standards were used in the design of this site, to reflect these characteristics.

At present, a 6 km long road exists between Sand Point Lake and Lake La Croix. Although this road is in poor condition, it is used by a local operator to shuttle a few parties of hunters and fishermen back and forth each year. The existing road is graded with sand, and cobble which quickly develops ruts. Additionally, there are no ditches and few culverts so the road is often washed out.

To bring the access road up to an acceptable standard, it is proposed to widen it and re-surface with 6" of granular 'A' material. Culverts will also be placed in 22 locations where water courses cross the road. To accomplish this the contractor will have the option to bring granular 'A' material in during the winter, or to set up a temporary crusher and screening plant and establish a borrow pit. Due to the remoteness of the site the temporary crusher option will likely be chosen.

The boat ramp sites are designed to be similar in standard to other by-pass sites with the exception that pit toilets, rather than outhouses are proposed. These toilets will be moved occasionally rather than pumped out.

At the Lac La Croix site, the existing floating dock can be re-used, however, at the Sand Point Lake site, a new floating dock is proposed due to the poor condition of the existing dock.

4.0 CONSTRUCTION COSTS, TECHNIQUES AND SCHEDULES

The costs of work and equipment associated with each site is shown in Table 4.0. The total construction costs is estimated to be $ 1.25 M and total start-up cost is $ 1.77 M. The $517,000 non-construction costs consist of the required equipment such as truck, trailers, telephones, radios etc. and the costs associated with construction administration supervision and contingencies. Periodic inspection and a final confirmation of works for the Atikokan River will be sufficient but full time supervision of construction at Tracy Rapids, Calm, Crilly, Fort Frances and Dawson Portage are highly recommended to ensure that the contractor completes the work in conformance with the drawings and specifications. This can avoid contract extras during the construction period and maintenance problems in the long run. The cost estimates assume there will be some overlap of supervision between the contracts as many projects will occur simultaneously.

Construction is presently planned for 1992 with implementation in 1993. It would be feasible to spread these costs out to some degree without jeopardizing the viability of the waterway. Fort Frances could be constructed this spring for 1992. This would result in the waterway extending from Rainy Lake to Minaki, providing a 350 km waterway with one lift. The route between Fort Frances and Atikokan could be constructed as planned for the 1993 season completing the main route of the waterway with one lift. The route between Fort Frances and Atikokan could be constructed as planned for the 1993 season completing the main route of the waterway with Dawson Portage improvements incorporated in 1994 or later.

Each of the construction cost estimates is divided into various sections to clarify the costs associated with each aspect of the work. Unit prices are based on queries of various local contractors - large and small, and do vary from site to site depending on the source, quantity and site conditions. Mobilization, site maintenance and demobilization costs are intended to reflect the contractors expenses with respect to bringing equipment on and off site, maintaining a site, trailer and site cleanup.

To the extent possible, tenders should close at the same time or in groups to allow the Waterway to evaluate all contracts simultaneously. The completion dates may be sufficiently long allowing a contractor to bid more than one contract.

Given the current economic climate the works should be constructed as soon as possible. With construction activity so depressed it is possible the tenders will be substantially lower than the estimates provided.

4.1 Atikokan River

The work involved in dredging the Atikokan river can be accomplished by working from the banks of the river using a small backhoe with an extended boom. In the one location remote from town it is assumed the contractor will place the dredgate above the high water line near the site. In the other locations the material will be hauled away at the contractors expense. There may be some locations which will require the contractor to cross private property to access the site. Prior to tendering the contract the Waterway should sign agreements with the affected residents allowing assess contingent upon adequate restoration.

The time required to complete this work will depend on the methods of the Contractor but should take approximately three weeks. The estimated costs are detailed in Table 4.1. Since no special or large equipment will be required the mobilization costs are relatively small. Construction supervision should include a verification that the proposed grade has been achieved.

4.2 Tracy Rapids Portage

The Tracy Rapids Contract constitutes the largest construction project with a estimated cost of $387,000 (see Table 4.2a) including the by-pass, the weir reconstruction and an access road. The estimated time for construction is 5 months. Potentially road construction could be done in the summer and fall of 1992 with completion of the contract occurring in the spring of 1993. Weir construction and ramp and dock construction will have to be scheduled to meet the construction windows established by the Ministry of Natural Resources.

Table 4.2b details costs at the Tracy Rapids site without construction of the access road. Since the access road will facilitate construction of the by-pass and weir, the unit costs to construct those facilities rise substantially if the access road is deleted. Materials would either be brought in by barge or winter road and stockpiled.

4.3 Boyce Rapids

The work at Boyce Rapids would be accomplished by assembling a sectional barge at Perch Lake and floating the required machinery (crane, drill rig, loader) to the site. The work is estimated to take three weeks and costs are outlined in Table 4.3. Construction supervision will consist of monitoring the fill placement and a post dredging sounding survey. This work should be carried out in August during a period of low flow.

4.4 Calm Lake Dam

Costs associated with this work are illustrated in Table 4.4. The construction schedule is anticipated to be two months.

4.5 Crilly Dam

Costs associated with this work are illustrated in Table 4.5. The work will require two months to complete. The large rock fill used to construct the road and downstream site will likely require larger construction equipment than the other sites.

4.6 Fort Frances

Costs associated with the work are illustrated in Table 4.6. Granular materials are most expensive at Fort Frances with the exception of clear stone.

Approximately 50% of the $149,000 estimated construction cost is for site work including docks, ramps, etc. while the remaining costs are for paving and landscaping. Equipment costs are higher for this portage because it is assumed that two trucks and trailers will be required to meet the demand at this focal point of the waterway. This work will require approximately two months to complete.

4.7 Dawson Portage

The costs associated with improvements to Dawson Portage are detailed in Table 4.7. The most probable scenario will be to establish a crushing and screening plot on site and establish a local borrow pit. To take the guess work out of contractors tenders the borrow pits should be established prior to the tender period. A local contractor should be hired for a few days to find the appropriate materials. The cost of this work will be minimal and should be more than offset by a reduction in the tenders.

This project will require three months to complete.

ATIKOKAN - TO - MINAKI WATERWAY

Cost Estimate

27-Nov-91

	SITE	CONSTRUCTION	OTHER	TOTAL
1.	Atikokan River	$37,600	$9,600	$47,200
2.	Tracy Portage and Weir	$387,000	$113,000	$500,000
3.	Boyce Rapids	$37,800	$9,500	$47,300
4.	Calm Lake Dam Portage	$128,000	$75,000	$203,000
5.	Crilly Dam Portage	$134,000	$76,000	$210,000
6.	Fort Frances Downstream Site	$149,000	$120,000	$269,000
7.	Dawson Portage	$380,000	$114,000	$494,000
	Totals	$1,253,400	$517,100	
	TOTAL PROJECT BUDGET			**$1,771,000**

Table 4.0

ATIKOKAN - TO - MINAKI WATERWAY

ATIKOKAN RIVER

Cost Estimate 27-Nov-91

ITEM	Quantity	Unit Price	Amount ($1991)
Construction			
1. Mobilization, Site Maintenance	L.S.		$5,000
2. Excavation	630 cu.m	$15.00	$9,450
3. Filter Cloth	1290 sq.m	$6.00	$7,740
4. Rip Rap	300 cu.m	$50.00	$15,000
5. Topsoil and Seed	90 sq.m	$5.00	$450
	SUB-TOTAL (Construction)		**$37,600**
Equipment, Admin, Cont, etc			
1. Costruction Administration and Supervision			$4,000
2. Contingency			$5,600
		TOTAL	**$47,200**

Table 4.1

ATIKOKAN - TO - MINAKI WATERWAY

TRACY RAPIDS PORTAGE

Cost Estimate

29-Nov-91

	ITEM	Quantity		Unit Price	Amount ($1991)
Construction					
1.	Mobilization, Site Maintenance	L.S.			$24,000
2.	Site Grading				
	a) Clearing and Grubbing	1500	sq.m	$1.00	$1,500
	b) Excavation	310	cu.m	$6.00	$1,860
	c) Clear Stone	63	cu.m	$60.00	$3,780
	d) Granular 'B'	355	cu.m	$12.00	$4,260
	e) Granular 'A'	115	cu.m	$22.00	$2,530
	f) Rip Rap	51	cu.m	$40.00	$2,040
	g) Filter Cloth	120	sq.m	$4.00	$480
3.	Docks				
	a) Timber Cribs	4	ea.	$1,800.00	$7,200
	b) Timber Deck	38.6	sq.m	$87.00	$3,358
	c) Ramps	13.0	sq.m	$75.00	$975
	d) Floating Docks	47.6	sq.m	$100.00	$4,760
4.	Launch Ramp Concrete Panels	71	ea.	$250.00	$17,750
5.	By-Pass Road				
	a) Clearing and Grubbing	4,640	sq.m	$0.75	$3,480
	b) Excavation	435	cu.m	$8.00	$3,480
	c) Fill	600	cu.m	$8.00	$4,800
	d) Granular 'B'	1,200	cu.m	$12.00	$14,400
	e) Granular 'A'	550	cu.m	$22.00	$12,100
	f) Surface Treatment	3,360	sq.m	$5.00	$16,800
	g) Culverts	3	ea.	$1,500.00	$4,500
	h) Ditches	1,160	l.m	$4.00	$4,640
6.	Access Road				
	a) Clearing and Grubbing	17,500	sq.m	$0.50	$8,750
	b) Select Native or Rock	1,340	cu.m	$6.00	$8,040
	c) Granular 'B'	7,080	cu.m	$12.00	$84,960
	d) Granular 'A'	2,440	cu.m	$22.00	$53,680
	e) Geogrid	7,560	sq.m	$3.00	$22,680
	f) Culverts	13	ea.	$1,200.00	$15,600
	h) Ditches	3,600	l.m	$3.00	$10,800

Table 4.2a

6.	Buildings				
	a) Operator's Cabin	29.7	sq.m	$650.00	$19,305
	b) Outhouse	2	ea.	$1,500.00	$3,000
	c) Plumbing System	L.S.			$1,500
	d) Septic System	L.S.			$3,500
	e) Propane System	L.S.			$3,500
7.	Miscellaneous				
	a) Gasoline Storage Tank	1	ea.	$1,000.00	$1,000
	b) Storage Shed	1	ea.	$500.00	$500
	c) Sign Installation	2	ea.	$400.00	$800
8.	Weir				
	a) Excavation	40	cu.m	$30.00	$1,200
	b) Rock Fill	80	cu.m	$25.00	$2,000
	c) 100mm Stone	25	cu.m	$60.00	$1,500
	d) Native Clay Core	60	cu.m	$65.00	$3,900
	e) Filter Cloth	220	sq.m	$8.00	$1,760
				SUB-TOTAL (Construction)	$387,000

Equipment, Admin, Cont, etc

1.	Equipment				
	a) Four Wheel Drive Vehicle	1	ea	$30,000	$30,000
	b) 34 ft Cap. Hydraulic Trailer	1	ea	$15,000	$15,000
	c) 20 ft Cap Universal Trailer	1	ea	$2,000	$2,000
	d) Telephone	1	ea	$700	$700
	e) Marine Band Radio	2	ea	$400	$800
	f) Signs	2	ea	$500	$1,000
	g) Furniture	L.S.			$2,000
	h) Portable Generator	1	ea	$900	$900
2.	Construction Administration and Supervision				$25,000
3.	Contingency and Miscellaneous				$35,700
				SUB-TOTAL (Other)	$113,000
				TOTAL	**$500,000**

Table 4.2a cont.

