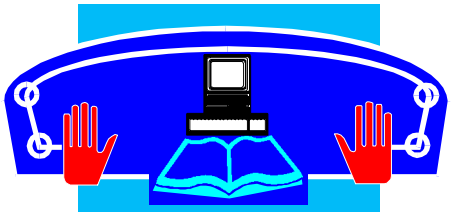

Mackenzie River Bridge Study - Volume Ii
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Mackenzie River Bridge Study Volume II

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SCENARIO A - MAINTENANCE OF STATUS QUO - POST BRIDGE WITHOUT DEVELOPMENT - ZERO GROWTH

FREIGHT COST SAVINGS - N.W.T. FREIGHT CARRIERS QUESTIONNAIRE

INTRODUCTION

Freight is transported to Y.K. from Edmonton by air and truck. To determine whether freight carriers incurred extra costs because of no bridge, an "N.W.T. Freight Carrier Questionnaire" was distributed to the following companies.

Only 5 companies (4 trucking and one air) ship large volumes into Y.K. The questionnaire responses will be tabled and discussed, sequentially by question. "FQ #" indicates the questionnaire number.

FREIGHT CARRIERS CONTACTED

Freight Carrier	Trucking		Air Freight	
	hip Freight to ellowknife	hip Little 'reight to ellowknife	hip Freight to 'ellowknife	lostly Shi 'reight Out f Yellow- nife
yers Transport	x			
rimshaw Trucking	x			
ay River Truck Lines	x			
Northwest Transport	x			
Mike's Trucking and Moving		x		
N.W.T. Coachlines		x		
Pacific Western Air Cargo			x	
Northwest Territorial Airways				x
Northward Airlines				x
Ptarmigan Airways				x
Wardair				x
Gateway Aviation				x
Totals	4	2	1	5

To preserve anonymity, the responses of pacific Western Air Cargo will not be tabled. Their air cargo manager indicated that if a bridge did exist, there would be no effect upon their freight costs and rates. Also, any loss of their customers resulting from a bridge (i.e. a cost to P.W. Air Cargo) would result in an equal gain of customers for the trucking companies (i.e. an equal benefit to truckers); thus there would be no net benefit or cost to freight companies. (However, businesses would benefit as outlined in "Business Benefits - Transportation Costs Reduction).

Therefore the responses to each question are those of the "Big Four" trucking companies. Responses to many questions involved a great deal of research. Other answers were sometimes impossible to achieve due to a lack of information. Where this occurred, the response was "blank". Responses are presented verbatim. Where responses are self explanatory, no discussion is given. The questionnaire is presented sequentially in entirety. The questionnaires are available for examination by a critiquing party.

DO WE NEED A BRIDGE ACROSS THE MACKENZIE RIVER?

QUESTIONNAIRE FOR N.W. T. FREIGHT CARRIERS

The Yellowknife Chamber of Commerce is conducting a cost-benefit study of a bridge across the Mackenzie River at Fort Providence,N.W.T. The study will be completed by September 1, 1979. The Chamber will present this study as part of an application for funding to the federal government through the Department of Regional Economic Expansion. A bridge would definitely affect N.W.T. freight carriers, some positively and some negatively. The Chamber would greatly appreciate receiving YOUR views on this subject. Please answer the following questions and return this questionnaire in the enclosed, self-addressed envelope.

As a followup study may be necessary, please ensure that the figures and statements given here are reasonably accurate to the best of your knowledge and are not exaggerated to either prove or not prove the need for a bridge across the Mackenzie River.

As this questionnaire is for ALL freight carriers, certain questions may not apply to you, depending on whether you are a trucking or air freight company. For these questions, simply answer N/A (=not applicable) .

THIS INFORMATION WILL BE KEPT IN STRICTEST CONFIDENCE AND WILL BE USED ONLY FOR THE PURPOSE OF THIS STUDY. If you wish a copy of the results of this questionnaire, enclose a stamped, self-addressed envelope. Your questionnaire will be returned to you once the study has been utilized. If you have any questions, please call me at 873-3131, or drop into the Chamber office.

Please refer to # F-_____ in future correspondence. To ensure confidentiality, this number will be known by ONLY you and myself.

Thank you kindly for your assistance.

Sincerely,

Robert Given
MACKENZIE RIVER BRIDGE STUDY

I - TYPE OF BUSINESS (Check one)

WE OPERATE A 1) Trucking Company

2) Airway Company

11 -LENGTH OF BREAKUP

FQ 1 - Records for the last 18 years indicate that breakup lasts an average of 30 days from April 21 to May 20. April 21 is the average time that the ice bridge is out , and May 20 is the average time of the ferry's first trip. However, uncertainty exists before the ice bridge goes out and after the ferry's first trip. How does this uncertainty affect YOUR TRUE CLOSURE PERIOD FOR SHIPPING FREIGHT? (About how much longeristhe TRUE CLOSURE PERIOD for you?)
True Closure period is _____ days longer for us.
PLEASE EXPLAIN. (6 blank lines)

esponse - Extra Length of Breakup	Times Mentioned
· The same.	1
We continue shipping to last possible day, then use aircraft out of Hay River.	1
· 5 days longer. Spring season - we start watching the river approaches to get on the ice. Secondly, we don't want to leave our equipment on the north side of the river.	1
. 4 to 5 days longer. Loads arrive after official closure of ice bridge and the company takes these across the unsure crossing at the company's own risk. This is a slow tedious time as trucker's are unwilling to cross and the company is pushing to get across. There are frequent times trucks become stuck, etc., thus contributing to length of closure time. When ferry begins, ice makes it extremely difficult to cross and thus time is spent attempting to get across. Also the ice is very hard on the ferry equipment and there are frequent breakdowns that last hours to days.	1

III-LENGTH OF FREEZEUP

FQ 2 – Records for the last 18 years indicate that freezeup lasts an average of 33 days from November 18 to December 20. November 18 is the average time that the ferry makes its last trip; December 20 is the average time that the ice

bridge is open for a 10 TON CAPACITY LOAD . The government has no records for heavier loads. However, uncertainty exists before the ferry's last trip and after the ice bridge is open to 10 ton loads.

About how long is the period of uncertainty before the ferry's last trip?

_____ DAYS OF UNCERTAINTY BEFORE FERRY'S LAST TRIP.

Response - Extra Length of Freezeup	Times Mentioned
Blank	2
6 days of uncertainty	1
7-10 days of uncertainty	1
Average = 4 days	

FQ 3 – When the ice bridge just opens, how are your loads different than during normal times? (2 blank lines)

Response - Less Than Full Truckloads	Times Mentioned
Blank	1
Unable to cross with full trailer loads.	1
Use pup loads (one-half of full load)- take one across at a time	2

FQ 4 – How does this affect your freight rates? (2 blank lines)

Response - Affect Upon Freight Rates	Times Mentioned
Blank	1
No Change	1
Doubles	1
Extra charges for freight handling	1

FQ 5 - What do your records indicate as being the average date when you are able to ship your normal loads on the ice bridge? (one blank line)

Response - Avg. Date for Normal Loads on Ice Bridge	Times Mentioned
Don't keep records	1
Dec. 23	1
Second week of January	1
Jan. 16	1
Average = Jan. 5	

DISCUSSION - LENGTH OF BREAKUP AND FREEZEUP

Although the official closure period for breakup is April 21 to May 20, truckers incur an average of about 2 more days closure before and after the official breakup period, i.e. their closure period is about April 19 to May 22.

Although the official closure period for freezeup is Nov. 18 to Dec. 9 (ice bridge open to 5 ton capacity), truckers incur an average of about 4 days of uncertainty before the ferry's last trip on Nov. 18, i.e. their true closure period for full loads is about Nov. 14 to Jan. 5.

Therefore, truckers can only operate full loads about 9 months of the year.

IV- FREIGHT RATES

FQ 6 - Could you please enclose a copy of your tariffs for different commodities and weights? (For both the normal shipping season AND for breakup and freezeup.)

All 4 truckers' tariffs are governed by the Western Tariff Bureau. The actual individual rates are not pertinent to this study, we are only interested in extra costs resulting from no bridge and the reasons for those costs.

However, it is appropriate to compare air freight rates versus truck freight rates. The "Big Four" average truck rate from Edmonton to Y.K. for 32,995 tons per year (FQ 8) is $8.55 per hundred pounds. P.W.A.'s cheapest rate is $970 for a container of 6600 lb., or $14.70 per hundredweight, i.e. 172% of the average truck rate. Thus it is much cheaper to ship by truck versus air, from Edmonton to Y.K. (see also "Yellowknife as a Warehousing and Transportation Centre").

V-FREIGHT LOADS

FQ 7 - For shipments from the south to Yellowknife, about what is your average load at normal times of the year? (i.e. not breakup and freezeup.)
Our average normal load is about _____ TONS .

Response - Avg. Normal Load	Times Mentioned
17 to 18 Tons	1
20 Tons	3

FQ 8 - How many of these average normal loads do you ship in an average year from the south to Yellowknife?
We ship _____ # average normal loads in an average year,

Total # average normal loads = 1689 loads.
Using FQ 7 and FQ 8 answers, total normal load tonnage = 32,995 Tons.

FQ 9 - About HOW MANY loads of WHAT average weight do you ship during each month of the year from the south to Yellowknife?

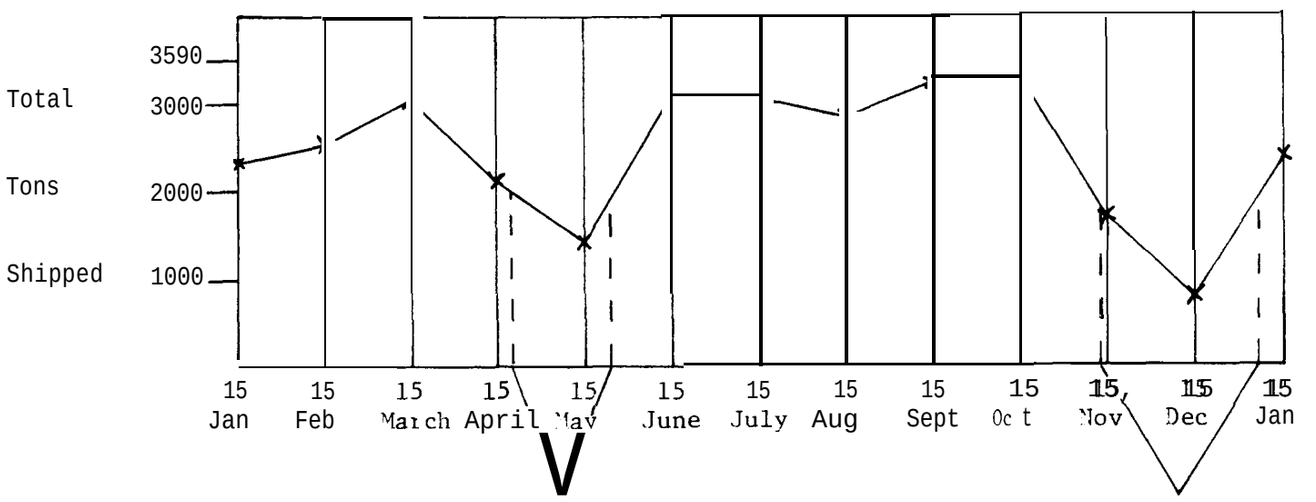
For January, we ship about _____ loads of _____ TONS average weight.
For February, we ship about _____ loads of _____ TONS average weight.
For March, we ship about _____ loads of _____ TONS average weight.
For April, we ship about _____ loads of _____ TONS average weight.
For May, we ship about _____ loads of _____ TONS average weight.
For June, we ship about _____ loads of _____ TONS average weight.
For July, we ship about _____ loads of _____ TONS average weight.

For August, we ship about _____ loads of _____ TONS average weight.
For September, we ship about _____ loads of _____ TONS average weight.
For October, we ship about _____ loads of _____ TONS average weight.
For November, we ship about _____ loads of _____ TONS average weight.
For December, we ship about _____ loads of _____ TONS average weight.

Combined Response

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec	Yearly Total
Total Tons Shipped	**2349**	2525	3049	2105	1378	3037	**3055**	**2817**	3231	**3316**	**1685**	822	**29,372**

Graph of Monthly Tonnage



Breakup = April 19 to May 22 Freezeup = Nov. 14 to Jan. 5

The periods of breakup and freezeup result in the low periods of trucking tonnage.

VI-FREIGHT TONNAGE - YEAR ROUND

FQ 10 - Approximately how much TOTAL TONNAGE do you ship EACH YEAR from the south to Yellowknife?

_____ TOTAL TONS PER YEAR FROM THE SOUTH TO YELLOWKNIFE.

Combined total tonnage = 36,970 tons per year

FQ 11 - Approximately how much of this TOTAL TONNAGE EACH YEAR has its FINAL destination being Yellowknife?

_____ TONS PER YEAR, FINAL DESTINATION YELLOWKNIFE.

Total tonnage, final destination Y.K. = 32,927 tons per year.

FQ 12 - Approximately how much of this TOTAL TONNAGE EACH YEAR arrives in Yellowknife for TRANSSHIPMENT to communities NORTH OF YELLOWKNIFE?

_____ TONS PER YEAR, TRANSSHIPMENT TO OTHER COMMUNITIES.

Total tonnage, transshipment to other communities = 4043 tons per year. (i.e. 10.9% of freight, shipped to Y.K., is transshipped to other communities) .

VII- FREIGHT TONNAGE - BREAKUP AND FREEZEUP

FQ 13 - Approximately how much tonnage do you ship from the south to Yellowknife EACH YEAR DURING ONE BREAKUP AND ONE FREEZEUP?

_____ TONS PER YEAR DURING ONE BREAKUP PLUS ONE FREEZEUP.

Combined total b. & f. tonnage = 1630 tons per year.

FQ 14 - Approximately how much of this BREAKUP PLUS FREEZEUP TONNAGE has its FINAL destination being Yellowknife?

_____ BREAKUP PLUS FREEZEUP TONS PER YEAR, FINAL DESTINATION YELLOWKNIFE.

Combined total b. & f. tonnage, final destination Y.K. = 1547 tons per year.

FQ 15 - Approximately how much of this BREAKUP PLUS FREEZEUP TONNAGE arrives in Y.K. for TRANSSHIPMENT to communities NORTH of Yellowknife?

_____ BREAKUP PLUS FREEZEUP TONS PER YEAR, TRANSSHIPMENT TO OTHER COMMUNITIES

Combined total b. & f. tonnage, transshipped to other communities = 103 tons per year.

VIII (A)-BREAKUP & FREEZEUP - ACTIVITIES

FQ 16 - How does breakup and freezeup alter your normal shipping patterns? (5 blank lines)

Response - B. & F. Affect on Shipping Pattern	Times Mentioned
- Use road to Hay River, aircraft to Y.K.	2
Unable to cross river resulting in rehandling of freight.	1
Many customers ask that freight be held in Edmonton and not shipped until freight rates are back to normal. Reduction in weight limits are necessary as the load has to be adjusted to fit into aircraft. Loads are moved north only when aircraft times are available, thus cutting dowu scheduled service.	
Freight specially packaged for easy transferal into aircraft.	
Some goods cannot be moved because unable to fit into aircraft.	1

VIII (B) BREAKUP & FREEZEUP - INTERMODAL TRANSFERS

FQ 17 - Breakup and freezeup results in special intermodal transfers across the Mackenzie River.
During an average year, in what kind of different intermodal transfers are you involved during breakup and freezeup, that you would not be if there were a bridge? (5 blank lines)

Response - B. & F. Intermodal Transfers	Times Mentioned
- Aircraft	1
- We use a helicopter to fly the freight across the river.	1
- Very costly. Dispatch truck and trailer out of Y.K. to north	

side of river. Dispatch trucks and trailer out of Hay River to south side of river. Dispatch body job out of Hay River to haul across ice, require 3 extra men.	1
Freight is prepared in Edmonton for easy handling between truck and plane. Special pallets are used so that they can be easily put together and broken down. Truck arrives at Hay River airport. Aircraft is loaded by forklift, then flown to Y.K. and offloaded. Depending on size of aircraft, it can take from 4 to 15 hours to bring load into Y.K. from Hay River.	1

FQ 18 - How many loads requiring special intermodal transfer at breakup plus freezeup are you involved with during an average year?

_____ # loads special intermodal transfer per year.

Response - # Loads Intermodal Transfer	Times Mentioned
Blank	1
14	1
16	1
30	1

FQ 19 – About what is the approximate average weight of these loads?

_____ TONS .

Response - Weight of Inter-modal Loads	Times Mentioned
2 tons per body job trip across river	1
17 tons	1
20 tons	2

FQ 20 - About what is the total extra average YEARLY COST of these special intermodal transfers?

