

PIPELINE RELATED BORROW STUDIES

**NORTHERN ENGINEERING SERVICES
COMPANY LIMITED**

CALGARY ALBERTA



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Company Limited**

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ENGINEERS FOR

CANADIAN ARCTIC GAS STUDY LIMITED

BEAUFORT-DELTA OIL PROJECT LIMITED

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PIPELINE RELATED BORROW STUDIES

PREPARED FOR

CANADIAN ARCTIC GAS STUDY LIMITED

by

NORTHERN ENGINEERING SERVICES COMPANY LIMITED

635 6th Ave, S.W.

Calgary, Alberta

1974

TABLE OF CONTENTS

	<u>Page</u>
SUMMARY	
INTRODUCTION	1
METHODS USED TO CHOSE BORROW SOURCES	2
<u>Geologic Origin and Properties of Borrow Sources</u>	3
<u>Selection of Borrow Sources</u>	4
SOURCES OF BORROW INFORMATION	5
PRESENTATION OF DATA ON BORROW SOURCES	5
<u>Location of Potential Borrow Sites</u>	6
<u>Description of Borrow Sources</u>	7
<u>Environmental Data on Borrow Sources</u>	26
DEVELOPMENT OF TYPICAL BORROW PITS	43
<u>General Criteria for Gravel Borrow Pits in Upland Areas</u>	45
Proposed Development of Borrow No. FGH - 2, Fort Good Hope, M.P. 490	50
Proposed Development of Borrow No. P - 298, Oscar Creek, M.P. 365.9	51
<u>Special Criteria for Gravel Borrow Pits in Flood Plains</u>	52
Proposed Development of Borrow No. 138, Rapid Creek, M.P. 319.5	56
Proposed Development of Borrow No. 107, Tamayariak River, Alaska M.P. 81.4	57
Proposed Development of Borrow No. 102 Sagavanirktok River, Alaska M.P. 8.3	58

<u>General Criteria for Quarry Sites</u>	59
Proposed Development of Quarry No. P - 199, Saline River, M.P. 489.83	63
Proposed Development of Quarry No. 121, Kongakut River, Alaska, M.P. 176.0	64
GRADING CONSTRUCTION SCHEDULE FOR ANCILLARY FACILITIES	65
FUTURE BORROW STUDIES	65
SELECTED BIBLIOGRAPHY	69
TABLES	
Table 1: Borrow Information	10 - 25
Table 2: Summary of Environmental Comments on Borrow Sites	37 - 42
Table 3: Grading Construction Schedule (Coastal and Richards Island Route)	67
Table 4: Grading Construction Schedule (Interior Route)	68
APPENDICES	
Appendix I: Corrections for Strip Maps	

SUMMARY

Sources of borrow material have been located at regular intervals along the proposed gas pipeline in northern Canada and Alaska. Information on the pipeline facilities where borrow is needed, quantities of material required, the location of borrow sources, and the properties of potential borrow deposits is contained in this report. Environmental considerations applicable to each borrow area, discussion of future investigations for proposed borrow sites, plans for development of pits in typical borrow deposits, and schedules for pit development are also included.

INTRODUCTION

Borrow material is required for construction of the proposed gas pipeline and associated facilities. Sources of borrow material have been located along the pipeline route in the vicinity of ancillary facilities and along the right-of-way from Prudhoe Bay, Alaska, to Chinchaga River, Alberta.

Material of borrow sources varies in quality. The most favorable borrow for construction purposes is available as sand and gravel in glaciofluvial and alluvial deposits. Bedrock, especially competent varieties like limestone, can also provide high quality borrow material, although crushing will usually be required. Finer-grained material found in morainal, glaciolacustrine, and eolian deposits is less desirable for construction purposes, but it can be used for backfill, etc., in areas where coarser material is lacking.

Along the Coastal and Interior Routes from Prudhoe Bay, Alaska, to the Travaillant Lake Junction, N.W.T., most borrow will be taken from gravelly, alluvial deposits or bedrock. Borrow sites along the Main Route from Richards Island to the Liard River, N.W.T., commonly occur in glaciofluvial deposits and bedrock. South from the Liard River to the Chinchaga River, Alberta, coarse granular material is scarce. Unfrozen, fine-grained morainal and glaciolacustrine deposits will be used to supplement the available coarse material during construction activities.

Methods used to choose borrow sites, sources of information on potential borrow sites, details on each proposed and alternative borrow site in Alaska and

northern Canada are discussed in this report. Much of this information is listed on Table 1, pages 10 to 25. Environmental considerations pertaining to each proposed borrow site are shown on Table 2, pages 27 to 42.

In arriving at the quantities required for construction, a contingency of 30 percent over the estimated quantities has been used. Moreover no cut grading or terracing has been considered at this stage in the design of the various facilities. During final design and site layout, advantage will be taken, where possible, of cut and fill as well as terracing in order to reduce the quantities required.

Future borrow investigations, plans for development and restoration of typical borrow pits, and construction schedules for borrow pit development are included in the text and Table 3.

METHODS USED TO CHOOSE BORROW SOURCES

Borrow sources were chosen on the basis of quantity of material available, quality of the material and haul distance to the proposed pipeline and facilities. Both preferred and alternative borrow sources were chosen for areas where large quantities of granular material will be needed for construction purposes. These sites are illustrated on the strip maps (scale 1 inch equals 4 miles) which appear in the pipeline application. Only preferred borrow sources are located on the photomosaic alignment sheets which accompany the pipeline application.

Geologic Origin and Properties of Borrow Sources

Knowledge of the quality of granular material present in potential borrow areas was essential for choosing the most favorable borrow sources. Sufficient quantities of good quality material can be obtained from unconsolidated surficial deposits or from competent, crushable bedrock. The type and properties of surficial materials and bedrock are related to their geologic origin. Therefore, information on the geologic history of surficial deposits and bedrock obtained from published geologic reports, airphoto interpretation, field investigations, and drilling programs has been utilized to determine the borrow sites with the best potential for development.

The geologic processes responsible for producing unconsolidated deposits with granular resources are glacier activity, river deposition, and mass wasting. Glacial deposits include those of morainal, glaciolacustrine, and glaciofluvial origin. Glaciofluvial deposits (outwash plains, terraces, eskers, kames) usually have good quality granular material in the form of sand and gravel. Glaciolacustrine silt and sand, eolian materials derived from glaciolacustrine deposits, and till of morainal deposits are generally finer-grained and have higher ground ice content. These factors make them less desirable for development as borrow sources. River deposits, e.g. flood plains and terraces, often contain abundant sand and gravel, and will be utilized where feasible, when other sources of granular material are insufficient.

Competent bedrock may also be crushed to obtain granular material for construction purposes. Limestone, dolomite, argillite, granite, and quartzite generally are most competent. Sandstone, siltstone and shale can be crushed but are less competent and are usually adequate only for use as fill. Bedrock especially limestone and shale, is at or near the surface in many localities along the pipeline routes. Problems associated with quarrying bedrock are related to disturbance of birds nesting in cliffs and the expense of quarrying procedures.

Borrow sites containing enough good quality granular material were located by airphoto interpretation and published and unpublished reports on surficial geology and granular materials.

Selection of Borrow Sources

Borrow sources were chosen to supply granular material for construction along the pipeline and at facility sites (compressor stations, staging areas, stockpile sites, wharfs, communications towers, roads, airstrips, meter stations, and operations and maintenance areas). A catalogue of potential borrow sources was compiled in early phases of borrow location work. Final choices of borrow sources were made from (1) borrow areas outlined by J.D. Mollard and Associates, (2) borrow areas shown in the Canadian government sponsored Granular Materials Inventory, (3) borrow sources shown on the United States Geological Survey (U.S.G.S.) and Geological Survey of Canada (G.S.C.) surficial and bedrock geology maps.

A preferred and alternative borrow site has been selected at each locality where large quantities of borrow will be needed. At localities where small quantities are required, e.g. intermediate borrow areas between compressor sites, only one area has been chosen. Quality and quantity of material, haul distance (usually 8 miles or less), accessibility of proposed pit, environmental acceptability, and communities' granular material needs were considered before choosing preferred and alternative borrow areas. Preferred and alternative borrow sites are listed and described on pages 10 to 25.

SOURCES OF BORROW INFORMATION

Information on potential borrow sources was obtained from pipeline-related projects and from Canadian and United States government sponsored geologic mapping and Granular Materials Inventory studies.

Three pipeline studies that contributed borrow information were:

- (1) terrain typing of soils and bedrock by airphoto interpretation and related drilling programs
- (2) airphoto location of potential borrow sources by J.D. Mollard and Associates
- (3) Geologic study of the pipeline routes in Canada and Alaska by CAGPL staff.

Other sources contributing information were:

- (1) United States Geological Survey

- (2) Geological Survey of Canada
 - (3) Department of Indian Affairs and Northern Development
- Granular Materials Inventory

PRESENTATION OF DATA ON BORROW SOURCES

Information on the location and description of potential borrow sites, access roads, and quantities of borrow required is presented on the project strip maps and alignment sheets filed by the Applicant.

Location of Potential Borrow Sites

Major facilities where borrow will be needed are shown by symbols on the strip maps and alignment sheets. Potential preferred and alternative borrow pit locations and access roads are shown on the strip maps. Also calculations of quantities required for various segments appear in the right hand margin of these maps. The corrections and updating of locations which have been made since the time the strip maps were prepared are listed in Appendix 1.

The photomosaic portion of the alignment sheets illustrates the approximate location of preferred borrow sites, access roads, and pipeline facilities for the land area covered by the photomosaic windows. Data relevant to the location of proposed borrow sources is also presented in the site identification columns of Table 1.

Description of Borrow Sources

Table 1 and the legend for Table 1 (pages 8 to 25) give details of potential borrow deposits and proposed borrow pits in these deposits. The following sections are presented in this table:

- 1) Main Canadian Route - Richards Island, N.W.T., Chinchaga River, Alberta
- 2) Coastal Route - Prudhoe Bay, Alaska, to the Travaillant Lake Junction, N.W.T.
- 3) Interior Route - Prudhoe Bay, Alaska, via the Marsh Fork of the Canning River and the Canning River Option to the Travaillant Lake Junction. It should be noted that mileages for this section are given on the "Borrow Information" chart for the Marsh Fork Route because borrow sites for both routes, except for GM-140a and GM-147, are identical.

Details related to site identification, description of the potential borrow source, and proposed borrow pit data are listed in Table 1. Headings and abbreviations on the Table are explained in the legend which precedes it.

BORROW INFORMATION LEGEND TO ACCOMPANY TABLE 1

- 1) BORROW AREA NUMBER: Identifying number assigned to each prospective pipeline borrow pit.
- 2) MILE POST: Mileage location of borrow pit along the pipeline route. N/A denotes pits not on the pipeline right-of-way.
- 3) FACILITY AND REQUIRED VOLUME (10^3 yd^3): Facility for which the corresponding borrow is needed and the amount of material required. Quantity details are also shown under "Facility Description" on the strip maps.
- 4) MATERIAL: Type of material available in borrow pit. Abbreviations used: g-gravel; s-sand; si-silt; cl-clay; t-till; gr-granite; ls-limestone; ss-sandstone; dol-dolomite; sh-shale; sis-siltstone; arg-argillite; ch-chert; cgt-conglomerate; q-quartzite. Unified Soil Classification System group symbol also shown if determined by drilling results. Geologic age of bedrock is also indicated where known from geologic investigations.
- 5) LANDFORM: Physical feature of the terrain where borrow pit is located.
- 6) ICE CONTENT: Measure of excess ice in deposit according to the scale: Low - 5 to 15%; Medium - 15 to 50%; High - 50%.
- 7) DRAINAGE: General assessment of drainage of surface water from the borrow deposit.
- 8) DIMENSIONS (FT): Area of deposit expressed as a product of length and width
 - a) When one dimension of the deposit is in excess of 2 miles, e.g. alluvial flood plains, only one dimension is shown.
 - b) Deposits which cover more than 2 mi.² are termed 'extensive'.
- 9) ESTIMATED DEPTH (FT) AND ESTIMATED RECOVERY DEPTH (FT): Average thickness of deposit and the average depth to which material contained in deposit will be exploited.
- 10) ESTIMATED AVAILABLE VOLUME (10^3 yd^3): Figure based on the product of the estimated recovery depth and the area of a typical borrow pit which is defined as 0.25 mi.². This includes area used for camp, equipment, waste material stockpile and washing and sorting. In cases where deposits are less than 0.25 mi.² only small amounts of borrow will be required and these smaller deposits should be adequate.
- 11) OVERBURDEN (FT): Thickness of organic and silty material covering borrow material.

- 12) SITE EVALUATION: Either 'P' for preferred source (most desirable for exploitation in the area), or 'A' for alternative source.
- 13) CROSS REFERENCE: Site number of consulting company which has test pitted and drilled in deposit.
- a) RKL - Ripley, Klohn and Leonoff Ltd., Granular Materials Inventory (for pertinent volumes, see Selected Bibliography).
 - b) EBA - EBA Engineering Consultants Ltd., Granular Materials Inventory, Stage III (for pertinent volumes, see Selected Bibliography).
 - c) Pem - Pemcan Services "72", Granular Materials Inventory (for pertinent volumes, see Selected Bibliography).

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT)	ESTIMATED DEPTH (FT)	ESTIMATED RECOVERY DEPTH (FT)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT)	SITE EVALUATION	C.D.S. REFERENCE	
	MILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPANY	SITE NUMBER
3	18.5	ROW	118.6	s, g (SW)	esker	low	good on ridges	1,600 X 800	10+	5	1,250	0 to ½	P	RKL	217
10	26	ROW	118.6	s	outwash plain	medium	fair to good	5,200 X 1,600	100	20	5,000	2 to 10	P	-	-
256	130.3	ROW	91	s, g	deltaic kame terrace	low	good to adjacent terrain	10,400 X 500	10+	10	2,500	0 to 1	P	EBA	1109a
300	181	M - 04	1,880	s, g (SP-SM)	kame complex	medium	fair to surrounding terrain	6,000 X 3,000	15+	15	3,750	0 to ½	A	EBA	1086
303	203	ROW	119.1	s, g	hummocks & kames	low to medium	fair on ridges	extensive	10+	10	2,500	2 to 5	P	-	-
304	211.6	ROW	106.5	s, g (SM)	kame	low to medium	good to surrounding terrain	2,600 X 2,000	15	10	2,500	0 to ½	P	EBA	1049
308	218	M - 05	640	s, g (SM)	alluvial terrace	low	well	extensive	15	15	3,750	0 to 1	P	EBA	1047
319	230.5	ROW	69.3	s, g	kame	low to medium	good to surrounding terrain	2,400 X 500	20	10	2,500	0 to ½	P	EBA	1037a
321	250.5	ROW	111	g, s, si (GM)	esker	low	good to surrounding terrain	3,000 X 400	20	10	2,500	0 to 2	P	EBA	1025
324	269.3	M - 06	480	s, g (GM-SW)	alluvial or glaciofluvial terrace	low	well	10,400 X 2,000	30	20	5,000	0 to 4	A	EBA	1003
328	275.5	ROW	119.2	s, si	esker	low	good to surrounding terrain	14,000 X 400	20	10	2,500	0 to 1	P	EBA	1003a
374	342	ROW	84.4	s, si, t	sandy till plain	low to medium	fair to west and south	extensive	10+	10	2,500	0 to 1	P	-	-
374a	348	ROW	84.4	s, g	outwash plain	medium	fair	extensive	25	20	5,000	0 to 8	P	-	-
413	367	ROW	187.7	ls and sh	ridges	low to nil	poor	extensive	50+	20	5,000	½ to 4	P	-	-
1502H	446	M - 10	450	s, si (SP-SM)	glaciofluvial plain	low	good to numerous lakes	extensive	20+	20	5,000	0 to 2	P	-	-

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE CONT'D

Borrow Area Number	SITE IDENTIFICATION			DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
	Borrow Location			Material	Landform	Ice Content	Drainage	Dimensions of Deposit (ft.)	Estimated Depth (ft.)	Estimated Recovery Depth (ft.)	Estimated Available Volume (10 ³ yd ³)	Overburden (ft.)	Site Evalu- ation	Cross Reference	
	Wile Post	Facility	Required Volume (10 ³ yd ³)											Company	Site Number
FGH2	287.6	staging area RMP 685 and M-06A	244	s, s (GW)	outwash plain & ridges	very low	well	12,000 X 2,500	20+	20	5,000	0 to 1/2	P	Pem	same
FGH3	286	staging area RMP 685 and M-06A	244	s, s (GW)	outwash plain	low	fair to north	4,000 X 2,000	25	20	5,000	0 to 1/2	A	Pem	same
FGH7	293.2	ROW	47	s, (SP)	esker	medium	fair	5,200 X 200	10	5	1,250	0 to 1/2	P	Pem	same
GM-4	56.5	ROW	208.2	poorly consoli- dated Tertiary, bedrock(ss, sig, cg)	ridges	low to medium	good to sur- rounding terrain	4,000 X 2000	100+	20	5,000	0 to 7	P	-	-
GM-5	65.5	ROW	151	s, s	outwash plain	medium	good	4,600 X 400	20+	20	5,000	1 to 5	P	-	-
GM-8a	143	M - 03	1,435	s, s, (SM)	kame	low	fair to sur- rounding terrain	2,000 X 600	20	10	2,500	0 to 5	P	EBA	1110a
GM-10	177	M - 04	1,880	s, s (GW-GM)	outwash plain	low	well	12,000 X 2,500	10+	5	1,250	0 to 1	P	EBA	1085
GM-10a	177	M - 04	1,880	s, s (GW-GM)	outwash plain	low	well	12,000 X 2,500	10+	5	1,250	0 to 1	P	-	-
GM-14	259	M - 06	480	ls	plateau	low to nil	good downslope	extensive	50+	20	5,000	0 to 7	P	EBA	1023
GM-19	670	M - 15	780	sh (Low. Cret.)	plateau	low to nil	good downslope	extensive	50+	20	5,000	0 to 7	P	-	-
GM-20	670.5	M - 15	780	t, s	till plain	medium	fair to good	extensive	30+	20	5,000	0 to 5	P	-	-
GM-22	707	M - 16	600	s, s	outwash plain	low	good to sur- rounding terrain	extensive	30+	20	5,000	0 to 1	P	-	-
GM-25	717	M - 16	600	s, s, si, t (SW-GW)	outwash plain & ridges	low	good to channel	extensive	50	20	5,000	0 to 1	P	-	-
GM-27	716.6	M - 16	600	t,	till plain	medium	fair in ridges	extensive	50	20	5,000	1 to 3	P	-	-
GM-30	755	M - 17	630	s, t	kame	low	fair in ridges	extensive	30+	30	7,500	0 to 1	P	-	-

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA						REFERENCE
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALUATION	CPC		SITE NUMBER
	WILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPAN		
M-30a	752	M - 17	630	t	moraine ridge	low	fair in ridge	extensive	30+	30	7,500	0 to 1	P	-		-
M-32	807	M - 18	1,240	s,g,t	outwash & till plain	low	fair to surrounding terrain	extensive	20+	10	2,500	0 to 1	P	-		-
M-32a	808	M - 18	1,240	s,g,t	outwash & till plain	low	fair to surrounding terrain	extensive	20+	10	2,500	0 to 3	A	-		-
M-33	805	M - 18	1,240	g,s	outwash plain	low	good into channel	extensive	20+	10	2,500	0 to 1	P	-		-
M-39	91	M - 02	320	s,g	kame terrace	low	good to surrounding terrain	800 X 600	20	10	2,500	0 to 1	P	-		-
M-78	120	ROW	35.4	s,g	outwash ridge	medium	fair on ridge	1,000 X 500	5+	5	1,250	0 to 1	P	-		-
M-79	855	M - 19	385	g,s	outwash terrace	low	good to channel	800 X 500	20+	20	251	0 to 1	P	-		-
M-80	854.5	M - 19	385	g,s	outwash terrace	low	good to channel	1,000 X 500	20+	20	393	0 to 1	P	-		-
M-81	856	M - 19	385	t	till plain	low	fair	4,000 X 1,000	50+	20	5,000	0 to 1	P	-		-
M-82	901	M - 20	120	s,si	glaciolacustrine plain	low to medium	fair	extensive	20+	20	5,000	2 to 5	P	-		-
M-83	784	ROW	-	s,g	esker	low	good to surrounding terrain	1,600 X 400	20+	15	225	0 to 1	P	-		-
M-83a	N/A	M - 20	120	g	outwash plain	low	well drained						P	-		-
M-84	941	M - 21	350	s,si	plain	low	fair	extensive	20+	20	5,000	2 to 5	P	-		-
M-85	842.5	M - 21	350	s,si	plain	low	fair	extensive	20+	20	5,000	2 to 5	P	-		-
M-86	N/A	M - 21	350	g,s,si	alluvial terrace	low	good to channel		10+	10	2,500		P	-		-

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALUATION	CROSS REFERENCE	
	WILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											CON	ANY
CM-87	680	ROW	69.7	g,s,sl	alluvial meander plain	low to medium	mid-channel	extensive	10+	10	2,500	0 to 2	P	-	-
CM-89	762.5	ROW	-	s	outwash plain	low	good	4,000 X 3,000	25	20	5,000	0 to 1	P	-	-
CM-90	730.6	ROW	105.9	s,g	outwash plain	low	good to adjacent channels	7,000 X 3,000	25	20	5,000	0 to 1	P	-	-
CM-96	142	ROW	91	g,s (G1-SM)	kame terrace	low	good to surrounding terrain	8,000 X 2,000	10+	10	2,500	0 to 1/2	P	EBA	1076
CM-97	699.2	ROW	72.1	s,sl,t	till, plain	medium	fair in ridge	extensive	10+	5	1,250	1 to 5	P	-	-
CM-98	70.5	Staging Area & Liard Hwy	242	g,s,t	gravelly till plain	low to medium	fair in ridges	extensive	50	20	5,000	1 to 3	P	-	-
CM-99	707	M - 16	600	t	till plain	medium	fair	extensive	50	20	5,000	1 to 3	P	-	-
CM-100	709	M - 16	600	t	till plain	medium	fair	extensive	50	20	5,000	1 to 3	P	-	-
CM-101	712	M - 16	600	t	drumlins	medium	fair in ridges	11,000 X 2,000	50	20	5,000	1 to 3	P	-	-
CM-116	143	M - 03A	2	sh	scarp	low to nil	poor	extensive	50+	20	5,000	to 28	P	EBA	1077a
CM-117	199	M - 04A	2	s,g	hummocks & kames	low to medium	fair in ridges	extensive	10+	10	2,500	2 to 5	P	-	-
CM-118	N/A	M - 08A	2	g,s	terrace	low	fair to good	extensive	10+	10	2,500	0 to 1/2	P	-	-
CM-119	N/A	M - 11A	2	s,g, & st (Upper Dev.)	plateau	low to nil	fair to good downslope	extensive	50+	20	5,000	0 to 10	P	-	-
CM-120	N/A	M - 13A	2	ls,sls,sh	plateau	low to nil	good down-slope	extensive	50+	20	5,000	0 to 7	P	-	-
CM-121	656.8	M - 14A	2	sl,s,g	alluvial meander plain	low	mid-channel	1,800	5+	5	1,250	0 to 2	P	-	-

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE CONT'D

BORROW AREA NUMBER	SITE IDENTIFICATION			DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALUATION	CROSS REFERENCE	
	MILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPANY	SITE NUMBER
GM-122	N/A	M - 15A	2	s,s	alluvial terrace	medium	good to channel	extensive	20	10	2,500	0 to 2	P	-	-
GM-123	N/A	M - 16A	2	t,g	crevasse fillings & till	low	good downslope	2,000 X 200	50	20	5,000	0 to ½	P	-	-
GM-130	N/A	M - 19A	2	s	knoll	low	well drained	1,000 X 1,000	20+	10	2,500	0 to 1	P	-	-
GM-131	N/A	M - 05A	2	s,g	hummocks	low to medium	fair to good	2,000 X 1,000	10+	10	2,500	0 to 2	P	-	-
GM-132	39	M - 01	565	s,g,si (SP-GW)	kames	low	fair in ridges	extensive	10+	10	2,500	0 to 2	P	RKL	319
GM-133	0	P-00 (Parson's Lake)	24	s,g,si (GW-GM)	kames	medium	good	extensive	10+	10	2,500	0 to 4	P	RKL	307
GM-134	23	staging area RMP 1042	291	s,g,si (SW-SP)	terrace	low to medium	fair to channel	5,400 X 3,000	10+	5	1,250	0 to 5½	P	RKL	222
GM-135	2	M-00	24	s,si (SP)	delta remnant	medium to high	good	extensive	10+	10	2,500	0 to 2	P	RKL	202A
GM-136	42	M-01S	2	poorly consolidated Tertiary bedrock (ss,sls,cgt)	colluvium & Tertiary gravels	low to medium	good	extensive	100+	15	3,250	0 to 1½	P	RKL	315
GM-137	N/A	staging area at Inuvik & M-01A	364	s,g,si (SM)	outwash plain	medium	good to fair	2,000 X 1,500	30+	30	7,500	0 to 3	P	RKL	I-400
GM-138	N/A	ROW	320	s,si (SM)	kame & esker	medium to high	good in ridges	12,000 X 2,000	20+	15	3,750	1 to 4	P	RKL	I-405A
GM-140	N/A	M - 02A	2	s,g (GW)	esker	low	good in ridges	5,000 X 500	20+	10	2,500	0 to ½	P	EBA	1119A

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (Ft.)	ESTIMATED DEPTH (Ft.)	ESTIMATED RECOVERY DEPTH (Ft.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (Ft.)	SITE EVALUATION	CRO 3 REFERENCE	
	WILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPAN	SITE NUMBER
CM-143A	817	ROW	-	s,g	outwash plain	low	good to channels	1,000 X 800	10+	10	270	0 to 1	P	-	-
CM-144	835.7	ROW	-	s,t	ridge	low	fair to good	800 X 500	20	10	107	0 to ½	P	-	-
NW-4	377	staging area RMP 565	175	ls (Dev.)	ridge	low to nil	good to west	extensive	50+	20	5,000	0 to 2	P	Pcm	same
NW-15	373	staging area RMP 565	175	s,s,sl (CM-GW)	kames & eskers	low to medium	fair to surrounding terrain	7,500 X 2,500	10+	10	2,500	0 to ½	A	Pcm	same
P-109	642	Staging area RMP 255	193	s,sl (SM-ML)	alluvial terrace	low to medium	good into channel	extensive	30	15	3,750	0 to 1	P	Pcm	same
P-118	620	M - 14	1,010	s,g (SW-GW)	esker	low	good to west	extensive	30+	10	2,500	1 to 6	P	Pcm	same
P-124	620	M - 14	1,010	s,g (SW-GW)	esker	low	good to surrounding terrain	extensive	30+	10	2,500	1 to 6	A	Pcm	same
P-139	598	ROW	108	s,g (SW-GW)	kame	low	fair to N.W.	10,000 X 2,500	20+	10	2,500	0 to 1	P	Pcm	same
P-143	584	M - 13	420	g, sandy (GW)	outwash plain	low	fair to N. & S.	10,800 X 1,800	10+	10	2,500	2 to 5	A	Pcm	same
P-146	579.5	M - 13	420	s,g, (SW-GW)	esker complex	low	good	2,600 X 2,000	10+	10	2,500	0 to 2	P	Pcm	same
P152	573.2	ROW	118.6	s,sl,g	outwash plain	low	fair to good	extensive	20+	10	2,500	0 to 5	P	Pcm	same
P159	551	ROW	115.5	g,s (GW-SW)	alluvial fan	low	well to west	4,000 X 3,000	10+	10	2,500	0 to ½	P	Pcm	same
P170	538	M - 12	520	s,g,sl (SM-GM)	alluvial terrace	low	fair to west	10,000 X 1,000	20+	20	5,000	1 to 12	P	Pcm	same
P174	534	M - 12	520	g,s (GW-SW)	alluvial meander plain	low	mid-channel	500	10+	10	2,500	0 to 1½	A	Pcm	same
P183	517	ROW	60	g,sl (GM-GC)	glaciofluvial terrace	low	fair to west	4,000 X 700	20+	15	3,750	0 to ½	P	Pcm	same

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ m ³)	OVERBURDEN (FT.)	SITE EVALUATION	CROSS REFERENCE	
	WILE FOOT	FACILITY	REQUIRED VOLUME (10 ³ m ³)											COMPANY	SITE NUMBER
P191	507.5	ROW	75.8	s,g (SW-GW)	outwash plain	low	fair to west	8,600 X 2,400	20+	20	5,000	0 to 1	P	Pem	same
P197	N/A	M - 11	615	s,g (GW-SW)	outwash plain	low	well to surrounding terrain downslope	extensive	20+	20	5,000	0 to 1	P	Pem	same
P199	491	M - 11	615	ls (Dev.)	ridge	low to nil		extensive	50+	20	5,000	0 to 5	P	Pem	same
P213	478.5	ROW	96	s,g (SW-SM)	glaciofluvial terrace	low	well to channels	7,000 X 2,000	20+	15	3,750	0 to 1	P	Pem	same
P226	N/A	M - 10A	2	ls, dol (Dev.)	ridge	low to nil	good to west and south	extensive	50+	20	5,000	0 to 1	P	Pem	same
P227	465.5	ROW	49.8	s,g (SW-GW)	outwash plain (deltaic)	low	well to north	extensive	20+	15	3,750	0 to 1	P	Pem	same
P2-2	458	ROW	49.8	s,g	kame	low to medium	fair to west	2,500 X 1,500	10+	10	2,500	0 to 1	P	Pem	same
P262	408.3	ROW	76.5	s,g (SM-GM)	eskers	low to medium	fair to southwest	4,000 X 600	10+	10	2,500	0 to 1	P	Pem	same
P266	400.4	M - 09	330	g, si (GM)	plain and terrace	medium	mid channel	extensive	10+	5	1,250	0 to 2	A	Pem	same
P271	399.2	M - 09	330	ls, sh (Dev.)	ridge	low to nil	well downslope	extensive	50+	20	5,000	0 to 5	P	Pem	same
P279	328	ROW	57.7	s,g (SM-GM)	alluvial fan	low	good to southwest	3,000 X 1,500	10+	10	2,500	0 to 2	P	Pem	same
P289	356.9	M - 08 and staging area RMP 584	630	g,s (GW-SW)	outwash plain	low	good to southwest	3,000 X 5,000	10+	10	2,500	0 to 1	P	Pem	same
P291	356.9	M - 08 and staging area RMP 584	630	s,g (SM-GW)	alluvial meander plain	medium	mid-channel	extensive	10+	5	1,250	1 to 3	A	Pem	same
P315	304.5	ROW	47	g,s (GW)	esker	low	well	12,000 X 300	10+	10	2,500	0 to 2 1/2	P	Pem	same
P319	312	M - 07	370	ls,sh	ridge	low to nil	fair to adjacent terrain	extensive	50+	20	5,000	none	P	Pem	same

TABLE 1 BORROW INFORMATION
MAIN CANADIAN ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALU- ATION	CROSS REFERENCE	
	MILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPANY	SITE NUMBER
WS	565.3	ROW	164.4	g.s (GW-SW)	alluvial terrace	low	well	extensive	50+	15	3,750	1 to 2	P	Pen	same
DPW	97	M-02	320	ls	ridge	low to nil	good downslope	extensive	50+	20	5,000	0 to 2	P	-	-