ATIKOKAN - TO - MINAKI WATERWAY

TRACY RAPIDS PORTAGE

(not including access road)

Cost Estimate 29-Nov-91

	ITEM	Quantity		Unit Price	Amount ($1991)
Construction					
1.	Mobilization, Site Maintenance	L.S.			$48,000
2.	Site Grading				
	a) Clearing and Grubbing	1500	sq.m	$1.00	$1,500
	b) Excavation	310	cu.m	$6.00	$1,860
	c) Clear Stone	63	cu.m	$60.00	$3,780
	d) Granular 'B'	355	cu.m	$12.00	$4,260
	e) Granular 'A'	115	cu.m	$22.00	$2,530
	f) Rip Rap	51	cu.m	$40.00	$2,040
	g) Filter Cloth	120	sq.m	$4.00	$480
3.	Docks				
	a) Timber Cribs	4	ea.	$1,800.00	$7,200
	b) Timber Deck	38.6	sq.m	$87.00	$3,358
	c) Ramps	13.0	sq.m	$75.00	$975
	d) Floating Docks	47.6	sq.m	$100.00	$4,760
4.	Launch Ramp Concrete Panels	71	ea.	$250.00	$17,750
5.	By-Pass Road				
	a) Clearing and Grubbing	4,640	sq.m	$0.75	$3,480
	b) Excavation	435	cu.m	$8.00	$3,480
	c) Fill	600	cu.m	$8.00	$4,800
	d) Granular 'B'	1,200	cu.m	$12.00	$14,400
	e) Granular 'A'	550	cu.m	$22.00	$12,100
	f) Surface Treatment	3,360	sq.m	$5.00	$16,800
	g) Culverts	3	ea.	$1,500.00	$4,500
	h) Ditches	1,160	l.m	$4.00	$4,640
6.	Buildings				
	a) Operator's Cabin	29.7	sq.m	$650.00	$19,305
	b) Outhouse	2	ea.	$1,500.00	$3,000
	c) Plumbing System	L.S.			$1,500
	d) Septic System	L.S.			$3,500
	e) Propane System	L.S.			$3,500

Table 4.2b

7.	Miscellaneous				
	a) Gasoline Storage Tank	1	ea.	$1,000.00	$1,000
	b) Storage Shed	1	ea.	$500.00	$500
	c) Sign Installation	2	ea.	$400.00	$800
8.	Weir				
	a) Excavation	40	cu.m	$30.00	$1,200
	b) Rock Fill	80	cu.m	$25.00	$2,000
	c) 100mm Stone	25	cu.m	$60.00	$1,500
	d) Native Clay Core	60	cu.m	$65.00	$3,900
	e) Filter Cloth	220	sq.m	$8.00	$1,760
				SUB-TOTAL (Construction)	$206,000

Equipment, Admin, Cont, etc

1.	Equipment				
	a) Four Wheel Drive Vehicle	1	ea	$30,000	$30,000
	b) 34 ft Cap. Hydraulic Trailer	1	ea	$12,000	$12,000
	c) 20 ft Cap Universal Trailer	1	ea	$2,000	$2,000
	d) Telephone	1	ea	$700	$700
	e) Marine Band Radio	2	ea	$400	$800
	f) Signs	2	ea	$500	$1,000
	g) Furniture	L.S.			$2,000
	h) Portable Generator	1	ea	$900	$900
2.	Construction Administration and Supervision				$25,000
3.	Contingency and Miscellaneous				$20,600
				SUB-TOTAL (Other)	$95,000

TOTAL $301,000

Table 4.2b cont.

ATIKOKAN - TO - MINAKI WATERWAY

BOYCE RAPIDS

Cost Estimate 29-Nov-91

ITEM	Quantity	Unit Price	Amount ($1991)
Construction			
1. Mobilization, Site Maintenance	L.S.		$20,000
2. Dredging			
a) Class 'A' (drill & blast)	50 cu.m	$125.00	$6,250
b) Class 'B'	770 cu.m	$15.00	$11,550
	SUB-TOTAL (Construction)		**$37,800**
Equipment, Admin, Cont, etc			
1. Costruction Administration and Supervision			$3,800
2. Contingency			$5,700
		TOTAL	**$47,300**

Table 4.3

ATIKOKAN - TO - MINAKI WATERWAY

CALM LAKE DAM PORTAGE

Cost Estimate 29-Nov-91

	ITEM	Quantity		Unit Price	Amount
Construction					
1.	Mobilization, Site Maintenance	L.S.			$12,000
2.	Site Grading				
	a) Excavation	100	cu.m	$8.00	$800
	b) Rock Fill	235	cu.m	$10.00	$2,350
	b) Clear Stone	63	cu.m	$60.00	$3,780
	d) Granular 'A'	50	cu.m	$30.00	$1,500
4.	Docks				
	a) Timber Cribs	5	ea.	$1,800.00	$9,000
	b) Timber Deck	52.0	sq.m	$87.00	$4,524
	c) Ramps	13.4	sq.m	$75.00	$1,004
	d) Floating Docks	47.6	sq.m	$100.00	$4,760
5.	Concrete				
	Launch Ramp Panels	85	ea.	$200.00	$17,000
	Parking Blocks	11	ea.	$50.00	$550
6.	Roads				
	a) Surface Treatment	930	sq.m	$5.00	$4,650
	b) Guide Posts	37	ea.	$85.00	$3,145
	c) Culverts	3	ea.	$1,500.00	$4,500
	d) Ditches	800	l.m	$5.00	$4,000
7.	Buildings				
	a) Operator's Cabin	29.7	sq.m	$650.00	$19,305
	b) Outhouse	1	ea.	$1,500.00	$1,500
	c) Plumbing System	L.S.			$1,500
	d) Septic System	L.S.			$4,000
	e) Electrical System	L.S.			$17,000

Table 4.4

8.	Miscellaneous				
	a) Gasoline Storage Tank	1	ea.	$1,500.00	$1,500
	b) Storage Shed	1	ea.	$500.00	$500
	c) Sign Installation	2	ea.	$400.00	$800
	d) Safety Boom	250	l.m	$32.00	$8,000
				SUB-TOTAL (Construction)	$128,000

Equipment, Admin, Cont, etc

1.	Equipment				
	a) Four Wheel Drive Vehicle	1	ea	$30,000	$30,000
	b) 34 ft Cap. Hydraulic Trailer	1	ea	$15,000	$15,000
	c) 20 ft Cap Universal Trailer	1	ea	$2,000	$2,000
	d) Telephone	1	ea	$700	$700
	e) Marine Band Radio	2	ea	$400	$800
	f) Signs	2	ea	$500	$1,000
2.	Construction Administration and Supervision				$12,800
3.	Contingency and Miscellaneous				$12,800
				SUB-TOTAL (Other)	$75,000
				TOTAL	**$203,000**

Table 4.4 cont.

ATIKOKAN - TO - MINAKI WATERWAY

CRILLY DAM PORTAGE

Cost Estimate 29-Nov-91

	ITEM	Quantity		Unit Price	Amount
Construction					
1.	Mobilization, Site Maintenance	L.S.			$12,000
2.	Site Grading				
	a) Clearing and Grubbing	605	sq.m	$2.00	$1,210
	a) Rock Fill	240	cu.m	$5.00	$1,200
	b) Clear Stone	60	cu.m	$50.00	$3,000
	d) Granular 'A'	160	cu.m	$25.00	$4,000
	e) Granular 'B'	105	cu.m	$16.00	$1,680
3.	Docks				
	a) Timber Cribs	5	ea.	$1,800.00	$9,000
	b) Timber Deck	52.0	sq.m	$87.00	$4,524
	c) Ramps	19.3	sq.m	$75.00	$1,448
	d) Floating Docks	56.6	sq.m	$100.00	$5,660
4.	Concrete				
	Launch Ramp Panels	81	ea.	$250.00	$20,250
5.	Roads				
	a) Clearing and Grubbing	1950	cu.m	$2.00	$3,900
	b) Excavation	156	cu.m	$8.00	$1,248
	c) Rock Fill	1088	cu.m	$6.00	$6,528
	d) Granular 'B'	360	cu.m	$16.00	$5,760
	e) Granular 'A'	155	cu.m	$25.00	$3,875
	f) Guide Posts	59	ea.	$85.00	$5,015
	g) Culverts	2	ea.	$1,500.00	$3,000
	h) Ditches	125	l.m	$12.00	$1,500
6.	Buildings				
	a) Operator's Cabin	29.7	sq.m	$650.00	$19,305
	b) Outhouse	1	ea.	$1,800.00	$1,800
	c) Plumbing System	L.S.			$1,500
	d) Septic System	L.S.			$3,500
	e) Electrical System	L.S.			$4,000

Table 4.5

7.	Miscellaneous				
	a) Gasoline Storage Tank	1	ea.	$1,000.00	$1,000
	b) Storage Shed	1	ea.	$500.00	$500
	c) Sign Installation	2	ea.	$400.00	$800
	d) Furniture	L.S.			$2,000
	e) Safety Boom	140	l.m	$32.00	$4,480
				SUB-TOTAL (Construction)	$134,000

Equipment, Admin, Cont, etc

1.	Equipment				
	a) Four Wheel Drive Vehicle	1	ea	$30,000	$30,000
	b) 34 ft Cap. Hydraulic Trailer	1	ea	$15,000	$15,000
	c) 20 ft Cap Universal Trailer	1	ea	$2,000	$2,000
	d) Telephone	1	ea	$100	$100
	e) Marine Band Radio	2	ea	$400	$800
	f) Signs	2	ea	$500	$1,000
2.	Construction Administration and Supervision				$13,400
3.	Contingency and Miscellaneous				$13,400
				SUB-TOTAL (Other)	$76,000
				TOTAL	**$210,000**

Table 4.5 cont.