_____ TOTAL EXTRA AVERAGE YEARLY COST OF SPECIAL INTERMODAL TR4NSFERS.

Response - Avg. Yrly. Cost of Intermodal Transfers	Times Mentioned
Blank	1
Aircraft charges only, added directly to rates	1
$10,000	1
$12,200	1

IX-PRESENT BUSINESS OPERATIONS

In general, how does the spring breakup and fall freezeup affect your present business operations? For the following more detailed questions, consider a ONE YEAR PERIOD of one breakup plus one freezeup (i.e. Jan. 1 to Dec. 31). If yOU need more room, use the reverse side or another piece of paper.

IX (A) -BUSINESS ACTIVITIES

FQ 21 - How does breakup and freezeup affect your business activities? (3 blank lines)

Response - B. & F. Affect Upon Bus. Activities	Times Mentioned
. Rehandling of freight from south to north across river.	1
. Customers stockup before b. & f. Mainly perishable goods and essential orders during both periods.	1
- We have to lay men off in Y.K. Equipment sits idle. The high costs of operation still carry on.	1
- Business drops off. All shipments have to be cleared with customers. Time is spent in extra handling. More damages occur. Have an odd mixture of lots of overtime for days when loads arrive and then layoffs until next load arrives. More customer complaints due to more time involved to get a load ready and ship to Y.K. Less material sent south as some of it too difficult to fit in aircraft. Cannot offer a regular service as delays are inevitable.	1

FQ 22 - Do yOU experience overtime periods as a result of breakup and freezeup?

_____ YES _____ NO

Response - Overtime Resulting from B. & F.	Times Mentioned
Yes	3
No different than normal	1

FQ 23 - If YES, what is the net cost of this overtime? (i.e. Cost of overtime MINUS cost which you would have incurred anyhow.)

$ _____ PER YEAR NET OVERTIME COST.

Response - Net Cost of Overtime	Times Mentioned
Blank	3
$2000	1

FQ 24 - What kind of disturbances to scheduling your business operations have you experienced as a result of breakup and freezeup? (3 blank lines)

Response - B. & F. Disturbances to Scheduling	Times Mentioned
· Blank	1
· Equipment sitting idle. Laying off men.	1
. Arranging for aircraft time.	1
Experience a general slowdown overall. Time between departing Edmonton and arrival Y.K. is extended by sometimes a full day. Aircraft availability can delay freight movement into Y.K. Normal scheduled truck times thus become unreliable as well as delivery times. Arrangements have to be made for odd delivery times, i.e. nights and weekends, etc.	1

FQ 25 - What is the approximate average yearly cost of these disturbances to scheduling? $ _____ PER YEAR FOR DISTURBANCES TO SCHEDULING.

Response - Avg. Yrly. Cost of Disturbances to Scheduling	Times Mentioned
Blank	4

FQ 26 - How does breakup and freezeup affect the service you provide to your customers, including the availability of services and added costs? (2 blank lines)

Response - B. & F. Affect on Customer Service	Times Mentioned
Unable to haul heavy equipment.	1
Delay freight by one to two days - depending when we can get plane to fly.	1
Customers have to plan their operation accordingly or pay extra costs. No problem with regular service to Y.K.	1
FREEZEUP - Service becomes erratic as the ferry crossings become more difficult. Loads thus are delivered at odd times (nights, early mornings). Due to increased handling when the air shuttle begins, damages are more due to handling and increased exposure time to the cold. Delays are here also as aircraft availability is sometimes difficult to arrange. Service is also disrupted because so many customers refuse to ship goods. It sometimes takes an extra day or so before enough freight can be accumulated to make a trip from Edmonton up a profitable one. BREAKUP - Once again delays because of trucks unwilling to cross crossing. Delays again in the availability of aircraft. Odd times for delivery (again, nights, early mornings), Increased damages and claims. Extra time in accumulating freight for load to come north. Some material cannot be shipped due to restrictions on what can fit inside aircraft.	1

FQ 27 - How does breakup and freezeup affect your net number of customers? Do you gain, lose, or have no change in your number of customers? If they change, by how much do they change?

We (circle one) GAIN ; LOSE; HAVE NO CHANGE. _____ # OF CUSTOMERS

What is your guess as to the approximate total value of this gain or loss to your business? $ _____ PER YEAR.

Response - Affect on Net Number of Customers	Times Mentioned
Have no change	3
Lose $17,500 per year	1

FQ 28- What kind of equipment limitations do you experience as a result of the ferry and ice bridge? Please explain. (4 blank lines)

Response - Equip. Limitations Due to Ferry & Ice Bridge	Times Mentioned
Blank	2
None	2

IX (B) 'EQUIPMENT INVENTORY AND WAREHOUSING COSTS

FQ 29 - What is the effect on your business as a result of not being able to operate across the Mackenzie River for a full 12 months? How"does this affect your freight rates? (4 blank lines)

Response - B. & F. Affect Upon Freight Rates	Times Mentioned
- Blank	1
- Aircraft charges added to existing rates.	1
- Increased freight rates by not being able to operate 12 months of the year.	1
- Business drops way off. Freight rates for air shuttle, time are increased to cover the cost of the aircraft charter only. Does not affect the normal rates.	1

FQ 30 - Approximately how much total EXTRA equipment inventory (in dollars) do you require for one BREAKUP plus one FREEZEUP?

$ _____ EXTRA EQUIPMENT INVENTORY FOR ONE BREAKUP PLUS ONE FREEZEUP.
About how long is your money tied up in this EXTRA equipment inventory?
_____ DAYS OUR MONEY IS TIED UP IN EXTRA EQUIPMENT INVENTORY FOR ONE BREAKUP PLUS ONE FREEZEUP.

Response - Extra Equip. Inventory	Times Mentioned
Blank	2
3 units for 2 months	1
$2500 for 45 days	1

FQ 31 - What kind of problems result from the outlay of this extra money at breakup and freezeup? (3 blank lines)

Response - Extra Cash Outlay Problems	Times Mentioned
Blank	2
None	2

FQ 32 - How does it affect your warehousing? About how much EXTRA warehouse space do you need compared to that needed if there were a bridge?
_____ EXTRA square feet.

Response - Extra Warehouse Space	Times Mentioned
None	2
Blank	1
16 trailers at $30.00 per day	1

FQ 33 - What would you do with this extra space if there were a bridge?
(2 blank lines)

Response - Bridge Affect Upon Extra Space	Times Mentioned
Blank	3
We would load 45 foot trailers in Edmonton and leave them set for highway.	1

FQ 34 - What would be the approximate value of this extra space for its alternate use?

$ _____ PER YEAR FOR EXTRA SPACE.

Response - Value of Extra Space	Times Mentioned
Blank	4

FQ 35 - How would your warehouse equipment requirements be changed if there were abridge? (2 blank lines)

Response - Warehouse Equipment Effects	Times Mentioned
Blank	2
None	1
No change	1

FQ 36 - How would your warehouse labour requirements be changed if there were a bridge? (2 blank lines)

Response - Warehouse Labour Effects	Times Mentioned
Blank	2
None	1
Would be able to keep a full staff year round instead of laying off during breakup and freezeup.	1

FQ 37 - What other effects would a bridge have on your inventory and warehousing? (2 blank lines)

Response - Other Inventory & Warehousing Effects	Times Mentioned
Blank	3
None	1

IX (c)-ADMINISTRATIVE COSTS

FQ 38 - Please estimate your net administrative costs of breakup PLUS freezeup. i.e. The number of extra hours required MINUS the number of hours saved which you would have spent at other times of the year.
Approximate number of Net extra hours required = _____ EXTRA HOURS FOR ONE BREAKUP PLUS ONE FREEZEUP.
Approximate cost per hour = $ _____ PER HOUR.

Response - B. & F. Net Administrative Costs	Times Mentioned
Blank	2
320 extra hours x $8.25 per hour (= $2640)	1
, 100 extra hours x $10.00 per hour (= $1000)	1

IX (D)-UNPREDICTABLE COSTS

FQ 39 - What kind of emergency situations have you experienced as a result of having no bridge? (example: hotels, special charters necessary, etc.)
(3 blank lines)

Response - Emergency Situations Due to B. & F.	Times Mentioned
Blank	2
$800 per season	1
Special charters to get loads across in order for these to coincide with other shipments that were going out of Y.K. to the north.	1

FQ 40 - What would you estimate as being the approximate average yearly cost of these emergencies?

$ _____ PER YEAR FOR EMERGENCIES.

Response - Avg. Yrly. Cost of Emergencies	Times Mentioned
Blank	2
$800 per year	1
$2000 per year	1

FQ 41 - Describe any other ways that breakup and freezeup affect your business, for better or worse. (4 blank lines)

Response - Other B. & F. Effects	Times Mentioned
Blank	2
We need a bridge.	1
Main problem is customer loses a sense of confidence that they might have in the company as delay and damages occur. The freight company becomes unreliable in service. Also many ill feelings happen as arguments break out between management and the drivers. Management wants all loads across river while the drivers (many of whom own their own trucks) are reluctant to cross at freezeup because of the chance of getting stuck in Y.K. until crossing is in. At breakup, drivers are again reluctant to cross for fear of damaging their rigs.	1

1X (E)- SHIPPING COST OF YOUR PRODUCT AND/OR SERVICE

FQ 42 - Approximately what average added cost on a yearly basis, as a percentage of total business costs, results from employing a non all weather Mackenzie River crossing?

Our approximate added cost, as a percentage of total business costs, resulting from the present crossing is _____ % per year.

If your business operating expenses (transportation, customer servicing, inventory and warehousing, administrative costs) decreased by having a bridge, could the majority of these savings be passed onto the consignee?

YES _____ NO _____

If NO, why not? (2 blank lines)

Response - Added Cost Resulting From No Bridge	
Added Cost as a % of Total Costs	Savings Passed On?
Blank	Blank
2.5%	Yes
3.5%	Yes
6%	Yes

DISCUSSION - COST SAVINGS TO TRUCKING COMPANIES IF A BRIDGE EXISTED

For each of the three companies reporting cost savings, the following calculations were performed individually to derive the total cost savings to trucking companies from a bridge. Due to anonymity, individual costs are not quoted.

Calculations:

Total Costs = X% x Total Revenues

Savings = Y% x Total Costs

Note: Total revenues were obtained from company managers.

X is 1 minus the profit margin (i.e. 1 - π), obtained from managers.

Y is derived from FQ 42 and confirmed by managers.

The total yearly cost savings for trucking companies (i.e. the reported benefits) if a bridge existed, would be $228,377.

These cost savings (i.e. bridge benefits) only have one corresponding cost (that is the cost of intermodal transfers) as they result from the following extra costs : being able to operate full loads only 9 months of the year and related equipment utilization costs, costs of intermodal transfer, labour overtime, disturbances to scheduling and administrative costs.

The portion of the cost of intermodal transfer which would also result in a cost to other businesses in the form of lost revenue (see FQ 20) probably totals about $40,000. An optimistic estimate (i.e. conservative approach for bridge benefits) of the contribution to profits and wages would be 50%, i.e. 50% of $40,000 or $20,000 would also be a cost to other transportation companies.

Therefore the total net yearly freight savings would be $228,377 - 20,000 = $208,377.

These freight savings are also totally different from the transportation cost savings reported by businesses. Those extra business transportation costs resulted from employing air freight, charters, and their own trucking operations.

Total yearly costs for the "Big Four" truckers are about $6 million. Total yearly revenues are only slightly above this as profit margins range from 0% to 10%. Thus extra costs of $228,377, resulting from no bridge, amount to 3.8% of total costs.

The same method as employed for the business benefit section (see Business Benefits, scenarios 1 and 2, p. 98) results in 40 year savings of:

Scenario (Reported Net Benefits = $208.377)	Total 40 Year Trucking Benefits at Social Discount Rates of:		
	5%	10%	15%
1A - Reported benefits at no growth.	$3,576,000	$2,038,000	$1,384,099
1B - Reported benefits at 3% growth.	$5,759,000	$2,845,000	$1,767,000
2A - Reported benefits minus 25% response bias, at no growth.	$2,682,000	$1,528,000	$1,038,000
2B - Reported benefits minus 25% response bias, at 3% growth,	$4,319,000	$2,134,000	$1,325,000

The remainder of the Freight Questionnaire is presented for the sake of completeness.

X- FUTURE BUSINESS POTENTIAL

FQ 43 - Some members of the Yellowknife Chamber of Commerce feel that a bridge could lead to Yellowknife becoming a gateway to the north, i.e. a transportation, warehousing and development centre. Some other N.W.T. citizens feel that this would not happen.

If a bridge were built, and if Yellowknife developed into a transportation, warehousing and development centre, how would this affect your freight company? Please answer the following questions.

TWO-WAY FREIGHT

Would your company be capable of shipping manufactured goods from the north to the south?

YES _____ NO _____

If NO, why not? _____

Response - Capability of Shipping Manufactured Goods from North to South	Times Mentioned
Yes	4

FQ 44 - Would your company be capable of shipping mineral ore concentrates to the south?

YES _____ NO _____

If NO, why not? (2 blank lines)

Response - Capability of Shipping Ore to South	Times Mentioned
Yes	3
Yes, we do now	1

FQ 45 - If two way freight existed, and if you were capable of shipping back haul loads, what would the freight rates be for back haul loads of various commodities and weights? (2 blank lines)

Response - Back Haul Freight Rates	Times Mentioned
Blank	2
Use a rate approximately 50% of up (haul) right at present.	1
Unable to answer at this time, need more info.	1

FQ 46 - If two way freight existed, and if you were capable of shipping back haul loads, how would this affect your present south to north freight rates? By how much would they decrease, increase, or would they stay the same?
Your south to north rates would (CIRCLE ONE) DECREASE INCREASE BY _____%
STAY THE SAME
Please explain why this would happen. (2 blank lines)

Response - Back Haul Affect on Up Haul Rates	Times Mentioned
- Blank - no reason given.	1
- Stay the same - no reason given.	1
- Decrease - Possibly decrease if could get a normal two way freight haul.	1
- Decrease - If guaranteed backhaul, then can justify a rate reduction. Percentage unknown at present.	1

FQ 47 - Would your company be capable of shipping oil and gas pipeline construction materials to the north?
YES _____ NO _____
If NO, why not? (2 blank lines)

Response - Capability of Shipping Pipeline Materials to North	Times Mentioned
Yes	4

X1- CROSSING TOLL (Trucking Companies only)

FQ 48 - If there were a permanent crossing of the Mackenzie, a possible source of revenue could be a toll.
Would you be willing to pay a toll?
YES _____ NO _____
If NO, why not? (2 blank lines)

Response - Willing to Pay a Toll for Bridge?	Times Mentioned
Yes	2
Blank - If toll charged, would be reflected in freight rate.	1
No - Operating costs are high in the north, why add to this?	1

FQ 49 - If you are willing to pay a toll, how much would you be willing to pay for a full truck?
Toll of $ _____ per full loaded truck.
How much of this toll would be added to your shipping costs, i.e. passed onto the consignee? _____
Please explain why _____

* * * * * * * * * * * * *

THANK YOU FOR ANSWERING THIS QUESTIONNAIRE!

Response - Amount of Toll Willing to Pay		
Toll - $	Passed On?	why ?
Blank	Blank	Blank
Blank	All	Blank
$15.00	Blank	Blank
$10.00 each way	Nil	We are now faced with $20.00 per trip waiting time for road drivers.

BUSINESS BENEFITS

INTRODUCTION

In order to determine the extent of business benefits due to a permanent crossing, a 5 page questionnaire was personally distributed to 306 Y.K. area businesses, including 6 questionnaires covering all government activities at the federal, territorial and municipal levels. The responses to each question will be discussed sequentially and where dollar benefits or costs are indicated, the net yearly benefit or cost will be given. Segments from the Business Questionnaire are notated by "BQ #." All questionnaires were initially screened to ensure that double counting of dollar benefits did not occur. For analysis purposes, it is assumed that responses of "blank, N/A, no" indicated zero effect. The questionnaires are available to a critiquing party wishing to confirm these benefits. Breakup and freezeup are signified by "b. & f." Dollar benefits and costs cover a one year period which includes one breakup plus one freezeup.

All business benefits and costs are then added to estimate the total reported yearly net business benefit (business scenario #1 = reported figures). However, these benefits may have been overestimated by business people. Therefore an average response bias of 25% is employed to derive business scenario #2 = reported figures minus 25% response bias.

Both yearly business benefit scenarios are then projected over the 40 year time horizon according to the two scenarios of; A) no growth, i.e. no development, or a continuation of the 1979, status quo conditions; B) growth, i.e. medium development resulting in an average, annual growth rate of 3%.

