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MACKENZIE HIGHWAY EXTENSION

JULY 1992

NORTHWEST TERRITORIES
TRANSPORTATION

IMPLEMENTATION PLAN
FOR THE
MACKENZIE HIGHWAY EXTENSION

DEPARTMENT OF TRANSPORTATION
GOVERNMENT OF THE NORTHWEST TERRITORIES

JULY, 1992

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EXECUTIVE SUMMARY

On June 16, 1992, the Government Leader announced "the government will be completing the Wrigley extension as the first leg of the Mackenzie Valley Highway. The focus of this pilot project will be local involvement and innovative training projects to get people off social assistance and into the workforce."

The Department plans to complete the highway to Wrigley by 1994/95. This document presents an implementation plan for the extension of the Mackenzie Highway between Wrigley and Inuvik, starting in 1995/96.

THE PROJECT - The proposed highway between Wrigley and Inuvik is 804 km long. The route of the proposed highway is shown in Figure 1. It is recommended that construction be spread over 20 years with an average of 40 km of road built each year. Construction costs will be in the order of $25 million annually for a total cost of $500 million, in 1992 dollars. This project will be the biggest project ever undertaken by the Government of the Northwest Territories.

As sections of the highway are completed, additional operations and maintenance work will be created each year until completion of the highway, when $8 million dollars will be spent annually on these activities.

COMMUNITIES - This project will directly affect 5 communities: Wrigley, Fort Norman, Norman Wells, Fort Franklin and Fort Good Hope. Five additional communities in the region can be expected to benefit from the work: Fort Liard, Fort Simpson, Inuvik, Arctic Red River and Fort McPherson.

The 1989 labour survey indicates that, in aggregate, these communities had 1,000 unemployed people who were interested in working. Over the next 15 years an additional 2200 people will potentially enter the work force.

BENEFITS - Maximizing local and regional employment, economic benefits and social benefits is a primary objective of this project. Spreading expenditures over 20 years is considered optimum. Accelerating the completion would require increased use of southern resources and would reduce local and regional participation. Taking any longer would defer the benefits of the completed highway too far into the future.

The NWT Bureau of Statistics has used the NWT economic model to predict that, at an annual expenditure level of $25 million, this project will generate 174 direct and 75 indirect person years of employment in the NWT each year. Preliminary analysis of construction schedules confirms the direct full-time jobs figure and suggests that 300 to 400 seasonal construction jobs would be created.

The project organization will take a very active role in managing the marketplace. Existing training, employment and business development programs will have to be well integrated with construction planning and contracting. A substantial administrative effort will be required to coordinate all parties and programs.

This proposal also recommends that the project organization offer its seasonal employees a form of co-op education, which allows time each year for:

- working or receiving on-the-job training;
- formal training leading to certification; and
- traditional activities.

If all applicable programs are fully utilized, the federal government could effectively fund 85% of the payments made to co-op participants.

FINANCING - A large portion of the funding will have to be found from sources outside the Department of Transportation. Therefore, the Department is proposing a number of strategies for obtaining financing as the first phase of a detailed implementation plan. The most likely scenarios involve the GNWT providing some funds, from a combination of sources, and the federal government providing matching or over-matching funds. See Figure 2 for details.

A reasonable target for federal funding is $19 million annually, representing 75% of the capital cost of the project. However, federal funds are not assured and considerable effort will be required to persuade the federal government to provide new funds.

DETAILED IMPLEMENTATION PLAN - In addition to maximizing economic benefits and obtaining financing, the Department will develop a detailed implementation plan for:

- designing a consultation process which provides the people of the Mackenzie Valley with real influence in the decision making process;
- completing engineering and design work;
- guiding the project through the environmental review and regulatory processes; and
- designing an effective organization and process.

PROPOSED ACTIONS - Over the next nine months, the efforts will be concentrated on investigating and securing financing, and conducting initial work on community consultation, maximizing local economic benefits, environmental assessment and engineering.

If sufficient financing can be found, Cabinet will be asked in June 1993, to approve the preparation of the detailed implementation plan over the fiscal years 1993/94 and 1994/95.

The project office will be moved to one or more communities in the Mackenzie Valley in April, 1994.

Training of local residents will be conducted in the summer of 1994 to provide continued momentum, following completion of the highway between Fort Simpson and Wrigley, and to pilot the project's operations. Construction on the highway will start in the summer of 1995.

See Figure 3 for a summary of proposed activities and costs.

CONCLUSIONS

Building a road from Wrigley to Inuvik is feasible and is a powerful means for furthering the economic and social aspirations of the people of the Mackenzie Valley.

If the federal government can be persuaded to provide the majority (75%) of the required funding, a significant amount of new funds can be brought into the Northwest Territories as a result of this project.

A concentrated effort is needed to investigate and secure federal funds. Resource requirements for carrying out these activities are 1 PY and $105,000 over the next nine months.

Initial planning and research will take place concurrently with the financing activities. Resources requirements for initial planning and research activities are 2 PY's and $150,000 over the next nine months.

A detailed implementation plan will be developed, once financing has been secured and Cabinet has given final approval to proceed.

RECOMMENDED DECISIONS

It is recommended that Cabinet:

1. Direct the Minister of Transportation to pursue the financing strategies outlined in this proposal;

2. Approve the implementation plan in principle;

3. Provide the $255,000 and 3 PY's required to pursue the funding strategies and conduct initial planning and research activities; and

4. Direct the Minister of Transportation to return to Cabinet in June of 1993 with a report on the prospects for financing the project.

Mackenzie Highway Extension

Figure 1

Mackenzie Highway Extension Project
Potential Financing Arrangements
for Raising an Annual Target of $25 million
($ 000)

	Scenario One (75% federal funding)		Scenario Two (50% federal funding)		Scenario Three (25% federal funding)	
	Percent	Dollars	Percent	Dollars	Percent	Dollars
Government of the Northwest Territories						
Department of Transportation	15	3,750	30	7,500	30	7,500
Reallocation of Social Assistance	2	500	2	500	2	500
Reallocation from other GNWT programs	3	750	13	3,250	38	9,500
	20	5,000	45	11,250	70	17,500
Training and employment Programs	5	1,250	5	1,250	5	1,250
Federal Government						
Matching funds	75	18,750	50	12,500	25	6,250
Total	100	25,000	100	25,000	100	25,000

Figure 2

Mackenzie Highway Extension Project
Summary of Activities

Stage	Time-Frame	Activities	Resources Required PY's	Resources Required O&M ($)
1	Sep/92-Mar/95	Complete construction of Wrigley Extension Including the Camsell Bend ferry, at a capital cost of $5.4 Million.		Approved
		Operation and maintenance of Wrigley Extension and ferry at a cost of $2.5 million annually.		Approved
		O&M training program in ferry and highway operations.		
2	Sep/92-Jun/93	Investigate and secure financing for the Mackenzie Highway Extension project from Wrigley to Inuvik.	1	105,000
		Perform initial work on consultation, engineering, maximizing economic benefits, and environmental assessment.	2	150,000
	Jun/93	Decision by the GNWT to proceed with the project. The scale and scope of the project to be determined by the funding obtained.		
3	Jun/93-Apr/95	Prepare a detailed implementation plan, including financing arrangements, consultation with communities, the planning of construction, maximizing of economic benefits, environmental assessment, and regulatory approvals.	9	1,660,000 (annually)
4	May/95 onward	Begin construction of highway from Wrigley to Inuvik. Staff required for consultation, training, environmental assessment and general administration.	9	1,660,000 (annually)
5	May/96 onward	Ongoing operations and maintenance activities. Each year an average of 40 kilometres will be added to the length of the road which must be maintained.		400,000 (annual increment)

Figure 3

1.0 INTRODUCTION

1.1 Purpose of the Proposal

The extension of the Mackenzie Highway from Wrigley to Inuvik was one of the initiatives announced by the Government Leader on June 17, 1992.

The purpose of this proposal is to:

- allow Cabinet to consider the implications of the Mackenzie Highway Extension project;
- request approval in principle for the implementation plan; and
- request the authorization and funds required to proceed with financing strategies and initial research.