ATIKOKAN - TO - MINAKI WATERWAY

FORT FRANCES PORTAGE

Cost Estimate

29-Nov-91

	ITEM	Quantity		Unit Price	Amount ($1991)
Construction					
1.	Mobilization, Site Maintenance Demobilization	L.S.			$10,000
2.	Excavation (Site Grading)	120	cu.m	$8.00	$960
3.	Fill (Site Grading)				
	a) Select Native	120	cu.m	$15.00	$1,800
	b) Clear Stone	120	cu.m	$45.00	$5,400
	d) Granular 'A'	325	cu.m	$35.00	$11,375
	e) Granular 'B'	280	cu.m	$25.00	$7,000
4.	Docks				
	a) Timber Cribs	1	ea.	$1,500.00	$1,500
	b) Timber Deck	5.8	sq.m	$87.00	$500
	c) Floating Docks	90.0	sq.m	$100.00	$9,000
	d) Anchor System	L.S.			$6,000
5.	Concrete				
	Launch Ramp Panels	128	ea.	$200.00	$25,600
6.	Roads				
	a) Asphalt Paving	2500	sq.m	$25.00	$62,500
	b) Culvert	1	ea.	$1,000.00	$1,000
7.	Buildings				
	a) Outhouse	1	ea.	$2,000.00	$2,000

Table 4.6

8.	Landscaping				
	a) Sign Installation	2	ea.	$400.00	$800
	b) Topsoil and Sod	300	sq.m	$3.75	$1,125
	c) Trees	5	ea.	$500.00	$2,500
				SUB-TOTAL (Construction)	$149,000

Equipment, Admin, Cont, etc

1.	Equipment				
	a) Four Wheel Drive Vehicle	2	ea	$30,000	$60,000
	b) 34 ft Cap. Hydraulic Trailer	2	ea	$15,000	$30,000
	c) 20 ft Cap Universal Trailer	1	ea	$2,500	$2,500
	d) Telephone	1	ea	$100	$100
	e) Marine Band Radio	3	ea	$400	$1,200
	f) Signs	2	ea	$500	$1,000
2.	Construction Administration and Supervision				$10,000
3.	Contingency and Miscellaneous				$14,900
				SUB-TOTAL (Other)	$119,700
				TOTAL	**$268,700**

Table 4.6 cont.

ATIKOKAN - TO - MINAKI WATERWAY

DAWSON PORTAGE

Cost Estimate

29-Nov-91

	ITEM	Quantity		Unit Price	Amount ($1991)	
Construction						
1.	Mobilization, Site Maintenance Demobilization	L.S.			$50,000	
2.	Excavation (Site Grading)	60	cu.m	$8.00	$480	
3.	Site Grading					
	a) Clear Stone	61	cu.m	$40.00	$2,440	
	b) Granular 'A'	200	cu.m	$25.00	$5,000	
	c) Sand or screenings	6	cu.m	$20.00	$120	
4.	Docks					
	a) Timber Cribs	3	ea.	$1,800.00	$5,400	
	b) Timber Deck	32.7	sq.m	$87.00	$2,845	
	c) Ramps	9.0	sq.m	$75.00	$675	
	d) Floating Docks	23.8	sq.m	$100.00	$2,380	
5.	Concrete					
	Launch Ramp Panels	91	ea.	$350.00	$31,850	
6.	Roads					
	a) Rock Fill	240	cu.m	$10.00	$2,400	
	b) Granular 'B'	5650	cu.m	$12.00	$67,800	
	c) Granular 'A'	5300	cu.m	$22.00	$116,600	
	d) Culverts	23	ea.	$1,500.00	$34,500	
	e) Ditches	11000	l.m	$5.00	$55,000	
7.	Miscellaneous					
	a) Pit Toilets	2	ea.	$800.00	$1,600	
	b) Sign Installation	2	ea.	$400.00	$800	
				SUB-TOTAL (Construction)		**$380,000**

Table 4.7

Equipment, Admin, Cont, etc

1.	Equipment				
	a) Four Wheel Drive Vehicle	1	ea	$30,000	$30,000
	b) 34 ft Cap. Hydraulic Trailer	1	ea	$15,000	$15,000
	e) Marine Band Radio	1	ea	$400	$400
	f) Signs	2	ea	$500	$1,000
2.	Construction Administration and Supervision				$30,000
3.	Contingency and Miscellaneous				$38,000
				SUB-TOTAL (Other)	$114,400
				TOTAL	**$494,400**

Table 4.7 cont.

APPENDIX I
ATIKOKAN-TO-MINAKI WATERWAY
ENVIRONMENTAL ASSESSMENT

APPENDIX I
ATIKOKAN-TO-MINAKI WATERWAY
ENVIRONMENTAL ASSESSMENT

INTRODUCTION

This report documents a reconnaissance of 9 sites between Atikokan and Lake of the Woods at which navigation improvements are proposed. Existing habitat conditions are identified, followed by assessment of impacts for one proposal at each site.

More specifically, localized physical impacts are identified followed by interpretation of possible impacts to fisheries resources. Our reconnaissance was restricted to habitat and did not include fish habitat utilization studies. The work is based on target species of concern to the Ontario Ministry of Natural Resources and the federal Department of Fisheries and Oceans. Analyses of system wide impacts on fisheries resulting from changed access, increased tourism, physical alteration, etc. were beyond the scope of the current study.

STUDY AREA AND PROPOSED PROJECT

A system of connected waterbodies stretches approximately 400 km from Atikokan to Minaki Lodge north of Kenora including:

Atikokan River
Seine River
Perch Lake
Calm Lake
Crilly Lake
Rainy River
Rainy Lake
Lake of the Woods

Hough, Stansbury + Woodland Ltd. conducted a study (April, 1989) of the feasibility of rendering the system navigable from end to end for pleasure boat traffic. In particular, the study identified nine localized sites with navigation impediments, and "low technology" solutions (presumably those not requiring installation of large scale engineering works such as locks). The report also addressed social and economic considerations.

The project is being managed by a local steering committee comprised of municipal, provincial and private sector representatives.

The scope of the current study is limited to those nine specific sites, for detailed engineering and environmental impacts.

POLICIES AND LEGISLATION

All proposed works within a waterbody require permits under the Lakes and Rivers Improvement Act, administered by the Ontario Ministry of Natural Resources. The impact analyses of this report will assist the OMNR in reviewing the sites for approval under this act.

The federal Fisheries Act is implicated since the proposals may result in alteration of aquatic habitat. Although this Act is administered locally by the OMNR, ultimate authority rests with the federal Department of Fisheries and Oceans which may review the project. The level of involvement by DFO, and possible requirement for a Compensation Agreement are unknown at this time. Compensation Agreements are called for when it is known that a project will alter aquatic habitat, but where it is justified on the condition that appropriate compensating works are installed. In addition, review by a federal agency may implicate the Environmental Assessment Review Process (EARP).

The Atikokan District Fisheries Management Plan identifies the Atikokan and Seine river systems as warm water fisheries containing northern pike, walleye and smallmouth bass.

The OMNR Bald Eagle Habitat Management Guidelines are addressed in this report with respect to a nest located in the vicinity of proposed works at Tracy Rapids. The Environmental Guidelines for Access Roads and Water Crossings (OMNR 1990) are implicated in the proposal for a road to Tracy Rapids as well.

METHODS

Background investigations and field reconnaissance were conducted during May, 1991. We interviewed OMNR staff, native groups and local anglers for existing knowledge of the sites. Field observations of aquatic habitat were made concurrently with bathymetry survey work. A goal for these observations was those habitat features which may be altered by the proposed project at each site.

The southern shoreline of the Atikokan River was walked roughly from the west end of the town of Atikokan downstream to its mouth. Some areas in town were also examined. Parameters such as the soils, substrate and slopes both above and below the observed water level and the type and extent of shoreline vegetation especially the emergent vegetation were noted. Soils and vegetation were examined in the floodplain areas further away from the river. Vegetation was also examined in and along the eastern shore of Sawmill Bay on Lower Steep Rock Lake, in Carabus Creek north of the CNR tracks and along the lower sections of the Atikokan River.

The proposed Tracy Rapids route was walked on June 8 and 9, 1991. The route was divided into broad ecological subunits. These subunits are relatively homogeneous with similar topography, soils, soil moisture regime and vegetation. These ecological subunits were then analyzed to determine their local and regional significance, the impact of construction and maintenance of a road, and what mitigation measures could be considered.

The proposed route for the Calm Lake Dam and Crilly Dam portages were examined by foot on June 10, 1991. Notes were made on the areas to be disturbed and on possible mitigation measures.

ATIKOKAN RIVER

Existing Conditions

The Atikokan River averages 15m wide and was 1.5 to 2.0 m deep at the time of the survey. The water surface gradient is very low, in a uniform 'U' shaped channel with steep banks and moderate confinement.

Stream gauge data (Water Survey of Canada) was used in hydraulic and hydrologic analyses which suggest that low flow occurs at 0.5 cms and results in a depth of approximately 1.2m. Water levels are controlled by those in Apungisagen Lake which are in turn controlled by an old vandalized weir at Tracy Rapids.

The bed and banks appear to be comprised primarily of silty clay soils with some silty sand deposits in places and rocky substrate near filling areas. Sandy deposits appear to be closely associated with the river, since clays are predominant in the floodplain community. In most reaches banks are vertical and the bankful mark was approximately 0.25-0.50 m above the May 11/91 water level. Filling has occurred in many urbanized reaches, and a railroad has impacted the stream alignment, confinement and substrate.