The Questionnaire - Title Page, page 1.

The title page is presented in entirety. Note the request for unbiased information. Also, due to keen competition among some Y.K. area businesses, research on the business effects was performed in a confidential manner.

yellowknife chamber of commerce

BOX 906, *YELL OWKNIFE, NORTHWEST TERRI TORIES, CANADA*

DO WE NEED A BRIDGE ACROSS THE MACKENZIE RIVER?

QUESTIONNAIRE FOR N .W .T. BUSINESSES

The Yellowknife Chamber of Commerce is conducting a cost-benefit study of a bridge across the Mackenzie River at Fort Providence, N.W.T. The Chamber will present this study as part of an application for funding to the federal government through the Department of Regional Economic Expansion. The Chamber would greatly appreciate receiving YOUR views on this subject, Please answer the following questions and return this questionnaire in the enclosed, self-addressed envelope.

As a followup study may be necessary, please ensure that the figures and statements given here are reasonably accurate to the best of your knowledge and are not exaggerated to either prove or not prove the need for a bridge across the Mackenzie River.

THIS INFORMATION WILL BE KEPT IN STRICTEST CONFIDENCE AND WILL BE USED ONLY FOR THE PURPOSE OF THIS STUDY. If you wish a copy of the results of this questionnaire, enclose a stamped, self-addressed envelope. Your questionnaire will be returned to you once the study has been utilized. If you have any questions, please call me at 873-3131, or drop into the Chamber office.

Please refer to #_____ in future correspondence. To ensure confidentiality, this number will be known by ONLY you and myself..

Some of the questions may not apply to your business. For these questions, simply write "N/A" (=not applicable) .

Thank you kindly for your assistance.

Sincerely,

Robert Given

Robert 'Given

Present Business Operations

BQ 1 - In general, how does the spring breakup and fall freezeup affect your present business operations? For the following detailed questions, consider a ONE YEAR PERIOD of one breakup PLUS one freezeup (i.e. Jan. 1 to Dec. 31). If You need more room, use the reverse side or another piece of paper.

I-Type of Business

In a few words, describe what type of business you operate. (Example: bank, housing construction, hardware retail, restaurant). (one blank line)

Businesses were classified according to the types summarized in the following "Summary Table of Y.K. Area Businesses." A total number of 208 respondents represents a response rate of 68.0%. This is a very high response rate in lieu of the conditions that; 1) Yellowknife businesses receive many questionnaires; 2) a thorough research of business effects and costs where applicable took an average of about 3 hours for each business person to achieve. These effects have never been enumerated separately, i.e. business people have grown accustomed to extra costs and accepted them as a normal state of affairs; 3) the overworked nature of many Y.K. business people and their lack of priority for activities (such as responding to a questionnaire) that are not profit oriented.

Factors contributing to the high response rate were; 1) personal emphasis by the consultant of the importance of this raw data towards achieving a complete study, this emphasis included follow Up phone calls; 2) the fact that Y.K. business people had never been asked before to comment in writing on this issue; 3) the argument that the majority of Y.K. business people perceive that the bridge would be a benefit to their business including both short run direct business benefits and long run developmental benefits. Accordingly, the response bias scenario 2 is incorporated in the analysis.

The non respondents were questioned as to their excuse for not responding. Excuses included; 1) a bridge would have very little or no effect; 2) the current non permanent crossings do affect them negatively but they are too busy or unable to quantify the effects. Non respondents were also examined

according to business type (some types are affected greatly, others, very little). The excuses and business type were combined to yield the last 2 columns in the following table.

The non respondents, questionnaire applicable, represents only 22.7% (39/172) of Y.K. area affected businesses. As these are generally smaller operations, it is estimated that no more than about 5% of total business benefits are represented by non respondents. This factor will not be included in total business benefits as its extent is considered to be small, although it may be regarded to be a conservative margin of safety in estimating business benefits.

Summary Table of Y.K. Area Businesses

Type of Business		Total Number	Respondents		Non Respondents	
			Questionnaire		Questionnaire	
			Non Applicable	Applicable	Non Applicable	applicable
Banks and Investment Companies		9	4	3	2	0
Professional - Accounting, Engineering, Law, Medical		23	9	6	8	0
Restaurants		14	0	8	0	6
Hotels & Lodges		10	1	6	1	2
Automotive		9	1	5	0	3
Media & Printing		9	4	3	1	1
Transportation		10	4	2	4	0
Government		6	3	2	0	1
Other Service		75	34	14	23	4
Electrical and Mechanical contracting		11	0	7	0	4
construction, Other contractors		44	8	20	10	6
Mining & Exploration		10	1	6	2	1
Retail Companies		76	6	51	8	11
Totals	Number	306	208		98	
			75	133	59	39
	Percentages	100%	68.0%		32?:	
			24.5%	43.5%	19.3%	12.7%

BQ 2 - In which town or settlement is your business located? (one blank line)

Response - Community	Questionnaires Distributed
Yellowknife	292
Rae-Edzo	6
Fort Providence	8
Total	306

The other Y.K. area communities of Rae Lakes, Lac La Martre, Detah, Reliance and Snowdrift are very small, have only a few businesses and perform much of their business trade with the above tabled communities.

BUSINESS ACTIVITIES IMPROVEMENT

II - Business Activities

BQ 3 - How does breakup and freezeup affect your business activities? (3 blank lines)

Response - Business Activities Effects	Times Mentioned	% of Respondents
No effect.	48	23.1
Very little effect.	26	12.5
Increased air freight costs.	55	26.4
Increased inventory.	42	20.2
Delays in arrival of equipment and supplies.	32	15.4
Slowdown in business, loss of revenue	19	9.1
Other costs.	11	5.3
Increased warehouse capacity.	9	4.3
More bank and interest charges.	8	3.8
Increased spoilage and damage to goods.	8	3.8
Decreased availability of goods and services.	7	3.4
More overtime.	5	2.4
More administrative costs.	5	2.4
More accommodation and meals.	3	1.4

Con't.

11 - Business Activities - Con't.

Affects business travel	3	1.4
Just - Yes	2	1.0
Totals not relevant as some respondents mentioned more than one effect.		

These effects are further detailed and quantified in the remainder of this questionnaire. Many respondents who indicated effects elsewhere did not indicate them here as well.

Labour Benefits - Overtime Costs Reduction

BQ 4 - Do you experience overtime periods as a result of breakup and freezeup?
YES _____ NO _____

Response - Overtime Due to B. & F.	Times Mentioned	% of Respondents
No	179	86.0
Yes (where b. & f. is a negative business effect)	27	13.0
Yes (where b. & f. actually increases their business)	2	1.0
Totals	208	100%

BQ 5 - If YES, what is the net cost of this overtime? (i.e. Cost of overtime MINUS cost which you would have incurred anyhow.)
$ _____ PER YEAR NET OVERTIME COST.

Response - Net Cost of Overtime	Times Mentioned	% of Respondents
None	180	86,6
Don't Know	4	1,9
Dollar figures reported by businesses	24	11.5
Totals	208	100%

BQ 4 and 5 will be combined with BQ18 (How would your warehouse labour requirements be changed if there were a bridge?) for analysis purposes. See the following "Summary Table of Overtime Labour Effects", and "Summary Table of Overall Labour Effects".

All businesses reporting overtime were consulted to determine whether the overtime was for regular staff and/or extra staff.

All businesses (22 used regular staff, 2 used both regular and extra staff) utilized regular staff overtime for reasons of reliability and no extra training involved.

For benefit-cost analysis purposes, overtime for regular staff is considered to be a cost to the employer. At the same time, overtime is both a' benefit to the regular employee (i.e. overtime wages received) and a cost to that employee as they are giving up leisure time for overtime. Thus overtime for regular staff is a net cost, i.e. bridge benefit.

Overtime resulting in extra staff hiring is a cost to the employer. However, it is also a benefit to that new employee, given the assumption that this employee was previously unemployed. Thus extra staff hiring results in a net labour effect of zero.

BQ 5 Response - Summary Table of Overtime Labour Effects

Overtime for Regular Staff		Overtime Resulting in Extra Staff Hiring	
Number of Businesses	Total Dollars	Number of Businesses	Total Dollars
24	$118,300	2	$2350

Therefore, the net cost of overtime labour (i.e. bridge benefit) is $118,300 reported by 24 businesses for an average of $4929 per business.

One business also reported laying off personnel during b. & f. resulting in $12,000 lost wages. This is a net labour cost given that the employee loses wages and that the employer is losing profits to pay those wages. Profit lost is covered under "Lost Customer Cost."

Thus the total overtime cost is $130,300 ($118,300 + 12,000).

Overall Labour Effects

Businesses reporting overall labour effects (i.e. not overtime effects) in response to BQ 4 and 5 and BQ 18 were consulted to determine the nature and extent of these effects.

Where a bridge would result in an overall labour requirement decrease, this decrease is both a benefit to the employer (elimination of wage payment) and a cost to the employee (elimination of wages received) given the assumption that this employee becomes unemployed. This is a reasonable assumption according to the current high unemployment situation. Thus there is no net benefit here.

Where a bridge would result in an overall labour requirement increase, this increase is a net benefit, assuming that the newly employed individual would have been otherwise unemployed. For the employer, it is both a cost (cost of wages paid) and a benefit (the business would be generating revenues to pay extra wages if a bridge Drought more business). For the employee, it is a net benefit.

Summary Table of Overall Labour Effects

Overall Labour Decrease		Overall Labour Increase	
Number of Businesses	Total Dollars	Number of Businesses	Total Dollars
3	$94,375	1	$18,000

Thus, the total benefit to labour is $130,300 (total overtime cost) plus $18,000 or $148,300.

Cost-Benefit Analysis of Gross Revenue Effects

For cost-benefit analysis purposes, gross revenue must be divided into the two components of:
X = percentage contribution to gross before tax profits and wages
Y = gross revenues of 100% minus X
= percentage contribution to rent and utilities, raw materials, supplies, costs of production, etc., where X + Y = 100%.

A 100% loss of gross revenues represents a gross cost of 100% i.e. gross lost benefit. Correspondingly, this 100% loss also represents a lost benefit equal to X, lost percentage contribution to gross before tax profits and wages. Thus the net bridge benefit is usually 100% - X = Y.

Where this net benefit analysis is employed, businesses are classified according to the 4 broad areas of: retail, transportation, hotels and restaurants, and other service businesses.

Local accountants and businesspeople were asked to comment on Y.K. values for X and Y. Stats. Can. (Catalogue 31-203, Manufacturing Industries of Canada: National and Provincial areas, 1977) stated the Canadian average for manufacturing as being X = 44%, Y = 56%. Dun and Bradstreet, Key Business Ratios, 1976, was also consulted. In summary, the following X and Y values are probably already conservative (i.e. X is overestimated, Y is underestimated) in light of the fact of the Can. manufacturing X component being 44% (i.e. manufacturing has a high labour component).

Then, to ensure compliance with the conservative approach maintained throughout this study, the Y values were scaled down by 5%. (The higher Y is, the higher the net bridge benefit is). The following table summarizes X and Y.

Gross Revenue (100%) Division Into X (Profits and Wages) and Y (Other Costs)

Source	Type of Business							
	Retail		Transportation		Hotel & Restaurant		Other Service Businesses	
	X	Y	X	Y	X	Y	X	Y
Average of Accountants and Business People	45	55	40	60	55	45	60	40
Conservative Values Employed in the Study	50	50	45	55	60	40	65	35

Disturbances to Scheduling

BQ 6 – What kind of disturbances to scheduling your business operations have you experienced as a result of breakup and freezeup? (3 blank lines)

Response - Scheduling Disturbances	Times Mentioned	% of Respondents
None	103	49.5
Very little, nothing significant	12	5.8
Delayed freight	29	13.9
Delayed or postponed jobs due to lack of materials	19	9.1
Using air freight instead of truck	9	4.3
Increased inventory	18	8.7
Decreased availability of goods and services	8	3.8
Business slowdowns	9	4.3
Personnel layoffs	4	1.9
More management time	3	1.4
More warehouse space	4	1.9
Higher costs result in losing competitive edge against similar southern businesses	2	1.0

Con't.

Scheduling Disturbances - Con't.

Higher cost of employee movement	2	1.0
Staff Overtime	3	1.4
Just - increased costs	3	1.4
Disrupts when employees can take holidays	2	1.0

Totals not relevant as some respondents mentioned more than one disturbance.

Other important disturbances which were mentioned once were: our air freight has been located in Hay River rather than Y.K. because of b. & f. effect on supply (large mining co.); it could be disastrous to a developer (development co.); clients schedule year ends for ideal inventory levels, therefore year ends are not geared to the clients proper bus. cycle, results in accounting problems (accounting co.); can't patrol south of the river (Providence RCMP).

These disturbances were expanded upon throughout the remainder of the questionnaire. The only positive disturbance mentioned (once) was that: "We have long and well deserved holidays."

BQ 7 - What is the approximate average yearly cost of these disturbances to scheduling?

$ _____ PER YEAR FOR DISTURBANCES TO SCHEDULING.

Response - Cost of Scheduling Disturbances	Times Mentioned	% of Respondents
None	125	60. 1%
Don't Know	17	8.2%
Included elsewhere (stated by business person or screened by consultant)	45	21,6%
Dollar figures reported by businesses	22	10.6%

Totals not relevant as some businesses have "included elsewhere" components and scheduling disturbances dollar figures.

Disturbances, not included elsewhere (i.e. screened to ensure double counting did not occur), reported by 22 businesses amounted to a total of $161,369. As these disturbances included multiple cost factors, they could not be separated and included under other categories. The disturbance costs resulted from reasons tabled in BQ 6.

The net benefit of disturbances cost reduction, calculated in the following table, is $73,045.

Summary Table of Net Benefit of Disturbances Cost Reduction

Type of Business	Number of Businesses Reporting Negative Effects	Total Dollar Value of Effects	Percentage of Dollar Value Which is a Net Bridge Benefit (i.e. Y%)	Dollar Value of Net Bridge Benefit
Retail	9	$100,619	50%	$50,310
Transportation	2	$ 5,400	55%	$ 2,970
Hotels and Restaurants	3	$ 7,850	40%	$ 3,140
Other Service Businesses	8	$ 47,500	35%	$16,625
Totals	22	$161,369	--	$73,045

BQ 8 - How does breakup and freezeup affect the service you provide to your customers, including the availability of goods and services and added costs? (4 blank lines)

Response - Customer Service Effects	Times Mentioned	% of Respondents
None	111	53.4%
Very Little	12	5.8%
Decreased availability of goods and services	39	18. 8%
Service and job delays	37	17. 8%
Added freight costs	16	7,7%
Other added costs	23	11. 1%
Totals not relevant as some respondents mentioned more than one customer service problem.		

In general, b. & f. create many customer service problems as indicated by the above table.

BQ 9 - How does breakup and freezeup affect the service you receive from your suppliers, including the availability of goods and services and added costs? (4 blank lines)

Response - Supplier Service Effects	Times Mentioned	% of Respondents
None	90	43.3%
Very little	16	7.7%
Delays arrival of equipment and supplies	46	22. 1%
Increased freight costs	47	22.6%
Other increased costs	17	8.2%
Results in increased inventory	10	4.8%
Results in increased labour costs	5	2.4%
Creates supplier negligence	3	1.4%
Creates business slowdowns	2	1.0%
Totals not relevant as some respondents mentioned more than one supplier service problem.		

In general, b. & f. create many supplier service problems as indicated by the above table.

Loss of Business

BQ 10 - How does breakup and freezeup affect your net number of customers? Do you gain, lose, or have no change in your number of customers? If they change, by how much do they change?

We (circle one) GAIN ; LOSE; HAVE NO CHANGE. _____ # OF CUSTOMERS.

What is your guess as to the approximate total value of this gain or loss to your business?

$ _____ PER YEAR.

Response - Net Customer Number Effects	Times Mentioned	% of Respondents
Have no change	174	83.6
Businesses reporting a gain in customers	2	1.0
Businesses reporting a loss in customers	25	12.0
Don't know	7	3.4
Totals	208	100%

For the businesses reporting a gain or loss of customers, each business was questioned concerning what happens to these customers gained or lost. The following breakdown table is a summary of this information.

The percentage of cost which is a net cost (i.e. net lost benefit) is equal to X, the % contribution to profits and wages. However, wages effects for this particular benefit have already been covered in the "Labour Benefits" section. Therefore the net cost % equals the % contribution to profits, which is conservatively estimated to be 5%.

The total net dollar value of net customer cost (i.e. net lost benefit of $8,693 minus the gain in customers of $1000 x 0.05 = $50) equals $8643.