1.2 Description of the Project

The Mackenzie Highway Extension project, as envisioned in this proposal, refers to the 804 kilometres of road between Wrigley and a point on the Dempster Highway 40 kilometres south of Inuvik.

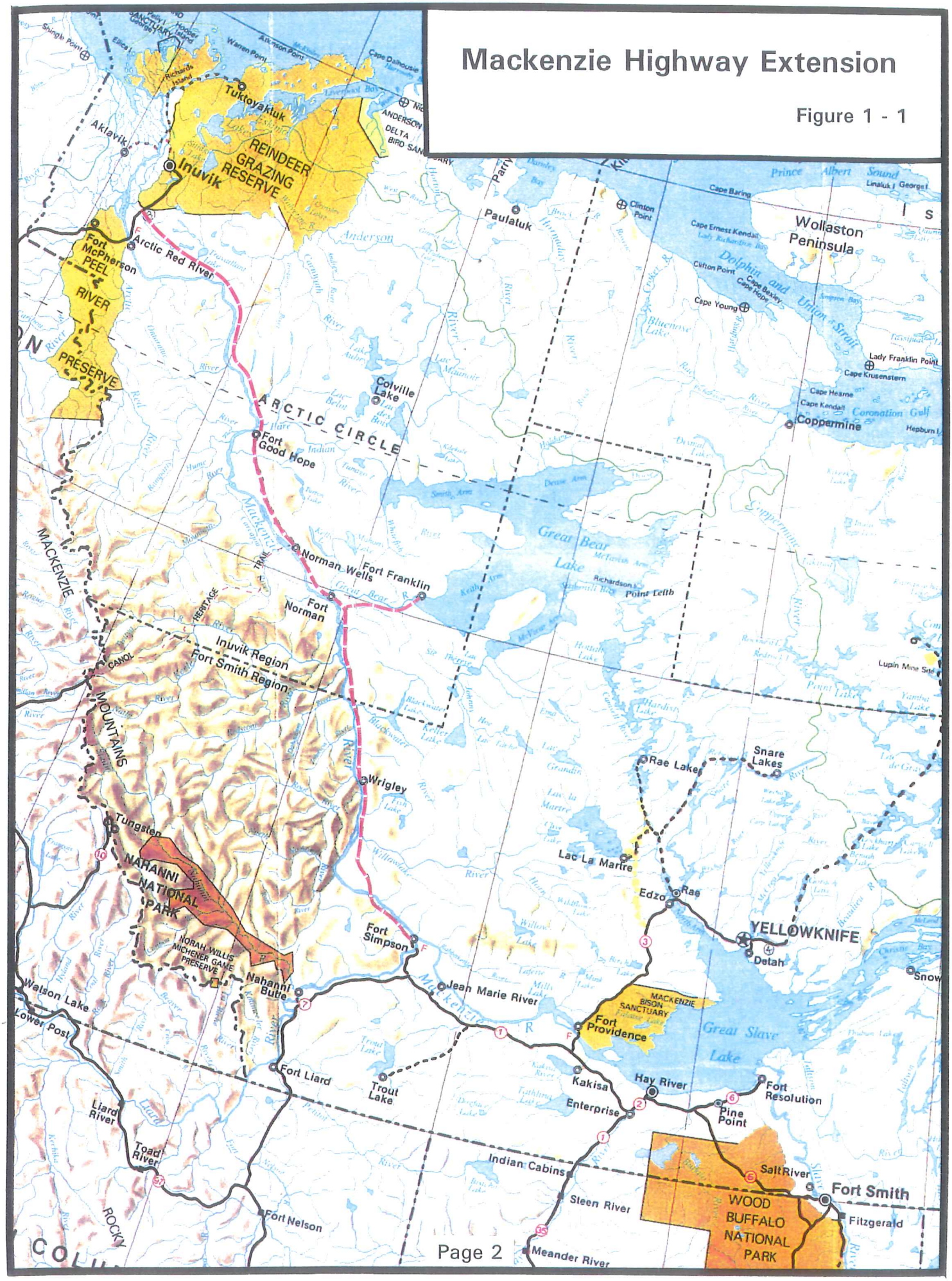
This project is designed to provide continued construction work once the section of highway between Fort Simpson and Wrigley has been opened in 1994.

This proposal does not include the road from Fort Franklin to the Mackenzie Highway, although this section could be added.

See Figures 1-1, 1-2 and 1-3 for maps of the proposed project.