Approximately 25m into Apungisagen Lake off the mouth of the Atikokan River, a channel up to 3m deep is still apparent. The shores of this lake are generally steep and rocky with bedrock outcrops and exposed rock. This may indicate water levels before the Tracy Rapids weir was vandalized. OMNR staff suggest that loons, and nesting gulls (Herring Gulls and Ring Billed Gulls) utilize the lake transiently. Reconnaissance of the Apungisagen Lake was beyond the scope of our study.

Channel morphometry and substrate are relatively consistent between the lake and the general vicinity of Front Street and the railroad bridge. Between these bridges, and upstream of the study area, gradient and velocity increase.

There is a vegetated fringe along the edge of the river in reaches without bank filling. This extends approximately 1.0 m from each bank and consists of *Sparganium sp.* and sedges. Natural banks appear stable with Willows, alder and occasional grass hummocks. Although measurement of banks was difficult, soils were exposed behind the vegetated edge in numerous locations. The fine consolidated soils and patchy distribution of well rooted bank vegetation suggest that the banks are sensitive. Our 16 foot motor boat produced wake that disturbed the fringe vegetation, and a silt plume was evident as it washed along the banks. Other notable species in the riparian zone include Elm and small Red Ash. Sweet Flag, a unique plant species regionally, has also been recorded in this area.

The potential of the lower Atikokan River to provide aquatic habitat is moderate. Cover is limited to occasional obstructions and patches of overhanging alder. Channel morphometry is relatively uniform and habitat is homogeneous. Depth, flow and velocity appear adequate to support holding and migrating habitat, although spawning, nursery and forage production habitat is limited.

According to OMNR Atikokan District, the river is utilized by Shorthead Redhorse Suckers (*Moxostoma macrolepidotum*), Lake Whitefish, Walleye, Northern Pike, Brown Bullheads and Smallmouth Bass. Walleye likely migrate through the study area and are caught there approximately one month after the spawning season, probably during the downstream migration to Lower Steep Rock Lake. Shorthead Redhorse were observed in Atikokan during the field trip.

OMNR Atikokan District have provided verbal comment regarding the wildlife use pattern in the area. Pertaining to waterfowl OMNR staff stressed a western influence in the species composition. Mink, River Otter and Spotted Sandpiper were observed during the field trip.

There is a large marsh (Sawmill Bay) which is hydrologically connected to the Atikokan River and Lower Steep Rock Lake, and it is situated west of the lower reaches of the river. The river is separated from Sawmill Bay and Caribus Creek by a berm comprised at least partially of bedrock outcrops. Species associated with the wetland include Red Necked Grebes, several species of Rail, Yellow Headed Blackbirds, Snipe and Woodcock, Spotted Sandpiper, Mallard, Ring Necked Ducks and Black Ducks. Many of these species are also closely associated with contiguous habitats along the Atikokan River.

Proposal

The Tracy Rapids weir will be reconstructed with a uniform crested rubble mound at an elevation of 384.1m and a low flow channel at 383.85m. Water levels will be raised approximately 0.6m at low water and 0.36m at high water in Apungisagen Lake and the Atikokan River. More detailed discussion of the reconstruction is provided in section ... of this report. This alternative is proposed in lieu of large scale dredging between Apungisagen lake and the waterway terminus.

Localized dredging is proposed at seven sites where obstructions to navigation are present. Most of these include debris (logs or individual boulders) old beaver dam material in the bed, and the submerged remains of historic check dam. Banks will be stabilized at the work areas using rip-rap.

Impacts

* Locally dredging activity will probably not negatively impact the geomorphologic stability of the Atikokan River, nor the aquatic habitat potential.

* The proposed change in water level (and therefore flow regimes) will effect a geomorphologic adjustment. Vegetated edges and banks will move to accommodate a larger cross sectional area for the channel.

* The length of riverine habitat will decrease due to extension of lake level further upstream. Since the most significant issue relating fish utilization revolves around migration of several species through the study area, this impact may be neutral.

* The vulnerability of the banks of the river to increased erosion, resulting from increased boat activity, will have a potentially negative impact. This could be manifested in loss of vegetated edge, riparian zone degradation, siltation, increased turbidity and sediment transport, and geomorphologic destabilization (increased width:depth ratios, aggradation, etc.). Clay soils remain in suspension for long periods of time and will travel into the lake before settling out. Microbiological production in the water column and bed of the river will adjust to a change in turbidity levels.

* Proposed work at the Tracy Rapids weir will effect a water level increase in the Sawmill Bay marsh area. Adjustments in vegetation communities and habitat will occur, and it is possible that the successional process of the marsh (toward a drier ecosystem) will be set back. Therefore, the marsh character of Sawmill Bay may be enhanced.

* Residence time of water in the lake and river will increase slightly with concomitant increases in temperature.

TRACY RAPIDS

Inventories of existing conditions for this site are related directly to proposals due to the size of the area covered and logistical constraints. Briefly, proposed works include an access road, two boat launches, and reconstruction of the Tracy Rapids weir. The weir reconstruction is proposed for the Atikokan River component of the waterway and will have affects upstream of the Tracy Rapids site. Therefore, it is discussed in that section of the report, affects at the rapids and downstream are discussed below.

Existing Conditions (access road)

The proposed road between Highway 11 and the Tracy Rapids portage follows an existing winter road. The vegetation along this roadway has already been disturbed. Only herbs grow on the roadway. The disturbed roadway varies between 4m and 9m wide. The wider areas are primarily in lowlands.

The broad ecological subunits on the roadway are described below. Refer to the attached map for the location of these subunits.

Broad Ecological Subunits

Broad Ecological Subunit #	Broad Ecological Subunit Description
01	These are deciduous to mixed upland woods. The topography is rolling. The soil is mostly fine textured with clay to sandy clay loam soils. Bedrock outcrops are frequent through these areas. The soil moisture regimes are very fresh to moderately moist. Dominant tree species are Trembling Aspen with Balsam Fir, White Birch and Balsam Poplar. There is a thick and rich shrub layer. Herbs are abundant in open areas and moderate abundant in shaded areas. Through these areas, the winter roadway is covered by grasses and broad-leaved herbs.
02	These are mixed to coniferous upland woods. The topography, soils and moisture regimes are similar to that found in Subunit 01. Dominant tree species is Balsam Fir with some Trembling Aspen and White Birch. There is a low shrub layer. Herbs are low to moderate in abundance. Through these areas, the winter roadway is covered by grasses and broad-leaved herbs.
03	These are rich moderately moist woods. The topography is mostly flat. The soils consist of clay to silty clay and there are no bedrock outcrops. The soil moisture regime is moderately moist to moist. The dominant species consist of Trembling Aspen, Black Ash and Balsam Poplar. There is a thick and rich shrub layer and the herb layer is very rich. Through these areas, the roadway is covered by robust sedges.
04	These are rich wet deciduous woods. The topography is flat. The wetland type is a swamp. The soil consists of peat of variable thickness to clay. The soil moisture regime is very moist to wet. The dominant tree species is Black Ash. There is moderate coverage by shrubs and thick diverse cover by herbs. Through these areas, the winter roadway is covered by robust sedges.
05	These are semi-open moderately rich coniferous woods. The wetland type is a fen. The topography is flat. The soils consist of peat deposits of unknown thickness. The soil moisture regime is wet. The dominant tree species is Larch with some Black Spruce. There is moderate coverage by shrubs, mostly Speckled Alder, Willow species and other shrubs. There is moderate coverage by herbs and moderate coverage by mosses. Through these areas, the winter roadway is covered by robust sedges.
06	These are poor wet coniferous woods. The wetland type is a bog. The topography if flat. The soils consist of peat deposits of unknown thickness. The soil moisture regime is wet. The dominant tree species is Black Spruce. There is moderate coverage by shrubs, most of which are ericaceous species. There is low coverage by herbs and high coverage by mosses, most of which are Sphagnum species. Through these areas, the winter roadway is covered by robust sedges.

07	These are rich, wet shrubby areas. The topography is flat. The soils consist of peat of unknown thickness. The soil moisture regime is wet but there is no surface water. There are few trees and the dominant shrub species is Speckled Alder. There is moderate coverage by diverse herbs. The winter road does not run through these areas.
08	These are open very moist areas with no trees or shrubs. The soils vary from peat of unknown depth to clay. The soil moisture regime is very moist to wet. There are no trees or shrubs and the dominant herb species is a species of robust sedge.
09	These are open wet areas with areas of open water and mud flats. The topography is flat. The soils consist of clay deposits. There are many areas with shallow open water. These are no living trees or shrubs but there are many standing dead tree trunks. There are patches of grasses, sedges and other herbs throughout this area. The water is mostly covered by duckweed.
10	This is the railway crossing. There is no vegetation.

Existing Conditions (aquatic habitat and launch sites)

The proposed site of the upstream landing is on a section of beach along Dog Bay. There are few to no emergents. There is a thin strip of shrubs between the road and the proposed landing. The proposed site of the downstream landing is forested to the shore with White Birch and Trembling Aspen upland woods. Substrate include primarily large boulders and the shoreline drops off steeply to at least 3m deep. There is a 1-2m strip of moist sedges and grasses along the shore. Sparse floating leaf macrophytes extend up to 1.5m offshore.

An active Bald Eagle nest is located approximately 150m from the upstream landing of the portage. This is the closest point of the proposed work to the eagle nest.

OMNR staff indicate that the rapids are utilized by spring spawning Walleye and fall spawning Lake Whitefish. There is no known passage of fish over the weir, before or after the vandalism. Large scales were found on the shore during the site visits, possibly of Common Carp. Clams, large Caddisfly species and small diving beetles were observed. There are submergent grasses and algal blooms in backwater areas. Occasional patches of a large leafed submergent, possibly *Potamogeton amplifolus*.

The Tracy Rapids area is characterized by bedrock outcrops and large broken rock. The weir outlets over a rock riffle approximately 30m long to a large pool above the true rapids. The pool is approximately 300 -400m long and has a central emergent shoal. Flows over the Tracy Rapids weir are distributed across the entire channel width during high water periods (including the period which our field work occurred). During site investigations, there did not appear to be a significant change in water surface gradient from through the true Tracy Rapids from the pool immediately upstream. The rapids are formed by a bedrock constriction. The bed consists of large boulders and occasional gravel bars, particularly along the edges.