Breakdown for Businesses Reporting a Loss of Customers at a Related Dollar Value

Lost Customer Action	Reported Dollar Value of Loss	% of Dollar Value Which is a Cost, i.e. Lost Benefit	Dollar Value of Cost i.e. Lost Benefit	% of cost Which is a Net Cost i.e. Net Lost Benefit	Dollar Value of Net Cost i.e. Net Lost Benefit
1) Customers never buy - ie permanently foregone purchases	$ 70,200	100%	$ 70,200	5%	$3,510
2) Purchases made in south during breakup and freezeup	$103,666	100%	$103,666	5%	$5,183
3) Purchases made in north from another business during B & F	$130,533	o%	$ 0	o%	$ 0
4) Purchases delayed until after B & F	$ 43,501	o%	$ 0	o%	$ 0
Totals	$347,900	--	--	--	$8,693

INVENTORY COSTS REDUCTION

III - Inventory and Warehousing costs

BQ 11 - Approximately how much total EXTRA inventory (in dollars) do you require for one BREAKUP?

$ _____ EXTRA INVENTORY FOR ONE BREAKUP.

About how long is your money tied up in this EXTRA inventory?

_____ DAYS OUR MONEY IS TIED UP IN EXTRA INVENTORY FOR ONE BREAKUP.

Response - Extra Breakup Inventory	Times Mentioned	% of Respondents
No extra inventory	126	60.6%
Don't know amount of extra inventory	5	2.4X
Businesses reporting an increase in inventory	77	37,0%
Totals	208	100%

Because of the uncertainty involved concerning exactly when breakup will occur, and the related uncertainty involving supply from the south, and breakup's incidence close to the Easter season (a higher than average consumer period), businesses store inventory for much longer periods than the actual breakup period in order to maintain a factor of safety (i.e. the cost to businesses of extra inventory is much less than the cost of lost sales would be). B. & F. result in a waiting and guessing game for these businesses. They are always losers because of either holding extra inventory or losing sales.

The 77 businesses stored extra inventory ranging in value from $500 to $500,000 for periods ranging from 15 days to 120 days according to the following distribution table, with an average period of .58.8 days.

Period of Extra Breakup Inventory (days)	15	21	30	35	37	40	45	49	50
Number of Respondents	1	1	8	3	2	3	11	3	1

Period of Extra Breakup Inventory (days)	52	60	75	80	90	105	120	Total Respondents
Number of Respondents	2	22	6	1	7	3	3	77

According to BQ 13, 32 businesses reported borrowing funds for extra inventory. Y.K.'s 5 bank managers reported these average cost of funds: 1) short term investments average 12%; 2) cost of borrowed money averages 15%.

Considering a 40 year time horizon, it is very difficult to predict what future interest rates for invested or borrowed money will be. The 25 year average real before tax return on capital for businesses in Canada is 10%. This blanket figure will be employed for all businesses holding extra inventory (a conservative approach given that 32 out of 77 businesses borrow) to calculate the real opportunity cost of extra inventory, using the accurate 365.25 days/year.

The total cost of extra breakup inventory, incurred by 77 businesses, is $42,578, an average of $553 per business.

BQ 12 - Approximately how much total EXTRA inventory (in dollars) do you require for one FREEZEUP?

$ _____ EXTRA INVENTORY FOR ONE FREEZEUP.

About how long is your money tied up in this inventory?

_____ DAYS OUR MONEY IS TIED UP IN EXTRA INVENTORY FOR ONE FREEZEUP.

Response - Extra Freezeup Inventory	Times Mentioned	% of Respondents
No extra inventory	125	60.1%
Don't know amount of extra inventory	5	2.4%
Businesses reporting an increase in inventory	78	37.5%
Totals	208	100%

Because of the uncertainty involved concering exactly when freezeup will occur and related uncertainty of supply, and freezeup's incidence during the Christmas consumer season, the most active consumer period of the year, businesses store inventory for much longer periods than the actual freezeup period. The 78 businesses stored extra inventory ranging in value from $500 to $500,000 for periods ranging from 15 days to 120 days, with an average period of 62.0 days.

Period of Extra Freezeup Inventory (days)	15	21	30	35	37	38	40	42	45	49
Number of Respondents	1	1	8	1	1	1	2	1	9	2

Period of Extra Freezeup Inventory (days)	50	52	60	70	75	90	105	120	Total Respondents
Number of Respondents	1	2	23	1	7	10	3	4	78

Applying the blanket figure of 10% results in a total extra freezeup inventory cost incurred by 78 businesses of $52,957, an average of $679 per business. Total breakup plus freezeup inventory cost is $95,535.

BQ 13 - What kind of problems result from the outlay of this extra money at breakup and freezeup? (3 blank lines)

Response - Extra Money Outlay Problems	Times Mentioned	% of Respondents
None	137	65.9%
Shortage of working capital (paying bills, payroll), cash flow problems	29	13.9%
Bank financing problems, extra bank charges	32	15.4%
Lose investment interest and supplier discounts	22	10.6%
Requires scheduling some major activities at other times due to required cash for B. & F.	5	2.4%
Causes increased storage facilities	3	1.4%
Results in increased spoilage	2	1.0%
Totals not relevant as some respondents mentioned more than one cash outlay problem.		

Therefore, the outlay of this extra money twice yearly creates many financial problems for Y.K. area business people, particularly in light of the already undercapitalized nature of their operations.

WAREHOUSING COSTS REDUCTION

BQ 14 - How does it affect your warehousing? About how much EXTRA warehouse space do you need compared to that needed if there were a bridge?
_____ EXTRA square feet.

Response - Extra Warehouse Space	Times Mentioned	% of Respondents
None	159	76. 4%
Businesses reporting warehouse effects if there were a bridge.	49	23.6%
Total	208	100%

Responses to BQ 15 and BQ 16 will be analyzed in combination.

BQ 15 - What would you do with this extra space if there were a bridge?
(2 blank lines)

BQ 16 - What would be the approximate value of this extra space for its alternate use?
$ _____ PER YEAR FOR EXTRA SPACE.

Many business people require extra warehouse space for holding inventory over the b. & f. periods. If a bridge existed, this space could be employed for various purposes. The utility of extra warehouse space would depend on whether Y.K. experienced Scenario A (no growth) or Scenario B (average annual growth of 3%) ,

Scenario A (no growth) Warehousing Costs Reduction

1) Business people who mentioned that they could decrease their amount of space rented would achieve rental payment savings. However, renters of warehouses would lose this revenue, given that no other rentees would demand this space. Net bridge benefit = rentee rental savings - rentor revenues (X value for other service businesses) = 100% - 65% = 35%.

2) Those who stated that freed Up space could be used to provide a service or product currently not available in Y.K. would generate revenues resulting in a net benefit of X%, i.e. the contribution to before tax gross profits and wages. A conservative X value of 40% will be employed.

3) Those who replied that their only use would be to rent their warehouse would not generate revenues as no rentees would be demanding this space.

4) Some of these business people would save utility costs on this excess space. Others quoted an ascertained net value for their space or a net savings value.

Others reported that: 5) they simply wouldn't need it; 6) that the space is provided at no extra cost ; and 7) it would just result in a more organized warehouse.

8) One business cited that a bridge would make their warehouse available for an alternate one time use, total value of $5000. This one time value is in addition to the net yearly bridge benefit of $188,898.

Summary Table of Scenario A (no growth)
Yearly Warehousing Costs Reduction

Response - utility of Extra Space	Times mt ione	Total Extra 'arehouse Space (Square Feet)	Average Value Per Square Foot	Total Dollar Value	Net Bridge Benefit ?ercentage (i.e. cost Saved Minus Lost Benefit)	Net Yearly Bridge Benefit
1) Would decrease amount of space rented.	13	12,075	--	$ 47,850	35%	$ 16,748
2) Would provide goods/services not available now.	13	21,750	--	$233,500	40%	$ 93,400
3) Only use - rent it, but no rentees.	4	5,300	--	$ 29,000	0%	zero
4) Net value or savings.	4	10,000	--	$ 78,750	100%	$ 78,750
5) Just - wouldn't need it.	7	12,900	+ fuel storage tank + 1 cement silo		zero	zero
6) Space provided at no extra cost.	2	360	zero	zero	0%	zero
7) Only result in a more organized warehouse.	5	--	zero	zero	0%	zero
8) One time value added after.	1	500 @ $5000 added after				
Totals where applicable	49	62,385	$6.2	$389,100	--	$188,898

Summary Table of Scenario B (3% growth)
yearly Warehousing Costs Reduction

Response - Utility of Extra Space	Times Mentioned	Total Warehouse Space (Square Feet)	Average Value Per Square Foot	Total Dollar Value	Net Bridge Benefit Percentage (i.e. cost Saved Minus Lost Benefit	Net Yearly Bridge Benefit
1) Would decrease amount of space rented.	13	12,075		$ 47,850	100 %	$ 47,850
2) Would provide goods/services not available now; and/or expand business processing, production, service, retail facilities.	15	33,350		)402,900	40%	$161,160
3) Would rent space for revenues.	4	6,100		$ 40,600	40%	$ 16,240
4) Net value or savings.	3	7,600		$ 75,500	100%	$ 75,500
5) Just - wouldn't need it	5	12,900 + 1 fuel storage tank			zero	zero
5) Space ?rovided at no extra cost	2	360				
7) Only result in a more organized warehouse	5		zero	zero	zero	zero
3) One time value added after.	2	500 + 1 cement silo @ $65,000, added after				
Totals where Applicable	49	62,385	$9.1	$566,850	-	$300,750

Scenarios A and B Summary Tables indicate the net yearly bridge benefit of warehousing costs reduction. However, unlike the other business benefits indicated in the Summary Table of Yearly Business Benefits, warehousing costs reduction does not experience a real growth, i.e. the current warehouses would not grow with a growing population and business community.

Thus for Scenario B (3% growth), yearly warehousing costs must be discounted separately and added on to the Scenario B Total Business Benefit.

One time warehousing benefits (Scenario A = $5000, Scenario B = $65,000) must be added to the Total Business Benefits.

See the Summary Table of Yearly Business Benefits and the Summary Table of 40 Year Total Business Benefits.

BQ 17 - HOW would your warehouse equipment requirements be changed if there were a bridge? (2 blank lines)

Response - Warehouse Equipment Changes	Times Mentioned	% of Respondents
No change	199	95.7%
Nominal change	2	0.9%
Just - decrease	3	1.4%
Decrease by 1/4	1	0.5%
Decrease by 1/2	1	0.5%
Much less refrigeration, other equipment	2	1.0%
Totals	208	100%

Dollar values for decreased equipment requirements are included in BQ 16.

BQ 18 - How would your warehouse labour requirements be changed if there were a bridge? (2 blank lines)

Response - Warehouse Labour Changes	Times Mentioned	% of Respondents
No change	197	94.7%
A change involving significant dollars	5	2.4%
A change involving insignificant dollars	6	2.9%
Totals	208	100%

Dollar values for decreased labour requirements are included in BQ 5. See BQ 5 for a combined analysis of labour effects.

BQ 19 - What other effects would a bridge have on your inventory and warehousing? (2 blank lines)

Response - Other Inventory and Warehousing Effects	Times Mentioned	% of Respondents
None	173	83.2
Would allow better flow of goods and funds	16	7.7
Decreased inventory	10	4.8
Only - reduced costs	12	5.8
Only - more convenience	3	1.4
Better use of our own trucks	2	l.0
More customers	1	0.5
Totals not relevant as some businesses mentioned more than one other effect.		

ADMINISTRATIVE COSTS REDUCTION

IV - Administrative Costs

BQ 20 - Please estimate your net administrative costs of breakup PLUS freezeup. (i.e. the number of extra hours required MINUS the number of hours saved which you would have spent at other times of the year.)

Approximate number of NET extra hours required = _____ EXTRA HOURS FOR ONE BREAKUP PLUS ONE FREEZEUP.

Approximate cost per hour = $ _____ PER HOUR.

Response - Administrative Effects	Times Mentioned	% of Respondents
None	169	81. 3%
Dollar values reported by businesses	39	18. 7%
Totals	208	100%

Some business people must spend extra administrative hours organizing business service and retail activities before and during the b. & f. periods. Business people spent extra administrative hours ranging from 4 hours to 300 hours, according to the following distribution.

Number of Extra Hours	4	5	8	10	20	25	30	35	40	50	60
Number of Respondents	1	1	1	1	5	1	1	1	2	4	2

Number of Extra Hours	80	96	100	120	140	150	160	200	300	Total Number of Respondent
Number of Respondents	4	1	5	1	1	2	1	1	3	39

Business people value their leisure time (i.e. extra admin. hours) according to a wide range of values from $5 to $35/hour, according to the following distribution.

Dollar Value Indicated	$ 5	$6.50	$ 7	$ 8	$10	$10.50	$12	$12.50
Number of Respondents	1	2	3	2	10	1	1	2
Dollar Value Indicated	$14	$15	$20	$25	$26	$30	$35	Total Respon-dents
Number of Respondents	1	4	5	2	1	2	2	39

The average dollar value amounts to $14.94. Obviously, many business people have quoted their chargeable business rates. For analysis purposes, the quoted rate will be used if that rate is less than or equal to $10.00/hour. For rates greater than $10/hr., a blanket figure of $10/hour will be employed. Total administrative costs (i.e. bridge benefit) equal $30,838. There is no corresponding partial cost (i.e. lost benefit).

TRANSPORTATION COSTS REDUCTION

V - Transportation Costs

BQ 21 - Approximately what total additional transportation costs do you incur during one breakup plus one freezeup?

$ _____ EXTRA TRANSPORTATION COSTS FOR ONE BREAKUP PLUS ONE FREEZEUP.

Response - Extra Transportation Costs	Times Mentioned	% of Respondents
None	110	52.9
Don't Know	12	5.8
Dollar values reported by business	86	41.3
Totals	208	100%

Many businesses incur extra transportation costs due to retailing perishables which can not be inventoried and/or guessing wrong on their b. & f. inventory. These extra costs represent the difference between employing the much more expensive mode of air freight versus that of road transportation which is impossible during b. & f.

The total dollar value, reported by 86 businesses, amounts to $435,316, an average of $5062 per business.

A bridge would decrease overall transportation costs resulting in a 100% benefit to these businesses. At the same time, this decrease would also represent a partial cost or loss of business to the air transportation companies (lost profits and wages).

The net bridge benefit of transportation costs reduction equals Y% (transportation value) or 55% of $435,316 which equals $239,424.

UNPREDICTABLE COSTS REDUCTION

VI - Unpredictable Costs

BQ 22 - What kind of emergency situations have you experienced as a result of having no bridge? (example: hotels, special charters necessary, etc.) (2 blank lines)

Response - Unpredictable Costs	Times Mentioned	% of Respondents
None	144	69.2%
Air freight and extra costs	23	11.1
Special charters required	10	4.8
Accommodations and meals	10	4.8
Freight and heavy equipment stuck on south side of river	8	3.8
Damaged goods and perishable loads written off	3	1,4
Business stoppage due to material shortage	2	1.0

Con't.

Breakdown of Businesses Reporting Emergencies

Emergency Type	Times Mentioned	Total Dollar Value	Net Cost Percentage (ie Cost Minus Lost Benefit) ie Y value)	Net Dollar cost
Air freight not included in BQ 21.	12	$14,770	55%	$ 8,124
Special charters required.	4	$10,500	55%	$ 5,775
Accommodations and meals, higher moving expenses.	9	$18,450	40%	$ 7,380
Freight and heavy equipment stuck on south side of river.	2	$ 5,000	100%	$ 5,000
Damaged goods and perishable loads written off.	2	$11,000	100%	$11,000
Business stoppage, slowdown or delays due to material shortage.	5	$ 9,000	100%	$ 9,000
Flying south on business instead of driving.	3	$ 2,750	55%	$ 1,513
Only - Other extra costs.	3	$ 1,800	35%	$ 630
Totals Where Applicable	--	$73,270	--	$48,422

The total net cost (i.e. bridge benefit) of emergencies (i.e. Unpredictable Costs Reduction) is $48,422.

BQ 24 - Describe any other ways that breakup and freezeup affect your business, for better or for worse. (4 blank lines)

Other Effects of B. & F.	Times Mentioned	% of Respondents
None	154	74*0
B. & F. Affect Them for Worse		
Very little	7	3.4
Business slowdowns and interruptions in supply	22	10.6
Other increased costs	17	8.2
Just - inconvenience	8	3.8
Damaged and spoiled goods	2	1.0
Creates mistrust between consumers & business people	2	1.0
Isolation effect felt on employees	2	1.0
B. & F. Affect Them for Better		
Not having to order every week	1	0.5
Keeps other competitors from bringing in heavy equipment twice a year, therefore advantage in bidding some jobs.	1	0.5
Totals not relevant as some businesses reported more than one other effect.		