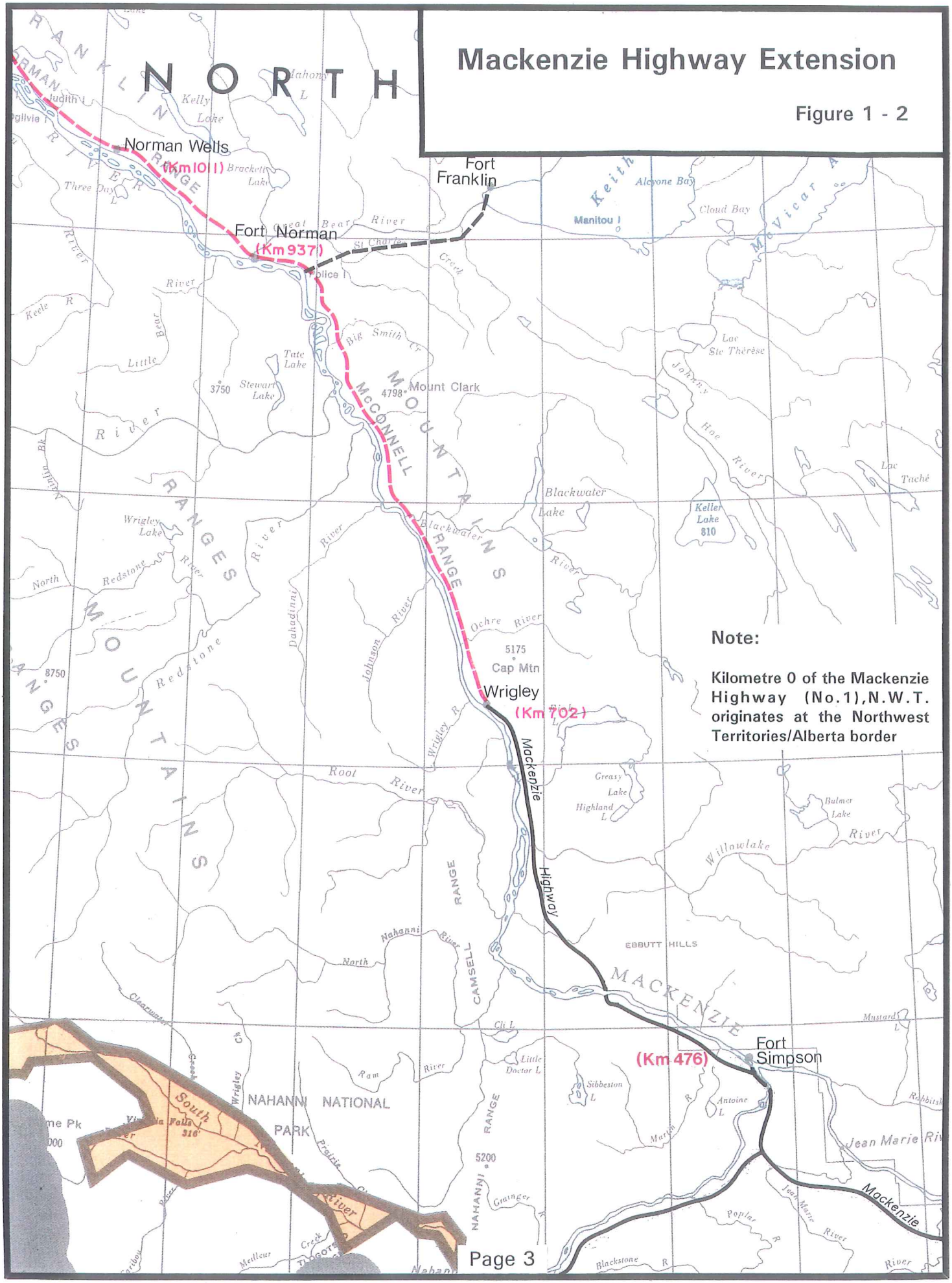
Mackenzie Highway Extension

Figure 1 - 1



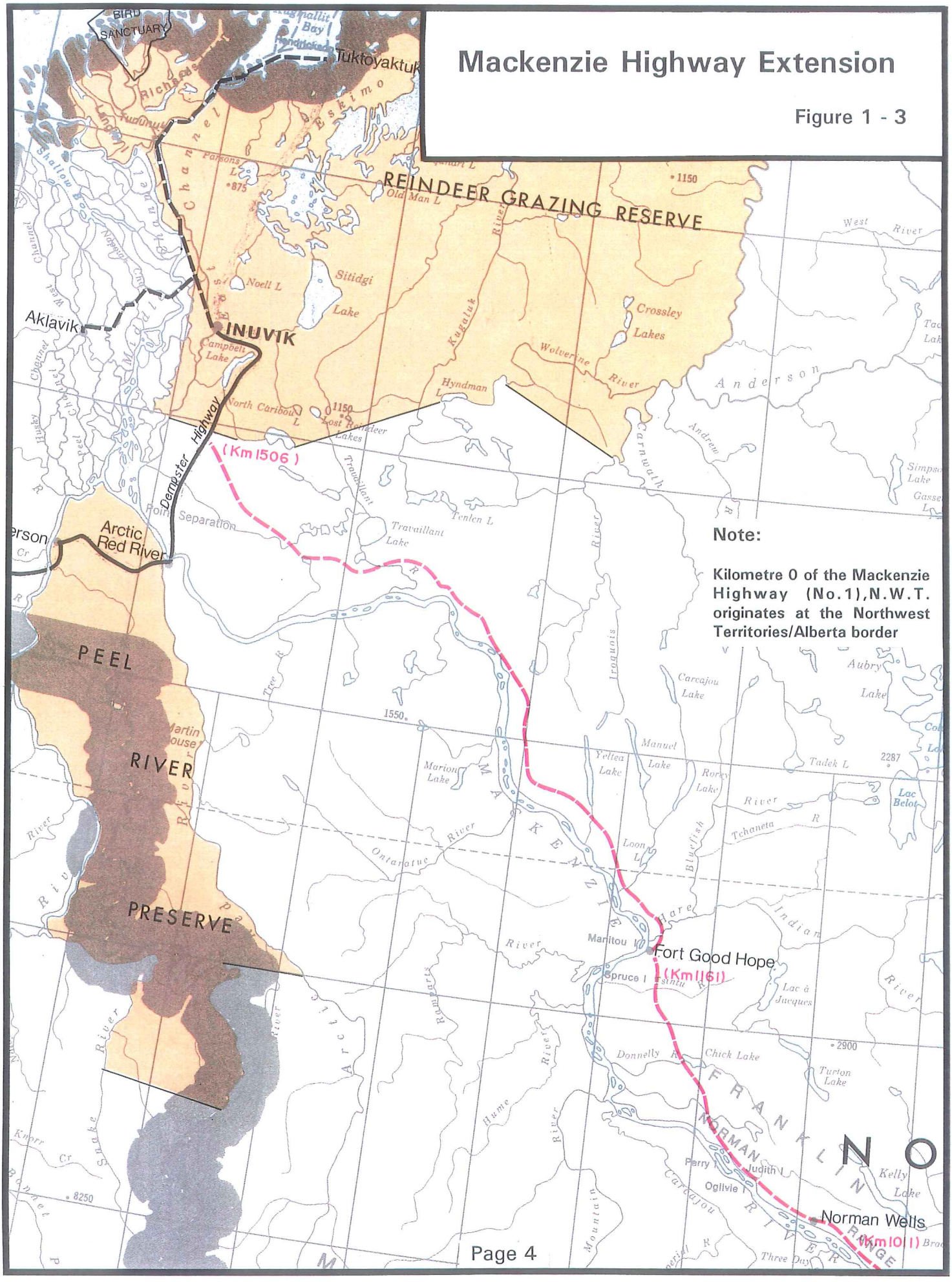
Mackenzie Highway Extension

Figure 1 - 2



Note:

Kilometre 0 of the Mackenzie Highway (No.1), N.W.T. originates at the Northwest Territories/Alberta border


Mackenzie Highway Extension
Figure 1 - 3
REINDEER GRAZING RESERVE
INUVIK
Aklavik
Tuktoyaktuk
Dempster Highway
(Km 1506)
Arctic Red River
PEEL
RIVER
PRESERVE
Fort Good Hope
(Km 1161)
Norman Wells
(Km 1011)
Note:
Kilometre 0 of the Mackenzie Highway (No.1), N.W.T. originates at the Northwest Territories/Alberta border

1.3 Scope of the Implementation Plan

The implementation plan focuses on the planning and preparation activities that will have to be undertaken prior to construction.

Preliminary analysis and work plans are provided to deal with the following groups of issues:

- obtaining financing;
- consulting the people of the Mackenzie Valley;
- planning for engineering, construction and logistics;
- maximizing the economic benefits to the local and regional communities;
- assessing environmental impact and complying with the regulatory and approval processes; and
- implementing an effective organization and process.

2.0 BACKGROUND AND APPROACH

2.1 History and Status

The federal government announced in 1972 that the Mackenzie Valley Highway would be extended from Fort Simpson to Inuvik. Extensive survey, environmental and design work was carried out over a six year period ending in 1976.

Actual construction of the highway was halted in the summer of 1977 at a point 18 kilometres south of Wrigley. The remaining 18 kilometres was completed in the early 1980's. Currently, the highway route is used as a winter road as far north as Fort Good Hope.

The highway will be upgraded to all-weather status between Fort Simpson and Wrigley with the addition of a bridge, a ferry crossing, and some gravel surfacing work. This work will be completed during the summers of 1993 and 1994 at a cost of $5 million, and funded from within the current capital program.

Following the termination of construction activities in 1977, design work for the remainder of the extension was consolidated into a volume of provisional contract packages. These packages contain detailed plans and specifications for 23 grading contracts which could be tendered with only minor updating.

Detailed design work for bridges, culverts and other structures is not as advanced and would have to be completed.

Design specifications used for the highway meet NWT standards for a Rural 90 kmph highway.

Extensive environmental studies were conducted prior to the termination of construction, however, substantial new environmental work will likely be required to ensure that assessment information is current.

2.2 Stages

In this proposal, work on the Mackenzie Extension project is broken down into five stages, as follows.

Stage	Description	Actions
1.	Completion of the road to Wrigley	Construction, training and maintenance
2.	Pursue financing and initial research	Carry out financing strategies and proceed with initial planning and research activities
	Decision to proceed with the project	Prepare Cabinet and FMB submissions
3.	Detailed implementation planning	Conduct the necessary consultation Determine how the highway will be built Implement strategies for maximizing local and regional economic benefits Conduct environmental assessments and obtain approvals Determine how best to organize and manage the project
4.	Construction	Construction, training, administration and monitoring
5.	Operations	On-going maintenance, etc

The detailed implementation plan will specify how the construction and operations activities will take place and how much they will cost.

2.3 Sections of the Highway

Construction of the highway will take place a section at a time. The specific order for construction will be determined by a combination of consultation, logistical and benefit payback considerations.

There will be a separate cycle of planning and preparation activities for each section of the highway.

2.4 Key assumptions

Financing

Funding of $25 million per year can be found. Funding for the project will be less in the early years of the project and will build to a plateau in the middle years.

The federal government will provide a significant portion of the funding required.

Training and employment programs can be used to fund some of the project's activities.

Consultation

There is public support to build the road.

The people of the Mackenzie Valley will have a meaningful role in the decision making process.

Planning of Engineering, Construction and Logistics

Approximately 40 kilometres of road will be built each year over a 20 year period.

Construction of the road will start in the summer of 1995, after the completion of the road to Wrigley in the summer of 1994.

Work on the road will proceed simultaneously at several locations.

Maximizing Economic Benefits

Spreading construction over 20 years will optimize the local absorption of economic benefits, create sustained economic activity, and result in viable local businesses.

Training, business development and contracting activities will be integrated in a highly planned economic process; which will, in certain cases, by-pass the marketplace and the normal contracting procedures.

Training, employment and business development programs will be actively managed on a client-by-client basis to ensure that the maximum benefits are extracted from these programs.

