SUSITNA HYDROELECTRIC PROJECT

ACCESS PLAN

RECOMMENDATION REPORT

AUGUST 1982

Prepared by:

ACRES

ALASKA POWER AUTHORITY

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ACCESS PLAN RECOMMENDATION - August 1982

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1 - INTRODUCTION

1.1 Purpose of Project Access

The prime purpose of access is to allow the flow of materials and personnel to the project site to ensure an orderly construction program. Access must support the goals of the construction program and be sufficiently flexible to adjust to varying demands. Access must allow the Project Manager the greatest possible operating scope in order to control schedule and costs.

1.2 Purpose of Report

The selection of the access plan for the Susitna Project requires a rational assessment of the tradeoffs between the major environmental concerns of impacts on the sometimes conflicting fish, wildlife, socioeconomic, land use and recreational needs on the one hand, with project cost, schedule, construction risk and management needs on the other. The selected plan will have important significance, both during project construction and operation. A consensus could not be reached on one preferred alternative which ssatisfied all concerns. A number of alternatives have therefore been considered in some detail. These alternatives were subjected to a multi-disciplinary assessment to identify in each case those attributes which influence the selection of a preferred plan.

This report presents the results of this assessment and describes the process used in arriving at a recommendation for a preferred plan.

1.3 Organization of Report

The report has been organized into nine sections. Tables and Figures directly related to the text are at the end of each section. A more detailed review of some subjects along with statements and letters are included in the Appendices.

2 - SUMMARY AND RECOMMENDATIONS

2.1 Plan Selection and Evaluation

Detailed access studies resulted in the development of seventeen possible access plans within three corridors. The criteria used to evaluate these plans were also developed.

An initial evaluation was made to determine the plan in each corridor that was most responsive to project objectives as well as inputs from the community and agencies. The project objectives of cost and schedule control along with the need to have maximum flexibility of access were given prime consideration. Initial access to support construction activities at site will be required within one year in order to maintain project schedule and minimize the construction period. A flexible support system utilizing both road and rail was considered a necessity to reduce risks and control costs. Access plans that could not provide access within one year of receipt of the FERC license or imposed a restraint on construction activities were therefore eliminated. Plans that did not provide access between sites for the operation and maintenance phase of the project were also eliminated. In addition a number of plans were eliminated because more recently developed plans were superior to similar plans within the same corridor and reduced community and agency concerns. The initial evaluation reduced the acceptable options to the following three alternative access plans:

North - Plan 13
South - Plan 16
Denali - Plan 17

Following the identification of these three plans a more detailed evaluation and comparison was undertaken. The highlights of this evaluation are as follows:

(1) Costs/Schedule

The elimination of prelicense construction of a pioneer access road increased the criticality of construction activities leading up to scheduled river diversion in 1987. The evaluation indicated that the Denali Plan has the shortest schedule and least cost in providing initial access to Watana and hence the least risk of schedule delay and project cost increases. The North Plan was rated second and the South Plan third in the evaluation.

(2) Environmental Issues

Each of the selected alternatives will have environmental impacts.

Wildlife and Habitat: The North Plan is the best for minimizing adverse impacts to wildlife, because it traverses or approaches the fewest areas of productive habitat and zones of species concentration or movement. The Denali Plan is the least advantageous from this standpoint because it would create the potential for disturbances and public access to caribou, brown bear, and black bear concentrations and movement zones. The South Plan occupies an intermediate position: the advantages of the Gold Creek to Devil Canyon segment are offset by the potential for adverse impacts to the Prairie Creek, Stephan Lake, and Tsusena Creek areas created by the Devil Canyon to Watana (South Side) segment.

Fisheries: All three alternatives will have direct and indirect impacts on the fisheries. The North Plan is likely to have a significant impact on the salmon in Portage Creek and Indian River. The Denali Plan is likely have both direct and indirect impacts on the grayling fisheries along the Denali Highway to Watana segment and indirect impacts in the Stephan Lake area. The South Plan is likely to effect salmon spawning in the Indian River and also have indirect impacts in the Stephan Lake area.

Socioeconomics: If the workers travel to the construction site by personal vehicle, or organized ground transportation, socioeconomic impacts on the Mat-Su Borough as a whole will be relatively minor and similar in magnitude regardless of which access plan is implemented. Based on public input to date, it appears that of the three plans, the Denali Plan will come closest to creating socioeconomic changes that are acceptable to or desired by landholders and residents in potentially impacted areas and communities such as Cantwell, Trapper Creek and Talkeetna. More important than route selection in determining the socioeconomic impacts in the neighboring communities will be the policies adopted for commuting to and from the contruction camp and hours of work.

(3) Preferences of Native Organizations

The Tyonek Native Corporation, Cook Inlet Region, Inc. (CIRI) and the CIRI Village residents all prefer the South Plan. They would accept the Denali Plan if access is provided to the south side of the Susitna River across the Watana dam.

The Ahtna Native Region Corporation and the Cantwell Village Corporation support the Denali Plan.

None of the Native Organizatons have supported the North Plan, although it appears that their need for access to the south side of the Susitna can be met by providing access across the Watana dam and the bridge downstream of Devil Canyon.

(4) Relationship to Current Land Stewardships, Uses and Plans

Much of the land required for project development has been or may be conveyed to Native Organizations. The remaining lands are generally under State and Federal control.

Present land uses pertaining to recreation, subsistance activities and mining are low in density.

The land management plans that have the largest bearing on access development are BLM's recent decision to open the Denali Planning Block to mineral exploration, the Denali Scenic Highway study being initiated by the Alaska Land Use Council and the general planning of the Native Organizations to develop their lands for recreation and mineral extraction.

The development of the Susitna Project will have a significant effect on future land use planning in the northern portion of the Mat-Su Borough. Access by any of the three alternative plans studied, provided it is properly managed, does not appear to be in conflict with any present Federal, Borough or Native management plans.

2.2 Plan Recommendation

The results of the alternative plan evaluation are summarized on Table 2.1. No one plan satisfied all the criteria nor accommodated all the concerns of the resource agencies, native organizations and public. The final selection of a plan requires trade-offs of objectives. Moreover many of the potential impacts of access cannot be quantified and hence comparisons are qualitative and to some extent subjective.

The final recommendation is the result of a multi disciplinary evaluation and comparison. The order of recommendation is given below along with the primary justifications:

(1) Denali or Plan 17 is the best choice for access because:

- It is the shortest, least costly and most easily constructed route for initial access to the Watana site.
- It has the lowest potential for schedule delays and project cost impacts.
- The initial route crosses State and Federal lands and does not conflict with land use planning.
- It does not conflict with the interests of local communities and Native Organizations.

Disadvantages

- It has been assessed to have the highest potential for environmental impacts and therefore would require the most extensive mitigation program.
- It has the highest overall cost when the Devil Canyon phase is included.
- It is the longest transport route.

(2) North or Plan 13 is the second choice for access because:

- It has the lowest overall cost.
- It has been assessed to have the least potential environmental impacts.

Disadvantages

- It requires a longer construction period for initial road access and hence has a greater potential for schedule delays and project cost increases.
- It does not accommodate the reported preferences of the Native Organizations, but it does meet their apparent need for access to the south side of the Susitna.

(3) South or Plan 16 is not considered an acceptable alternative because:

- It imposes too high a risk of schedule delay and hence increased project costs.
- Requires a very high investment for access to Watana.

In summary the Denali Plan permits rapid and economical development of access for construction. It permits the greatest flexibility in total access development to blend with the needs and objectives of other interests. It essentially permits a more orderly, progressive development by allowing the necessary time to test and implement changes in on-going access development, in order to achieve the best development for all concerned.

2.3 Recommendations

It is recommended that;

(1) The Denali Plan (17) be adopted for access to develop the Susitna Project.

(2) The Power Authority reaffirms its commitment to the concerns of resource agencies and its policy to support mitigation of environmental impacts throughout the life of the project.

(3) The Power Authority reaffirms its commitment to take reasonable steps to mitigate adverse socioeconomic impacts on local communities by adoption of appropriate project management policies and practices.

(4) The Power Authority, in cooperation with resource agencies, conducts a public participation program designed to determine an appropriate policy regarding the degree and nature of public access subsequent to the completion of the construction phase of the project.

TABLE 2.1

SUMMARY OF ALTERNATIVE PLAN EVALUATION

	CRITERIA	DENALI (17)	NORTH (13)	SOUTH (16)
(1)	No prelicense construction	M	M	M
(2)	Minimize construction duration and maximize net project benefits	M(1)	M(2)	M(3)
(3)	Provide access between sites during project operation phase	M	M	M
(4)	Provide access flexibility to ensure project is brought on-line within budget and schedule	M	M	M
(5)	Accommodate preferences of Gold Creek and Indian River communities.	M	M	M
(6)	Minimize total cost of access	3	1	2
(7)	Minimize initial investment required to provide access to Watana	1	2	3
(8)	Minimize risks to project schedule	1	2	3
(9)	Minimize environmental impacts	3	1	2
(10)	Accommodate Agency preferences	3	1	2
(11)	Accommodate preferences of Native Organizations	2	3	1
(12)	Accomodate present land uses and plans	M	M	M
(13)	Accommodate public concerns	*	**	**

Notes: (i) M = Meets criteria
(ii) (1) = Ranking where (1) is best and three (3) is worst
(iii) * = Cantwell prefers the Denali Plan
(iv) ** = Talkeetna and Trapper Creek are more concerned with the camp and commuting policies than with the actual access selection.

3 - IDENTIFICATION OF ACCESS ALTERNATIVES

3.1 General

Three broad corridors to the damsites have been identified:

- A corridor running west to east from the Parks Highway to the damsites on the north side of the Susitna (the North route);

- A corridor running west to east from the Parks Highway to the damsites on the south side of the Susitna River (the South route); and

- A corridor running north to south from the Denali Highway to the damsites (the Denali route).

During the past 2 1/2 years a total of seventeen alternative plans have been identified within the three corridors. These alternatives were developed by laying out routes on topographic maps in accordance with acceptable road and rail design criteria. Field investigations resulted in minor adjustments to reduce impacts or improve alignment.

Each route linked the Watana and Devil Canyon sites with the existing road or rail transport system.

A study of these plans has determined the "best" plan for each corridor which meets project objectives and selection criteria.

3.2 Development of Plans

During 1980 and 1981 eight alternative access plans were developed. A plan formulation and selection process was developed and the criteria that most significantly affected the selection of the preferred access plan were identified.

During the access plan evaluation and selection process input from the

public, agencies and native organizations resulted in the expansion of the original list of eight alternative plans to eleven plans. In late 1981 use of the selection process resulted in the selection of Plan 5 as the route which most closely satisfied the selection criteria contained in the Access Route Selection Report (1). Plan 5 was an access road from the Parks Highway through Gold Creek to Devil Canyon and Watana. It was based on construction of a pioneer road prior to obtaining the FERC license for the project, in order to ensure completion of the project on schedule.

In March of 1982 the Power Authority presented the results of the Susitna Hydroelectric Project Feasibility Report (2) to the public, agencies and organizations. During April comment was obtained relative to the Feasibility Study from these groups. As a result of these comments the evaluation criteria were refined, the pioneer road concept was eliminated, and six additional access alternatives were developed, thus increasing the total under evaluation to seventeen plans.

3.3 Evaluation of Plans:

During the final evaluations of the alternative access plans the following criteria were employed:

(1) No prelicense construction
(2) Minimize the construction duration and maximize net project benefits
(3) Provide access between sites during project operation phase
(4) Provide access flexibility to ensure project is brought on-line within budget and schedule
(5) Accommodate preferences of Gold Creek and Indian River communities
(6) Minimize total cost of access
(7) Minimize initial investment required to provide access to Watana
(8) Minimize risks to project schedule
(9) Minimize environmental impacts
(10) Accommodate Agency preferences

(11) Accommodate preferences of Native Organizations

(12) Accommodate present land uses and plans

(13) Accommodate public concerns

In order to arrive at a recommended access plan a two staged evaluation process was established. First, all plans were evaluated and the most responsive plan for each corridor was identified. This part of the evaluation process is reviewed in Section 3.3.1 below and summarized in Table 3.1. Second, the three selected alternatives were evaluated and compared. This part of the evaluation process is reviewed in the following sections of the report.

3.3.1 Evaluation to Identify Most Responsive Plan for Each Corridor

The various developed plans were evaluated in accordance with the established criteria. Emphasis was placed on project objectives as well as the general concerns of communities and agencies.

(1) No Prelicense Construction

The access plan submitted in the Susitna Feasibility Report (Plan 5) was withdrawn in response to the concerns of the agencies and public with regard to prelicense construction of a pioneer road.

(2) Minimize Construction Duration and Maximize Net Project Benefits

These criteria have two aspects. First and foremost is the objective to minimize the construction period. Once construction is initiated and costs incurred, those expended funds have an opportunity cost but are returning no dividends until the project is complete and power is being produced. Therefore, completing construction as rapidly as possible is an important goal.

The second factor arguing for an early power on-line date is the set of findings from the generation planning studies conducted as part of the feasibility analysis. These studies show that, under the mid-range load

forecasts, maximum net benefits are realized when the Watana Project comes on line in 1993. While the assumptions underlying these results are subject to uncertainty, there is no better basis for planning.

To minimize interest during construction and maximize net benefits an eight year construction period has been adopted as a goal. Achieving this goal necessitates initial access within one year. Of the seventeen plans considered, five were eliminated because initial access could not be completed within one year.

(3) Access Between Sites

It has been planned that both power stations would be operated and maintained from Watana, hence the eventual need for access between sites. This criterion eliminated two plans.

(4) Access Flexibility

Access flexibility is required to ensure that the project is brought on-line within budget and schedule.

In developing an access plan for the Susitna Project two essential elements of access must be considered. The first element is the public transportation system of highways and railroads. The second element is project access from the existing public highways and railroad systems. Project management can generally control the latter, but has little or no control over public systems. Access plans which have been considered flexible are those utilizing both public road and railroad to a marshalling yard (or project gateway) with a project road from that point to the project site.

The ability to make full use of both rail and road systems from Southcentral ports of entry to the marshalling yard provides project management with far greater flexibility to meet contingencies, and control costs and schedule. Limited access would not provide this flexibility and could result in both financial, administrative and schedule impacts. The interruption of service and/or lack of flexibility generally results in

increased costs. Short delays of critical materials can often have significant cost impacts.

Limited access would result in a greater degree of site isolation and restrictions on personnel travel. This situation is usually reflected in workers desiring to work longer hours while at the site and to make more frequent trips home. Construction experience generally indicates that longer work hours along with lower productivity and more frequent trips would result in increased costs to the project. Limited access would also limit the options contractors have for personnel and material transport. Economies expected from bid competition among transporters and personnel providing their own transportation to the site would not be realized.

Several resource agencies have expressed a strong preference for a plan that relies on railroad transport as the sole gateway to the project area. The agencies prefer the rail-only plan for two primary reasons. (Reference Steering Committee letter dated November 5, 1981 in Appendix A.1) First, it is believed that disturbance to wildlife adjacent to the railroad can be more easily controlled, and, second, it is believed that access by rail will make it easier to limit public access after construction.

With regard to the Agency concerns of disturbance to wildlife and the ecology several comments can be made:

(a) Disturbance of Habitat Resulting from Construction of Access: Whether road or rail, this disturbance can be mitigated by proper design and careful advance planning of construction, particularly relative to stream crossings and extraction of borrow materials. Generally a road alignment is more flexible than rail and can be more easily routed to avoid sensitive areas.

(b) Disturbance of Wildlife: Impact on wildlife along access routes can be controlled by mitigation measures. With road access some of these measures will have to be restrictive. In order to be effective, control measures will have to be developed by the Agencies and the Power Authority, and jointly implemented. Monies

will have to be allocated to carry out agreed mitigation programs in co-operation with appropriate agencies.

(c) Control of Access: The Agency concerns of control of access after construction should be given special consideration. Throughout the construction life of the project it is in the interest of the Power Authority and Agencies to control access. During the construction period a public participation program should be undertaken to develop a long term policy relative to controlled or open access subsequent to completion of the construction phase of the project.

(d) Hazardous Material Spills: The Agencies feel that rail transport decreases the potential of hazardous material spills due to adverse weather conditions and multiple handling. Limited or open access involves both rail and truck transport as well as the transfer of materials. The potential for spills and the control of them is similar for all the access plans. The reduction of spill hazard will result from the effective implementation of safe transfer and transport practices.

The Bureau of Land Management notes that both road and rail modes may be required for construction. (Reference BLM letter dated August 11, 1982 in Appendix A.2).

Recently the Power Authority requested comment on the issue of limited access from seven firms submitting proposals for Phase II of the Project. The firms reflect significant experience in the construction of large projects. Six firms replied. Five supported the need for road access to provide the necessary flexibility to control costs and schedule. The sixth firm indicated that the project could be developed with rail access only. Copies of the replies are in Appendix A.3.

The following excerpts from the response by the firm of R.W. Beck and Associates are indicative of the arguments presented by five of the six respondents. According to Beck,

> "... none [of our experienced construction people] can recall a project close to the size of Susitna that did not utilize every form of transportation available, and in addition none recall a site that did not have some available truck haul. If the highway did not exist, we doubt that it would be built just for this project. With only the short access and the fact that the highway leads to both Anchorage and Fairbanks, however, it is logical and prudent to make the [road] connection. Limiting the access to the project would in fact be putting a restraint on all operations of the prime contractors, supply contractors, project managers, camp operators and especially on the local contractors who are accustomed to using their own hauling equipment. This restraint would add millions of dollars to the cost, and could possibly delay the on-line dates of the units."

In conclusion, limited access would impose a restraint on project operations that could result in delays and increased costs. Four limited access plans were consequently eliminated from further study.

(5) Preferences of Gold Creek and Indian River Communities

One plan was eliminated because two similar plans achieved the same objectives and did not impact the Gold Creek and Indian River areas.

(6) Final Selection of Alternatives

Of the seven remaining plans, three more were eliminated because the most recently developed plan was an improvement of previous plans for that same corridor. Another plan was eliminated because it included a circuit route connecting to both the Parks and Denali highways which was not considered acceptable. This circuit route is not required for project purposes, and it aggravates the control of public access.

The "best" route in each of the three corridors was retained for further analysis. These are:

North - Plan 13

Access from the Parks Highway at Hurricane to Watana via the North side of the Susitna River (Figure 3.1)

South - Plan 16

Access from the Parks Highway at Hurricane through Devil Canyon with the road between Devil Canyon and Watana on the South side of the Susitna River. The main access road is connected to a railhead at Gold Creek by a road extension (Figure 3.2).

Denali - Plan 17

Access from the Denali Highway to Watana with construction of a connecting link from Watana to Devil Canyon on the south side of the Susitna River when the development of Devil Canyon proceeds. A rail extension from Gold Creek to Devil Canyon would be added for construction of Devil Canyon facilities (Figure 3.3).

The locations of the three selected plans are shown in more detail on plans attached in Appendix A.

3.3.2 Evaluation and Comparison of Selected Alternative Access Plans

The three selected alternatives have been evaluated and compared in the following Sections:

Section 4 - Cost of Access Alternatives
Section 5 - Risk to Project Schedule
Section 6 - Environmental Issues
Section 7 - Preferences of Native Organizations
Section 8 - Relationship to Current Land Stewardship, Uses and Plans
Section 9 - Public Preferences

TABLE 3.1

SELECTION OF ACCESS ALTERNATIVES

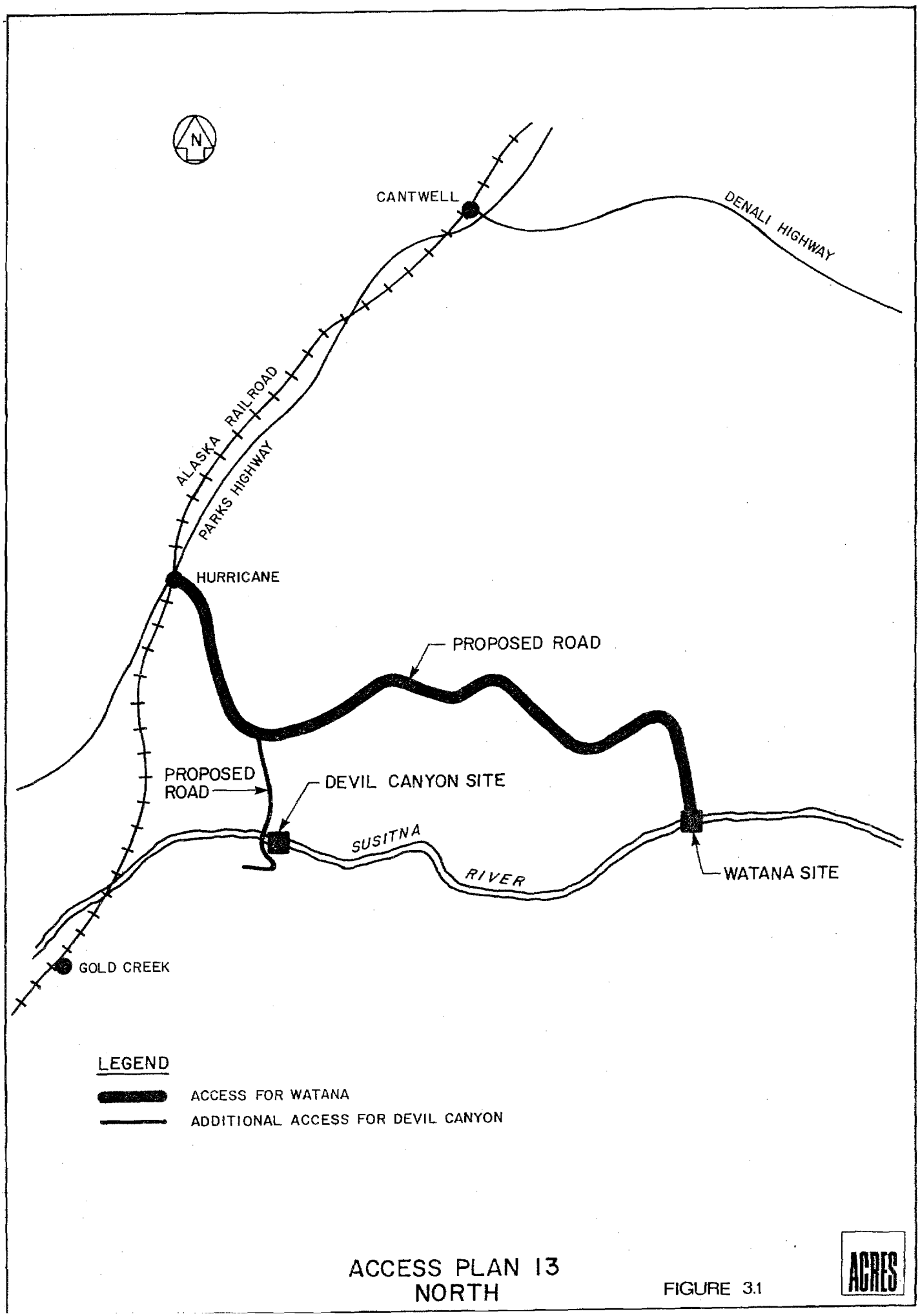
	PLANS ELIMINATED BY EVALUATION CRITERIA						SELECTED ALTERNATIVES
PLAN	1	2	3	4	5	*	
1					X		
2		X					
3			X				
4			X				
5	X	X					
6						X	
7						X	
8		X		X			
9		X		X			
10		X		X			
11						X	
12		X					
13							13 - North
14						X	
15				X			
16							16 - South
17							17 - Denali

Notes

(1) X means plan eliminated based on evaluation criteria.

(2) Routes are described in Table A.1 of Appendix A.

