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SUSITNA HYDROELECTRIC PROJECT

TRANSMISSION LINE CORRIDOR SCREENING
CLOSEOUT REPORT

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TASK 8 – TRANSMISSION
FINAL DRAFT
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TASK 8 - TRANSMISSION

SUBTASK 8.01 - CLOSEOUT REPORT
TRANSMISSION LINE CORRIDOR SCREENING

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1 - INTRODUCTION

The Acres American Incorporated (Acres) Plan of Study (POS) for the Susitna Hydroelectric Project was issued by the Alaska Power Authority (APA) for public review and comment in 1980. The POS outlined the selection of the most environmentally, economically, and technically acceptable route for transmission lines which would carry power from the proposed Watana and Devil Canyon damsites to the cities of Fairbanks and Anchorage.

Subsequent to February 1980, APA engaged Commonwealth Associates, Incorporated, (CAI) to study and recommend a location for a proposed transmission line intertie between the Anchorage and Fairbanks electrical utility systems (see Appendix D - Record of Events). The existing Fairbanks transmission system extended southward to Healy, and the Anchorage transmission system terminated in the vicinity of Willow. The corridor connecting Willow and Healy will be designated for the purpose of this report as the Intertie Corridor; this corridor must also contain the Susitna transmission lines. The corridor, therefore, is a north-south alignment along the Susitna/Chulitna/Tanana river valleys. See Figure 1.1 for general location of the study area.

This report, therefore, contains the results of studies conducted by Acres to determine the optimum corridor locations to bring power: 1) from the damsites to the connection with the Intertie; 2) from the northern terminus of the Intertie at Healy to Fairbanks; and 3) from the southern terminus of the Intertie at Willow to Anchorage. The results of this report will be used in the license application submittal to the Federal Energy Regulatory Commission (FERC).

1.1 - Organization of Report

In order to improve readability of the report, it is structured in seven sections as follows:

Section 1 contains the introduction.

Section 2 is a summary of the work undertaken and the findings to date.

Section 3 describes the scope of work and approach utilized to meet the study objectives.

Section 4 briefly summarizes previous studies of transmission line corridors conducted in the railbelt area by others.

Section 5 discusses the methodology and results of the corridor selection study conducted by Acres and a brief description of alternative corridors. Figures 5.1 through 5.3 show the alternative corridors investigated.

Section 6 presents the screening of corridors and the criteria established by Acres for that purpose which are based on environmental, economical, and technical aspects. The methodology of screening is also discussed. Table 6.7 shows the summary of the screened corridors, together with their ratings.

The findings and recommendations are discussed in Section 7. Figures 7.1 through 7.8 show the location of the recommended corridor.

The following appendices are also included:

A - Generic Plan Formulation and Selection Methodology
B - Soils Information
C - Critique of Previous Reports
D - Record of Events

1.2 - Existing Transmission Systems in the Railbelt

The railbelt area is presently served by three separate transmission systems. Each system operates independently and maintains its own reserve generation. The three areas in which the three systems operate are Anchorage-Cook Inlet, Fairbanks-Tanana Valley, and Glennallen-Valdez.

The utilities serving these areas are listed in Table 1.1. The Alaska Power Administration operates the Eklutna Hydroelectric Project and markets wholesale power to Chugach Electric Association, Anchorage Municipal Light and Power, and Matanuska Electric Association.

1.3 - Plan Formulation and Selection Process

(a) Plan Formulation

A key element in this study is the process that was applied for selection and comparison of several alternative transmission line corridors. Emphasis was placed on consideration of all aspects that may influence the choosing of a most likely candidate corridor. A description of a generic plan formulation and selection methodology is presented in Appendix A.