Shorelines are steep, comprised of boulders with patches of cobble and large gravels. Vandalism, which is though by locals and OMNR to have occurred during the last five years, has created a breach up to 10m wide. Visual observations suggest that water levels have dropped approximately 0.5m as a result of this breach.

The weir has been the site of several boat launches and a marine railway in the past.

PROPOSAL

The Tracy Rapids weir will be reconstructed with a uniform crested rubble mound at an elevation of 384.1m and a low flow channel at 383.85m. Water levels will be raised approximately 0.6m at low water and 0.36m at high water in Apungisagen Lake and the Atikokan River.

The following summarizes proposed changes at and upstream of the weir:

inverts

original crib	384.75m asl
existing invert	383.25m
proposed invert	383.85m

waterlevels

	low water	high water
flow rate	$0.5m^3/s$	$15.7m^3/s$
existing level	383.52m	384.14m
proposed level	384.12m	384.50m

A existing winter road will be upgraded to a one lane road extending 3.1km from Highway 11 to Tracy Rapids. A 600m two lane "truck around portage" will be installed between Dog Bay on Lake Apungsisagen and the Seine River below Tracy Rapids. Two boat launch facilities and piers will also include an operator's cabin, septic, water and propane systems, outhouses and gasoline storage tanks. Please refer to the accompanying submissions for details of the proposal.

Impacts

* The proposed upstream launch site is approximately 150m from a Bald Eagle nest, within the secondary management zone (200m) laid out in the Bald Eagle Habitat Management Guidelines (OMNR Wildlife Branch) under the Ontario Endangered Species Act. The secondary zone 'should extend 200m from the nest'. In this zone, 'land use activities that result in significant changes in the landscape, such as clear cutting, land clearing, (road construction, pipeline construction, hydro rights-of-way) or (any) major construction should be prohibited'. The launch facility may disturb Eagle activity during nesting season, particularly if free access is allowed closer to the nest.

* The ecological subunits identified along the proposed access road route are common locally, regionally and provincially. Most of the vegetation there is already disturbed by its current use as a winter road. Localized hydrological and concomitant biological adjustments may occur if the road or ditches impede wetland flow. Adequate ditches and culverts must be included.

* Weir reconstruction is not expected to result in negative impacts to flow regime since water levels are predicted to remain the same, controlled hydraulically downstream. However, there may be localized impacts of flow distribution immediately below the weir structure. The proposal will result in concentration of low flows.

* The launch sites will result in localized shoreline disturbances in Dog Bay and on the Seine River below Tracy Rapids. Positive impacts may result from structural habitat provided by docks, and flow will not be affected. Direct, untreated runoff from surfaces used by portage vehicles may contribute pollutants such as oil.

* No negative impacts from sewage are expected. The septic field will be designed according to OMOE specifications and will only be used by the operator. Public outhouse effluent will be removed from the site.

BOYCE RAPIDS

Existing Conditions

Boyce Rapids is formed by bedrock constrictions separated by several large pools in a 600-700m stretch of the Seine River. Water level fluctuations are drastic and, due to regulation, do not necessarily follow a seasonal pattern. OMNR staff suggest that discharge was approximately 50 cms at the time of field investigations, but that flows can exceed 110 cms. The valley walls are comprised of bedrock faces and outcrops, overlain by forested topsoils with sands and interspersed gravels, and the channel is relatively confined.

The north bank is comprised of sandy soils with gravels and cobbles, except for occasional bedrock outcrops. Observations from the bank suggest that the substrate is comprised mainly of cobble and occasional boulders, interspersed with beds of silty sand and fine gravel. However, clay and bedrock are more predominant at the upstream end of the rapids. Slopes are steep (approximately 2:1). Edge vegetation consists of alder, shrubs and small spruce trees.

Bedrock outcrops, small cliffs and broken bedrock beaches are more prevalent along the south bank. Valley slopes appear to be steeper than the north side, although still overlain by sands and gravels. Substrate consists predominantly of cobbles and boulders, with shear bedrock dropoffs in places, occasional clay lenses, and silty/sand and gravel deposits in eddies.

Hydraulic analyses concluded that the water surface gradient through the rapids is 0.75m at high water and 0.20m at low water.

Walleye and White Suckers spawn in the middle of Boyce Rapids. Whitefish and Herring are purported to migrate through the rapids to upstream spawning and feeding grounds in Spring and Fall.

Proposal

Works proposed in the Boyce Rapids include dredging and removal of obstructions to navigation in a 12-15m wide section of the river. The engineering plans accompanying this report illustrate the locations, type and extent of proposed works. Near the upstream end of the rapids a bedrock shelf would be drilled and blasted. Transfer of boulders and cobble substrate from the proposed navigation channel to the river's edges to maintain the cross-sectional area is proposed for the remainder. Details of types of materials to be kept in the river and exact locations for replacement would be agreed to by the consultant and review agency staff. The channel would be buoyed, but no shoreline activity is proposed.

Impacts

* Proposed dredging in the channel may result in localized adjustments of bed materials. Shallow margins at the river's edge will be extended out as the main thalweg channel is deepened. Velocity in the deep and shallow microhabitats will be altered with concomitant changes in deposition of fines and transport of gravels. If the surface area of shallow edges increases, there may be an increase in nursery habitat.

CALM AND CRILLY DAMS

Existing Conditions

Two navigational impediments exist at dams on the Seine River. Shorelines are disturbed and both sites have access roads and parking areas. The dams are approximately 15 km apart. The dam sites were examined from shore, but detailed instream habitat assessment was not undertaken.

There is little vegetation at the upstream side of the Calm Lake dam (where the launch site is proposed) and the area has been disturbed by filling.

Water levels are purported to be relatively stable on Calm Lake, above the Calm Lake Dam. The system outlets from Perch Lake through Banning Narrows and those areas are subjected to water level fluctuation from upstream diversions and regulation. Below the dam river edges are characterized by sands and fine gravels, and erosion is evident under tree roots (approximately 0.75m above the water level in May, 1991).

Although Crilly Dam has some bedrock outcrops, the upstream side has relatively gentle shoreline slopes with silt and organic deposits in the river. These are underlain in places by sand and gravel beds.The upstream landing is presently close to an existing roadway. A section between the roadway and the shoreline approximately 10m in length would be removed. The shoreline at the proposed landing has 0.5-1.0m of Speckled Alder and Sweet Gale. Between this shoreline vegetation and the road there is a strip of semi-open shrubby vegetation with Pin Cherry, Raspberry, Sandbar Willow, Rose species, Speckled Alder and Willow species.

The portage then runs along a wide road towards the dam and then follows a small old road towards the downstream landing. The small road leading to the downstream landing would have to be widened. The vegetation along this small road consists of upland deciduous woods dominated by Trembling Aspen, White Birch and Balsam Fir.

At the bottom of the slope near the downstream landing, there is a small seepage channel which crosses the road and flows into the river. It flows in a small gulley 2-3m wide and 0.7-1.5m deep. The vegetation along this seepage channel is more moisture-loving in nature, with Balsam Poplar, Trembling Aspen, White Birch, Pin Cherry, many ferns and mosses.

The downstream landing consists of rock outcrops with no emergent vegetation nearby.

Walleye and Sturgeon are also known to spawn below the Crilly Dam. Either Goldeyes or Mooneyes have been caught there as well (Dave Forester, Conservation Officer, OMNR Fort Frances).

Sturgeon, Walleye and whitefish populations are known by OMNR to exist in the river between the Calm and Crilly dams, spawning below the Calm Lake Dam. Fry drift over the Crilly Dam likely contributes to downstream populations to some extent.

Proposal

Truck around portages are proposed for both sites. These include access road improvements (ditches, culverts and surface treatments), stone fill topped with a concrete ramp above and below each dam, piers on timber cribs, and one operation cabin at each dam with plumbing and septic systems. Safety booms above the dams are also proposed. Several steep road sections will be either paved or treated with tar and gravel.

Impacts

Shorelines will negatively impacted in those localized areas in which ramps are proposed. The timber cribs and docks will likely have positive impacts on aquatic habitat, particularly as cover and structural habitat. Uncontrolled road drainage may contribute some silt and pollutants as runoff. Structural habitat diversity will increase as a result of the ramps and piers. Impacts will be very localized and unlikely to expand in the future. Therefore, they are not seen as incremental degradation.

Terrestrial impacts will likely be insignificant since the proposed works are very confined geographically, and will occur on disturbed sites.

LONG SAULT AND MANITOU RAPIDS

No works to improve navigation other than buoying the channel are proposed for these sites.

Sturgeon and Walleye are the species of concern in both locations, and the prime recreational boating season does not overlap with spawning seasons for these species.

APPENDIX II
LOW FLOW ANALYSIS

APPENDIX II
LOW FLOW ANALYSIS

This portion of the project was to study the low flow hydraulics in three segments of the waterway. These segments are the Long Sault Rapids on Rainy River at Manitou, Boyce Rapids on the Seine River downstream of Atikokan, and approximately 5.5 km of the Atikokan River in Atikokan.

The study included determining a summertime (mid-May to early September) low flow for each site and calculating water depths to ensure safe boating in the waterway.

To aid in the determination of low flows, historical daily flow records at nearby sites were obtained from various sources.

Raft Lake Dam (Moose Lake, Marmion Lake) records for the years 1955-1987 were supplied by Ontario Hydro.

Boise Cascade Canada Ltd. supplied records for Moose Lake, Calm Lake and Sturgeon Falls for the period January, 1985 through May, 1991.

Daily Discharges for Rainy River at Manitou Rapids, Minnesota were supplied by the U.S. Geological Survey.

The low flow for the period of record was noted for each site.

Reference was also made to the report, "Low Flow Characteristics in Ontario, Appendix F: Northwest Region"[1]. From this report the seven day average low flow with a recurrence interval of 20 years (7Q20) was determined for several water gauge stations. Station 05PC018 at Manitou Rapids was chosen as most representative for this study. The 7Q20 low flow applied to each site was 1.451 $l/s/km^2$. Each site with the corresponding area and peak flow is summarized in Table 1.