Environmental and Regulatory

The impact review process will take place in stages, with an overview initially and detailed reviews on each section of the highway as the sections are built.

A statement of environmental principles or guidelines will be adopted.

There will be some latitude for the highway organization to take a lead role designing an acceptable review process, which will help simplify and shorten the process.

Organization and Process

The 20 year time-frame for this project will require an organizational form which will provide a sustained and focused effort.

Additional resources for conducting this project will be added gradually as the project progresses.

3.0 ISSUES AND ACTIONS

3.1 Introduction

Each group of issues is analyzed in the following fashion. A listing of the important issues is given, the results of the preliminary analysis are presented, and the proposed methods, resources and work plans are set out.

3.2 FINANCING

3.2.1 Issues

The important issues related to financing are as follows:

- determining how the federal government can be persuaded to contribute to the project;
- determining the extent and methods of funding from within the GNWT;
- taking maximum advantage of training, employment and business development programs;
- determining the benefits, cost savings and additional revenues that may be available as a result of the project; and
- developing strategies for obtaining funds.

3.2.2 Preliminary Analysis

Obtaining new money from outside the Northwest Territories is critical to meeting the objective of maximizing economic benefits. While the reallocation of GNWT funding may have some net benefits and will be required, the largest economic benefits will come from new federal funding.

Federal Government

Indian and Northern Affairs Canada

The primary source of new funding is the federal government. Indian and Northern Affairs Canada (INAC) currently retains the responsibility for new roads in the Northwest Territories. The problem with this situation is that INAC has:

- no budget for new roads;
- no organizational unit responsible for new roads; and
- little or no interest in new roads.

A joint effort at the political and civil service levels will be required if any funding is to be obtained through INAC.

Transfer of "New Roads" Responsibility to the GNWT

The responsibility for new roads could be transferred from the federal government to the territorial government. The main concern with this option is that the federal government may adopt a negotiating position based on the existing expenditure levels, which are currently nil.

On the other hand, the adoption of such a position by Canada may be considered so unreasonable that meaningful negotiations on the level of funding can take place.

The Transportation Strategy identifies a need for $90 million per year for new road funding. The GNWT should determine in advance what minimum level of funding will be acceptable before the responsibility for new roads is assumed.

National Highway Policy

Adoption of the National Highway Policy by the federal government may also assist in freeing up funds for construction of the Mackenzie Highway North of Wrigley.

Under this Policy, a network of arterial highways connecting the various provincial and territorial capitals has been designated. It has been recommended that the major portion of the costs of upgrading this network to an acceptable standard, consistent with the traffic carried and its national status, should be assumed by the federal government.

The infrastructure needs on the designated system in the NWT, being the highway from the Alberta border to Yellowknife, amount to approximately $300 million. If the National Highway Policy is implemented and the federal government contributes approximately 80% of the funds required to upgrade the route to Yellowknife, some of the funds now allocated for this purpose by the GNWT could be reallocated to the Mackenzie Highway extension. The reallocated funds could be in the order of $5 to $10 million per year over the next ten years. However, there is no definite commitment from the federal government for these funds at this time.

Funding from the Existing GNWT Base

A number of potential funding sources exist within the GNWT, including:

- reallocation of funds from other projects within the current funding base within the Department of Transportation;
- reallocation of funds due to reduced social assistance payments as a result of increased employment and subsequent reliance on UIC versus social assistance;
- reallocation of funds from other GNWT programs; and
- increased tax rates on motive fuel.

Further research and analysis will be required to determine the feasibility, impact, and extent of the reallocations.

Each one cent a litre increase in the tax rates on motive fuels will result in approximately $630,000 in additional tax revenues.

Training, Employment and Business Development Programs

A wide variety of training, employment and business development assistance programs exist. Tapping the funding available from these programs will assist in defraying the costs of the Extension project.

This project would use primarily federally funded programs.

Funds are potentially available for both planning and construction work. The contribution of this funding option could range from $1 to $2 million each year, but further study is required to confirm this.

Other Options

Other potential sources of funding exist and, to varying extents, warrant additional consideration. These options include:

- interest free loans from the federal government;
- a capital endowment fund; and
- private sector funding, to the extent the new highway has a direct impact on major resource developments.

These options are possible, but less likely than other alternatives.

3.2.3 Methodology

Each of the options or groups of options listed above can be pursued as a separate strategy. This approach may provide useful information regarding the prospects for success with each of the potential contributors.

The best method may be a strategy which combines the various funding options and solicits federal funds on a matching or over-matching basis. Such a strategy is quite flexible and could be used to leverage whatever funds can be found from GNWT or northern sources.

An optimistic scenario comprised of 75% federal funding and 25% territorial funding would provide solid financing for the project. A 50% federal contribution would also provide substantial assistance and allow the project to go ahead. A pessimistic scenario involving only 25% federal funding would require a re-evaluation of the project.

Figure 3-1 illustrates the funding contributions anticipated under these three scenarios, using the combined strategy.

The funding strategies will be carried out as the first stage of the implementation plan. The Department will have an understanding of the funding prospects by May, 1993, even if detailed negotiations with the federal government continue for several years.

Mackenzie Highway Extension Project
Potential Financing Arrangements
for Raising an Annual Target of $25 million
($ 000)

	Scenario One (75% federal funding)		Scenario Two (50% federal funding)		Scenario Three (25% federal funding)	
	Percent	Dollars	Percent	Dollars	Percent	Dollars
Government of the Northwest Territories						
Department of Transportation	15	3,750	30	7,500	30	7,500
Reallocation of Social Assistance	2	500	2	500	2	500
Reallocation from other GNWT programs	3	750	13	3,250	38	9,500
	20	5,000	45	11,250	70	17,500
Training and employment Programs	5	1,250	5	1,250	5	1,250
Federal Government						
Matching funds	75	18,750	50	12,500	25	6,250
Total	100	25,000	100	25,000	100	25,000

Figure 3-1

Identifying and securing the funds for the project will require 50% of the time of a project coordinator and 50% of the time of an administrative assistant. Other O&M funds are required for travel and for support of the financing negotiations. Total costs to the end of May, 1993 are expected to be $255,000.

A work plan for financing activities is set out on the following pages.

A combined schedule for all planning and preparation activities is shown in Figure 5-1.

3.2.4 WORK PLAN - FINANCING

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 1	Research and Analysis	• Identify and review any relevant documentation for each funding source • Meet with appropriate program staff to identify specific funding opportunities • Identify the actions and strategy required to realize funds from each source • Develop detailed estimates for each strategy's potential contribution • Prepare briefing notes on each strategy	• Briefing notes on each funding strategy • Summary of potential contributions
Phase 2	Initial Contacts	• Meet with Steering Committee to determine which strategies to pursue • Confirm or revise the actions required for each strategy • Make initial contacts at the bureaucratic level and request funds • Review and summarize responses	• Revised Strategies • Summary of responses
Phase 3	Identify GNWT Funding	• Identify potential reallocations from within Transportation • Meet with departmental management to determine which reallocations to propose • Identify other specific sources of GNWT funding • Develop analysis supporting the transfer of funds from specific GNWT sources • Prepare Cabinet/FMB submission requesting funds	• List of Transportation reallocations • Cabinet/FMB submission • Contingent approval for GNWT funding

WORK PLAN - FINANCING

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 4	Identify Federal Funding	• Meet with Steering Committee to review initial response and tailor combined strategy • Prepare briefing for Cabinet regarding actions to be taken at the political level • Obtain Cabinet feedback • Develop negotiating strategies and supporting material	• Combined funding strategy • Cabinet briefing • Negotiating strategy
Phase 5	Negotiations	• Carry out negotiating strategy • Support negotiating process	• Funding agreements
Phase 6	Approval to Proceed	• Prepare summary of financial commitments obtained • Prepare analysis regarding the adequacy of the funding base obtained	• Summary and analysis of financial commitments

3.3 CONSULTATION

3.3.1 Issues

The important issues related to consultation are:

- involving the people of the communities at an early stage;
- making decisions based on the wishes of the communities and the information it provides;
- coordinating plans with the wide variety of organizations that will have an interest in the Mackenzie Extension project;
- staying in contact as the project progresses; and
- communicating developments in a clear and relevant manner.