(b) Selection Process

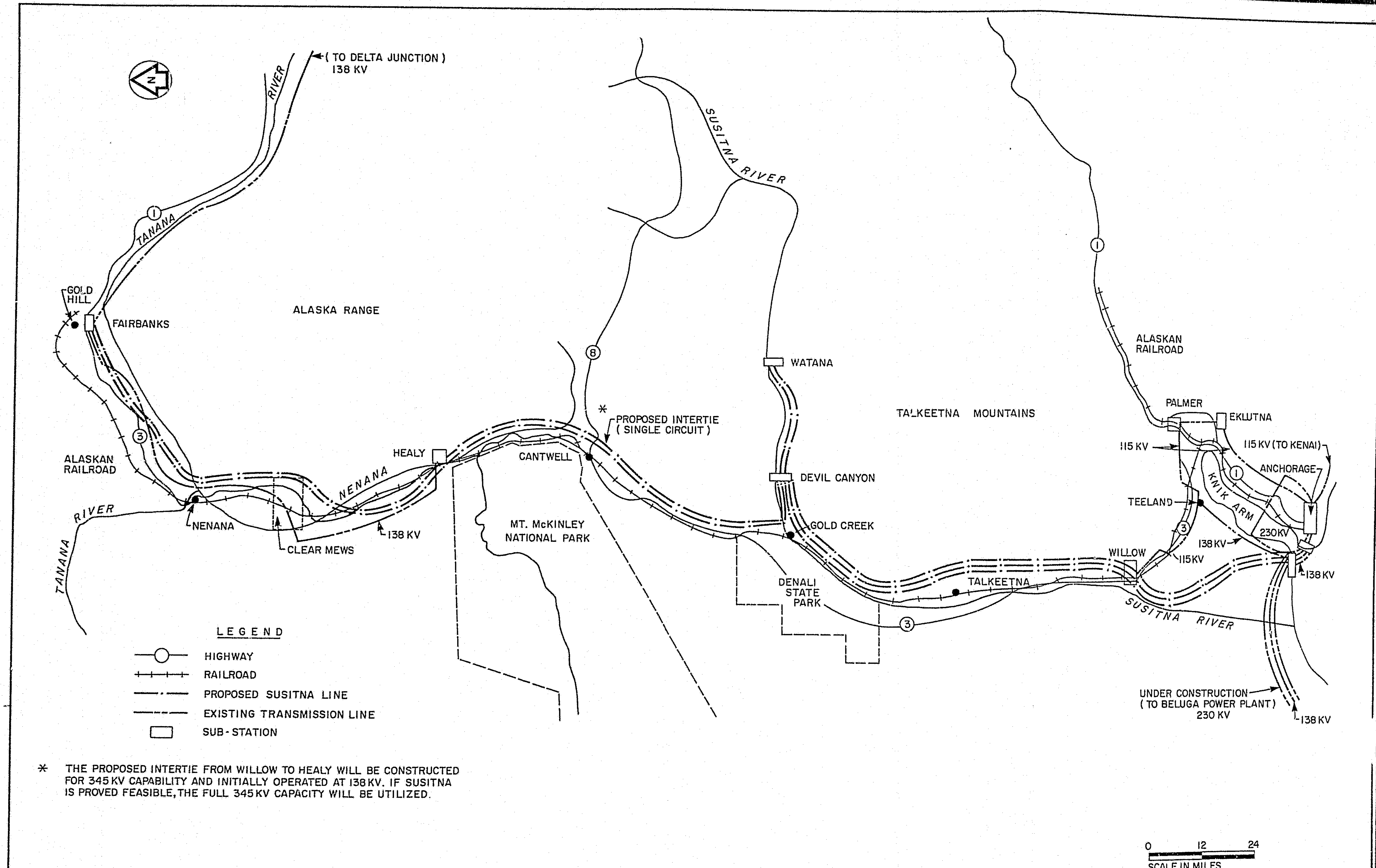
The selection process generally follows that described in Appendix A.

The POS defines the objective for Subtask 8.01 as screening of transmission line corridors from the Susitna sites to Fairbanks and Anchorage. Since then, the extent of the geographical areas has been changed by the proposed prebuild of the Intertie. The objective has been revised to define three areas which were investigated as outlined in Section 5.