These flows were used in a HEC-2 backwater model to determine stream depths at each site. These sites are discussed below.

---

[1] CCL, June, 1989

Long Sault Rapids

Long Sault Rapids are on the Rainy River near the Town(s) of Barwick, Ontario. The total drainage area to the gauge is approximately 50,200 km^2. The 7Q20 low flow is 72.9 m^3/s. The minimum recorded daily flow for the period of record is 81 m^3/s.

The river channel was sounded on May 19, 1991. The peak flow for that day was 501 m^3/s. HEC-2 cross-sections were written for approximately 2700 m through Long Sault Rapids using the survey information. The flow on the day of the survey was input to the HEC-2 model to calibrate the model to the surveyed depths. As a comparison, it was then run starting at critical depth. The 7Q20 low flow and the minimum recorded flow were then run to determine the minimum water depths at each cross-section.

Actual starting level for the low flow is not known. Critical depth is a conservative starting elevation. It was found that the depth at any cross-section for the 7Q20 low flow was greater than 1.0 m except at section number 2.370 where the depth was only 0.60 m.

Boyce Rapids

Low flows to Boyce Rapids were determined using the 7Q20 formula for three scenarios:

a) Assume 7Q20 flow for watershed area to Boyce Rapids, including Atikokan River, but assume zero flow from Raft Lake Dam.

b) Assume 7Q20 low flow including local drainage area (to next upstream dam) to Raft Lake Dam.

c) Assume 7Q20 for entire watershed to Raft Lake Dam and Boyce Rapids.

The calculated low flows are summarized in Table 1.

The flow used for calibrating the model to the day of the survey, May 12, 1991, was determined by the recorded flow from Raft Lake Dam, at the WSC gauge at Atikokan, and transfer of flow based on area for the local inflow to Boyce Rapids. The peak flow for that day was calculated to be 87.6 m^3/s.

When the three flow options were input to HEC-2, it was found that the water level for Option 'a' ($0.90 m^3/s$) did not increase through the reach. The profile remained flat.

The higher flows caused minor increases in water level (maximum increase = 0.06 m).

The HEC-2 model was then altered to simulate a dredged channel, with dredge to be placed in the river to keep the same cross-sectional area. The new channels were assumed to be dredged to a depth of at least 1.2 m and widths of 12 and 15 m.

It was found that nay changes in water level, as a result of dredging and filling were minimal (up to +0.02 m). Above Boyce Rapids, water surface elevations remained the same as existing elevations for all flows modelled.

Tracy Rapids/Atikokan River

The Atikokan River was surveyed on May 11, 1991. The peak flow for that day ($6.4 m^3/s$) was calculated from the recorded flow at the WSC gauge 05B018, and the increased drainage area to the outlet.

The 7Q20 low flow was based on the area to the outlet of the Atikokan River at Apungsisagen Lake.

The starting water surface elevation is controlled from downstream by an old weir at the upstream end of Tracy Rapids.

When a new weir, with spillway 0.6 m higher was modelled, the low flow depth increased accordingly.

Along the Atikokan River, it was found that the water surface elevation for the 7Q20 low flow was dependent on the starting elevation, i.e. the weir elevation at Tracy Rapids. There was very little (0.10 m) change in water surface elevation through the 5.5 km study area. At some critical areas depths were as low as 0.22 m (detail C/2, Section 3+973). These areas are summarized in Table 2. Several other locations also had depths of only 0.80 m.

The model was then rerun, assuming a new weir was constructed at Tracy Rapids. The increased water level (0.6 m) increased the low flow depths at all but two problem areas to greater than 1.2 m.

It is evident from Table 2 that sections 2+950 and 3+973 (details A/2 and C/2) will need some dredging to increase water depths to 1.2 m.

TABLE 1

SUMMARY OF 7Q20 FLOWS

Site		Area (km^2)	Flow (m^3/s)
Long Sault Rapids (Manitou 05PC018)		50,246	72.9
Atikokan River (outlet) GSC station 05PB18		382 332	0.55 0.48
Boyce Rapids			
a)	No flow from Raft Lake	632	0.92
b)	With Raft Lake to next control	3,375	4.9
c)	Entire Raft Lake Dam Watershed	5,120	7.4

TABLE 2

DEPTH OF FLOW - ATIKOKAN RIVER

Section	Detail	Depth Existing (m)	Depth with Tracy Rapids Weir (m)
2+950	A/2	0.62	1.12
3+270	-	0.72	1.22
3+470	B/2	0.82	1.32
3+973	C/2	0.22	0.73

APPENDIX III

PROCUREMENT PACKAGE

ATIKOKAN - TO - MINAKI WATERWAY

REQUEST FOR SEALED BID

FOR

SUPPLY OF HYDRAULIC ADJUSTABLE BOAT TRAILERS

4640

ATIKOKAN - TO - MINAKI WATERWAY

REQUEST FOR SEALED BID

FOR

SUPPLY OF HYDRAULIC ADJUSTABLE BOAT TRAILERS

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1.0 INSTRUCTIONS TO BIDDERS

1.1 TIMING AND RECEIPT OF BIDS

Bids are due in the hands of the Atikokan - to - Minaki Waterway Corporation (ATM) no later than 2:00 p.m. Fort Frances _____.

This date and time will be strictly adhered to. Bids received after this date and time will not be considered, and will be returned unopened to the Bidder.

BIDS SHALL BE SEALED AND RETURNED IN THE ENCLOSED ENVELOPE TO:

Atikokan - to - Minaki Waterway Corporation
P.O. Box 789
226 Scott St.
Fort Frances, Ontario
P9A 3N1

Attention Mr. Hugh McTaggart, Coordinator
Tel: 807-274-9696

1.3 BID DOCUMENT

The bid document issued consists of the following:

COMMERCIAL

1. Instructions to Bidders (4 pages)
2. Commercial Specifications (4 pages)
3. General Terms and Conditions (6 pages)
4. Price Schedule (2 pages)
5. Revenue Canada - Exporters Certificate of Origin

TECHNICAL

1. Submittals
2. Hydraulic Trailers

1.4 USE OF BID DOCUMENTS

All bids shall be submitted on the documents provided by ATM and shall be submitted in duplicate (2) priced copies. Each copy shall be complete with all pertinent information, drawings, brochures, data sheets, etc., necessary for a comprehensive commercial and technical evaluation. FAILURE TO COMPLETE ATM DOCUMENTS MAY RESULT IN DISQUALIFICATION.

1.5 COMMUNICATION

All questions pertaining to this bid package shall be directed to the appropriate ATM personnel only:

Commercial questions to H. McTaggart, Tel: No. 807-274-9696, Telefax No. 804-274-9209

Technical questions to H. McTaggart, Tel: No. 807-274-9696, Telefax No. 804-274-9209

1.6 CLARIFICATION OF BID DOCUMENTS

The bid documents are defined herein. It shall be the responsibility of the Bidder to ascertain that they are in possession of a complete set of Bid Documents. The Bidder shall check with the Buyer concerning any discrepancies, omissions, or additional information required. The Bidder shall not claim after submission of a bid that there was any misunderstanding with respect to the conditions imposed by the Bid Documents.

1.7 RESPONSIBILITY FOR BID DOCUMENTS

This invitation to bid, including all documents, drawings, designs, specifications and other data, is the property of ATM and is supplied only for the purpose thereto, and must be returned to ATM in its entirety. Bid documents shall not be tampered with or mutilated in any way whatsoever.

1.8 AMENDING BIDS

ATM reserves the right to amend or revise the Bid Documents prior to the date set for the closing of the bids. All bidders will be informed by numbered Addenda of any such change to the Bid.

1.9 BID DECLINE

Any bidder declining to submit a quotation on these requirements shall return all bid documents in the enclosed envelop and shall clearly mark the envelope "NO BID".

1.10 EXCEPTIONS TO COMMERCIAL AND TECHNICAL SPECIFICATIONS

All bids shall be for the exact service and conditions as set forth in this bid and appendices. No exceptions or alternatives to the Commercial and Technical Specifications shall be considered, unless clearly set forth in Appendix I and II respectively. FAILURE TO COMPLY AS REQUESTED MAY RESULT IN DISQUALIFICATION.

1.11 ALTERNATIVE TO BID

Bidders wishing to submit alternatives may do so, however conditions described in the technical specifications must be met before an alternate bid will be considered. Alternatives must be detailed and specifications supplied and the bid must be identified as an Alternative.

1.12 BID PREPARATION COSTS

Neither Cumming Cockburn nor ATM shall, under any circumstances, be responsible for any costs incurred by the bidder in the preparation of his bid.

1.13 EVALUATION CRITERIA

Bids will be evaluated on a "best value" basis. The criteria for evaluation shall include but are not limited to:

- vendor performance based on delivery and service
- technical acceptability of products
- competitive and firm pricing
- volume discounts
- reservation of manufacturing capacity, where applicable
- spare parts, where applicable
- inventory support

Note: Unit prices will be used in the evaluation. If it is found that an extension error has been made the unit price will be used to determine the amount bid.

1.14 OBLIGATION FOR ACCEPTANCE

ATM shall not be obligated to accept the lowest bid or any other bid, and shall have the right to reject any or all bids.

1.15 ACCEPTANCE OF BIDS

All bids without exception shall be firm and irrevocable for ATM acceptance for a period of 90 days from the Bid closing date.

1.16 BID RETURN CHECKLIST

Bidder shall complete and return the ATM bid document ensuring that:

- Price schedule completed
- Appendices to the Commercial and Technical specifications completed, when applicable.
- Technical data is attached, when applicable, such as:
  - data sheets - sample drawings - etc.

2.0 COMMERCIAL SPECIFICATIONS

2.1 PRICING

Prices bid shall include the supply, fabrication and delivery of all materials, except those specified to be supplied by ATM and shall include all supervision, labour, equipment, and a provision for overhead and profit, and shall represent the entire cost to ATM for the complete package.

2.2. SEPARATE COST ITEMS

All separate cost items shall be indicated on the attached Price Schedule.

2.3 TAXES, DUTY AND EXCHANGE RATE

All bid pricing submitted shall include GST, PST and Duty. The amount of taxes and duty must be clearly stated.

Note: A certificate of origin shall be included with Successful Bidder's documentation for products originating in the U.S.A. A sample is attached.