(3) * is not a specific criteria, but final screening based on plan rationalization



ACCESS PLAN 13
NORTH

FIGURE 3.1

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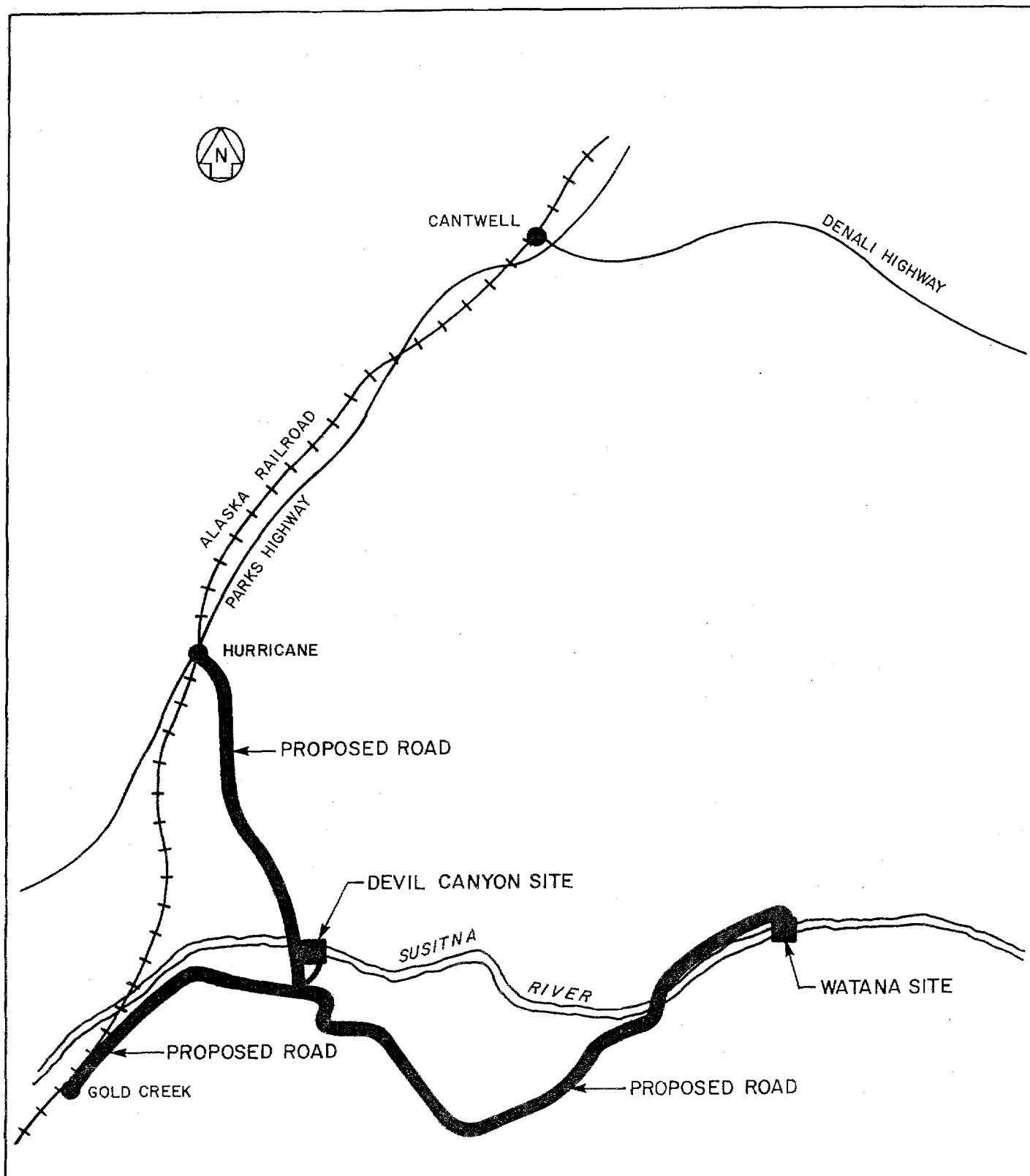

ACCESS PLAN 16
SOUTH

FIGURE 3.2

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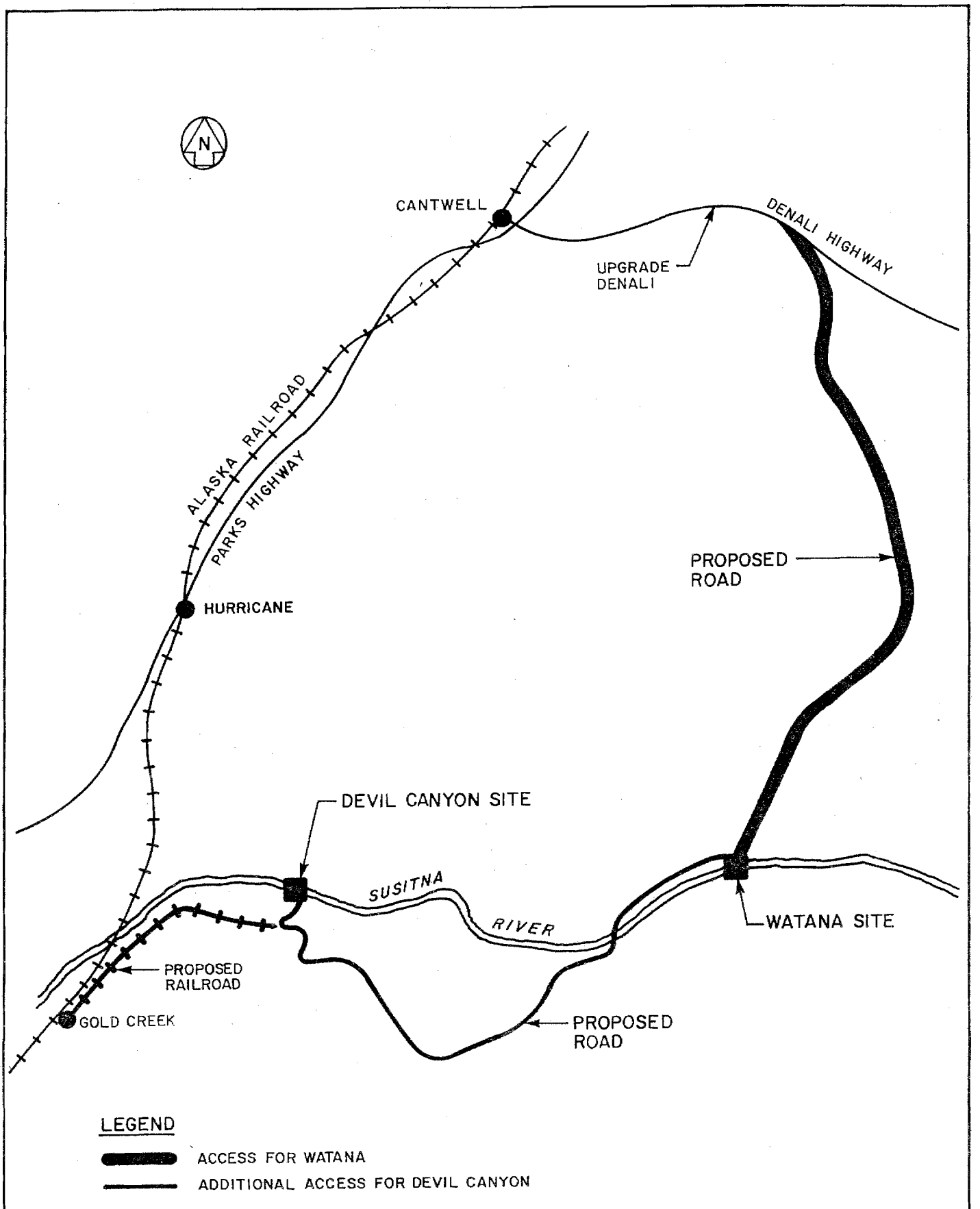


ACCESS PLAN 17
DENALI

FIGURE 3.3

ACRES

4 - COST OF ACCESS ALTERNATIVES

4.1 - General

The relative cost of the three access alternatives is presented in Table 4.1. This table outlines the total costs of the three plans with a schedule constraint that initial access must be completed within one year of receipt of FERC license. Costs to complete the access requirement for the Watana development only are also shown. The costs of the three alternative plans can be summarized as follows:

Estimated Total Costs ($ X 10^6)

Plan	Watana	Devil Canyon	Total	Discounted Total
North (13)	$241	$127	$368	$287
South (16)	312	104	416	335
Denali (17)	222	228	450	339

Costs have been calculated in 1982 dollars, and include all costs described in section 4.2 below. Discounted total costs (present worth as of 1982) have been shown here for comparison purposes to account for the differences in timing of the expenditure. Land acquisition costs associated with the development of access have not been included for any of the plans.

4.2 Composition of Costs

The estimated costs given for each plan are composed of the following items:

(a) Design and Construction Costs

This includes all design, field supervision and construction costs as well as an allowance for contingency.

(b) Logistics Costs

This includes the cost of transport of materials, equipment and supplies necessary for construction of the dams and related facilities from the port of entry to site.

(c) Maintenance Costs

This includes the cost of road maintenance and snow removal during the construction life of the project. For the Denali Plan an allowance has been made for maintenance of the upgraded section of the Denali Highway.

(d) Impact of Accelerated Schedule Costs

This represents the additional costs resulting from an accelerated schedule to complete initial access within one year. Additional costs include increased road lengths, increased or redundant fill, and increased labor and equipment costs.

4.3 Evaluation of Costs

The Denali Plan has the lowest cost for the Watana development. The Denali Plan includes approximately $10 million to upgrade 21 miles of the Denali Highway. The North Plan has the second lowest cost for access to Watana.

The North access plan has the lowest overall cost while Denali has the highest. However, a higher portion of the cost of the Denali Plan would be incurred more than a decade in the future. Therefore, a valid cost comparison requires a consideration of the time value of money. Converting all costs to equivalent present value results in the overall costs of the Denali and South Plans being approximately equal.

The Denali Plan has the greatest potential for cost savings as much of the work is deferred until a decision to build Devil Canyon is made. This allows the greatest opportunity to optimize the type of access, and the access

route used to build Devil Canyon in the future. In addition, the section from Watana to the river crossing would probably be completed as a site road during the Watana development.

The Denali Plan has the lowest potential for cost increases due to changes and unforeseen conditions owing to the relative uniformity of topography and the absence of major river crossings.

Cost Ranking of Alternatives

	Denali	North	South
Lowest Cost for Watana Development	1	2	3
Lowest Overall Cost	3	1	2
Lowest Probability for Increased Costs	1	2	3
Highest Potential for Cost Savings	1	2	3

4.4 - Summary

For the development of access for the Watana site, the Denali Plan offers the lowest cost as well as the lowest probability of increased costs resulting from unforeseen conditions. The North Plan is ranked as a second choice.

In terms of development of access for both Watana and Devil Canyon the North Plan has the lowest cost. Although the Denali Plan has the highest overall cost it is expected that, because of higher potential cost savings and lower probability for increased costs, the differential between the final costs for the Denali and South Plans would not be significant.

TABLE 4.1: ACCESS PLAN COSTS

INITIAL ACCESS WITHIN ONE YEAR

DESCRIPTION	NORTH PLAN 13			SOUTH PLAN 16			DENALI PLAN 17		
	WATANA	DEVIL CANYON	COMBINED	WATANA	DEVIL CANYON	COMBINED	WATANA	DEVIL CANYON	COMBINED
Mileage Road	52	7	59	69	0	69	61 *	41	102 *
Rail	0	0	0	0	0	0	0	14	14
Construction Cost ($ x 1,000,000)	95	20	115	156	0	156	80	120	200
Logistics Cost ($ x 1,000,000)	118	105	223	115	101	216	127	100	227
Maintenance ($ x 1,000,000)	5	2	7	7	3	10	4	8	12
Subtotal ($ x 1,000,000)	218	127	345	278	104	382	211	228	439
Impact of Accelerated Schedule ($ x 1,000,000)	23	0	23	34	0	34	11	0	11
Total ($ x 1,000,000)	241	127	368	312	104	416	222	228	450
Construction Schedule for Initial Access (Years)	1			1			1		
Construction Schedule for Full Access (Years)	3			3			3-4		

* Includes upgrading 21 miles of the Denali Highway

Revision: C

5 - RISK TO PROJECT SCHEDULE

5.1 General

The project construction schedule has two major constraints. Work cannot start until issuance of the FERC license, and power output is scheduled for 1993. Within this time interval the construction of the main dam is controlled by the diversion of the Susitna River which must be completed by spring of 1987 to maintain the overall project schedule.

Issuance of the FERC license cannot be accurately determined at this time. Issuance has been forecasted during the first nine months of 1985. Owing to this fact the interval between licensing and the required date of diversion can vary significantly. Therefore, the time available for construction cannot be stated with assurance. If delays in the licensing occur there is the risk of delay to project schedule to the extent that 1987 diversion is missed. Project delay would increase costs because of the extended construction schedule. Risk of delay increases:

(a) The later the FERC license is issued

(b) The longer the schedule required for construction of initial access.

5.2 Initial Access Schedule

Initial access can be completed on any of the three selected access plans within twelve months of receipt of FERC license. The forecasted construction period including mobilization and float time for normal problems for the three plans is as follows:

Denali	6 months
North	9 months
South	12 months

The determination of initial access schedules is based on:

a. Ease of mobilization to starting point and provision of continued support to construction work
b. Quantities of work to be completed including number and location of potential borrow areas
c. Number of stream crossings
d. Susitna River crossings
e. Unforeseen problems

Neither the Denali nor North routes pose serious construction problems. Both can be supported from highway access.

The South route has two serious drawbacks. The construction work must be supported off a railhead without road access which may present limitations to mobilization and support flexibility. In addition the South route must cross the Susitna River. This involves the construction of a floating or fixed temporary bridge which will have to be removed prior to breakup, each spring resulting in an interruption of the flow of transport to the site. Floating bridges require continual maintenance and are generally more subject to weight and dimensional limitations than permanent structures.

The quantity of work required to complete initial access is least for the Denali Plan, with the North ranked second.

Owing to the variable schedule time available for initial access construction the Denali route offers greatest flexibility and hence lowest risk of delay to the project while the South route offers the least flexibility. This situation has been demonstrated on the attached Schedule for Access and Diversion, Figure 5.1. This illustrates the latest start date for construction of each of the access routes in order to support diversion work. If diversion is not accomplished prior to spring runoff in 1987, dam foundation preparation work will be delayed one year, and hence cause a delay to the overall project of one year.

5.3 Cost Impacts

Failure to meet river diversion by spring of 1987 would have the

following estimated cost impacts on the project.

a. Financial cost of investment by spring '87 $800 X 10^6 @ 10% for one year	$ 80 X 10^6
b. Financial costs of rescheduling work for one year delay	$ 30 X 10^6
c. Replacement power costs	$ 43 X 10^6
	$153 X 10^6

It is recognized that some cost impacts would be mitigated by delaying certain work if the uncertainty of meeting diversion is very high. On the other hand delays quite often result in unforeseen costs and claims. Therefore, it is expected that a delay to the project could result in additional costs in the range of $100-200 million.

These costs are in 1982 dollars and do not include inflation which will also increase with any delay of the project.

5.4 Summary

Owing to the variable schedule time available for access construction and the fact that on-site construction activities will be severely compressed in the 1985-86 period, the access route that assures the quickest completion and hence the earliest delivery of equipment and material to the site has a distinct advantage.

Using the Denali Plan, it is expected that site activities can be supported at an earlier date than by either of the other routes.

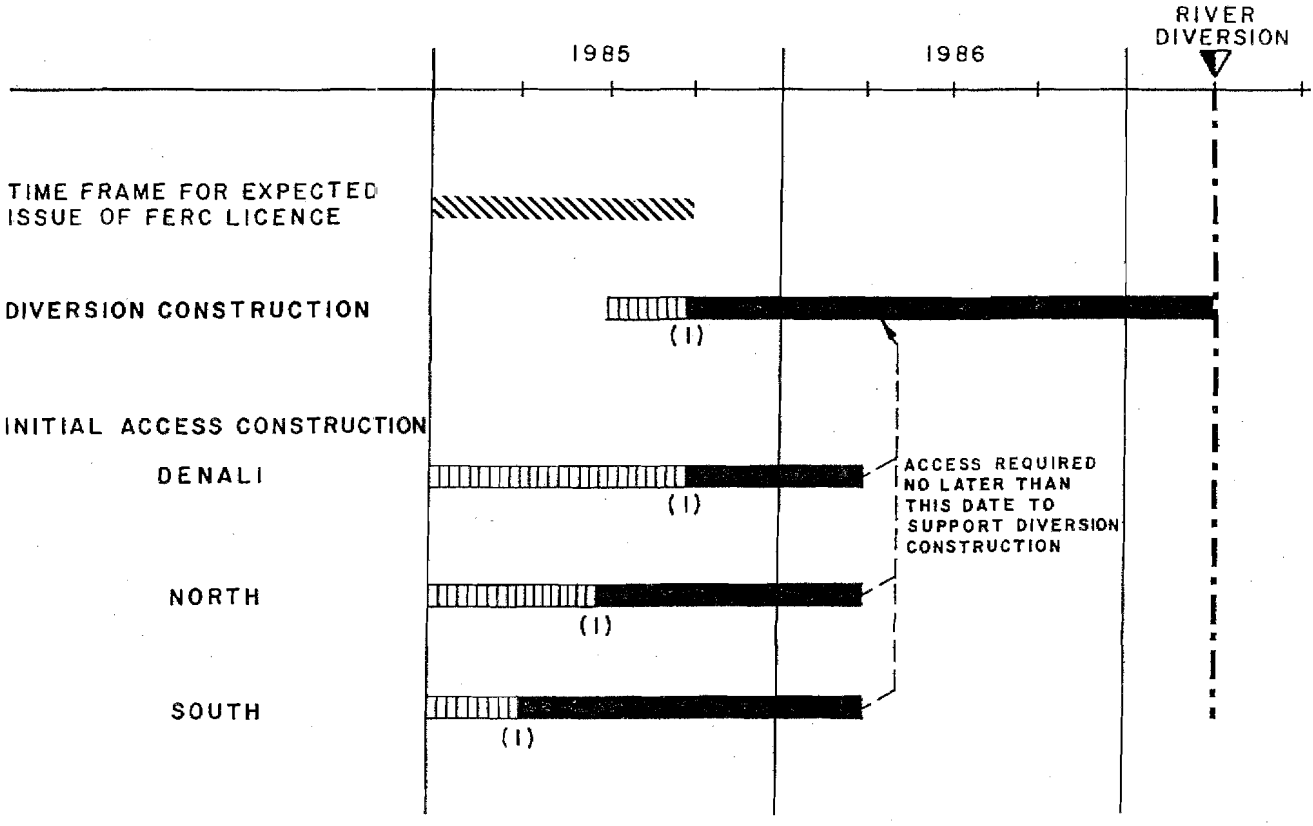
Therefore, Denali offers the highest probability of meeting schedule and hence least risk of project delay and increase in project cost.

The North Plan has a medium level of probability of meeting the schedule to provide on-site support for diversion construction and hence, a medium level of risks of project delay and increased costs.

The South Plan has the lowest probability of meeting schedule along with the highest risk of delay and cost increases.

FIGURE 5.1

SCHEDULE FOR ACCESS AND DIVERSION



NOTES:

▨ ACTIVITY START COULD BE DELAYED AND DIVERSION STILL MET.

(1) LATEST START DATE OF CONSTRUCTION ACTIVITY.

6 - ENVIRONMENTAL ISSUES

6.1 Introduction

In granting a license for the Susitna Hydroelectric Project, the Federal Energy Regulatory Commission (FERC) will be required by the National Environmental Policy Act (NEPA) Section 102(2)(3) to document adverse project related impacts and to ensure that specific mitigation measures necessary to avoid, minimize, or compensate for such impacts are clearly delineated. Access route, its design, construction, and use may significantly contribute to avoiding or minimizing adverse impacts produced by the project. It is important, therefore, that impact identification and mitigation be included as a necessary and influential component of access route planning. The single greatest opportunity to achieve impact mitigation is through selection of the route itself.

This section discusses briefly the potential impacts of the various plans on:

Wildlife and their habitats
Fisheries
Cultural resources
Socioeconomics

Environmental issues have played a major role in access planning to date. The major issue that has arisen is that a road will permit human entry into an area which is relatively inaccessible at present.

The issue of impacts to caribou is discussed in this section. A more detailed discussion is presented in Appendix B.1, as well as a report prepared by A.W.F. Banfield of Rangifer Associates Environmental Consultants and a summary of the issue by the Alaska Department of Fish and Game. Letters from resource agencies are included in Appendix B.

6.2 Wildlife and Habitat

The following discussion summarizes the proposed access alternatives from

the standpoint of potential effects on wildlife and terrestrial habitats. The evaluation assumes no basis of quantitative analysis beyond that of previous studies by the Alaska Department of Fish and Game, the University of Alaska, and private consultants, and of review comments provided by representatives of State and Federal resource agencies. Professional judgements supporting the recommendations presented here are documented in the references cited.

The three proposed access plan alternatives incorporate combinations of five access route segments:

A - Hurricane to Devil Canyon;
B - Gold Creek to Devil Canyon;
C - Devil Canyon to Watana (North Side);
D - Devil Canyon to Watana (South Side); and
E - Denali Highway to Watana.

A. Hurricane to Devil Canyon: This segment is composed almost entirely of productive mixed forest, riparian, and wetlands habitats important to moose, furbearers, and birds (9, 10, 11, 12). It includes three areas where slopes of over 30 percent will require side-hill cuts, all above wetland zones vulnerable to erosion-related impacts (1).

B. Gold Creek to Devil Canyon: This segment is composed of mixed forest and wetland habitats, but includes less wetland habitat and fewer wetland habitat types than the Hurricane to Devil Canyon segment (9). Although it contains habitat suitable for moose, black bears, furbearers, and birds, this route is generally favored as having the least potential for adverse impacts to wildlife among the five segments (5, 8).

C. Devil Canyon to Watana (North Side): This segment traverses a varied mixture of forest, shrub, and tundra habitat types, generally of medium to low productivity as wildlife habitat (9). It crosses the Portage, Devil, and Tsusena Creek drainages and tributary streams, and includes three areas above Portage and Devil Creeks where major side-hill cuts will be required, creating a high probability of

erosion-related impacts to these streams. The Portage Creek drainage is productive furbearer habitat (8, 12).

D. Devil Canyon to Watana (South Side): This segment is highly varied with respect to habitat types, containing complex mixtures of forest, shrub, tundra, wetlands, and riparian vegetation. The western portion of the route is mostly tundra and shrub, with forest and wetlands occurring along the eastern portion in the vicinity of Prairie Creek, Stephan Lake, and Tsusena and Deadman Creeks. A major wildlife concern of the route is that it will provide access to these productive habitat areas and provide a greater opportunity for hunting on the lands which this segment crosses. Prairie Creek supports a high concentration of brown bears which congregate to feed on salmon. Increased access could disturb these bears and lead to their avoiding the creek, which is a major food source for the large brown bear population of the Upper Susitna Basin (5). The lower Tsusena and Deadman Creek areas support lightly hunted concentrations of moose and black bears (5). The Stephan Lake area supports high densities of moose and bears, currently protected by relatively restricted human access. Access-related recreational development and all-terrain-vehicle use would result in habitat loss or alteration, increased hunting, and human-bear conflicts (5).

E. Denali Highway to Watana: This route is primarily composed of shrub and tundra vegetation types, with little productive forest habitat present (10). Although habitat diversity is relatively low along this segment, the southern portion along Deadman Creek is an important brown bear concentration area (5), and the large quantity of available willow shrub provides excellent browse for moose (9). A major concern of this route is that it crosses a peripheral portion of the range of the Nelchina caribou herd (Figure 1). There is evidence that as herd size increases, caribou are likely to migrate across the route in large numbers and calve in the vicinity (2, 4, 5, 8, 9). Although it is not possible to predict with any certainty how the physical presence of the road itself or vehicular traffic will affect caribou movements, population size, or productivity, two points should be noted:

- The route crosses level, open terrain and, if constructed, will afford improved access for all types of off-road vehicle into an area which at times may be important to the Nelchina herd.

- The ease of access provided by this segment may require a variety of site-specific mitigation measures less likely to be necessary for the other route alternatives.

Our current understanding of the effects of roads and traffic on caribou, and the implications for consideration of the Denali Highway to Watana segment, are discussed in Appendix B.1.

Table 6.1 summarizes the three alternatives access plans with respect to potential adverse impacts on wildlife and their supporting habitats. Of the proposed alternative access routes, the North Plan is the best for minimizing adverse impacts to wildlife, because it traverses or approaches the fewest areas of productive habitat and zones of species concentration or movement. The Denali Plan is the least advantageous from this standpoint because it would create the potential for public access and disturbances to caribou, brown bear, and black bear concentration and movement zones. The South Plan occupies an intermediate position: the advantages of the Gold Creek to Devil Canyon segment are offset by the potential for adverse impacts to the Prairie Creek and Stephan Lake areas created by the Devil Canyon to Watana (South Side) segment.

6.3 Fisheries

Construction of the Susitna Hydroelectric Project access route will have fishery impacts regardless of which plan is selected. The potential impacts will be of both a direct and indirect nature. The direct impacts will be the affects on water quality and aquatic habitat and the indirect impacts will be the increased angling pressure.

Information concerning fisheries population and habitat suitability is insufficient to provide a quantitative assessment. Hence this discussion provides only a qualitative comparison of the fishery impacts for the

alternative access plans based on existing knowledge. Information concerning the presence of fish in the streams crossed was obtained from discussion with personnel of ADF&G. No new data were collected.

The three proposed access plan alternatives incorporated combinations of six access route segments:

A - Hurricane to Devil Canyon;
B - Gold Creek to Devil Canyon;
C - Devil Canyon to Watana (North Side);
D - Devil Canyon to Watana (South Side);
E - Denali Highway to Watana; and
F - Denali Highway

The relative parameters to assess impacts along each segment include the number of streams crossed, the number and length of lateral transits (i.e. where the roadway parallels the stream and runoff from the roadway can run directly in to the stream), the number of distinctive watersheds affected, and the presence of resident and anadromous fish along the access route. Table 6.2 depicts the comparison of the parameters for each segment and combinations of segments to form each plan.

Specific comments regarding each segment of the access plans are presented as follows:

A - Hurricane to Devil Canyon: Seven stream crossings will be required along the route from Hurricane to Devil Canyon, including Indian River which is an important salmon spawning river. Both the Chulitna River watershed and the Susitna River watershed are affected by this route. The increased access to Indian River will be an important indirect impact of this plan. Approximately 1.8 miles of cuts into banks greater than 30 degrees occur along this portion.

B - Gold Creek to Devil Canyon: This 16 mile long segment which crosses six streams is expected to have minimal direct and indirect impacts. Anadromous fish spawning is likely in some streams but impacts are expected to be minimal. Approximately 2.5 miles of cuts into banks greater than 30 degrees

occur in this section. In the Denali plan, this segment will be railroad whereas in the South plan it will be road.

C - Devil Canyon to Watana (North Side): This 41 mile segment crosses 20 streams and laterally transits four rivers for a total distance of approximately 12 miles. Seven miles of lateral transit are along Portage Creek which is an important salmon spawning area.

D - Devil Canyon to Watana (South Side): The portion of this segment from Watana to the Susitna River is not expected to have any major direct effects. The portion between the Susitna River crossing and Devil Canyon requires nine stream crossings but these may not contain significant fish populations. However, increased angling pressure in the vicinity of Stephan Lake may result from the proximity of the access road to Stephan Lake. This segment crosses both the Susitna and the Talkeetna watershed. Seven miles of cut into banks of greater than 30 degrees occur in this section.

E - Denali Highway to Watana: The 40 mile segment from Denali Highway to Watana has 22 stream crossings and passes from the Nenana into the Susitna watershed. Much of the route crosses or is in proximity to seasonal grayling habitat. Recruitment and growth rates may be low along this segment. If the area were open to angling it is unlikely that resident populations could sustain heavy fishing pressure. Hence this route has a high potential for impacting the local grayling population. The route transits Deadman Creek for nearly eleven miles.

F - Denali Highway: The Denali Highway from Cantwell to the Watana turnoff will require upgrading. Stream crossings will be modified during reconstruction of the highway.

The evaluation and comparison of fishery impacts for the alternative access plans can be summarized as follows:

The Denali Plan (segments B, D, E and F) is likely to have a significant direct and indirect impact on grayling fisheries given the number of stream crossings, lateral transits, and watersheds affected. Anadromous fisheries

impacts will be minimal and will only occur along the railroad spur between Gold Creek and Devil Canyon.

The South Plan (segments A, B, and D) may impact salmon spawning activity in Indian River both directly and indirectly.

The North Plan (segments A and C) may impact salmon spawning activity in Indian River and is likely to have a significant impact along Portage Creek due to water quality impacts through increased erosion and due to increased angling if the route is open to the public.

Regardless of the plan selected, direct and indirect affects can be minimized through proper engineering design and prudent management. Culverts and bridges must be appropriately sized and constructed to maintain velocities below four feet per second, to minimize erosion and to maintain fish passages. Where lateral transits occur, erosion control measures must be undertaken. This is especially true along Deadman Creek (segment E, Denali Plan) and Portage Creek (segment C, North Plan).

Through careful management, secondary impacts can be minimized although restrictive management policies may be necessary. Restrictive management policies may be necessary along segment E (Denali Plan) to protect grayling population from over fishing, at Indian River (segment A, North and South Plans) and along Portage Creek (segment C, North Plan) to protect king salmon populations. Nonetheless, it may be possible to provide additional sport fishery opportunities along the selected access corridor.