Alternative corridors have been identified in each area. The results of the screening of these corridors were based on technical, economical, and environmental considerations. Successful candidates are identified and recommended.

TABLE 1.1: UTILITY COMPANIES SERVING THE RAILBELT AREA

Area	Utilities
Anchorage - Cook Inlet	Anchorage Municipal Light & Power (AML&P)
	Chugach Electric Association (CEA)
	Matanuska Electric Association (MEA)
	Homer Electric Association (HEA)
	Seward Electric System (SES)
Fairbanks - Tanana Valley	Fairbanks Municipal Utility Systems (FMUS)
	Golden Valley Electric Association (GVEA)
Glennallen - Valdez	Copper Valley Electric Association (CVEA)



ANCHORAGE TO FAIRBANKS
PROPOSED AND EXISTING TRANSMISSION LINE CORRIDORS

FIGURE 1.1

2 - SUMMARY

This section summarizes the studies conducted and the results of these studies.

2.1 - Scope of Work (Section 3)

One of the main objectives of Task 8 - Transmission, is the recommendation of a transmission line route linking the Susitna Hydro sites with the Anchorage and Fairbanks areas and selecting intermediate station sites for switching or other system functions.

Figure 1.1 shows the general transmission line configuration and related locations of the stations.

Subtask 8.01 is the preliminary step in carrying out the objective of connecting the generation with the load areas. The 8.01 subtask included the following functions which resulted in this closeout report:

(a) Review previous studies and reports.

(b) Assemble all data from U.S. Geological Survey (USGS) maps, available aerial photography, and field investigations.

(c) Obtain aerial photography.

(d) Obtain land status information.

(e) Obtain and utilize input from environmental sources.

(f) Identify the geographical areas to be considered in the study.

(g) Identify all previously selected corridors that will meet basic technical, economical, and environmental criteria established in Section 5 and select new corridors that meet these requirements.

(h) Screen the candidate corridors and select the preferred ones.

(i) Identify the selected corridors for further 1981 field investigations and aerial photography.

2.2 - Previous Studies (Section 4)

A number of studies have considered an electrical interconnection from Fairbanks to the south-central and Anchorage areas. The Susitna Hydroelectric Project Interim Feasibility Report produced by the U.S. Army Corps of Engineers, hereafter called the COE report, reviewed a number of alternative transmission corridors in considerable depth. None of the studies included a specific route for a transmission line.

International Engineering Company, Inc./Robert W. Retherford Associates (IECO/RWRA) produced the Economic Feasibility Study report for the Anchorage-Fairbanks Intertie. The preferred corridor selected in the COE report was further refined and a specific route identified. The study presents a determination of the economic feasibility for a transmission line interconnection between the utility systems of Anchorage and Fairbanks.

2.3 - Selection of Alternative Corridors (Section 5)

The proposed prebuilding of the Intertie has indicated three areas that will require study: the northern area to connect Healy with Fairbanks; the central area to connect the Watana and Devil Canyon damsites with the Intertie; and the southern study area to connect Willow with Anchorage.

Utilizing existing data, previous reports, and assumptions concerning transmission tower configuration, corridor width, and certain key locations (tie-in points), twenty-two corridors were selected for screening. This selection was based on those corridors which met certain technical, economical, and environmental criteria (Table 5.1).

Of these twenty-two corridors, four are in the southern study area, fifteen in the central study area, and four in the northern study area. Two of the corridors in the southern study area run in a north-south direction, while one runs northeast to Palmer, then back northwest to Willow. Corridors in the central study area are in two general groups: those running from Watana damsite westerly to the proposed Intertie and those running northerly across the Denali Highway and the Chulitna River. Corridors to the northern study area run either westerly or easterly to bypass the Alaska Range, then proceed northerly to Fairbanks.

2.4 - Screening of Corridors (Section 6)

Corridors selected previously were screened utilizing technical, economic, and environmental criteria similar to but more precise than those used in the selection process. Corridors were rated in terms of their acceptability from each of a technical, economical, and environmental standpoint as follows:

A = recommended
C = acceptable but not recommended
F = unacceptable

The results of these ratings were used to form a summary rating for each corridor. Technical, economical, and environmental tables are presented which reflect the criteria and rating for each corridor.