2.4 DELIVERY

2.4.1 Delivery is required by May 1, 1993. Please confirm that you can meet the delivery date specified.

2.4.2 State delivery as:

(a) number of weeks after commitment of order (verbal or written);

(b) number of weeks required to provide submittals for approval;

(c) number of weeks to delivery after submittal approval.

2.4.3 All work as defined within the bid document shall be fully and totally completed to ATM's satisfaction by May 1, 1993. All overtime, premium time and/or shop rescheduling to meet the subject schedule shall be the Bidder's responsibility. Cumming Cockburn or ATM will not accept any charges for overtime to meet the promised schedule unless prior written authorization is obtained.

2.5 DELIVERY POINT

Prices are to include delivery and off-loading to Fort Frances, Ontario. The exact location within the town will be specified by ATM prior to delivery.

2.6 PAYMENT TERMS

2.6.1 Terms of payment are to be bid on the basis of Net 30 Days, based upon receipt of complete materials, or invoice, whichever is latest. Time consumed returning invoices for correction will constitute an extension of the discount period. Alternate terms will be considered.

2.6.2 Progress payments will be considered, Net 30 Days, from receipt of invoice, based upon actual incurred costs of labour and materials, properly documented, up to the date of invoice. The approval of ATM or their designated Inspection Representative verifying progress of the work shall be required, and such verification shall be included with any and all invoices. In no event shall invoices be submitted less frequently than 30 days.

2.6.3 Approval Submittals will be required within two weeks (2) from date of commitment of order.

2.7 SUB-CONTRACTORS AND AGENTS

If any portion of the work is to be sublet, clearly state in your bid the name and address of all sub-contractors. All sub-contractors shall require the approval of ATM prior to the release of a Purchase Order. After the issuance of an order, any changes of sub-contractors shall require the approval of ATM.

2.8 CONTRACT DOCUMENTS AND ORDER OF PRECEDENCE

The contract documents shall consist of:

(i) the Purchase Order;

(ii) the tendering document consisting of the Commercial and General Conditions, the Technical Specifications, Drawings and Data. Cumming Cockburn's Invitation to Bid and Form of Bid; and

(iii) the Bidders Tender, Drawings and Data.

These documents, and portions thereof, take precedence in the order in which they are named above, notwithstanding the chronological order in which they are issued or executed.

Amendments to the contract, in the form of Instruction Notices to the Purchase Order, shall take precedence over the documents amended thereby. Appendices and addenda to any contract document shall be considered part of such document.

2.9 INSPECTION

2.9.1 Without prejudice to any inspection or test after delivery, ATM or its authorized representative may inspect the goods during manufacture whether at the works of the seller or sub-suppliers and before dispatch.

2.9.2 Inspection and testing (or witnessing of tests performed by the Vendor) by ATM or authorized agent is a safeguard in the purchaser's own interests, but the Vendor is not relieved of his responsibility and liability under the terms of the purchase order notwithstanding that any such inspection and tests have been carried out.

2.9.3 The Vendor shall give adequate notice to ATM when approaching important stages of manufacture, assembly or test to allow inspection scheduling.

2.10 EXPEDITING

2.10.1 The goods to be supplied under this purchase shall be subject to expediting by ATM and/or its authorized representative.

2.10.2 ATM or its authorized agent shall be allowed reasonable access to the Vendor's plant(s) and those of his sub-supplier(s), for expediting purposes.

2.11 WARRANTY

Vendor will warrant the materials/equipment for a period of twelve (12) months from the date of startup/commissioning or eighteen (18) months from the date of shipment whichever occurs first. Vendor shall enter into a maintenance contract with a competent mechanic within the general area of delivery who shall provide emergency maintenance/repairs within 24 hours of request by ATM. All costs associated with maintenance and repairs during the warranty period shall be the responsibility of the vendor. If in the opinion of ATM, a problem persists with a trailer or component of a trailer, that trailer or component shall be replaced with a new trailer or component at no cost to ATM.

GENERAL TERMS AND CONDITIONS

1. TITLE

(a) Vendor, at the time of transfer of title to the goods sold hereunder to ATM, shall have good title to and/or the full right and authority to sell such goods and they shall be free and clear of all liens, claims and encumbrances whatsoever except to the extent of taxes, duties and charges for which ATM is made responsible pursuant to the other provisions hereof.

(b) Title to the goods, including special order goods in the process of manufacture, shall transfer to Purchaser at the earlier of payment or partial payment or when the goods are delivered to the delivery point indicated on the face hereof.

2. CHANGES AND SUBSTITUTIONS

Vendor shall not change the quality, quantity, nature and specifications of the goods ordered by ATM hereunder unless authorized in writing by a ATM representative.

3. INSPECTIONS

Any inspection, acceptance or testing of the goods by ATM or failure to inspect or test shall not relieve Vendor of its obligations, warranties or guarantees hereunder. ATM shall have full access to the place where the goods are being manufactured and the right to inspect and test all materials being incorporated therein. ATM may perform such work as necessary to render goods acceptable where defective goods are not repaired or replaced promptly by Vendor, or in urgent circumstances and Vendor shall reimburse ATM for costs of making goods acceptable. No replacements shall be made without ATM's prior written instructions.

4. TRANSPORTATION AND DELIVERY

(a) The Vendor shall ensure that the goods arrive at the stipulated destination by the delivery date specified and in this regard, time shall be of the essence.

(b) Risk of loss passes to ATM at or prior to shipment, Vendor shall ensure bills of lading are properly completed, insurance is placed if requested by ATM, and shipment is made in accordance with all legal requirements and in the manner and by the route as may be directed by ATM and failing such direction, in the most cost effective manner.

5. PAYMENT, WITHHOLDING AND SET-OFF

(a) Payment for goods sold hereunder shall be made within 30 days of ATM's receipt of an invoice therefor unless otherwise provided on the face hereof.

(b) ATM shall be entitled to withhold payment as may be required by law and to the extent necessary to protect ATM in respect of:

(i) cost incurred by ATM pursuant to clause 3, or clause 10(b) hereof;

(ii) claims or liens filed or the reasonable possibility thereof, on the goods or property to which the goods have been delivered;

(iv) any audit exception.

(c) ATM shall be entitled to set off against any amount owing to Vendor hereunder, any amount owed by Vendor to ATM or its agents under this or any other agreement.

6. WARRANTIES AND GUARANTEES

(a) Vendor guarantees that all goods, including parts of material listed in ATM specifications, shall be of merchantable quality; and be of acceptable standards common to the industry; and shall meet the requirements of governmental authorities which establish standards for such type of goods and all requirements of ATM as per any specifications.

(b) Vendor acknowledges that it is aware of the purpose of which the goods are required and that ATM is relying on Vendor's judgement that the goods are fit for such purpose.

(c) Nothing herein shall be construed to limit or exclude any warranties or guarantees implied by statute or by usage of the trade.

7. INFRINGEMENT

Vendor shall ensure that goods supplied hereunder do not incorporate any trade secret, copyright, trademark or patent of any third party pursuant to which a suit for infringement could reasonably be brought.

8. LIABILITY AND INDEMNITY

(a) Vendor shall:

(i) Be liable to ATM and its servants, agents, and employees for all loss, costs, and damages whatsoever which any of them may suffer, sustain, pay or incur; and in addition,

(ii) defend, indemnify and hold harmless ATM and its servants, agents and employees against all proceedings, claims, demands, loss, costs, damages, penalties and interest whatsoever which may be brought against or suffered by any of them or which they may sustain, pay or incur; arising directly or indirectly out of, or in connection with a breach of any provision of this agreement by Vendor, including without limitation; any claim for alleged infringement of any copyright, trade secret, trademark or patent in connection with the goods; any alleged claim, lien or encumbrance attaching to the goods or property to which they were delivered arising through the ownership, possession or manufacture of the goods by the Vendor; or failure to pay when due and payable, taxes and duties for which Vendor is responsible.

(b) ATM shall have the right at its option to participate in the defence of any claim without relieving Vendor of its obligations hereunder in respect of the defence of such claim and costs thereof.

9. DEFAULT AND CANCELLATION

(a) ATM may cancel this order or any part hereof, notwithstanding acceptance and inspection of the goods:

(i) if the goods are not delivered by the specified time;

(ii) if the goods are not the same quantity, quality, nature or specification ordered by ATM;

(iii) upon breach of any guarantee specified herein or conditions implied by law;

(iv) if the goods infringe any patent, trade secret, trademark or copyright of a third party of their use is judicially enjoined by virtue of such potential infringement;

(v) if prior to delivery, the Vendor becomes insolvent, enters into bankruptcy or a receiver is appointed in respect of any of its business or Vendor makes an assignment for the benefit of creditors;

(vi) if a claim of lien is filed or there is the reasonable possibility thereof, in respect of the goods or the property to which they are delivered;

(vii) pursuant to clause 11 or 14;

(viii) upon breach by the Vendor of any other provision of this agreement.

(b) Vendor shall reimburse ATM for the costs of inspection, repackaging and return shipment of any goods returned pursuant to such cancellation.

(c) Prior to delivery, ATM may cancel this order or any part hereof upon paying to Vendor all reasonable costs incurred by Vendor in respect of such goods less any moneys already paid to Vendor.

(d) ATM shall not be liable to Vendor for any loss of profit or other damages arising from cancellation pursuant to this clause.

10. FORCE MAJEURE

(a) The obligations of a party hereunder shall be suspended during the time and to the extent compliance is prevented, and in ATM's case when and to the extent its need for the goods is reduced or eliminated, by occurrences not reasonably within the control of the party affected (an "Event of Force Majeure"). Labour disturbances shall be deemed to be an Event of Force Majeure.

(b) In the event that delivery of the goods in the reasonable opinion of either party could be delayed by an Event of Force Majeure beyond the delivery date for a period in excess of seven(7) days, then either party shall so notify the other in writing and ATM shall either (a) cancel the order, or (b) authorize Vendor to complete the order with such adjustments as are agreed upon in writing by both parties and are required by reason of the existence of the Event of Force Majeure.