As each plan will require borrow material, care will be taken to ensure that fishery habitats are left undisturbed.

6.4 Cultural Resources

A level one cultural resources survey has been conducted along a large part of the three access plans. The portion of the Denali Plan between the Watana dam site and the Denali Highway crosses an area of high potential for cultural resources. The treeless areas lack appreciable soil deposition,

making cultural resources visible and more vulnerable to secondary impacts. A portion of the South Plan crosses areas of high to moderate potential for cultural resources.

Prior to construction, a detailed cultural resources survey will have to be conducted along the selected access route. If necessary, minor road realignments will be required to avoid discovered sites. In addition, construction monitoring will include an archaeological team to determine the significance of any new sites discovered. Therefore, impacts to cultural resources can be fully mitigated by avoidance, protection or salvage and this issue is not critical to the decision making process.

6.5 Comparison of Socioeconomic Impacts under Various Access Route Plans

Socioeconomic impacts on the Mat-Su Borough as a whole will be similar in magnitude regardless of which of the three access plans under consideration is implemented. This will be the case so long as workers travel to and from the construction sites using their own vehicles or organized ground transportation. However, each of the three plans will affect future socioeconomic conditions in differing degrees in certain areas and communities within and near the Borough.

Cantwell: As illustrated in Table 6.3, the Denali Plan could create significantly larger population, support sector employment, business activity, housing, and transportation (traffic) impacts on Cantwell, together with a larger schools (education) impact, than would the North and South Plans. This is because a railhead would be located at Cantwell, and because Cantwell would be the nearest community to the dam site. This would create an incentive for workers to settle in Cantwell and purchase goods and services there. Settlement by workers, however, could be limited by available land in Cantwell. Availability of land will be determined in large part by future land use policies of the AHTNA Corporation. When more is known about these policies, the magnitude of impacts on Cantwell can be forecast with more certainty.

Hurricane: Significant changes are also anticipated in Hurricane (primarily

in and around the Indian River Subdivision), especially with the North Plan. The Hurricane area currently has very little population, employment, business activity, and housing. Therefore, any change in the levels of these indicators would be a large relative change. With a railhead and road access to the dam sites at Hurricane, large changes would occur. Workers and others would settle on the subdivided land available. There would be employment opportunities at the railhead, and at lodges, restaurants, etc., that could develop here. Additional housing would be required and the need for education services at Trapper Creek and elsewhere would increase. As Table 6.3 shows, changes in these socioeconomic indicators would be less under the South Plan and considerably less under the Denali Plan.

Trapper Creek and Talkeetna: In contrast, Trapper Creek, Talkeetna, Palmer, Wasilla and Houston; and other areas of the Mat-Su Borough (except Hurricane) will experience about the same amount of changes in socioeconomic indicators regardless of which Plan is implemented. In general, Trapper Creek will experience about a doubling in population, support sector employment, and other socioeconomic indicators with the North Plan. The South and Denali Plans will tend to slightly reduce these impacts. Talkeetna will experience a 10-50 percent increase in socioeconomic indicators with the North Plan. With the South Plan, changes in socioeconomic indicators will be more than with the North, yet still well within the 10-50 percent range. Changes in Talkeetna under the Denali Plan would be essentially the same as those under the North Plan.

Palmer, Wasilla, and Houston: Palmer, Wasilla, and Houston will experience slight changes in population, housing, and schools regardless of which Access Plan is implemented (less than 2.5 percent increase in those socioeconomic indicators over 1990, base case). There will be slightly larger changes in service sector employment, business activity and transportation (between 2.5 percent and 10 percent increases in these indicators over 1990, base case). The choice of access plan will not influence the magnitude of these changes.

Public Preferences: The public's responses to these potential changes are mixed. Cantwell, and Palmer, Wasilla and Houston are generally in favor of the changes discussed above. These communities would even welcome more

economic development. Residents of Trapper Creek and Talkeetna have indicated that rapid, uncontrolled change is not desired. Some of the residents of each community would like to preserve the status quo and others of each community would like to have controlled economic development. These latter groups want to proceed with caution and learn more about what could happen to their communities as a result of the Project before committing to a growth plan. Landholders in Hurricane (Indian River Subdivision) have not expressed their attitudes toward change.

The South and Denali Plans would have implications for Gold Creek. A railhead would be located here at the outset of Watana construction in the South Plan, and at the outset of Devil Canyon construction in the Denali Plan. Under the South Plan, this railhead would create employment opportunities and cause population to rise during the mid to late 1980's. Additional housing and education services would be needed and rail traffic in this area would increase. Under the Denali Plan these changes would occur during 1993-1995. Landholders in Gold Creek currently have differing opinions concerning development of a railhead at Gold Creek.

In summary the socioeconomic impacts on the Mat-Su Borough as a whole will be relatively minor and similar in magnitude regardless of which access plan is implemented. However, each of the three plans under consideration will affect future socioeconomic conditions in differing degrees in certain areas and communities within and near the Borough. Based on public input to date, it appears that of the three plans, the Denali Plan will come closest to creating socioeconomic changes that are acceptable to or desired by landholders and residents in the potentially impacted areas and communities. This is because economic development in Cantwell would be relatively large with the Denali Plan, and socioeconomic changes in Trapper Creek and Talkeetna would, in most cases, be rather similar under each of the three plans being considered.

REFERENCES CITED (Section 6.2)

1. Acres American Incorporated, 1982. Preliminary Analysis of Potential Erosion Areas of Proposed Access Routes.

2. Alaska Department of Fish and Game, 1980. Letter to N. Gutcher, R&M Consultants, Inc., from K. Schneider. November 26.

3. Alaska Department of Fish and Game, 1982. Susitna Hydroelectric Project Brown Bear and Black Bear Studies. Phase I Report.

4. Alaska Department of Fish and Game, 1982. Susitna Hydroelectric Project Caribou Studies. Phase I Report.

5. Alaska Department of Fish and Game, 1982. memorandum on Susitna Hydroelectric Project Access Routes. K. Schneider to C. Yanagawa. August 4. Attachment by K. Pitcher.

6. Gipson, P., 1982. Personal Communication to S. Fancy.

7. LGL Alaska Research Associates, Inc., 1982. Letter to W. Ballard, Alaska Department of Fish and Game, from S. Fancy. July 30.

8. Susitna Hydroelectric Steering Committee, 1981. Letter to E. Yould, Alaska Power Authority, from A. Carson. November 5.

9. Terrestrial Environmental Specialists, Inc., 1981. Environmental, Socioeconomic, and Land Use Analysis of Alternative Access Plans for the Susitna Hydroelectric Project.

10. University of Alaska, 1981. Letter to C. Baumgastnes, Terrestrial Environmental Specialists, Inc., from B. Kessel, August 16.

11. University of Alaska, 1982. Susitna Hydroelectric Project Bird and Non-Game Mammal Studies. Phase I Report.

12. University of Alaska, 1982. Susitna Hydroelectric Project Furbearer Studies. Phase I Report.

TABLE 6.1

SUMMARY OF WILDLIFE HABITAT
ISSUES ASSOCIATED WITH
ACCESS ALTERNATIVES

Issue	North (13)	South (16)	Denali (17)
Waterfowl	No water bodies of high relative importance along route.	Stephan Lake is of high relative importance to waterfowl.	Stephan Lake is of high relative importance to waterfowl.
Raptor nests	Avoids known nest sites.	Avoids known nest sites.	Near bald eagle nest on Deadman Creek.
Breeding birds	Least amount of productive forest habitat removed.	Greatest amount of productive forest habitat removed.	Amount of forest removed less than South Route but greater than North Route.
Aquatic Furbearers	.Avoids Fog Lakes-Stephan Lake wetlands. .Crosses highly productive habitat in Chulitna Pass area. .Near productive habitat along Portage Creek.	.Near Fog Lakes-Stephan Lake wetlands. .Crosses highly productive habitat in Chulitna Pass area. .Avoids Portage Creek area.	.Near Fog Lakes-Stephan Lake wetlands. .Avoids Chulitna Pass area. .Avoids Portage Creek area.
Red fox den: concentration areas	.Within 1/4 mile of Swimming Bear Lake den sites. .Avoids Deadman Creek and Deadman Lake den areas.	.Avoids red fox den concentration areas.	.Avoids Swimming Bear Lake denning area. .Near Deadman Creek and Deadman Lake den concentration areas.
Brown bears	.Avoids Prairie Creek concentration area. .Avoids Deadman Creek concentration area.	.Near Prairie Creek concentration area; crosses movement corridor between Prairie Creek and Susitna River. .Avoids Deadman Creek area.	.Near Prairie Creek concentration area; crosses movement corridor between Prairie Creek and Susitna River. .Crosses Deadman Creek concentration area.

TABLE 6.1 (cont'd)

Issue	North (13)	South (16)	Denali (17)
Black bears	.Avoids den sites. .Traverses important south-facing slopes. .Least amount of forest is removed.	.Near several den sites west of Tsusena Creek. .Fewer south-facing slopes are traversed. .Removes greatest amount of forest.	.Near several den sites, west of Tsusena Creek. .Fewer south-facing slopes are traversed. .Removes less forest than South Route but more than North Route.
Caribou	.Avoids caribou range and movement corridor between Denali Highway and Susita River. .Avoids Fog Lakes-Stephan Lake caribou range.	.Avoids caribou range and moveme between Deanli Highway and Susitna River. .Near Fog Lakes-Stephan Lake caribou ranges.	.Crosses caribou range and movement corridor between Denali Highway and Susitna River. .Near Fog Lakes-Stephan Lake caribou range.
Moose	.Traverses important south-facing slopes. .Least amount of forest is removed. .Avoids Fog Lakes-Stephan Lake area	.Fewer south-facing slopes are traversed. .Removes greatest amount of forest. .Near Fog Lakes-Stephan Lake wetlands.	.Fewer south-facing slopes are traversed. .Removes less forest than South Route but more than North Route. .Near Fog Lakes-Stephan Lake wetlands.
Transmission line impacts	.Can use same corridor.	.Can use same corridor.	.Can use same corridor
Secondary effects:	.Least potential for secondary effects through public access and recreational development.	.Potential for secondary effects through public access less than Denali Route but greater than North Route. High potential for secondary effects through recreational development of lands south of Susitna River.	.Highest potential for secondary effects through public access and recreational development.

TABLE 6.2

FISHERY IMPACTS FOR VARIOUS ACCESS ALTERNATIVES

SEGMENT		MILEAGE	CROSSINGS					
			SUSITNA RIVER	MAJOR[4] STREAMS	MINOR STREAMS	TOTAL	LATERAL[5] TRANSECTS	WATERSHED IMPACTED	ANADROMOUS FISH
A	Hurricane to Devil Canyon	16	1	1	6	8	1 (3)	2	yes
B	Gold Creek to Devil Canyon	12	0	2	4	6	1 (3)	1	minimal
C	Devil Canyon to Watana (North side)	41	0	4	16	20	4 (12)	1	yes
D	Devil Canyon to Watana (South side)	41	1	6	9	16	2 (2)	2	none
E	Denali to Watana	40	0	7	15	22	2 (11)	2	none
F	Denali Hwy. (Upgraded)	21	0	5	6	11	2 (5)	1	none
DENALI (No. 17)	Total to Watana (E,F)	61	0	12	21	33	4 (16)	2	none
	Total Watana/ Devil Canyon (B, D, E, F)	116[3]	1	20	34	55	7 (21)	3	minimal
SOUTH (No. 16)	Total to Watana (A, B, D)	69	2	9	19	30	4 (8)	3	yes
	Total Watana/ Devil Canyon (A, B, D)	69	2	9	19	30	4 (8)	3	yes
NORTH (No. 13)	Total to Watana (A,C)[1]	52	0	5	20	25	5 (15)	2	yes
	Total[2] Watana/ Devil Canyon (A,C)	59	1	5	21	27	5 (15)	2	yes

Footnotes:

1. Total to Watana does not include segment from the Devil Canyon cutoff to Devil Canyon.

2. Mileage is 2 miles longer than the additions of segments A and C. Total number of streams is actually 1 less than the addition of streams along segment A and C due to difference in alignment.

3. Mileage is 2 miles longer than the sums of segments B, D, E, F because the railroad option is two miles longer than the road option along segment B

4. A major stream is arbitrarily selected as a stream with a drainage area greater than 5 square miles.

5. Lateral transits are parellel to the river bed. The first number represents the number of transits and the second the total distance in miles.

TABLE 6.3
COMPARISON OF SOCIOECONOMIC IMPACTS UNDER
VARIOUS ACCESS ALTERNATIVES

Socioeconomic Indicator and Location	Access Plan Number 13 North	16 South	17 Denali
Population			
Cantwell	A[1]	A	(+)Z
Hurricane[2]	F	(-)F	(-)B
Trapper Creek	E	(-)D	(-)D
Talkeetna	C	(+)C	(-)C
Palmer, Wasilla & Houston	A	( )A	( )A
Support Sector Employment			
Cantwell	A	A	(+)Z
Hurricane	F	(-)F	(-)B
Trapper Creek	E	(-)D	(-)D
Talkeetna	C	(+)C	( )C
Palmer, Wasilla & Houston	B	( )B	( )B
Business Activity			
Cantwell	A	A	(+)Z
Hurricane	F	(-)F	(-)Z
Trapper Creek	E	(-)D	(-)D
Talkeetna	C	(+)C	( )C
Palmer, Wasilla & Houston	B	( )B	( )B
Housing			
Cantwell	A	A	(+)Z
Hurricane	F	(-)F	(-)Z
Trapper Creek	E	(-)D	(-)D
Talkeetna	C	(+)C	( )C
Palmer, Wasilla & Houston	A	( )A	( )A
Schools			
Cantwell	A	A	(+)Z
Trapper Creek	D	(-)D	(-)D
Talkeetna	C	(+)C	( )C
Palmer, Wasilla & Houston	A	( )A	( )A
Transportation (Traffic)			
Cantwell	A	A	(+)F
Hurricane	F	(-)F	(-)Z
Trapper Creek	Z	(-)Z	( )Z
Talkeetna	C	(+)C	( )C
Palmer, Wasilla & Houston	C	( )C	( )C

COMPARISON OF SOCIOECONOMIC IMPACTS UNDER
VARIOUS ACCESS ROUTE PLANS (continued)

[1]The letters in each row and column refer to relative levels of changes in socioeconomic indicators. In each column these letters represent the percent change in an indicator relative to the base (without Susitna Project) case for 1990. Minus (-) and plus (+) symbols in the second and third columns (Access Plans 16 and 17, respectively) refer to changes in indicators relative to the first column (Access Plan 13). The relationship between letters and magnitudes of changes are defined below.

Z - Size of impact uncertain. There could be a significant increase over 1990, base case.
A - Less than 2.5% increase over 1990, base case.
B - Less than 10% increase, but greater than 2.5% increase over 1990, base case.
C - Less than 50% increase, but greater than 10% increase over 1990, base case.
D - Less than 100% increase, but greater than 50% increase over 1990, base case.
E - Less than 200% increase, but greater than 100% increase over 1990, base case.
F - Size of impact relative to 1982 level is very uncertain. Impact could be very substantial (greater than 200% increase over 1990, base case).

Note: The percentage changes for all communities except for Cantwell and Hurricane are based on baseline and impact projections and analysis conducted in Subtask 7.05: Socioeconomic Analysis, Phase I Report, April 1982. The percentage changes for Cantwell and Hurricane were estimated after the Phase I Report was completed.

[2]Primarily in and around the Indian River Subdivision.

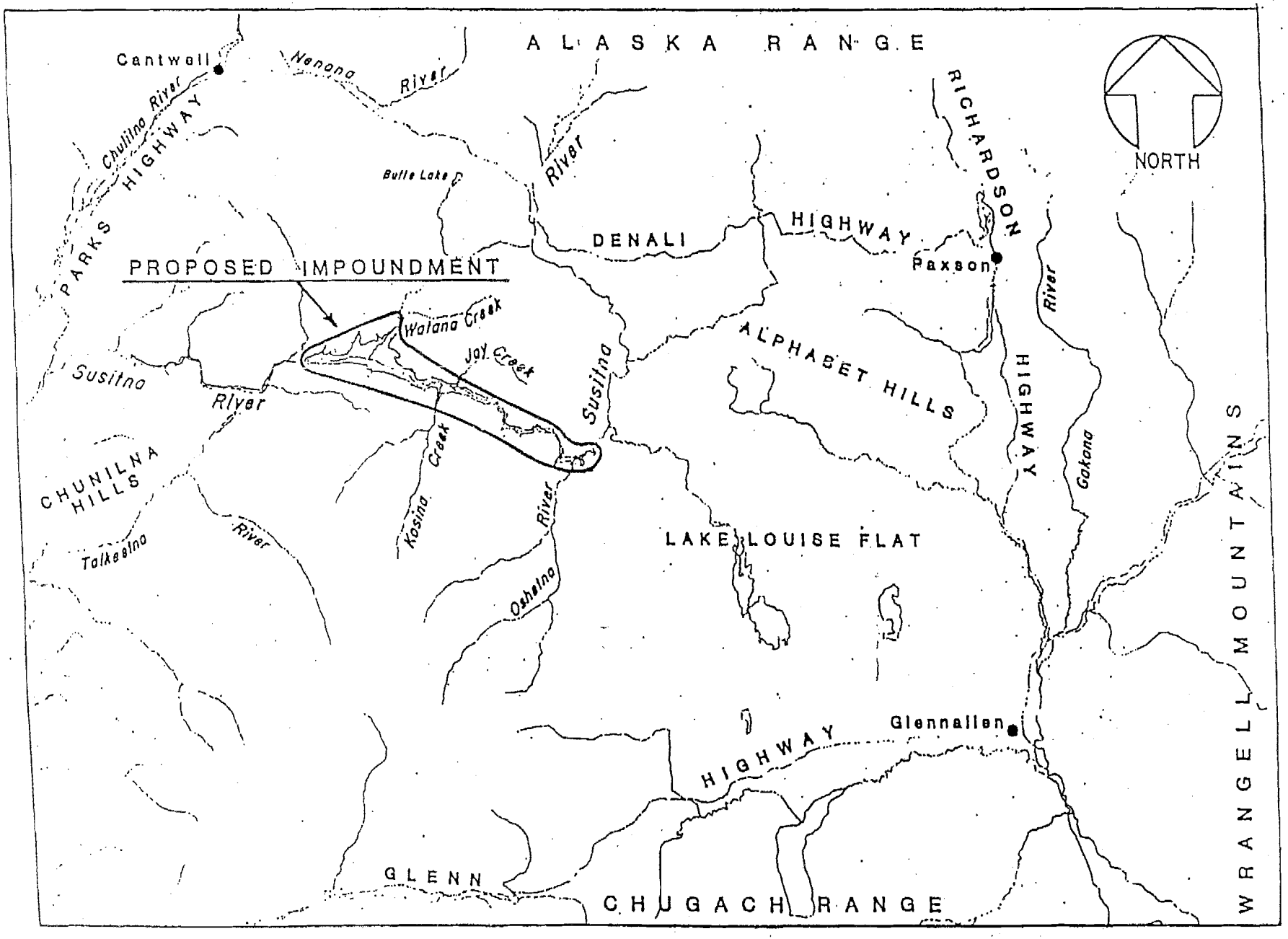


Figure 1. Nelchina caribou range with basic geographic features.

FIGURE 6.1

7 - PREFERENCES OF NATIVE ORGANIZATIONS

This section reviews the preferences of Native Organizations. Letters received from landowners are attached in Appendix C.

7.1 Tyonek Native Corporation

The Corporation fully supports the South Plan. The Denali Plan would probably receive their acceptance if provision for access to the south side of the river was made prior to the start of construction of Devil Canyon.

7.2 Cook Inlet Region Inc. (CIRI)

CIRI fully supports the CIRI Village Presidents position for the South Plan as the best alternative.

CIRI could support the Denali Plan with a realignment of the road so that it crosses over the Watana dam, after the dam is completed. The North Plan is considered unacceptable.

7.3 CIRI Village Presidents

The CIRI Village Presidents fully support the South Plan as this plan meets their criteria for the highest and best use of their lands on the South side of the Susitna River.

This use has been identified as follows:

A - Recreation
B - Residential
C - Timber Harvesting
D - Mining

The Denali Plan as presented might possibly be accepted with some modifications. These modifications should assure access to the lands south of the Susitna River across the completed Watana dam.

The North Plan is not an acceptable route to the villages.

7.4 Ahtna Native Regional Corporation (AHTNA)

Ahtna fully supports the Denali Plan. This access is within 3 miles of Ahtna selected lands on both sides of the Denali Highway.

Ahtna Development Corp. a subsidiary of Ahtna fully supports the Denali Plan.

7.5 Cantwell Village Corporation

Cantwell Village Corp., fully supports the Denali Plan. Village land selections begin at the East side of Mt. McKinley National Park bordering with the Regional selections adjacent to the Denali Plan.

8 - RELATIONSHIP TO CURRENT LAND STEWARDSHIP, USES AND PLANS

8.1 Introduction

The purpose of this section of the report is to identify current land stewardship, land uses and land management plans in the project study area. The relationship of the alternative access plans is then discussed in respect of these current uses and management plans.

8.2 Land Stewardship and Preservations

Prior to statehood and the Alaska Native Claims Settlement Act, the entire Susitna drainage area was mostly federally owned. There were no agency resource management plans for the area and, except for minimal mining and timbering, very little resource exploitation. A major limiting factor to development of the area has been access; inaccessibility has rendered it economically impractical, except for hunting and fishing, to utilize the area's resource base.

8.2.1 Ownership Patterns

The Susitna River proper, the lands immediately adjacent, and lands along the bench country around Stephan and Fog lakes extending eastward to the Kosina Creek drainage have been selected by Cook Inlet Region, Inc. (CIRI) and associated Native village corporations. The State has selected land entitlements on the north side of the proposed reservoir between the remaining federal lands and the Native lands (Figures 8.1, 8.2, 8.3). In the areas designated for the Cook Inlet land trade, the State will be conveyed all those lands that are not conveyed to the Natives. Matanuska-Susitna Borough owns no lands in the project area.

Two state land disposal sites (Figure 8.1) exist near the Indian River in the westernmost part of the project area, just north of the Susitna River. The Indian River Subdivision (T33N, R2W, S.M.) lies near mile 168 of the Parks Highway, northwest of Chulitna Butte, and contains

approximately 518 ha (1,280 a) of land. The disposal area has been subdivided into roads and also some 139 lots averaging about two hectares (five acres) per lot. South of this subdivision is the Indian River remote parcel, located northeast of the confluence of the Susitna and Indian rivers. This remote parcel (T31-32N, R2W S.M.) is located just east of and, at some places, adjacent to Denali State Park. The Indian River remote parcel is comprised of 2,590 ha (6,400 a). Approximately 607 ha (1,500 a) in 75 parcels is being disposed of.

These land disposals, along with scattered private parcels of land, represent the only real dedication of a given piece of land to a particular use. Table 8.1 summaries various land holdings in the vicinity of the proposed project, by status/ownership category.

8.2.2 Preservations

a) Mining Claims

Several mining claims exist within the study area as shown in Figures 8.1, 8.2, 8.3.

b) Power Site Classification

The U. S. Department of the Interior has preserved part of the area within the proposed impoundment zones as a Power Site Classification (No. 443)

c) Railroad Withdrawal Lands

The Alaska Railroad is contained within federal Railroad Withdrawal Lands which includes an enlarged zone in the vicinity of Hurricane. (Fig. 8.1).

d) Others

During the past decade of systematic studies, the Upper Susitna did not match criteria standards required for recommendation as units within:

1. National Park-Preserve System
2. Wild and Scenic River System
3. Natural or Historic Landmark Status
4. Wilderness Preservation System
5. National Trail System
6. National Forest System

However, even as lower priority lands, the Susitna Basin does offer much potential for recreation and resource development.

8.3 Present Land Use in the Project Area

The combined factors of the size of the Susitna project area, its isolation, and its location in a subarctic environment result in extremely low-density land use. This use is still tied to the values of the area people, for whom the land is still a source of income, food and related subsistence activities, and recreation. The development of land use has been a slow, evolutionary process involving utilization of the resource base. Many historic uses are relevant in assessing present land use patterns, and, indeed, many of the remnants of past uses shape present patterns. Information for existing structures in the project area are shown on Table 8.2. The major trails into the project area, although not structures, represent substantial environmental modifications and reflect general use patterns; they are presented in Table 8.3.

The greatest concentrations of physical developments are in the Stephan Lake area (13 cabins and one lodge with outbuildings and airstrip) and the Portage Creek mining area and summer cabins (19 cabins and related buildings). Chulitna Creek and Gold Creek also have some mining developments. Three commercial lodge operations are located at High, Tsusena, and Stephan lakes.

8.4 Land Use Management

Personnel employed by responsible land managing agencies were interviewed initially and throughout the study to gain information about present and future programs. See Table 8.4. The results of the interviews are summarized in Table 8.5.

Entities with land management concerns in the area are the Bureau of Land Management (U.S. Department of Interior), the Alaska Department of Natural Resources, Matanuska-Susitna Borough, and the Cook Inlet Region, Inc. and associated village groups.

Federal

Federal lands to the north of the project area are managed by the Bureau of Land Mangement (BLM). These lands are included in the Denali Planning Block, for which a land use plan has been approved.

Management in the Denali Unit and those areas not yet conveyed either to the Natives or the State is essentially passive. Very few mananagement activities are taking place. However BLM has in the past expressed a desire to open the lands to entry to meet public demands for recreational and commercial uses. (BLM Docket No. DA-74-Alaska, 1961) In BLM's Draft Amendment to the Southcentral Alaska Land Use plan for the Denali/Tiekel planning blocks (May 1982) the following preferred alternatives as relating to the Denali block were expressed.

a) Mineral Leasing

Open all lands in the Denali planning block to mineral leasing.

b) Mineral Entry

Open the areas in the Denali block shown in Figure 8.4 to both metalliferous and nonmetalliferous locations in response to indications of interest.

c) Settlement

Take No Action

Fire control is also a current management consideration; BLM has a cooperative fire control agreement with the State of Alaska that covers the project area.

BLM is developing regulations for the management of public easements across Native lands. Lands in the project area that have been identified for conveyance to the Natives have a total of six easements across them. These include: an access trail 15 m (50 ft) wide from the Chulitna wayside on the Alaska Railroad to public lands immediately east of Portage Creek; a state site easement and trail easements on Stephan Lake; and an access trail running east from Gold Creek. Easements were only identified when it was shown that access to public lands was not possible from any other public land area. There are no easements immediately adjacent to the Susitna River above Gold Creek.