Elevation, length, and extensive clearing were the primary reasons corridors were rated unacceptable from a technical or economical aspect. Potential conflicts with land use, visual impacts, and increased access resulted in many corridors being unacceptable from an environmental standpoint. In each study area, however, one corridor was considered acceptable for technical, economical, and environmental aspects and was therefore recommended. These corridors are described in Section 7 and 2.5 below.

2.5 - Conclusions and Recommendations (Section 7)

The preferred corridor described in the COE report was also recommended by IECO/RWRA. Other alternatives have been considered in this study area and comparisons made for the purpose of further investigation. Some of the alternatives appear to be feasible, and others have been rejected for economic or reliability reasons.

The APA decision to proceed with the Intertie has resulted in a split of this study into three separate geographical entities; namely, the southern, the central, and the northern areas. For each area, one corridor has been recommended the most feasible.

The recommended corridors have attained higher ratings than any others in the selection and screening process. Any transmission lines located in these corridors will have the advantage of being relatively accessible via existing transportation corridors and being relatively short compared to other corridors under consideration. These lines can also be constructed in a manner that will minimize environmentally unacceptable impacts, particularly those regarding aesthetics, crossing of private land, and increased access to remote areas.

The recommended corridor in the southern study area stretches from an area north of Willow Creek southward to Point MacKenzie. The corridor is located east of the lower Susitna River and crosses the Little Susitna River. It is located in a sparsely inhabited area, thereby reducing land use and visual impacts. The corridor is also accessible from the Parks Highway and Anchorage, resulting in economic and reliability advantages.

The corridor recommended in the central study area connects Watana Dam to the Devil Canyon Dam and continues westward to connect with the Intertie near Gold Creek. This corridor, on the south side of the Susitna River, is the shortest in the study area and has no technical constraints. Although clearing of vegetation would be required and some wetlands crossed, the corridor's short length and potential use of a service or access road in this area result in a minimization of environmental impacts.

In the northern study area, the recommended corridor's short length, low elevation, and few water crossings result in a favorable technical and economical rating. This corridor, stretching from Healy to Fairbanks, is in the vicinity of the Parks Highway and is visible in the floodplain of the Tanana River. This corridor offers routing potential for the final right-of-way that will minimize any adverse visual and land use impacts.

3 - SCOPE OF WORK

The scope of work discussed in this section includes the objectives and the approach used to achieve the objectives. It also reviews events which occurred after the issuance of the POS. These events have had an impact on the corridor selection process. For purposes of this study and this report, corridors were defined as being three to five miles wide.

3.1 - Objectives

The objectives of this study were to:

(a) Review reports from previous studies of Susitna Hydroelectric transmission line options.

(b) Choose feasible corridors from these studies.

(c) Identify new corridors for consideration.

(d) Screen these corridors to select the one most acceptable considering economical, technical, and environmental constraints.

3.2 - Approach

The following approach was used to meet the objectives described above:

(a) Reports prepared by COE and by IECO/RWRA were reviewed to develop an understanding of the physical conditions in the railbelt area.

(b) Alternative corridors described in the previous reports were assessed from an economical, technical, and environmental view.

(c) New alternative corridors were established and assessed economically, technically, and environmentally.

(d) The above information was utilized to select preferred corridors for further study.

(e) Selected corridors were identified on one-inch to one-mile USGS maps for use in the environmental and geotechnical studies.

4 - PREVIOUS STUDIES

In this section of the closeout report, a summary is presented of studies undertaken by COE and IECO/RWRA.

Critiques and review of these studies may be found in Appendix C.

4.1 - COE Studies

The main element of the COE study was an evaluation of alternative corridor locations to select those maximizing reliability while minimizing cost.