3.3.2 Preliminary Analysis

The Communities

The people that will be affected the most by the new road live in the communities of Wrigley, Fort Norman, Norman Wells, Fort Good Hope and Fort Franklin. These people should be meaningful partners in the development of this project. The community councils should be contacted first and consulted on all aspects of the project.

The objective is to work closely with these people over the life of the project. They should be participants in all important decisions.

The people in the nearby communities of Fort Liard, Fort Simpson, Inuvik, Arctic Red River and Fort McPherson will also be affected by the project, although to a lesser extent. These people should be participants in the training and business development processes. They should also be provided the opportunity to comment on any issues of concern to them.

It is proposed that the community councils be the primary contact for public consultation and participation in the decision making process.

Other Stakeholders

A number of representative individuals or organizations exist, including;

- the local Member of Parliament;
- Members of the Legislative Assembly;
- band councils;
- land claim organizations;
- Pathways-to-Success boards;
- community based associations; and
- local entrepreneurs.

These parties will all be directly affected by the Mackenzie Extension project. It is proposed that these parties be consulted at an early stage to determine what role they would like in the consultation and decision making process.

A number of other organizations will be affected by the Mackenzie Extension project, including:

- federal government departments;
- territorial government departments;
- other governmental and regulatory agencies;
- Interprovincial Pipeline Co; and
- the NWT Construction Association.

The interest of these parties will relate to the coordination of plans and the satisfaction of regulatory requirements. It is proposed that these organizations be brought into the planning process at an early stage in order to coordinate government programs as much as possible and to minimize the overhead required to meet regulatory requirements.

Environmental and Regulatory Approval

By designing a comprehensive consultation process, many of the regulatory aspects related to the environmental review process can be satisfied. Working closely with the communities and other representative groups will help shorten and simplify the requirements of the regulatory process.

Consultation Process and Organizational Form

Initially, the consultation process should involve a tour by senior project personnel through all the affected communities. Discussions should be held to determine how the consultation process should work. As a result of these discussions, the consultation process and organizational form of the project could be further defined.

Timing

Initial consultation should take place once funding has been secured and Cabinet has made a decision to proceed.

3.3.3 Methodology

The tasks outlined in the Work Plan on the following pages are designed to produce a consultation process which the communities will be happy with and which can be used regularly for two-way communication on plans and current operations.

The intent is to provide project team members with the means for working with the people in the Mackenzie Valley.

Initial planning and preparation can proceed concurrently with financing activities. As soon as a decision has been made to proceed, the project should be announced and initial consultations should start.

Initial resource requirements can be met through the part time involvement of the coordinator and other project team members. Once actual consultations begin, a dedicated PY and Other O&M funds of $200,000 will be required annually.

A combined schedule for all planning and preparation activities is shown in Figure 5-1.

3.3.4 WORK PLAN - CONSULTATION

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 1	Planning and Preparation	• Identify who will be consulted • Identify members of consultation work team • Review methods of successful consultation processes used in the North • Determine methods to use for initial consultation • Develop consultation information and materials	• Initial consultation plan
Phase 2	Initial Consultation	• Announce project, communicate our intention to consult, and make the necessary arrangements • Hold 1st round of consultation meetings • Review and summarize feedback • Design consultation process and modify organizational design • Hold 2nd round of consultation meetings to communicate and confirm the process	• Summary of consultation comments • Proposed consultation process and organization
Phase 3	Prepare for On-going Consultation	• Estimate costs of the consultation process • Develop procedures and routines for collecting and disseminating information	• Consultation budget • Procedures for handling information
Phase 4	On-going Consultation	• Regular meetings to review up-coming developments and recent accomplishments	• decisions • presentations • answers to questions

3.4 PLANNING OF ENGINEERING, CONSTRUCTION AND LOGISTICS

3.4.1 Issues

The important issues related to engineering, construction and logistics are as follows:

- packaging and scheduling the required work in a fashion that will maximize the use of local labour and businesses;
- determining the number of workers and the skills required;
- determining which portions of the highway should be constructed first;
- ensuring that road and structure designs are cost effective and provide the best value possible;
- ensuring that road and structure designs meet environmental guidelines;
- determining the preconstruction and construction costs of the project; and
- determining the significant risks in undertaking this project.

3.4.2 Preliminary Analysis

Given the time available for preparing this proposal, the analysis work that has been done is preliminary. Based on the information currently available, the following assertions can be made with a reasonable degree of accuracy.

It is feasible to construct the highway over a period of 20 years. Project packages and schedules can be designed to maximize the use of local labour and businesses. The work can be tailored to fit the requirements of training, employment and business development programs.

Constructing an average of 40 kilometres of highway annually over 20 years is considered:

- optimum for maximizing economic benefits;
- reasonable in terms financing requirements; and
- feasible from the perspective of managing a long term construction project.

Figure 3-2 shows a number of scenarios indicating the rate of annual progress, the annual funding requirements and the overall time to complete.

Actual work could vary substantially from year to year depending on operational requirements.

By spreading the work over 20 years, the equivalent of 174 full time construction jobs would be created.

The work will be seasonal, and could potentially be managed to provide work for 300 to 400 people over the course of each year.

Mackenzie Highway Extension Completion Options
(1992 dollars)

Years Required to Complete	Annual Progress (kilometres)	Annual Funding ($ millions)
50	16	10
30	27	16
20	40	25
10	80	50
5	160	100
Total	804	500

Figure 3-2

The need to reconstruct portions of the highway after 20 years and the operational requirements for maintaining the highway mean that a large portion of these jobs can be considered permanent.

The road from Wrigley to Fort Norman could be built in six years. Construction could start from both Wrigley and Fort Norman in order to help disburse the economic benefits and draw upon as many communities as possible.

It will be necessary to have at least four construction locations working on the road in any given year. This will help distribute economic benefits and keep workers close to their home communities.

The design work completed by the federal government is expected to provide good value. The GNWT Department of Transportation has reviewed this design work with a view to reducing costs through design changes and reduced standards.

The Department's review has identified that bridge standards can be reduced, from two lane to one lane, and road alignments can be changed, in order to achieve reasonable cost savings. Other cost saving measures were considered but did not result in an overall road design that represented good value.

In general, the concepts incorporated into the road and structure designs are environmentally sound. Some additional work can be expected to confirm this.

The total cost of construction is expected to be approximately $500 million, in 1992 dollars. This estimate is based on a review of the existing design work and contract packages.

Figure 3-3 provides information on four comparable highway projects in the Northwest Territories.

Mackenzie Highway Extension Project
Comparable Highway Projects

Project	Year	Length (kilometres)	Construction Costs ($ millions)	Cost per Kilometre ($ millions)
Liard Highway	1978/82	254	126	0.5
Dempster Highway	1971/78	546	288	0.5
Wrigley Highway	1971/87	222	141	0.6
Yellowknife Highway -Reconstruction	1990/92	65	21	0.3
Mackenzie Highway -Proposed Project	1995/2015	804	500	0.6

Note - Costs have been converted to 1992 dollars

Figure 3-3

There are two significant risks related to construction costs: the cost of local involvement, and the possibility of payments to land claim organizations.

The cost of the project could rise 10 to 20% as a result of the aggressive use of regional labour and businesses. Given the 20 year time-frame, it should be possible to mitigate any problems through monitoring, training and management assistance.

The payment of royalties for granular and construction materials could mean a substantial increase in the total project cost. Obtaining right-of-ways is not expected to pose a problem as the highway is contemplated in the Gwich'in land claim and land has been designated for it.

3.4.3 Methodology

Preconstruction work during the implementation planning stage will require 4 PY's at a cost of $360,000 and Other O&M funding of $300,000 in each of the two years prior to the start of construction.

Additional preconstruction work on later sections of the highway will take place as the project proceeds and will form part of the capital cost of the project.

The detailed implementation plan will phase in construction spending. In the initial years of construction, spending will be considerably lower than $25 million.

A work plan for planning the implementation activities is set out on the following pages.

A combined schedule for all planning and preparation activities is shown in Figure 5-1.