TABLE 1 BORROW INFORMATION
COASTAL ROUTE

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALU- ATION	CROSS REFERENCE	
	WIDE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPANY	SITE NUMBER
107	81.6	CA - 02	325	g,s,sl	fossil flood plain	low	fair into channel	600	10+	10	2,000	1 to 3	P	-	-
113	130	CA - 03	330	g,s,sl (GP-GM)	active flood plain	medium	mid channel	800	10+	10	2,500	0 to 3	P	-	-
121	174	CA - 04	395	ls,ss,sh	plateau	low	downslope	extensive	50+	20	5,000	0 to 2	P	-	-
124	198.5	Row		g,s	active flood plain	low to medium	mid channel	1,000	10+	10	2,500	0 to 3	P	-	-
125	223.6	CA - 05	1,055	g,s,sl	active flood plain	low to medium	mid channel	2,000	10+	10	2,500	0 to 3	P	-	-
126	225	CA - 05	1,055	arg. (Precam) & ls	plateau	low to nil	downslope	extensive	50+	20	5,000	0 to 10	A	-	-
127	235	Row		g,s,sl	active flood plain	low to Medium	mid channel	2,000	10+	10	2,500	0 to 3	P	-	-
131	255.7	Row		g,s,sl (GM-GW)	fossil flood plain	low	fair into channel	extensive	10+	10	2,500	1 to 4	P	-	-
133	270	CA - 06	615	g,s,sl	active flood plain	low to medium	mid channel	1,000	10+	10	2,500	0 to 3	P	-	-
137	308	Row		g,s,sl	active flood plain	low to medium	mid channel	1,000	10+	10	2,500	0 to 3	P	-	-
138	316	CA - 07	615	g,s,sl	active flood plain	low to medium	mid channel	800	10+	10	2,500	2 or more	P	-	-
140	338	Row		g,s,sl	fossil flood plain	low to medium	fair into channel	7,000 X 2,000	10+	10	2,500	1 to 3	P	-	-
141	361	CA - 08	518	sh & sis (Cret.)	plateau	low to nil	good down- slope	extensive	50+	20	5,000	1 to 10	P	-	-
142	375	Row		g,s,sl	active flood plain	low to medium	mid channel	300	10+	10	2,500	0 to 3	P	-	-
142A	375	Row		s,sl,g	alluvial meander plain	low to medium	mid channel	7,000 X 2,600	10+	10	2,500	2 to 5	P	-	-
143	385	staging area RMP 990	242	sh,sis,sh (Cret.)	plateau	low to nil	downslope to east	extensive	50+	20	5,000	1 to 10	P	-	-

TABLE 1 BORROW INFORMATION
COASTAL ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA						S. REFERENCE	
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALUATION	C	S. REFERENCE		
	WILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)													COMP	SITE NUMBER
147	407.5	CA - 09	1,700	s,g,si	fossil flood plain	low	fair to channel	2,000 X 3,000	15	10	2,500	1 to 3	P	-	-		
237	432	staging area RMP 950	290	sh,ss (Cret.)	ridge	low to nil	poor	extensive	50+	20	5,000	2 to 4	P	RKL	FM-500		
244	457	CA - 10	280	sh & ss (Cret.)	river bank (escarpment)	low to nil	fair into channel	extensive	50+	20	5,000	0 to 10	P	-	-		
249	475	Row		g,s,si (GM)	outwash plain	low to medium	good to surrounding terrain	3,600 X 6,000	10+	10	2,500	1 to 3	P	EBA RKL	1069a		
252	486	M - 03	1,435	s,g,si (SM-SC)	outwash plain	low to medium	good to surrounding terrain	7,000 X 1,600	20+	20	5,000	1 to 5	P	EEA	1070		
GM-34	N/A	staging area Komakuk Beach	435	g,s	active flood plain	low to medium	mid channel	2,000	10+	10	2,500	0 to 3	P	-	-		
GM-35	268	CA - 06	615	s,g	outwash plain	low	fair to surrounding terrain	4,000 X 1,000	40	20	5,000	to 5	A	-	-		
GM-36	314	CA - 07	615	ss & sh (Cret.)	ridge	low to nil	good	3,000 X 1,000	50+	20	5,000	1 to 10	A	-	-		
GM-37	361	CA - 08 & RMP 1010	721	t	rolling plain	medium to high	poor to fair	extensive	30	20	5,000	to 1	P	-	-		
GM-38	410	CA - 09	1,700	g,s (GM-GM)	eskers	low to medium	well to surrounding terrain	extensive	10+	10	2,500	1 to 3	A	RKL	554		
GM-39	433	staging area RMP 950	290	t	hummocks	medium	fair	extensive	50+	20	5,000	to 1	A	-	-		
GM-42	458.5	staging area RMP 902	365	sh and ss (Cret.)	river bank	low to nil	good to channel	extensive	50+	20	5,000	0 to 10	P	-	-		
GM-46	N/A	staging area Shingle Point	338	g,s,si	active flood plain	low to medium	mid channel	1,000	10+	10	2,500	0 to 3	P	-	-		
GM-47	N/A	staging area Shingle Point	338	s,si	marine (?)	medium to high	poor to surrounding terrain	extensive	30+	20	5,000	0 to 1	A	-	-		
GM-52	N/A	staging area Prudhoe Bay	103	g,s,si	active flood plain	low to medium	mid channel	extensive	10+	10	2,500	0 to 3	P	-	-		

TABLE 1 BORROW INFORMATION
COASTAL ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALUATION	CROSS REFERENCE	
	MILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPANY	SITE NUMBER
GM-53	N/A	staging area Prudhoe Bay	103	s, s	marine (?)	medium to high	poor	extensive	30+	20	5,000	0 to 1	A	-	-
GM-54	43.5	CA - 01	320	s, g (SP)	active flood plain	medium to high	mid channel	600	10+	10	2,500	0 to 3	P	-	-
GM-56	82	CA - 02	325	s, s (GW)	outwash plain	low	fair to surrounding terrain	extensive	20+	20	5,000	0 to 2	A	-	-
GM-57	130	CA - 03	330	s, s, si (GW)	fossil flood plain	medium	fair into channel	extensive	20+	10	2,500	1 to 3	A	-	-
GM-58	173	CA - 04	395	s, s, si	fossil flood plain	medium	fair into channel	extensive	20+	10	2,500	1 to 3	A	-	-
GM-59	N/A	staging area Camden Bay	470	s, s, si	fossil flood plain	medium	fair into channel	extensive	20+	10	2,500	1 to 3	P	-	-
GM-60	N/A	staging area Demarcation Bay	470	s	marine (?)	high	poor	extensive	10+	10	2,500	0 to 1	P	-	-
GM-102	9	staging area Prudhoe Bay and Row	25.1	s, g	active flood plain	low	mid channel	6,400	10+	10	2,500	0 to 3	P	-	-
GM-103	28.5	Row	2.1	s, g (SM-SP)	fossil flood plain	medium to high	fair to channel	2,600	20+	10	2,500	2 to 5	P	-	-
GM-104	62	Row	4	s, s (GM)	fossil flood plain	low to medium	fair to channel	extensive	20+	10	2,500	2 to 5	P	-	-
GM-105	111	Row	3.9	s, g (SW)	fossil flood plain	medium	fair to channel	1,200	20+	10	2,500	2 to 5	P	-	-
GM-106	151	Row	5.2	s, g	active flood plain	low to medium	mid channel	2,000	10+	10	2,500	0 to 3	P	-	-
GM-107	196	Row	2.8	s, g	active flood plain	low to medium	mid channel	1,000	10+	10	2,500	0 to 3	P	-	-
GM-109	N/A	CA - 00A	2	s, g, si	fossil flood plain	low to medium	fair to channel	6,000 X 2,000	10+	10	2,500	1 to 3	P	-	-
GM-114	100	CA - 02A	2	s, s, si (GM)	fossil flood plain	low to medium	fair to channel	2,000	20+	10	2,500	2 to 8	P	-	-
GM-125	N/A	CA - 05A	2	s, s, si, t	hummocks	medium	fair to surrounding terrain	1,000 X 1,000	50+	20	5,000	0 to 2	P	-	-

TABLE 1 BORROW INFORMATION
COASTAL ROUTE CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALUATION	CROSS REFERENCE	
	MILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPANY	SITE NUMBER
GM-126	244	CA - 05A	2	s, g	outwash plain	medium	fair	3,000 X 3,000	10+	5	1,250	1 to 5	A	-	-
GM-127	N/A	CA - 07A	2	sh and s/s (Cret.)	plateau	low to nil	good	extensive	50+	20	5,000	to 5	P	-	-
GM-128	N/A	CA - 08A	2	s, g	alluvial terrace	medium	fair to channel	1,000 X 1,000	5+	5	1,250		P	-	-
GM-129	477	CA - 10A	2	s, g	moraine ridge	medium	fair to surrounding terrain	3,200 X 2,000	20	10	2,500		P	-	-

TABLE 1 BORROW INFORMATION
INTERIOR ROUTES - MARSH FORK AND CANNING RIVER

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NO.	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (100,000 cu yd)	OVERBURDEN (FT.)	SITE EVALU- ATION	CROSS REFERENCE	
	WILE POST	FACILITY	REQUIRED VOLUME (100,000 cu yd)											COMPANY	SITE NUMBER
202	39.2	IA - 01	425	g,s,si	active flood plain	low to medium	mid-channel	2,000	10+	10	2,500	0 to 2	P	-	-
203	73	IA - 02	400	g,s,si	active flood plain	low to medium	mid-channel	1,000	10+	10	2,500	0 to 2	P	-	-
203a	65.3	Road for IA - 02	300	g,s,si	active flood plain	low to medium	mid-channel	800	10+	10	2,500	0 to 2	P	-	-
204	71.5	IA - 02	700	ss,sls,sh	ridge	low to nil	good downslope	extensive	50+	20	5,000	0 to 5	A	-	-
210	118.7	IA - 03	400	g,s,si	fossil flood plain	low to medium	fair to channel	3,000 X 500	10+	10	2,500	1 to 3	A	-	-
212	143.6	IA - 04	480	g,s,si	fossil flood plain	low to medium	good to channel	600	10+	10	2,500	1 to 3	A	-	-
226	349	IA - 08	665	volcanic rock (greenstone)	ridge	low to nil	good downslope	extensive	50+	20	5,000	1 to 5	P	-	-
237	478	staging area RMP-950	290	sh,ss (Cret.)	ridge	low to nil	poor	extensive	50+	20	5,000	2 to 4	P	RKL	FM-500
244	503	IA - 11	360	sh,ss (Cret.)	river bank (escarpment)	low to nil	fair into channel	extensive	50+	20	5,000	0 to 10	P	-	-
249	519.5	ROW		g,s,si (GM)	outwash plain	low to medium	good to surrounding terrain	3,600 X 6,000	10+	10	2,500	1 to 3	P	EBA RKL	1069a 654
252	530.5	M - 03	1,435	s,g,si (SM - SC)	outwash plain	low to medium	good to surrounding terrain	7,000 X 1,600	20+	20	5,000	1 to 5	P	EBA	1070
GM-39	479	staging area RMP - 950	290	t	moraine hummocks	medium	fair	extensive	50+	20	5,000	to 1	A	-	-
GM-42	505	staging area RMP - 902	415	sh,ss (Cret.)	river bank (escarpment)	low to nil	good to channel	extensive	50+	20	5,000	0 to 10	P	-	-
GM-43	301.3	IA - 07	610	sl,s	alluvial terrace	low to medium	fair to channel	100	10+	5	1,250	1/2 to 3	P	-	-
GM-44	301.4	IA - 07	610	gr	ridge	low to nil	good on ridges	4,000 X 1,400	50+	20	5,000	0 to 1	P	-	-

TABLE 1 BORROW INFORMATION
INTERIOR ROUTES CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT.)	ESTIMATED DEPTH (FT.)	ESTIMATED RECOVERY DEPTH (FT.)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT.)	SITE EVALUATION	CROSS REFERENCE	
	FILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPLY	SITE NUMBER
GM-52	N/A	staging area Prudhoe Bay	303	g,s,sl	active flood plain	low to medium	mid-channel	extensive	10+	10	2,500	0 to 3	P	-	-
GM-53	N/A	staging area Prudhoe Bay	303	sl,s	marine (?)	medium to high	poor	extensive	30+	20	5,000	0 to 1	A	-	-
GM-61	335.4	staging area @ MP 335-Old Crow	240	gr	plateau	low to nil	good downslope	3,600 X 1,400	50+	20	5,000	1 to 5	P	-	-
GM-62	334	staging area @ MP 335-Old Crow	240	s,g (SM)	alluvial terrace	medium to high	fair to channel	3,600 X 1,000	15+	10	2,500	1 to 10	A	-	-
GM-63	394	IA - 09 compressor st'n pad	360	sh,ss (Cret.)	plateau	low to nil	good downslope	extensive	50+	20	5,000	1 to 5	P	-	-
GM-64	396.5	IA - 09 airstrip and road	1,210	sh,ss (Cret.)	ridge	low to nil	good downslope	14,000 X 700	50+	20	5,000	1 to 5	P	-	-
GM-65	409	Row		ss,sh,sls	plateau	low to nil	good downslope	extensive	50+	20	5,000	1 to 5	P	-	-
GM-66	433.9	IA - 10	300	sh,ss (Cret.)	plateau	low to nil	good downslope	extensive	50+	20	5,000	1 to 10	P	-	-
GM-67	39.4	IA - 01	425	s,g,sl (SP)	fossil flood plain	low	fair to channel	2,000	10+	10	2,500	1 to 3	A	-	-
GM-68	117.2	IA - 03	400	q,schist	ridge	low to nil	good down-slope to channel	extensive	50+	20	5,000	0 to 5	P	-	-
GM-71	147	IA - 04	480	bedrock colluvium	talus slopes	medium to high	fair down-slope to channel	3,600 X 1,400	50+	20	5,000	½ to 2	P	-	-
GM-72	189.4	IA - 05	465	ss,sh,cgt (Upper Dev.)	ridge	low to nil	fair downslope	extensive	50+	20	5,000	0 to 5	P	-	-
GM-73	251.5	IA - 06	1,521	sh,ch (Perm.) gabbro, diorite basalt (Jur.)	terraces & ridges	low to nil	fair to good downslope to channel	extensive	50+	20	5,000	5 to 10	P	-	-
GM-74	95.5	Row		q	ridge	low to nil	good down-slope to channel	extensive	50+	20	5,000	0 to 2	P	-	-
GM-75	95	staging area @ MP - 91	1,125	g,s,sl	fossil flood plain	low to medium	good to channel	2,000	10+	10	2,500	1 to 3	A	-	-
GM-76	167.2	airstrip for staging area @ MP 168	1,800	ls	ridge	low to nil	good downslope	extensive	50+	20	5,000	0 to 5	P	-	-

TABLE 1 BORROW INFORMATION
INTERIOR ROUTES CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT)	ESTIMATED DEPTH (FT)	ESTIMATED RECOVERY DEPTH (FT)	ESTIMATED AVAILABLE VOLUME (100,000 cu yd)	OVERBURDEN (FT)	SITE EVALU- ATION	CRISIS REFERENCE	
	WILE POST	FACILITY	REQUIRED VOLUME (100,000 cu yd)											COMPANY	SITE NUMBER
GM-77	168.2	road and staging area @ MP 168	265	g,s,si	outwash plain	low to medium	fair to channel	7,000 X 600	10+	10	2,500	0 to 2	A	-	-
GM-91	311.9	Row		s,si,g	alluvial meander plain	medium	good to channel	500	10+	10	2,500	1/2 to 3	P	-	-
GM-92	369.3	Row		s,g,si	active flood plain	low	mid-channel	1,400	10+	10	2,500	0 to 3	P	-	-
GM-93	387.5	Row		si,s,g	alluvial meander plain	low to medium	good to channel	1,800	10+	10	2,500	2 to 5	P	-	-
GM-95	429.5	Row		g,s,si	active flood plain	low	mid-channel	400	10+	10	2,500	0 to 3	P	-	-
GM-108	10.1	IA - 00	24	s,g,si (SM-GW)	active flood plain	medium to high	mid-channel	6,000	10+	10	2,500	0 to 3	P	-	-
GM-109	32.5	Row		s,g,si	fossil flood plain	low to medium	fair to channel	6,000 X 2,000	10+	10	2,500	1 to 3	P	-	-
GM-110	105.7	Row		s,g,si	fossil flood plain	low to medium	good to channel	6,000 X 2,600	10+	10	2,500	1 to 3	P	-	-
GM-111	131.2	Row		g,s,si	fossil flood plain	low to medium	fair to channel	4,200 X 1,800	10+	10	2,500	1 to 3	P	-	-
GM-112	235.5	staging area @ MP 235	240	g,s (SM-GW)	outwash plain	low	fair to good	extensive	10+	10	2,500	2 to 5	P	-	-
GM-113	267.1	staging area @ MP 269	194	g,s (SM-GW)	active flood plain	low	mid-channel	1,200	10+	10	2,500	0 to 3	P	-	-
GM-124	463	IA - 10B	2	s,g	glaciofluvial ridge ?	low	well downslope	1,000 X 100 ?	10+	10	2,500	0 to 2	A	-	-
GM-140a	191.4	IA - 05 (on Canning River Option Route only)	585	g,s	kame	low	good to adjacent lakes	1,500 X 500	10+	10	2,500	0 to 2	P	-	-
GM-141	417.2	staging area MP 417 Lapierre House	145	ss,sh,sls (Cret.)	ridge	low to nil	good downslope	extensive	50+	20	5,000	1 to 5	P	-	-

TABLE 1 BORROW INFORMATION
INTERIOR ROUTES CONT'D

SITE IDENTIFICATION				DESCRIPTION OF DEPOSIT						PROPOSED BORROW PIT DATA					
BORROW AREA NUMBER	BORROW LOCATION			MATERIAL	LANDFORM	ICE CONTENT	DRAINAGE	DIMENSIONS OF DEPOSIT (FT)	ESTIMATED DEPTH (FT)	ESTIMATED RECOVERY DEPTH (FT)	ESTIMATED AVAILABLE VOLUME (10 ³ yd ³)	OVERBURDEN (FT)	SITE EVALU- ATION	GOOD REFERENCE	
	MILE POST	FACILITY	REQUIRED VOLUME (10 ³ yd ³)											COMPANY	SITE NAME
GM-142	447.2	staging area @ MP 447	567	g,s	alluvial or glaciofluv- ial terrace	low to medium	fair to channel	9,000 X 1,200	20+	10	2,500	0 to 3	P	-	-
GM-146	93.5	staging area @ MP 91	1,125	g,s	outwash plain	low to medium	fair	extensive	20+	10	5,000	0 to 2	P	-	-
GM-147	118	LA - 03 (on Canning River Option Route)	480	ss,sh (Cret.)	ridge	low to nil	good downslope	extensive	50+	20	5,000	1 to 5	P	-	-

Environmental Data on Borrow Sources

Borrow sites were assessed in the office by a team of environmentalists. Data obtained from the environmental overlays on the project alignment sheets provided the basis for determining the nature of environmental concerns related to the borrow sites. Site specific information was lacking for most sites.

Table 2 was prepared to summarize environmental considerations related to each borrow site. It should be noted that these conclusions are tentative and must be confirmed by field investigations. For example, sites labelled as denning areas may simply mean that the habitat conditions are suitable for dens and the presence and number of suspected dens must be confirmed in the field.

Also it should be pointed out that assessment from the vegetation viewpoint is related specifically to problems that must be considered if revegetation of borrow sites is attempted.

Environmental concerns may be satisfied by scheduling borrow operations during seasons that are not critical from the fish, wildlife and vegetation standpoints.

TABLE 2

SUMMARY OF ENVIRONMENTAL COMMENTS ON BORROW SITES

1

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
Taglu Pool Supply Line				
GM 135	Potential fox and bear denning	Potential waterfowl breeding, moulting, migration	Possibility of flooding	Non-critical
3	Potential fox and bear denning	Potential waterfowl breeding, moulting, migration	Revegetation difficult due to very dry soils	Non-critical
GM 134	Non-critical	Non-critical	Non-critical	Non-critical
10	fox denning area	Swan, duck, geese breeding	Possible drought conditions, Non-critical	Non-critical
GM 132	fox denning area	Non-critical	Non-critical	Non-critical
GM 133	fox denning area	Waterfowl breeding and moulting	Possible drought conditions, Non-critical	Non-critical
GM 136	fox denning area	Non-critical	Possible drought conditions, Non-critical	Non-critical
GM 4	fox denning area	Non-critical	Non-critical	Non-critical
GM 137	Potential denning area	Potential waterfowl breeding and moulting	Non-critical	Non-critical
GM 5	Potential denning area	Potential waterfowl breeding and moulting	Non-critical	Non-critical

TABLE 2 CONT'D

2

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 138	Non-critical	Potential raptor breeding sites	Non-critical	Non-critical
GM 39	Non-critical	Potential raptor breeding sites	Non-critical	Potential siltation
DPW	Non-critical	Potential raptor breeding sites	Non-critical	Non-critical
GM 78	Non-critical	Non-critical	Possibility of water erosion revegetation necessary	Non-critical
GM 140	Potential denning area	Non-critical	Non-critical	Non-critical
GM 8A	Potential denning area	Potential raptor breeding site	Non-critical	Non-critical
<u>Main Line</u>				
256	Potential denning area	Potential waterfowl area	Non-critical	Potential siltation
GM 96	Potential denning area	Potential raptor area	Non-critical	Non-critical
GM 116	Potential denning area	Potential raptor area	Potential water erosion	Non-critical
	Productive mammal habitat	Potential raptor area	Non-critical	Non-critical

TABLE 2 CONT'D

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 10	Productive mammal habitat	Potential raptor area	Non-critical	Non-critical
300	Productive mammal habitat	Potential raptor area	Non-critical	Non-critical
GM 117	Potential denning area	Potential raptor area	Non-critical	Non-critical
303	Potential denning area	Potential raptor area	Non-critical	Non-critical
306	Potential denning area	Potential raptor area	Non-critical	Non-critical
308	Potential denning area	Potential waterfowl area	Non-critical	Potential siltation
319	Potential denning area	Potential raptor area	Potential thermal erosion	Non-critical
GM 131	Potential moose wintering area	Potential raptor and waterfowl area	Non-critical	Non-critical
321	Productive mammal area	Raptor area	Non-critical	Non-critical
GM 14	Productive mammal area	Potential raptor area	Non-critical	Non-critical
326A	Potential denning area	Potential raptor area	Non-critical	Non-critical

TABLE 2 CONT'D

30

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
328	Potential denning area	Potential raptor area	Non-critical	Non-critical
FGH 3	Potential denning area	Potential raptor area	Non-critical	Non-critical
FGH 2	Potential denning area	Potential raptor area	Non-critical	Non-critical
FGH 7	Non-critical	Non-critical	Potential thermal erosion	Non-critical
P 315	Non-critical	Potential raptor area	Potential thermal erosion and flooding	Non-critical
P 319	Potential denning area	Potential raptor area	Non-critical	Non-critical
374	Non-critical	Potential raptor area	Potential thermal erosion	Non-critical
374A	Non-critical	Non-critical	Non-critical	Non-critical
P 289	Productive mammal habitat	Potential raptor area	Non-critical	Non-critical
P 291A	Productive mammal habitat	Potential raptor area	Potential channelization	Non-critical
413	Non-critical	Potential raptor area	Non-critical	Non-critical
NW 15	Potential denning area	Potential raptor area	Non-critical	Non-critical
GM 118	Non-critical	Non-critical	Non-critical	Non-critical

TABLE 2 CONT'D

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
NW 4	Non-critical	Potential raptor area	Non-critical	Non-critical
P 279	Productive mammal habitat	Potential raptor area	Non-critical	Grayling stream, Potential disruption of spawning and rearing habitat
P 271	Non-critical	Non-critical	Non-critical	Non-critical
P 266 A	Productive mammal habitat	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
P 262	Potential denning area	Non-critical	Non-critical	Non-critical
150 BH	Non-critical	Non-critical	Potential thermal erosion	Non-critical
P 242	Potential denning area	Non-critical	Non-critical	Non-critical
P 227	Non-critical	Non-critical	Non-critical	Non-critical
P 226	Non-critical	Non-critical	Non-critical	Non-critical
P 213	Productive mammal habitat	Potential raptor area	Potential slope failure	Non-critical
P 199	Non-critical	Non-critical	Non-critical	Non-critical
P 197	Potential moose winter habitat	Potential raptor area	Non-critical	Non-critical
P 191	Productive mammal habitat	Non-critical	Non-critical	Non-critical
G4 119	Potential moose winter habitat	Potential raptor area	Non-critical	Non-critical

TABLE 2 CONT'D

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
P 183	Potential moose winter habitat	Potential raptor area	Non-critical	Non-critical
P 174	Productive mammal habitat	Potential raptor area	Potential thermal erosion	Potential disruption of spawning and rearing habitat
P 170	Productive mammal habitat	Potential raptor area	Potential thermal erosion	Non-critical
P 159	Non-critical	Non-critical	Non-critical	Non-critical
W 5	Non-critical	Non-critical	Non-critical	Non-critical
P 152	Non-critical	Non-critical	Potential slope failure	Non-critical
P 146	Potential denning area	Non-critical	Non-critical	Non-critical
P 143A	Productive mammal habitat	Potential raptor area	Non-critical	Non-critical
P 139	Potential moose winter habitat	Potential raptor area	Non-critical	Non-critical
P 118	Non-critical	Non-critical	Non-critical	Non-critical
P 124	Non-critical	Non-critical	Non-critical	Non-critical
P 109	Non-critical	Non-critical	Non-critical	Non-critical
GM 121	Productive mammal habitat	Potential raptor area	Potential flooding and channelization	Potential siltation
GM 20	Non-critical	Non-critical	Potential thermal erosion	Non-critical

TABLE 2 CONT'D

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 19	Non-critical	Non-critical	Potential slope failure and erosion of shale	Non-critical
GM 87	Productive mammal habitat	Potential raptor area	Potential flooding and channelization	Potential disruption of spawning and rearing habitat
GM 97	Non-critical	Non-critical	Non-critical	Non-critical
GM 122	Non-critical	Potential raptor area	Non-critical	Non-critical
GM 98	Non-critical	Non-critical	Non-critical	Non-critical
GM 99	Non-critical	Non-critical	Non-critical	Non-critical
GM 100	Non-critical	Non-critical	Non-critical	Non-critical
GM 101	Non-critical	Non-critical	Non-critical	Non-critical
GM 22	Non-critical	Non-critical	Non-critical	Non-critical
GM 27	Non-critical	Non-critical	Non-critical	Non-critical
GM 25	Potential moose winter habitat	Potential raptor area	Non-critical	Non-critical
GM 90	Non-critical	Non-critical	Potential flooding	Non-critical
GM 123	Non-critical	Non-critical	Non-critical	Non-critical
GM 30A	Non-critical	Non-critical	Some thermal erosion but Non-critical	Non-critical
GM 30	Non-critical	Non-critical	Non-critical	Non-critical

TABLE 2 CONT'D

8

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 89	Productive mammal habitat	Potential waterfowl area	Non-critical	Non-critical
GM 83	Potential denning area	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
GM 32	Non-critical	Non-critical	Potential flooding and channelization	Non-critical
GM 33			Non-critical	Non-critical
GM 32A	Productive mammal habitat	Non-critical	Non-critical	Potential siltation
GM 143A	Productive mammal habitat	Potential raptor area	Potential flooding	Potential siltation
<u>Prudhoe Bay Supply Line</u>				
GM 102	Non-critical	Non-critical	Non-critical	Potential disruption of rearing and overwintering habitat
GM 109	Non-critical	Non-critical	Non-critical	Potential disruption of spawning and rearing habitat
GM 103	Potential denning area	Non-critical*	Potential thermal erosion	Potential siltation
GM 54	Non-critical	Non-critical*	Non-critical	Potential disruption of spawning and rearing habitat
GM 104	Non-critical	Non-critical*	Potential thermal erosion	Potential siltation
107	Non-critical	Non-critical*	Non-critical	Potential disruption of spawning and rearing habitat

TABLE 2 CONT 'D

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 56A	Potential denning area	Non-critical	possible drought conditions Non-critical	Non-critical
GM 114	Potential denning area	Non-critical*	Potential thermal erosion	Non-critical
GM 105	Potential denning area	Non-critical*	Non-critical	Potential siltation
113	Non-critical	Non-critical	Non-critical	Potential disruption of spawning and rearing habitat and migration
GM 57	Potential denning area	Non-critical*	Non-critical	Non-critical
GM 106	Non-critical	Non-critical	Non-critical	Potential disruption of spawning and rearing habitat and migration
121	Non-critical	Non-critical	Non-critical	Potential disruption of spawning and rearing habitat and overwintering habitat and migration
GM 58A	Potential denning area	Non-critical*	Non-critical	Non-critical
GM 107	Non-critical	Non-critical	Non-critical	Potential disruption of spawning and rearing habitat
124	Non-critical		Non-critical	Potential disruption of spawning and rearing habitat
GM 34	Further studies required	Further studies required		Potential disruption of spawning, rearing and over- wintering habitat
125	Potential denning area	Non-critical*	Non-critical	Potential disruption of spawning and rearing habitat

TABLE 2 CONT'D

10

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
126A	Non-critical	Potential raptor area	Non-critical	Non-critical
127	Potential denning area	Non-critical	Non-critical	Potential disruption of spawning, rearing and overwintering habitat and migration
GM 126A	Potential denning area Further studies required	Potential raptor area	Potential thermal erosion	Non-critical
GM 125			Non-critical	Non-critical
131	Potential denning area Further studies required	Potential raptor area	Potential thermal erosion and slumping	Non-critical
GM 35A	Potential denning area Further studies required	Non-critical	Non-critical	Non-critical
133	Non-critical	Raptor Area, Buff-breasted sandpiper	Non-critical	Potential disruption of spawning and rearing habitat
GM 46	Non-critical Further studies required	Non-critical	Non-critical	Potential disruption of spawning and rearing habitat
GM 47	Non-critical	on beach!	Non-critical	Potential disruption of estuarian habitat
137	Non-critical	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
GM 36	Non-critical	Potential raptor area	Possible slumping	Potential siltation

TABLE 2 CONT'D

11

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
138	Non-critical	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
140	Productive mammal habitat	Potential raptor area	Non-critical	Potential disruption of rearing habitat
GM 127	Productive mammal habitat	Potential raptor area	Potential thermal erosion	Non-critical
141	Productive mammal habitat	Potential raptor area	Non-critical	Non-critical
GM 37	Non-critical	Non-critical	Non-critical	Non-critical
142(A)	Potential denning area	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
142	Potential denning area	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
GM 128	Potential denning area	Waterfowl area	Non-critical	Non-critical
143	Non-critical	Potential raptor area	Non-critical	Non-critical
147	Productive mammal habitat	Potential raptor area	Non-critical	Potential siltation
GM 38	Non-critical	Non-critical	Non-critical	Non-critical
237	Non-critical	Potential raptor area	Non-critical	Non-critical
GM 39A	Non-critical	Non-critical	Potential thermal erosion	Non-critical
244	Non-critical	Potential raptor area	Non-critical	Potential siltation

TABLE 2 CONT'D

12

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 42	Non-critical	Potential raptor area	Potential thermal erosion possible slumping	Non-critical
249	Productive mammal habitat	Non-critical near good waterfowl area	move to kame	Non-critical
GM 129	Productive mammal habitat	Good Waterfowl area	Non-critical	Potential siltation
252	Productive mammal habitat	Good Waterfowl area Further studies required	Non-critical (move slightly W. to esker)	Potential siltation
38 Interior Alternative				
GM 108	Non-critical	Non-critical*	Non-critical	Potential disruption of rearing and overwintering habitat
GM 109	Potential denning area	Non-critical*	Potential thermal erosion	Potential siltation
202	Non-critical	Non-critical	Non-critical	Potential disruption of rearing habitat and migration
GM 67a	Potential denning area	Non-critical*	Non-critical	Potential siltation
203a	Productive mammal habitat	Non-critical*	Non-critical	Potential disruption of rearing habitat and migration
204a	Further studies required		Non-critical	Non-critical
203	Further studies required		Non-critical	Potentially very serious
GM 146	Non-critical	Non-critical	Potential thermal erosion	Non-critical

TABLE 2 CONT'D

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 74	Further studies required	Potential raptor area	Potential accelerated erosion	Non-critical
GM 110	Productive mammal habitat	Non-critical*	Non-critical	Potential siltation
GM 68	Productive mammal habitat	Non-critical*	Non-critical	Potential disruption of spawning and rearing habitat
210A	Productive mammal habitat	Non-critical*	Non-critical	Potential siltation
GM 111	Productive mammal habitat	Non-critical*	Non-critical	Potenital siltation (most important spawning area on Canning)
39 212A	Productive mammal habitat	Non-critical*	Possible slumping	Non-critical
GM 71	Productive mammal habitat	Non-critical*	Potential accelerated erosion	Non-critical
GM 76	Productive mammal habitat	Non-critical*	Non-critical	Non-critical
GM 77a	Productive mammal habitat	Non-critical*	Non-critical	Non-critical
GM 72	Potential denning area	Potential raptor area	Non-critical	Non-critical
			Non-critical	Non-critical
GM 112	Non-critical	Non-critical	Non-critical	Non-critical

TABLE 2 CONT'D

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 73	Potential denning area	Potential raptor area	Possible slumping	Non-critical
GM 113	Productive mammal habitat	Non-critical	Non-critical	Potential disruption of spawning and rearing habitat
GM 43	Productive mammal habitat	Non-critical*	Potential thermal erosion	Potential disruption of spawning and rearing habitat
GM 44	Productive mammal habitat	Potential raptor area	Non-critical	Non-critical
GM 91	Productive mammal habitat	Non-critical*	Possible slumping	Potential disruption of spawning and rearing habitat
GM 62A	Non-critical	Potential raptor area	Potential thermal erosion	Potential siltation
GM 61	Non-critical	Potential raptor area	Possible slumping	Non-critical
226	Non-critical	Potential raptor area	Possible slumping	Non-critical
GM 92	Productive mammal habitat	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
GM 93	Productive mammal habitat Very critical	Potential raptor area	Possible slumping	Potential disruption of spawning and rearing habitat
GM 63	Non-critical	Non-critical	Non-critical	Non-critical
GM 64	Non-critical	Non-critical	Non-critical	Non-critical

TABLE 2 CONT'D

15

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 65			Non-critical	Non-critical
230	Productive mammal habitat	Non-critical*	Non-critical	Potential disruption of spawning and rearing habitat
GM 141	Non-critical	Non-critical	Non-critical	Non-critical
GM 95	Productive mammal habitat Sensitive	Potential raptor area	Non-critical	Potential disruption of spawning and rearing habitat
GM 66		Non-critical	Non-critical	Non-critical
GM 142	Productive mammal habitat Sensitive	Non-critical	Potential thermal erosion	Non-critical
<u>South of 60°N</u>				
GM 143	Productive mammal habitat	Non-critical	Potential flooding	Potential siltation
GM 144	Non-critical	Potential waterfowl area	Potential thermal erosion and flooding	Non-critical
GM 80	Productive mammal habitat	Non-critical*	Potential flooding	Potential siltation
GM 79	Productive mammal habitat	Non-critical*	Potential flooding	Potential siltation
GM 81	Productive mammal habitat	Non-critical*	Potential flooding	Potential siltation
GM 82	Non-critical	Non-critical	Definite flooding	Non-critical

TABLE 2 CONT'D

16

<u>Borrow Site</u>	<u>Mammals</u>	<u>Birds</u>	<u>Vegetation</u>	<u>Fish</u>
GM 84	Productive mammal habitat	Non-critical	Potential flooding	Non-critical
GM 85	Productive mammal habitat	Non-critical	Potential flooding	Non-critical
GM 86	Productive mammal habitat		Non-critical	Non-critical

* riparian area more productive to birds than surrounding areas, but birds here are widely distributed, prefer floodplain.