The corridor evaluation began with map identification of all potentially feasible corridors and a field reconnaissance which eliminated those for which topography, elevation, and climate factors would be unacceptable. The remaining corridors were then evaluated in more detail to determine their relative advantages and disadvantages. Much of the detail of the environmental evaluation is presented in the Alaska Power Administration's environmental assessment which was incorporated in the COE report.

The COE concluded that Susitna I Corridor (between the damsites and Anchorage) and Nenana I Corridor (between the damsites and Fairbanks) were the preferred corridors (see Appendix C). The Susitna I and Nenana I fall within existing transportation systems and likely present the least construction impacts of all the alternatives considered. It is worth noting that the corridors' locations are general in nature and serve the purpose of demonstrating project feasibility.

4.2 - The IECO/RWRA Report

The IECO/RWRA study made use of the COE report as background information for both the economic feasibility and the selection of a transmission line corridor.

The selected corridor is almost the same as that recommended by the COE report with further definition. The corridor was chosen because of its favorable length, accessibility, and environmental considerations.

The report presents a detailed economic feasibility study for the Anchorage-Fairbanks transmission system. However, it is general in nature when dealing with environmental studies.

The report points out that construction and maintenance of other Alaskan transmission systems have shown that careful route selection and proper mitigation measures can substantially reduce environmental impacts.

5 - SELECTION OF ALTERNATIVE CORRIDORS

This section of the report outlines the study areas, the data base, and the assumptions used in planning the selection process. It also describes the selection criteria used in choosing corridors from previous reports and identifying new corridors for this study. The corridors are then described according to geographical location, topography, soils, vegetation, and stream and road crossings.

5.1 - Objectives

The main objective of this POS subtask was to select feasible transmission line corridors from those identified in previous studies and to list new alternative corridors as candidates for consideration in the screening methodology. The proposed prebuilding of the Intertie has indicated three areas which will require study:

(a) The northern area to connect Healy with Fairbanks.

(b) The central area to connect the Watana and Devil Canyon damsites with the Intertie connecting Willow to Healy.

(c) The southern area to connect Willow with Anchorage.

5.2 - Data Base

The data base used for this analysis was obtained from the following sources.

(a) Existing aerial photos taken in the area for previous projects.

(b) USGS maps.

(c) Land status maps.

(d) The Interim Feasibility Report prepared by the COE for the south central railbelt area, 1975.

(e) The Economic Feasibility Study Report for Anchorage-Fairbanks Transmission Intertie by IECO/RWRA in 1979.

(f) Results and observations of field trips by Acres' personnel and subcontractors which included aerial and ground reconnaissances of the potential corridors.

5.3 - Assumptions

The following assumptions were made for the selection process.

(a) The main purpose of the transmission system is to deliver electrical power from Watana and Devil Canyon to the Anchorage and Fairbanks areas.

(b) The transmission lines will be built on single-circuit towers (345 kV) to ensure reliability of operation.

(c) An Intertie will be built by 1984 between Willow and Healy to 345 kV specifications but will initially be operated at 138 kV. If the Susitna Hydroelectric Project is proved feasible, the full 345 kV capability will be utilized. If constructed, the Susitna lines will parallel the prebuilt Intertie and will share the same right-of-way.

(d) Access roads will be constructed to the Watana and Devil Canyon damsites in the central study area wherever possible, and the transmission line will parallel this road.

(e) The transmission system configuration will consist of three single-circuit lines from Devil Canyon to Anchorage and two single-circuit lines from Devil Canyon to Fairbanks. The connection between Watana and Devil Canyon will consist of two single-circuit lines.

(f) Corridors will be three to five miles wide.

(g) The Willow area will be the future site of the state capital.

5.4 - Selection Criteria

This subsection outlines the guidelines used for establishing the criteria for selecting feasible transmission line corridors adopted in this study. The main classifications are:

- technical
- economical
- environmental

Since the corridors being studied could range in width from three to five miles, the base criteria had to be applied in broad terms. The study also indicated that the criteria listed for technical purposes could reappear in the economic or environmental classification. The technical criteria will be defined as requirements for the normal and safe performance of the transmission system and its reliability.