Most of these points have been mentioned previously.

OTHER BUSINESS AND CONSUMER BENEFITS - INCREASED COMPETITION AND PRODUCTIVITY

Increased Business Competition

Due to the small Y.K. market and lack of a permanent crossing among other factors, there is a general shortage of business competition in Y.K. Some inefficiency results due to complacency among some business people and low

economies of scale in business operations.

The cost of starting and operating a new business venture in Y.K. is much higher than in the south. Many new buildings have incurred extra construction costs because of the timing of breakup and increased cost components of: labour, scheduling disturbances, inventory holding, warehousing, administration, transportation and unpredictable costs. This contributes to higher capital and rent costs.

When the new business commences operation, it continues to incur some of these extra costs. Therefore, a bridge would contribute to decreased starting and operating costs. This could stimulate the opening of more businesses and lead to increased business competition and possibly lower prices. This would also contribute to a greater percentage of personal disposable income being spent in Y.K. (many Y.K. consumers shop in the south) due to lower prices and increased availability of goods and services.

Increased Employee Productivity

Productivity in the north is low relative to the Canadian average. This is partially a result of both the slower pace of life and increased hardships. .4 bridge would decrease these hardships and improve the quality of life, possibly influencing positively Y.K. productivity (see "Social Benefits" for discussion about improvement of quality of life).

One reputable professional business person commented that "The most attractive aspect of a bridge at this point in time would be the tremendous lift in public morale that it would undoubtedly create in this city - in the case of our firm, increase in productivity of 5% or so could reasonably be anticipated, and that represents greater than $10,000/annum in revenue."

Although a dollar value cannot be attached to increased productivity, a small percentage increase represents a very significant economic benefit.

EFFECT ON CONSUMER COST OF GOODS AND SERVICES

VII - Consumer Cost of Your Product and/or Service

BQ 25 - Approximately what average added cost on a yearly basis, as a percentage of total business costs, results from employing a non all weather Mackenzie River crossing? (i.e. sum of all extra costs, #II to VI, DIVIDED BY total business costs)

Our approximate added cost, as a percentage of total business costs, resulting from the present crossing is _____% per year.

If your business operating expenses (customer servicing, inventory and warehousing, administrative, transportation costs) decreased by having a bridge, could the majority of these savings be passed onto the consumer?

YES _____ NO _____

If NO, why not?

Summary Table of Consumer Cost Reduction

% Decrease	Times Mentioned	Yes, Savings Would Be Passed On	No, Savings Not Passed On	If No, Why Not? -Reason # (see Reasons)	Response Given = N/A or Blank
No change	115	N/A	N/A	N/A	115
Insignificant	2	1	1	too small	0
Very little	2	2	0		0
Don't know	22	18	2	1,2	2
Blank	2	0	2	3,4	0
0.01%	1	1	0		0
0.02%	1	0	1	5	0
0.04%	1	0	0		1
0.05%	2	2	0		0
0.1%	3	0	3	6,7,8	0
0.17%	1	0	1	9	0
0.25%	1	0	1	10	0
0.5%	2	2	0		0
Less than 1%	4	1	3	11,12,13	0

Con't.

Consumer Cost Reduction - Con't.

% Decrease	Times [entioned	Yes, Savings Would Be Passed On	No, Savings Not Passed On	If No, Vhy Not? -Reason # (see Reasons)	lesponse Given = N/A)r Blank
L%	3	1	2	14,15	o
1.3%	1	1	0		0
1.4%	1	1	0		0
1.5%	1	1	0		0
2%	10	9	1	16	0
2.5%	1	1	0		0
3%	4	2	2	17,18	0
3.5%	1	1	0		0
4%	1	1	0		0
5%	7	7	0		0
5.12%	1	1	0		0
7%	1	1	0		0
7,5%	2	2	0		0
8%	2	1	1	19	0
10%	4	3+1 possibly			0
11%	1	1	0		0
12.5%	2	2	0		0
13%	1	1	0		0
15%	4	4	0		0
17.5%	2	2	0		0
20%	1	1	0		0
Totals Where Applicable	208	72 (out of 93 =77.4%)	18 (+N/A=2 +Blank=1 =21 out of 93 =22.6%		118

If No. Why Not? - Reasons

Reason #	Reason
1.	Have always absorbed costs, don't increase prices.
2.	Rates depend on truck freight rates.
3.	Rates are charged on a national scale,
4.	Sales affected by international prices.
5.	Territorial Gov't. sets prices.
6.	Predetermined tariffs.
7.	Very insignificant extra costs.
8.	Don't charge extra for special freight.
9.	Keep it myself.
10.	Fixed commission basis.
11.	Retail price structure remains constant all year.
12.	Extra costs are absorbed as they are small.
13.	They are so minimal.
14.	Rates set at national scale.
15.	Return on investment now is very low, Profits would then become acceptable and ensure that our company stayed in business.
16.	Too small, no bearing on selling price.
17.	Absorbed by business now.
18.	Company absorbs extra costs.
19.	Fixed prices.

Therefore, because a majority of businesses mentioned that bridge business savings could be passed onto consumers (77.4% versus 22,6% who couldn't pass savings on; most of the reasoning being that extra costs were so low, or that fixed prices governed), it appears that consumers would also benefit economically from a bridge.

Although the percentages mentioned are small, the dollar value is quite large (see Summary Table of Business Benefits). These business benefits represent almost equal savings to both businesses and consumers. They are only counted

once, under business benefits; to count them again as consumer benefits would be double counting.

The final, fifth page of the business questionnaire is presented here for purposes of entirety. However the responses are either already previously discussed or extraneous to this study.

Future Business Potential

If the bridge is constructed and more than average (prebridge) development occurs in the north, what areas of development do you think the Chamber of Commerce should promote specifically with reference to the Bridge and other infrastructure? (3 blank lines)

How much do you think your business would gain or lose if more than average development occurred? For example, if the gross business revenues of the N.W.T. increased by, say 5%, would your business revenues increase by more, less or about the same?
If N.W.T. revenues increased by 5%, our revenues would _____.

COMMENTS : (Please include any additional comments which you consider important.) (6 blank lines)

SUMMARY OF BUSINESS BENEFITS

Summary Table of Yearly Business Benefits

Benefit	Net Dollar Amount
Labour Benefits	$148,300
Disturbances to scheduling	$ 73,045
Loss of Business	$ 8,643
Inventory Costs Reduction	$ 95,535
Administrative Costs Reduction	$ 30,838
Transportation Costs Reduction	$239,424
Unpredictable Costs Reduction	$ 48,422
Scenario A & B Total Yearly Business Benefit Without Warehousing Costs Reduction	$644,207
Scenario A (no growth) Warehousing Costs Reduction	$188,898
Scenario A Total Yearly Business Benefit	$833,105

Projection to 40 Year Total Business Benefits

Scenario 1:

Scenario 1A - Reported Benefits at No Growth

Scenario A Total Yearly Business Benefit of $833,105 is projected over the 40 year time horizon at no growth to yield Total 40 Year Business Benefits of $14,295,000, $8,147,000 and $5,533,000 at social discount rates of 5, 10 and 15% respectively. The one time warehouse benefit of $5000 is added to yield Total 40 Year Business Benefits of $14,300,000, $8,152,000 and $5,538,000 at social discount rates of 5, 10 and 15% respectively.

Scenario 1B - Reported Benefits at 3% Growth

Scenario B Total Yearly Business Benefit Without Warehousing Costs Reduction of $644,207 is projected over the 40 year time horizon at 3% growth to yield Total 40 Year Business Benefits (without warehousing) of $17,804,000, $8,796,000 and $5,462,000 at social discount rates of 5, 10 and 15% respectively. Scenario B Yearly Warehousing Costs Reduction of $300,750 is projected over 40 years at no growth to yield 40 Year Total Warehousing Costs Reductions of $5,161,000, $2,941,000 and $1,998,000 at social discount rates of 5, 10 and 15% respectively which are added to the above Total 40 Year Business Benefits to yield Total 40 Year Business Benefits of $22,965,000, $11,737,000 and $7,460,000 at social discount rates of 5, 10 and 15% respectively.

The one time warehouse benefit of $65,000 is added to yield Total 40 Year Business Benefits of $23,030,000, $11,802,000 and $7,525,000 at social discount rates of 5, 10 and 15% respectively.

Scenario 2:

For this scenario, it is assumed that reported business benefits are inflated by business people. Accordingly, a response bias of 25% is employed to yield Scenario 2 = reported figures minus 25% response bias.

Scenario 2A - Reported Benefits Minus 25% at No Growth

Scenario A Total Yearly Business Benefit of $833,105 becomes $624,829 (75% of $833,105) which is projected over 40 years at no growth to yield Total 40 Year Business Benefits of $10,721,000, $6,110,000 and $4,150,000 at social discount rates of 5, 10 and 15% respectively. One time warehouse benefit of" $5000 becomes $3750 which is added to yield Total 40 Year Business Benefits of $10,725,000, $6,114,000 and $4,154,000 at social discount rates of 5, 10 and 15% respectively.

Scenario 2B - Reported Benefits Minus 25% at 3% Growth

Scenario B Total Yearly Business Benefit (without warehousing costs reduction) of $644,207 becomes $483,155 which is projected over 40 years at 3% growth to

yield Total 40 Year Business Benefits (without warehousing) of $13,353,000, $6,597,000 and $4,097,000 at social discount rates of 5, 10 and 15% respectively. Scenario B Warehousing Costs Reduction of $300,750 becomes $225,563 which is projected over 40 years at no growth to yield Total 40 Year Warehousing Costs Reductions of $3,870,000, $2,206,000 and $1,498,000 at social discount rates of 5, 10 and 15% respectively which is added to the above Total 40 Year Business Benefits to yield $17,223,000, $8,803,000 and $5,595,000 at social discount rates of 5, 10 and 15% respectively. One time warehouse benefit of $65,000 becomes $48,750 which is added to yield Total 40 Year Business Benefits of $17,272,000, $8,851,000 and $5,643,000 at social discount rates of 5, 10 and 15% respectively.

See the following summary table.

Summary Table of Total 40 Year Business Benefits

Scenario	Total 40 Year Business Benefits at Social Discount Rates of:		
	5%	10%	15%
LA = Reported Benefits at No Growth (Yearly Benefit = $833,105).	$14,295,000	$ 8,147,000	$5,533,000
Add One Time Warehouse of $5000	$14,300,000	$ 8,152,000	$5,538,000
1B = Reported Benefits at 3% Growth (1979 Benefit = $644,207, 1979 Warehouse at No Growth = $300,750).	$22,965,000	$11,737,000	$7,460,000
Add One Time Warehouse of $65,000	$23,030,000	$11,802,000	$7,525,000
2A = Reported Benefits Minus 25% Response Bias at No Growth (Yearly Benefit = $624, 829).	$10,721,000	$ 6,110,000	$4,150,000
Add One Time Warehouse of $3750	$10,725,000	$ 6,114,000	$4,154,000
2B = Reported Benefits Minus 25% Response Bias at 3% Growth (1979 Benefit = $483,155, 1979 Warehouse at No Growth = $225,563).	$17,223,000	$ 8,803,000	$5,595,000
Add One Time Warehouse of $48,750	$17,272,000	$ 8,851,000	$5,643,000

FERRY COST ELIMINATION

INTRODUCTION

A bridge would eliminate the need for a ferry at Fort Providence, N.W.T. This would result in many benefits and some costs.

The present Merv Hardie ferry started operations in 1971. Built by Vancouver Ship Yards in 1971, the capital cost was $689,898. With a dead weight of 101 tons,

it carries 69 tons payload. It is 163 feet long with ramps and 134 feet without ramps. It is 44 feet wide with a cargo deck width of 24 feet.

REPLACEMENT CAPITAL COST

It has an expected life of 30 years, i.e. a new ferry would be required in 2001. The 1979 capital cost of the Merv Hardie would be $1,648,879 (Vancouver Ship Yards) . This equals an average annual increase of 11.5%.

Arthur MacLaren (President, Allied Ship Yards) gave two examples of ferry capital cost increases: one ferry purchased in 1960 at $3.5 million would cost $20 million in 1980 and another purchased in 1976 for $18 million would cost $28 million in 1981. Both these examples result in average annual increases of 9%.

Mr. Blanchard (Superintendent of Ferries, B.C. Government) concurs with a 10% average yearly cost increase.

The non-residential, construction price index, 8 year (1972-1979) average annual percentage increase (Stats. Can, Catalog #62-007) is 9.1%

W.G. Cleghorn, Chief, Northern Roads and Airstrips Div., D.I.A.N.D. , indicates that "The cost estimated by Public Works Canada to replace the Merv Hardie ferry in 1980 dollars, is in the order of $2,5 to $3 million." (Correspondence, Oct. 10, 1979).

As the Merv Hardie is a relatively small ferry, it may be possible that capital cost increases would be greater than 9%, i.e. closer to the 11.5% given by Vancouver Ship Yards, because of economics of scale, i.e. price increases may be greater for smaller ships than for larger ones. (Larger ships afford greater economies of scale in construction than smaller ones.)

In conclusion, to remain conservative, it is assumed that price increases from 1979 to 2001 occur at an average annual rate of 10%. Applied to the 1979 capital cost of $1,648,879 (Vancouver Ship Yards) this yields a capital cost of $13,422,328 in 2001.

For the purposes of cost-benefit evaluation, the future cost of the ferry in 2001 must be expressed in real dollar, 1979 terms. Therefore, Table 4, Note 2, includes the purchase in 2001 of a newMerv Hardie valued at $1,648,879 in 1979 real dollars.

Also the unused portion of the ferry must be considered to be a residual cost in 2019. Therefore, Table 4, Note 3, includes the amount of the unused portion (12 years out of 30 years) expressed as a residual cost, i.e. expressed negatively.

MERV HARDIE CAPACITY

The Merv Hardie can carry about 12 average cars or 2 large trucks. An examination of Table 1, number of vehicles per ferry trip, indicates a ratio range of only 1.2/1 to 2/1.

As the population of Yellowknife (and therefore trips made by Yellowknifers) increases at about 3% per year (see "Population Considerations") and road tourists increase at 5% per year (see "Tourism Benefits"), the ratio of vehicles per ferry trip would increase. The current method of operating the ferry on demand would evolve to one of scheduled operation.

Even in 2019 (see "Revenues and Costs of a Toll", Table 2), summer traffic would be about 70,000 vehicles (summer = about 2/3 x total yearly traffic), and the Merv Hardie capacity would be sufficient.

TABLE 1

PERIODS OF MERV HARDIE FERRY OPERATION

MACKENZIE RIVER CROSSING HWY R #3 - FORT PROVIDENCE, NWT.

YEAR	FERRY FIRST TRIP	FERRY LAST TRIP	NUMBER OF DAYS	FERRY TRIPS	NUMBER OF VEHICLES	VEHICLES PER FERRY TRIP
1962	May 31	Nov. 17	171	5078	6022	1.19
1963"	May 17	NOV. 18	186	7127	7334	1.03
1964	May 28	Nov. 17	174	7215	7890	1.09
1965	May 20	Nov. 7	172	8018	8730	1.09
1966	May 25	Nov. 9	169	8094	9286	1.15
1967	May 29	Nov. 9	165	8363	10499	1.26
1968	May 28	Nov. 19	176	9590	12326	1.29
1969	May 25	Nov. 15	175	10581	15537	1.47
1970	May 21	Nov. 17	181	12084	19590	1.62
1971	May 11	Dec. 4	208	12172	19068	1.57
1972	May 29	Nov. 17	173	—	—	—
1973	May 14	Nov. 9	180	11962	20998	1.76
1974	May 18	Dec. 10	207	12601	20554	1.63
1975	May 14	Nov. 15	186	11134	19313	1.73
1976	May 9	Dec. 9	215	10005	20307	2.03
1977	May 8	Nov. 14	191	12459	24596	1.97
1978	May 19	Nov. 3	169	12247	21746	1.78
1979	May 16	← NC T KNOWN →				
AVE RAGE	May 20 (20.1)	NOV. 18 (17.6)	182	increases, therefore an average is not applicable.		

BENEFITS (ELIMINATION OF COSTS) -
OPERATING AND MAINTENANCE COSTS

Up to and including 1977, the ferry was operated by the N.W.T. Government. Ferry services were contracted out during 1978 and 1979. Historical costs are outlined below. Data gaps result from unavailability of data from the G.N.W.T.