3.4.4 WORK PLAN - ENGINEERING, CONSTRUCTION & LOGISTICS

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 1	Routing	• Choose initial sections of road to work on • Confirm initial choice through the consultation process • Identify the tentative sequence for work on subsequent sections of the road	• Tentative schedule for the long term
Phase 2	Forecasting Economic Demand	• Estimate demand for labour and the specific skills that the project will require • Summarize demand for business services and products	• Detailed analysis of labour requirements • Summary of business services and products required
Phase 3	Environmental & Regulatory Considerations	• Review environmental soundness of existing designs with Planning Division • Design and cost mitigative measures, if required • Assist in meeting regulatory requirements, as needed • Participate in the consultation process, as needed	• Summary of design changes required, or design acceptability • Summary of mitigative measures and costs • Participation in regulatory and consultation processes

WORK PLAN - ENGINEERING, CONSTRUCTION & LOGISTICS

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 4	Cost Estimates	• Develop detailed cost estimates on the first section of the road • Develop cost estimates for the balance of the design and preconstruction work • Update cost estimates on the complete project • Conduct an additional review of alternatives which may lead to cost savings, including minor design changes and the use of fuel from Norman Wells	• Detailed cost estimates for initial section of the road • Cost estimates for design and preconstruction work by section • Cost estimate for total construction costs
Phase 5	Complete Design Work	• Complete final design and preconstruction work for initial section of highway	• Final designs and contract packages for initial section of road
Phase 6	Coordinate Contract Packages	• Redesign contract packages • Review labour requirements with training staff to integrate work with training and employment programs • Review contracting requirements with business development staff to integrate contract packages with development programs • Assist in developing a method for coordinating road work with training, business development and the use of UIC funding	• Tailored contract packages

3.5 MAXIMIZING ECONOMIC BENEFITS

3.5.1 Issues

The important issues involved in maximizing local and regional economic benefits are as follows:

- providing a sustained economic environment in which local businesses can grow and prosper, and which will allow the local workers to develop and maintain their skills;
- designing contract packages to accommodate the local workforce and local businesses;
- ensuring that the workforce is trained and has the skills necessary to participate in the project;
- ensuring that local businesses are developed and prepared to undertake the contract work available from the project;
- accessing training, employment, economic development and business development programs to the maximum extent possible;
- incorporating the work patterns and desires of the local communities; and
- retaining spin-off economic activity within the Northwest Territories to the extent possible.

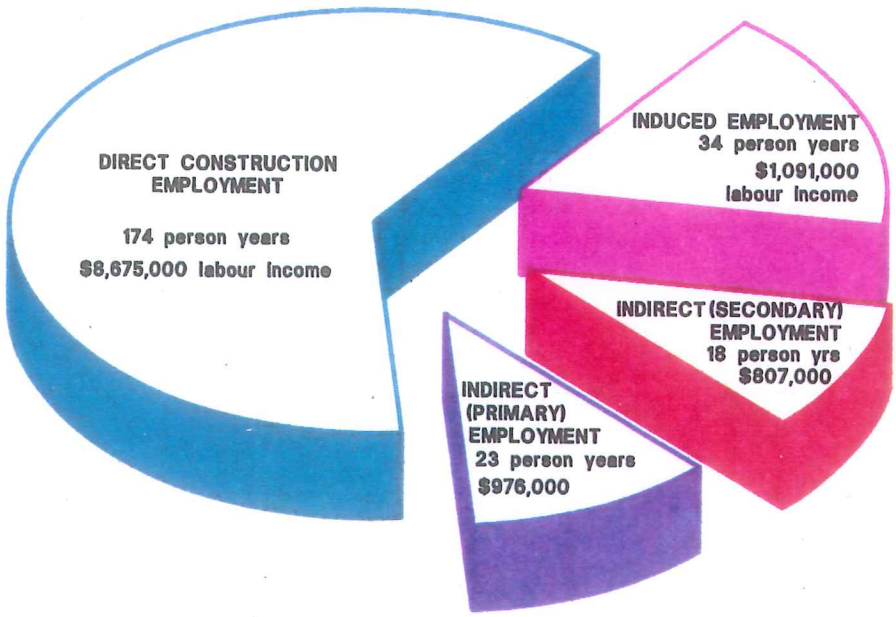
3.5.2 Preliminary Analysis

Benefits of the Project

The economic benefits of the Mackenzie Extension project have been estimated by the NWT Bureau of Statistics using a forecasting model of NWT economy. The details of the forecast are illustrated in Figures 3-4 and 3-5.

This economic model predicts that every dollar spent on the Mackenzie Extension project will generate $1.24 of economic activity within the Northwest Territories.

EMPLOYMENT AND LABOUR INCOME FROM $25,000,000 OF HIGHWAY CONSTRUCTION



Total Employment 249 person years
Total Labour Income $11,549,000

NOTES:

1. DIRECT CONSTRUCTION EMPLOYMENT includes all "on the job" personnel required to construct the highway such as skilled heavy equipment operators, clerical staff, survey staff, engineering and supervision personnel, etc. An estimated 75% of these person years would be from the Northern Labour Force.

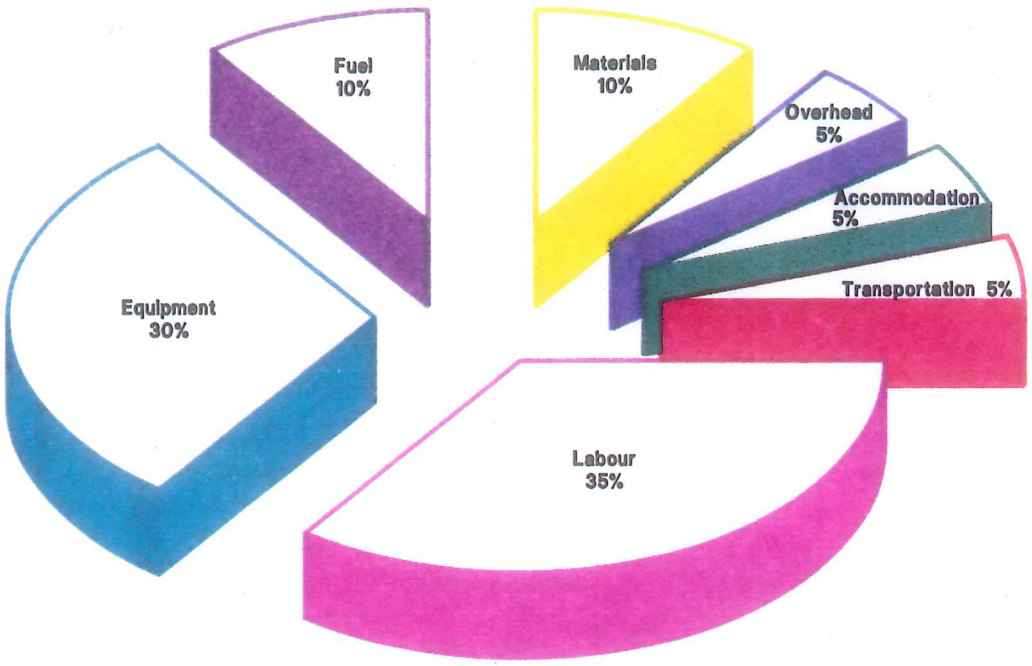
2. INDIRECT (PRIMARY) EMPLOYMENT includes personnel required to provide services or goods which go directly into the project. INDIRECT (SECONDARY) EMPLOYMENT includes personnel required to produce/wholesale goods and services which are one step removed from the project. All are from the Northern Labour Force.

3. INDUCED EMPLOYMENT includes personnel required to provide goods and services purchased by households using income from direct and indirect employment. All are from the Northern Labour Force.

4. As highway construction is seasonal, a direct labour force of 300 to 400 would be required during construction periods.

Figure 3-4

MACKENZIE HIGHWAY EXTENSION INPUT COMPONENTS



NOTES:

1. Existing equipment from Northern sources would make up 40% of the total equipment requirement.

2. The Northern Labour Force would make up 75% of the total direct labour requirement.

3. 50% of the fuel requirement for construction would be produced in the N.W.T.

4. Almost all of the material requirements for construction would be produced outside the N.W.T.

Figure 3-5

The model also estimates that, based on annual expenditures of $25 million, the Mackenzie Extension project will create 174 direct person years of employment and an additional 75 indirect person years of employment each year.