The final selection of all borrow sites is dependent upon on-site investigation by biologists to ensure that the potential site is acceptable from an environmental point of view.

DEVELOPMENT OF TYPICAL BORROW PITS

Development and restoration plans for typical borrow pits including original contours (form lines), rehabilitation and revegetation requirements and assessment of potential uses and environmental impact are included in this section.

The following representative preferred major borrow sites have been selected and their general development and rehabilitation shown:

1. Gravel Borrow Pits in Upland Areas

- a) An esker-kame complex where mining operations will generally be carried out at approximately the same elevation or above that of the surrounding terrain, e.g. Fort Good Hope esker.
- b) An outwash terrace where mining operations may be carried out either at the level of the surrounding terrain or below it, e.g. Oscar Creek outwash terrace.

2. Gravel Borrow Pits in Flood Plains

- a) A river flood plain where granular borrow will be mined from both the bars in the active flood plain and the adjacent fossil flood plains, e.g., Rapid Creek, Yukon Territory and the Tamayariak River, Alaska.
- b) A river flood plain typical of Arctic Coastal rivers having broad

seasonally active flood plains¹ with numerous small low-flow braided channels, e.g., Malcolm River, Yukon Territories and the Sagavanirktok River, Alaska.

3. A rock quarry where mining of a prominent outcrop of limestone will be carried out above the general elevation of the surrounding terrain, e.g., Franklin Mountains at approximately M.P. 490 between the Blackwater River to Little Smith Creek and adjacent to the Kongakut River, Alaska.

These examples will, in general, provide relatively detailed descriptions of the proposed borrow operations as they will affect most of the preferred sites.

¹ It should be noted that the term "Active Flood Plain" as used here is in accordance with J.D. Mollard's terrain unit definition for active flood plain (AFP). Mollard uses "active flood plain" to refer to the area of the flood plain that experiences frequent flooding. The term "Active Flood Plain" in the Environmental Impact section of Exhibit 14d was used to refer to the portion of the channel with flowing water. Although gravel borrow operations have been proposed for areas of the "Active Flood Plain", this refers to those areas like gravel bars, which are above normal levels of flowing water. Borrow operations will not be attempted in channels of the active flood plain where flowing water is present.

General Criteria for Gravel Borrow Pits in Upland Areas

- (1) The proposed borrow pit area will be examined and assessed prior to detailed investigation and development in order to locate and minimize potential damage to any significant critical mammal, bird or fish populations and/or habitat.
- (2) Where necessary, buffer zones with a minimum width of 300 feet will be established between water courses and the final limits of a proposed borrow area in order to prevent introduction of sediment into these water courses. All necessary erosion and drainage control measures will be undertaken during the restoration and rehabilitation of the borrow pit to prevent erosion and siltation.
- (3) Subsurface investigations will be carried out in the designated borrow pit area by test pitting with backhoe equipment or drilling prior to any major clearing, stripping or excavating operations to confirm the continuity, consistency and adequacy of quantities within the gravel stratum.
- (4) On the basis of this additional test pit information, the final limits of the borrow pit will be surveyed to conform, as near as possible, to the designated area outlined on the site plan.
- (5) Test pits which will be outside the final boundary of the proposed borrow site will be properly backfilled and restored. All test pitting will be conducted with as little disturbance as possible to the surrounding ground surface.
- (6) Any stands of large timber which may be of commercial value will be harvested and stockpiled adjacent to the borrow site in accor-

dance with respective Territorial or other government regulations.

All harvested timber will be topped and limbed.

- (7) In general, the development of the borrow site will be conducted in several stages (ref. site drawing) so that the adjacent borrow areas can be used for burning of slash and stockpiling of organic and mineral soil overburden.
- (8) Initially the large timber will be cleared and/or harvested from the first two stages of the borrow areas.
- (9) The slash material from limbing operations and larger under-story growth will be windrowed and burned in accordance with current land use regulations. These windrows will be properly isolated with required firebreaks and will be adequately policed during the burning.
- (10) In general, the lesser vegetation, organic top soil and overburden material (if any) will be stripped from the initial stage and will be stockpiled on the adjacent cleared area of the next stage.
- (11) The mineral soil overburden encountered on applicable borrow sites will be removed and stockpiled separately from the organic stripping on the adjacent cleared borrow area.
- (12) Sand and gravel from the initial stage will be excavated to the final borrow pit floor elevation for that stage as designated on the cross sections on the attached drawings.
- (13) All depleted areas will be graded to the approximate elevations designated on the cross sections.
- (14) The final borrow pit floor will be graded where necessary, to ensure floor gradients not exceeding 1% and will be sloped in a

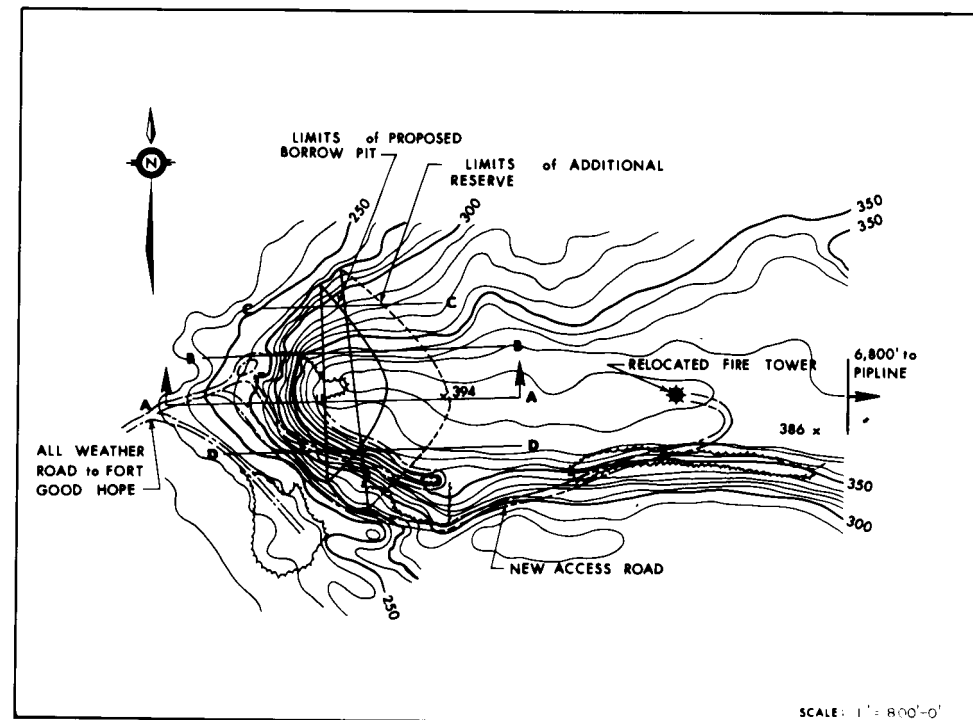
direction compatible with the surficial drainage of the adjacent terrain. Terracing between stages within borrow pit areas may be required to ensure final borrow pit floor gradients of less than 1%. Erosion and drainage control measures as outlined in the exhibit such as flow obstructions, dikes, etc. will be used to minimize the erosion of the exposed surfaces.

- (15) The resultant gravel faces of an excavation which are to be left exposed will be shaped and left standing at a final slope of approximately 2 horizontal to 1 vertical or at the natural angle of repose of the gravel where no re-vegetation is contemplated. Where gravel faces are to be restored by replacement of organic cover, final grading to a maximum slope of 3 horizontal to 1 vertical will be carried out. In general, less area will be disturbed by construction operations when steeper final slopes compatible with stability can be used.
- (16) Exposed faces of excavation consisting of fine-grained mineral soil or overburden with high ice contents will be cut vertically and left for natural restoration by slumping.
- (17) In order to avoid unsightly stockpiles, the organic top soil and mineral soil overburden will be re-excavated from the stockpiles and will be spread as uniformly as possible over the recontoured borrow pit floor of the initial borrow area. The mineral soil will be replaced first followed by the organic material spread over the surface.
- (18) The clearing, windrowing and burning of slash, stripping and stockpiling of organic top soil and/or mineral soil overburden,

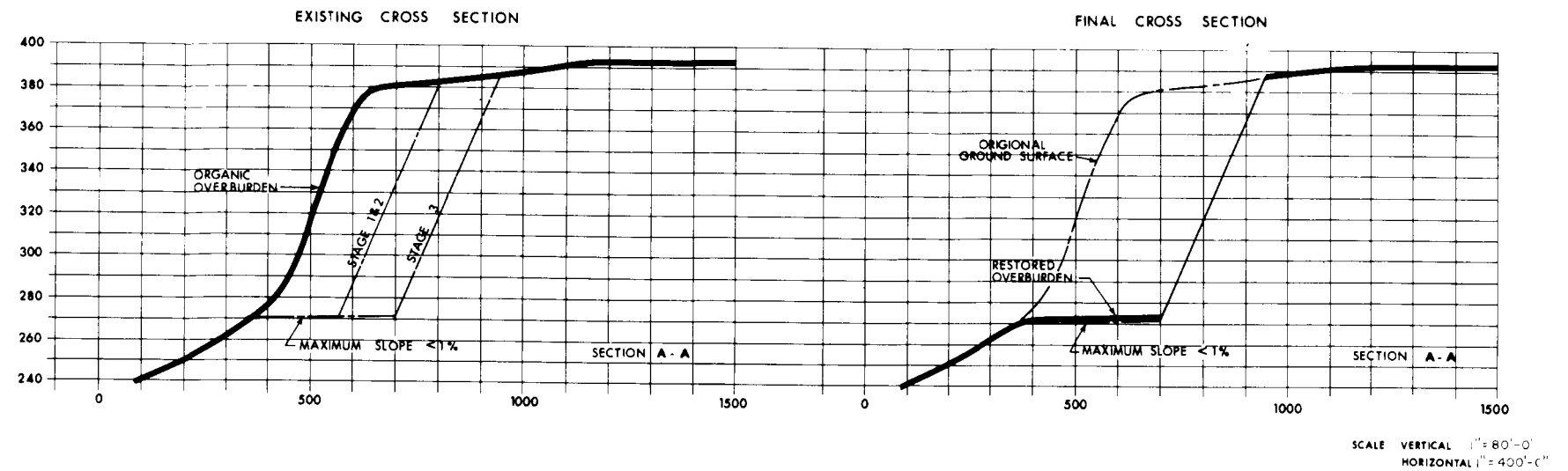
excavation of sand and gravel, and restoration of the depleted borrow areas will be carried out in a sequential manner for subsequent borrow pit stages.

- (19) The depleted borrow areas of each preceding stage will be utilized for spreading of mineral soil overburden and for temporary stockpiling or windrowing of organic top soil and pulverized vegetation.
- (20) The restored layer or organic top soil, mixed with vegetation on depleted borrow areas, will be broken down and pulverized where necessary by several passes of dozer track equipment to assure the best possible distribution over the area to be rehabilitated.
- (21) If required, seeding of grasses and planting of shrub cuttings will be undertaken on the slopes of the abandoned borrow pits to minimize erosion and on the floor areas to rehabilitate wildlife habitat where desirable or necessary.
- (22) The final grading of the borrow area in accordance with the attached cross sections will ensure drainage with minimum gradients which will be compatible with the surrounding terrain and will minimize future erosion.
- (23) In general, the excavation of sand and gravel, and overall borrow pit development operations will be conducted during the winter months between freeze-up and breakup to ensure a minimum of damage to the surrounding terrain.
- (24) Where washing operations are required for the production of concrete aggregate, stilling basins will be provided for the accumulation of wash water.

- (25) Notes relative to the specific development, rehabilitation and/or restoration for selected borrow sites are tabulated on the respective drawings.

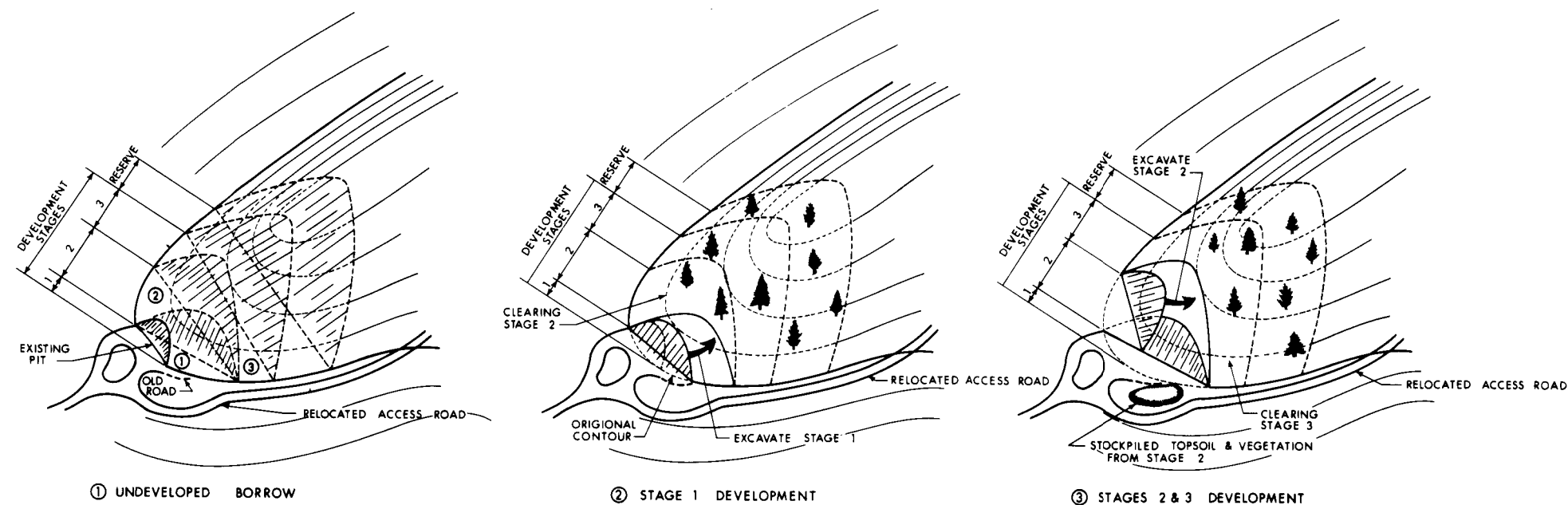


BORROW PIT DEVELOPMENT PLAN



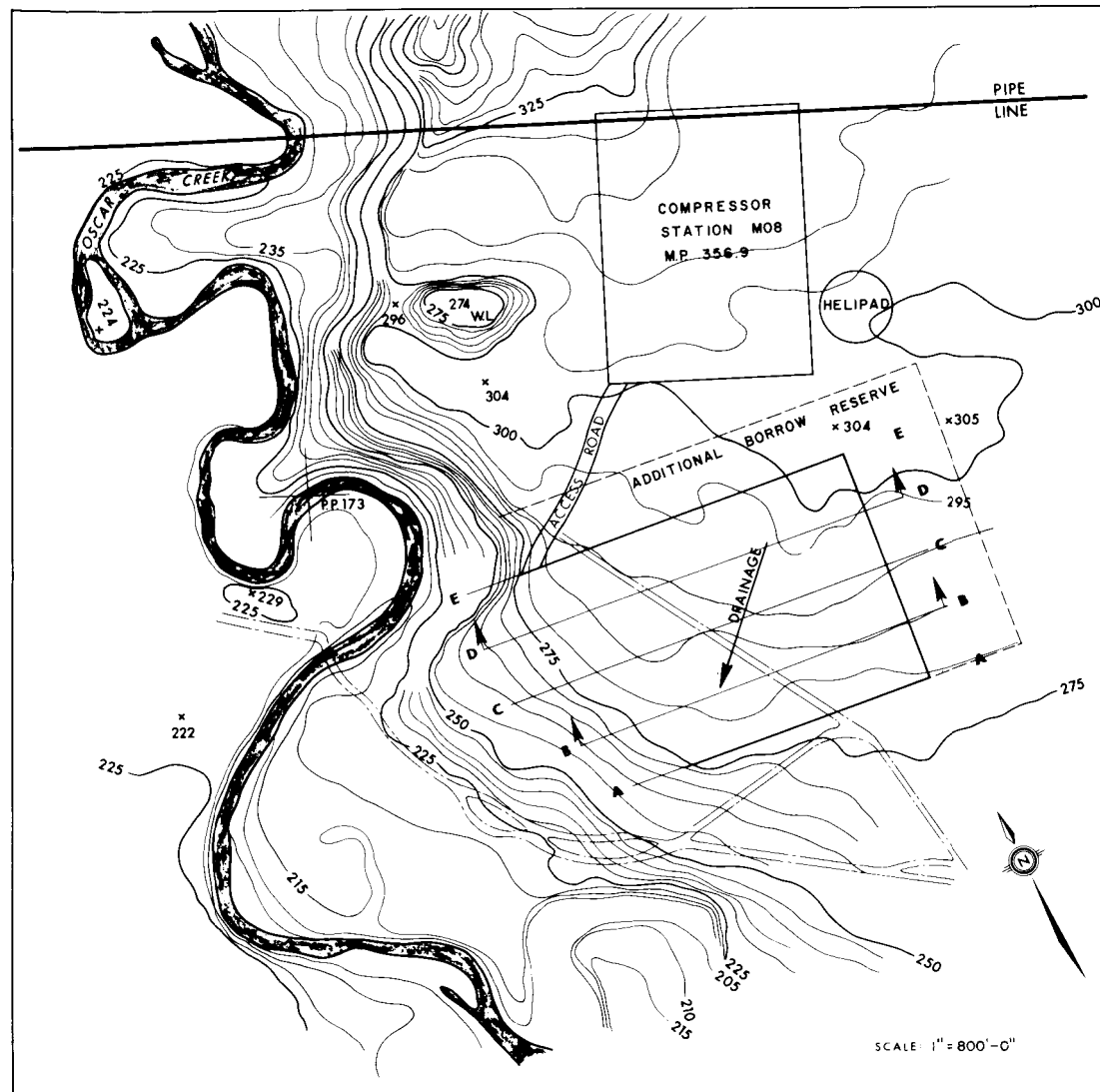
NOTES:

1. TERRAIN: ESKER-KAME COMPLEX.
2. GRAVEL REQUIREMENTS: 244,000 CUBIC YARDS FOR WHARFS, PERMANENT ROADS, HELIPAD AND PIPELINE.
3. AREA OF PROPOSED BORROW PIT: 8 ACRES.
4. VEGETATION: MODERATELY DENSE GROWTH OF LARGE SPRUCE ALONG THE NORTHWESTERN FLANKS OF THE ESKER RIDGE.
5. ORGANIC TOPSOIL: LESS THAN 8 INCHES IN DEPTH, APPROXIMATELY 10,000 CUBIC YARDS.
6. MINERAL SOIL OVERBURDEN: NONE ANTICIPATED AT THIS SITE.
7. TIMBER OF POTENTIAL COMMERCIAL QUALITY IS AVAILABLE ALONG THE NORTHWEST PORTION OF THIS SITE AND SHOULD BE HARVESTED.
8. THE INITIAL DEVELOPMENT OF THE PROPOSED BORROW PIT WILL BE CARRIED OUT BY EXTENDING THE EXCAVATION OF THE EXISTING PIT IN AN EASTERLY DIRECTION. THIS AREA IS NATURALLY CLEAR OF TREE GROWTH.
9. THE FIRE LOOKOUT TOWER AND ITS RELATED ACCESS ROAD WILL REQUIRE RELOCATION.
10. THE BORROW PIT DEVELOPMENT WILL BE CARRIED OUT IN SEQUENTIAL ORDER AS OUTLINED ON THE ISOMETRIC SCHEMATIC PLAN.
11. THE ORGANIC TOPSOIL AND PULVERIZED VEGETATION WILL BE PLACED ON THE RECONTOURED BORROW PIT FLOOR. IT IS NOT CONSIDERED NECESSARY TO RESTORE AND REVEGETATE EXPOSED, EXCAVATED FACES WHICH WILL BE SLOPED AT 2 HORIZONTAL TO 1 VERTICAL.
12. ALL NECESSARY EROSION AND DRAINAGE CONTROL MEASURES WILL BE EMPLOYED TO PREVENT THE CONTAMINATION OF ADJACENT WATERSHEDS BY SILTATION.
13. THE EXISTING ALL WEATHER ROAD TO FORT GOOD HOPE MAY REQUIRE WIDENING RE-GRADING AND/OR RECONSTRUCTION IN ORDER TO HANDLE THE GRAVEL HAUL TRAFFIC DURING CONSTRUCTION.

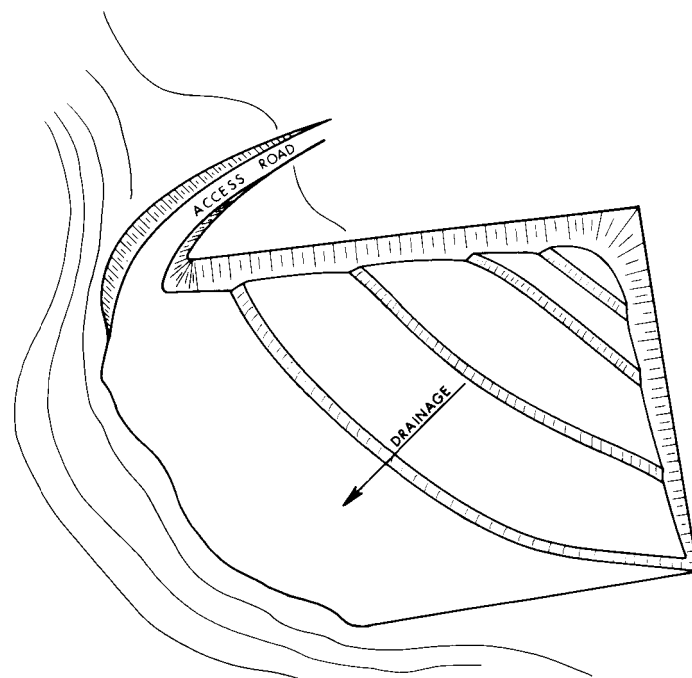


SCHEMATIC OF BORROW DEVELOPMENT

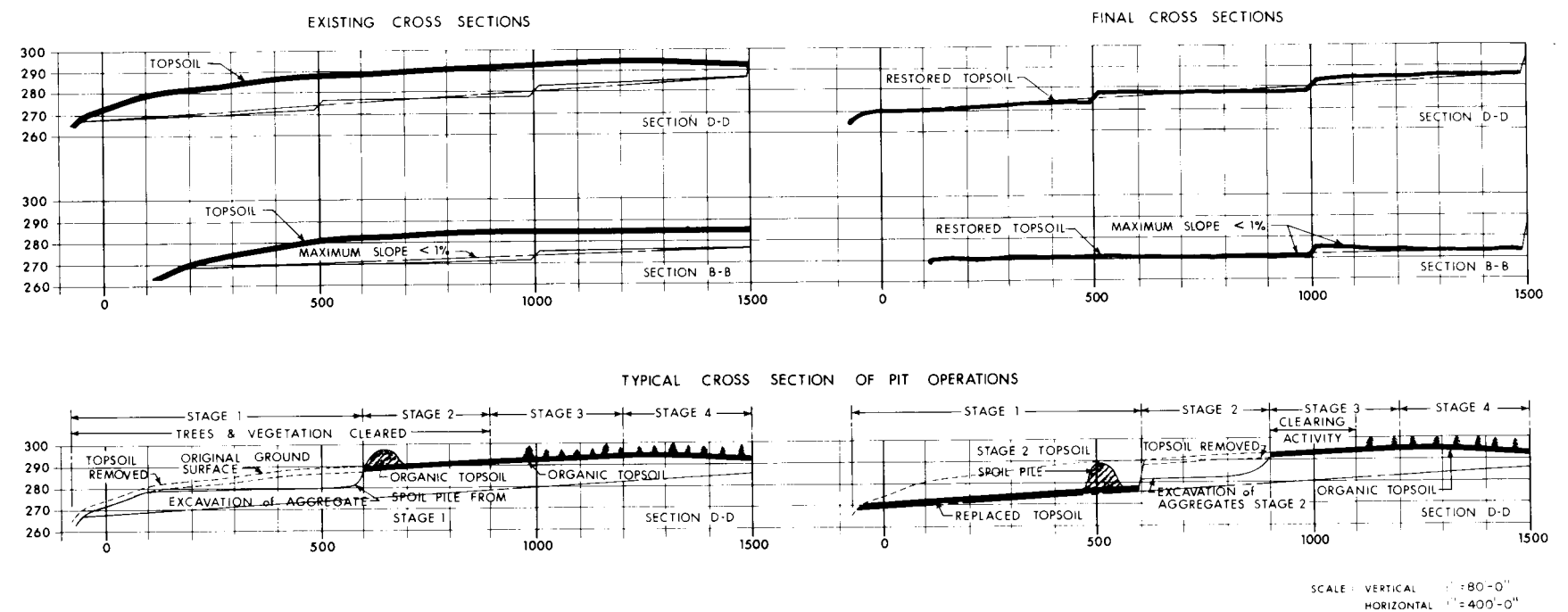
DESIGNED BY:	NORTHERN ENGINEERING SERVICES COMPANY LIMITED CALGARY ALBERTA ENGINEERS FOR CANADIAN ARCTIC GAS STUDY LIMITED	SCALE: AS SHOWN
DRAWN BY:		DATE: JUNE 28/78
CHECKED BY:		PROJECT No: 1894.(d)
ENGINEERS APPROVAL:		DRAWING No:
PROJECT MANAGER:		REV: -D
PROPOSED DEVELOPMENT OF BORROW NO. FGH-2 FORT GOOD HOPE M.P. 490		



BORROW PIT DEVELOPMENT PLAN



OSCAR CREEK SCHEMATIC
of
FINAL RECONTOURED BORROW PIT



NOTES:

1. TERRAIN: OUTWASH PLAIN AND OR OUTWASH DELTA PLAIN
2. GRAVEL REQUIREMENTS: 485,000 CUBIC YARDS FOR COMPRESSOR STATION, PERMANENT ROADS, WHARFS, HELI-PAD, PIPELINE
3. AREA OF PROPOSED BORROW PIT: 31 ACRES
4. VEGETATION: DENSELY COVERED WITH LARGE ASPEN, WHITE SPRUCE AND OCCASIONAL BIRCH.
5. ORGANIC TOPSOIL: LESS THAN 1 FOOT IN DEPTH, APPROXIMATELY 30,000 CUBIC YARDS.
6. MINERAL SOIL OVERBURDEN: NONE ANTICIPATED AT THIS SITE.
7. TIMBER OF POTENTIAL COMMERCIAL QUALITY IS AVAILABLE AND SHOULD BE HARVESTED AT THIS SITE.
8. THE LIMITS OF THE PROPOSED BORROW AREA ARE AT SUFFICIENT DISTANCE FROM THE OSCAR CREEK STREAM CHANNEL AND PIT OPERATIONS WILL BE ADEQUATELY CONTROLLED SO THAT THE POSSIBILITY OF CONTAMINATION DUE TO SEDIMENTS WILL NOT OCCUR. ALL NECESSARY EROSION AND DRAINAGE CONTROL MEASURES WILL BE EMPLOYED.
9. THE OSCAR CREEK AREA IS AN IMPORTANT MOOSE HABITAT THEREFORE ALL DISTURBANCES OUTSIDE OF THE DESIGNATED WORK AREA DURING INVESTIGATION AND CONSTRUCTION ACTIVITY WILL BE KEPT TO AN ABSOLUTE MINIMUM.
10. DEVELOPMENT OF THIS BORROW WILL BE STAGED, SEQUENTIALLY, AS SHOWN.
11. EXPOSED GRAVEL FACES WHICH WILL NOT BE RESTORED OR REVEGETATED WILL BE SLOPED 2 HORIZONTAL TO 1 VERTICAL. GRAVEL FACES REQUIRING RESTORATION AND REVEGETATION WILL BE SLOPED AT 3 HORIZONTAL TO 1 VERTICAL.