TABLE 2

Year	cost	Cost Includes:	Source
1969	$116,000		1971 DIAND Report
1970	$102,'300		G.N.W.T.
1976	$400,000	budgeted operating costs – fuel, maintenance, salaries	MPS Canalog Logistics Report
1977	$832,000	operating expenditures, including cost of refitting, maintenance on major breakdowns, 4 crews, 24 hour service commences	G.N.W.T.
1978	$350,010	all costs	G.N.W.T.
1979	$363,195	all projected costs	G.N.W.T.

It is important to note the sharp cost increases from pre 1973 to post 1973. This is partly a result of an increase in trips and especially due to a sharp rise in the price of oil (according to the OPEC quadrupling of world oil prices in 1973 from $3 to $12 per barrel).

The great cost increases are also due to a discontinuation of a “limited service” and the commencing of a 24 hour service in 1977. In 1977, a possibly excessive amount of labour (4 crews) was employed.

day to day maintenance, crew salaries, maintenance of landings to the high water mark, PLPD and total loss insurance, and summer utilities for the crew quarters three houses. The present contractor was understandably unable to state the confidential components of his contract. Yearly costs incurred by G.N.W.T. include:

Major refilling ($50,000) prior to placement into water, every 4 years, yearly cost = $50,000/4	=	$ 12,500
Minor refit ($15,000), other 3 years, yearly cost = 15000 - (15000/4)	=	$ 11,250
Major painting ($10,000), every other year, yearly cost = 10,000/2	=	$ 5,000
Minor painting touch up ($3,000), every other year, yearly cost = $3,000/2	=	$ 1,500
Consumable parts and supplies, yearly cost	=	$ 10,000
Camp maintenance, 3 houses and warehouse, utilities and furniture (facilities would be sold if bridge existed), yearly cost	=	$ 30,000
* Personnel administrative budget chargable to ferry, yearly cost (1980)	=	$ 60,000
G.N.W.T. Total Cost		$130,250

* Marine Operations, G.N.W.T., now administers 4 ferries on the Mackenzie River. They will expand to 6 ferries in 1980. Ferry operations are constantly expanding with the expansion of the Mackenzie Highway system. Therefore, if the Merv Hardie is eliminated, the need for future staff increases would be decreased. About 39% of Marine Operations' administration budget of $130,000 is chargable to the Merv Hardie, i.e. benefit = 0.39 x $130,000 = $50,700. In 1980, this would be about $60,000.

There is a strong indication that there may be more hidden administrative costs involved at both the federal and territorial levels. However, as the amount of these costs is unknown, a dollar amount will not be included.

Also, in the 1979 season, there have been numerous mechanical breakdowns which may indicate that the amount being spent on maintenance could be insufficient.

All future ferry costs (G. N.W. T. and contract) could escalate greatly, if energy, maintenance and labour costs rise rapidly and hidden costs become known, possibly approaching the 1977 total cost of $832,000. In conclusion, these future costs should be examined with respect to the overall cost-benefit analysis presented in this study.

If there were a bridge, the ferry would no longer be required at Providence. However, the ferry could relocate to a new crossing. As the Mackenzie Highway system expands, ferry requirements will also expand. Thus , there is a high probability that the Merv Hardie could move immediately to a new location if a bridge existed.

The corresponding value of this residual benefit would be the 1980 capital cost of a new ferry minus 1971-1979 depreciation. One could use straight line depreciation of 10 years subtracted from an expected lifetime of 30 years to yield a benefit of 2/3 x capital cost. However, to remain conservative, a benefit of only 1/2 x 1979 capital cost or $824,440 will be used. (Table 4, Note #l).

cosTs (ELIMINATION Of BENEFITS)

The loss of employment of the ferry workers is a cost to the employees if those employees cannot find other work. However, they will most likely find other employment , for example, with the expansion of G.N.W.T. ferries services, other Canadian ferrv set-vices, bridge construction and maintenance and other sources. Therefore this loss of employment is not considered to be a cost. However, this loss is considered to be a benefit to the overall elimination of the Merv Hardie.

The only net cost (see Table 4, #6) would be the fuel savings (benefit elimination) resulting from the ferrv transporting vehicles across the Mackenzie River and the added distance of the proposed crossing. Fuel savings

(1980) lost would be about:

39934[1] vehicles (#4) x 1 mile [1 mile of approaches & crossing]

x $\frac{1 \text{ gallon}}{20 \text{ vehicle-miles}}$ x $\frac{\$1.60 \text{ (\#5)}}{\text{gallon}}$

'$ 2' " 8"

Note: A conservative average gas mileage of 20 miles per gallon is employed. Mileages are improving with increased fuel efficiency.

FERRY COST CALCULATIONS

The net benefit of ferry cost elimination is calculated in Tables 3 and 4. The time horizon (Tables 3and 4, #1) is from 1980 (year 1) to 2019 (year 40).

Energy costs (Table 3, #2 & 5) are very difficult to predict, even in the short term. Many unknowns exist such as: Canadian government policy concerning the relationship between the domestic and world prices of oil, OPEC actions, world-wide discoveries of new reserves, new technologies, and alternate sources.

In the N.W.T., it is widely felt that energy costs such as diesel and gasoline (as well as heating oil and electricity) will double during the period 1979 to 1981. "Overall, a 33 to 50% increase in utility costs is anticipated both this year and next." [2]

The federal government employs a scenario of 2% real price growth for world oil prices (i.e. in addition to the average rate of inflation). Both these assumptions are employed to calculate #2 and #5.

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[1] See "Revenues and Costs of a Toll", Table 2, 1980 Total Yearly Traffic.

[2] Government Reinsulation Program Results in Energy Savings, News of the North, August 22, 1979; and conversation with Joe Vermeulen, Chief, Supply Services, G.N.W.T.

The Ferry Energy Cost (#3) is oPen to speculation. The contractor was understandably unwilling to reveal fuel consumption. It may be speculated that between 1/4 to 1/2 of his contract cost of $232,945 could be spent on fuel and lubricants. Only 3 1/2 person-years of employment are involved (2 captains, 2 engineers, 3 deckhands = 7 x 1/2 year); this component probably being the largest component besides fuel.

Mr. Gadsby, Vancouver Ship Yards, quotes a figure of 30.4 gal./hr. while running and about 75% or 22.8 gal./hr. while idling.

CALCULATIONS:

$$\frac{12{,}000 \text{ trips}}{\text{year}} \Big/ \frac{1 \text{ yr.}}{182 \text{ days operating}} = \frac{66 \text{ trips}}{\text{day}} \times \frac{1 \text{ hr.}}{6 \text{ trips}}$$

$$\text{Running} = \frac{11 \text{ hr.}}{\text{day}} \times \frac{182 \text{ days}}{\text{yr.}} \times \frac{30.4 \text{ gal.}}{\text{hr.}} = 60{,}800 \frac{\text{gal.}}{\text{yr.}}$$

$$\text{Idling} = \frac{7 \text{ hr.}}{\text{day}} \times \frac{182 \text{ days}}{\text{yr.}} \times \frac{22.8 \text{ gal.}}{\text{hr.}} = 29{,}000 \frac{\text{gal.}}{\text{yr.}}$$

$$\text{Total} = 89{,}800 \frac{\text{gal.}}{\text{yr.}}$$

$$= 493 \frac{\text{gal.}}{\text{day}}$$

(Vancouver Ship Yards)

Captain Marsh guesstimates an annual fuel consumption of 45,000 gal.
Cal Marshall concurs with a figure of 250 gal./day (x 182 days) or 45,500 gal./yr. These 2 guesstimates were made with respect to practical knowledge of the Merv Hardie's actual operations and will be used instead of the theoretical figure provided by Vancouver Ship Yards.

The ferry currently makes a maximum of 12,500 trips per year. As the traffic volume increases, the ratio of vehicles per ferry trip will increase and the number of trips will not change greatly. In any case, the quantity of diesel consumed is not solely proportionate to the number of trips as the ferry must remain idling at all times. Therefore, fuel consumed is assumed to remain constant at 45,000 gal./yr.

Yearly Traffic Volumes (#4) are obtained from "Revenues and Costs of a Toll", Table 2, #10 projected. Gasoline Cost, #6, is $(\#4 \times \#5 \times \frac{1 \text{ gal.}}{20 \text{ mi.}}$,

Net Energy Component, Tables 3 & 4, #7, is (#3 - #6).

Other costs (Table 4, #8) are Table 2, 1979 costs of $363,195 minus 1979 Energy costs, #3, of $37,800 = $325,395. Other costs are assumed to remain constant over time, i.e. they do not experience real growth.

Total Net Ferry Costs, #9 are (#7 + #8).

The Total Present Values of Total Net Ferry Costs (#10) at social discount rates of 5%, 10% and 15% are $8,268,000, $4,867,000 and $3,432,000, respectively.

FERRY COST CALCULATIONS - TABLE 3

Year	Unit Diesel Energy cost $ /gal. (doubles from 1979 to 1981, at 2% hereafter;	Ferry Energy cost @ 45,000 gal. /yr. (#2 x 45, 000)	Yearly Traffic Volumes, vehicles rom "Toll Table 2, #lo Projected	Unit Gasoline Energy cost (same increase s diesel)	Gasoline cost (Loss of 'as Saved) (#4 x #5 x 0.05)	Net Energy Component (#3 - #6)
#1	#2	#3	#4	#5	#6	#7
1979	$0.84	$ 38,000	38,252	$1.15	$ 2,000	$ 36,000
980 (yr. 1	1.20	54,000	39,934	1.60	3,000	51,000
1981	1.60	72,000	41,617	2.30	5,000	67,000
1982	1.63	73,000	43,300	2.35	5,000	68,000
1985	1.73	78,000	48,348	2.49	6,000	72,000
1990	1,91	86,000	56,762	2.75	8,000	78,000
1995	2.11	95,000	65,176	3.03	10,000	85,000
2000	2.33	105,000	73,590	3.35	12,000	93,000
2001	2.38	107,000	75,273	3.42	13,000	94,000
2005	2.57	116,000	82,004	3.70	15,000	100,000
2010	2.84	128,000	90,418	4.08	18,000	109,200
2015	3.14	141,000	98,833	4.51	"22,000	119,900
!019 (yr.40	$3.40	$153,000	105,564	$4.88	$26,000	$127,000

FERRY COST CALCULATIONS - TABLE 4

Year	Net Energy Component (#3 - #6)	Other costs	Total Net Ferry costs (#7 + #8)	Present Value of Total Net Ferry Costs at Social Discount Rates of:		
#1	#7	#8	#9	#lo		
				5%	10%	15%
1979	$ 36,000	$ 325,000	$ 361,000	--	--	--
.980 (yr.1	51,000	1,150,000[1]	1,201,000	$1,143,000	$1,091,000	$1,044,000
1981	67,000	325,000	393,000	356,000	324,000	297,000
1982	68,000	325,000	394,000	340,000	296,000	259,000
1985	72,000	325,000	397,000	296,000	224,00	172,000
1990	78,000	325,000	404,000	236,000	141,000	87,000
1995	85,000	325,000	410,000	188,000	89,000	44,000
2000	93,000	325,900	418,000	150,000	56,000	22,000
2001	94,000	1,974,000[2]	2,069,000	707,000	254,000	96,000
2005	100,000	325,000	426,000	120,000	36,000	11,000
2010	109,000	325,000	435,000	96,000	23,000	6,000
2015	119,000	325,000	444,000	77,000	14,000	3,000
2019(yr.40	+127,000	-334,000[3]	-207,000	-29,000	-5,000	-1,000
Totals of Yr. 1 to Yr. 40				$8,268,000	$4,867,000	$3,432,000

1 Includes benefit of movement of ferry *to* new location, benefit = 1/2 x $1,648,879 = $824,440.

2 Includes benefit of purchase of new ferry in 2001 at 1979 real cost of $1,648,879.

3 Includes cost of unused portion of ferry (12/30 x $1,648,879 = $659,552) in 2019.

ICE BRIDGE COST ELIMINATION

During winter, the Mackenzie River at Fort Providence is spanned by an ice bridge. It is constructed and maintained by G.N.W.T.

If an ice bridge were no longer required, the labour and equipment could be utilized in other G.N.W.T. activities. Therefore, a net benefit (cost elimination) would be involved.

Historical cost figures have fluctuated widely depending on the length of season and the seasonal transition from summer to winter. For the period of March 31, 1978 to March 31, 1979, incurred costs were $20,460 for labour and $14,550 for equipment, a total of $35,010. March 31, 1980 to March 31, 1981, year 1 (1980) in the following table, projected costs are $24,900 for labour and $19,800 for equipment, a total of $44,700.

This represents an average yearly increase of 13% ($35,010 to $44,700 in 2 years) . G.N.W.T. employs a 7 1/2% per annum increase for labour and 10% for equipment for ice bridge cost projections.

For the purposes of the following table, year 1 costs are the projected costs of $44,700. It is conservatively assumed that these costs remain constant, i.e. experience no real growth.

The total present value of year 1 to year 40 benefits at social discount rates of 5, 10 and 15%, would be $645,000, $437,000 and $297,000 respectively.

TABLE 1 - BENEFIT OF ELIMINATION OF ICE BRIDGE COST

Year	Total Cost of Ice Bridge	1979 (Yr. 0) Present Values at Social Discount Rates of		
		5%	10%	15%
1980 (Yr. 1)	$44,700	$ 43,000	$ 41,000	$ 39,000
1985	44,700	33,000	25,000	19,000
1990	44,700	26,000	16,000	10,000
1995	44,700	20,000	10,000	5,000
2000	44,700	16,000	6,000	2,000
2005	44,700	13,000	4,000	1,000
2010	44,700	10,000	2,900	1,000
2015	44,700	8,000	1,000	0
2019 (Yr.40)	$44,700	$ 6,000	$ 1,000	$ 0
Year 1 to Year 40 Totals		$645,000	$437,000	$297,000

REVENUES AND COSTS OF ATOLL

DISCUSSION

Consideration should be given to operating a toll on the permanent crossing. This could result from the theory of the user-pay approach and result in a closer public association with the assistance of financing the project. A toll could result in substantial net revenues.

However, although the collection of a toll represents a benefit to the toll collector (who could be the financier of the crossing project), this collection also represents an equal cost to the payers of the toll. Therefore, it is simply a transfer payment where costs = benefits and therefore does not appear in the final analysis of costs versus benefits.

Both the Yellowknife public and tourists were in favour of a toll, although tourists were less emphatic and less generous. The Yellowknife public was

strongly in favour of a toll (90.4% ± 3.4%), and were willing to pay an average of $3.87 per crossing, with the most mentioned toll being $5.00 (16.7% ± 4.3%). (See Appendix - Public Questionnaire, Results and Discussion, Questions 14 and 15.)

Tourists questionned (again NOT a scientific sample - see Appendix-Tourism Questionnaire, Research Methodology) were in favour (79.6% - Question 4) and were willing to pay an average of $1.79 (Question 5).

Trucking companies were divided in their opinions on a toll (see Freight Questionnaire - Section XI, FQ 48 and FQ 49). However, the benefits of a permanent crossing to them far outweigh this added toll cost (see also Freight Discussion).

There should also be a much reduced toll for frequent users such as commuters.

COSTS

The toll booth could be maintained 24 hours a day, 365 days a year. Employees could work alone and could reside in Fort Providence, thereby replacing the ferry as a source of employment.

A toll booth would be required, necessitating an initial capital investment of about $20,000. The booth would need heating and lighting also.

Cost Calculations

Toll booth construction = $20,000
to be amortized over 10 years, thus first year = $ 2,000

Salaries = $\frac{24 \text{ hours}}{\text{day}} \times \frac{7 \text{ day}}{\text{week}} = \frac{168 \text{ hours/week}}{35 \text{ hours/week}}$
employee

= (4.8) 5 employees x $15,000/year = $75,000

Toll Booth Utilities:	Heating	= 1000/year	
	Electricity	= 500/year	
	Total	= 1500/year	$ 1,500
Total Yearly Cost			**$78,500**

REVENUES

See the following tables, Total Yearly Traffic Calculations (Table 1), and Future Toll Revenues (Table 2).

† Traffic volumes and ferry operating days are obtained from the G.N.W.T. Merv Hardie ferry logs (Table 1, #1 and #2). Where information gaps are present, they are indicated by a – ,

‡ Summer tourist traffic counts are obtained from the G.N.W.T. 60th parallel border station and from TravelArctic. It is conservatively assumed that all tourists crossing the border station also cross the Mackenzie at Fort Providence (i. e. if #4 is actually lower i.e. less tourists cross the Mackenzie at Providence than cross the 60th parallel, #5 would be lower, #6 would be lower, #7 would be higher, #9 would be higher and #10, Total Yearly Traffic, would be higher).