BLM is also developing a wildlife habitat management plan in cooperation with Alaska Department of Fish and Game (ADF&G) for the Alphabet Hills between the Tyone and Maclaren rivers (T11-12 N, R2-9 W, Copper River Meridian). This plan will involve moose habitat manipulation to improve winter range. The study has been approved and could be implemented in the late summer of 1982.

State

The State's general policy is to "encourage the settlement of its land and the development of its resources by making them available for

maximum use and development consistent with the public interest." -- Article VIII Section 1 of the State Constitution.

Most state lands fall under the jurisdiction of the Alaska Department of Natural Resources (DNR). As indicated, the State is disposing of 607 ha (1,500 a) of remote housing parcels and 518 ha (1280 a) in a subdivision. These disposal areas (located north and south of Chulitna) are west of the project area and in the vicinity of the proposed access route.

In the project area, the State had, until recently, done only a resource assessment for those lands it is proposing to select. DNR's Division of Research and Development in cooperation with the Matanuska-Susitna Borough recently published its report on 'Land Use Leases and Preliminary Resource Inventory' as proposed as part of the Matanuska-Susitna-Beluga Cooperative Planning Program (May 1982). Planning for state lands in this area will be based in part on this assessment.

The Alaska Department of Transportation and Public Facilities (DOT-PF) has proposed to upgrade the Denali Highway between the Richardson and the Parks Highways. However future plans relating to this proposal will be somewhat dependent on the outcome of the Denali Scenic Highway Study presently being initiated by the Alaska Land Use Council. According to the Environmental Assessment prepared by DOT-PF, agencies, organizations and individuals have indicated a strong base of suppot for the upgrading of the Denali Highway. (DOT-PF, Environmental Assessment, Denali Highway Cantwell to Paxson, Fall 1981)

The Denali Scenic Highway Study has been initiated by the Alaska Land Use Council as required by Section 1311 of the Alaska National Interest Lands Conservation Act. (ANILCA) The purpose of the study is to determine the feasibility/desirability of establishing a scenic highway in the areas of - Parks Highway from Talkeetna Junction to Denali Park, Denali Highway from Cantwell to Paxson and the Richardson Highway and the Edgerton Highwway between Paxson and Chitina.

Borough

Matanuska-Susitna Borough is involved in three separate management efforts which affect the project area. These are the Mat-Su Borough Comprehensive Plan (1970), the Talkeetna Mountains Special Use District, and the Mat-Su Borough Coastal Management Program. The current Mat-Su Borough Comprehensive Plan (1970) contains very little discussion of the Susitna area lands. The borough has already selected more than its entitlement of land and is concentrating its selections in the lower Susitna basin near existing highways. Thus, it is unlikely that the borough will select any land in the project area.

The borough, by ordinance, has created the Talkeetna Mountains Special Use District, through which the borough can exercise planning and zoning authority over all lands within the district's boundaries. The Special Use District includes the project area. The ordinance provides for multiple resource use of the district and takes into account unique scenic values. Thus, lands within the special use district are subject to permit requirements for specified developments (roads, subdivisions, etc.).

The borough is updating its comprehensive plan, and additional studies are currently being performed. The project area is considered a mixed-use zone, which would permit hydro development. Management objectives for the project area will probably not be refined until the current hydro studies are complete.

Through a cooperative arrangement with the Office of Coastal Zone Management (National Oceanic Atmospheric Administration, U.S. Department of Commerce) and the Alaska Coastal Management Program (Division of Community Planning, Alaska Department of Community and Regional Affairs), Mat-Su Borough is preparing a Coastal Mangement Program. Preliminary studies were completed in May, 1981; the Susitna River through Devil Canyon was designated to be within the biophysical boundaries of the program. Program results to date provide for a preliminary determination of uses subject to the program guidelines including, specifically, hydroelectric development in Devil Canyon. The appropriateness of this use is

to be reviewed as resource analysis continues in subsequent phases of the program.

Natives

The Cook Inlet Region, Inc. has been transferred selected Native lands to hold in trust until these lands are conveyed to the appropriate villages (Chickaloon-Moose Creek, Tyonek, and Knik). Currently, no land management activities are being carried out. When the villages obtain their lands, the different village ownerships will create a checkerboard pattern. Immediate land problems and land reconveyance to villages are being handled by the Village Deficiency Management Association, a group made up of representatives from each of the concerned villages. Because of the checkerboard pattern of ownership described above, any management of Native lands may be undertaken by this association.

The CIRI corporation and its villages have, however, expressed an interest in potentially developing their lands for mining, recreation, forest harvesting, or residential use.

8.5 Relationship to Current Land Uses and Land Use Planning

8.5.1 General

All three plans presently being asssessed include road access connecting to an existing road system. As a consequence all three plans have the potential of providing public access to a now relatively inaccessible, semi-wilderness area. The plans are thus compatible, to varying degrees, with the development of future recreation and mining activities but may pose conflicts with wildlife habitats and necessitate an increased level of wildlife and people management. Access by means of any of the three plans, provided it is properly managed, does not appear to be in conflict with any present Federal, Borough or Native land management plans, or State policy. The approximate distances in miles of each access plan through the various land ownership classifications is shown on Table 8.6

Although the transmission line corridor alignment will have to be reassessed following an access plan selection, coordination with any of the three access plans is possible. However, since the transmission corridor will be routed in an east-west direction from Watana to the intertie, the selection of the Denali Plan could result in the construction of the transmission line prior to the construction of the east-west access as needed for Devil Canyon.

8.5.2 North Plan

The North Plan does not cross federal land, with the exception of the Federal Railroad Lands, hence it is not directly affected by BLM's recent decision to open the area under its jurisdiction for mineral entry and mineral leasing. However, state lands could also be open to mineral entry at some future time. The route does offer a mainstream opportunity to prospect northern parallel sectors if State lands are opened.

The North Plan does cross-cut through areas that are now relatively inaccessible. Increased accessibility due to road construction and bridging is compatible with the possible future land uses of recreation and mining but may pose conflicts with wildlife habitat and some Native lands. If public access to the project is provided, the control of access, enforcement of state game laws and regulations and the development of an access management plan could be used to control the potential impacts of increased access.

The development of a railhead in the vicinity of Hurricane, as would be required with the North Plan, could be in conflict with the management recommendations of the DNR's "Scenic Resources along the Parks Highway Study" and could be in conflict with the future findings of the Denali Scenic Highway Study. However, such a railhead would be compatable with the Federal Railroad Withdrawal land designation at Hurricane.

8.5.3 South Plan

The South Plan does not cross any federal land, hence it is only indirectly affected by BLM's recent decision to open the area under its jurisdiction for mineral entry and mineral leasing. It could be affected by future remote state land selections and related offerings.

As with the North Plan, the South Plan does cross lands that are currently relatively inaccessible. Increased accessibility due to road construction is compatible with recreation uses and with mining but may pose conflicts with wildlife habitat and private land ownership patterns. As with the North Plan, this conflict may be manageable through development of a comprehensive plan to regulate hunting and access to the area.

The South Plan is also compatible with the economic goals of Native landowners. It will provide for access to their lands on the south side of the river which Natives may wish to develop for mineral and recreational, residential or timber purposes.

The South Plan could have the same aesthetic conflicts with the DNR management recommendation for the Hurricane area as identified for the North Plan.

8.5.4 Denali Plan

The Denali Plan crosses BLM, state selected, and Native selected land north of the Susitna River. State and Native lands are used south of the river. The northern section of the Denali Plan, from Denali Highway to Deadman Lake is compatible with the BLM's decision to open much of their land this year to mineral leasing and mineral entry. The southern portion of the Denali route is identical to the South Plan.

The rail line from Gold Creek to Devils Canyon in the Denali Plan reduces the ease of public access to the area from the west. It is not as compatible with CIRI Native requests for access to the southern region as found in the South Plan.

The Denali access plan could create conflicts, during the construction phase of the project, with the development of a Denali Scenic Highway. Following construction the access road and project facilities could be incorporated into the overall Scenic Highway planning.

TABLE 8.1 SUMMARY OF LAND STATUS/OWNERSHIP IN STUDY AREA

Land Status/Ownership Category	Total Area Hectares	Acres
Federal	122,899	303,680
Federal (State Selection Suspended)	150,121	370,945
Federal (Railroad Withdrawal)	1,912	4,724
State Selection	230,632	569,883
State Selection Patented or TA'd	70,515	174,239
Denali State Park (within study area)	10,360	25,500
Regional Selection	12,562	31,040
Native Group Selection	1,554	3,840
Native Selection	83,970	207,487
Village Selections (included in Native selection total)		
Chickaloon	2,072	5,120
Tyonek	8,288	20,480
Knik	16,058	39,680
Private	3,996	9,874

TABLE 8.2 USE INFORMATION FOR EXISTING STRUCTURES IN THE UPPER SUSITNA RIVER BASIN

	Zone 1[1]	Zone 2[2]	Zone 3[3]
PRESENT CONDITION OF STRUCTURE			
Remains of structured foundations only (no use)	1	5	-
Badly weathered; partial structure remains - use no longer possible	2	-	1
Structure intact; not currently maintained			
- seasonal use - past & present	2	2	2
- no current seasonal use	2	7	1
Structure intact; maintained, with seasonal use - past & present	3	49	12
Structure intact; maintained, with year-round use	-	9	3
Structure intact; maintained; no current use information	-	4	3
USE TYPES			
Hunting, fishing, trapping	3	7	1
Hunting, fishing	2	43	3
Hunting only	1	7	2
Fishing only	-	1	-
Boating	1	21	-
Skiing	-	6	-
Mining	-	4	1
Research/exploration	3	2	-
ACCESS			
Air:			
Airstrip	3	26	6
Floats/skis	2	34	6
ATV	1	20	5
4WD	1	16	1
Boat	3	3	1
Foot, dog team	6	37	9
Snowmachine	-	6	1
Horse	-	4	-
Rail	-	1	2
Car	-	1	2

Footnotes

1. Zone 1 is the impoundment zone plus a 61 m (200 ft) perimeter
2. Zone 2 is the 10 km (6 mi) perimeter around Zone 1
3. Zone 3 is that zone between 10 km (6 mi) and 19 km (12 mi) from the impoundments

TABLE 8.3 MAJOR TRAILS IN THE UPPER SUSITNA RIVER BASIN

Type	Beginning	Middle	End	Years Used
Cat, ORV	Gold Creek		Devil Canyon	1950's-present
Cat, ORV	Gold Creek	Ridge top west of VABM Clear	Confluence of John & Chunilna creeks	1961-present
Packhorse	Sherman		Confluence of John & Chunilna creeks	1948
Cat	Alaska Railroad, mile 232		Chunilna Creek	1957-present
Foot	Curry		Cabin 3 km (2 mi.) east of VABM Dead	1926
Packhorse, foot	Talkeetna	North of Disappointment Creek	Stephan Lake	1948
Packhorse, old sled road	Chulitna	Portage Creek	Lake west of High Lake	1920's-present
ATV	Denali Highway	Butte Lake	Tsusena Lake	1950's-present

TABLE 8.4 LIST OF CRITICAL MANAGEMENT AGENCY INTERVIEWEES

Name and Title	Agency	Type of Interview	Date
	FEDERAL		
Stanley H. Bronczyk, Chief Branch of Easement Identification	BLM	Meeting	5 May 1980
Lee Barkow, Planner, Anchorage District Office	BLM	Telephone	25 June 1980
	STATE		
Debbie Robertson Land Management Officer	DNR Division of Forest Land & Water Management, Southcentral District	Telephone	5 May 1980
Bill Beaty Planning Supervisor	Division of Research & Development, Land Resources Planning	Meeting	18 June 1980
Ron Swanson Land Management Officer	Division of Research & Development, Policy Research Land Entitlement	Meeting	18 June 1980
	MUNICIPALITY		
Lee Wyatt Planning Director	Matanuska-Susitna Borough	Meeting	4 May 1980
	NATIVE		
Marge Sagerser Land Manager	Cook Inlet Native Corporation	Personal Telephone	23 April 1980 10 July 1980

TABLE 8-5 SUMMARY OF PRESENT AND FUTURE LAND MANAGEMENT ACTIVITIES IN THE PROPOSED SUSITNA HYDROELECTRIC PROJECT AREA

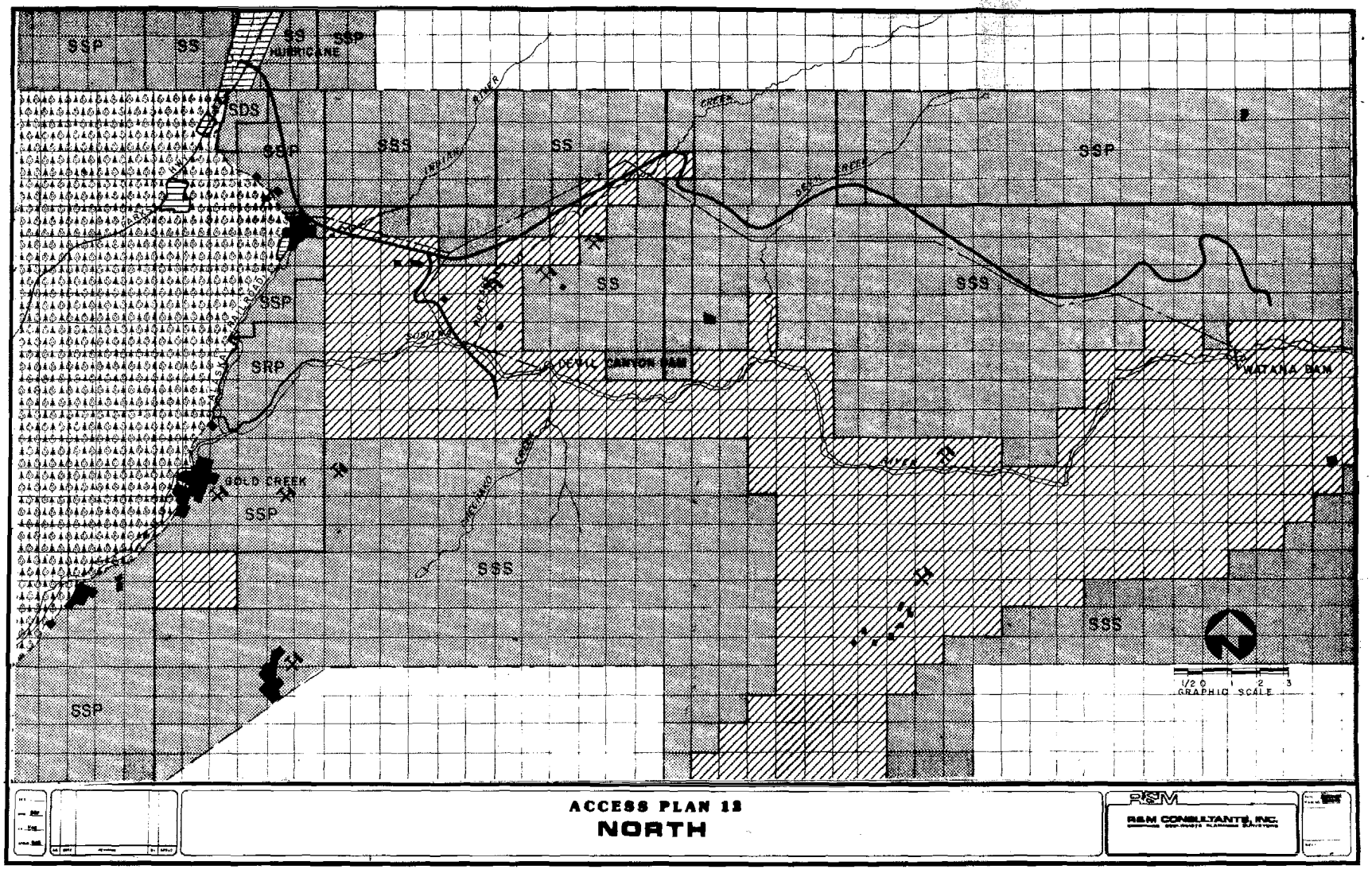
Land Management Agency	Current Management	Future Management Direction
U. S. Department of Interior Bureau of Land Management	Protection of natural environment; fire control and the issuing of of some special use permits. Present land use planning includes mineral leasing and mineral entry	Future management will be guided by Southcentral Planning Area Management Framework Plan and an easement management plan.
Alaska Department of Natural Resources	Planning for the disposal of state lands that are immediately adjacent to the west side of the project area (north and south of Chulitna).	State will be conveyed lands in project area not conveyed to the Natives. Management planning on lands will not begin before 1983.
Alaska Power Authority	Performing hydroelectric development feasibility studies.	Submittal of a FERC license application
Matanuska-Susitna Borough	Borough has no lands in the project area. Project area does fall within the borough's boundaries and is part of the borough's Talkeetna Mountain Special Use District. Project area is a "mixed use" zone.	By Ordinance No. 79-35 creating the Talkeetna Mountains Special Use District, the borough can exercise planning and zoning authority over private lands within its boundaries will commence further activities when hydro studies are completed.
Matanuska-Susitna Borough (in affiliation with the Federal Office of Coastal Zone Management and the Alaska Coastal Management Program)	Currently has designated the Susitna River to and including Devil Canyon as part of a biophysical area for the coastal Zone Management Program.	Continuing CZM studies will determine any additional management direction in areas downstream of Devil Canyon.
Cook Inlet Region, Inc. and several villages	None; lands currently being transferred to individual villages.	Management planning in general is still undergoing land conveyance.

Table 8.6 Approximate Distances in Miles of Each Access Plan Through Various Land Ownership Classifications.

Land Classification	Plan 13 (North)	Plan 16 (South)	Plan 17 (Denali)
FD	0	0	27.0
FS	1.0	0.5	-
SS	5.5	1.0	-
SSP	7.5	10.0	14.3
SSS	26.5	16.2	20.2
VSC	18.5	40.5	31.5
PP	0	0.8	2.0
TOTAL	59.0	69.0	95 *

Note: FD = Federal D-1
FS = Federal Small Parcel
SS = State Selected
SSP = State Selection Patented or TA'D
SSS = State Selection Suspended
VSC = Village Selection
PP = Private Parcel

* In addition 21 miles of the Denali Highway would be upgraded. (probably within present ROW)



- DENALI STATE PARK
- PRIVATE PARCELS
- VILLAGE OR NATIVE GROUP
- STATE LANDS
  - SSP - STATE SELECTION PATENTED OR T.A.'D
  - SS - STATE SELECTED
  - SSS - STATE SELECTION SUSPENDED
  - SRP - STATE REMOTE PARCEL
  - SDS - STATE DISPOSAL SITE
- FEDERAL SMALL PARCELS
- FEDERAL D-1
- MINING CLAIM
- LIMITS OF LAND IDENTIFICATION
- PROPOSED TRANSMISSION LINE CORRIDOR
- PROPOSED RAILROAD
- PROPOSED ROAD

FIGURE 8.1
LAND OWNERSHIP

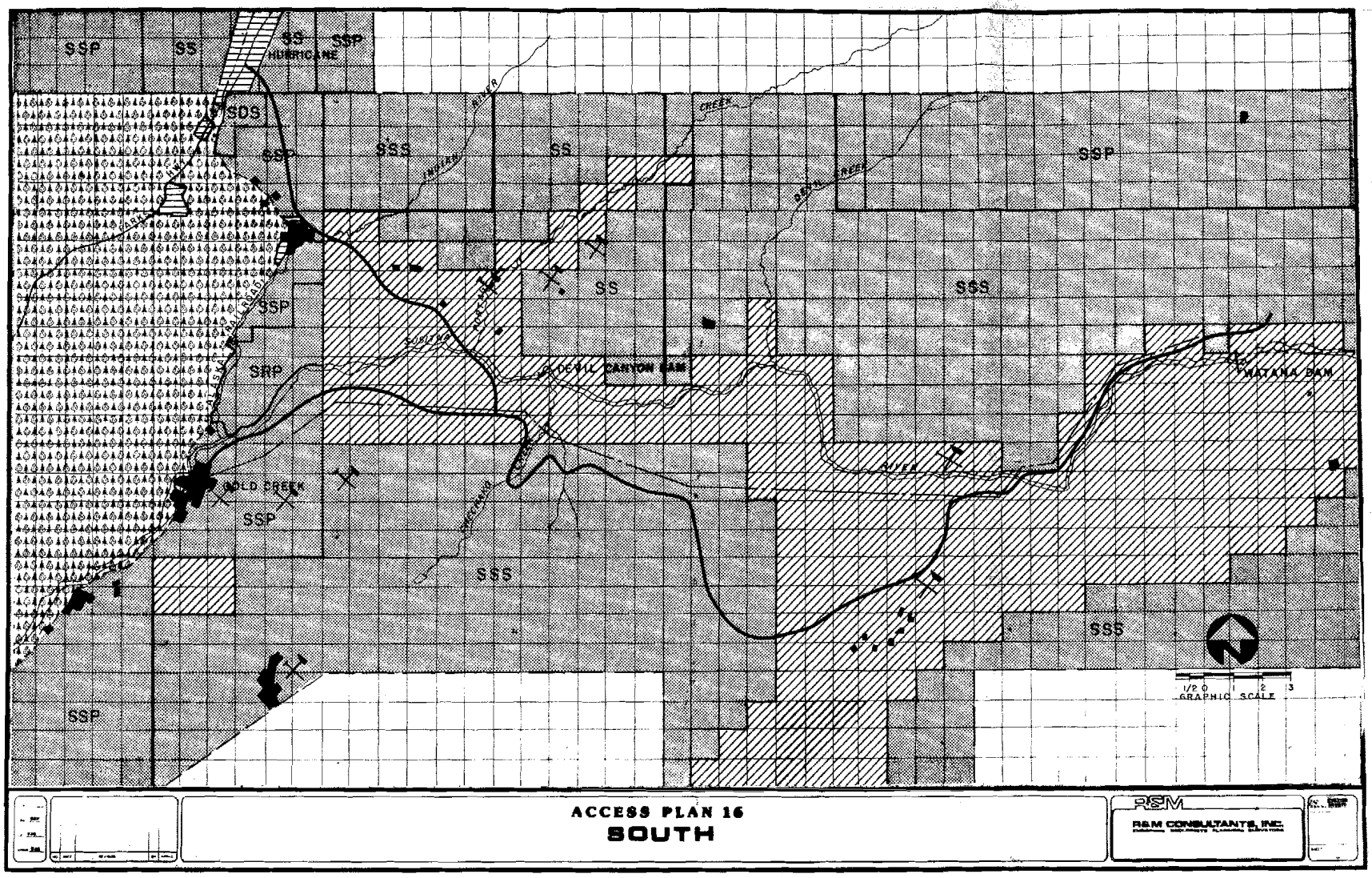
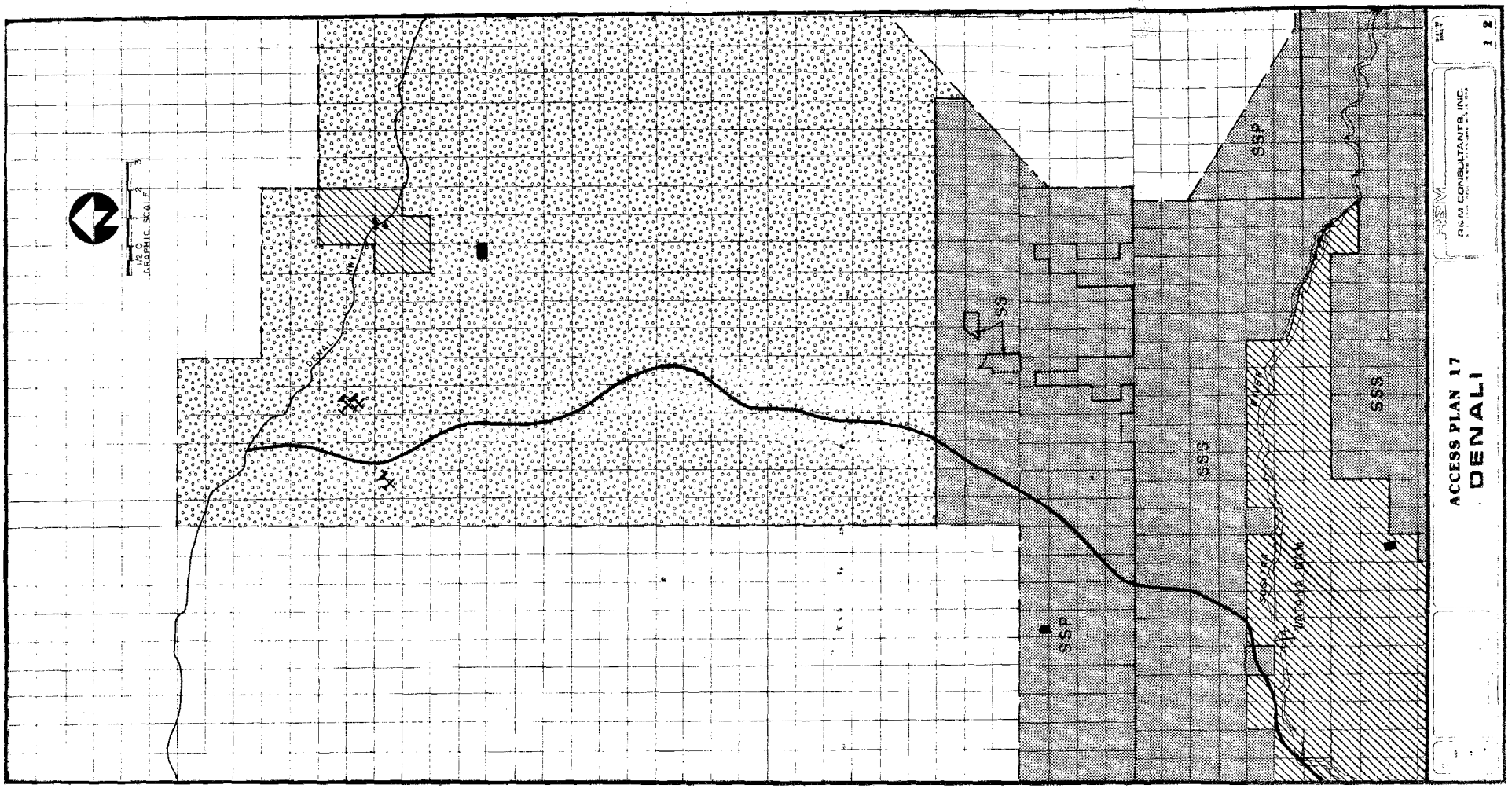