DESIGNED BY	NORTHERN ENGINEERING SERVICES COMPANY LIMITED CALGARY, ALBERTA ENGINEERS FOR CANADIAN ARCTIC GAS STUDY LIMITED PROPOSED DEVELOPMENT OF BORROW NO. P-289 OSCAR CREEK M.P. 365.9	SCALE	AS SHOWN
DRAWN BY		DATE	JUNE 28 / 74
CHECKED BY		PROJECT NO.	1.8.9.4 (d)
ENGINEER'S APPROVAL		DRAWING NO.	- D
PROJECT MANAGER		REV	

Special Criteria for Gravel Borrow Pits in Flood Plains

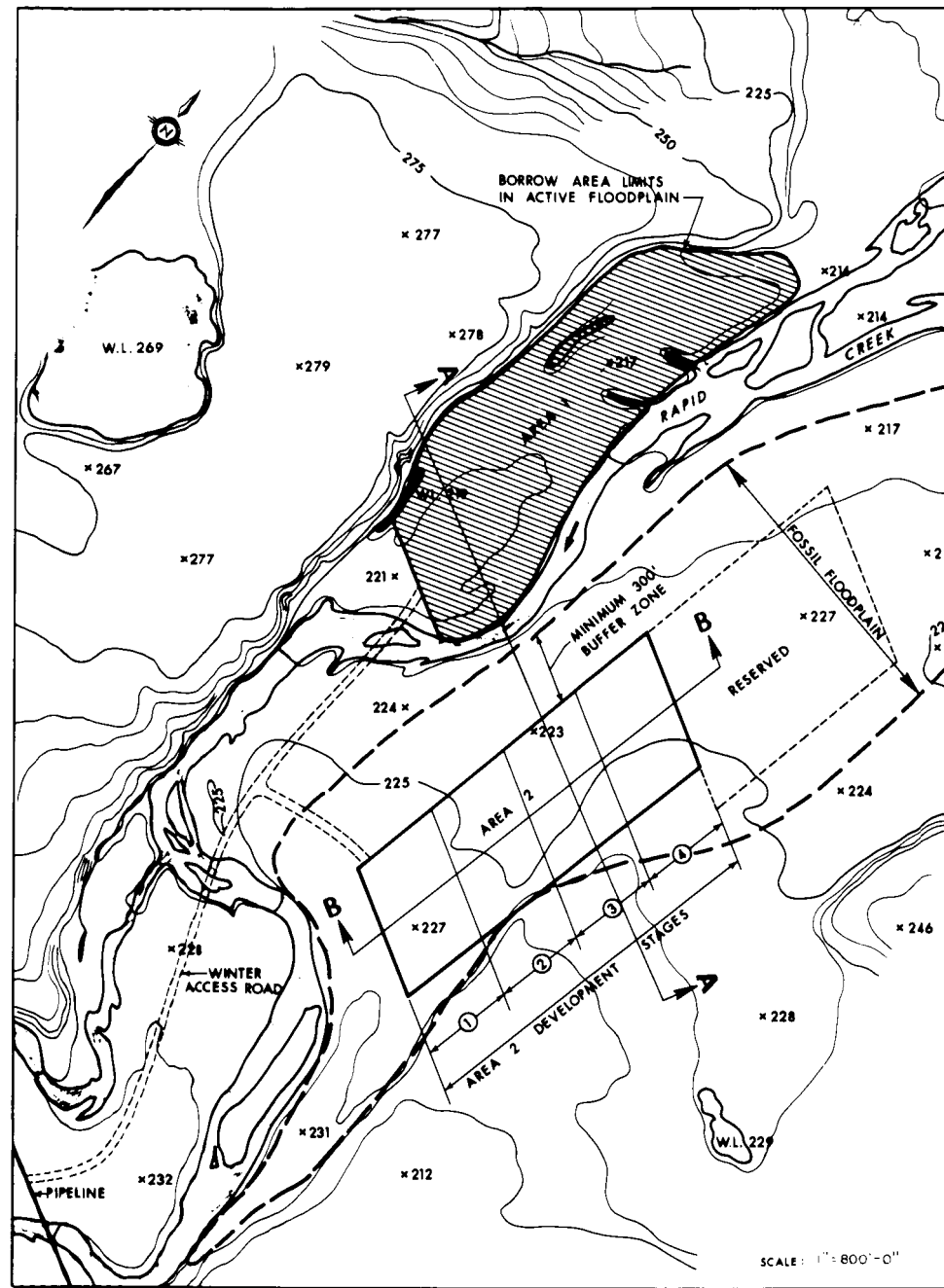
- (1) Each borrow pit proposed within the "Active" and/or "Fossil" flood plains will be pre-examined in detail by on-site inspections to evaluate the possible impact of gravel mining operations on any existing critical fish, mammal and bird populations and/or habitats.
- (2) On-site hydrological and river engineering surveys will be carried out for each borrow pit proposed in flood plains to evaluate the influence of gravel mining operations on the hydraulics and regime characteristics of the water courses. Special attention will be given to the potential effects of gravel mining operations on both the aquatic life and the integrity of the pipeline river crossing.
- (3) In general, all gravel pits proposed in the flood plain, which are in close proximity to pipeline river crossings, will be located downstream of the pipeline crossings.
- (4) The development of gravel borrow pits in the "Active" flood plain will be restricted to a distance of not less than 2,000 feet downstream of the pipeline crossing to provide adequate protection from potential upstream migration of streambed degradation. Gravel borrow pits in "Fossil" flood plains may be established closer to the pipeline crossing because streambed degradation is not critical.

- (5) The depth of excavation for gravel borrow pits in the "Active" flood plain will be restricted to a depth not exceeding the bed elevation of the adjacent flowing water course.
- (6) The final boundaries of the area to be exploited for gravel borrows in the "Active" flood plain will be designated based on site-specific environmental and river engineering considerations relative to birds, mammals, and fish.
- (7) Gravel mining operations in "Active" flood plain deposits will be conducted preferably during the period from late summer to freeze-up and will be governed by site-specific considerations relative to birds, mammals, and fish.
- (8) Since unrestricted summer gravel mining operations in the "Active" flood plain may increase silt loads in adjacent flowing streams, all necessary precautions and measures, such as temporary berms and dikes, will be carried out to minimize the introduction of sediments into the water course.
- (9) All gravel removed from the "Active" flood plain during the period prior to freeze-up will be stockpiled and/or windrowed for recovery during the winter construction period.
- (10) In general, the development of a gravel pit in the "Fossil" flood

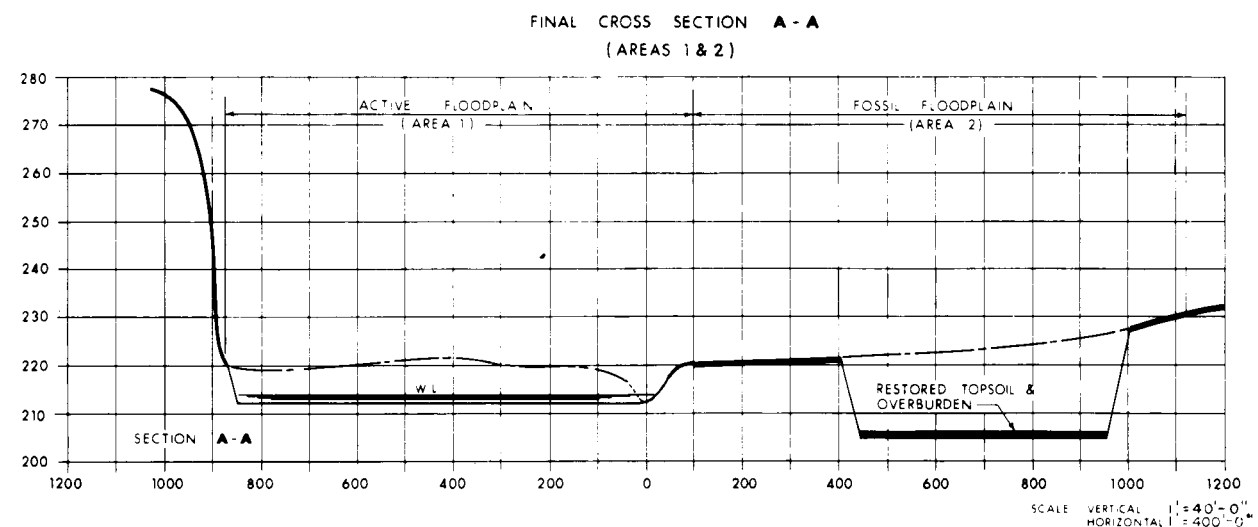
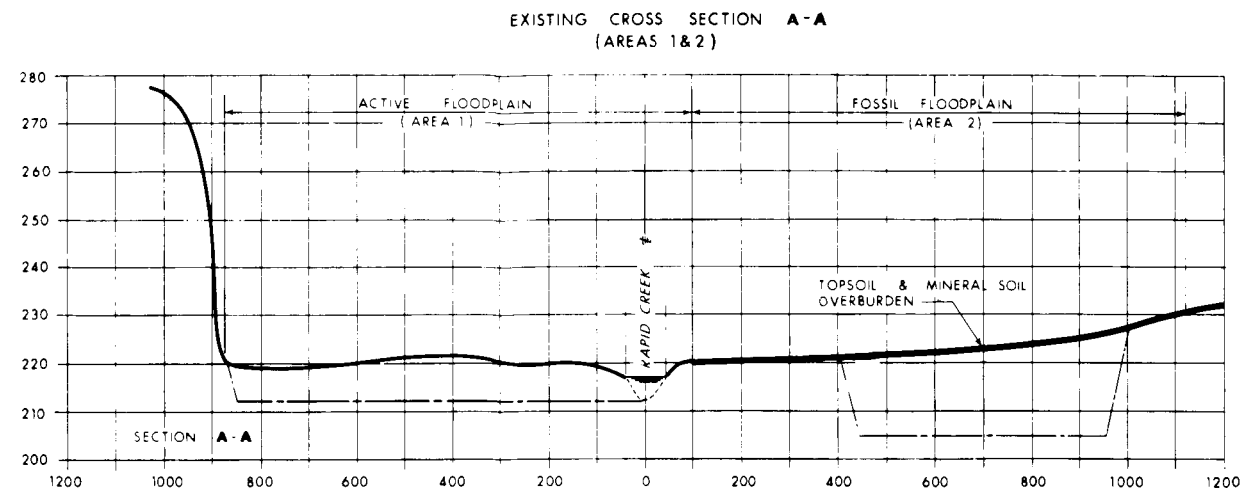
plain can be carried out in accordance with the "General Criteria for Gravel Pits" in Upland Areas for clearing, overburden removal, mining, restoration and rehabilitation techniques.

- (11) The final depth of excavation in the "Fossil" flood plain is not critical and will in general be governed by the insitu characteristics of the gravel deposit such as excess ice contents, free water, etc.
- (12) A buffer zone, approximately 300 feet in width, consisting of undisturbed vegetation and ground will be maintained at the interface between the "Active" and "Fossil" flood plains to prevent the introduction of sediment into the water course.
- (13) The excavation of sand and gravel from the "Fossil" flood plain will be carried out during the winter period (i.e., between freeze-up and break-up) to minimize damage to the surrounding terrain.
- (14) If necessary, based on the inplace frozen characteristics of the gravel deposits in the "Fossil" flood plain, blasting may be required to facilitate the excavation and removal of sand and gravel. Specific sites where blasting will be required will be evaluated in advance to assess the effects of blasting on the biological environment.

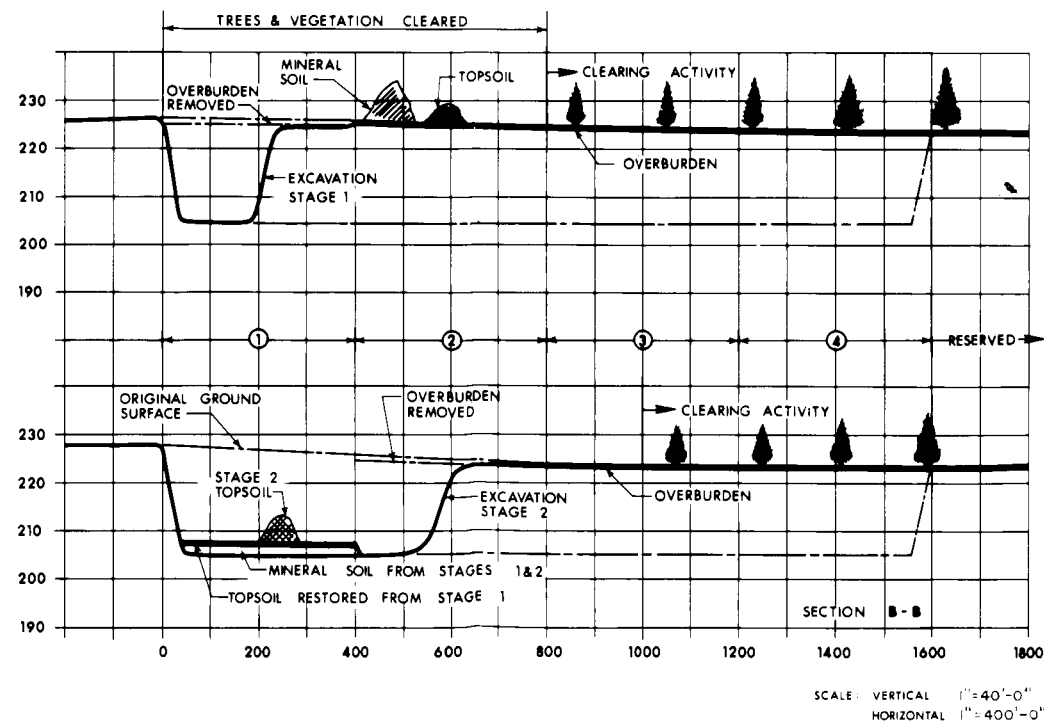
- (15) The passage of construction equipment across flowing stream channels during summer gravel removal operations will be restricted in order to minimize unnecessary siltation and contamination of these water courses.
- (16) Where temporary stream crossings are required during winter gravel hauling operations, proper and adequate crossings constructed of ice, snow and/or limbed timber will be installed. These temporary crossings will be completely removed prior to spring break-up or at the completion of gravel mining operations in accordance with current land use practices.
- (17) Notes relative to the specific development, rehabilitation and/or restoration for selected borrow sites located in "Active" and/or "Fossil" flood plains on the respective drawings.



FLOOD PLAIN DEVELOPMENT PLAN



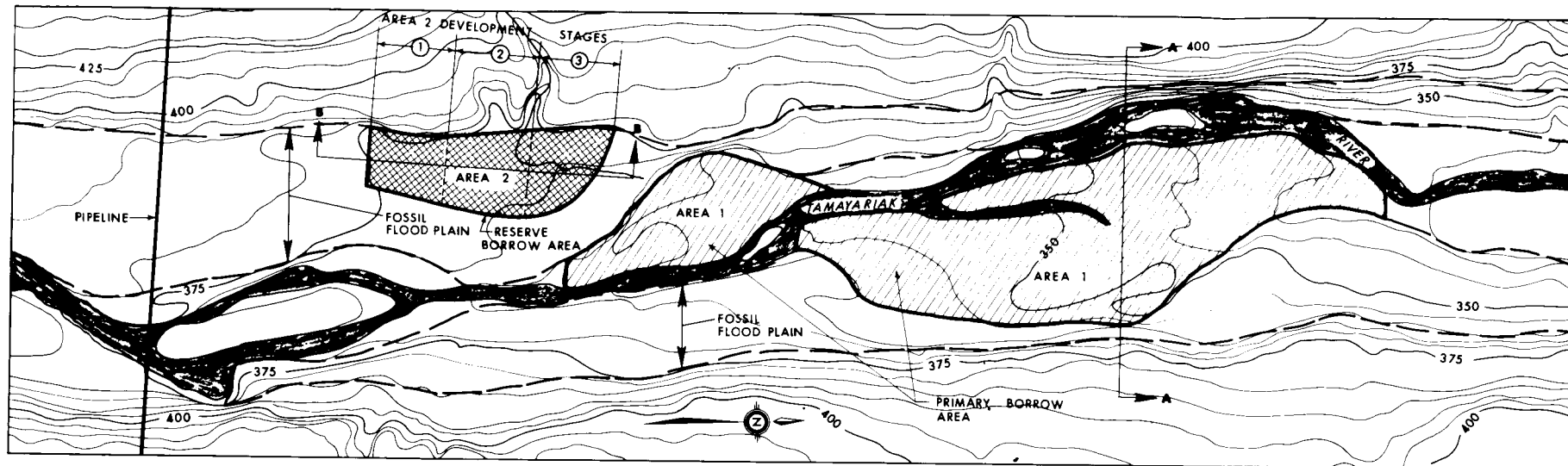
TYPICAL CROSS SECTION B-B FOR DEVELOPMENT OF FOSSIL FLOOD PLAIN AREA 2



NOTES:

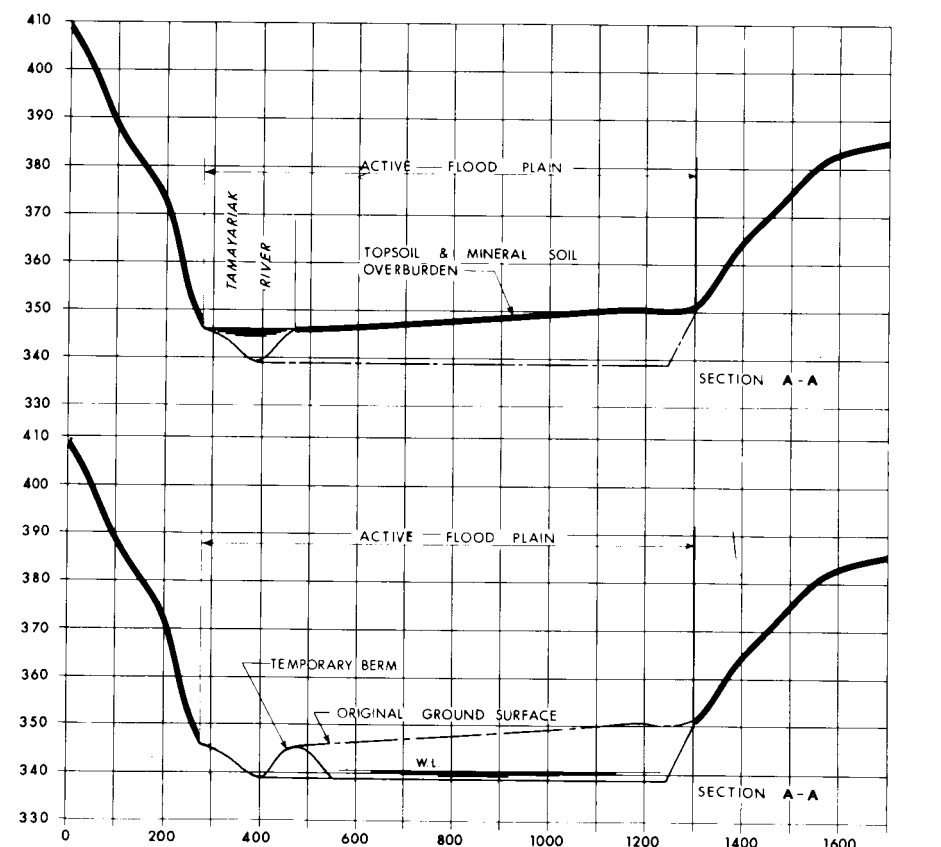
- 1: TERRAIN AREA 1 - ACTIVE FLOOD PLAIN
AREA 2 - FOSSIL FLOOD PLAIN
- 2: GRAVEL REQUIREMENTS: 615,000 CU. YDS. FOR AIRSTRIP, HELI- PADS, COMPRESSOR STATIONS, PERMANENT ROADS, PIPELINE
- 3: AREA OF PROPOSED BORROW PIT: AREA 1 - 25 ACRES
AREA 2 - 20 ACRES
- 4: VEGETATION: THE ACTIVE FLOODPLAIN IS, GENERALLY, DENUDED. THE FOSSIL FLOODPLAIN SUPPORTS GROWTHS OF SPRUCE AND OCCASIONAL ASPEN
- 5: ORGANIC TOPSOIL: NONE ON THE ACTIVE FLOODPLAIN. GENERALLY LESS THAN 6 INCHES IN DEPTH ON THE FOSSIL FLOODPLAIN, APPROXIMATELY 15,000 CU. YDS.
- 6: MINERAL SOIL OVERBURDEN: NONE ANTICIPATED ON ACTIVE FLOODPLAIN. DEPTHS OF 2 - 3 FEET ANTICIPATED ON FOSSIL FLOODPLAIN, APPROXIMATELY 100,000 CU. YDS.
- 7: ALL NECESSARY EROSION AND DRAINAGE CONTROL MEASURES WILL BE TAKEN TO PREVENT THE CONTAMINATION OF ADJACENT WATER COURSES BY SILTATION

DESIGNED BY	 NORTHERN ENGINEERING SERVICES COMPANY LIMITED CALGARY, ALBERTA ENGINEERS FOR CANADIAN ARCTIC GAS STUDY LIMITED	SCALE AS SHOWN
DRAWN BY		DATE JUNE 28/74
CHECKED BY		PROJECT NO. 1894 (d)
ENGINEERS APPROVAL		DRAWING NO.
PROJECT MANAGER		REV.
PROPOSED DEVELOPMENT OF BORROW NO. 138 RAPID CREEK M.P. 319.5		



FLOOD PLAIN DEVELOPMENT PLAN

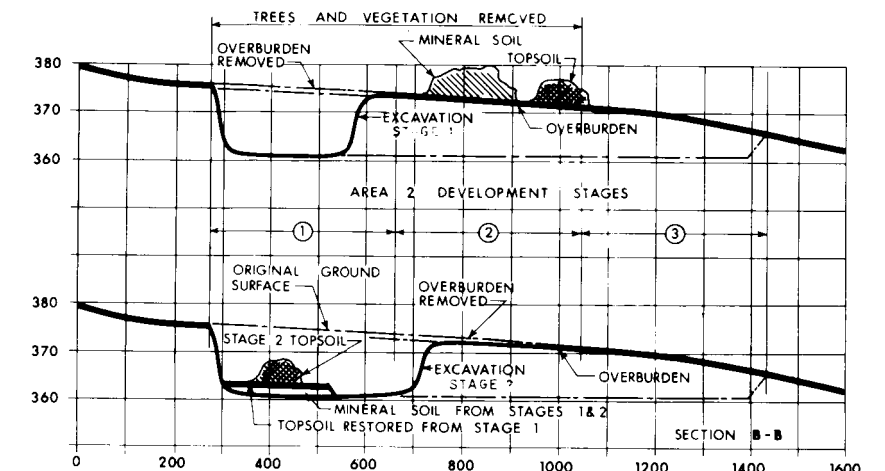
SCALE: 1" = 400'-0"



EXISTING & FINAL CROSS SECTION
(AREA 1)

SCALE: HORIZONTAL 1" = 400'-0"
VERTICAL 1" = 40'-0"

TYPICAL CROSS SECTION FOR DEVELOPMENT OF FOSSIL FLOOD PLAIN
(AREA 2)

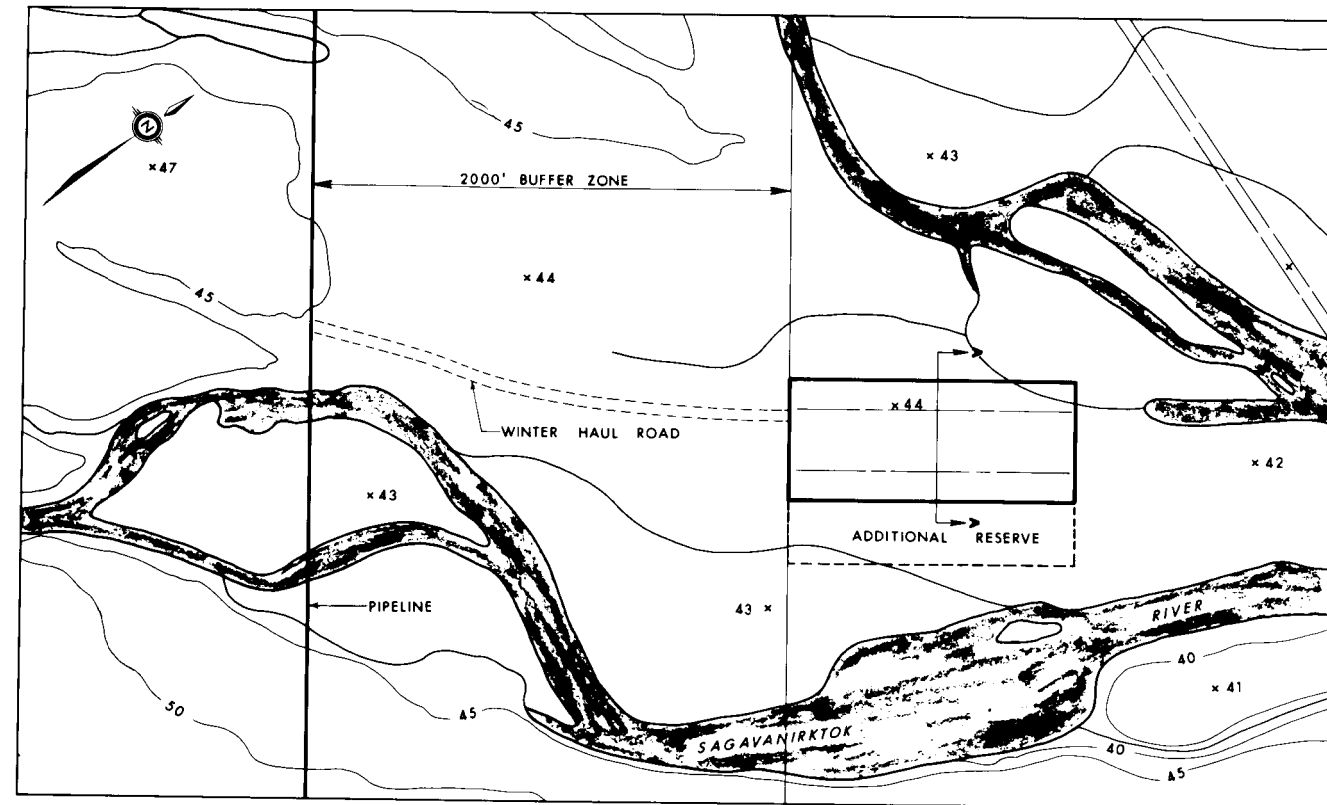


SCALE: HORIZONTAL 1" = 400'-0"
VERTICAL 1" = 40'-0"

NOTES:

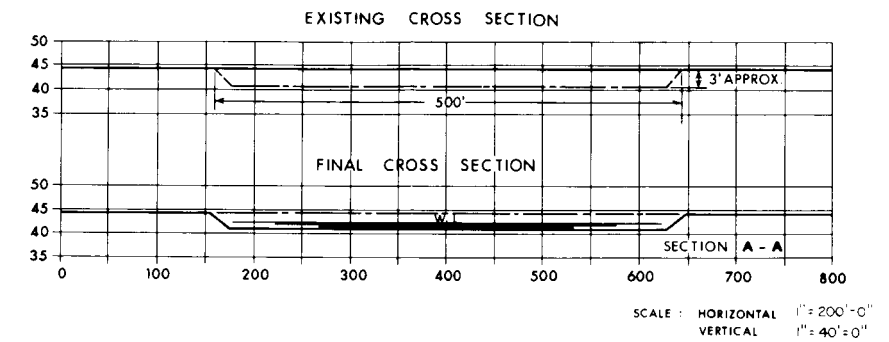
1. **TERRAIN:** AREA 1 - ACTIVE FLOOD PLAIN
AREA 2 - FOSSIL FLOOD PLAIN
2. **GRAVEL REQUIREMENTS:** 325,000 CUBIC YARDS FOR AIRSTRIP, HELIPADS, COMPRESSOR STATION, PERMANENT ROADS, PIPELINE.
3. **AREA OF PROPOSED BORROW PIT:** AREA 1 - 37 ACRES.
AREA 2 - 7 ACRES.
4. **VEGETATION:** THE ACTIVE FLOOD PLAIN IS GENERALLY DENuded WITH ONLY OPEN WILLOW AND LEGUME VEGETATION. THE FOSSIL FLOOD PLAIN SUPPORTS GROWTH OF LICHEN, DRYAS, LEGUMES, SEDGES AND LOW OPEN WILLOW.
5. **ORGANIC TOPSOIL:** NONE ANTICIPATED ON ACTIVE FLOOD PLAIN. GENERALLY, LESS THAN 6 INCHES IN DEPTH ON FOSSIL FLOOD PLAIN.
6. **MINERAL SOIL OVERBURDEN:** NONE ANTICIPATED ON ACTIVE FLOOD PLAIN. LESS THAN 2 FEET ANTICIPATED ON FOSSIL FLOOD PLAIN.
7. ALL NECESSARY EROSION AND DRAINAGE CONTROL MEASURES WILL BE TAKEN TO PREVENT THE CONTAMINATION OF ADJACENT WATER COURSES BY SILTATION.
8. THIS SITE IS WITHIN THE ARCTIC NATIONAL WILDLIFE RANGE WILL BE INSPECTED IN DETAIL FOR ENVIRONMENTAL IMPACTS PRIOR TO THE BORROW PIT DEVELOPMENT, SUCH AS:
 - a) RAPTOR HABITAT MAY OCCUR 2 TO 5 MILES SOUTH OF PIPELINE ROUTE.
 - b) CARIBOU CALVING IN AREA.
 - c) NO WINTER FLOW, SPAWNING AND FEEDING MAY OCCUR 12 MILE DOWNSTREAM OF PIPELINE CROSSING.
9. A TEMPORARY BERM WILL BE LEFT BETWEEN THE FLOWING STREAM CHANNEL AND EXCAVATION AREA IN ACTIVE FLOOD PLAIN. THIS BERM WILL BE REMOVED AFTER COMPLETION OF EXCAVATION, PREFERABLY DURING THE SPRING FLOOD PERIOD.

DESIGNED BY:	 NORTHERN ENGINEERING SERVICES COMPANY LIMITED CALGARY ALBERTA ENGINEERS FOR CANADIAN ARCTIC GAS STUDY LIMITED PROPOSED DEVELOPMENT OF BORROW NO. 107 TAMAYARIK RIVER ALASKA M.P. 140	SCALE AS SHOWN
DRAWN BY:		DATE JULY 15/74
CHECKED BY:		PROJECT No. 189.4 (1)
ENGINEERS APPROVAL:		DRAWING No.
PROJECT MANAGER:		-D REV



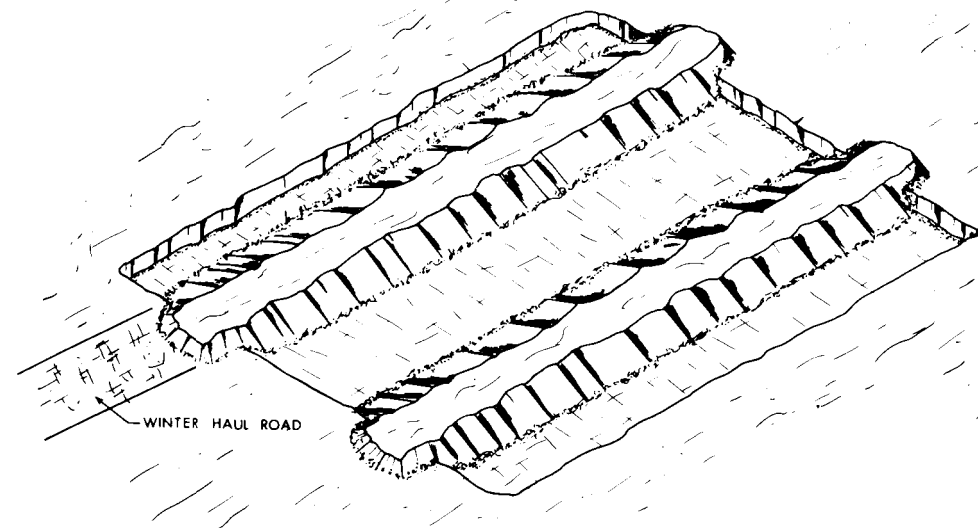
DEVELOPMENT OF PROPOSED BORROW PIT IN ACTIVE FLOOD PLAIN

SCALE: 1" = 800'-0"

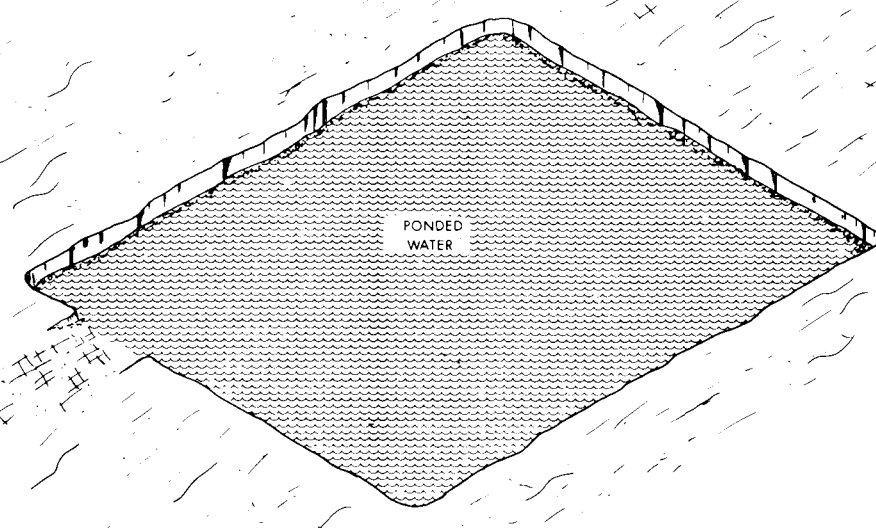


NOTES:

1. TERRAIN: ACTIVE FLOOD PLAIN.
2. GRAVEL REQUIREMENTS: 25,000 CUBIC YARDS FOR HELIPADS, COMPRESSOR STATION, PERMANENT AND TEMPORARY ROADS, PIPELINE.
3. AREA OF PROPOSED BORROW PIT: 15 ACRES.
4. VEGETATION: VERY OPEN LOW WILLOW, SEDGE AND GRASS.
5. ORGANIC TOPSOIL: NONE OR VERY THIN ON ACTIVE FLOOD PLAIN.
6. MINERAL SOIL OVERBURDEN: NONE ANTICIPATED ON ACTIVE FLOOD PLAIN.
7. ALL NECESSARY EROSION AND DRAINAGE CONTROL MEASURES WILL BE TAKEN TO PREVENT THE CONTAMINATION OF ADJACENT WATER COURSES.
8. STOCKPILING OF GRAVEL IN WINDROWS PROPOSED FOR SUMMER OPERATIONS; PREFERABLY LATE SUMMER TO EARLY FALL.