* Where tourist vehicle stats are unavailable, the number of tourist vehicles is assumed to be one half of the total summer traffic count (i.e. #5 = #2 x 1/2).

No traffic counts are maintained for winter traffic. To derive a best estimate for winter traffic, it is assumed that winter traffic = summer traffic tourists. It is also assumed that the small number of winter tourists (which should be added to the left side of this equation) would be about equal to the slight decrease in local winter traffic (which should be subtracted from the left side of the equation).

Total yearly traffic figures are then calculated (#10). A least squares linear regression is then employed to project 1962 - 1978 figures to 1980 - 2019 (Table 2). The correlation coefficient (r^2) is 0.943 which indicates the validity of employing this projection method. (The closer r^2 is to 1, the better; an r^2 of 1.0 indicates perfect correlation.) The slope of the "traffic versus time" line is 1683, indicating an average yearly traffic increase of 1683 vehicles.

Toll revenues at $5.00 per vehicle (Table 2) (tourists and commuters could be charged less and commercial vehicles more), Net Toll Revenues, and Present Value of Net Toll Revenues are then calculated.

It is assumed that Toll Revenues remain at $5.00 per vehicle (i.e. experience no real growth) as well as Toll Costs at $78,500 per annum (i.e. experience no real growth). Energy cost of $1500/year will increase in real $ terms at 2%/year, but this is a minimal change.

A second comparative estimate of yearly traffic volumes (Table 3) can be derived from the Yellowknife Public Questionnaire, Question 13. Question 13 provides us with #1 and #2 (Table 3). Population size equals 6,345 (20 years and older).

Population Round Trips, #5, totals = 16,575. This represents the number of round trips that the population would make if a permanent crossing existed. However, this number must be divided by a factor somewhere between one and two as some of this population would travel with a husband/wife, etc. Only those 20 years and over were surveyed, therefore "other passengers" do not appear in these calculations.

Also, the number of tourist and commercial vehicles must be added to the "Population Round Trips". This may result in a figure of about 20,000 round trips, i.e. it may approximate the 1980 figure of 39,934 one way toll paying customers.

In conclusion, the Public Questionnaire, Question 13, could not provide a final accurate count of total yearly traffic. However, it did indicate that Table 1 calculations were in the right ballpark,

SUMMARY

It is recommended that a toll be considered for the bridge. It would provide large revenues for the financier in the form of a transfer payment. It would also help satisfy the user pay philosophy and provide N.W.T. residents with a sense of sharing in the financing of the project.

Typical year I (1980) revenues at yearly traffic of 39,934 vehicles and various tolls are tabled.

Toll Amount	Toll Revenues	Net Toll Revenues (- Costs = $78,500)
$1.97	**$ 78,500**	**o** = Break Even Situation
$3.00	**$119,802**	$ 41,302
$4.00	**$159,736**	$ 81,236
$5.00	**$199,670**	$121,170

Total present value of net toll revenues at $5.00 per vehicle at social discount rates of 5%, 10% and 15% are $4,010,603, $1,933,016 and $1,169,041 respectively, rather substantial net revenues.

TABLE 1 - TOTAL YEARLY TRAFFIC CALCULATIONS

Year	Total Ferry Trips	† Private Vehicles	† Commercial Vehicles	† Buses	† Miscellaneous	† Total Vehicles = Total Summer Traffic Count = #2	* Tourist Vehicles (two way) = #5	Non Tourist Vehicles #2 - #5	Total Ferry Operating Days = #1	† Summer Traffic per Day = #3 = #2/#1	Total Summer Tourist Traffic (one way) = #4	* Total Summer Tourist Traffic (two way) = #4x2 = #5	Summer Tourist Traffic / Day #6 = #5/#1	Winter Traffic / Day #7 = #3 - #6	Winter Days = 365 - #1 = #8	Total Winter Traffic Count #9 = #7 x #8	Total Yearly Traffic = #10 = #2 + #9
1961	--	1,998	1,681	96	--	3,775	1,888 *	1,887	--	--	--	--	--	--	--	--	--
1962	5,378	3,694	2,978	147	103	6,022	3,011 *	3,011	171	35	1,506 *	3,011	18	17	194	3,298	9,320
1963	7,127	5,012	1,588	155	579	7,334	3,667 *	3,667	186	39	1,834 *	3,667	20	19	179	3,401	10,735
1964	7,215	5,351	1,820	151	568	7,890	3,945 *	3,945	174	45	1,973 *	3,945	23	22	191	4,202	12,092
1965	8,018	5,876	2,003	142	709	8,730	4,365 *	4,365	172	51	2,183 *	4,365	25	26	193	5,018	13,748
1966	8,094	6,183	2,298	132	673	9,286	4,643 *	4,643	169	55	2,322 *	4,643	27	28	196	5,488	14,774
1967	8,363	7,279	2,172	159	889	10,499	5,250 *	5,249	165	64	2,625 *	5,250	32	32	200	6,400	16,899
1968	9,590	7,793	3,853	137	543	12,326	6,163 *	6,163	176	70	3,082 *	6,163	35	35	189	6,615	18,941
1969	10,581	9,349	5,186	--	1002	15,537	7,769 *	7,768	175	89	3,885 *	7,769	44	45	190	8,550	24,087
1970	12,084	13,275	5,775	203	1037	19,590	8,678	10,912	181	108	4,339 ‡	8,678	48	60	184	11,040	30,630
1971	12,172	12,958	5,011	192	907	19,068	9,534 *	9,534	208	92	4,767 *	9,534	46	46	157	7,222	26,290
1972	--	--	--	--	--	--	--	--	173	--	--	--	--	--	--	--	--
1973	11,962	14,167	5,445	196	1190	20,998	10,499 *	10,499	180	117	5,250 *	10,499 *	58	59	185	10,915	31,913
1974	12,601	13,043	6,372	205	934	20,554	8,786	11,768	207	99	4,393 ‡	8,786	42	57	158	9,006	29,560
1975	11,134	10,779	7,117	200	1217	19,313	8,500	10,813	186	104	4,250 ‡	8,500	46	58	179	10,382	29,695
1976	10,005	11,496	7,592	218	1001	20,307	10,400	9,907	215	94	5,200 ‡	10,400	48	46	150	6,900	27,207
1977	12,459	14,668	9,561	243	124	24,596	9,592	15,004	191	129	4,796 ‡	9,592	50	79	174	13,746	38,342
1978	12,247	15,908	5,442	201	195	21,746	11,546	10,200	169	129	5,773 ‡	11,546	68	61	196	11,956	33,702

TABLE 2 - FUTURE TOLL REVENUES

Year	Total Yearly Traffic *	Toll Revenues at $5 Per Vehicle	Net Toll Revenues (-costs of $78,500)	Present Value of Future Net Toll Revenues, Discounted at Social Discount Rates of:		
				5%	10%	15%
(Yr.1 1980	39,900	$200,000	$121,000	$115,000	$110,000	**$105,000**
1985	48,300	$242,000	$163,000	**$122,000**	$ **92,000**	**$ 71,000**
1990	56,800	$284,000	$205,000	**$120,000**	**$ 72,000**	**$ 44,000**
1995	65,200	$326,000	$247,000	**$113,000**	**$ 54,000**	**$ 26,000**
2000	73,600	$368,000	$289,000	**$104,000**	**$ 39,000**	**$ 15,000**
2005	82,000	$410,000	$332,000	**$ 93,000**	**$ 28,000**	**$ 9,000**
2010	90,400	$452,000	$374,000	**$ 82,000**	**$ 19,000**	**$ 5,000**
2015	98,800	$494,000	$416,000	**$ 72,000**	**$ 13,000**	**$ 3,000**
2019	105,600	$528,000	$449,000	**$ 64,000**	**$ 10,000**	**$ 2,000**
40 Years: Totals				**$4,011,000**	**$1,933,000**	**$1,169,000**

*Table 1, #10 Projected.

TABLE 3

Number of Round Trips = #1	Number of Respondents = #2	Percent of Respondents #3 = $\frac{\#2}{281}$	Number of Population #4 = (6345 x #3)	Population Round Trips #5 = #1 x #4
0	42	14.946	948.4	0
1	74	26.335	1670.9	1671
2	73	25.979	1648.3	3297
3	21	7.473	474.2	1423
4	25	8.897	564.5	2258
5	13	4.626	293.5	1468
6	12	4.271	271.0	1626
7	5	1.179	112.9	790
8	1	0.356	22.6	181
9	4	1.424	90.3	813
10	8	2.847	180.6	1806
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	1	0.356	22.6	339
16	0	0	0	0
17	0	0	0	0
18	0	0	0	0
19	0	0	0	0
20	2	0.712	45.2	904
Totals	281	100.001%	6345.0	16576

TOURISM BENEFITS

RESEARCH METHODOLOGY

Individuals related with the tourism industry (see Appendix: Related Individuals-Tourism Industry) were interviewed. They were asked to comment on a bridge's possible effect on tourism and to forecast a related percentage change; to forecast a future rate of growth of Mackenzie highway tourist traffic; to remark on the present number of Mackenzie Road tourists and to help develop the Tourism Questionnaire. The following discussion and conclusions is a consensus of these interviews.

A questionnaire for tourists (see Appendix: Tourism Questionnaire) was left at the Chamber of Commerce tourist cabin. As explained in the appendix, sampling methodology was NOT purely scientific, although the results should give an indication of tourists' feelings.

Tourism publications (see Appendix - Tourism Reports) were consulted.

DISCUSSION

A bridge would provide physical year round access for road tourists wishing to travel north of Fort Providence. It would also result in a permanent slight reduction of the cost of living and an increase in the availability of goods and services in Yellowknife.

Thus more tourists will be encouraged to visit Yellowknife and even remain longer as their tourist dollar could go further and once they were in Y.K., they may spend more as a result of increased availability of goods and services.

The present ferry is actually a tourist attraction being one of the few last remaining ferries in existence. A bridge may also be a slight attraction.

Breakup and freezeup occur at times when few visitors are contemplating visiting the N.W.T. The majority of the public plans vacations according to weather, the

school year and attractions. At breakup and freezeup, temperatures hover around 0° C., children are in school and lakes and rivers are beginning to thaw or freeze.

However, some people (especially childless ones) do wish to travel at breakup and freezeup (see Appendix - Tourist Questionnaire, Question 8) for various reasons such as beating the tourist rush. Tourists presently unable to cross at breakup and freezeup are thus negatively affected in terms of present and possible future trips as well as being a negative source of publicity at their local environments.

There is plenty of room for expansion of the N.W.T. tourist trade. Gas shortages in the U.S. and elsewhere could encourage more Americans and other foreigners to visit Canada. Many potential visitors will be looking for a unique, northern, wilderness experience which will be harder to satisfy elsewhere. Knowledge of the N.W.T. is starting to grow. For example, "Thompson (Keith Thompson of Travelarctic) said this year's 8000 inquiries from the United States doubled over last year's mail." [1] This growth in tourism could be 100% five years from now. A bridge's affect on tourism would then be much greater.

However possible rising gas prices could mean that tourists take vacations closer to home or fly instead. Better gas mileages and alternate technology vehicles may counteract this.

TOURISM STATISTICS

Nobody really knows how many tourists travel the Mackenzie Highway to Yellowknife. The following table #1 indicates the total number of road visitors crossing the 60th parallel.

It is guesstimated that at least one half of those road visitors cross the Mackenzie River at Fort providence. That would yield 1977 and 1978 (tourists crossing the Mackenzie at Providence) values of 6715 and 8082 respectively.

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1 'Sort of' Good Year for N.W.T. Tourism, Northern News Report, Oct. 11, 1979, p. 9.

Keith Thompson (Head, Travelarctic, G.N.W.T.) "... estimated that tourists to the Mackenzie area and Yellowknife areas were up to 28,000 people compared to 25,000 last year. One third of these drove the Mackenzie Highway. [1] (i.e. 1978 = 8,333; 1979 = 9,333, a 12% increase from 1978). Mr. Thompson (personal conversation) estimates that 1979 road tourists to Yellowknife would amount to 11,300. This figure will be employed in the following calculations.

The latest figure for the average expenditure of road tourists is the 1975 value of $95.00. This is projected to 1980 using the Consumer Price Index **(1979 = $131, 1980 = $141).** This assumes that tourists continue to spend equal amounts on vacations, a conservative assumption considering that more time and money is being devoted to leisure and vacations.

TABLE 1 - N.W.T. ROAD VISITORS

Year	Total # Road Visitors	Average $ Expenditure	Information Source
1970	12,150	$ **63.00**	Report on Tourism, N.W.T., 1970, TravelArctic
1973	12,800		Travel Industry in N.W.T., 1974
1974	12,300	$ 85.00	Travel Industry in N.W.T., 1974
1975	11,900	$ 95.00	Travel Industry in N.W.T., 1975
1976	14,560	$102.00	Border Station Stats.
1977	13,429	$110.00	Border Station Stats.
1978	16,164	$120.00	Border Station Stats.

The following table of tourism benefits incorporates these assumptions: Mackenzie highway road traffic will grow steadily at a modest 5% per annum commencing with the latest 1979 estimate of 11,000. The average tourist expenditure will remain at a 1980 value of $141.00. In every year, the bridge's

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1 'Sort of' Good Year for N.W.T. Tourism, Northern News Report, Oct. 11, **1979,** p. **9.**

effect will be a conservative, 3% positive change. This is the consensus of opinion of the tourism related individuals. Responses to the question “How much would Mackenzie Highway tourist traffic to Yellowknife change if a permanent crossing existed?”, ranged from “very little,” "small," and values from 2% to 10%.

The gross dollar value of tourism benefits represents the gross benefit of tourist expenditures. However, this gross benefit also includes a cost as outlined in the business benefits section, pages 70 and 71. This cost is y% which is conservatively assumed to be 50%. Therefore the net benefit is 50% of the gross benefit.

The net benefit to tourism would be $931,000, $413,000 and $238,000 at social discount rates of 5%, 10% and 15% respectively.

TABLE 2 - TOURISM BENEFITS

Year	Mackenzie Highway (Fort Providence Crossing) Road Tourists + 5%/Annum	Gross $ Value at Average Expenditure of $141.00	Net $ Value (50% of Gross Value)	Bridge's Effect at +3% Change	Present Values (1979 = Year 0) at Social Discount Rates of:		
					5%	10%	15%
1979	11,000	$ 1,551,000	$ 776,000	$ 23,000	--	--	--
1980 (Yr.1)	11,550	1,629,000	814,000	24,000	$ 23,000	$ 22,000	$ 21,000
1985	14,741	2,078,000	1,039,000	31,000	23,000	18,000	13,000
1990	18,814	2,653,000	1,326,300	40,000	23,000	14,000	9,000
1995	24,012	3,386,300	1,693,000	51,000	23,000	11,000	5,000
2000	30,646	4,321,000	2,161,009	65,000	23,000	9,000	3,000
2005	39,112	5,515,000	2,757,?.00	83,000	23,000	7,000	2,000
2010	49,918	7,038,000	3,519,000	106,000	23,000	6,000	1,000
2015	63,710	8,983,000	4,492,000	135,000	23,000	4,000	1,000
2019 (Yr. 40)	77,440	$10,919,000	$5,460,000	$164,000	$ 23,000	$ 4,000	$ 1,000
Totals of 40 Years (Yr. 1 to Yr. 40)					$931,000	$413,090	$238,000

IMPROVEMENT OF N.W. T. BALANCE OF TRADE: IMPORTS AND EXPORTS

It is appropriate to study the N.W. T. 's trade balance especially in comparison with our other territory, the Yukon. Therefore, historical statistics are provided in Table 1. The most current stats available are the 1974 figures.

The Non-Resident Sector accounts classify imports as "receipts from the sale of goods and services to business, to government and to persons". Imports include a number of items such as freight and shipping, business service payments, travel expenditures, etc.

Exports are identified as "purchase of goods and services from businesses". With respect to the Territories, exports are composed of tourist expenditures, mineral exports, fur exports, oil and gas sales, exports of handicraft products and other non-resident purchases (i.e. purchases by transient workers).

The interest and miscellaneous investment income item of both the income and outlay accounts is also included in the total value of imports and exports.

Further information on these items and the sources and procedures used to calculate the estimates may be obtained by referring to pages 14 to 21 and pages 24 to 26 of "Economic Accounts, The Non-Resident Sector, N.W.T., Yukon, 1967-1974". [1]

[1] Correspondence with Mary Pavich, July 26, 1979.