As the construction work is seasonal, a direct labour force of 300 to 400 people will be required during construction periods.

This seasonal work will be combined with federally funded training programs to produce a form of co-op education. The result is a year-round income for seasonal workers.

This proposal recommends that the project organization offer its seasonal employees a form of co-op education, which allows time each year for the following components:

- working or receiving on-the-job training;
- formal training leading to certification; and
- traditional activities.

An important concept here is that the federal government will likely pay for the bulk of the costs.

Of the payments made to the co-op participants, the federal government is expected to fund a large portion of the work component through the Highway project and will effectively fund 100% of the other two components through UIC.

Of the training and delivery costs, the federal government is expected to share at least 50% of the costs through existing programs.

If the seasonal work is well coordinated with training programs and the UIC program, up to 85% of the money received by the co-op participants may come from the federal government, the majority of which will be new money in the NWT.

Realizing the Benefits

The key concept is the need to take all reasonable steps to assist the local, regional and territorial economies in absorbing the economic benefits of the project.

The Mackenzie Extension project will be tailored to provide a sustained level of economic activity that will allow:

- the development and retention of skills; and
- the development of healthy local businesses.

Time-frame

Constructing the road over 20 years and maintaining the average yearly expenditure to approximately $25 million is proposed. This will create a sustained level of economic activity.

After 20 years, the ongoing maintenance requirements and the future reconstruction of the highway will create continued employment. As a result, the jobs created by the construction of the highway can be viewed as permanent jobs.

Multiple Construction Locations

Where possible, construction on the road will take place at multiple locations. Smaller and more numerous projects will make it easier for local and regional companies to participate.

Local Involvement in the Project Organization

Local people will be hired for more than just construction jobs. Consultation, environmental and training activities can all be performed by local individuals, even if some upgrading is required. Locating the project organization in the Mackenzie Valley will provide the opportunity to hire local administration staff.

Training and Employment Programs

Initial research indicates that training and employment assistance is potentially available from the following sources:

- UIC development funds;
- Canada Employment and Immigration Centre (CEIC) funding through Pathways boards;
- Labour Force Development Agreement;
- Canada Assistance Plan (Worker Activity Component); and
- other agreements.

While the objectives of these programs are generally consistent with the objectives of the Mackenzie Extension project, each program has its own criteria and administrative process. Researching, negotiating and accessing this assistance will take time.

There is a need to determine:

- which combination of programs will provide the best benefits;
- which organizations can access these plans; and
- how to coordinate the requirements of the project, the requirements of the assistance programs and the needs of the communities.

Considerable administrative effort will be required in order to coordinate the benefits of these programs in a systematic fashion.

Many of these programs can only be accessed by the private sector. A association or board of private contractors, supported by government advisors, may be an appropriate form for the organization which coordinates training.

Certification

Most jobs on the Mackenzie Extension project will require some form of training or certification.

The training programs that are developed should focus on providing certification in a certain skill or trade. A combination of four year trade programs and one year technologist or operator programs may provide the best mix.

Co-op Education/Traditional Activities

The seasonal nature of the construction work should make it possible to alternate between working on the job and formal training.

Time for traditional activities could also be incorporated into the schedule at certain times of the year.

Coordinating the activities of such a program will be challenging, but will be worthwhile if it maintains the interest and lifestyle of the participants.

UIC Development Funds

An important point is that participants in the Co-op Education program would be paid by the Unemployment Insurance Commission during the time they are receiving formal training.

This arrangement has the benefit of accessing new non-NWT funding in addition to the funds raised through the Mackenzie Extension project.

Recipients must meet the normal criteria for receiving UIC. As long as the recipient works 20 weeks initially and then works an additional 10 to 14 weeks within the next 50 weeks, UIC funding can be maintained indefinitely.

Business Development Programs

A hands-on approach to managing the marketplace will be required to maximize local and regional business involvement.

To fully involve the local and regional communities it may be necessary to assist community councils or individuals in setting up businesses.

The objective will be to develop competent companies in the region, each capable of providing one or more of the specialized services that will be required by the Mackenzie Extension project.

From past experience, it will be advisable to provide substantial management training and assistance on all matters from bidding to billing. A full time business management advisor will be hired.

A highly planned process is envisioned in which contracts are tailored to the capacities of local businesses and local businesses are developed to meet the requirements of the project.

A decision from Cabinet on contracting methods and sole sourcing will be needed if business development and labour force training are to be fully integrated into the planning process.

3.5.3 Methodology

Concurrent with the financing activities, the project organization should apply for financial assistance in developing and administering a training strategy.

Initial resource requirements can be met with a part-time researcher and modest Other O&M funds.

Once financing has been obtained, resource requirements will expand to 2 full PY's and approximately $50,000 in Other O&M funding.

One position will be dedicated to the administrative requirements of the training and employment programs. The other position will be dedicated to business development and the provision of business management advice.

A work plan for maximizing economic benefits is set out on the following pages.

A combined schedule for all planning and preparation activities is shown in Figure 5-1.

3.5.4 WORK PLAN - MAXIMIZING ECONOMIC BENEFITS

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 1	Financial Assistance	• Prepare proposal for financial assistance in developing and administering a training strategy	• Proposal for financial assistance • Funding agreement
Phase 2	Research and Analysis	• Identify and review material relevant to training and employment programs • Identify and review material related to economic development and business development programs • Meet with appropriate program staff • Summarize programs with the greatest potential	• Summary of assistance programs
Phase 3	Training and Employment Plan	• Forecast the jobs and skills required for the project • Review labour market survey done by Energy, Mines and Resources • Identify the gap between existing and required skills (training requirements) • Develop plans for delivering training in conjunction with Advanced Education • Incorporate feedback from consultations • Integrate training plans with construction and business development plans • Estimate training costs	• Labour demand forecast • Labour market survey • Analysis of training needs • Training plan • Cost estimates

WORK PLAN - MAXIMIZING LOCAL ECONOMIC BENEFITS

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 4	Business Development Plan	• Identify business services which could be provided by local and regional firms • Identify purchased items which could be produced or purchased in the NWT • Identify individuals, through the consultation process, that have the potential to provide services and products • Take active measures to develop firms with the required expertise • Coordinate activities with ED&T, the Development Corporation, and the Business Credit Corporation as required • Contract with the private sector for the set-up and ongoing support of locally owned companies	• List of services and products required • List of potential entrepreneurs • New companies

3.6 ENVIRONMENTAL (AND REGULATORY)

3.6.1 Issues

The important issues related to the environmental impact assessment process and its requirements are as follows:

- identification of a new environmental assessment and review process which meets the requirements identified in Bill C-13 (Canadian Environmental and Assessment Act) and the Gwich'in Comprehensive Land Claim Agreement;
- determination of the level of review required i.e. screening or comprehensive review, and mediator and/or review panel;
- packaging a project description for the initial environmental review which may not include detailed routing for the entire project;
- determining the data/information/analysis requirements for the environmental review;
- determining the amount of primary research which may be required to complete an environmental assessment;
- determination of communities that will be part of the consultation/participation process;
- early identification of communities' environmental and socio-economic concerns;
- determining costs associated with the environmental assessment; and
- developing an environmental review process where design work and environmental assessment can occur concurrently.

3.6.2 Preliminary Analysis

There have recently been significant changes in the environmental review process.

- In April, 1992, the Gwich'in Comprehensive Land Claim Agreement

was signed. The Land Claim Agreement identifies an environmental and review process, led by an Environmental Impact Review Board (EIRB) for the Mackenzie Valley. The EIRB must be set up within two years of the date of settlement legislation.

- In July 1992, Bill C-13, the Canadian Environmental Assessment Act, was passed. This Act replaces the Environmental Assessment and Review Guidelines Order, which had been in place since 1974. The final version of Bill C-13 is not yet available, and the Regulations are currently being drafted. The Regulations will identify which projects require a comprehensive study and will further define the environmental assessment process.

The environmental assessment provisions of the Gwich'in Land Claim and Bill C-13 allow for joint reviews.