BORROW PIT DURING DEVELOPMENT OPERATION



FINAL ABANDONED BORROW PIT

SCHEMATIC OF WINDROWED GRAVEL STOCKPILES

DESIGNED BY	 NORTHERN ENGINEERING SERVICES COMPANY LIMITED CALGARY, ALBERTA ENGINEERS FOR CANADIAN ARCTIC GAS STUDY LIMITED PROPOSED DEVELOPMENT OF BORROW NO. GM-102 SAGAVANIRKTOK RIVER, ALASKA M.P.83	SCALE AS SHOWN
DRAWN BY		DATE JULY 15 / 74
CHECKED BY		PROJECT No. 18.9.4.(f)
ENGINEERS APPROVAL		DRAWING No.
PROJECT MANAGER		REV

General Criteria for Quarry Sites

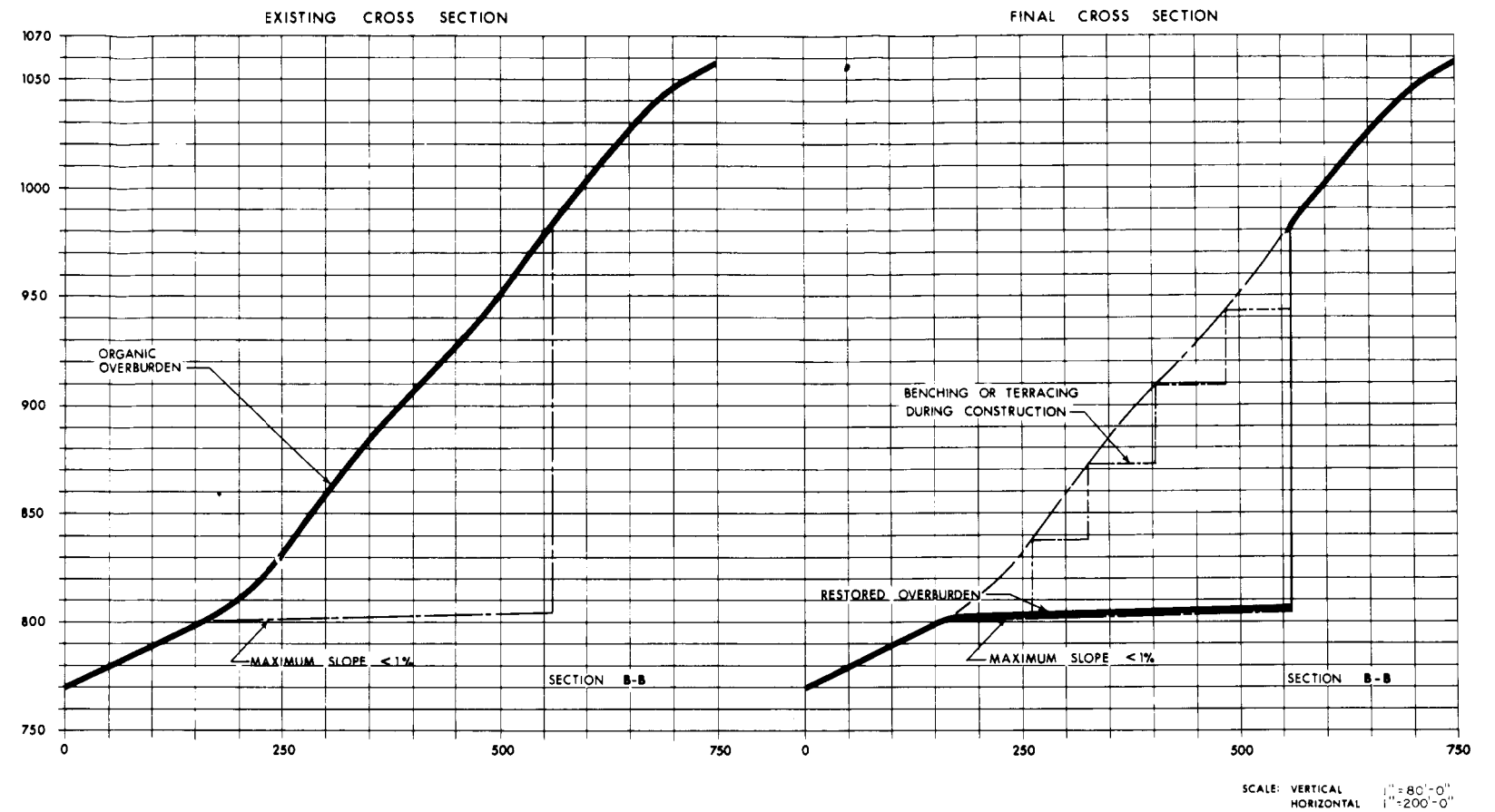
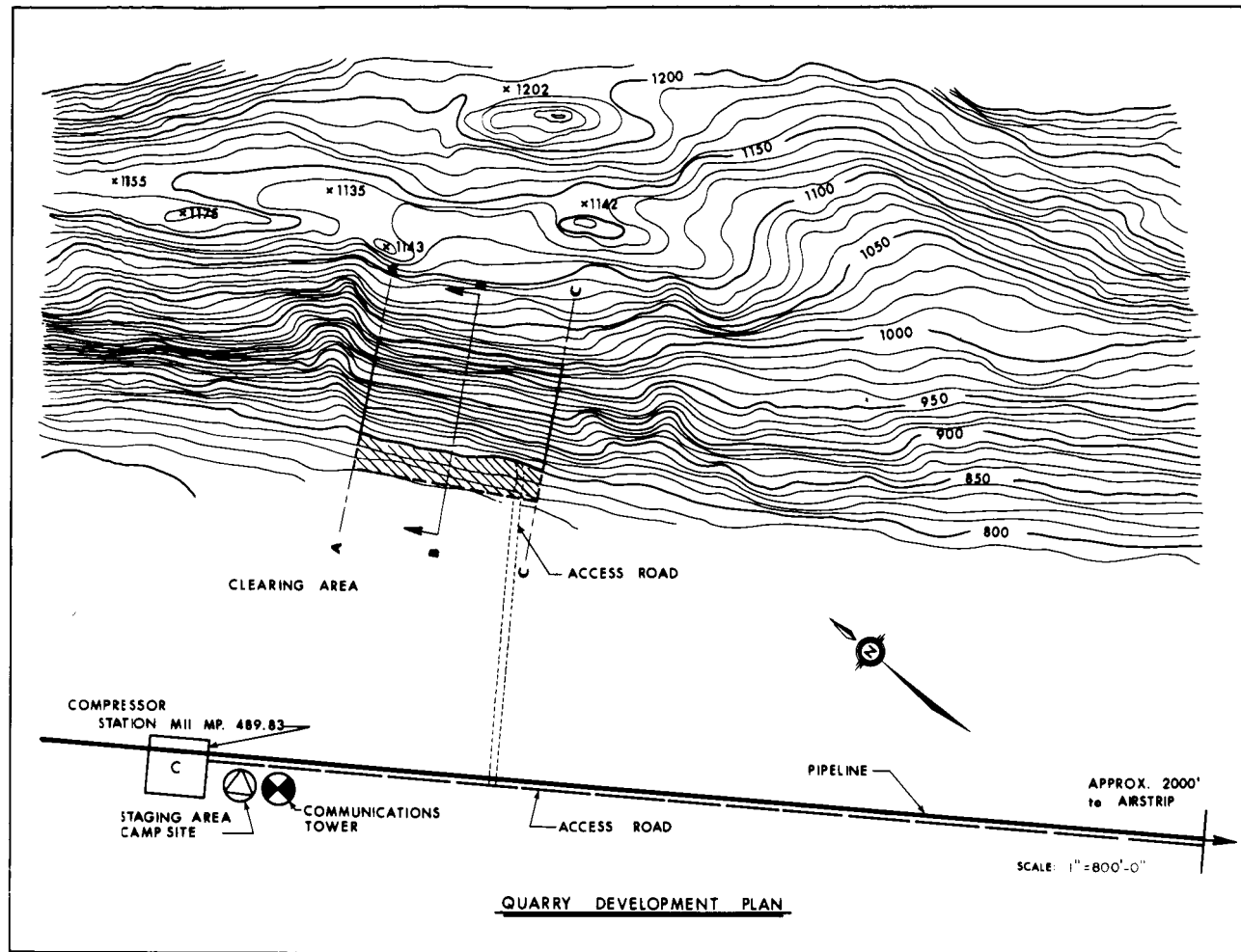
- (1) The proposed quarry will be examined and assessed prior to detailed investigation and development in order to locate and minimize potential damage to any significant critical mammal, bird or fish populations and/or habitat.
- (2) Where necessary, buffer zones with a minimum width of 300 feet will be established between water courses and the final limits of a proposed quarry in order to prevent introduction of sediment into these water courses. All necessary erosion and drainage control measures will be undertaken during the restoration and rehabilitation of the quarry to prevent erosion and siltation.
- (3) The boundary of the proposed quarry will be surveyed and located in accordance with the area designated on the site plan.
- (4) An area of adequate size will be cleared adjacent to the proposed quarry where organic and/or mineral soil overburden can be stockpiled for future recovery.
- (5) The slash material consisting of sparse tree and larger understory growth will be hand or machine cleared from the surface of the proposed quarry area and will be stockpiled and burned in accordance with current land use regulations. The burning of slash material will be carried out with adequate supervision.
- (6) In general, the lesser vegetation and organic top soil will be stripped

and stockpiled in the designated cleared area adjacent to the quarry area.

- (7) The mineral soil overburden will be excavated from localized depressions and stockpiled in the cleared area adjacent to the quarry.
- (8) Wherever feasible, the fractured and weathered surficial layer of bedrock will be utilized as borrow material, together with the more competent bedrock formations at depth.
- (9) The mining of the bedrock material from the quarry site may be developed in a series of benches or terraces in order that several rock faces can be mined simultaneously.
- (10) The height of the rock face to be mined on each terrace or bench level above the level of the next lower bench is anticipated to be of the order of 20 to 25 feet.
- (11) Construction roads consisting of access and exit ramps will be provided to each working level (terrace or bench) during the quarrying operations (ref. site plan).
- (12) The type of explosives to be used will have been predetermined based on the blasting characteristics of the bedrock. The pattern and size of holes for blasting will be finalized in the field.
- (13) The bedrock will be removed by blasting and loading into trucks to the final quarry floor elevation as typified on the cross sections on the attached drawings.

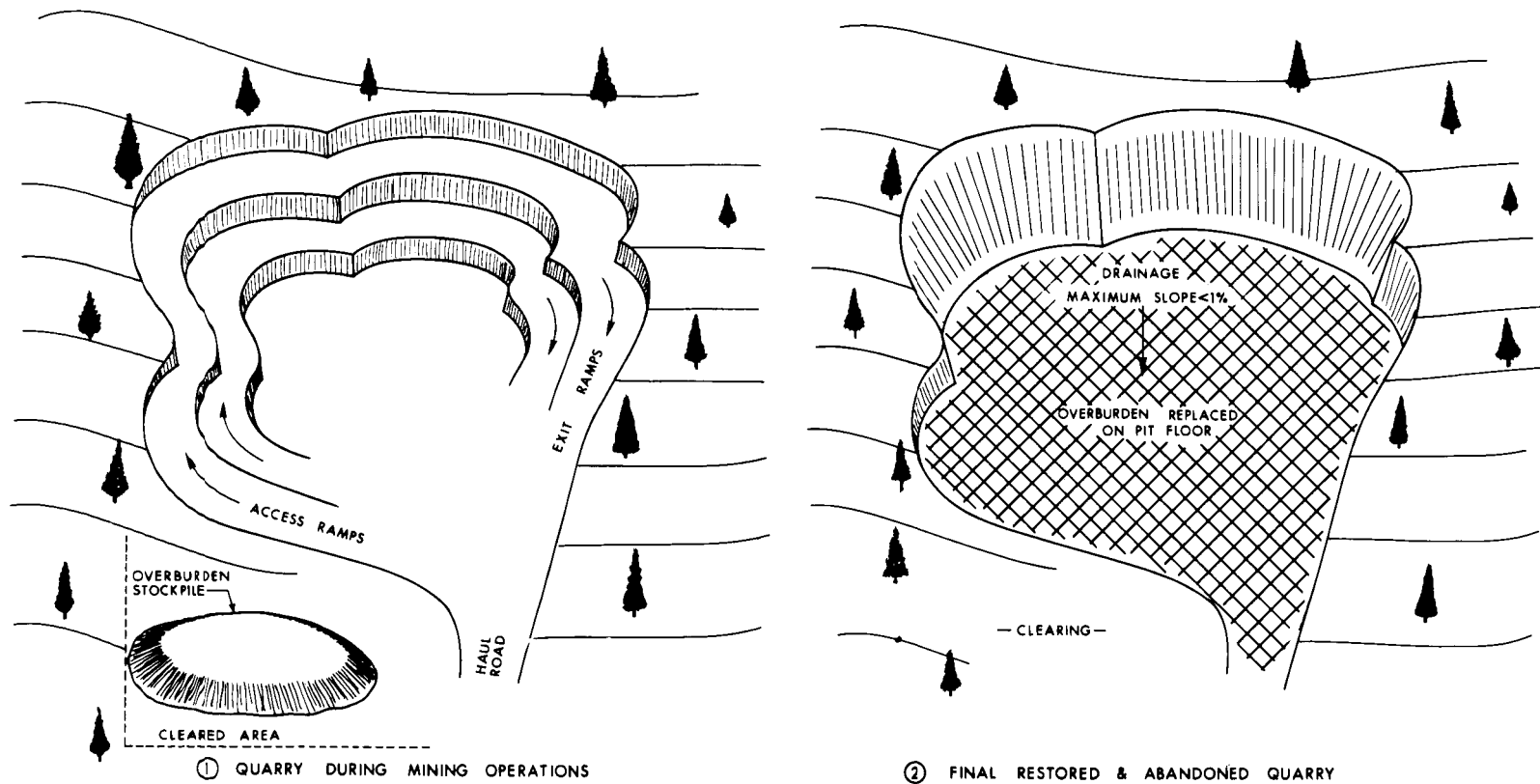
- (14) Where quarry development will be above surrounding ground elevation, the final quarry floor will be rough graded to ensure that floor gradients do not exceed 1% and will be sloped in a direction compatible with the surficial drainage of the surrounding terrain. Where quarry development will be either all or partially below the elevation of the surrounding terrain, floor gradients will not be of consequence and the abandoned quarry will be left to form a pond.
- (15) In order to avoid unsightly spoil piles, any organic top soil and mineral soil overburden will be re-excavated from the spoil piles and will be spread over the rough graded quarry floor. Mineral soil will be placed first with the organic material spread as uniformly as possible over the surface.
- (16) Any restored layer of organic top soil mixed with vegetation on the depleted quarry areas will be broken down and pulverized by several passes of dozer track equipment to ensure the best possible distribution over the area to be rehabilitated.
- (17) If required, seeding of grasses and planting of shrub cuttings will be carried out on the abandoned and restored quarry to minimize erosion.
- (18) In general, the mining activities for these quarry operations will be conducted during the winter months between freeze-up and break-up in order to minimize damage to the surrounding terrain.
- (19) Where crushing and washing operations are required for the production of concrete aggregates, stilling basins will be provided for the accumulation of wash water.

- (20) Notes relative to the specific development, rehabilitation and/or restoration for selected quarries are tabulated on the respective drawings for those sites.



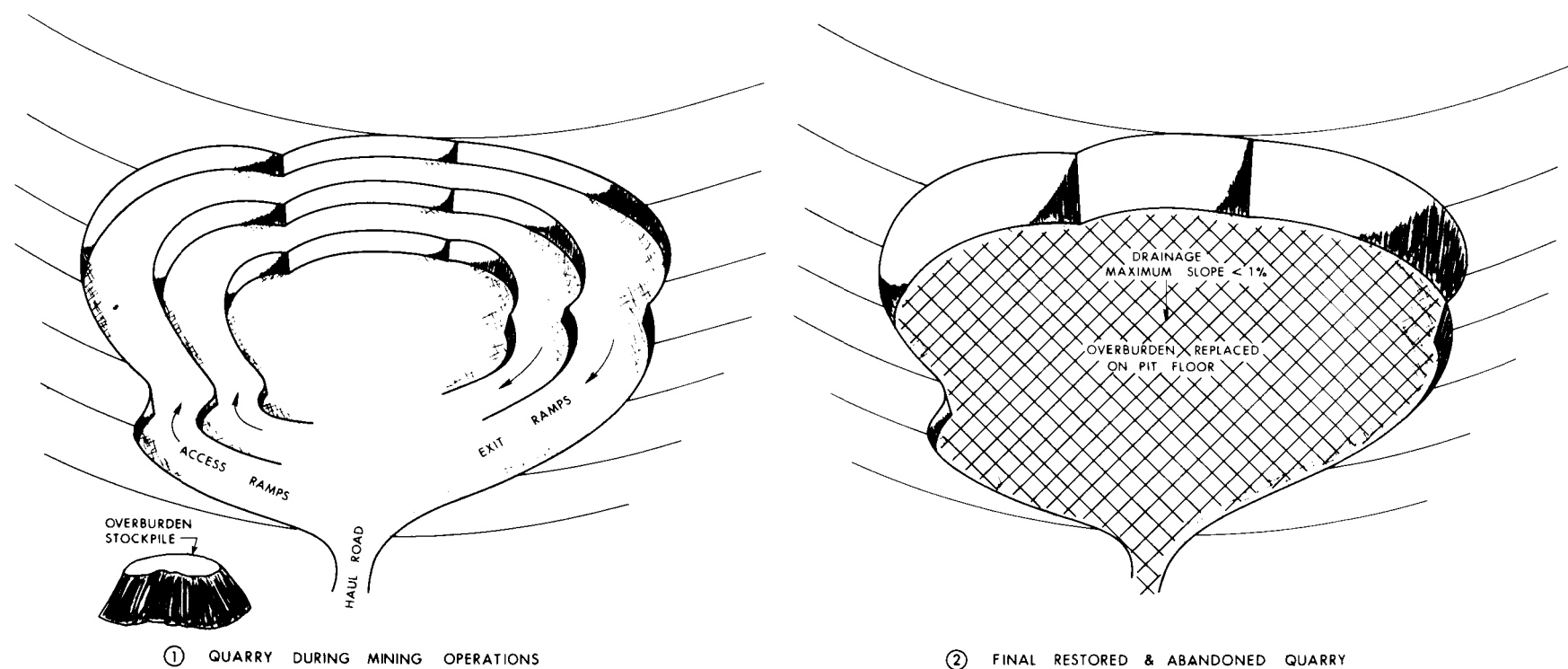
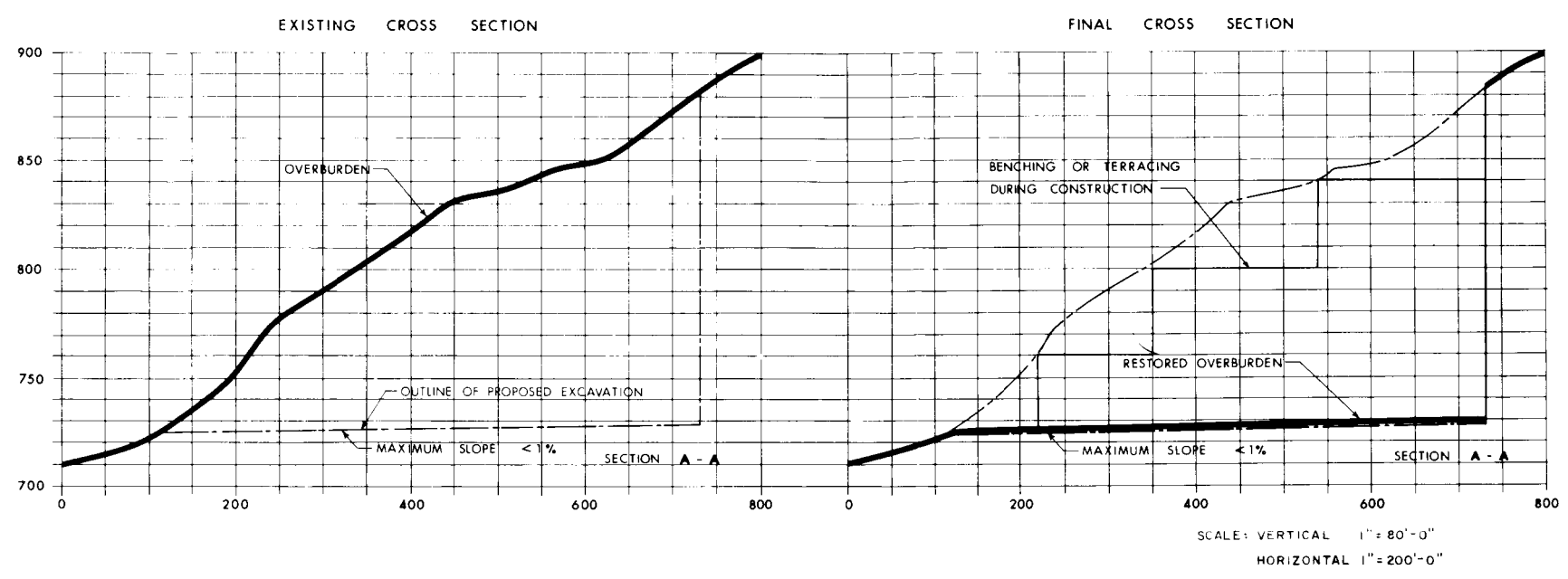
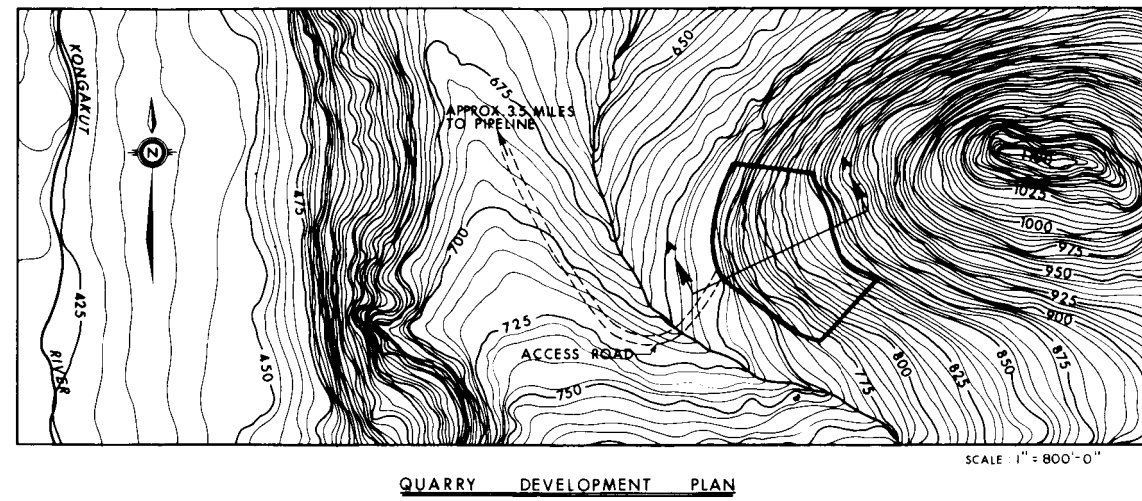
NOTES:

- TERRAIN:** BEDROCK RIDGE (DOLOMITE AND/OR LIMESTONE).
- AGGREGATE REQUIREMENTS:** 615,000 CUBIC YARDS FOR COMPRESSOR STATION, AIRSTRIP, PERMANENT ROADS, WHARFS, HELI-PAD, PIPELINE.
- AREA OF PROPOSED QUARRY:** 8 ACRES.
- VEGETATION:** SPARSE TO LIGHT GROWTH OF SPRUCE ON OUTCROP; DENSER GROWTH OF SPRUCE, ASPEN AND BIRCH ALONG SCREE AT TOE OF BEDROCK RIDGE.
- OVERBURDEN:** RESIDUAL SOIL AND COLLUVIUM, GENERALLY LESS THAN 6 INCHES IN DEPTH; IN EXCESS OF SEVERAL FEET IN LOCALIZED DEPRESSIONS.



SCHEMATIC OF QUARRY DEVELOPMENT

DESIGNED BY	 NORTHERN ENGINEERING SERVICES COMPANY LIMITED CALGARY ALBERTA ENGINEERS FOR CANADIAN ARCTIC GAS STUDY LIMITED PROPOSED DEVELOPMENT OF QUARRY NO. P-199 SALINE RIVER M.P. 489.83	SCALE	AS SHOWN
DRAWN BY		DATE	JUNE 28/74
CHECKED BY		PROJECT NO.	1824 (d)
ENGINEERS APPROVAL		DRAWING NO.	- D
PROJECT MANAGER		REV	



SCHEMATIC OF QUARRY OPERATIONS

NOTES:

1. TERRAIN: BEDROCK OUTCROP (LIMESTONE, SANDSTONE, SILTSTONE).
2. AGGREGATE REQUIREMENTS: 395,000 CUBIC YARDS FOR COMPRESSOR STATION, AIRSTRIP, PERMANENT ROADS, HELIPADS, PIPELINE.
3. AREA OF PROPOSED QUARRY: 9 ACRES.
4. VEGETATION: PLANT COVER OPEN WITH DRYAS LICHENS, SEDGES AND DWARF WILLOW.
5. OVERBURDEN: RESIDUAL SOIL AND COLLUVIUM, GENERALLY, LESS THAN 6 INCHES IN DEPTH, IN EXCESS OF SEVERAL FEET IN LOCALIZED DEPRESSIONS.
6. THIS SITE IS WITHIN THE ARCTIC NATIONAL WILDLIFE RANGE AND WILL BE INSPECTED IN DETAIL FOR ENVIRONMENTAL IMPACT, WITH EMPHASIS ON RAPTORS, POLAR BEAR DENNING AND MUSKOX, PRIOR TO QUARRY DEVELOPMENT.
7. A PERMANENT OR WINTER ROAD WILL HAVE TO BE BUILT FROM THE QUARRY TO THE PROPOSED FACILITIES AT M.P. 176.9; APPROXIMATELY 3.5 MILES IN LENGTH.

DESIGNED BY:	NORTHERN ENGINEERING SERVICES COMPANY LIMITED CALGARY, ALBERTA ENGINEERS FOR CANADIAN ARCTIC GAS STUDY LIMITED PROPOSED DEVELOPMENT OF QUARRY NO. 121 KONGAKUT RIVER, ALASKA M.P. 176.0	SCALE AS SHOWN
DRAWN BY:		DATE JULY 15 /74
CHECKED BY:		PROJECT No 1894 (f)
ENGINEERS APPROVAL:		DRAWING No
PROJECT MANAGER:		-D REV

GRADING CONSTRUCTION SCHEDULE FOR ANCILLARY FACILITIES

Tables 3 and 4, pages 67 and 68 show the grading construction schedule for ancillary facilities including compressor pads, airstrips, permanent project roads, meter station pads, wharf sites, stockpile areas, and operation and maintenance areas. The schedule applies to facilities north of latitude 60° in Alaska, the Yukon, and the Northwest Territories. It must be emphasized that this time schedule is subject to change as preconstruction and construction planning progress.

FUTURE BORROW STUDIES

Pipeline related borrow studies have been concerned with the compilation of existing geologic and environmental data on borrow sources. Most of this data is based on airphoto interpretation and a limited number of drilling logs. Future studies will be directed toward specific surface and subsurface information on each borrow source.

Site specific information obtained by field investigations will be oriented toward describing borrow sources in terms of the type, quality, quantity and engineering properties of the materials present. Information related to environmental impact and development of pits may also be collected at this time.

After surface investigations drilling and test pitting of these sites will take place. The results of this work will provide information on the part of the deposit that is the most desirable to develop, the amount of material present,

the quality and specific engineering properties of the material.

Field work is especially needed in areas not covered by the Canadian government Granular Materials Inventory. Generally these areas are along the Coastal and Interior routes in Alaska and along Canadian portions of the route from the Liard River N.W.T. south to Chinchaga River, Alberta.

GRADING CONNECTION SCHEDULE (COASTAL & RICHARD'S ISLAND ROUTE)

[illegible]

NOTE:

INTERMEDIATE BORROW SITES WILL BE DEVELOPED DURING CONSTRUCTION OF RIGHT OF WAY. COMMUNICATION TOWER BORROW SITES WILL BE DEVELOPED IN CONNECTION WITH NEARBY GRADING CONSTRUCTION.