FIGURE 8.2
LAND OWNERSHIP



DENALI STATE PARK

PRIVATE PARCELS

VILLAGE OR NATIVE GROUP

STATE LANDS

SS - STATE SELECTION
SSS - STATE SELECTION SUSPENDED
SSP - STATE SELECTION PATENTED OR T.A.'D
SRP - STATE REMOTE PARCEL
SDS - STATE DISPOSAL SITE

FEDERAL SMALL PARCELS

FEDERAL D-1

MINING CLAIM

LIMITS OF LAND IDENTIFICATION

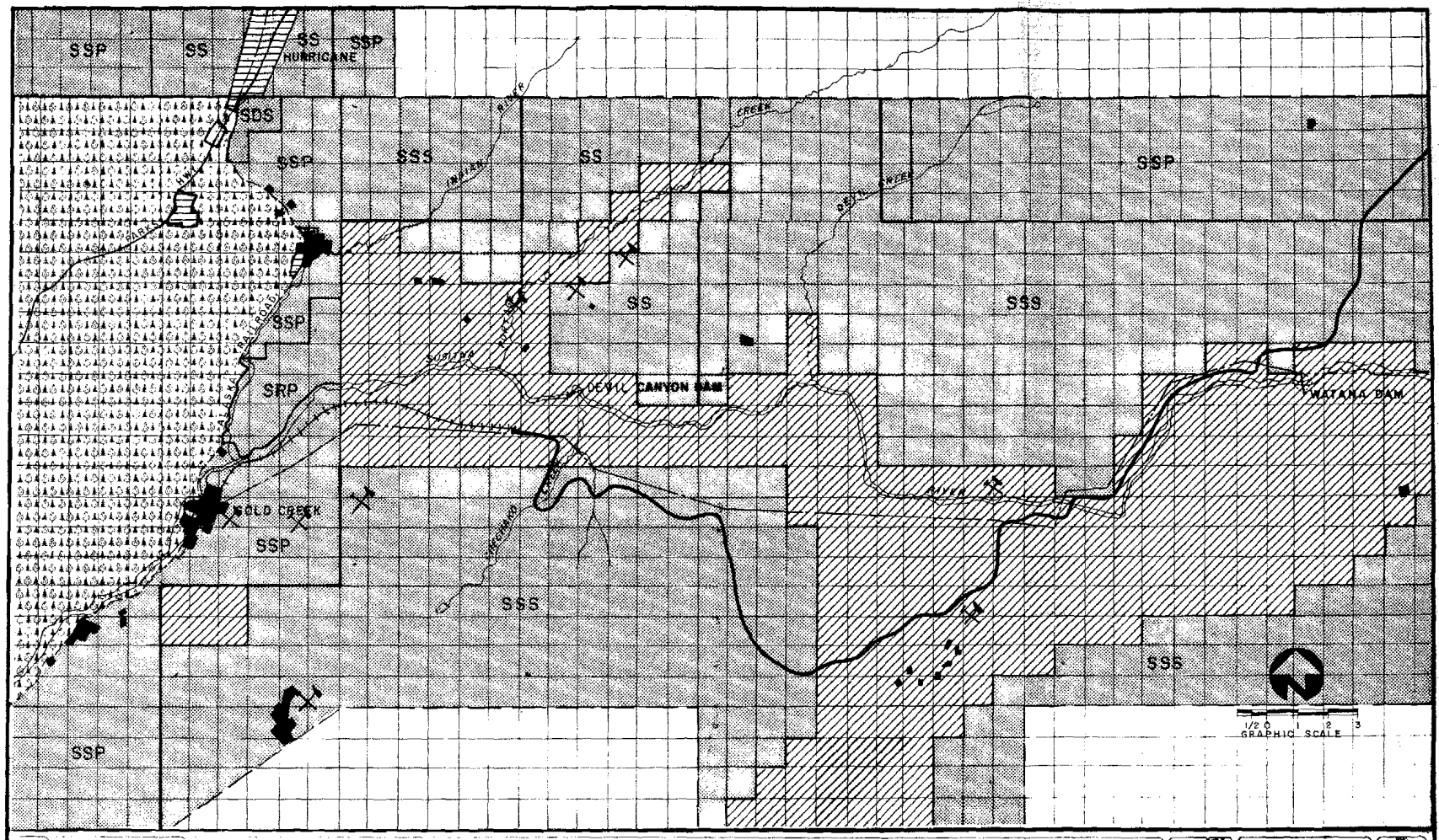
PROPOSED TRANSMISSION LINE CORRIDOR

PROPOSED RAILROAD

PROPOSED ROAD

FIGURE 8.3 SHEET 1 OF 2

LAND OWNERSHIP



- DENALI STATE PARK
- PRIVATE PARCELS
- VILLAGE OR NATIVE GROUP
- STATE LANDS
  - SS - STATE SELECTION
  - SSS - STATE SELECTION SUSPENDED
  - SSP - STATE SELECTION PATENTED OR T A'D
  - SRP - STATE REMOTE PARCEL
  - SDS - STATE DISPOSAL SITE
- FEDERAL SMALL PARCELS
- FEDERAL D-1
- MINING CLAIM
- LIMITS OF LAND IDENTIFICATION
- PROPOSED TRANSMISSION LINE CORRIDOR
- PROPOSED RAILROAD
- PROPOSED ROAD

FIGURE 8.3
SHEET 2 OF 2
LAND OWNERSHIP

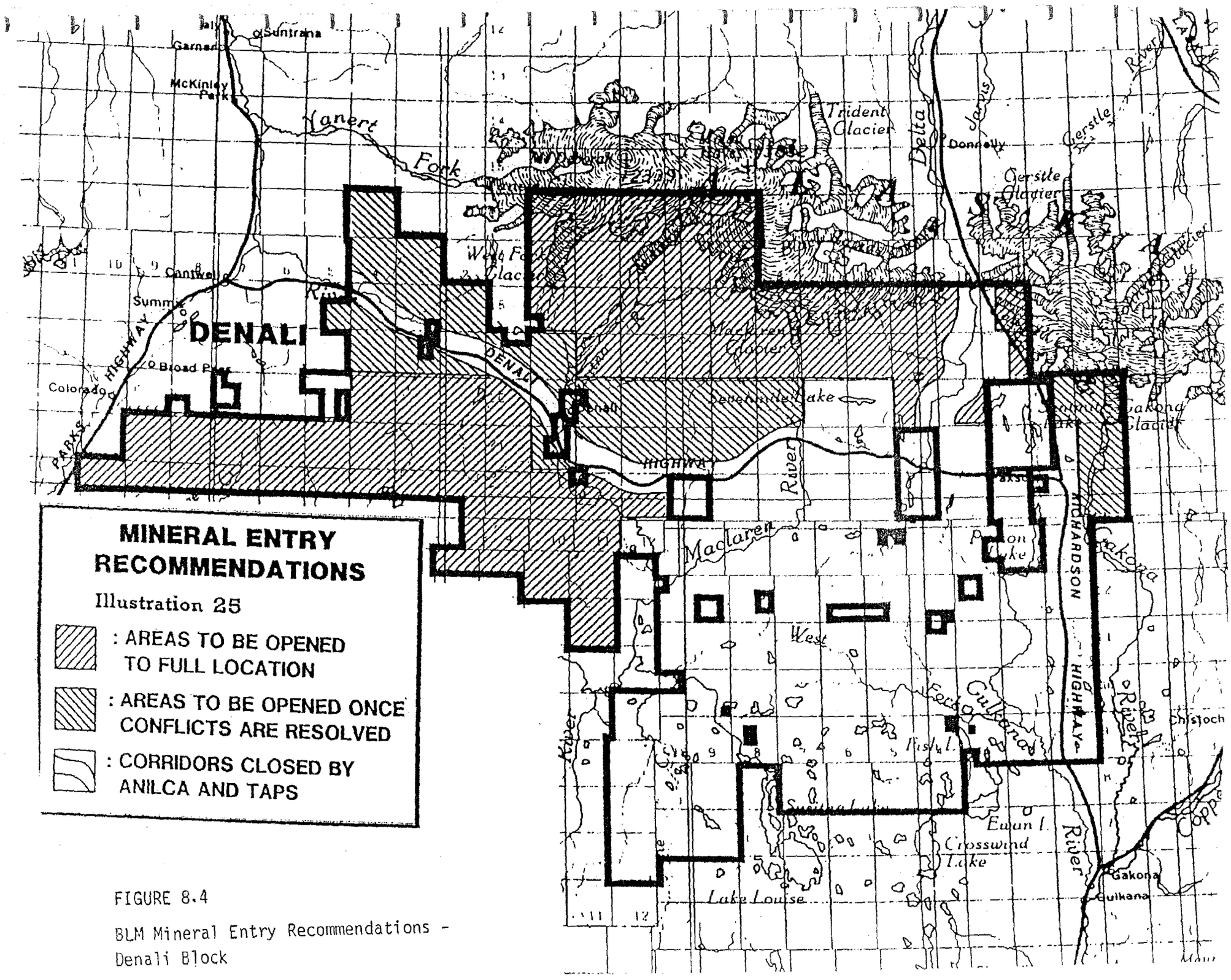


FIGURE 8.4

BLM Mineral Entry Recommendations - Denali Block

9 - PUBLIC PREFERENCES

This section summarizes what the various publics think and feel about the three access proposals, who will agree with them, who will disagree with them, and why.

9.1 Local Residents in the Immediate Project Area

The immediate project area includes about 14 residents in Gold Creek; people who obtained land in 1981 through the Indian River remote parcel land disposal; and people who obtained land in 1981 through the Indian River subdivision offering.

Divided Opinions in Gold Creek

Landholders in Gold Creek currently have differing opinions concerning the development of a railhead at Gold Creek. Under the South Plan, a railhead would be developed at Gold Creek at the outset of Watana construction. One family is strongly opposed to a railhead at Gold Creek; another family appears interested in having 160 acres of their land used as a marshalling yard.

Indian River Remote Parcel Owners Generally Desire No Roads in Their Area

With a few exceptions, most of the Indian River remote parcel owners expressed the desire to have no Susitna road access go near them because they wished the only access to their land to remain as it is now: railroad.

None of the three access plans has a road actually going directly to or through the Indian River remote area. The two western routes, however, come within several miles of the area.

Indian River Subdivision Owners

Significant changes are anticipated in the Hurricane area along the Parks Highway (primarily in and around the Indian River Subdivision) with the North Plan. Changes would also occur with the South Plan, and considerably less

changes with the Denali Plan. Landholders in the Hurricane area (Indian River Subdivision) have not expressed their attitudes towards change.

9.2 Surrounding Communities

The three communities discussed here are Trapper Creek, Talkeetna, and Cantwell.

Concern to Minimize Community Disruption in Talkeetna and Trapper Creek:

The main community concern on access plans is in regards to substantial changes that all three access plans could create in both communities. In terms of minimizing these changes, a commitment to control the transport of workers is more important than the route selected.

Economic Stimulus in Cantwell Generally Desirable:

Cantwell had mixed feelings about the Denali access route but generally desired economic stimulus in their area. The mixed feelings came from those who hunt along the Denali route now, and the realization that a road in that area would increase the hunting pressure.

Because of the current lack of land for housing in Cantwell, consultants to the Power Authority doubt that many people could relocate in Cantwell. This could change, depending in large part on the future land use policies of the AHTNA Corporation. Cantwell would, nonetheless, still receive some economic boost if the Denali route were selected and equipment and supplies were brought into Cantwell by rail and switched over to truck.

The selection of the Denali route is not expected to diminish any of the changes and growth that could happen in Trapper Creek and Talkeetna.

9.3 General Public

Two aspects of access planning are discussed here in regards to preferences of the general public: potential visual impacts and potential

recreation.

Concern for Visual Impact of Marshalling Yards

Marshalling yards are expected to be about 100 acres in size. This is a recently developed figure and one of which the public is not aware. Based on the large public concern that emerged during the intertie routing process, the Public Participation Office anticipates that the general public would find marshalling yards of this size quite objectionable if they were visible from the Parks Highway, obstructed views, or were located near where people lived.

The exact location of marshalling yards is not determined yet, nor has the visual impact been assessed; yards are being considered in Hurricane area along the parks Highway and also in Cantwell and Gold Creek.

All Three Access Plans Provide the Low to Moderate Level of Recreation Development Desired by the General Public

Early in the planning work, the Alaska Power Authority determined that the access plan would be selected first and that the recreation planning would follow.

Also early in the planning, the University of Alaska, Fairbanks conducted two mail surveys with randomly selected residents in the Railbelt area. The results of these surveys, coupled with comments at public meetings, suggests that a low to moderate level of recreational development was desired by the general public. The overall preference was to start small and build slowly. All three access plan could provide this.

In addition, the CIRI villages have indicated an interest in developing the recreation potential of the area, but as of yet, have not indicated any specifics about their thinking against which the current access plans could be evaluated.

9.4 Concern for Environmental Impacts

The conservation community and residents in Trapper Creek and Talkeetna expressed strong concerns for the environmental changes that the project could bring to the Susitna basin. Generally, those concerned would prefer limiting public access after construction, and were supportive of the "rail only" access.

The conservation community is generally against the Denali access route because work done to date has identified it as having the most potential environmental impacts, especially on the Nelchina caribou herd.

9.5 Current Users of the Susitna Basin

In an attempt to assess preferences of current users of the Susitna Basin, questionnaires were sent in 1981 to registered game guides within the Susitna Basin and miners who use the basin. Both these groups are organized such that it was possible to send materials to them through existing mailing lists and to solicit a response. The results are summarized here. There is no intention to represent these two groups as the only users of the basin, for in fact this is not so. Private hunters use the area, as well as trappers, recreationists, private lodge owners, and others. In order to reach these latter groups, we relied upon general public meetings and notices that were held in Railbelt communities in 1981.

The miner's questionnaires were given to members of the Miners Association in Fairbanks and to the Board of Directors in Anchorage. It is not known how many were distributed. Eighteen were returned. Almost every respondent identified a different area of the basin of interest to them. The use ranged from mineral development to hunting/trapping/fishing to general rest and recreation. Most use was in summer, and most wanted to see public access via privately-owned vehicles after construction.

The game guide questionnaire was mailed to 200 guides and 29 responses were received, a return of 15 percent. Of the responses 56 percent were in

favor of public access after construction while 31 percent were opposed. Responses on what game habitats should not be disturbed were varied, but tended to indicate several areas of concern. One was the Deadman's Creek drainage and the area south of the Denali Highway that is utilized by the Nelchina caribou herd. Other areas mentioned were the Susitna River proper and several of its major tributary routes. Over 40 percent of the guides favored rail only access and this was often mentioned as first choice with others listed second or third.

9.6 Other Interest Groups

In a November 5, 1981 letter to the Alaska Power Authority, the Alaska Sportfishing Association Board of Directors endorsed access plans that allowed the maximum access to their members. They specifically mentioned the Denali Plan as best responding to their desire to develop the area into a new recreation area. The Associated noted their membership at 1300 members.

SUSITNA HYDROELECTRIC PROJECT

ACCESS PLAN RECOMMENDATION REPORT

APPENDIX A-D

LIST OF APPENDICES

APPENDIX A

IDENTIFICATION OF ACCESS ALTERNATIVES

APPENDIX A.1

July 29, 1982

Gentlemen:

The Power Authority is currently engaged in final deliberations leading to a selection of a preferred access route. This is the route that will be reflected in the FERC license application. We have provided three (3) options to our Board of Directors, and some information concerning those options. We will supplement that information in mid August, and hopefully the Board will make a selection at their meeting later that month.

Basically, the three options presented involve access from the West on the South side of the Susitna River; access from the West on the North side of the Susitna River; and access from the Denali Highway directly to the Watana Dam site.

In recognition of the fact that the preferred access decision will not be made until after the deadline for proposal submittals, do not try to adjust your proposal to react to these three options. Instead, continue to use the guidance of our RFP Amendment No. 3.

There are numerous issues associated with this decision. For the most part, we feel we have adequate data in hand. However, we would like to invite all proposers to comment on one particular aspect; the question of limited versus open access to the construction sites.

A number of voices are concerned with maintaining to the maximum degree possible the pristine wilderness character of the Susitna Basin. They are apprehensive that free access to the project site will have primary and secondary impacts that would be detrimental to a preservation objective. On the other side of the issue, there is a sentiment that maximum transportation flexibility is necessary if the project is to successfully avoid undue logistics problems. As a result of prolonged evaluations and debate, the issue is now summarized as a choice between having project access from the existing road network or only via railroad. The limited access voices view access via railroad as facilitating access control, particularly if the objective is to have highly restricted access. Again, the opposing view is, the railroad is subject to too many uncertainties to be a reliable supply gateway.

We would welcome your comments on the issue of a railroad gateway only versus a connection to the road network. If you choose to comment, we would appreciate it if you would back up your position with examples and other tangible information as might be suitable. We will provide your input to our Board of Directors for their consideration. We would like to include these inputs in the briefing package mentioned above; in order to do that, we need to hear from you prior to August 9, 1982.

Let me emphasize that you are under no obligation to respond to this invitation. Further, this invitation is a matter totally unrelated to the Request for Proposals activities, and will not have any influence on those proceedings.

Sincerely,

FOR THE EXECUTIVE DIRECTOR

David D. Wozniak
Project Engineer

DDW:sf

Bechtel Civil & Minerals, Inc.
Engineers—Constructors
Fifty Beale Street
San Francisco, California
Mail Address: P.O. Box 3965, San Francisco, CA 94119

August 4, 1982

Mr. David N. Wozniak
Project Engineer
Alaska Power Authority
334 West 5th Avenue
Anchorage, Alaska 99501

Dear Mr. Wozniak:

With reference to your July 29, 1982 letter regarding a "railroad gateway" to the Susitna Project, we can offer the following comments:

- Construction of a railroad would probably cost in the order of twice as much as a road ($120 million vs $60 million, approximately).
- More significantly, a railroad would take at least one year longer to build which would, of course, impact costs for all of the rest of the project.
- Once the railroad is in place, we would not anticipate significant negative impacts on project construction. The Churchill Falls Project in Labrador was built essentially "at the end of a railroad", although that railroad was in place prior to project construction and all that was needed was a relatively short connecting access road.

We can think of no reason why effective access limitations could not be imposed during construction on a road built into Watana, restricting usage to authorized personnel. Such limitations are in place on the James Bay Project in Quebec, utilizing gates, guard posts, etc., and are working effectively. This should minimize impacts on the wilderness character of the area during the construction period. These limitations could, of course, be continued during the period following construction completion.

For the period following construction, as a related matter, APA might wish to consider the possibility of using single-status accommodations as an alternative to the family village concept now planned for housing the permanent operations staff. Under such an alternative, operators could be flown in and out on a scheduled basis such as "10 days on, 6 days off". This would place their families in existing metropolitan areas, would eliminate the need for a family-status operators' village with full support infrastructure, and would therefore eliminate the need to maintain open on a full-time basis an access road (or railroad) to the site from Gold Creek.

There is a family-status operations village, which was originally used for construction, in place on the Churchill Falls Project. At James Bay, the original intent was also to use a family-status village for operations, and some permanent village-type facilities were therefore constructed early so that they could be used by contractors and the owner's supervisory staff. Subsequently, after analysis, Hydro Quebec decided that it would be preferable both from the cost and employee morale standpoints to operate this remote project with single-status personnel only. It is now anticipated that permanent apartment-type units will eventually be constructed. At present, operators are flown in and out, and are housed single-status in the family village. This experience emphasizes the importance of considering these alternatives early in the final developmental phase of the Susitna Project.

I hope our comments are helpful to you. We look forward to submitting our definitive proposal for the Susitna Project Phase II engineering services on Monday, August 16th.

Sincerely yours,

John A. Peterson
Business Development Manager
Hydro Projects

JAP:yt

R. W. BECK AND ASSOCIATES, INC

ENGINEERS AND CONSULTANTS

P.O. BOX 2400
SITKA, ALASKA
99835

TOWER BUILDING
7TH AVENUE AT OLIVE WAY
SEATTLE, WASHINGTON 98101
206-622-5000

P.O. BOX 6818
KETCHIKAN, ALASKA
99901

FILE NO. HH-0000-BD-SW
A4-2

August 6, 1982

Mr. David D. Wozniak
Project Engineer
Alaska Power Authority
334 West 5th Avenue
Anchorage, Alaska 99501

Gentlemen:

Subject: Limited Versus Unlimited Access to Susitna Project Site

We are pleased to comment on what we agree is a most important decision that needs to be made by the Power Authority. There is no question that the Susitna Project could be built with only the railroad to handle all materials, equipment and supplies but the logistics of using only the railroad would add to scheduling problems, require load size limitations, do away with competitive haul rates, and result in cost increases.

Several of our people have long experience records in the construction field especially in work outside the lower forty-eight states. None of them can recall a project close to the size of Susitna that did not utilize every form of transportation available and in addition none recall a site that did not have some available truck haul. If the highway did not exist we doubt that it would be built just for this project. With only the short access and the fact that the highway leads to both Anchorage and Fairbanks, however, it is logical and prudent to make the connection. While access from the Denali Highway may be less expensive to construct, the all weather access from Parks Highway is measurably shorter from the Anchorage supply base.

Limiting the access to the project would in fact be putting a restraint on all operations of the prime contractors, supply contractors, project managers, camp operations and especially on the local contractors who are accustomed to using their own hauling equipment. This restraint would add millions of dollars to the cost, and could possibly delay the on-line dates of the units. Recent construction and operation of the Trans-Alaska Pipeline project demonstrates the desirability of road access for logistical and other supplies.

With a population at the site between 2,000 and 4,500 workers for several years the turnover coupled with the "R and R" traffic into the cities of Anchorage and Fairbanks will be enough to make a road mandatory. Getting people to work and live in the camp will be more difficult if they know their only access to the outside is by rail.

While air service by fixed wing aircraft will be supplied, there will be a continuous need for parts and supplies on a day by day basis that can be handled most efficiently by truck. Also air service to the site would be limited because of inclement weather.

Even though the area is closed off after completion of the project there is no reason that access from the highway should not be available during the construction period. Once the project is complete the access could be closed.

We believe that our wilderness should be preserved but we are also of the opinion that a project such as Susitna should be made available for every visitor and taxpayer to see. Projects such as these are monuments to man's ingenuity and to hide them from all but a few does not seem to fit our democratic system.

Very truly yours,

R. W. BECK AND ASSOCIATES, INC.

James V. Williamson
Vice President

JVW/vla

Gibbs & Hill, Inc.
ENGINEERS, DESIGNERS, CONSTRUCTORS

August 8, 1982

Mr. Eric Yould
Executive Director
Alaska Power Authority
334 West 5th Ave.
Anchorage, Alaska 99501

Dear Mr. Yould:

Reference is made to your letter of July 29, 1982, regarding project access and more specifically to the question of "open" versus "limited" access.

Open access per the Denali Highway Option -
It is certainly desirable from a contractor standpoint to have good highway access from the construction sites all the way to the Parks Highway or the Denali Highway. Several reasons may be sited:

a) Road access will allow the contractors and the owner to transport goods independent of the railroad. The railroad has not been particularly reliable in the past. Road access will allow the contractors and owner maximum flexibility to schedule shipments when and as required, and not when they must be shipped to fit the railroad schedule. Road access will allow shipment by LTL (less than truckload) lots of day-to-day requirements. For example, a town truck or trucks would daily shuttel parts, minor equipment, small tools and expendables from Anchorage to the site. The greatest need for this service would be earlier in the job before a good inventory is warehoused at the site, but normally such a service continues throughout the work.

b) If "limited access" wins out, APA should build a rail/truck depot a few miles towards the site from the mainline. This will entail clearing and grading of a substantial area for siding and warehouses which will have some effect on the "pristine wilderness".

c) Both items a) and b) above would result in higher costs if the limited access option wins out.

d) In case of emergency, when it may be necessary to evacuate injured or sick persons from the site and weather will not permit flying, it would be mandatory to have road access by ambulance to the main roads.

e) Transportation in and out of families and single men living at the site would be much facilitated by connections to roads. How do you handle this otherwise? Fly everyone in and out? Transport them by bus to the rail depot and then by train? This would be very awkward and not make for a happy living situation for either families or single persons.

228 W. Brokaw, Suite 200, San Jose, California 95110 (408) 280-7091 - Telex: 171612

Conclusion:

It is more desirable to have a connection to the road network from the standpoints of flexibility, economy, emergency and ease of living. It would appear that the APA could achieve this and still limit access to the site. This could easily be handled by establishing manned checkpoint just off the main highway and allow only authorized vehicle access to the site. This was done on the Alyeska Project and on numerous other projects with good results.

Very truly yours,

GIBBS & HILL, INC.

J. H. Johnston
Manager - Business Development
Electric Utilities

JHJ/djc

8/9/82
Sheeley
10.35 J

Gibbs & Hill, Inc.

ENGINEERS, DESIGNERS, CONSTRUCTORS

August 9, 1982

Mr. Eric Yould
Executive Director
Alaska Power Authority
334 West 5th Avenue
Anchorage, Alaska 99501

Dear Mr. Yould:

Reference is made to your letter of July 29, 1982, and our reply of August 8, 1982. Please add the following as a recommendation on Page 2 after "Conclusion":

1. Initially construct at the Watana site 6,000 ft. of road such that this portion of the road will be used as a landing strip for DC-3/DC-4 planes.

2. Equipment to construct the aforementioned road/runway can be mobilized during the winter months (either overland or by helicopter), disassembled, then reassembled.

3. Equipment and materials depots for the remaining road construction should be established at strategic points along the future road alignment, likewise during the winter months.

4. The remaining road itself can then be readily constructed during the summer months.

Very truly yours,

GIBBS & HILL, INC.

John Silveira
Project Manager

JS/dc
bcc: S.Koretsky
S.Shevekov
J.Silveira
P.Gafner
J.Johnston

HARZA-EBASCO

Harza-Ebasco
400 - 112th Avenue NE
Bellevue, WA 98004
(206/451-4500)

August 6, 1982

Alaska Power Authority
334 West Fifth Avenue
Anchorage, Alaska 99501

Attention: Mr. David D. Wozniak, Executive Secretary
Selection Committee

Subject: Susitna Hydroelectric Project - Access Road

Gentlemen:

The Alaska Power Authority invited comments on the issue of a railroad gateway only (limited access) versus an access connection to a public highway by letter dated July 29, 1982. These comments are intended to aid the Alaska Power Authority Board of Directors in their evaluation of a preferred access route for construction and operation of the Watana Project.

The key points which will be given consideration in selection of the route include:

- reliability -- freedom from interruptions which may have an impact on the construction schedule;
- logistics -- method and comparative cost of transport of materials and personnel; and
- multiple project savings -- can a savings on the combined projects, Watana and Devil Canyon, be realized?