In addition to the requirements of the environmental assessment processes, the following Acts and Regulations have potential impact on the project: Territorial Land Use Act and Regulations; Northern Inland Waters Act and Regulations; Heritage Act; Environmental Protection Act; Navigable Waters Protection Act and Regulations; Forestry Act; Commissioner's Land Act and Regulations, and the Fisheries Act and Regulations.

Based on information currently available, the following developments can be expected:

- A joint federal and Gwich'in environmental assessment review process can be developed. This may be expanded to include other land claim groups from the Mackenzie Valley.

- Department of Transportation will fulfil the role of proponent in this development, meaning that the Department is proposing the project. Indian and Northern Affairs Canada (INAC) will fulfil the role of responsible authority, with the responsibility to ensure that the environmental assessment of the project is conducted. As the responsible authority, INAC will have significant discretionary powers with regards to requirements and scope of the environmental assessment.

- Until the EIRB is set up, the vehicles for environmental review will remain much the same as pre-claim. This means that the Regional Environmental Review Committee (RERC), which is the existing joint GNWT and Federal environmental review body, will be the focus for

identifying and reviewing environmental concerns. RERC membership will have to be altered to ensure proper representation from the claimant groups.

- INAC will require a preliminary environmental screening of the entire project. However, a process which allows for detailed environmental assessment to be conducted on a section by section basis, is supported by INAC.

- INAC has indicated that the most significant element which will indicate the level of review required will be community concerns. However, community concurrence with the project does not absolve the Department from conducting the appropriate environmental assessments.

- A great deal of environmental assessment work has already been conducted as a result of the Interprovincial Pipeline Co project, proposals for a natural gas pipeline from the Beaufort, the Mackenzie Valley Monitoring Project (MEMP), and the Berger Inquiry.

The major risk involved with the environmental impact assessment for the Mackenzie Highway Extension project is the undefined process. This project will likely be the first major project to be completed under these new environmental assessment requirements.

How the environmental legislation and the land claim legislation will work together, what the exact requirements will be for an environmental impact assessment, and what level of review will be required are unknowns.

3.6.3 Methodology

Given the uncertainties outlined above, the following is one possible scenario for an environmental impact assessment and review process.

The best method for meeting the environmental assessment requirements is for the Department of Transportation to take the lead role in consultation and the identification and resolution of community concerns.

Prior to initiating the process with RERC, the Department must consult the communities and determine their concerns and issues.

Concurrently, the Department can begin research and analysis of existing environmental assessment, mitigation and monitoring work which was

prepared for previous developments and proposals.

Once the existing community concerns are identified and historical data is analyzed, the Department should be prepared to approach RERC and suggest further definition of the environmental assessment process and requirements.

A principle centred approach could be used to design the environmental assessment process. A set of principles or guidelines would be:

- developed in consultation with the communities;
- approved by the responsible authority (INAC); and
- used as a standard for designing the assessment process.

Overall Costs

Development of pipeline corridors provides an indication of environmental assessment requirements which may be similar to that required for the Mackenzie Highway Extension project. According to Canadian Petroleum Association and Interprovincial Pipeline Co, an accurate preliminary cost estimate for environmental assessments of corridor developments in northern Canada is 1% of total capital costs. Assuming the Mackenzie Highway Extension will be $500 million, the environmental assessment costs will be $5 million. This estimated cost includes regulatory hearings.

Annual Requirements

Once financing has been secured and a decision has been made to proceed with the project, there will be an ongoing requirement for 1 PY dedicated to the environmental assessment and regulatory processes, at an annual cost of $90,000. Other O&M funds of $150,000 for consultants and community work will also be required.

A work plan for environmental assessment and regulatory activities is set out on the following pages.

A combined schedule for all planning and preparation activities is shown in Figure 5-1.

3.6.4 WORK PLAN - ENVIRONMENTAL AND REGULATORY

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 1	Planning and Preparation	Confirm project plans, timing and approach. Meet with appropriate GNWT departments to ensure internal regulatory and environmental requirements are met, and other departmental concerns are identified.	Identification of GNWT concerns. GNWT concurrence on DOTs approach to environmental impact assessment
Phase 2	Initial Contact with Communities Research and Analysis	Preliminary scoping of community concerns and issues. Identify and assess environmental research, mitigation and monitoring documents from IPL, MEMP, and PWC work.	Initial analysis of community concerns. Analysis of existing environmental work. Preliminary assessment documents for environmental and socio-economic analysis.
Phase 3	Contact with RERC (Should be conducted after initial community consultation, but can be concurrent with research and analysis)	Meet with RERC to determine scope of work required, and initial definition of process. Identify standard operating conditions for sensitive areas. Meet with all stakeholders and identify concerns. Identify a detailed environmental review process which will be sufficient for a 20 year construction time-frame. Prepare and present a detailed project description with an initial environmental assessment to RERC.	Initial identification of concerns. Initial agreement on process identification. Guidelines for construction in environmentally sensitive areas. Project description document. Environmental Assessment document Screening Decision

3.7.3 Methodology

The initial organization will be set up in Yellowknife until financing has been established and coordinating arrangements have been made. Once the set-up activities have been completed, the office will be moved to one or more locations in the Mackenzie Valley.

The initial resource requirements are for a project coordinator, an administrative assistant, and a researcher, at a total cost of $205,000 over the first 9 months.

Once financing has been secured and a decision has been made to proceed with the project, the project team would be expanded as outlined in the previous sections.

With the start of construction, a project management and design team will be required. The size of this team will build to a level between 20 and 30 positions, once the project is fully operational.

A three person administration unit will also be required once construction starts.

A work plan for organization and process activities is set out on the following pages.

A combined schedule for all planning and preparation activities is shown in Figure 5-1.

3.7.4 WORK PLAN - ORGANIZATION AND PROCESS

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 1	Financing and Initial Research	• Hire a project coordinator, an administrative assistant and a researcher • Carry out financing work plan • Prepare a funding proposal for the development and administration of training and employment strategies • Conduct initial planning and research activities related to consultation, maximizing economic benefits, and environmental assessment • Prepare a Cabinet submission to proceed with the project	• Financing agreements • Decision to proceed with the project
Phase 2	Develop Detailed Implementation Plan	• Staff the required positions • Carry out the work plans for consultation, planning engineering and construction work, maximizing economic benefits, and environmental and regulatory work • Make organizational changes identified as a result of initial consultation process • Prepare cabinet submission to proceed with project • Move office to the Mackenzie Valley	• Detailed implementation plan • Cabinet submission to proceed with construction • Final organization and decision making process

WORK PLAN - ORGANIZATION AND PROCESS

PHASES	DESCRIPTION	TASKS	OUTPUTS
Phase 3	Initial Training, Development, and Operational Activities	• Conduct initial training programs • Assist in the set up of new businesses & the development of existing businesses • Assess the organization's effectiveness • Modify the organization as required	• Initial training results • Initial business development results • Internal organization review
Phase 4	Construction Activities	• Hire project management and design team • Hire administrative staff • Contracting and financial processing	• A highway

4.0 COSTS OF PREPARING A DETAILED IMPLEMENTATION PLAN

Projects the size and scope of the Mackenzie Extension project typically require a large planning and preparation effort.

Figure 4-1 provides some order-of-magnitude estimates used by other organizations on similar projects.

Mackenzie Highway Extension Project
Comparison of Planning Costs

Project or Sponsor	Percentage of Construction Costs
Government of B.C. - Major Projects	1 %
Public Works Canada - Major Projects	4 %
World Bank - Major Projects	1 - 2 %
Mackenzie Highway - Current Project	0.7 %

Figure 4-1

The planning and preparation work for the Mackenzie Extension project also includes several activities which are not included, or included at a reduced level, in the planning estimates of the other projects, as follows:

- a more substantial consultation process;
- the coordination of training and employment programs; and
- aggressive business development activities.

The total of the planning and preparation activities, including the financing and initial planning activities, totals $3.6 million dollars. This figure is comprised of the $255,000 requested as part of Stage 2, and $1,660,000 in each of the two years required for Stage 3, the development of the detailed implementation plan.

The figure of $3.6 million represents 0.7 percent of the capital cost of the project and is below the 1 to 2 percent suggested by the Government of B.C. and the World Bank, and the 4 percent experienced by Public Works Canada.

$3.6 million is likely a reasonable estimate, considering that some planning