[illegible]

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 - Vol. V, Books I and II: Intercommunity Study Area, Wrigley to Fort Norman, N.W.T. site numbers 159 to 258X and 192 to 258X
 - Vol. VII : Intercommunity Study Area, Fort Norman to Norman Wells, N.W.T. site numbers 259X to 284X
 - Vol. VIII : Community Study Area, Ten Mile Radius of Norman Wells, N.W.T. site numbers NW1 to NW21X
 - Vol. IX : Intercommunity Study Area, Norman Wells to Fort Good Hope, N.W.T., site numbers 285 to 319
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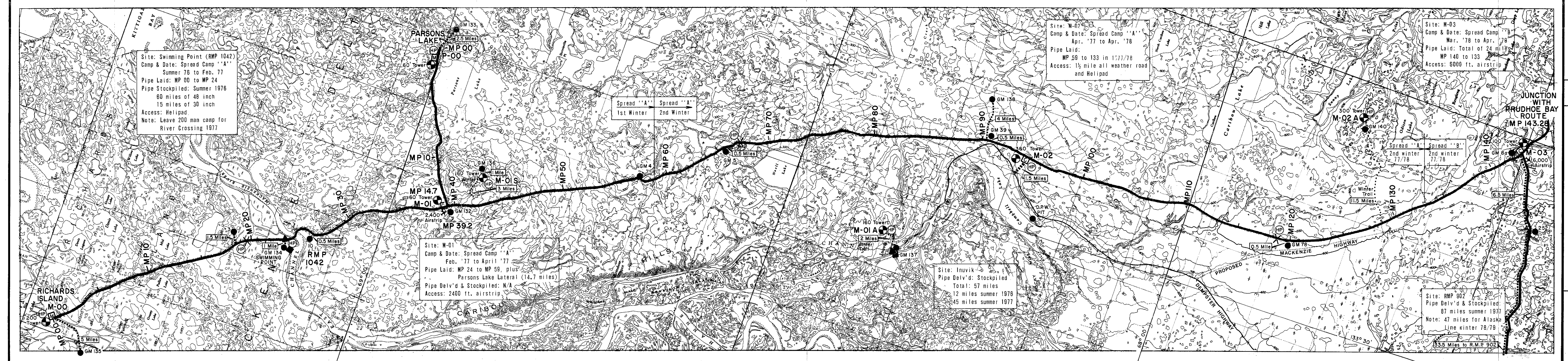
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APPENDIX I

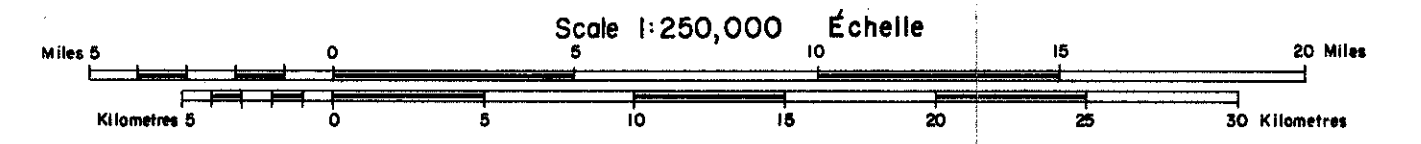
BORROW AREA NUMBER	APPEARS ON STRIP MAP NUMBER	APPEARS ON ALIGNMENT SHEET NUMBER	ERROR	CORRECTION
<u>I: MAIN CANADIAN ROUTE</u>				
GM-4	1A-1001	1A-1001	mislocated	relocate on west side of R.O.W.
GM-39	1A-1001	1A-1008	mislocated	relocate along R.O.W. about 3 mi. south of present position on strip map.
GM-140	1A-1001 1B-1001	-	misnamed	appears as GM-115 on strip map 1B-1001, should be changed to GM-140
GM-116	1B-1001	-	mislocated	relocate closer to scarp face west of M-03A
GM-10a	1B-1001	1B-1005	omitted	pit nearest M-04 is GM-10a pit nearest airstrip is GM-10
328	1B-1002	1B-1013	mislocated	relocate out of river channel to north on esker at about MP 275.5
P 315	1B-1002	1B-1015	mislocated	relocate about 1 mi. south along R.O.W.
P 279	1B-1003	1B-1022	misnamed	appears as P 290, should be P 279 located north of junction of Mack. Highway and Francis Creek.
P 197	1B-1003	1B-1030	mislocated	relocate about 4 mi. north of present location on strip map.
P 191	1B-1004	1B-1032	mislocated	relocate on west side of R.O.W.
P 183	1B-1004	-	misnamed	appears as P 133, should be P 183
GM-121	1B-1005	1B-1046	mislocated	relocate in stream channel on west side of R.O.W.
GM-30	1B-1005	1B-1054	mislocated	relocate about 2 mi. NNW of present location on strip map
GM-83a	2A-1001	2A-1004	misnamed	appears as GM-83, should be GM-83a
<u>II: COASTAL ROUTE</u>				
GM-102	3A-1001	3A-1002	mislocated	relocate on south side of R.O.W.
GM-54	3A-1001	3A-1004	mislocated	relocate south of CA-01
107	3A-1001	3A-1007 3A-1008	mislocated	relocate on south side of R.O.W.
GM-113	3A-1001 3A-1002	3A-1011	mislocated	relocate on south side of R.O.W.

APPENDIX I cont'd

BORROW AREA NUMBER	APPEARS ON STRIP MAP NUMBER	APPEARS ON ALIGNMENT SHEET NUMBER	ERROR	CORRECTION
121	3A-1002	-	mislocated	relocate about 4 mi. south of CA-04 in bedrock.
127	3A-1001	1C-1004	mislocated	relocate on south side of R.O.W.
GM-46	1C-1001	-	mislocated	relocate about 4 mi. north in river channel closer to Shingle Point.
<u>III: INTERIOR ROUTES</u>				
GM-52	3B-1001 3C-1001	-	misnamed	appears as GM-50, should be GM-52
GM-74	3B-1001 3C-1001	3B-1008 3C-1008	omitted	left off of alignment sheets
Staging area @ MP 95	3B-1001	3B-1008	mislocated	relocate facility at about MP 91 on strip maps
GM-111	3C-1002	-	mislocated	should not appear on this strip map
GM-71	3B-1002	3B-1013	mislocated	relocate on east side of R.O.W.
GM-77	3B-1002 3C-1002	3B-1016 3C-1016	misnamed	appears as an alternate borrow pit, should be a preferred pit
GM-72	3B-1002	3B-1017	mislocated	relocate to north at about MP 190 (3B series) and west of R.O.W. in bedrock outcrop.
GM-140a	3C-1002	3C-1018	misnamed	appears as GM-140 should be GM-140a
GM-112	3B-1002	3B-1022	mislocated	relocate from river channel to about 1 mi. to the west
GM-73	3B-1002	3B-1024	mislocated	relocate about ½ mi. south of 1A-06
226	3B-1003	1D-1005	mislocated	relocate about 2 mi. east of 1A-08 and ½ mi. south of R.O.W.
226	3C-1003	1G-1005	mislocated	relocate about ½ mi. south of 1A-08
GM-93	1D-1001 1G-1001	1D-1008 1G-1008	mislocated	relocate on south side of R.O.W. in Berry Creek
@ MP 411	1D-1001 1G-1001	1D-1010 1B-1010	mislocated	omit preferred pit shown on align. sheets in Waters River
GM-42	1F-1001 1H-1001	1F-1004 1H-1004	misnamed	appears as 42 should be GM-42 and positioned closer to eastern river bank and R.O.W.



THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.



- COMPRESSOR STATION
- METER STATION
- MATERIAL STOCKPILE
- CAMP, STATION AND STOCKPILE
- WHALE
- PREFERRED BORROW PIT
- ALTERNATE BORROW PIT
- BLOCK VALVE
- PIPELINE COMMUNICATIONS TOWER
- AIRSTRIP
- HELIPAD
- PERMANENT PROJECT ROAD
- TEMPORARY ACCESS SNOW ROAD
- PERMANENT ROAD
- WINTER SNOW TRAIL

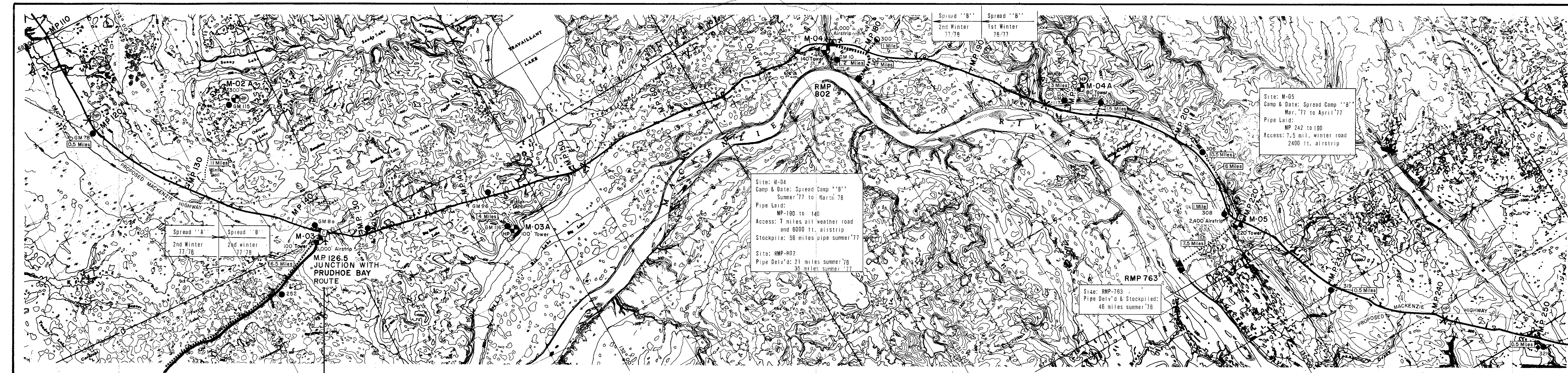
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DRAWN BY: *AW*
CHECKED BY: *AW*
ENGINEERS' APPR: *AW*
PROJECT MANAGER: *AW*

PROPOSED PIPELINE ROUTE MAP
MP 00 TO MP 140
RICHARDS ISLANDS TO TRAVAILLANT LAKE

SECTION 13c 2.2

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CU. YDS.
0	M-00 METER STATION	2.41	24,000
	RMP 1044	40.00	290,000
	CAMP & STOCKPILE PAD	2.07	1,000
	HELIPAD	2.41	24,000
39.20	MP-00 METER STATION		
	M-01 COMPRESSOR STATION		
	PAD	28.73	280,000
	AIRSTRIP	100.00	210,000
	ROAD	21.83	75,000
	M-01-S COMMUNICATIONS TOWER	5.50	2,000
	INUVIK		
	STOCKPILE PAD	20.00	258,000
	O & H PAD	8.04	104,000
94.90	M-01-A COMMUNICATION TOWER	5.50	2,000
	M-02 COMPRESSOR STATION		
	PAD	42.51	320,000
	M-02-A COMMUNICATION TOWER	5.50	2,000
133.0	PIPELINE RIGHT OF WAY	1335.15	
	TOTAL SPREAD "A"	2,218.55	1,592,000

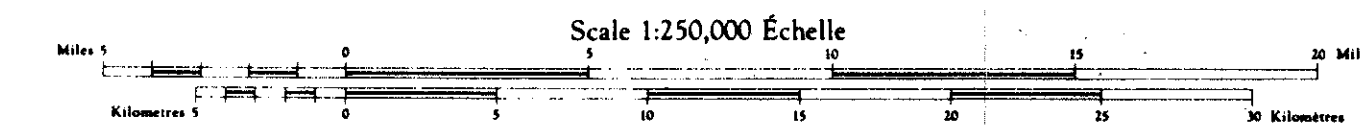
REVISED FEB 22 1974
SCALE: AS SHOWN
DATE: FEBRUARY 8, 1974
PROJECT NO. 2950
DRAWING NO. 1A-0211-1001
REV. 1



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CHAINAGE EQUATION

NORTH	SOUTH
143.28	126.50



- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

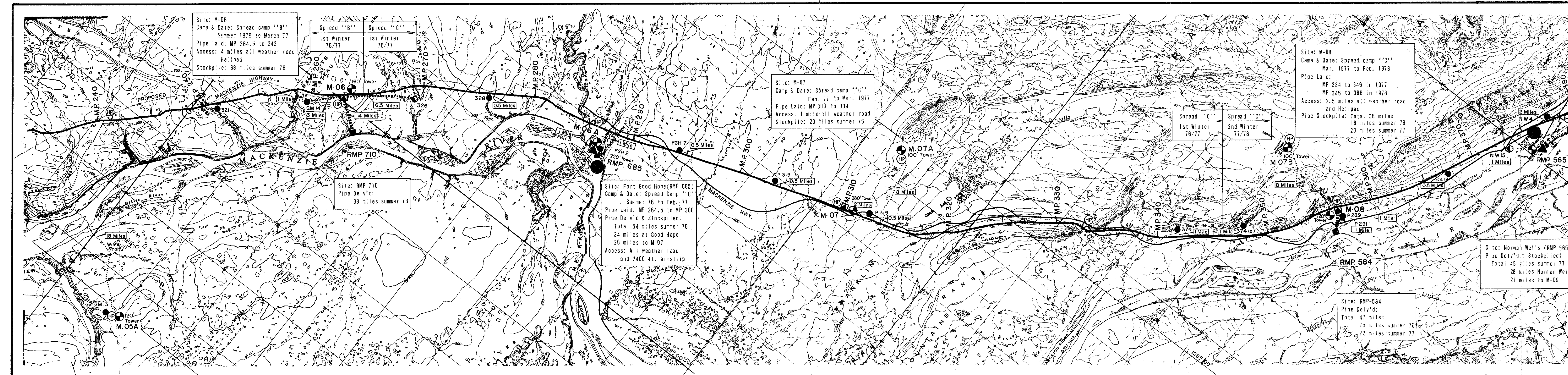
DESIGNED BY: *HEW*
DRAWN BY: *HEW*
CHECKED BY: *HEW*
ENGINEER: *HEW*
PROJECT MANAGER: *HEW/G.W.*

PROPOSED PIPELINE ROUTE MAP MP110.0 TO MP250.0 TRAVAILLANT LAKE to 60th PARALLEL

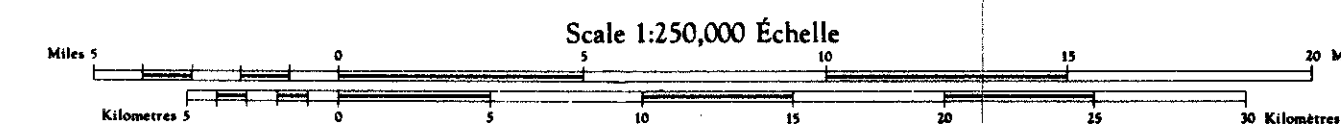
SECTION 13.a.2.2.

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CU. YDS.
143.28N	RMP 802	25.00	260,000
126.50S	M-03 COMPRESSOR STATION	42.51	400,000
	PAD	300.00	960,000
	AIRSTRIIP	21.83	75,000
	ROAD	5.50	2,000
176.00	M-03-A COMMUNICATIONS TOWER		
	M-04 COMPRESSOR STATION	42.51	570,000
	PAD	300.00	960,000
	AIRSTRIIP	101.85	350,000
	ROAD	15.00	145,000
220.00	RMP 802	5.50	2,000
	M-04-A COMMUNICATIONS TOWER		
	M-05 COMPRESSOR STATION	42.51	360,000
	PAD	175.00	180,000
	AIRSTRIIP	29.10	100,000
	ROAD	25.00	260,000
250.00	RMP 763	1798.93	
	PIPELINE RIGHT OF WAY	2,928.24	4,624,000
	SUB-TOTAL SPREAD "B"		

REVISED: FEB 22 1974
SCALE: AS SHOWN
DATE: FEBRUARY 8, 1974
PROJECT NO.: 2950
DRAWING NO.: 18-0211 -1001



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- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHAIR
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SHOW TRAIL

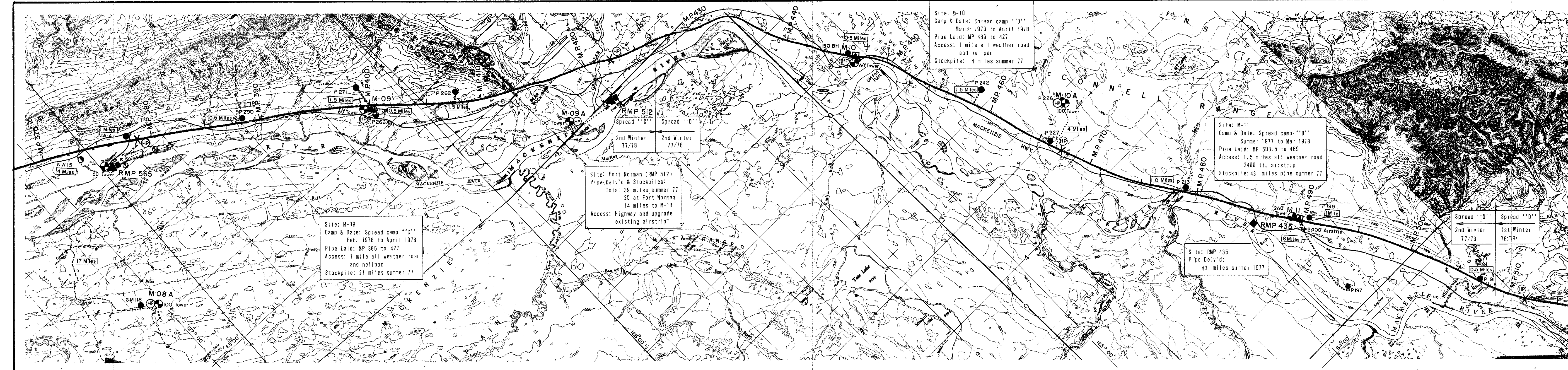
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DRAWN BY: *AW*
CHECKED BY: *AW*
ENGINEER APP: *AW*
PROJECT MANAGER: *AW/GW*

PROPOSED PIPELINE ROUTE MAP
MP 240.0 TO MP 380.0
TRAVAILLANT LAKE to 60th PARALLEL

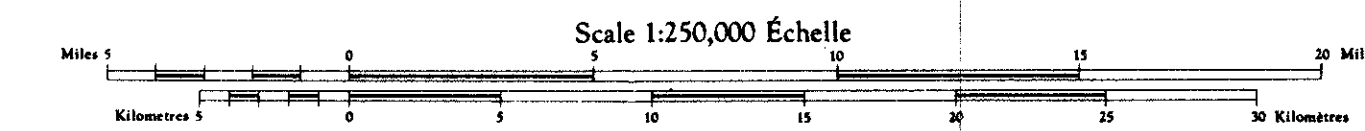
SECTION 13.a.2.2.

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CO. YDS.
250.00	SUB-TOTAL SPREAD "B"	2,928.24	4,624,000
	M-05-A COMMUNICATIONS TOWER	5.50	2,000
	M-06 COMPRESSOR STATION		
	PAD	42.51	280,000
	ROAD	58.20	200,000
	RMP 710	15.00	145,000
	PIPELINE RIGHT OF WAY	210.98	
	TOTAL SPREAD "B"	3,260.43	5,251,000
264.50	M-06-A COMMUNICATIONS TOWER	5.50	2,000
	RMP 685 (FT. GOOD HOPE)	25.00	242,000
	M-07 COMPRESSOR STATION		
	PAD	42.51	320,000
	ROAD	14.55	50,000
	M-07-A COMMUNICATIONS TOWER	5.50	2,000
	M-07-B COMMUNICATIONS TOWER	5.50	2,000
	M-08 COMPRESSOR STATION		
	PAD	42.51	360,000
	ROAD	36.38	125,000
	RMP 584	15.00	145,000
	RMP 565 (NORMAN WELLS) STOCKPILE	10.00	97,000
	O & M	8.04	78,000
375.00	PIPELINE RIGHT OF WAY	1607.78	
	SUB-TOTAL SPREAD "C"	1,818.27	1,423,000

REVISED: FEB 22 1974	REV.
SCALE: AS SHOWN	
DATE: FEBRUARY 8, 1974	
PROJECT NO. 2950	
DRAWING NO. 1B-0211-1002	



THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.



- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

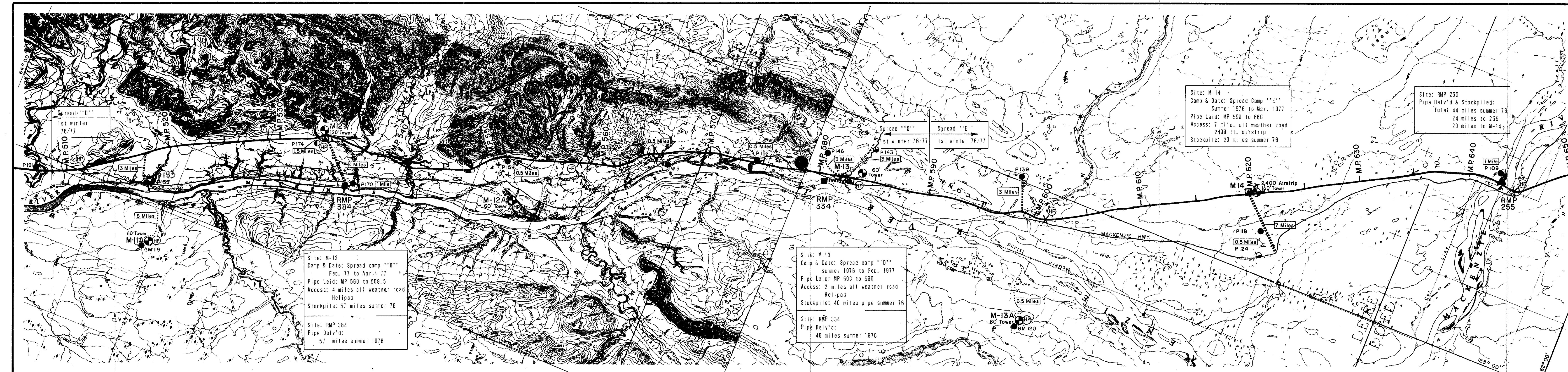
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DRAWN BY: *REW*
CHECKED BY: *REW*
ENGINEERS APP: *REW*
PROJECT MANAGER: *REW/GCW*

PROPOSED PIPELINE ROUTE MAP
MP 3700 TO MP 5100
TRAVAILANT LAKE to 60th PARALLEL

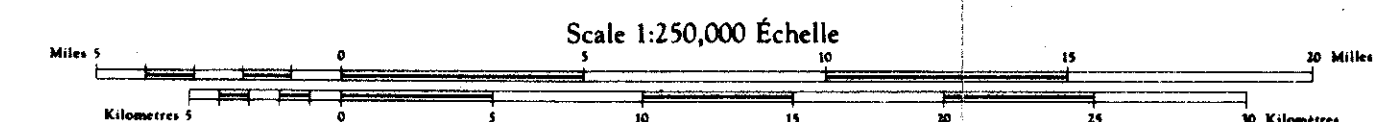
SECTION 13a.2.2.

REVISED: FEB 22 1974	SCALE: AS SHOWN	DATE: FEBRUARY 8, 1974	PROJECT NO. 2950	DRAWING NO. 18-0211-1003
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MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CU. YDS.
375.00	SUB-TOTAL SPREAD "C"	1,1818.27	1,423,000
	M-08-A COMMUNICATIONS TOWER	5.50	2,000
	M-09 COMPRESSOR STATION		
	PAD	42.51	280,000
	ROAD	14.55	50,000
	M-09-A COMMUNICATIONS TOWER	5.50	2,000
	RMP 512	25.00	242,000
	PIPELINE RIGHT OF WAY	756.60	
	TOTAL SPREAD "C"	2,667.93	1,999,000
427.00			
	M-10 COMPRESSOR STATION		
	PAD	42.51	400,000
	ROAD	14.55	50,000
	M-10-A COMMUNICATIONS TOWER	5.50	2,000
	RMP 435	15.00	145,000
	M-11 COMPRESSOR STATION		
	PAD		
	AIRSTRIIP	175.00	180,000
	ROAD	21.83	75,000
508.5	PIPELINE RIGHT OF WAY	1,185.83	
	SUB-TOTAL SPREAD "D"	1,507.73	1,212,000



THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.



- COMPRESSOR STATION
- METER STATION
- MATERIAL STOCKPILE
- COMP. STATION AND STOCKPILE
- WHARF
- PREFERRED BORROW PIT
- ALTERNATE BORROW PIT
- BLOCK VALVE
- PIPELINE COMMUNICATIONS TOWER
- AIRSTRIIP
- HELIPAD
- PERMANENT PROJECT ROAD
- TEMPORARY ACCESS SNOW ROAD
- PERMANENT ROAD
- WINTER SNOW TRAIL

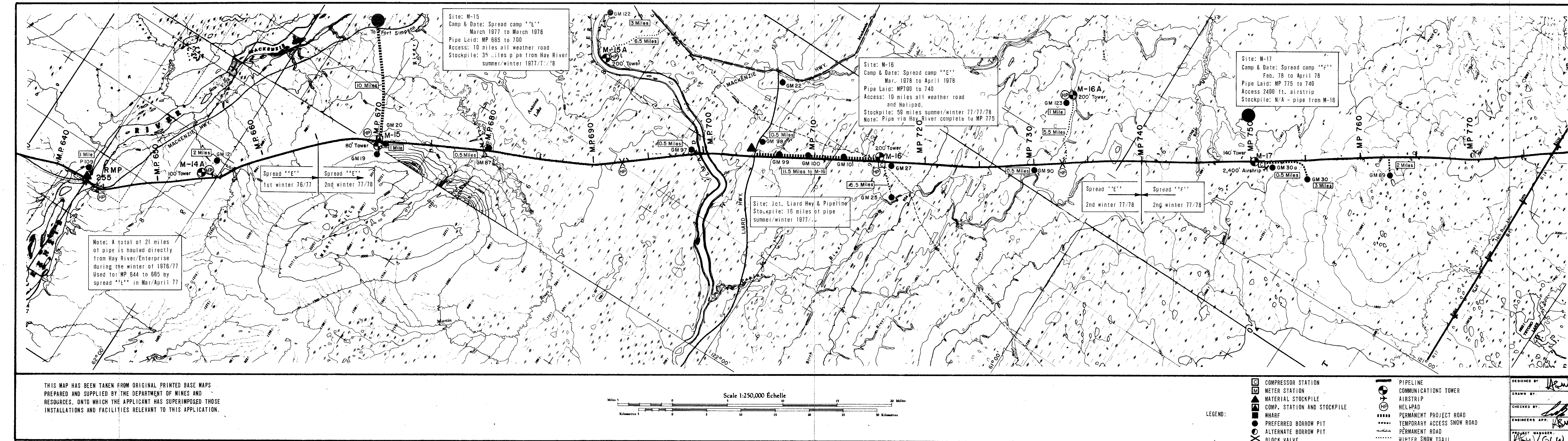
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DRAWN BY: *Ren*
CHECKED BY: *Ren*
ENGINEERS APP: *Ren*
PROJECT MANAGER: *Ren*

PROPOSED PIPELINE ROUTE MAP
MP 510.0 TO MP 650.0
TRAVAILANT LAKE TO 60th PARALLEL

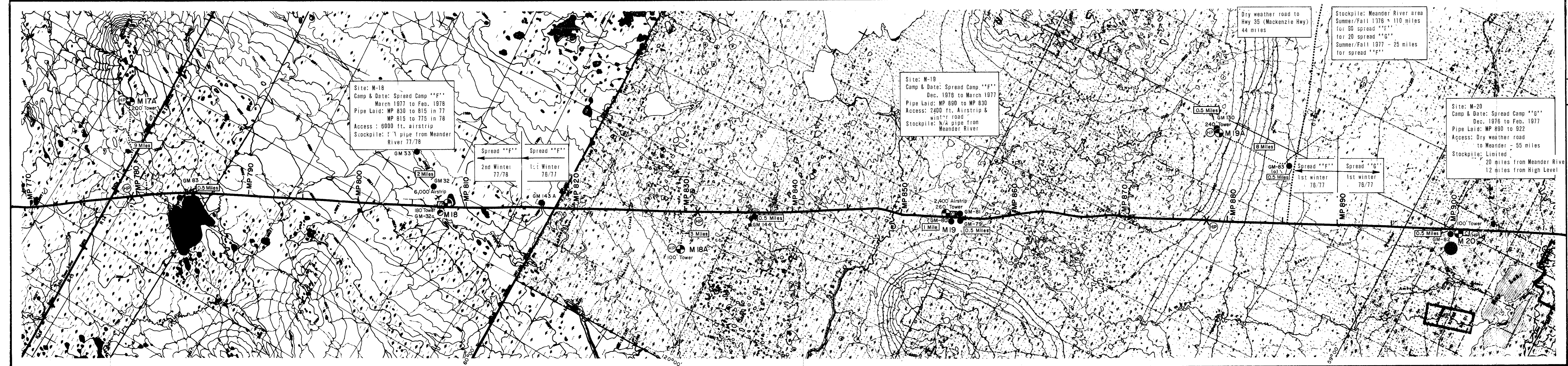
SECTION 13a.2.2.

REVISED: FEB. 22, 1974
SCALE: AS SHOWN
DATE: FEBRUARY 8, 1974
PROJECT NO. 2950
DRAWING NO. 1B-0211-1004

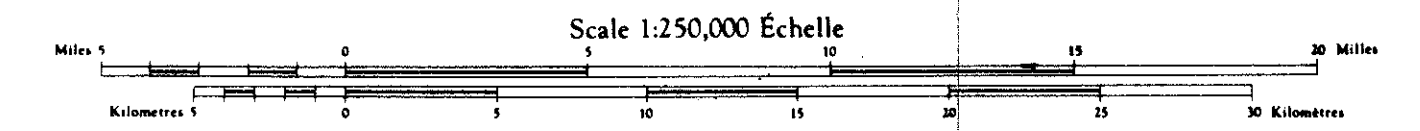
MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CU. YDS.
508.5	SUB-TOTAL SPREAD "D"	1,502.73	1,212,000
	M-11-A COMMUNICATION TOWER	5.50	2,000
	M-12 COMPRESSOR STATION		
	PAD	42.51	320,000
	ROAD	58.20	200,000
	RMP 384	15.00	145,000
	M-12-A COMMUNICATION TOWER	5.50	2,000
	RMP 334	15.00	145,000
	M-13 COMPRESSOR STATION		
	PAD	42.51	320,000
	ROAD	29.10	100,000
560.00	PIPELINE RIGHT OF WAY	749.33	
	TOTAL SPREAD "D"	2,465.38	2,446,000
	M-13-A COMMUNICATIONS TOWER	5.50	2,000
	M-14 COMPRESSOR STATION		
	PAD	42.51	400,000
	AIRSTRIIP	175.00	210,000
	ROAD	116.40	400,000
	RMP 255	25.00	193,000
650.00	PIPELINE RIGHT OF WAY	1309.59	
	SUB-TOTAL SPREAD "E"	1,672.91	1,205,000



MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CU. YDS.
650.00	SUB-TOTAL SPREAD "E"	1,673.91	1,205,000
	M-14-A COMMUNICATIONS TOWER	5.50	2,000
	M-15 COMPRESSOR STATION		
	PAD	42.51	280,000
	ROAD	145.50	500,000
	FORT SIMPSON		
	O & H	8.04	78,000
	M-15-A COMMUNICATIONS TOWER	5.50	2,000
	JUNCTION LIARD HIGHWAY & PIPELINE	25.00	242,000
	M-16 COMPRESSOR STATION		
740.00	PAD	21.19	350,000
	ROAD	145.50	250,000
	M-16-A COMMUNICATIONS TOWER	5.50	2,000
	PIPELINE RIGHT OF WAY	1309.50	
	TOTAL SPREAD "E"	3395.65	2,811,000
	M-17 COMPRESSOR STATION		
	PAD	29.19	470,000
	AIRSTRIP	175.00	90,000
	ROAD	14.55	70,000
	PIPELINE RIGHT OF WAY (60°)	494.70	
774.00	SUB-TOTAL SPREAD "E"	713.44	630,000



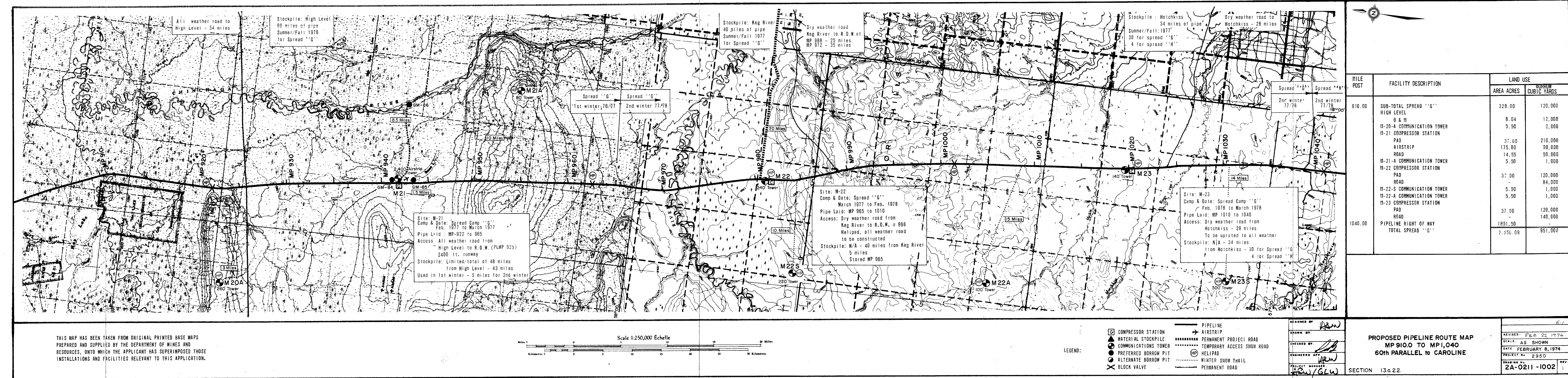
THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.