11. NOTICES

Any communication given hereunder shall be in writing to the recipient's address set out on the face hereof or such other address as the recipient may advise from time to time in writing. Any communication properly given hereunder shall be deemed to have been received, if sent by telecommunication or hand delivered, on the first business day following its transmission, or if sent by mail on the 4th business day following the mailing thereof except in the event of a postal disruption.

12. USE OF NAME

Vendor shall not use ATM's name in advertising, promotional material or publicity releases relating to the goods unless authorized in writing by ATM.

13. ASSIGNMENT

The rights and obligations of Vendor hereunder shall not be assigned or transferred without the prior written consent of ATM. Any attempt to transfer or assign the rights or obligations without such consent shall be wholly void and totally ineffective for all purposes and shall entitle ATM, at its option, to cancel this order.

14. CONFIDENTIALITY

The terms of this agreement and any supporting documentation, including without limitation specifications, engineering data and drawings given on behalf of ATM to Vendor to facilitate performance hereunder shall be deemed to be confidential to, and the property of, ATM. Vendor shall use such confidential material only as required to perform its obligations hereunder. Vendor shall safeguard and hold in the strictest confidence all such confidential material. Upon ATM's request, Vendor shall return all such confidential material (except for its copy of this agreement to ATM immediately following delivery of all goods ordered hereunder or upon cancellation of this order.

15. GENERAL PROVISIONS

(a) This agreement shall be governed by the laws in force from time to time in the Province of Canada from which the agreement is issued by ATM. The Courts of such Province and any Court of Appeal therefore shall have exclusive jurisdiction to determine all matters in dispute hereunder and the parties herby attorn to the jurisdiction of such Courts.

(b) In the performance of this agreement, Vendor shall observe and comply with all applicable laws, regulations, ordinances, directives and orders of any proper authority having or asserting jurisdiction.

(c) ATM shall be entitled to strict performance of Vendor's obligations hereunder, and such right shall not be affected by any prior waiver, forbearance or course of dealing. Any waiver by ATM of its rights hereunder shall not be binding unless in writing signed by a ATM representative.

(d) The giving of any bonus, commission, money or services in connection with this order by Vendor to any ATM employee or agent, either before or after this order is issued, shall be deemed to be a breach of this agreement.

(e) Vendor's written acceptance of this order, shipment of any article or commencement of performance hereunder shall constitute acceptance of the terms of this agreement in their entirety. No contrary or additional terms shall apply unless agreed to by ATM in writing.

ATIKOKAN - TO - MINAKI WATERWAY

SUPPLY OF HYDRAULIC TRAILERS

PRICE SCHEDULE

A. Manufacture

		Each	Quantity	Amount
1.	Design, Manufacture of Hydraulic Trailers	_____	6	_____
		PST		_____
		GST		_____
		Duty		_____
			Sub Total	_____

B. Spare Parts

List the spare parts recommended by you to be included with the supply of hydraulic trailers, the recommended quantity and the all inclusive cost (including GST PCT etc.) to supply these parts.

Item	Quantity	Total Price
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
	Sub Total	_____

C. Delivery (including taxes, duties, etc) _____

Total Price _____

D. Schedule

1. Number of weeks from commitment of order (verbal or written) to complete delivery. _____

E. Premium Time Included in Price

If your bid contains premium time to meet the delivery schedule, state amount of total price reduction that would apply for later delivery and amount of additional time required.

Total Price Reduction (_____)

Additional time required ___ calender days*

* excluding Saturdays, Sundays and Statutory Holidays

F. Method of Fabrication

List all suppliers and sub-contractors that you propose to use to complete the work.

G. Technical Specifications

Provide the following information and any other relevant technical data required to evaluate the bid

Rated Capacity of Trailer
Ultimate Capacity of Hydraulic System
Ultimate Capacity of Frame and Axils
Ultimate Capacity of Tires (total)
Gross weight of Trailer
Means of Power for Hydraulics

H. Qualifications

List the last 5 hydraulic trailers (at least) that you have manufactures, the capacity, and the names, addresses and phone numbers of the owners/operators.

I. Canadian Content

Specify by major component the extent of Canadian Content.

TECHNICAL SPECIFICATIONS

SECTION 01300 - SUBMITTALS

PART 1.00 - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Procedures for the submittal of design data to the Engineer for review or rejection to ensure that specified products are supplied in accordance with these Specifications.

B. Related work described elsewhere:

1. Contractual requirements for submittals: Contract Documents

C. Definitions:

Shop drawings shall consist of drawings, diagrams, illustrations, catalogue cuts, schedules, performance charts, brochures, colour charts, samples, patterns and other data which are to be provided by the Contractor to illustrate details of a portion of the work.

1.02 PRODUCT HANDLING

Make all submittals required in strict accordance with the provisions of this Section of these Specifications.

PART 2.00 - PRODUCTS

2.01 SHOP DRAWINGS

A. Scale:

1. Make all shop drawings to sufficiently large scale to show all pertinent features of the item and its method of installation.

2. Freehand sketches will not be accepted.

B. Number of prints:

1. Unless specified otherwise, submit five copies of all shop drawings.

2. Three copies will be retained by the Engineer.

2.02 SUBSTITUTIONS

A. Engineer's approval required:

1. All proposals for substitution shall be accompanied by full and complete technical data and all other information required by the Engineer to evaluate the proposed substitution.

2. Do not substitute materials, equipment or methods unless such substitution has been approved in writing by the Engineer.

B. Decision:

The decision of the Engineer shall be final regarding proposals for substitutions.

PART 3.00 - EXECUTION

3.01 REVIEW OF SHOP DRAWINGS

A. General:

1. Prior to submission, review all shop drawings.

2. Verify all dimensions, materials, catalogue numbers and other criteria against the Drawings and Specifications.

B. Identification:

Indicate by stamp, date and signature that each shop drawing has been reviewed.

3.02 IDENTIFICATION OF SUBMITTALS

Identify each submittal by the following:

1. Name of project and project number.

2. Drawing number and Specification Section number.

3. Name and address of manufacturer and telephone number of the individual responsible for the item.

3.03 COORDINATION OF SUBMITTAL

A. General:

1. Coordinate the submittal of all shop drawings with all sub-contractors, suppliers and manufacturers.

2. Number each submittal sequentially for ease of reference.

B. Timing:

1. Ensure that all submittals are made within the specified time and designated in the individual Sections of these Specifications.

2. Allow ten days for the Engineer's review following receipt of submittals.

C. Delay:

Failure to make submittal within the time specified in the individual Sections of the Specifications shall not entitle the Contractor to an extension of time.

END OF SECTION

SECTION 11100 - HYDRAULIC TRAILERS

PART 1.00 - GENERAL

1.01 DESCRIPTION

A. Work included:

Design and Manufacture of Hydraulic Trailers.

1.02 SUBMITTALS

Provide shop drawings of all components not explicitly detailed previously. Provide details of fabrication including frame, mechanical and hydraulic systems.

1.03 CAPACITY

A. Weight

The overall highway rated capacity shall be not less than 4500 kg. The trailer shall be designed to accommodate vessels up to 7000 kg at low speeds on a gravel road surface.

B. Length

The trailer shall adequately support vessels between 4.3 m (14 ft.) and 10.4 m (34 ft.) in length.

C. Configuration

The trailer shall be adjustable, utilizing hydraulics, to accommodate flat bottom and deep - V style hulls.

1.04 OPERATING REQUIREMENTS

A. Submersible

Trailers shall be used and operated on a launch ramp and shall be designed to operate in a submerged condition including lights and hydraulics

B. Licensed

Trailers to be supplied certified for use on public roadways including running and brake lights. The waterway will obtain the licence plate.

C. Spare Tire

Each trailer to include spare tire and rim.

END OF SECTION

APPENDIX I

EXCEPTIONS TO COMMERCIAL SPECIFICATIONS

THE BIDDER SHALL LIST ALL EXCEPTIONS TO THE COMMERCIAL SPECIFICATIONS, IDENTIFYING EACH ONE BY CLAUSE NUMBER.

APPENDIX II

EXCEPTIONS TO SCOPE OF WORK AND TECHNICAL SPECIFICATIONS

THE BIDDER SHALL LIST ALL EXCEPTIONS TO THE TECHNICAL SPECIFICATIONS, IDENTIFYING EACH ONE BY CLAUSE NUMBER.

APPENDIX IV

VEHICLE AND TRAILER DATA

HYDRAULIC TRAILERS

1. a) Conolift by Kropf Industrial Inc. - Parry Sound (telephone 705-378-2453)
Model YH-5

- standard equipment includes 5hp Honda gas engine to operate hydraulics, all equipment such as lights etc. for highway use, and eye bolt for tag along operation
- capacity is 10,000 lbs (12,000 lbs off road), up to 30' boat length
- weight is 4,000 lbs
- tongue load is 1,500 lbs (unloaded)
- base list price $14,975 F.O.B. (not including delivery, PST, or GST)

b) Conolift by Kropf Industrial Inc.
Model YH - 610

- same standard equipment as model YH-5
- capacity is 12,000 lbs (20,000 lbs off road), up to 35' boat length
- weight is 5,000 lbs
- base list price $19,985 F.O.B. (not including delivery, PST, or GST)

Gooseneck option for both above models (for 5th wheel operation)

- list price $784 (not including PST, or GST)

2. Kleeco Carrier (U.S. built) as supplied by Marina Harbour Systems - Scarborough, Ontario (telephone 416-485-2236)
Model 350

- standard equipment includes battery powered hydraulics, all equipment such as lights etc. for highway use, and eye bolt for tag along operation
- capacity is 12,000 lbs (16,000 lbs off road), up to 30' boat length
- weight is 6,005 lbs
- tongue load is 1,000 lbs (unloaded)
- list price for submersible model including spare parts kit, tie down rings & straps, spare tire and rim assembly, is $16,250 F.O.B. (not including delivery, PST or GST)
- gas engine powered hydraulic option is $600 extra (not including PST or GST)
- 5th wheel operation is not available with this model

TOWING AND PASSENGER VEHICLES

1. a) Ford F-350 crew cab pick-up truck

- 460 cu. in. gas engine with 4 speed auto transmission
- 6 person capacity
- heavy duty trailering equipment
- maximum trailer weight (5th wheel operation) is 12,500 lbs
- 2 wheel drive with dual rear wheels & locking differential
- base list price with above options is $20,700 (not including tire tax - $35, PST or GST)