Limited Access

Although the limited access approach, railhead in the vicinity of Gold Creek with a restricted roadway from the railhead to the site, with no road construction to the Parks Highway may be environmentally more attractive, it is undersirable from a construction standpoint wherein

schedules and logistics are vulnerable to interrpution of traffic flow on the railroad.

Advantages

- Precludes public access.
- No major bridge over Susitna River at Gold Creek.
- Connects Watana and Devil Canyon Project.
- Most economical construction if both Watana and Devil Canyon are considered.

Disadvantages

- Dependency on a single mode of transportation for mobilization and support of contracts can seriously impact schedules, which in the case of river diversion or closure may result in the loss of a full construction season.
- Lack of the flexibility of alternate access routes will result in higher bid prices for construction.
- The logistics of supply become more complicated due to:
  - Longer lead time requirements.
  - Supply line availability is beyond contractor's control and dependent on the railroad.
  - Special railroad equipment is not readily available at all times.
  - Possibility of railroad worker's strikes with resultant interruption of supply line for extended periods.
  - Dependency on train schedules.
- Emergency situations are more difficult to handle when direct access to major highways is not possible.

A recent example is provided of the effect of disruption of traffic on a single access corridor, although not as serious in nature:

> Early access for delivery of materials to the site of the Satsop Nuclear Power Plant in Washington was by way of a single one-way road, wherein the breakdown of a truck (there were as many as 40 in line) halted all travel until it could be towed off the road. In the case of Watana, in addition to delay in delivery of materials, a camp full of 3,000 workers would depend upon an air shuttle for support.

The unsettled future ownership of the Alaska Railroad may also affect the reliability of this mode of transport. The railroad (limited access) scheme is also subject to the same restraint that affects any access from the west -- possible schedule impact because of lack of a pioneer road.

Access from Parks Highway

Whether the route from Devil Canyon to Watana is located on the north side or the south side of the Susitna River, the problems with this access are similar. The north side may be preferable environmentally, but because of the high level bridge at Devil Canyon required for that route, the route on the south side of the river appears less likely to have schedule impact on Watana construction. Lacking a pioneer road, the massive rock excavation and high level bridge across Cheechako Creek are the major deterrents to early access on this route.

Advantages

- Full access including railhead at Gold Creek for construction supplies and personnel.
- Connects Watana and Devil Canyon Projects.
- Least restrictive - less costly for logistics.
- Greater flexibility and reliability in case of transportation interruption with one mode of transport.
- Lower construction and service contract bids with contractors' choice of transportation.
- Transmission line location can partially follow same corridor.

Disadvantages

- Without early entry, project schedule impacted by construction of major bridges.
- Potential detrimental effect to preservation objective because public access.

Alaska Power Authority
Mr. David D. Wozniak, Executive Secretary

Access from Denali Highway

Access road construction to serve the Watana site is simplified if this approach is adopted, since the length of new road construction is reduced, the terrain is such that cost per mile will be less, and no major bridges will be required. However, this route does not provide access to the Devil Canyon site.

Advantages

- Can meet Project Schedule since access construction can be completed in one construction season.
- No major bridges.
- Full access for construction contractors.
- Greater flexibility and reliability in case of transportation interruption with one mode of transport.
- Lower construction and service contract bids with contractors' choice of transportation.
- Access construction costs for Watana is least expensive. However if access to both projects is provided, the total access cost will be comparable to the Parks Highway-Watana access.

Disadvantages

- Estimated 50-mile longer road haul.
- No connection to Devil Canyon.
- Potential impact from public access.
- Impact on caribou calving area and summer range.

Cost Impacts

The limited access logistics expense will not be materially different from that which will be incurred if access is provided from the Parks Highway, since a combined through rate (lower 48 point of shipment to delivery at site), including rehandling costs at the railhead, can be negotiated. There will be some added expense of transporting more personnel by air. Large pieces of equipment, which cannot pass through the 10' x 12' tunnel between Whittier and Anchorage, will need to be rerouted through the port of Seward, with a much longer rail connection to Gold Creek.

With the added 52 miles (approximate--depending on final route selection within the corridor) in road length from Anchorage to the Watana site, the cost of road transport will increase if the Denali Highway access is adopted.

However, this increase will not be proportional to length since less mileage will be at the off-highway rate. The added cost for all-truck transport will have minimal effect on total logistics expense for Watana since the majority of material will move by rail to the railhead and be transferred to trucks at that point for the shorter road transport to the site.

We suggest that a marshalling yard be constructed at Broad Pass rather than Cantwell, in the event that access from the north is adopted. Gravel is readily available at Broad Pass, thereby minimizing the cost of construction. Operation of the yard at this location should overcome any objections by the residents to operation of a yard at Cantwell.

The added cost of rail transport to Broad Pass rather than Gold Creek will be a definite increase in the logistics expense; however, it will be partially offset by the lesser distance from railhead to damsite. Using quantities of materials previously estimated by the Power Authority, and today's railroad tariffs, we estimate that the added logistics expense for Watana will be in the neighborhood of $8,000,000 in 1982 dollars. This increase is far below the offsetting cost savings to be realized in access road construction.

Potential Schedule Impact

As can be seen from the discussion above, the limited access approach has a potential for major schedule impacts. Because of the time span required for construction of an access road between Gold Creek and Watana, the Parks Highway access route has much greater potential, with upwards of one year delay, for schedule impact than the Denali Highway access route.

The Denali Highway access route has very little potential for schedule impact. In addition, there is less roadway to be traversed beyond the limits of state highway maintenance.

The Harza-Ebasco Joint Venture appreciates the opportunity to provide these observations regarding access to the Susitna Hydroelectric Project. Should you have further questions or comments, please call.

Very truly yours

Harza-Ebasco

Stephen O. Simmons

cc: Richard L. Meagher

ALASCOM

Telegram

IPMAFUA AHG
1-025804C221 08/09/82
TLX KAISENGS OAK B
011 NL OAKLAND CALIF 8-9-82
PMS ALASKA POWER AUTHORITY
ATTN MR DAVID D WOZNIAK
334 WEST 5TH AVE
ANCHORAGE, ALASKA.

REFERENCE YOUR LETTER OF JULY 28, 1982, WE STRONGLY RECOMMEND THAT THE RAILROAD ONLY ALTERNATIVE NOT BE ADOPTED FOR ACCESS TO THE WATANA SITE. WE BELIEVE A RAILROAD ONLY SOLUTION WOULD BE IMPRACTICAL, BECAUSE IT WOULD NOT CONSTITUTE A SUFFICIENTLY EFFICIENT AND FLEXIBLE MEANS OF ACCESS FOR TRANSPORTING AN IRREGULAR FLOW OF LARGE QUANTITIES OF PEOPLE, HEAVY EQUIPMENT AND SUPPLIES TO THE JOBSITE. THE LACK OF A ACCESS ROAD UNDOUBTEDLY WOULD RESULT IN SUBSTANTIALLY HIGHER CONTRACTOR BID PRICES.

G R KOCH
MANAGER O HYDROELECTRIC PROJECTS
RAYMOND KAISER ENGINEERS

1727 EST

IPMAFUA AHG

STONE & WEBSTER - TAMS

ANCHORAGE, ALASKA

ADDRESS ALL CORRESPONDENCE TO: SUITE 1-BLDG. H
4791 BUSINESS PARK BLVD. ANCHORAGE, ALASKA 99503

RECEIVED

AUG 9 1982

ALASKA POWER AUTHORITY

August 6, 1982

Mr. David D. Wozniak
Project Engineer
Alaska Power Authority
334 West 5th Avenue
Anchorage, Alaska 99501

ACCESS ROUTES
SUSITNA HYDROELECTRIC PROJECT

Dear Mr. Wozniak:

We welcome the opportunity to reply to your July 29, 1982 letter in order to provide you with our comments on the question of limited versus open access to the Susitna Project construction sites. From our experiences on construction of major power projects, we believe that a total highway access route is the most reliable and least costly means of access during construction of the Susitna Project. Also, the highway access can be provided with effective access control to include eliminating the access after construction is complete. On the other hand, the limited access of a railroad gateway, as shown in Amendment No. 3, has a number of major disadvantages which will result in severe additional construction costs, possible schedule delays and possible adverse environmental impacts. Some of the most serious disadvantages of the railroad-highway access, compared to the all-highway access, are as follows:

1. The majority of material shipped to the site would have to be handled at least one additional time. Shipments of goods originating in Alaska would have to be handled twice except for those generated at shipping points on the railroad.

2. Shipments would be "locked" into the schedule established by the railroad. Emergency and rush shipments would have to be made by air, if possible.

3. Special handling equipment, ie. carriers, trucks, tractors, and trailers, to be used between the rail end and construction site would be captive to the project and not readily usable elsewhere. The materials and equipment entering the site will be designated for a number of different contractors, and it would be impractical and excessively costly to have each do his own hauling. Therefore, APA would need to award a contract that would have to provide and service this equipment. Attachment No. 1 is our first cut estimate of the captive equipment needed for hauling from the rail end to the site.

4. We estimate that total shipping time for materials leaving the Anchorage area to the site will be 2 to 4 times longer over the railroad-highway access route.

5. Equipment for offloading rail cars and loading trucks, as shown on Attachment No. 1 would have to be permanently located at the rail end. Also, provisions for storage of bulk materials, such as cement and fuel, would probably be required, and would partially duplicate those required at the site. Facilities for maintaining this equipment would be required at the rail terminals.

6. The activities and manpower required at the rail gateway will probably result in the development of a small community or camp with all the facilities needed for human habitation. This would be another center of human activity, with potential negative impacts on the surrounding area.

7. Work stoppage or interruption of the railroad would curtail and possibly stop construction activities. While this is also true for the all-highway access, our experience indicates such delays are of much greater duration with rail services.

Although it was not possible to quantify all of the above disadvantages, we did look at shipment of two key construction materials, cement and structural steel, as a measure of the impact of the railroad-highway access route.

Based on the present construction plans for Watana, we estimate that it will require 200,000 tons of cement to be used in the four-year period from 1989 through 1992. This will require receipt of about ten railroad cars of cement per week during the four years. One could anticipate that during peak usage, cement deliveries could be two to three times that average. We estimate that the additional costs associated with a railroad-highway mode for transportation of cement only is in the order of a million dollars, not including the capital investment in trucks, storage and transfer facilities. For the Devil's Canyon Project, which has the concrete arch dam, the cement tonnage may be doubled, with another 2 million dollars impact. We estimate that extra handling of structural steel, such as tunnel supports and reinforcing steel, will cost a half million dollars for each of the two projects; or an added million dollars just for handling the steel items. These are only two of the many materials that will need extra handling. If we include the special handling and off-loading for major equipment i.e. turbines, generators, transformers, breakers, etc., we are probably talking about a total added cost of 5 to 8 million dollars.

We understand that much of the opposition to overall highway access to the site is based on the concern that the highway will provide ready access to the general public to a large area which has not been subjected to the pressures usually associated with heavy human intrusion. We believe that during construction, use of the access road can be controlled with only those with legitimate purposes at the site permitted on the road. The same kinds of controls would be required on a railroad-highway access.

Upon completion of construction, there are several techniques available which can deny use of the highway and severely limit the access of the motoring public to the area. These are as follows:

1. Use of barriers and/or moveable spans on bridges across major river crossings. Bridge locations should be selected to ensure that motor vehicles cannot by-pass them.

2. Removal of the highway and return to natural contours and conditions of those sections which can not readily be by-passed.

Given the limited time we have had to look at this matter, we hope this information is of assistance in providing input to your Board of Directors regarding the access issue. We believe the project can be constructed using either access mode but that the all-highway access is the less costly and offers many advantages during construction. In our opinion, the highway option can be constructed and operated during and after construction to limit access of the general public to the area to the same degree as the railroad-highway access.

Very truly yours,

Bernard J. Roth
Project Manager

ATTACHMENT NO. 1

ESTIMATE OF MAJOR CAPTIVE EQUIPMENT FOR HAULING FROM TERMINUS OF RAIL SPUR TO WATANA

8	Bulk cement trailers (25 ton capacity) with 8 tractors
6	25 ton capacity flatbed trailers with 3 tractors
2	Heavy duty Gooseneck trailers for hauling equipment
1	Tractor for above
5	4 wheel drive snow plows
2	Rotary snow blowers
2	Road graders
2	Dozers
12	Enclosed trailers
2	Frozen food trailers
8	Gasoline tank trailers
8	Tractors for above

ESTIMATE OF MAJOR CAPTIVE EQUIPMENT REQUIRED AT RAILHEAD FOR OFFLOADING AND MAINTENANCE

1	Crane, approximately 90 ton
1	Large fork truck
1	Large cherry picker 30-40 ton
1	15 ton cherry picker
1	Road grader
1	Dozer

Pumping facility for transferring fuel
Facility for transferring cement
Maintenance facility including electric power

APPENDIX A.2

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF RESEARCH & DEVELOPMENT

JAY S. HAMMOND, GOVERNOR

323 E. 4TH AVENUE
ANCHORAGE, ALASKA 99501
276-2653

November 5, 1981

Mr. Eric Yould, Executive Director
Alaska Power Authority
333 West Fourth Avenue
Anchorage, Alaska 99501

Dear Mr. Yould:

The purpose of this letter is to transmit to the Alaska Power Authority (APA) comments from the Susitna Hydroelectric Steering Committee (SHSC) concerning APA's proposals for access to the proposed Susitna River dam sites. These comments are in response to information provided the SHSC from two access route meetings with APA and their contractors and the documents prepared by APA contractors and distributed during these meetings. At the October 20, 1981 meeting APA requested SHSC comments by November 6, 1981. The SHSC appreciates the fact that APA continued detailed consideration and studies of several access route options this year rather than focusing on a single route.

The SHSC review identified four areas of concern that merited comment. Those four are:

1. A critique of the studies of access routes which provide for construction of the dams.

2. The relationship between timing of access route construction and Federal Energy Regulatory Commission (FERC) approval for dams.

3. The relationship of access route decision and modes of access to regional land use management policies.

4. The issues resultant from land status and land ownership affected by the proposed project.

The assessment of corridor route alternatives should more adequately weigh the potential impacts of borrow sites and access to these sites, and transmission line(s) routing. Access corridors which serve a dual, or triple, purpose in regard to these other project access needs would be highly desirable from all decision-making criteria.

The access preferences expressed below pertain to the general locations cited for the corridors and are based upon the environmental data and conclusions contained within the environmental documents prepared for Subtask 2.10. Access Road Assessment. It does not represent our endorsement of a particular 1-mile-wide corridor, as presented.

The SHSC agrees with the Terrestrial Environmental Specialists, Inc. position that access via the Alaska Railroad to Gold Creek is environmentally preferable. Railroad access to at least Devil Canyon would alleviate the need for a staging area at Gold Creek and the consequent human activity, land use, fuel spills, and other impacts on the Gold Creek area. We recognized that a staging area at Devil Canyon would be required in any case. The use of this area as the terminus of a railroad appears to make a great deal of sense. Additionally, we feel that the south side route from Gold Creek to Devil Canyon is preferable since a trail already exists there. From Devil Canyon to Watana, we prefer a route on the north side of the Susitna River. At the October 20, 1981 meeting the SHSC was informed by Mr. David Wozniak of APA that there were two (2) additional railroad route/mode options (a total of 10) . If feasible we generally prefer a rail mode of access to and within the project site.

The SHSC identified three (3) environmentally sensitive areas that should be avoided. Those are:

1. The routes from the Denali Highway.

2. The route crossing the Indian River and through wetlands to the Parks Highway.

3. The route on the south side of the Susitna River from Devils Canyon to the proposed Watana dam site.

In evaluating the access route selection process undertaken by the APA and its contractors, the Steering Committee questions the validity of the power-on-line in 1993 assumption/mandate. The "We've got to hurry up and put in a road to meet the 1993 deadline" approach appears, from currently available reports and the briefings received by the Susitna Hydroelectric Steering Committee on October 20, 1981, to point toward the necessity of a pioneer road constructed before a FERC license is granted, or selection of an apparently environmentally unacceptable Denali Highway access route.

Local utilities are not approaching construction of a project the magnitude of Susitna in 1993 as a foregone conclusion and are making contingency plans to meet projected power needs. Gas and coal generated power options are being examined. In addition, feasibility studies are currently being undertaken by the U.S. Army Corps of Engineers and the APA at numerous potential hydroelectric generating sites. The Battelle Railbelt Electric Power Alternative Study should provide insight into additional power generation options. As such, we believe that the 1993 "deadline" for power-on-line from Susitna may not be that firm and imperative. Thus the SHSC does not believe the 1993 deadline should constrain the overall decision-making process and the orderly progress of various studies on project feasibility and environmental impacts. Permitting and resource agencies, including FERC, should be expected to link a pioneer road to the overall project.

Public access to the dam sites and through the Upper Susitna Valley is complex and a controversial subject and we believe this issue should be given thorough evaluation in the route selection process. How construction-related access is obtained to a great extent determines the project-related wildlife and socioeconomic impacts. The APA has been soliciting the views of local residents (Talkeetna, Trapper Creek, etc.) in regard to the access question. The majority of residents want to minimize impacts to both their community and the Upper Susitna Valley. The APA has solicited the views of the state and federal resource agencies. It has been the predominant view of these agencies, which represent public interests on a state or national level, that project-related wildlife impacts should be limited to the maximum extent practicable. In addition, the APA has expressed the desire to maximize the options for future public access. We believe that these views mesh. Minimizing impacts and maximizing options for future public access can be achieved by mimicking, to the extent possible, the status quo. For example, to provide full public access through a road system, forecloses the future option of maintaining the existing character of the Upper Susitna Valley.

Use of rail as the access mode increases the potential for management and control of socioeconomic and environmental impacts. Maximized rail use provides for the following advantages over road access:

1. Maintains a maximum range of future decision options.

2. Provides for control of worker impacts on local communities and wildlife.

3. Decreases the potential of hazardous material spills due to adverse weather conditions and multiple handling.

4. Disturbance to wildlife adjacent to the route can be more easily controlled.

5. Direct access right-of-way related habitat losses can be significantly limited.

Briefly the land status of the project area has not changed significantly within the last year. There are several complex problems concerning land status that have been brought to your attention by BLM.

Thank you for the opportunity to review and comment on the Access Road Assessment documents. We look forward to receiving the final version of these documents after November 15, 1981, and anticipate providing additional recommendations into this decision-making process.

Sincerely,

Al Carson

Al Carson, Chairman
Susitna Hydroelectric
Steering Committee

cc: D. Wozniak, APA
Steering Committee Members
R. Stoops

Table: A.1 Access Plan Costs

PLAN		1	2	3	4	5	6
DESCRIPTION		ROADWAY: PARKS HIGHWAY TO DEVIL CANYON & WATANA ON SOUTH SIDE OF SUSITNA.	RAIL: GOLD CREEK TO DEVIL CANYON & WATANA ON SOUTH SIDE OF SUSITNA.	ROADWAY: DENALI HIGHWAY TO WATANA. PARKS HIGHWAY TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. NO CONNECTING ROAD.	ROADWAY: DENALI HIGHWAY TO WATANA. RAIL, GOLD CREEK TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. NO CONNECTING ROAD.	ROADWAY: PARKS HIGHWAY TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. DEVIL CANYON TO WATANA ON NORTH SIDE OF SUSITNA.	ROADWAY: DENALI HIGHWAY TO WATANA. RAIL: GOLD CREEK TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. CONNECTING ROAD ON NORTH SIDE OF SUSITNA.
Mileage	Road	62	-	91*	65*	81	107*
	Rail	-	58	-	16	-	16
Design and Construction Cost ($ x 1,000,000)		170	149	157	123	160	180
Maintenance Cost ($ x 1,000,000)		9	5	7	5	8	12
Logistics Cost ($ x 1,000,000)		214	214	228	228	216	228
Total Cost ($ x 1,000,000)		393	368	392	356	384	420
Construction Schedule for Initial Access (Years)		1	3-4	1	1	2-3	1
Construction Schedule for Full Access (Years)		3-4	3-4	2-3	2-3	3-4	3
Bridges	Major (>1000 ft)	3	2	1	0	2	0
	Minor (<1000 ft)	2	0	1	0	1	0

* Includes upgrading 21 miles of the Denali Highway

Revision: D

Table: A.1 (cont'd)

PLAN	7	8	9	10	11	12
DESCRIPTION	ROADWAY: DENALI HIGHWAY TO WATANA. PARKS HIGHWAY TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. CONNECTING ROAD ON NORTH SIDE OF SUSITNA.	ROADWAY: GOLD CREEK TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. DEVIL CANYON TO WATANA ON NORTH SIDE OF SUSITNA.	RAIL: GOLD CREEK TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. ROADWAY: DEVIL CANYON TO WATANA ON NORTH SIDE OF SUSITNA.	RAIL: GOLD CREEK TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. ROADWAY: DEVIL CANYON TO WATANA ON SOUTH SIDE OF SUSITNA.	ROADWAY: DENALI HIGHWAY TO WATANA. CONNECTING ROAD BETWEEN WATANA AND DEVIL CANYON ON NORTH SIDE OF SUSITNA.	ROADWAY: PARKS HIGHWAY TO DEVIL CANYON AND WATANA ON NORTH SIDE OF SUSITNA.
Mileage Road	132*	69	56	36	114*	61
Rail	-	-	16	16	-	-
Design and Construction Cost ($ x 1,000,000)	215	117	126	136	172	127
Maintenance Cost ($ x 1,000,000)	9	7	6	6	11	7
Logistics Cost ($ x 1,000,000)	228	216	216	214	258	225
Total Cost ($ x 1,000,000)	452	340	348	356	441	359
Construction Schedule for Initial Access (Years)	1	2-3	3	2	1	2
Construction Schedule for Full Access (Years)	3	3	3	3	2-3	3-4
Bridges Major (>1000 ft)	1	0	0	2	0	1
Minor (<1000 ft)	1	1	1	1	1	2

* Includes upgrading 21 miles of the Denali Highway

Revision: D

Table: A.1 (cont'd)

PLAN	13	14	15	16	17
DESCRIPTION	ROADWAY: PARKS HIGHWAY TO WATANA ON NORTH SIDE OF SUSITNA WITH BRANCH ROAD TO SOUTH BANK AT DEVIL CANYON	RAIL/ROADWAY: GOLD CREEK RAILROAD EXTENSION. ROADWAY: TO DEVIL CANYON AND WATANA ON SOUTH SIDE OF SUSITNA. CONNECTING ROAD TO PARKS HIGHWAY.	RAIL/ROADWAY: GOLD CREEK RAILROAD EXTENSION. ROADWAY: TO DEVIL CANYON AND WATANA ON SOUTH SIDE OF SUSITNA.	ROADWAY: GOLD CREEK TO WATANA ON SOUTH SIDE OF SUSITNA. CONNECTING ROAD TO DEVIL CANYON AND PARKS HIGHWAY.	ROADWAY: DENALI HIGHWAY TO WATANA. CONNECTING ROAD TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA. RAIL: GOLD CREEK TO DEVIL CANYON ON SOUTH SIDE OF SUSITNA.
Mileage Road	59	64	49	69	102*
Rail	–	7	7	–	14
Design and Construction Cost ($ x 1,000,000)	115	174	128	156	200
Maintenance Cost ($ x 1,000,000)	7	9	6	10	12
Logistics Cost ($ x 1,000,000)	223	215	215	216	227
Total Cost ($ x 1,000,000)	345	398	349	382	439
Construction Schedule for Initial Access (Years)	1	1	1	1	1
Construction Schedule for Full Access (Years)	3	3-4	3	3	3-4
Bridges Major (>1000 ft)	1	2	1	2	1
Minor (<1000 ft)	2	2	1	2	1