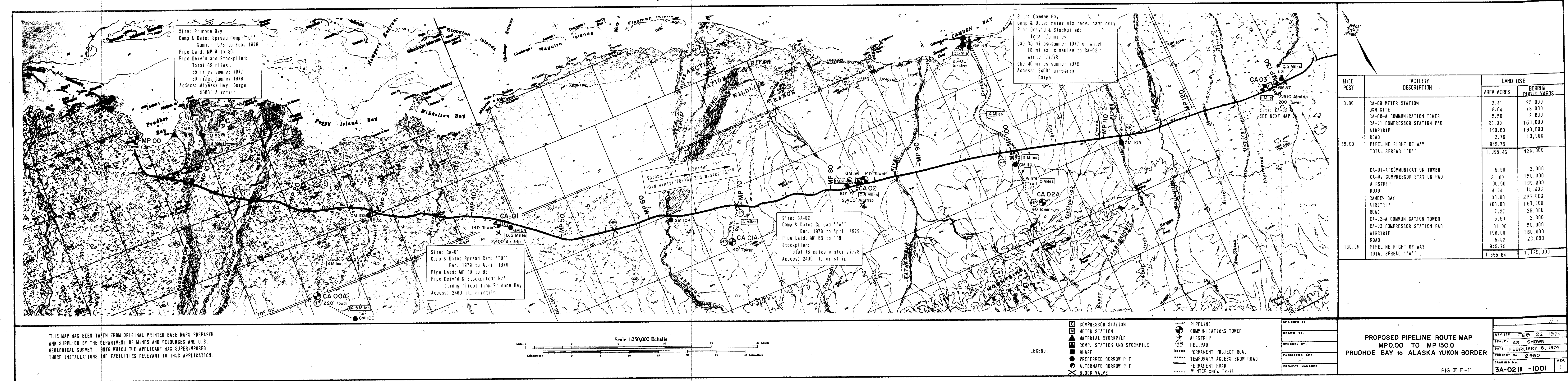


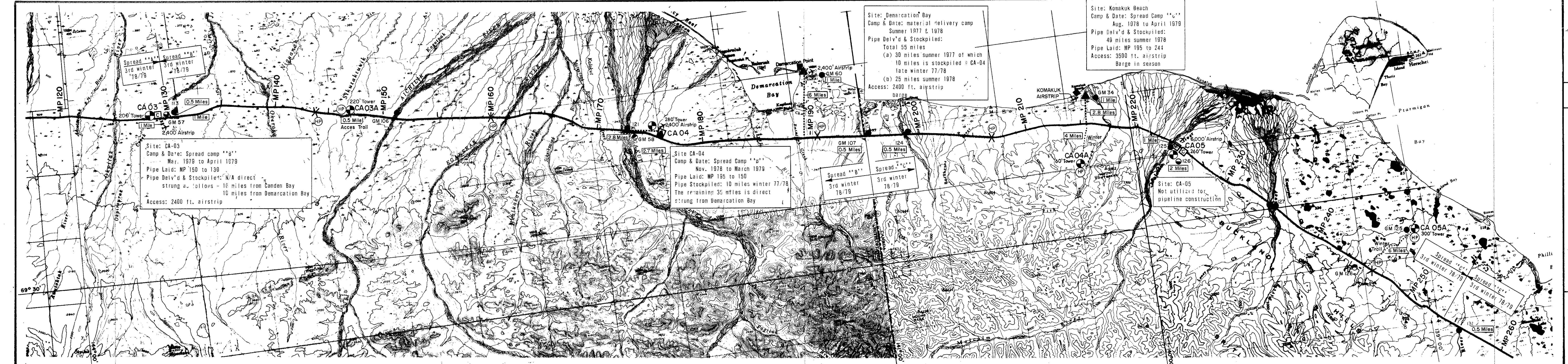
- LEGEND:
- COMPRESSOR STATION
 - MATERIAL STOCKPILE
 - COMMUNICATIONS TOWER
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE
 - AIRSTRIP
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS ROAD
 - HELIPAD
 - WINTER SNOW TRAIL

DESIGNED BY: ARW
DRAWN BY: LJB
CHECKED BY: LJB
ENGINEER'S APP: ARW
PROJECT MANAGER: ARW/GCW

PROPOSED PIPELINE ROUTE MAP	
MP 770.0 TO MP 900.0	
60th PARALLEL to CAROLINE	
SECTION 13a.2.2.	
REVISED: FEB. 22 1974	REV. 1
SCALE: AS SHOWN	
DATE: FEBRUARY 8, 1974	
PROJECT No: 2950	
DRAWING No: 2A-0211 -1001	

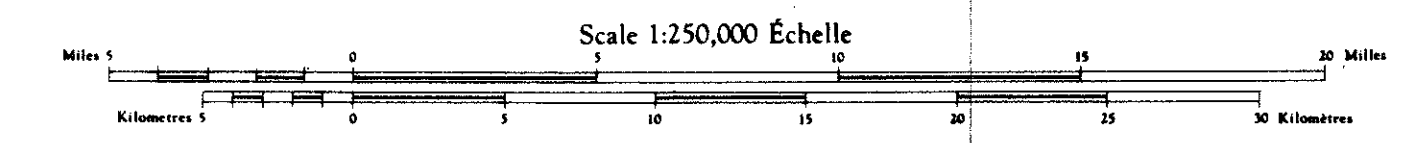






THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, AND U.S. GEOLOGICAL SURVEY, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.

PROPOSED PIPELINE ROUTE MAP
MP 120 TO MP 195
PRUDHOE BAY TO ALASKA, YUKON BORDER



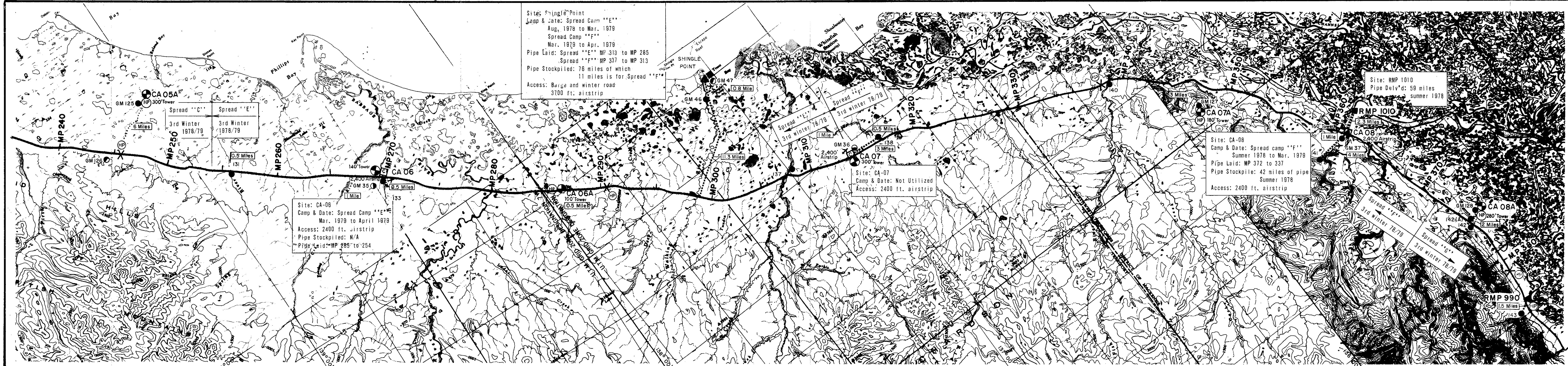
- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMM. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

DESIGNED BY: *[Signature]*
DRAWN BY: *[Signature]*
CHECKED BY: *[Signature]*
ENGINEERS APP: *[Signature]*
PROJECT MANAGER: *[Signature]*

PROPOSED PIPELINE ROUTE MAP
MP 195.0 TO MP 260.0
ALASKA, YUKON BORDER TO FORT McPHERSON

REVISED: FEB 22 1974
SCALE: AS SHOWN
DATE: FEBRUARY 8, 1974
PROJECT NO.: 2950
DRAWING NO.: 3A-0211 -1002

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
130.00	CA-03-A COMMUNICATIONS TOWER CA-04 COMPRESSOR STATION PAD AIRSTRIIP ROAD DEMARCATION BAY AIRSTRIIP ROAD	5.50 31.00 100.00 0.55 30.00 100.00 7.27	2,000 150,000 240,000 5,000 285,000 160,000 25,000
195.00	PIPELINE RIGHT OF WAY TOTAL SPREAD "B"	945.75 1,220.07	867,000
254.00	CA-04-A COMMUNICATIONS TOWER KOMAKUK BEACH ROAD CA-05 METER STATION CA-05 COMPRESSOR STATION PAD AIRSTRIIP ROAD CA-05-A COMMUNICATIONS TOWER PIPELINE RIGHT OF WAY TOTAL SPREAD "C"	5.50 30.00 21.83 2.41 31.00 130.00 14.55 5.50 858.45 1,095.24	2,000 360,000 75,000 25,000 240,000 720,000 50,000 2,000



Site: Shingle Point
Camp & Date: Spread Camp "E"
Aug. 1978 to Mar. 1979
Spread Camp "F"
Mar. 1979 to Apr. 1979
Pipe Laid: Spread "E" MP 313 to MP 285
Spread "F" MP 337 to MP 313
Pipe Stockpiled: 76 miles of which
11 miles is for Spread "F"
Access: Baige and winter road
3700 ft. airstrip

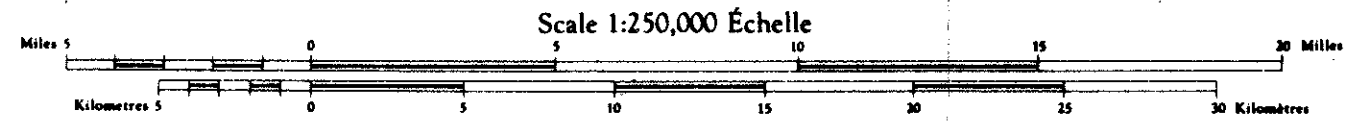
Site: CA-06
Camp & Date: Spread Camp "E"
Mar. 1979 to April 1979
Access: 2400 ft. airstrip
Pipe Stockpiled: N/A
Pipe Laid: MP 285 to 254

Site: CA-07
Camp & Date: Not Utilized
Summer 1978
Access: 2400 ft. airstrip

Site: CA-08
Camp & Date: Spread camp "E"
Summer 1978 to Mar. 1979
Pipe Laid: MP 372 to 337
Pipe Stockpile: 42 miles of pipe
Summer 1978
Access: 2400 ft. airstrip

Site: RMP 1010
Pipe Duly'd: 59 miles
Summer 1978

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RESOURCES AND U.S. GEOLOGICAL SURVEY ONTO WHICH THE APPLICANT
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- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE
 - COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

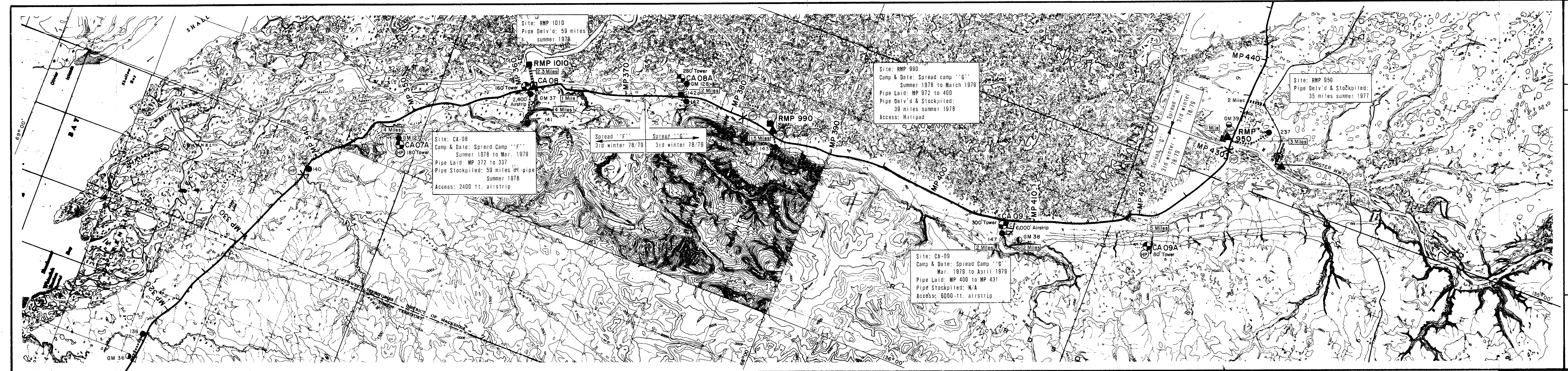
DESIGNED BY: *ARW*
DRAWN BY: *ARW*
CHECKED BY: *ARW*
ENGINEERS: *ARW*
PROJECT MANAGER: *ARW*

PROPOSED PIPELINE ROUTE MAP
MP 240.0 TO MP 380.0
ALASKA, YUKON BORDER to FORT McPHERSON

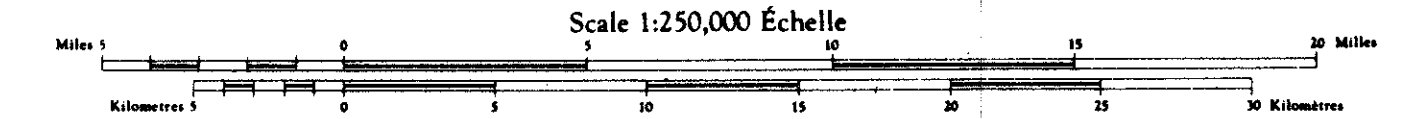
SECTION 13a.2.2.

REVISED: FEB 22, 1974
SCALE: AS SHOWN
DATE: FEBRUARY 6, 1974
PROJECT NO.: 2950
DRAWING NO.: 1C-0211-1001

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
254.00	CA-06 COMPRESSOR STATION PAD	31.00	320,000
	AIRSTRIIP	100.00	270,000
	ROAD	7.27	25,000
	CA-08-A COMMUNICATIONS TOWER	5.50	2,000
	SHINGLE POINT CAMP PAD AND STOCKPILE	35.00	338,000
	CA-07 COMPRESSOR STATION PAD	31.00	320,000
313.00	AIRSTRIIP	100.00	270,000
	ROAD	7.27	25,000
	PIPELINE RIGHT OF WAY	858.45	
	TOTAL SPREAD "E"	1,175.49	1,570,000
	CA-07-A COMMUNICATION TOWER	5.50	2,000
	CA-08 COMPRESSOR STATION PAD	31.00	240,000
372.00	AIRSTRIIP	100.00	240,000
	ROAD	10.91	38,000
	RMP-1010 WHARF AND PAD	15.00	145,000
	ROAD	33.47	58,000
	PIPELINE RIGHT OF WAY	858.45	
	TOTAL SPREAD "F"	1,054.33	723,000



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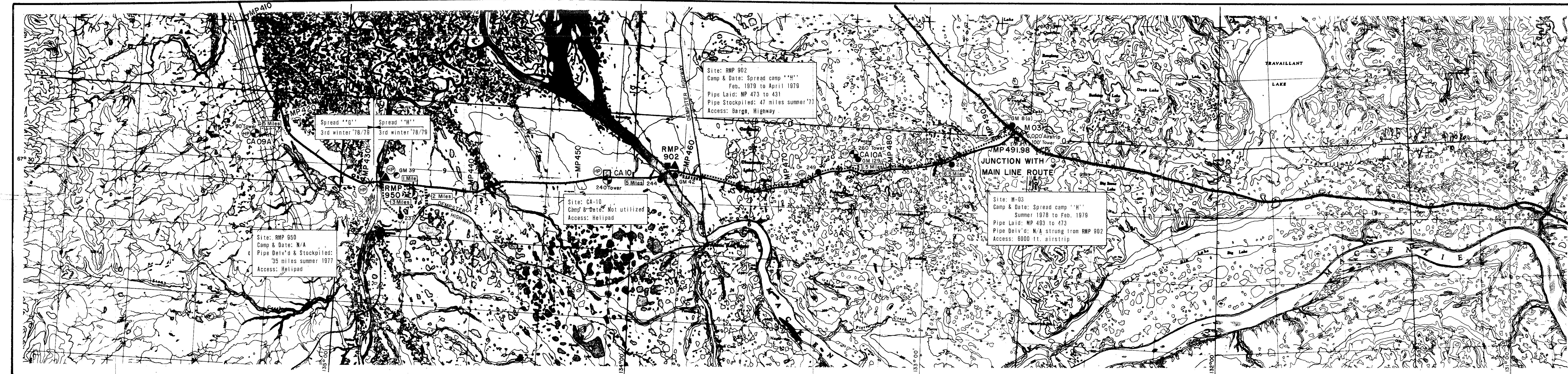


- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

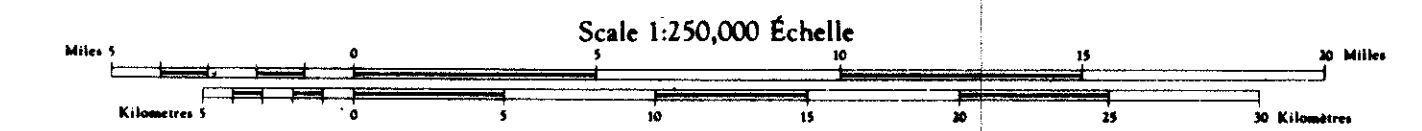
DESIGNED BY: *[Signature]*
DRAWN BY: *[Signature]*
CHECKED BY: *[Signature]*
ENGINEER'S APP: *[Signature]*
PROJECT MANAGER: *[Signature]*

PROPOSED PIPELINE ROUTE MAP
MP 320.0 TO MP 440.0
ALASKA, YUKON BORDER to FORT McPHERSON
SECTION 13.a.2.2.

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
372.00	CA-08-A COMMUNICATIONS TOWER RMP-990 CAMP & STOCKPILE PAD CA-08 COMPRESSOR STATION PAD AIRSTRIIP ROAD	5.50 25.00 42.51 300.00 20.10	2,000 242,000 400,000 1,200,000 100,000
431.00	CA-09-A COMMUNICATIONS TOWER PIPELINE RIGHT OF WAY TOTAL SPREAD "6"	5.50 858.45 1,278.06	2,000 1,946,000



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- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

DESIGNED BY: *ACW*
DRAWN BY: *ACW*
CHECKED BY: *ACW*
ENGINEERS APP: *ACW*
PROJECT MANAGER: *ACW/GLW*

PROPOSED PIPELINE ROUTE MAP
MP 410.0 TO MP 491.98
FORT McPHERSON to TRAVAILLANT LAKE

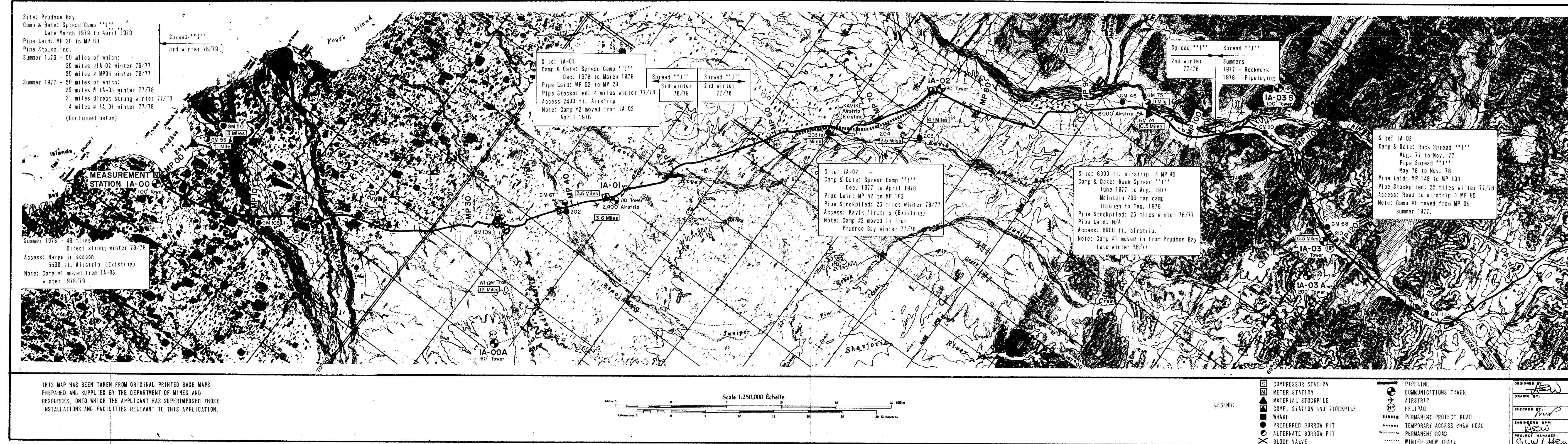
SECTION 13.a.2.2.

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
431.00	RMP-950 WHARF & STOCKPILE	30.00	290,000
	FORT McPHERSON STOCKPILE	15.00	145,000
	DEMPSER HIGHWAY ACCESS ROAD	29.10	50,000
	CA-10 COMPRESSOR STATION PAD	42.51	280,000
	RMP-902 WHARF, STOCKPILE, CAMP PAD	30.00	290,000
482.00	ROAD	46.85	75,000
	CA-10-A COMMUNICATIONS TOWER	5.50	2,000
	PIPELINE RIGHT OF WAY	887.55	
	TOTAL SPREAD "H"	1,088.31	1,132,000

Rev. 1, Mar. 27/74. 100' Tower at M03.

PRUDHOE BAY ROUTE

REVISED: FEB 22, 1974
SCALE: AS SHOWN
DATE: FEBRUARY 8, 1974
PROJECT NO. 2950
DRAWING NO. 1E-0211-1001
REV. 1



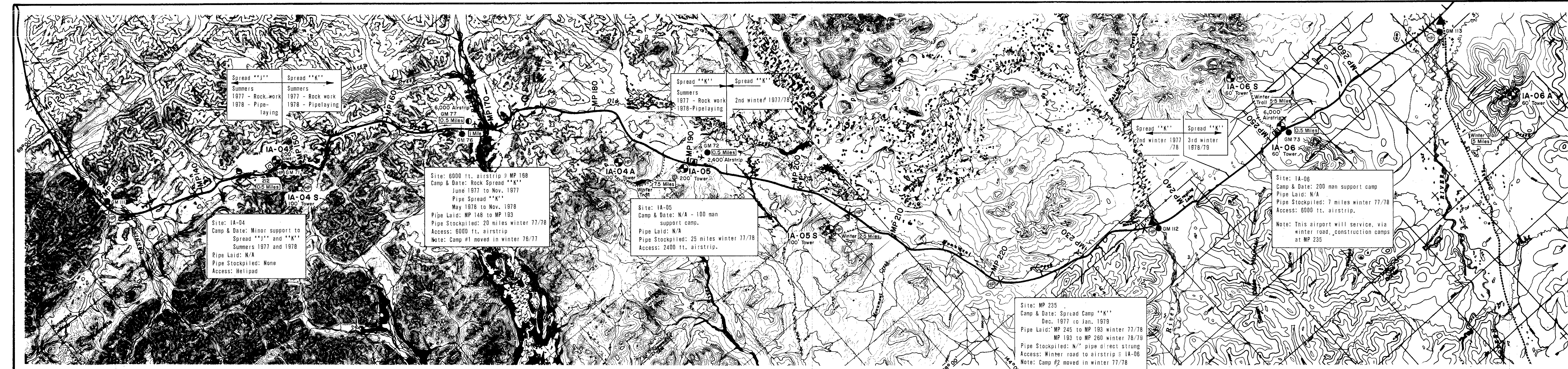
Canadian Section 14.8 and
U.S. Environmental Report - Chapter V-B.
Subsection - 1.10

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
0.0	PRUDHOE BAY - CAMP AND STOCKPILE	40.30	
	A-00 METER STATION	2.41	24,000
	ROAD	85.48	225,000
	O & M	8.04	78,000
	IA-00-A COMMUNICATIONS TOWER	5.50	2,000
	IA-01 COMPRESSOR STATION		
	PAD	31.00	240,000
	AIRSTRIIP	100.00	180,000
	ROAD	1.38	5,000
52.0	PIPELINE RIGHT OF WAY	758.60	
	SUB-TOTAL SPREAD "J" (WINTER)	1,919.41	754,000
	IA-02 COMPRESSOR STATION		
	PAD	51.00	400,000
	ROAD	87.30	360,000
	MILE POST 95		
	CAMP & STOCKPILE	25.00	240,000
	AIRSTRIIP	130.00	880,000
	ROAD	7.25	25,000
103.00	PIPELINE RIGHT OF WAY	742.05	
	SUB-TOTAL SPREAD "J" (WINTER)	1,922.60	1,825,000
	IA-03-S COMMUNICATIONS TOWER	5.50	2,000
	IA-03 COMPRESSOR STATION		
	PAD	31.00	400,000
	IA-03-A COMMUNICATIONS TOWER	5.50	2,000
130.00	PIPELINE RIGHT OF WAY	392.85	
	SUB-TOTAL SPREAD "J"	434.65	404,000

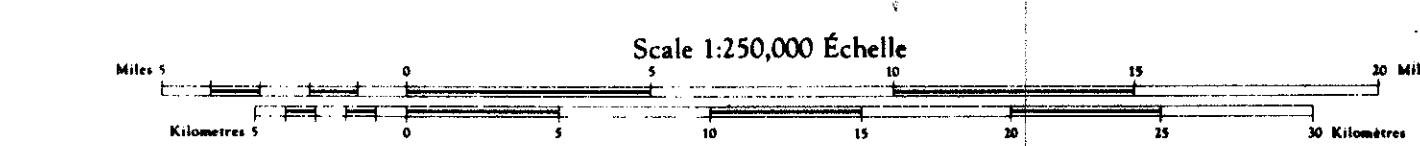
DESIGNED BY: *HEW*
DRAWN BY: *HEW*
CHECKED BY: *HEW*
ENGINEER APP: *HEW*
PROJECT MANAGER: *GLW/HEW*

REVISED: FEB. 22 1974
SCALE: AS SHOWN
DATE: FEB. 8, 1974
PROJECT No: 2950
DRAWING No: 3B-0211 -1001

PROPOSED PIPELINE ROUTE MAP
MP 00 TO MP 140.
PRUDHOE BAY to ALASKA YUKON BORDER
INTERIOR ROUTE - MARSH FORK OPTION



THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.



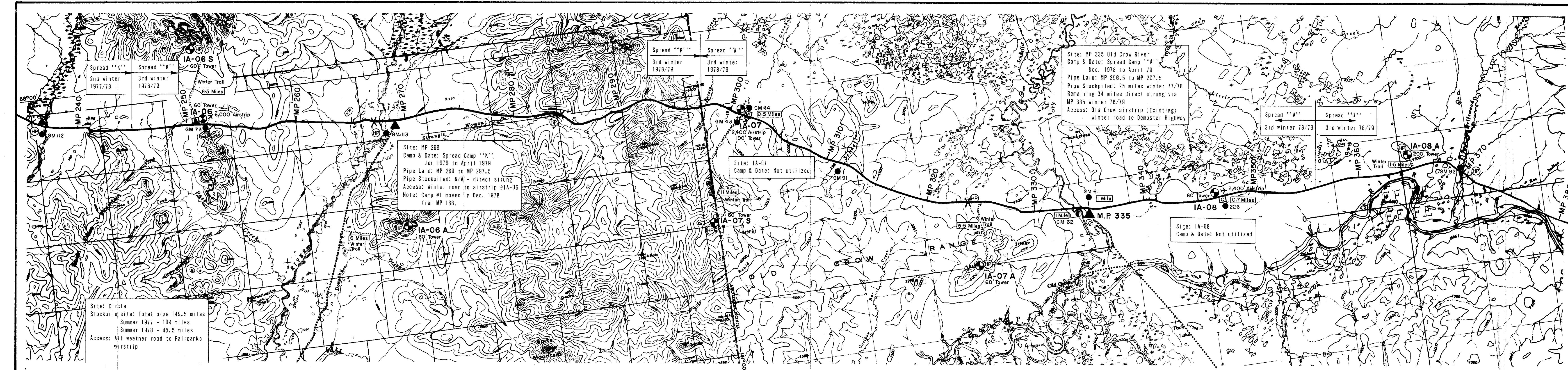
- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

DESIGNED BY: [Signature]
DRAWN BY: [Signature]
CHECKED BY: [Signature]
ENGINEER'S APP: [Signature]
PROJECT MANAGER: [Signature]

PROPOSED PIPELINE ROUTE MAP
MP 130 TO MP 260
PRUDHOE BAY TO ALASKA, YUKON BORDER
INTERIOR ROUTE - MARSH FORK OPTION

REVISED:	FEB 22 1974
SCALE:	AS SHOWN
DATE:	FEB 8 1974
PROJECT NO.	2950
DRAWING NO.	3B-0211 -1002
REV.	1

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
130.0	SUB-TOTAL SPREAD "J"	434.85	404,000
	IA-04-COMPRESSOR STATION PAD	31.00	480,000
148.0	PIPELINE RIGHT OF WAY	261.80	
	SUB-TOTAL SPREAD "J" (SUMMER)	727.75	884,000
	TOTAL SPREAD "J"	2,760.76	3,483,000
	IA-04-S COMMUNICATIONS TOWER	5.50	2,000
	MILE POST 168		
	CAMP AND STOCKPILE	25.00	240,000
	AIRSTRIP	300.00	1,800,000
	ROAD	7.28	25,000
	IA-04-A COMMUNICATIONS TOWER	5.50	2,000
	IA-05-COMPRESSOR STATION PAD	31.00	240,000
	AIRSTRIP	100.00	180,000
	ROAD	7.28	25,000
193.0	PIPELINE RIGHT OF WAY	654.75	
	SUB-TOTAL SPREAD "K" (SUMMER)	1,138.31	2,514,000
	IA-05-S COMMUNICATIONS TOWER	5.50	2,000
245.9	MILE POST 235 - CAMP	17.00	165,000
	PIPELINE RIGHT OF WAY	756.60	
	SUB-TOTAL SPREAD "K" (WINTER)	779.10	167,000



Canadian Section 14.e and
U.S. Environmental Report - Chapter V-B
Subsection - 1.10

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
297.50	IA-06 COMPRESSOR STATION		
	PAD	42.51	800,000
	AIRSTRIP	300.00	720,000
	ROAD	2.75	1,000
	IA-06-S COMMUNICATIONS TOWER	5.50	2,000
	CIRCLE ALASKA - PAD	50.00	240,000
	MILE POST 269 - CAMP PAD	20.00	194,000
	IA-06-A COMMUNICATIONS TOWER	5.50	2,000
	IA-07-S COMMUNICATIONS TOWER	5.50	2,000
	PIPELINE RIGHT OF WAY	763.88	
297.50	SUB-TOTAL SPREAD "K" (WINTER)	1,195.64	1,981,000
	TOTAL SPREAD "K"	3,111.65	4,642,000
	TOTAL ALASKA	5,871.81	8,105,000
356.50	IA-07 COMPRESSOR STATION		
	PAD	42.51	240,000
	AIRSTRIP	175.00	270,000
	ROAD	28.10	100,000
	IA-07-A COMMUNICATIONS TOWER	5.50	2,000
	MILE POST 335 OLD CROW RIVER CAMP & STOCKPILE	25.00	240,000
	IA-08 COMPRESSOR STATION		
	PAD	42.51	400,000
	AIRSTRIP	175.00	240,000
	ROAD	7.28	25,000
356.50	PIPELINE RIGHT OF WAY	858.45	
	TOTAL SPREAD "A"	1,360.35	1,517,000

THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.