TABLE 1 - TOTAL IMPORTS AND TOTAL EXPORTS: N.W.T. AN

Year	N.W.T.		
	Total Imports	Total Exports	Deficit[3]
1967	93,112,000	33,749,000	**58,205,00**
1968	98,847,000	39,792,000	**57,993,00**
1969	165,382,000	57,845,000	**105,622,90**
1970	204,766,000	62,158,000	**139,836,00**
1971	225,199,000	72,525,000	**149,355,00**
1972	349,924,000	88,315,000	**257,522,00**
1973	403,370,000	97,798,000	**301,290,00**
1974	443,751,000	138,280,900	**300,978,00**

[2] Economic Accounts, The Non-Resident Sector, N.W.T. and Total Exports.

[3] Ibid, Figures 3 and 4, Surplus or Deficit on Curre

It is interesting to note that the Yukon has a much smaller negative balance of payments compared to the N.W.T. (1974 Yukon deficit of about $10 million versus N.W.T. deficit of $301 million). Granted the Yukon is much smaller than the N.W.T. (N.W.T. = 1,304,903 Sq. mi.; Yukon = 207,073 sq. mi.; N.W.T. area = 6.3 times that of Yukon); the Yukon has about 1/2 the population of the N.W.T. (21,600 vs 43,200, Stats. Can., April 1, 1979), and has less communities (about 25 for the Yukon compared to about 60 for the N.W.T.). However the yukon also possesses more transportation infrastructure (such as roads and bridges) than the N.W.T.

It would therefore be reasonable to assume that a bridge could only help decrease the N.W.T.'s negative balance of payments, in conjunction with the business effects, according to the following process: decreasing added business costs thereby encouraging more business competition and increasing the availability of goods and services; an initial, one time, permanent decrease in the cost of living thus encouraging a greater percentage of personal disposable income to be spent in the N.W.T.; thus decreasing the N.W.T.'s negative balance of payments and increasing the Gross Territorial Product.

However, although the N.W.T.'s negative balance of payments will be improved according to the preceding process, the amount of this improvement will not be included in the final analysis of costs versus benefits as the amount is impossible to quantify.

STIMULATION OF N.W.T. GROSS DOMESTIC PRODUCT

A permanent Mackenzie crossing would increase the N.W.T. Gross Domestic Product (G.D.P. N.W.T.) in three ways.

Initially, the construction project itself would require a small number of N.W.T. employees and materials, thereby increasing the G.D.I'. N.W.T. slightly.

Also, according to the business effects (see Business Benefits) and balance of trade improvement (see Improvement of Balance of Trade), the G.D.P. N.W.T. would also be permanently increased.

Thirdly, a bridge would improve the economic viability of nonrenewable resource development such as oil, gas, and mineral (see Energy and Mining Development Scenarios). This would further increase the G.D.P. N.W.T.

TABLE 1 - COMPARISON OF GROSS DOMESTIC PRODUCT [1]
- NORTHNEST TERRITORIES AND CANADA

Year	Gross Domestic Product					per Capita Gross Domestic Product				
	N.W.T. (times $1,000)	Yearly % Age Increase	Canada (times 1,000,000	Yearly % Age ncrease	N.W.T./ Canada G.D.P. Ratio	N.W.T. $	Yearly % Age Increase	Canada $	Yearly % Age Increase	Per Capita G. D.P. Rat io
1967	**115,051**		67,678		0.0017	**3,967**	-	**3,321**		1.19
1968	**141,629**	23.1%	73,837	9.1%	0.0019	**4,721**	**19. o%**	3,567	**7.4%**	1.32
1969	**139,321**	-1.7%	81,057	9.8%	0.'-)017	**4,494**	**-4 .8X**	3,860	**8.2%**	1.16
1970	**175,036**	25.6%	87,071	7.4%	0.0020	**5,304**	**18.0%**	4,088	**5.9%**	1.30
1971	**173,454**	-0.9%	95,699	9.9%	0.0018	**4,956**	**-6.6%**	4,437	**8.5%**	1.12
1972	**208,631**	20.3%	106,220	11.0%	0.0020	**5,795**	**16.9%**	4,868	**9.7%**	1.19
1973	**251,964**	20.8%	124,406	17.1%	0.0020	**6,631**	**14.4%**	5,631	**15. 7%**	1.18
1974	**310,945**	23.4%	146,951	18. 1%	0.0021	**8,183**	**23.4%**	6,547	**16. 3%**	1.25

[1] Economic Accounts, N.W.T., 1967-1974, Table 6.

Examination of Table 1 produces the following observations (the latest available data is for 1974.). The G.D.P. N.W.T. has been increasing at a higher rate than the Canadian G.D.P. It would be safe to assume that future N.W.T. development will result in a further increase in the rate of growth of G.D.P. N.W.T.

The N.W.T./Canada G.D.P. ratio, although fluctuating, has increased from 0.0017 in 1967 to 0.0021 in 1974, i.e. the relative economic importance of the N.W.T. is increasing and would increase immensely with future development. Thus formerly uneconomical infrastructure requirements such as a bridge must now be more closely examined.

The Per Capita G.D.P. Ratio has averaged 1.21, i.e. the N.W.T. has consistently maintained a higher per capita G.D.P. than Canada.

FACILITATION OF N.W.T. MOVEMENT TOWARDS PROVINCIAL STATUS

The Northwest and Yukon Territories are both on the road to provincial status. The Yukon is closer to achieving that goal.

Some people have suggested that one of the important reasons (among other factors) why the Yukon is further down the road towards provincehood is that their negative balance of payments (as discussed in the preceding section "Improvement of N.W.T. Balance of Trade") is much smaller than the N.W.T.'s negative balance of payments. It makes sense that the federal government is more willing to examine the Yukon's desire for political self-sufficiency (than the N.W.T. 's) based on the premise that the Yukon is much closer to economic self-sufficiency.

A bridge at Providence would improve the N.W.T. 's negative balance of payments and stimulate the N.W.T. 's gross domestic product according to the reasons presented in these two preceding sections. It therefore follows that a bridge would facilitate the N.W.T.'s movement towards provincial status.

SOCIO-ECONOMIC BENEFITS

INTRODUCTION

There would be several significant social benefits resulting from a bridge at Fort Providence. (Related social costs are discussed in the "Costs" section).

Although these social benefits are unquantifiable, their total importance is such that they would equate to a significant economic benefit.

INCREASED AVAILABILITY OF GOODS AND SERVICES

As discussed in the "Business Benefits" section, increased competition and physical year round access by road would result in an increased availability of goods and services, both in the range and consistency of the goods and services offered. This represents a social benefit to all consumers. A small number of consumers perceive this as a benefit according to the public opinion poll (see Appendix). Responding to question 9, positive effects, 4.6% of respondents (and therefore Yellowknifers, + or - a sampling error of 2.4%) mentioned "increased availability of goods and services" as a benefit. More consumers would probably perceive this as a benefit if they were questioned more directly on this subject.

DECREASE IN COST OF LIVING

A lowering of business costs and increased competition would produce a slight decrease in the cost of living. The economic effects are discussed in the "Business Benefits" section. However as these effects are in the socio-economic category, they also represent significant social benefits due to a general improvement in the standard of living, especially to lower income groups who spend a higher proportion of their income on basic items.

CONVENIENCE OF YEAR ROUND ROAD ACCESS

Physical year round road access would afford Y.K. area residents the convenience of year round road travel.

These residents desire to take holidays and business trips at various times throughout the year. For a family, driving (versus flying) represents the most economical transportation alternative, according to the following calculations (one way travel).

Cost of Driving - Typical Vehicle, One to Four Passengers

Rough Assumptions:

distance from Y.K. to Edmonton	= 1000 miles
average vehicle mileage	= 20 miles/gallon
cost of gasoline	= $1.20/gallon
total lifetime vehicle cost (capital and maintenance)	= $10,000
total lifetime mileage	= 50,000 miles

cOst of gas = $1000 \text{ miles} \times \frac{1 \text{ gallon}}{20 \text{ miles}} \times \frac{\$1.20}{\text{gallon}}$ **= $60.00**

vehicle wear and tear cost = $\frac{\$10,000}{50,000 \text{ miles}}$

$= \frac{\$0.20}{\text{miles}} \times 1000 \text{ miles} = \$200.00$

Total cost = $60.00 + $200 = $260,00

This assumes a zero cost for driving time involved.

Plane fares are $108.00 adult, $89.65 for an accompanying wife, and $72.05 for children under 12. For a family of four (2 children under 12), this represents a one way cost of **$342.**; therefore driving results in a one way saving of $82. or two way saving of $164.

Bus fare is $60. This represents a $48. single adult saving compared to flying or a $212. saving compared to driving,

Therefore, it appears that there is an economic advantage for a family desiring to drive versus flying or for single passengers taking the bus versus flying or driving themselves.

This is minorly substantiated by the public opinion poll (see Appendix). In question 9, positive effects, 3.9% of respondents mentioned the benefit "alternative to flying at breakup and freezeup." Again, more people might perceive this as a benefit, if questionned more directly.

The convenience of year round road access is further perceived to be important to the general public in light of the following responses. To question 9, positive effects, 29.9% of respondents mentioned "personal convenience of in and out, year round access" as a benefit. To question 10, best positive effect, 4.6% of Yellowknifers thought "personal convenience of in and out, year round access" was the best benefit. This is further substantiated by question 11, personal effects where 34.9% of Y.K.ers thought that a good personal effect would be "personal convenience of in and out, year round access."

The timing of breakup and freezeup does not usually represent peak holiday seasons. Average breakup occurs from April 21† to May 20* , usually a post Easter period. Average freezeup occurs from November 18* to December 9**, a pre-Christmas period. (See also Ferry-Periods of Ferry and Ice Bridge Operations). However, the wide range (average range of 30 days for the 4 average dates given) and uncertainty of events requires that some individuals, wishing to travel by vehicle at these times, be restricted to the choice of air travel or road travel at an alternate time.

Similar to the effect on business activity, this restriction creates "peaks and valleys" in the travel patterns. A bridge would therefore help smooth out vacation patterns as well as providing a more economical alternative.

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† Earliest breakup = April 12; latest breakup = May 5.
* First ferry trip: earliest = May 8; latest = May 31.
* Last ferry trip: earliest = November 3; latest = December 10.
** Ice bridge open: earliest = November 23; latest = December 26.

A bridge would also provide a guaranteed year round road access. The ferry presently experiences a number of unpredictable breakdowns each year. Combined with the slight possibility of fire, shipwreck or strike, unpredictable interruptions produce a major public inconvenience as well as having the devastating effect of halting freight shipments.

INCREASED PHYSICAL AND POLITICAL UNITY WITH CANADA

Many Y.K.ers are of the opinion that southerners, in particular government Officials in Ottawa, treat the north in a colonial fashion. A physical year round access, financed by the government (and therefore all citizens of Canada via taxes) would indicate that the government and the rest of Canada does care about Canada north of 60°, and are willing to express this concern with an expenditure of funds.

This would result in Y.K.ers feeling more unified politically with the south and signify an important change in attitudes towards the north by southerners, especially government officials.

In times of declining Canadian unity, perhaps there is presently too much emphasis placed on unifying eastern and western regions, with little regard to unifying the north (representing 1/3 of Canada's area) with the south. Perhaps it is timely to distribute unifying efforts more uniformly throughout Canada.

INCREASED HARMONY BETWEEN CONSUMERS AND BUSINESS PEOPLE.

Relations between consumers and business people in Y.K. have not always been in total harmony. The high cost of living, and particularly the twice annual jump in prices, have contributed to a general mistrust among consumers of the local business people.

A bridge would produce a slight decrease in the cost of living and facilitate a more consistent pricing policy. Hopefully, consumers would then develop more favorable attitudes towards business people, and increased harmony between them would evolve.

ISOLATION AND MENTAL HEALTH EFFECTS

A bridge may result in a minor beneficial effect on the isolation experienced by some Yellowknifers.

Sheila Keet, Executive Director, Canadian Mental Health Association, makes the following related comments in correspondence, Aug. 30, 1979:

> "Statistically there is absolutely no indication of an increase in either mental health problems or the incidence of suicide during these times. In fact HELPline statistics indicate that the peak period for distress calls are early winter and summer after the winter road or ferry service are in place. . . . . Isolation seems to be related more closely to geographic distance and social isolation than to any interruption in road services."

Y.K.ers did make the following comments during the public opinion poll. In response to question 9, possible effects, 8.9% of the population mentioned "elimination of isolation feeling at breakup and freezeup." Responding to question 10, best positive effect, 1.4% mentioned "elimination of isolation feeling at breakup and freezeup." In response to question 11, personal effects, 7.5% of respondents cited "elimination of isolation" feeling at break-up and freezeup."

Although only a small proportion of Y.K.ers may be considering road travel during breakup and freezeup, the institution of this option for them may result in a slight beneficial psychological effect with respect to the isolation they experience and possibly even a slight improvement in their mental health.

IMPROVEMENT OF TURNOVER

Any manager will agree that human resources are an organization's most valuable asset. Turnover represents a significant cost to any organization.

Y.K. area employers have always experienced higher turnover rates relative to the south. This turnover depends on many variables such as: weather, management style of the organization, a simple desire to relocate or change jobs, and local quality of life. It is impossible to isolate one factor such as quality of life and quantify its effect upon turnover.

However, as a bridge would have the previously discussed beneficial social and economic effects, and therefore produce an increase in" the quality of life of Yellowknifers, there should be a beneficial spillover effect upon turnover, i.e. it is reasonably safe to conclude that turnover would decrease with a bridge.

OTHER BENEFITS - TIME SAVINGS AND MILITARY ASPECT

TIME SAVINGS

A bridge would result in significant time savings for vehicles crossing the Mackenzie, according to the following calculations:

Calculations :

1) Bridge Crossing Time

Given: The total crossing (approaches and span) is less than one mile.

Vehicles travel an average of 30 miles/hour.

$$\therefore \text{Avg. Bridge Crossing Time} = 1 \text{ mile} \times \frac{1 \text{ hr.}}{30 \text{ miles}} \times \frac{60 \text{ minutes}}{1 \text{ hr.}} = 2 \text{ minutes.}$$

2) Ferry Crossing Time

The ferry requires about 10 minutes to cross the river. If vehicles arrive in a random manner, their average waiting time will be equal to the crossing time (i.e. some vehicles will arrive as the ferry is on a departure trip, some when it is on the other side, some when the ferry is returning, and some when the ferry is docked on their side) . Average loading and unloading time is about 5 minutes on each side.

∴ Avg. Ferry Crossing Time = Waiting Time + Loading Time + Crossing Time
= 10 min. + 5 min. + 10 min. = 25 min.

Therefore avg. time savings = Ferry - Bridge Crossing Time
= 25 min. - 2 min.
= 23 min./vehicle.

Average Yearly Time Savings

Given: 1978 total summer traffic count = 21,746 vehicles (ferry log), 2 adult passengers/vehicle.

$$\text{Total Time Savings} = 21{,}746 \text{ vehicles} \times \frac{2 \text{ passengers}}{\text{Vehicle}} \times \frac{23 \text{ min.}}{\text{passenger}} \times \frac{1 \text{ hr.}}{60 \text{ min.}}$$

= 16,672 hours.

This does not include vehicles which miss the last ferry of the day or vehicles stranded due to ferry breakdown. Vehicle traffic will grow if Yellowknife and tourist traffic also grow.

It is very difficult to put a dollar value on the cost of this time savings. Assuming most of the vehicles are non commercial, then time savings would be spent on other leisure oriented, non productive (in terms of employment) activities. Merely as an example, if one used a value of $5/hour, then an equivalent dollar value would be about $83,000. This figure is presented simply to indicate an order of magnitude and will not be used in the final cost-benefit analysis.

MILITARY ASPECT

The bridge's possible effect on military capabilities is detailed in the following letter.

National Defence / Défense nationale

3060-0 (DCPC)

2 August 1979

Mr. Robert Given
Yellowknife Chamber of Commerce
Box 906
Yellowknife, NWT

Dear Mr. Given:

I am writing in reply to your letter of July 23, 1979, in which you have asked whether the lack of a permanent crossing over the Mackenzie River at Fort Providence in any way affects the Department of National Defence.

While the possibility of situations arising in which the existence of a permanent crossing at Fort Providence could be beneficial to this department cannot be dismissed entirely, the Canadian Forces readiness to respond to likely threats and tasks in that area, or northern Canada generally, is not dependent on the existence of such a crossing. Should a permanent crossing be constructed, its existence would, of course, be a factor in determining the most expeditious and efficient method of dealing with any defence task which could arise in the area.

I trust that this brief response to your query adequately addresses your concern. Should you have additional questions, I or my staff will be pleased to discuss them with you. Major Dick Paukstaitis of my staff, at (613) 992-3265, is especially interested in this subject.

Yours truly,

K.C. Simonson

K.C. Simonson
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