* Includes upgrading 21 miles of the Denali Highway

Revision: D

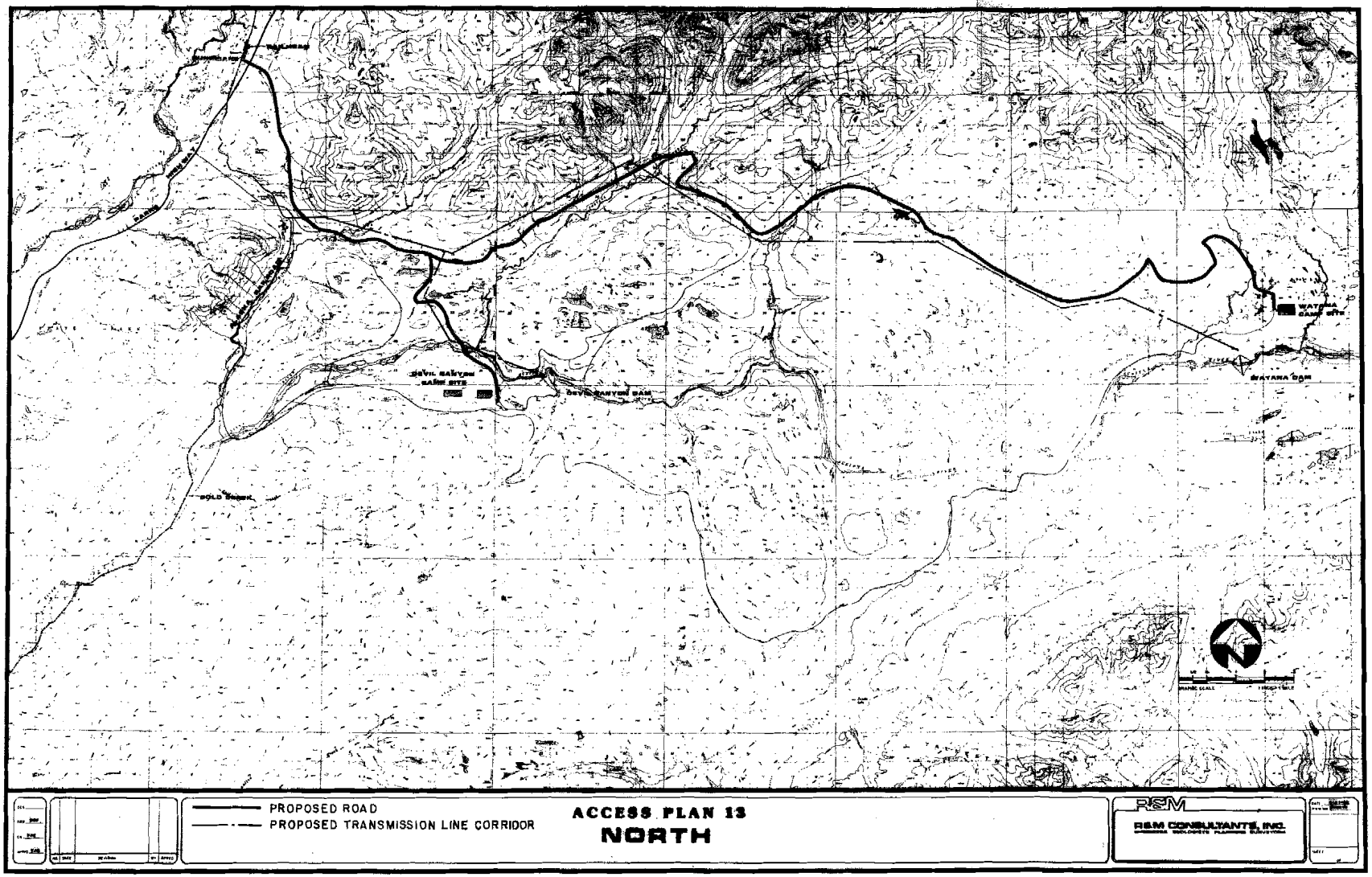


FIGURE A-1
ROUTE PLAN

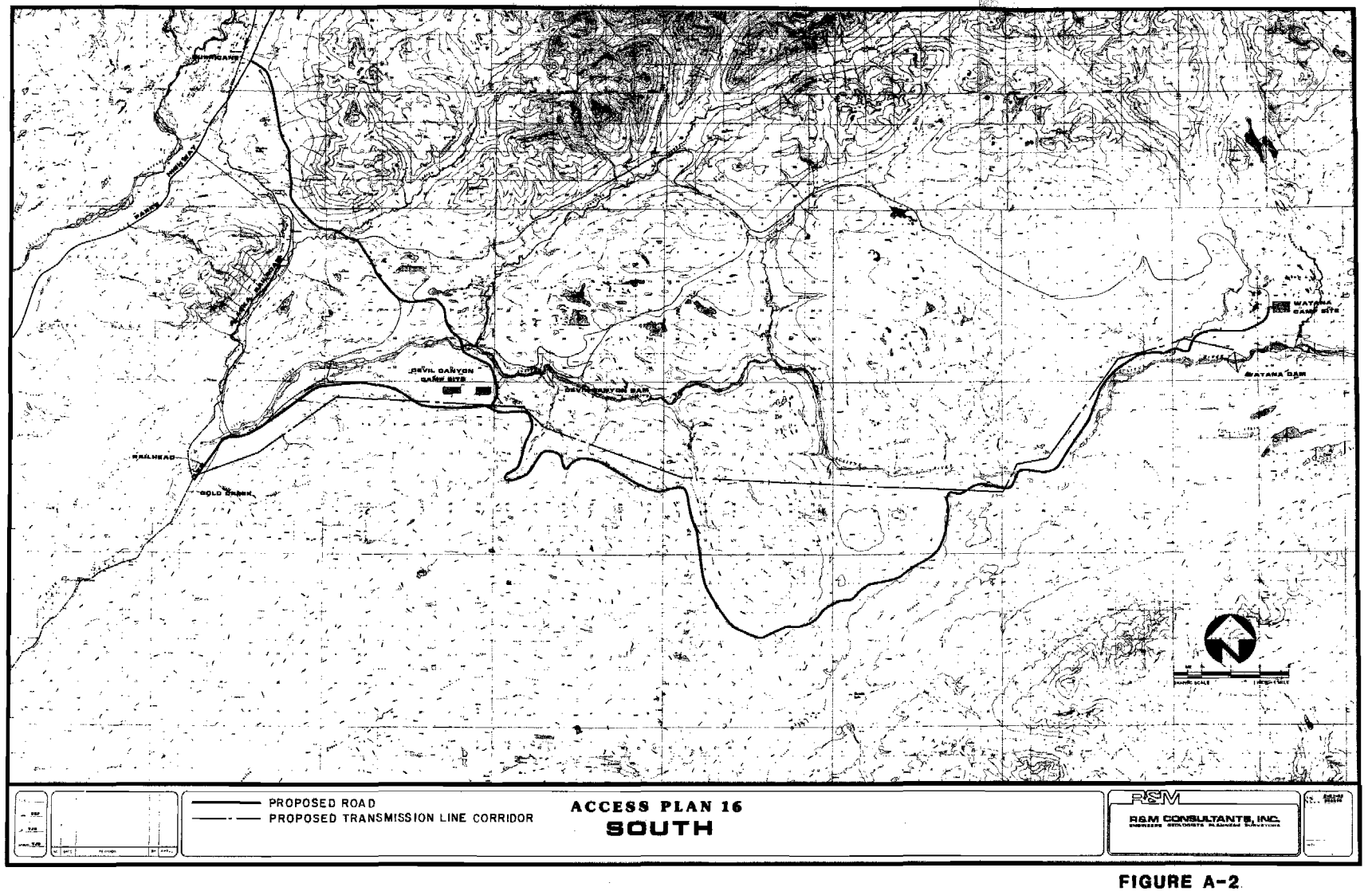


FIGURE A-2
ROUTE PLAN

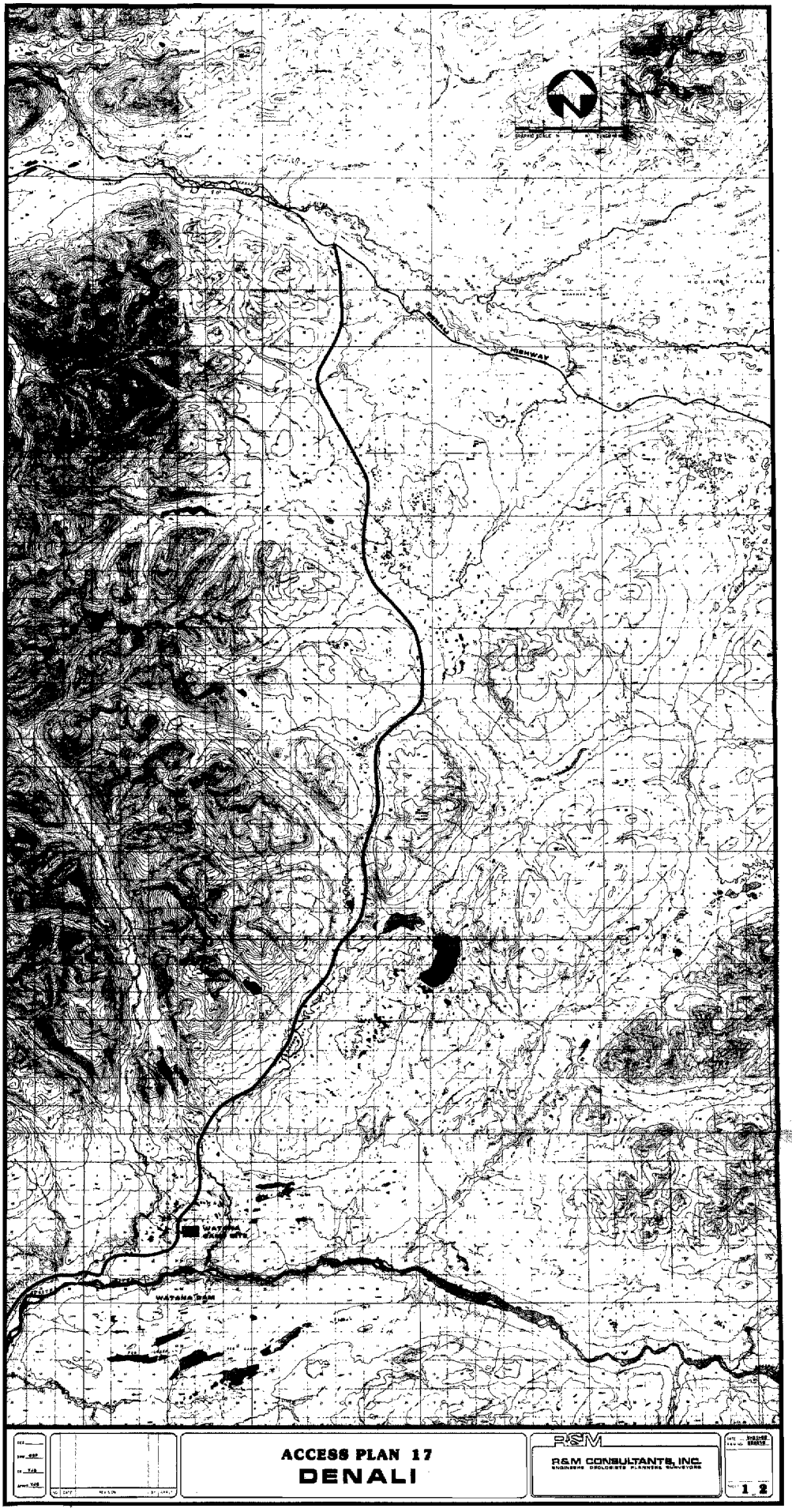


FIGURE A-3 SHEET 1 OF 2
ROUTE PLAN

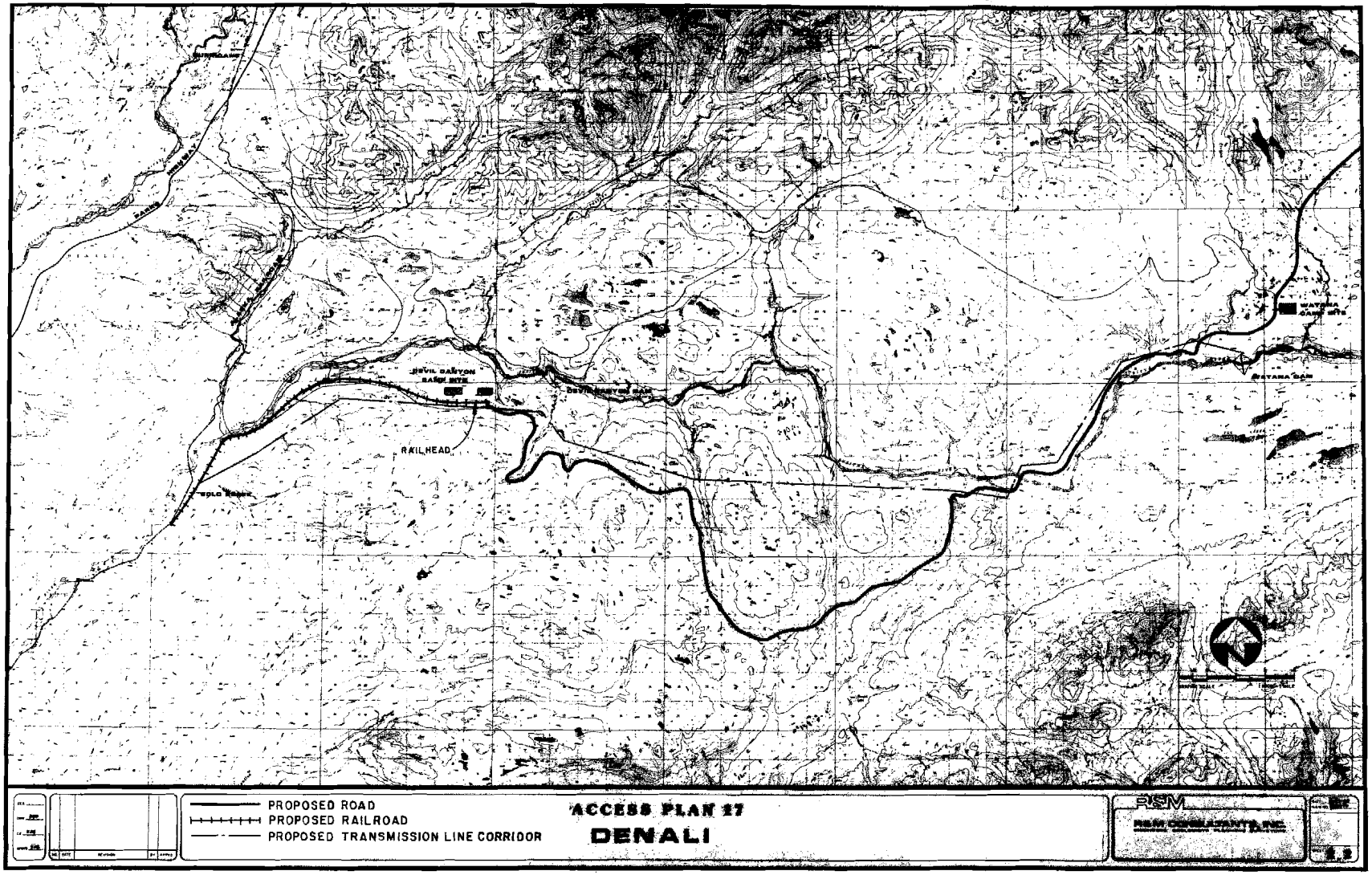


FIGURE A-3 SHEET 2OF 2
ROUTE PLAN

APPENDIX B

ENVIRONMENTAL ISSUES

B.1 Effects of Roads and Vehicle Traffic on Caribou by S. Fancy, LGL Alaska, Inc.

B.2 Statement by A.W.F. Banfield (dated August 14, 1981)

B.3 Statement by State of Alaska Dept. of Fish and Game (reiterated at APA Board meeting of July 28,1982).

B.4 Statement by State of Alaska Dept. of Environmental Conservation (dated August 11, 1982)

B.5 Statement by U.S. Dept. of the Interior Geological Survey, Water Resources Division (Dated August 4, 1982)

B.6 Statement by U.S. Dept. of the Interior Bureau of Land Management (dated August 11, 1982)

B.7 Statement by U.S. Dept. of the Interior Fish and Wildlife Service (dated August 17, 1982)

B.8 Statement by State of Alaska Dept. of Fish and Game (dated August 20, 1982).

APPENDIX B.1

by: S. Fancy
LGL Alaska, Inc.

EFFECTS OF ROADS AND VEHICLE TRAFFIC ON CARIBOU

The most detailed information on the effects of roads and associated human activities (e.g., vehicle traffic, construction activity, presence of workers) on caribou comes primarily from four sources: (1) studies by the Alaska Department of Fish and Game (ADF&G) along the Trans-Alaska Pipeline (TAPS) corridor since 1974, and along the Kuparuk oilfield access road since 1978; (2) a two year study by LGL in a floodplain area used by large numbers of caribou moving to and from insect-relief areas; (3) data from a Master's thesis by Dan Roby, who worked with ADF&G along the TAPS corridor; and (4) a two-year study now in its second year being conducted along the Kuparuk Oilfield access road by Alaska Biological Research (ABR). Alyeska Pipeline Service Company is also funding a three year study along the TAPS corridor as a "second opinion" to the ADF&G studies; however, no reports have been released after two years of study. All of these studies involve the Central Arctic Herd on Alaska's North Slope.

The results of these studies are somewhat contradictory, and as a result, caribou biologists disagree on the severity of road effects on caribou. ADF&G studies (Cameron and Whitten 1979, 1980; Cameron et al. 1979) have concluded that caribou cows and calves avoid the Prudhoe Bay oilfield, based on a lower percentage of calves in caribou groups observed from the roads in their study area as compared to aerial sightings over a larger area. However, the calf percentage may sometimes vary independently of human developments and activities (Fancy, unpublished manuscript), and different habitat preferences and the latitudinal segregation of bull and cow groups make it difficult to interpret differences in the calf percentage over a large study area. Along the Kuparuk oilfield access road (oriented E-W and thus not confused by latitudinal biases) the calf percentage has not been found to differ from that expected in three years of study (Cameron et al. 1981). During an aerial calving survey along that road in 1980, no calves were seen within 4 km either side of the road, but this was not the case in 1978 and 1979. Few calves have been born within the Prudhoe Bay complex in recent years; however, equally low numbers of neonatal calves are sighted between the Sagavanirktok and Shaviovik

Rivers (east of the oilfield), where no roads or other developments occur. The Central Arctic Herd has been steadily increasing in size each year, and productivity has been "excellent" (Cameron et al. 1981), in spite of the localized effects on caribou distribution and group composition.

Recent detailed studies by LGL and ABR involving continuous observations of caribou as they approach roads and pipelines have found that most caribou will cross roads with light to moderate vehicle traffic, but that caribou will often first try to find a way around the obstacle (paralleling movements), and some groups (10-14% for the most detailed study) may refuse to cross at all (Fancy, unpublished manuscript). Preliminary results by ABR (Curatolo et al. 1981) have found that the proportion of groups that crossed the Kuparuk oilfield road and pipeline was significantly less than that expected (control). Many groups left their study area paralleling the road and pipeline, and thus the proportion of groups that eventually crossed could not be determined.

The responses of individual caribou to roads and traffic are extremely variable; some animals appear to avoid lightly travelled roads entirely, whereas others will cross roads during rates of traffic exceeding one vehicle per minute with no observable response. In general, however, moving vehicles and/or the presence of workers will alter the local movements and behavior of caribou. Horejsi (1981) reported that 88% of the caribou he observed along the Dempster Highway reacted to a moving pickup truck by running or trotting away. A fleeing animal can expend eight to twenty times the cost of basal metabolism; increased energy costs resulting from disturbance are at the expense of body growth, development, and reproduction (Geist 1975).

The greatest concern for disturbance effects on caribou is for cows in late pregnancy and cows with young calves. Female caribou are particularly sensitive to disturbances during the calving period (Lent 1966, Bergerud 1974, Calef et al. 1976, Surrendi and DeBock 1976), and disturbances at this time are more likely to result in lowered recruitment because of premature travel by calves, disruption of cow/calf bonds, or trampling (Lent 1966, Geist 1971, Bergerud 1974, Surrendi and DeBock 1976).

An estimated 1000 animals remain year-round in the general vicinity of the Denali access corridor, and this area is used by some animals from the main Nelchina Herd each summer. Between 1955 and 1968, this area was used as winter range by the main herd; however, the herd at that time numbered over 40,000 animals, about twice the current estimate. Some calving occurs in the area, although the main traditional calving grounds are located south of the Susitna River in the Talkeetna Mountains. As the herd increases in size, it is likely that large numbers of caribou will again cross the area in the vicinity of the proposed access road. During construction of the Watana Dam, the area will most likely remain a peripheral part of the main herd's range.

Traffic levels as high as those expected during dam construction have not been encountered in any previous studies, and therefore it is not possible to predict with any certainty how the Denali access route would affect caribou. Some caribou will cross the road regardless of its high traffic frequencies, but the majority would probably cross only if lulls in traffic (i.e., convoys) were provided. Cows calving in the area can be expected to avoid the heavily used areas, but this should not affect herd productivity.

The greatest threat the proposed Denali route would create to the Nelchina herd is increased hunting and potential for secondary developments resulting from the access it provides. Some animals will also be killed by vehicles, particularly during winter.

It is likely the Denali access road can be built and operated without detrimentally affecting the Nelchina Herd, but only if several mitigation measures are strictly implemented. These measures include traffic restrictions at certain times of the year, low berm heights, special snow removal methods, prohibiting ATV use from the road, and a policy of giving caribou the right-of-way when crossing the road. It will also be necessary to continue the hunting permit system for the herd. These measures will increase the cost of road construction and operation and will result in occasional delays due to traffic restrictions (i.e., convoys). However, with strict adherence to these mitigation measures, it is unlikely that the road and vehicle traffic will have a measurable effect on herd size or productivity.

APPENDIX B.2

RANGIFER ASSOCIATES — ENVIRONMENTAL CONSULTANTS LTD.
37 YATES STREET • ST. CATHARINES, ONTARIO L2R 5R3
TELEPHONE (416) 688-0814
President: A. W. F. BANFIELD
Secretary: M. F. BANFIELD

Aug. 14th, 1981.

Ms Cathie A. Baumgartner,
Environmental Study Deputy Director,
Terrestrial Environmental Specialists Inc.,
R. D. 1 Box 388,
Phoenix, N. Y. 13135,
U. S. A.

Dear Cathie:

Re: Susitna Power Project

Attached you will find my comments on the various access routes with regards to caribou protection as requested in your letter of June 24.

Yours truly,

Frank.

A. W. F. Banfield,
President.

FB/fb

SUSITNA POWER PROJECT ACCESS PLANS

Access Plan 3

Railway from Gold Creek to Devil's Canyon and Watana Dam sites.

This is the most desirable access plan from the point of view of interference with the Nelchina Caribou herd. The small Chunilna subherd (approx. 300 animals) spends the summer in the Chunilna Hills and the migratory trails lead southward to the Chunilna and Prairie Creek valleys towards the winter ranges. We observed no caribou trails leading across the Susitna River Valley to the north until we reached the Fog Lakes.

Railways have the great advantage over roads of controlled access. Vehicles can scarcely drive on railway beds without special modifications while passengers can't get off between railway stops. This plan would greatly restrict all terrain vehicles making new trails along the south bank of the Susitna River. The fen country around the Fog Lakes and the Watana Mountain range would also block eastward travel.

Plan 3A is slightly preferable to 3B because it is farther from Stephan Lake which would provide a little more seclusion for the cottagers who live there.

Access Plan 8 (in part)

North Service Road between Devil's Canyon and Watana sites.

If plan 3 were adopted. It would probably be necessary

to link the two Dam sites by means of a Service Road. Although the proposed route of this road intersects several caribou north-south trails in the Devil Creek area, caribou traffic appeared to be light. Furthermore, the mountain ranges to the north would discourage ATV penetration. This route would add only minimally more impact on caribou, in combination with access Plan 3.

Access Plan 2

An access road from the Parks Highway to Devil's Canyon and Watana Dam sites on the south side of the Susitna River.

This plan is second in preferance to Plan 3 from the point of view of caribou disturbance. It also traverses the region seldom visited by caribou and would therefore cause minimum impact on caribou.

Its disadvantage is that it would provide access for ATV's to the south side of the Susitna River. ATV travel beyond the Fog Lakes and Watana Mountain would threaten the main calving grounds of the Nelchina Herd in the Kosina Creek and Oshetna River drainages. Although the Fog Lakes and Watana Mountain terrain would discourage ATV penetration, eventually the Alaskan Government would probably have to prohibit such entry in order to preserve the calving range.

Plan 2A is also slightly preferable to 2B because it avoids passing close to Stephan as mentioned for 3A.

Although not mentioned in the access plan outline, I believe

that a combination of plans 2 and 3 might be considered, which would obviate the need for the north service road between the dam sites and the Denali access road.

Access Plans 4, 8, 5 and 7

These plans include a northern access road to the Denali highway.

This proposed road would pass through the middle of the calving and summer ranges of the northwestern sub group of the Nelchina herd. This group of caribou is believed to number approximately 1000 animals. The alpine tundra area of the Deadman and Brushkana Creek valleys is the centre of its summer distribution. We saw three small groups of cows and calves during our reconnaissance flight on August 8.

The proposed access road lies across the late summer migration of caribou towards Butte Lake and Gold Creek. We saw massive caribou trail patterns in this area and a few bulls. The proposed road also parallels the traditional spring migration route southward down Deadman Creek to the Susitna River.

Direct impacts upon this group of caribou would include: disturbance to cows and calves during construction period, providing disturbance and an impediment to caribou migration caused by road traffic and a possibility of direct mortality resulting from road kills. (This impact might be mitigated by

early instructional sessions for the construction workers.)

Of greater importance are the indirect impacts to this caribou group by providing freer access to its range. An access road across this alpine tundra plateau between the Nenana and Susitna River valleys would provide the opportunity for ATV's to push a network of unplanned trails throughout the range of this subherd. We observed the ATV trails from the Denali highway fanning out across the tundra in the Butt Lake - Butte Creek region. Such new access would cause disturbance and increased mortality to this group of caribou by vehicles, campers and hunters.

Ultimately it would be the responsibility of Alaskan Government agencies such as the ADF and G to control this activity. Such steps would be unpopular and require increased funds and manpower for surveillance. Without controls, however, the survival of this subherd would be placed in jeopardy.

I have concluded that the Denali access road would involve moderate to severe impacts on the northwestern portion of the Nelchina herd. These impacts could be mitigated by resolute application of controls by the Alaskan authorities. I find these access plans less desirable than the southern routes. The (B) route alternative is slightly preferable to (A) route because of drier terrain, and the availabiltiy of more grade material.

These factors would result in less habitat disturbance.

Rangifer Associates Environmental
Consultants Limited.

APPENDIX B.3

NELCHINA CARIBOU AND THE DENALI ACCESS ROUTE

Recent caribou use of the area: the northwestern portion of the Nelchina caribou range, which would be nearly bisected by the Denali access route, is occupied by a resident subherd possibly numbering as many as 1,000 animals. These caribou appear to live in the area year around. Females calve in the area rather than migrating to the Talkeetna mountains for calving as do females from the main Nelchina herd.

In addition to this subherd, many bulls from the main Nelchina herd spend the summer (May - September) in this area. Also, small numbers of caribou from the main Nelchina herd migrate through the area in transit from the Talkeetna Mountains to the Lake Louise Flat and vice versa during both spring and fall.

Historical caribou use of the area: the area north and west of the proposed Watana impoundment was used extensively as both summer and winter range in the past by the main Nelchina herd and Skoog (1968) considered some of this area as the most important habitat for year around use in the Nelchina range. Use of the area by large numbers of animals from the main Nelchina herd has not occurred since about 1976. However, because of historical use patterns and the quantity of good habitat available it seems inevitable that many animals from the main herd will again use the area, particularly as herd size increases.

Potential impacts of the Denali access route: the proposed access road from the Watana dam site, along Deadman Creek then through either the drainages of Butte Lake or Brushkana Creek to the Denali Highway passes through important caribou habitat. Calving by females from the resident subherd has been documented in drainages of Butte Lake and Brushkana Creek. Cameron et al (1979) documented abandonment of a portion of the calving grounds of the Central Arctic caribou herd concurrent with development of the Prudhoe Bay oil fields. Even Bergerud (1978) who felt that impacts of development and human harassment on caribou have been overstated, stressed the importance of protecting calving areas.

Reports on reactions of caribou to roads and vehicular traffic are somewhat contradictory. Cameron et al (1979), in the most thorough study to date, documented avoidance of the Trans-Alaskan Pipeline corridor by females and calves during summer (the Denali access route passes through summer range which historically has been important for the female-calf segment of the main Nelchina herd). They also suggested avoidance by large groups, group fragmentation and/or decreased group coalescence near the pipeline corridor. Horejsi (1981) reported that caribou exhibited signs of anxiety and fear when encountering a fast-moving vehicle and speculated that they might avoid well-traveled highways. Klein (1971) reported that well-traveled highways have obstructed the movement of wild reindeer in Norway. It has also been suggested that roads might increase susceptibility of caribou to predators (Robey 1978).

In another study it was concluded that mountain caribou became habituated to the presence of a highway and traffic and continued to use a traditional movement route despite harassment and mortality (Johnson and Todd 1977). Nelchina caribou continue to cross the Richardson Highway, often in large numbers, and have done so during many years since about 1960 (Hemming 1971).