Scale 1:250,000 Échelle

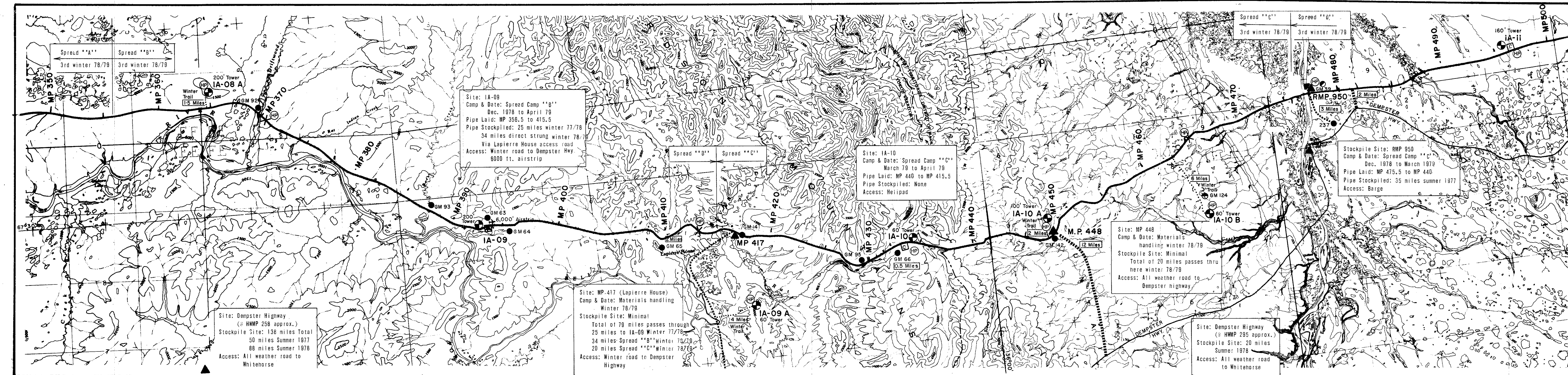
LEGEND:

- COMPRESSOR STATION
- METER STATION
- MATERIAL STOCKPILE
- COMP. STATION AND STOCKPILE
- WHARF
- PREFERRED BORROW PIT
- ALTERNATE BORROW PIT
- BLOCK VALVE
- PIPELINE COMMUNICATIONS TOWER
- AIRSTRIP
- HELIPAD
- PERMANENT PROJECT ROAD
- TEMPORARY ACCESS SNOW ROAD
- PERMANENT ROAD
- WINTER SNOW TRAIL

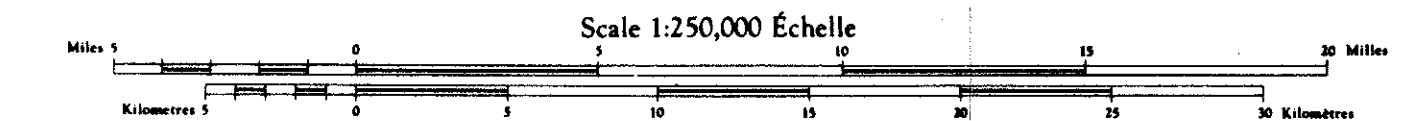
DESIGNED: *[Signature]*
CHECKED BY: *[Signature]*
DRAWN BY: *[Signature]*
ENGINEER: *[Signature]*
PROJECT MANAGER: *[Signature]*

PROPOSED PIPELINE ROUTE MAP
MP 240 TO MP 380
ALASKA, YUKON TERRITORY TO TRAVAILANT JCN
INTERIOR ROUTE - MARSH FORK OPTION

REVISED: FEB. 22, 1974
SCALE: AS SHOWN
DATE: FEB. 8, 1974
PROJECT NO.: 2950
DRAWING NO.: 38-0211-1003



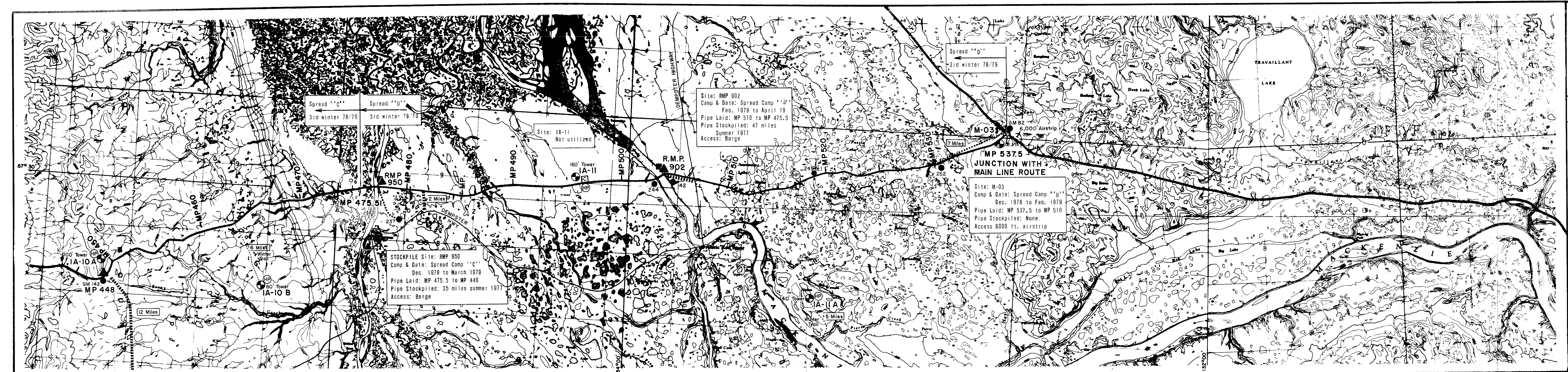
THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.



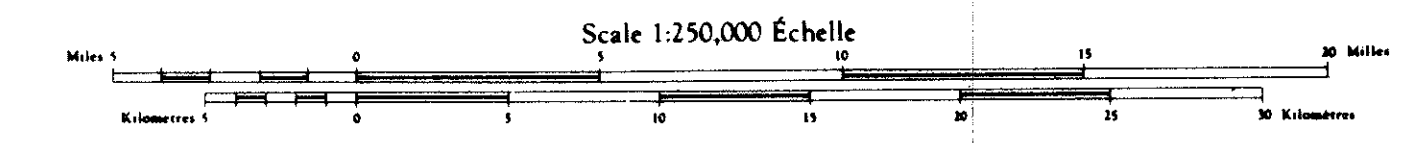
- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

DESIGNED: *[Signature]*
DRAWN BY: *[Signature]*
CHECKED BY: *[Signature]*
ENGINEER: *[Signature]*
PROJECT MANAGER: *[Signature]*

PROPOSED PIPELINE ROUTE MAP MP 350 TO MP 500 ALASKA, YUKON BORDER to TRAVAILANT JCN INTERIOR ROUTE - MARSH FORK OPTION	
REVISED: FEB. 22, 1974 SCALE: AS SHOWN DATE: FEB. 8, 1974 PROJECT NO.: 2950 DRAWING NO.: ID-0211-1001	REV. 1



THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.



- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS
 - PERMANENT ROAD
 - WINTER SHED TRAIL

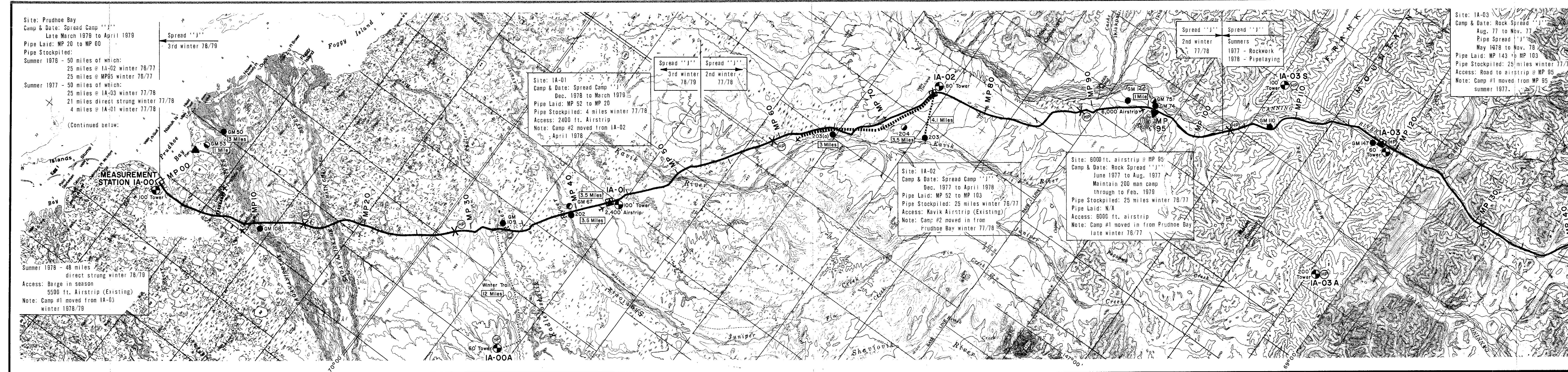
DESIGNED BY
DRAWN BY
CHECKED BY
ENGINEER'S APP.
PROJECT MANAGER

PROPOSED PIPELINE ROUTE MAP
MP 450 TO MP 537.5
ALASKA, YUKON BORDER TO TRAVALLANT JCN.
INTERIOR ROUTE - MARSH FORK OPTION

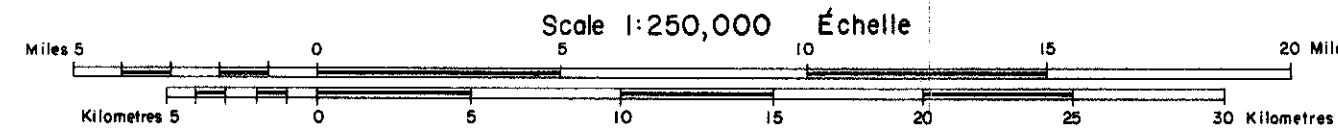
REVISED	FEB. 22, 1974
SCALE	AS SHOWN
DATE	FEB. 8, 1974
PROJECT NO.	2950
DRAWING NO.	1F-0211 -1001
REV	1

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
475.9	RMP - 950 CAMP AND STOCKPILE	30.00	290,000
	MILE POST 481		
	PERMANENT ROAD TO DEMPSTER HWY	29.02	100,000
	IA-11 COMPRESSOR STATION	42.51	360,000
	RMP-902 CAMP AND STOCKPILE	30.00	290,000
	PERMANENT ROAD TO DEMPSTER HWY	36.36	125,000
	IA-11-A COMMUNICATIONS TOWER	5.5	2,000
	PIPELINE RIGHT OF WAY	902.10	
	TOTAL SPREAD "D"	1,075.51	1,167,000
	TOTAL PRUDHOE LATERAL	10,767.75	13,863,000

Canadian Section 14.6 and
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Subsection - 1.10



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- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

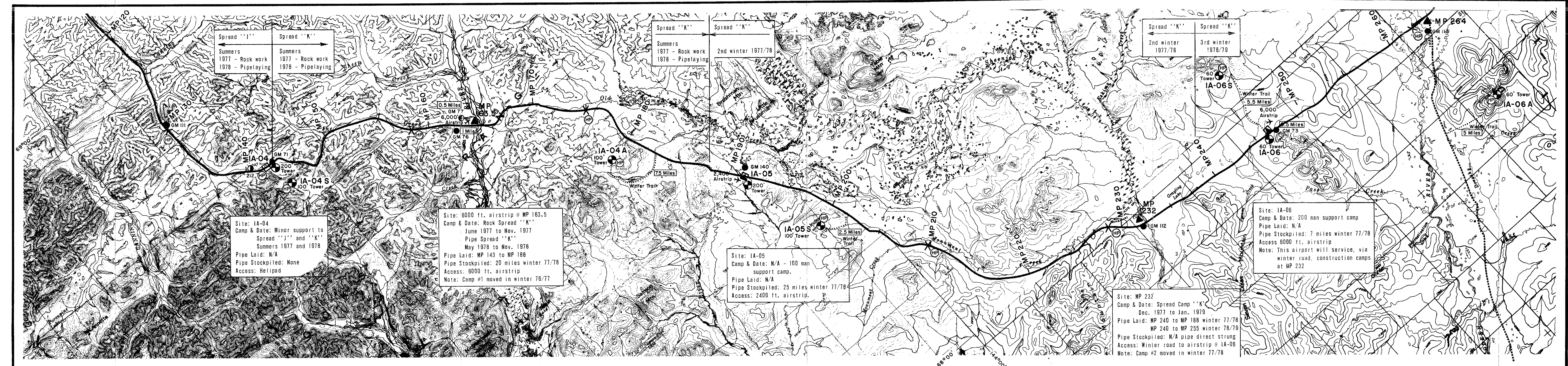
DESIGNED BY
DRAWN BY
CHECKED BY
ENGINEERS APP.
PROJECT MANAGER

PROPOSED PIPELINE ROUTE MAP
MP 00 TO MP 140
PRUDHOE BAY TO ALASKA, YUKON BORDER
INTERIOR ROUTE - CANNING RIVER OPTION

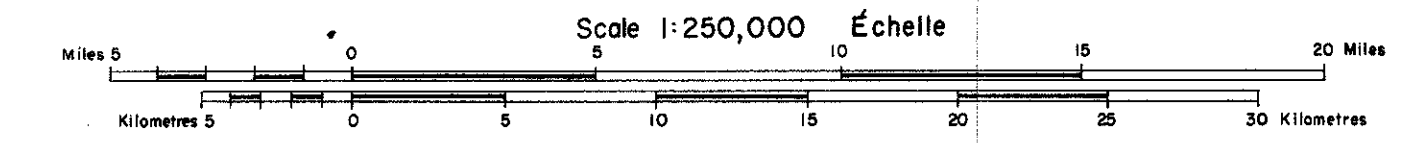
REVISED: FEB. 22, 1974
SCALE: AS SHOWN
DATE: FEB. 8, 1974
PROJECT NO. 2950
DRAWING NO. 3C-0211-1001

Canadian Section 14.e and
U.S. Environmental Report - Chapter V-B
Subsection - 1.10

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
0.0	PRUDHOE BAY - CAMP & STOCKPILE	40.00	
	A-00 METER STATION	2.41	24,000
	ROAD	65.48	225,000
	O & M	8.04	78,000
	IA-00-A COMMUNICATIONS TOWER	5.50	2,000
43.0	IA-01 COMPRESSOR STATION		
	PAD	31.00	240,000
	AIRSTRIP	100.00	180,000
	ROAD	1.38	5,000
52.0	PIPELINE RIGHT OF WAY	738.80	
	SUB-TOTAL SPREAD "J" (WINTER)	1,510.41	754,000
75.0	IA-02 COMPRESSOR STATION		
	PAD	31.00	400,000
	ROAD	145.46	500,000
95.0	MILE POST 95		
	CAMP & STOCKPILE	25.00	240,000
	AIRSTRIP	130.00	880,000
	ROAD	7.25	25,000
103.0	PIPELINE RIGHT OF WAY	742.05	
	SUB-TOTAL SPREAD "J" (WINTER)	1,080.76	2,025,000
118.5	IA-03-S COMMUNICATIONS TOWER	5.50	2,000
	IA-03 COMPRESSOR STATION		
	PAD	31.00	480,000
	IA-03-A COMMUNICATIONS TOWER	5.50	2,000
130.0	PIPELINE RIGHT OF WAY	392.85	
	SUB-TOTAL SPREAD "J"	434.85	484,000



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LEGEND:

- COMPRESSOR STATION
- METER STATION
- MATERIAL STOCKPILE
- COMP. STATION AND STOCKPILE
- WHARF
- PREFERRED BORROW PIT
- ALTERNATE BORROW PIT
- BLOCK VALVE
- PIPELINE COMMUNICATIONS TOWER
- AIRSTRIIP
- HELIPAD
- PERMANENT PROJECT ROAD
- TEMPORARY ACCESS SNOW ROAD
- PERMANENT ROAD
- WINTER SNOW TRAIL

DESIGNED BY: *HEW*

DRAWN BY: *HEW*

CHECKED BY: *HEW*

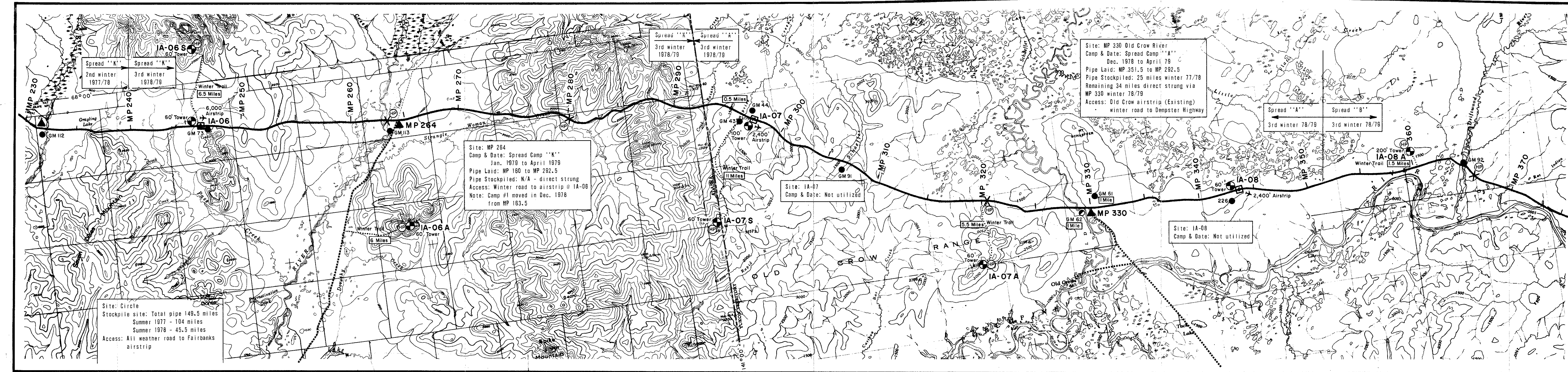
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PROJECT MANAGER: *GLW/HEW*

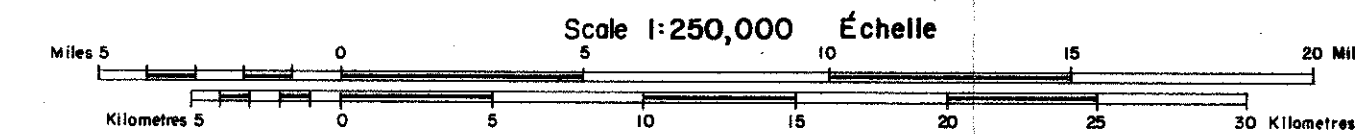
PROPOSED PIPELINE ROUTE MAP
MP 120 to MP 260
PRUDHOE BAY to ALASKA, YUKON BORDER
INTERIOR ROUTE - CANNING RIVER OPTION

REVISED: FEB. 22, 1974
SCALE: AS SHOWN
DATE: FEB. 8, 1974
PROJECT NO. 2950
DRAWING NO. 3C-0211-1002
REV. 1

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
130.0	SUB-TOTAL SPREAD "J"	434.85	484,000
143.0	IA-04 COMPRESSOR STATION PAD	31.00	480,000
	PIPELINE RIGHT OF WAY	188.15	
	SUB-TOTAL SPREAD "J" (SUMMER)	653.00	984,000
	TOTAL SPREAD "J"	2,746.17	3,743,000
163.5	IA-04-S COMMUNICATIONS TOWER	5.50	2,000
	MILE POST 163.5	25.00	240,000
	CAMP & STOCKPILE	300.00	1,800,000
	AIRSTRIIP	7.28	25,000
	ROAD	5.50	2,000
188.0	IA-04-A COMMUNICATIONS TOWER	654.75	
	PIPELINE RIGHT OF WAY	998.03	2,089,000
	SUB-TOTAL SPREAD "K" (SUMMER)		
	IA-05 COMPRESSOR STATION PAD	31.00	360,000
	AIRSTRIIP	100.00	210,000
	ROAD	3.84	15,000
	IA-05-S COMMUNICATIONS TOWER	5.50	2,000
	MILE POST 232 CAMP	17.00	185,000
	PIPELINE RIGHT OF WAY	756.60	
	SUB-TOTAL SPREAD "K" (WINTER)	913.74	752,000



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- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

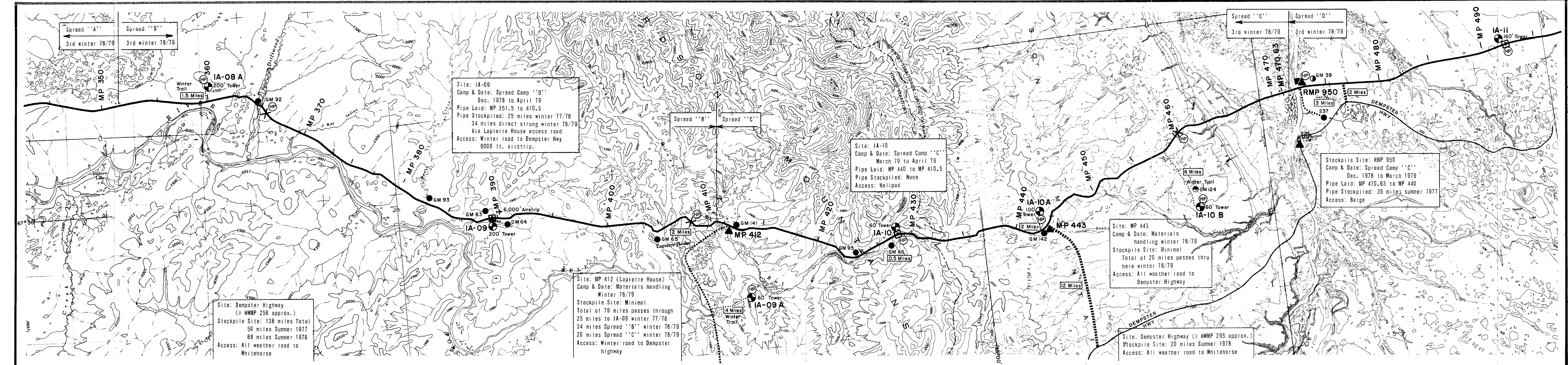
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CHECKED BY: *[Signature]*
ENGINEER'S APP. *[Signature]*
PROJECT MANAGER: *[Signature]*

PROPOSED PIPELINE ROUTE MAP
MP 230 to MP 370
ALASKA, YUKON TERRITORIES TO TRAVAILANT JCN
INTERIOR ROUTE - CANNING RIVER OPTION

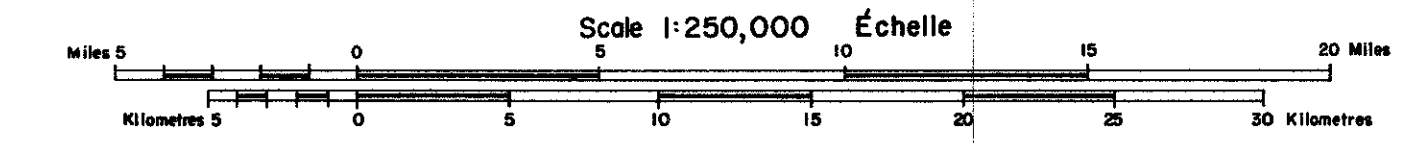
REVISED: FEB. 22 1974
SCALE: AS SHOWN
DATE: FEB. 8 1974
PROJECT NO. 2950
DRAWING NO. 3C-0211-1003
REV. 1

Canadian Section 14.e and
U.S. Environmental Report - Chapter V-B,
Subsection - 1.10

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
240.0	IA-06 COMPRESSOR STATION PAD AIRSTRIIP ROAD IA-06-S COMMUNICATIONS TOWER CIRCLE, ALASKA - STOCKPILE MILE POST 264 - CAMP PAD IA-06-A COMMUNICATIONS TOWER IA-07-S COMMUNICATIONS TOWER PIPELINE RIGHT OF WAY SUB-TOTAL SPREAD "K" (WINTER) TOTAL SPREAD "K" TOTAL ALASKA	42.51 300.00 2.75 5.50 50.00 20.00 5.50 5.50 763.88 1,195.64 3,107.41 5,853.58	800,000 720,000 1,000 2,000 240,000 194,000 2,000 2,000 1,961,000 4,782,000 8,525,000
282.5	IA-07 COMPRESSOR STATION PAD AIRSTRIIP ROAD IA-07-A COMMUNICATIONS TOWER MILE POST 330 OLD CROW RIVER CAMP & STOCKPILE IA-08 COMPRESSOR STATION PAD AIRSTRIIP ROAD PIPELINE RIGHT OF WAY TOTAL SPREAD "A"	42.51 175.00 36.38 5.50 25.00 42.51 175.00 14.55 858.45 1,374.03	240,000 270,000 125,000 2,000 240,000 400,000 240,000 50,000 1,567,000
351.5			



THIS MAP HAS BEEN TAKEN FROM ORIGINAL PRINTED BASE MAPS PREPARED AND SUPPLIED BY THE DEPARTMENT OF MINES AND RESOURCES, ONTO WHICH THE APPLICANT HAS SUPERIMPOSED THOSE INSTALLATIONS AND FACILITIES RELEVANT TO THIS APPLICATION.



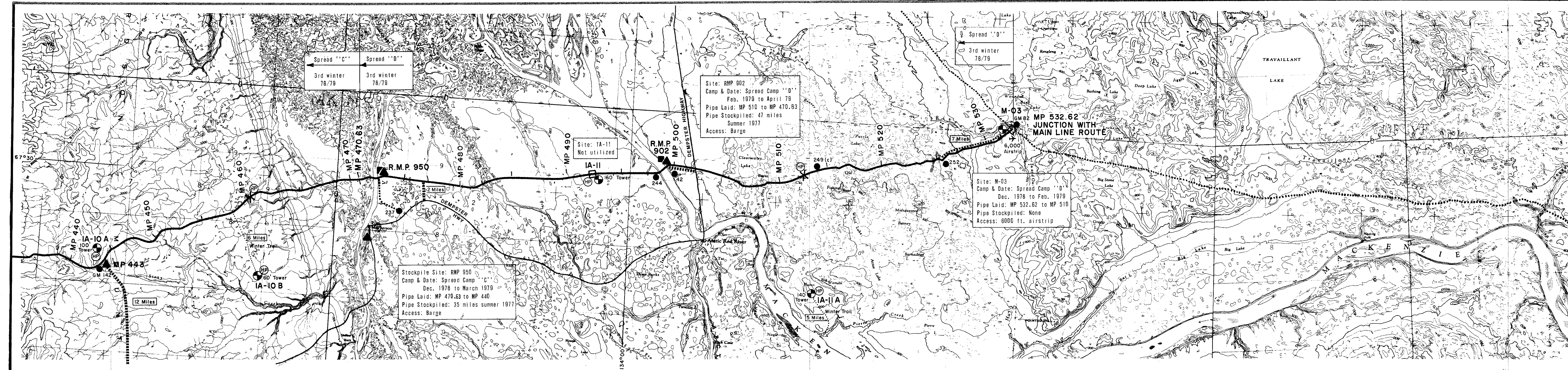
- LEGEND:
- COMPRESSOR STATION
 - METER STATION
 - MATERIAL STOCKPILE
 - COMP. STATION AND STOCKPILE
 - WHARF
 - PREFERRED BORROW PIT
 - ALTERNATE BORROW PIT
 - BLOCK VALVE
 - PIPELINE COMMUNICATIONS TOWER
 - AIRSTRIIP
 - HELIPAD
 - PERMANENT PROJECT ROAD
 - TEMPORARY ACCESS SNOW ROAD
 - PERMANENT ROAD
 - WINTER SNOW TRAIL

DESIGNED BY: JAW
DRAWN BY: JAW
CHECKED BY: JAW
ENGINEERS APP: JAW
PROJECT MANAGER: G.W. JAW

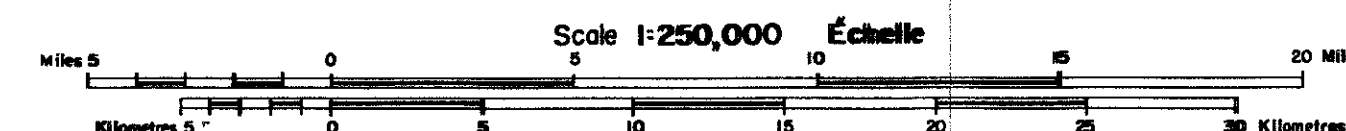
PROPOSED PIPELINE ROUTE MAP	
MP 350 TO MP 490	
ALASKA, YUKON BORDER TO TRAVAILANT JCN.	
INTERIOR ROUTE - CANNING RIVER OPTION	
REVISED: FEB. 22, 1974	SCALE: AS SHOWN
DATE: FEB. 8, 1974	PROJECT NO. 2950
DRAWING NO. 16-0211-1001	REV. 1

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
351.5	IA-08-A COMMUNICATIONS TOWER DEMPSTER HWY. MILE 258 - STOCKPILE IA-08 COMPRESSOR STATION PAD AIRSTRIIP	5.50 35.00 42.51 300.00	2,000 339,000 360,000 980,000
410.5	ROAD PIPELINE RIGHT OF WAY TOTAL SPREAD "B"	72.75 858.45 1,314.21	250,000 1,911,000
470.9	MILE POST 417 - LAPIERRE HOUSE CAMP & STOCKPILE IA-09-A COMMUNICATIONS TOWER IA-10 COMPRESSOR STATION PAD IA-10-A COMMUNICATIONS TOWER MILE POST 443 PERMANENT ROAD TO DEMPSTER HWY. CAMP & STOCKPILE DEMPSTER HWY. MILE 295 STOCKPILE IA-10-B COMMUNICATIONS TOWER PIPELINE RIGHT OF WAY TOTAL SPREAD "C"	15.00 5.50 31.00 5.50 174.55 15.00 15.00 5.50 878.82 1,145.87	145,000 2,000 300,000 2,000 422,000 145,000 145,000 2,000 1,185,000

Canadian Section 14.e and
U.S. Environmental Report - Chapter V-B,
Subsection - 1.10



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LEGEND:

	COMPRESSOR STATION		PIPELINE COMMUNICATIONS TOWER
	METER STATION		AIRSTRIP
	MATERIAL STOCKPILE		HELIPAD
	COMP. STATION AND STOCKPILE		PERMANENT PROJECT ROAD
	WHARF		TEMPORARY ACCESS SNOW ROAD
	PREFERRED BORROW PIT		PERMANENT ROAD
	ALTERNATE BORROW PIT		WINTER SNOW TRAIL
	BLOCK VALVE		

DESIGNED BY	HEW
DRAWN BY	HEW
CHECKED BY	HEW
ENGINEER'S APP.	HEW
PROJECT MANAGER	GLW/HEW

PROPOSED PIPELINE ROUTE MAP
MP 440 TO MP 532.62
ALASKA, YUKON BORDER TO TRAVAILLANT JCTN.
INTERIOR ROUTE - CANNING RIVER OPTION

REVISED	FEB. 22, 1974
SCALE	AS SHOWN
DATE	FEB. 8, 1974
PROJECT NO.	2950
DRAWING NO.	1H-0211-1001
REV.	1

Canadian Section 14.e and
U.S. Environmental Report - Chapter V-B
Subsection - 1. 10

MILE POST	FACILITY DESCRIPTION	LAND USE	
		AREA ACRES	BORROW CUBIC YARDS
470.9	RMP-950 CAMP & STOCKPILE MILE POST 476 PERMANENT ROAD TO DEMPSTER HWY IA-11 COMPRESSOR STATION RMP-902 CAMP & STOCKPILE PERMANENT ROAD TO DEMPSTER HWY IA-11-A COMMUNICATIONS TOWER	30.00 29.02 42.51 30.00 36.38 5.50	290,000 100,000 360,000 290,000 125,000 2,000
532.9	PIPELINE RIGHT OF WAY TOTAL SPREAD "D"	902.10 1,075.51	1,167,000
	TOTAL PRUDHOE LATERAL	10,763.17	14,333,000