From a caribou conservation viewpoint the Denali access route is far less desirable than proposed routes originating on the Alaska Railroad and Parks Highway. The Denali route would most certainly have immediate detrimental impacts on the resident subherd and future negative impacts on the main Nelchina herd although these impacts cannot be quantified.

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Ken Pitcher
Alaska Department of Fish and Game
333 Raspberry Road
Anchorage, AK 99502

APPENDIX B.4

STATE OF ALASKA

DEPT. OF ENVIRONMENTAL CONSERVATION

SOUTHCENTRAL REGIONAL OFFICE

JAY S. HAMMOND, GOVERNOR

☒ 437 E. Street
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VALDEZ, ALASKA 99686
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☐ P.O. BOX 1064
WASILLA, ALASKA 99687
(907) 376-5038

August 11, 1982

RECEIVED
AUG 1 1 1982
ALASKA POWER AUTHORITY

Mr. Eric P. Yould
Executive Director
Alaska Power Authority
334 West 5th Avenue
Anchorage, Alaska 99501

Dear Mr. Yould:

The Alaska Department of Environmental Conservation is pleased to respond to the Alaska Power Authority's request for comments concerning access routes to the Susitna Hydroelectric Project.

Although not included as one of the three access alternatives presented for comment, it is this Department's opinion that in order to minimize primary and secondary impacts associated with the construction and operation of an access route, we recommend the following alignment for and mode of access:

1. Rail access from Gold Creek to Devil Canyon along the south side of the Susitna River with a staging area at Devil Canyon.

2. Cross to the north side of the Susitna River at Devil Canyon and proceed to the Watana site with a road.

3. No road or rail access from the Parks Highway.

4. No road or rail access from the Denali Highway.

The above routes are recommended by this Department for the following reasons:

1. Rail access moves project personnel and materials in the safest manner. The potential for major fuel spills is greatly reduced and control into the project site is easily regulated.

2. Avoidance of the environmentally sensitive wetlands in the Indian River area.

3. Avoidance of the Portage Creek salmon spawning habitat. This habitat is very sensitive to erosion and subsequent deterioration of Portage Creek water quality as a result of road construction, operation, and maintenance. Also, if a fuel tank truck were to have an accident and discharge its load, the effect on the salmon in Portage Creek could be catastrophic.

4. Avoidance of the Stephan and Fog Lakes regions. These regions are important for caribou, moose, brown bear, waterfowl, and fur bearers.

5. Avoidance of the region between the Watana site and Denali Highway. This entire region is historically utilized by portions of the Nelchina caribou herd. Additionally, there is the potential for major impact to the many native grayling streams that would be crossed by this route.

6. The route recommended above will also, we feel, decrease unnecessary vehicular trips in the area, thus resulting in less overall disruption of habitat during construction.

Through an evaluation of the three access alternatives presented, our analysis reveals the following:

Plan 17

1. Denali Highway access passes through portions of the Nelchina caribou herd range and crosses many native grayling streams. Water quality problems could occur from construction, maintenance, and operation of the road as well as from fuel spills.

2. Access along the south side of the Susitna River could have major impacts, both primary and secondary, on the Stephan Lake region. This region is important habitat for moose, wintering caribou, migratory waterfowl, and fur bearers.

3. Wetlands habitat is crossed southwest of Devil Canyon.

Plan 16

1. Glenn Highway access passes through wetlands area.

2. Same comments as #2 and #3 for Plan 17.

Plan 13

1. Glenn Highway access passes through wetlands area.

2. North of Susitna River access passes along Portage Creek and crosses its headwaters. Portage Creek is a salmon spawning river. This type of habitat is very sensitive to changes in water quality from erosion or fuel spills (see comment on recommended route).

Reference should also be made to the Su-Hydro Steering Committee letter to you dated November 5, 1981 concerning the access issue (copy attached). This letter, in part, supports our current recommendations for access modes and routes.

This Department appreciates the opportunity to comment on the access issue. We hope our input will assist the Alaska Power Authority in selecting the best access alternative. If you have any questions regarding these comments, please contact Steve Zrake or myself.

Sincerely,

Bob Martin

Bob Martin
Regional Supervisor

BM/ccs
cc: Ernst Mueller
Steve Zrake

APPENDIX B.5

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Water Resources Division
1515 E. 13th Avenue
Anchorage, Alaska 99501

August 4, 1982

RECEIVED
AUG 6 1982
ALASKA POWER AUTHORITY

Mr. Eric P. Yould
Executive Director
Alaska Power Authority
334 West Fifth Avenue
Anchorage, Alaska 99501

Dear Eric:

Our comments on the three access alternatives presented in your letter of July 29, 1982 is that Access Plan 13 would be preferable from an environmental viewpoint.

The portion of the route from Hurricane on the Parks Highway through Chulitna Pass is the best method of access to a major highway. Likewise, the eastern segment from the head of Devil Creek to Watana Camp Site is preferable. We prefer not to state a preference about the segment from Chulitna Pass to the head of Devil Creek, which would include access to the Devil Canyon Camp Site.

Sincerely yours,

Philip A. Emery
District Chief

APPENDIX B.6

IN REPLY REFER TO
2920 (016)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Anchorage District Office
4700 East 72nd Avenue
Anchorage, Alaska 99507

AUG 11 1982

Mr. Eric Yould, Executive Director
Alaska Power Authority
334 West 5th Avenue
Anchorage, Alaska 99501

RECEIVED
AUG 13 1982
ALASKA POWER AUTHORITY

Dear Mr. Yould:

This is in response to your letter dated 29 July, 1982 in which you requested comments concerning the access routes to the Watana and Devils Canyon Dam sites.

The access preference expressed below pertain to the general locations cited for the corridors and are based upon environmental data and conclusions contained within the environmental documents prepared by your contractors for the project.

We agree with the position of TES, Inc., that access via the Alaska Railroad from Gold Creek to Devils Canyon is environmentally preferable. Since a trail exists on the south side from Gold Creek to Devils Canyon this corridor alignment is logical. From Devils Canyon to Watana we feel that the northern corridor alignment is probably environmentally and economically preferable.

We feel that both rail and road access will be required for construction since this concept provides adequate flexibility and logistics during construction. By the same token we are well aware that a project of this magnitude without a road access from a major highway is improbable.

To recommend a specific routing or plan from the options presented, we would opt for the northern corridor alignment or our second choice would be the Denali highway corridor to Watana with rail access from Gold Creek to Devils Canyon.

In evaluating the access route selection process taken by APA we would appreciate clarification of the justification for establishing 1993 as a planning objective. The routes should weigh all impacts including borrow sites and access to these sites, as well as transmission line routing to be serviced by one of these options as part of a single corridor concept.

Thank you for the opportunity to review and comment on the Access Road Alignment. Should you have further questions that require elaboration and elucidation feel free to contact me.

Sincerely yours,

Richard J. Vernimen

Richard J. Vernimen
Acting District Manager

APPENDIX B.7

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503
(907) 276-3800

IN REPLY REFER TO:
WAES

17 AUG 1982

RECEIVED

ALASKA POWER AUTHORITY

Eric P. Yould
Executive Director
Alaska Power Authority
334 W. 5th Avenue, 2nd Floor
Anchorage, Alaska 99501

Dear Mr. Yould:

The Alaska Power Authority (APA), by letter dated 29 July 1982, requested comments from the Fish and Wildlife Service (FWS) regarding construction access alternatives for the proposed Susitna Hydroelectric Project. We hope, with this letter, to convey our immediate concerns regarding this subject to facilitate your decision-making. This letter should not be construed as providing in toto our concerns related to project access. We fully intend to provide substantive comments on this, and related issues, upon receipt of the draft Federal Energy Regulatory Commission (FERC) license application Exhibit E. (Federal Register Vol. 46, No. 219, November 13, 1981).

The FWS has expressed, through our participation on the Susitna Hydroelectric Steering Committee (SHSC) (letters dated 26 March 1981 and 5 November 1982), concerns as to the direction and emphasis which this issue has taken. It is apparent that the APA has been lead to the present 3 access alternatives by the conclusion that power must be the forthcoming in 1993. Presently, the 1993 deadline is constraining the overall decision-making process and the orderly progress of various studies on project feasibility and environmental impacts and alternatives. The External Review Panel, in their Report, presented to the Board of Directors, Alaska Power Authority on 15 April 1982, did not acknowledge the 1993 mandate, prefering to state that:

> "The arrival of any opportune time to proceed with construction will depend on critical issues of finance and marketing of power which cannot now be accurately forecast. Our recommendation is that tender documents with all supporting geotechnical investigations and design studies be developed. We estimate that a total period of three to four years will be required for this phase of work. The project will then be ready to be implemented whenever the financial climate for contracting becomes favorable. The advantages of proceeding in this manner are:
>
> (1) The economic benefits of being ready for financing;
> (2) the momentum of the ongoing study and an informed staff; and
> (3) the ability to avoid a crash design program.

The disadvantage is the small risk of loss of the design costs in the event that, for some reason, the project is never built.

. . . This Panel is of the opinion that the economic climate will eventually indicate that it is advisable to proceed with the construction of the Susitna project and at that time it will be in the best interests of the State of Alaska to develop this important natural resource."

Given the above the FWS continues to endorse the views expressed in the Steering Committee letter dated 5 November:

"The SHSC agrees with the Terrestrial Environmental Specialists, Inc. position that access via the Alaska Railroad to Gold Creek is environmentally preferable. Railroad access to at least Devil Canyon would alleviate the need for a staging area at Gold Creek and the consequent human activity, land use, fuel spills, and other impacts on the Gold Creek area. We recognize that a staging area at Devil Canyon would be required in any case. The use of this area as the terminus of a railroad appears to make a great deal of sense. Additionally, we feel that the south side route from Gold Creek to Devil Canyon is preferable since a trail already exists there. From Devil Canyon to Watana, we prefer a route on the north side of the Susitna River . . . . If feasible we generally prefer a rail mode of access to and within the project site.

The SHSC identified three (3) environmentally sensitive areas that should be avoided. Those are:

1. The routes from the Denali Highway.

2. The route crossing the Indian River and through wetlands to the Parks Highway.

3. The route on the south side of the Susitna River from Devil Canyon to the proposed Watana dam site.

. . . Use of rail as the access mode increases the potential for management and control of socioeconomic and environmental impacts. Maximized rail use provides for the following advantages over road access:

1. Maintains a maximum range of future decision options.

2. Provides for control of worker impacts on local communities and wildlife.

3. Decreases the potential of hazardous material spills due to adverse weather conditions and multiple handling.

4. Disturbance to wildlife adjacent to the route can be more easily controlled.

5. Direct access right-of-way related habitat losses can be significantly limited."

We believe that rail, in conjunction with air access, would provide dependable service and that a redundant system of rail and road is not a necessary project feature and, as stated above, is environmentally undesirable.

An assessment of corridor route alternatives must weigh the potential impacts of borrow sites and access to these sites, and transmission line(s) routing and maintenance. Access corridors which serve a dual, or triple, purpose in regard to those other project access needs would be highly desirable from all decision-making criteria.

Public access to the damsites and through the Upper Susitna Valley is a complex and a controversial subject and we believe this issue should be given thorough evaluation in the selection of access routes, mode of access, transmission line routing, and method of maintenance access for the transmission lines. How construction and maintenance related access is obtained to a great extent determines the project-related wildlife and socioeconomic impacts.

The following comments are provided in light of our concerns and are not an endorsement of these routing alternatives.

Alternative 17

Terrestrial Environmental Specialists, Inc. expressed the opinion that the Denali Highway alternatives should not be considered. The view that the risk of substantial negative impact to the Nelchina caribou herd from a Denali Highway route is high has also been expressed by Karl Schneider, Research Coordinator, Susitna Hydroelectric Big Game Studies, Alaska Department of Fish and Game. We concur. There may be a difference of opinion amongst participants in the Susitna Hydroelectric Project Study as to the extent of the risk. However, we must conclude that the Nelchina caribou herd could be substantially negatively impacted by an access route connecting the Denali Highway to the Watana camp; and that these risks are avoidable.

In addition to potential risk to the caribou, the Denali route cuts across valuable moose, brown bear, and black bear habitat between the Watana camp and Deadman Lake. Although no major river crossings would be involved, numerous small river and tributary crossings would need to occur along this route and could pose extensive problems to numerous virgin grayling fisheries.

Alternative 16

A southern routing between the dam sites could intersect movements of large numbers of brown bears to and from Prairie Creek. The upper Prairie Creek, Stephan Lake, and the Fog Lakes regions support large year-round moose concentrations. Impacts to furbearers and waterfowl also appear to be less avoidable in a southern routing between Watana and Devil Canyon in comparison to a northern access route.

Alternative 13

We favor an access route to the north of the Susitna River between the two dam sites. However, we cannot endorse the proposed routing. Given the stated rationale that the siting of the Devil Canyon dam was partially an attempt to avoid adversely impacting the important salmonid fishery of Portage Creek we are highly concerned with any plans to place a road in close proximity to the creek for approximately 1 mile. This places the fishery in a highly vulnerable position in respect to erosion and hazardous spills.

In summary, the FWS recommends:

1. That justification for the power-on-line in 1993 planning objective be clarified.

2. Rail access into the project site, to the exclusion of a road connection, with routing north of the Susitna River between the two dam sites.

3. That alternatives for borrow sites and their access, and transmission line(s) routing be provided so that they can be considered in conjunction with construction access routing.

4. That public access to the upper Susitna basin should be evaluated within the context of the project's need to minimize, to the extent possible, adverse impacts to fish and wildlife, and their habitats.

Thank you for the opportunity to comment.

Sincerely,

Acting Assistant Regional Director

cc: FWS-ROES, WAES
Quentin Edson/FERC
APA, NMFS, EPA, NPS, USGS, ADEC, AEIDC
ADF&G, Hab. Div., Su Hydro/Aquatic Studies
Robin Sener/LGL
APA Board Members

APPENDIX B.8

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

OFFICE OF THE COMMISSIONER

JAY S. HAMMOND, GOVERNOR

P.O. BOX 3-2000
JUNEAU, ALASKA 99802
PHONE: 465-4100

RECEIVED
AUG 24 1982
ALASKA POWER AUTHORITY

August 20, 1982

Mr. Eric P. Yould
Alaska Power Authority
334 W. 5th Avenue
Anchorage, Alaska 99501

Re: Access to the Susitna Hydroelectric Project - Request for Comments

Dear Mr. Yould:

The Alaska Department of Fish and Game has reviewed alternative Access Plans, 13, 16, and 17 and submits the following comments for your consideration.

PRIMARY IMPACTS

Primary impacts are those that can be directly attributed to physical alteration of habitats as might be expected from development of material sites, construction of the roadway prism, bridge or culvert installation, etc. Primary impacts which are disturbance-related result from construction traffic and the presence of a work force.

In this preliminary stage of planning, there is no means of adequately quantifying these impacts. Therefore, the following is a qualitative evaluation of primary fish and wildlife impacts related to each route.

Access Plan 13

With respect to significant salmon streams, this route crosses Indian Creek and Portage Creek enroute to the Watana site. Other major Susitna tributaries crossed by the route are Devil Creek and Tsusena Creek. While not important to salmon, they provide habitat for resident fish. We understand that initial construction of a route to the Watana site will require construction of two minor bridges (less than 1000 ft.) and, we imagine, a significant number of culverts. Later, as the Devil Canyon site is developed, a major bridge (greater than 1000 ft.) will have to be constructed across the Susitna River.

Although we have not had the opportunity to conduct fisheries surveys at any of the proposed bridge or culvert sites, we feel that with adequate review to enable development of suitable

installations and mitigation measures, this route is acceptable from a fisheries perspective.

The proposed route will impact moose habitat in the area of Portage Creek and brown bear denning habitat in the central segment of the route.

The area around Tsusena Creek and lower Deadman Creek support concentrations of moose and black bear. Slightly upstream along Deadman Creek is an important brown bear concentration area.

The Deadman-Tsusena Creeks area will be impacted by both the road and, especially, the Watana camp site. This impact will, however, occur regardless of which access alternative is chosen.

Access Plan 16

Significant salmon streams crossed by this proposed route are the Indian River and Susitna River. As with Route 13, several resident fish streams, including Tsusena Creek will require crossings. The Department feels that with adequate review, design consideration and mitigation, significant fisheries impacts related to this route can be minimized. In addition, it appears that the individual number of discrete drainages crossed with adoption of Plan 16 will be about equal to those under Access Plan 13. Plan 16, however, requires one additional major bridge.

Wildlife impacts can be expected to be greater for Plan 16 than those for Plan 13 due to the proximity of the route to Prairie Creek, Stephan Lake and Fog Lakes. The Stephan Lake-Fog Lake area currently supports high densities of moose and bear which are exposed to very little human disturbance. Prairie Creek supports what may be the highest concentration of brown bears in the Susitna Basin. Bear come from up to 50 miles away to feed on salmon in this drainage. This route would intersect bear travel paths to Prairie Creek and could impact bear movements and also result in bear-human conflicts. Seasonally abundant food sources, such as salmon at Prairie Creek, may be essential to the continued perpetuation of high density brown bear populations in the Susitna Basin.

The impact of this route on the Tsusena-Deadman Creeks moose and bear populations will be comparable to those of Plan 13.

Access Plan 17

Construction of Plan 17 will result in a route that crosses approximately twice the number of discrete drainages as Access Plans 13 or 16. The additional crossings are a result of the Denali Highway-Watana Camp leg of the route and impact primarily grayling streams. The remainder of the route will have fisheries impacts essentially identical to Plan 16. Although this Department

believes that, given ample review and design consideration, most fisheries impact can be mitigated, there will still be some unavoidable losses to fish. We believe Plan 17 will result in the greatest unavoidable losses.

The Plan 17 route from the Denali Highway to Watana Camp bisects one of the most historically important portions of the Nelchina caribou herd's range. Observation of similar situations shows that caribou cows with calves are likely to avoid roads. The impacts of this leg of the route, when compounded with the Denali Highway and the proposed Watana impoundment, may result in an impact more severe than the sum of these individual impacts.

The wildlife impacts of this route in the Tsusena-Deadman Creeks area will be greater than the other routes due to the alignment along segments of Deadman Creek. The wildlife impacts of Plan 17 in the Stephan Lake, Fog Lakes, Prairie Creek area would be virtually the same as those for Access Plan 16.

SECONDARY IMPACTS

Secondary impacts are those which are not directly related to the project but which occur as a consequence of it. For example, increased fishing or hunting pressure on previously pristine lands which now have access as a result of project roads. The following is a subjective assessment of secondary impacts resulting from each of the proposed routes.

Access Plan 13

Secondary impacts to fisheries will result primarily from increased fishing pressure. The Indian Creek and Portage Creek fisheries are multi-species and can probably be managed to provide a sustained yield fishery without great difficulty. The Tsusena and Deadman Creek drainages would support primarily a grayling fishery which would be somewhat more susceptible to sport fishing pressures.

Of the three proposed routes, Plan 13 is likely to have the least secondary impacts related to wildlife. This is by virtue of the fact that the route traverses the least sensitive habitat of the three alternatives. The majority of wildlife impacts would be disturbance related, hunting pressure could be controlled by bag limits or permit hunts.

Access Plan 16

As with Plan 13, sport fishing impacts on Indian Creek would be minimized with proper management. Impact to grayling streams would be somewhat higher. We feel secondary fisheries impacts that may be expected from Plans 13 and 16 are essentially equal.

Secondary wildlife impacts related to this route will be considerably higher than Plan 13 relative to the high density of bear and moose in the Prairie Creek, Stephan Lake and Fog Lakes area. While hunting pressure could be controlled, the disturbance factor and opportunity for bear-human conflicts will be greater.

Access Plan 17

Secondary fisheries impacts for Plan 17 are the same as those for Plan 16 with the addition of those incurred by the Denali-Watana segment. The Denali-Watana segment will provide increased public access to nearly pristine grayling habitat of the Brushkana and Deadman Creek drainages. With respect to fisheries, we would rate this alternative as having the overall greatest secondary impact.

We also believe that execution of Plan 17 will also result in the greatest overall secondary wildlife impact. In addition to those same impacts attributable to Plan 16, there will be increased access and disturbance to habitat significant to the Nelchina caribou herd.

SUMMARY MATRIX

The following matrix summarizes the Department's qualitative assessment of the impacts related to each proposed route.

Alaska Department of Fish and Game
Relative Impact Assessment Matrix

Scoring:

3 = High Impact
2 = Moderate Impact
1 = Low Impact

	Plan 13	Plan 16	Plan 17
Primary Fisheries Impact	1	1	2
Secondary Fisheries Impact	1	1	2
Primary Wildlife Impact	1	2	3
Secondary Wildlife Impact	1	2	3
Cumulative Total	4	6	10

Based on our understanding of the probable impacts associated with the proposed alternative, we favor access Plan 13.

The Alaska Department of Fish and Game thanks you for the opportunity to comment and encourage you to contact us if you have any questions or comments.

Sincerely,

for Ronald O. Skoog
Commissioner

cc: Charles Conway - Fawcett, McDermott, Cavanaugh, Conway, Inc.
Robert Weeden - University of Alaska
Robert Ward - Dept. of Transportation and Public Facilities
John Schaeffer - NANA Corp.
Charles Weber - Dept. of Commerce and Economic Development
Ronald Lehr - Div. of Budget and Management

APPENDIX C

PREFERENCES OF NATIVE ORGANIZATIONS

C.1 Cook Inlet Region, Inc. letter (dated August 17, 1982)

C.2 Tyonek Native Corporation letter (dated August 13, 1982)

C.3 Ahtna, Inc. letter (dated August 13, 1982)

APPENDIX C.1

CIRI COOK INLET REGION INC.

August 13, 1982

Board of Directors
Alaska Power Authority
334 West Fifth Avenue
Anchorage, Alaska 99501

Dear Sirs:

I would like to take this opportunity to clarify Cook Inlet Region, Inc.'s (CIRI) position regarding access routes for the Susitna project.

We concur with the position taken by the villages that access plan 13 is unacceptable. We would support access plan 16 as the best alternative. We also could support access plan 17 with some modifications.

We would support any plan which provides access to the Native land on the south side of the Susitna River. This could require some redesign of the dam to insure that it could act as a roadway.

Thank you very much for the opportunity to address this issue.

Sincerely,

COOK INLET REGION, INC.

Roland Shanks
Manager, Land Administration

RS:mw

APPENDIX C.2

TYONEK NATIVE CORPORATION

912 East 15th Avenue, Suite 200
Anchorage, Alaska 99501
(907) 272-4548

August 13, 1982

Board of Directors
Through Mr. Eric Yould, Executive Director
Alaska Power Authority
334 W. Fifth Avenue
Anchorage, Alaska 99501

Sirs:

The CIRI Village Presidents fully support Access Plan 16 as described in recent publications and maps provided by the Alaska Power Authority.

Plan 13 as outlined is not an acceptable access route.

Plan 17 as presented might possibly be acceptable with some modifications. These modifications should assure some access to the lands south of the Susitna River. Access to the lands south of the river will only be provided under Plan 17 if the Devil Canyon project is actually constructed. Perhaps another approach might be to provide a dam with a roadway constructed on top of the dam for earlier access as has been alluded to by Mr. John Hayden.

In summary, our Villages will support a road plan which provides access to our lands laying south of the Susitna River.

Plan 16 as presented, or possibly a modified Plan 17 would receive our support.

Sincerely,

B. Agnes Brown

B. Agnes Brown
Chairman, CIRI Village Presidents

cc: Cook Inlet Region, Inc.
CIRI Village Presidents

APPENDIX C.3

Ahtna, Inc.

DRAWER G
COPPER CENTER, AK. 99573

PHONE 907-822-3476

August 13, 1982

AD-83-A-12

Mr. David Wosniak
Alaska Power Authority
334 W. 5th Ave.
Anchorage, AK 99501

Dear Mr. Wosniak:

In response to recent discussions on access routes to Watana Dome we wish to recommend Corridor # 3 which is the Denali Highway to Watana route. Representatives of Cantwell village have also endorsed this route. We have selected this route based on our analysis of economic and environmental considerations.

Sincerely yours,

Lee R. Adler
Land Manager

LRA:ee

APPENDIX D

RELATIONSHIP TO CURRENT LAND STEWARDSHIP, USES AND PLANS

D.1 Record of Telephone Conversation with Planning Director, Mat-Su Borough (dated August 10, 1982)

D.2 Statement by State of Alaska Dept. of Community and Regional Affairs, Division of Community Planning (dated August 12, 1982)

APPENDIX D.1

Record of Telephone Call August 10, 1982

FROM: Claudio Arenas
Planning Director
Mat-Su Borough

TO: R.A. Mohn
Susitna Project Manager
Alaska Power Authority

The following represents the recommendation of the Mat-Su Planning Staff regarding access into the proposed Susitna sites:

1) The Denali Plan (Plan 17) is preferred because the cost is lower, it is easier to build, and can be built within the one year timeframe.

2) The North Plan (Plan 13) is also acceptable.

3) The South Plan (Plan 16) is not acceptable owing to the high initial cost and that it is not advantageous to public at large.

APPENDIX D.2

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPT. OF COMMUNITY & REGIONAL AFFAIRS

DIVISION OF COMMUNITY PLANNING

225 CORDOVA, BUILDING B
ANCHORAGE, ALASKA 99501
(907) 264-2255

August 12, 1982

Mr. Eric P. Yould
Executive Director
Alaska Power Authority
334 W. 5th Ave.
Anchorage, AK 99501

Dear Mr. Yould:

We are in receipt of your July 29 letter requesting this Department's comments, ranking and rationale regarding access alternatives to the Susitna and Watana damsites. Your letter stated that comments must be in your hands by August 10 in order to be included in the briefing document.

It is curious to us that after approximately 2.5 years of study and $35 million in expenditures, we are given less than 7 working days to provide our final recommendation regarding access alternatives. Inasmuch as we actually had only 2 working days due to mail time from Anchorage to Juneau and back to Anchorage, we are unable to respond to your request in a sound and responsible manner.

The only recommendation we will make is that Access Plan 17 Denali not be considered due to the scenic highway study mandated for the Denali Highway by ANILCA. Fifteen years of consistent, heavy truck traffic hardly seems compatible with a potential scenic highway.

We assume the affected local governments, particularly the Matanuska-Susitna Borough, have also been asked their views.

In the interest of affording this Department more response time in the future, we request that copies of all correspondence to Commissioner McAnerney be sent to me at this address.

Sincerely,

Lawrence H. Kimball, Jr.

Lawrence H. Kimball, Jr.
Director

cc: Lee McAnerney
Commissioner

Al Carson, Chairman
Susitna Hydro Steering Committee