The selection criteria are:

(a) Technical Criteria

The criteria, listed in Table 5.1, are established and evaluated to ensure that the corridors chosen are technically sound for the ultimate performance of the transmission system.

(b) Economical Criteria

The criteria are established and evaluated to incorporate economic considerations into corridor selection; they appear in Table 5.1.

(c) Environmental Criteria

The criteria, listed in Table 5.1, are established and evaluated to aid in selecting the corridor with the least amount of environmental impact.

5.5 - Identification of Corridors

As discussed previously, the Susitna transmission line corridors studied are located in three geographical areas; namely:

- The southern study area between Willow and Anchorage.

- The central study area between Watana, Devil Canyon, and the Intertie.

- The northern study area between Healy and Fairbanks.

The selection process resulted in the corridors identified in Figures 5.1, 5.2, and 5.3 for each study area, taking into consideration the criteria established in the previous Subsection 5.4 (technical, economical, and environmental), and according to the generic plan formulation and selection methodology (Appendix A).

5.6 - Description of Corridors

Figures 5.1 through 5.3 portray the corridors under evaluation in the southern, central, and northern study areas, respectively. For purposes of simplification, only the centerline of the three-to-five-mile-wide corridors are shown in the figures. The figures have been produced as large fold-outs so the reader can more easily understand the following narratives.

In each of the three figures, each corridor under consideration has been identified by the use of letter symbols. The various segment intersections and the various segments, where appropriate, have been designated. Thus, segments in each of the three study areas can be separately referenced. Furthermore, the segments are joined together to form corridors. For example, in the northern study area Corridor ABC is composed of Segments AB and BC.

The alternative corridors selected for each study area are described in detail in the following paragraphs. In addition, Tables 5.2, 5.3, and 5.4 contain detailed environmental data for each corridor segment. The data were also used in the screening process as described in Section 6.

(a) Southern Study Area

The alternative corridors for the southern study area are identified in Figure 5.1.

(i) Corridor One - Willow to Anchorage via Palmer

Corridor ABC', consisting of Segments AB and BC', begins at the intersection with the Intertie in the vicinity of Willow. From here, the corridor travels in a southeasterly direction, crossing wetlands, Willow Creek, and Willow Creek Road before turning slightly to the southeast following the drainage of Deception Creek. The topography in the vicinity of this segment of the corridor is relatively flat to gently rolling with standing water and tall-growing vegetation in the vicinity of the creek drainages.

At a point northwest of Bench Lake, the corridor turns in an easterly direction crossing the southern foothills of the Talkeetna Mountains. The topography here is gently to moderately rolling with shrub- to tree-sized vegetation occurring throughout. As the corridor approaches the crossing of the Little Susitna River, it turns and heads southeast again, crossing the Little Susitna River and Wasilla Fish-hook Road.

Passing near Wolf Lake and Gooding Lake, the corridor then crosses a secondary road, some agricultural lands, State Route 3, and the Glenn Highway, before intersecting existing transmission lines south of Palmer. In the vicinity of the Little Susitna River, the topography is gently rolling. As the corridor travels toward Palmer, the land flattens, more lakes are present, and some agricultural development is occurring. After crossing the Glenn Highway, the corridor passes through a residential area before crossing the broad floodplain of the Matanuska River.

Just west of Bodenburg Butte, the corridor turns due south through more agricultural land before crossing the Knik River and eventually connecting with the Eklutna Power Station. All of the land south of Palmer is very flat with some agricultural development. Just south of Palmer, the proposed corridor intersects existing transmission facilities and parallels or replaces them from a point just south of Palmer, across the river, and into the vicinity of the Eklutna Power House. From here into Anchorage, the corridor as proposed would parallel existing facilities, crossing near or through the communities of Eklutna, Peters Creek, Birchwood, and Eagle River by using one of the two existing transmission line rights-of-way in this area. The land here is flat to gently rolling with a great deal of residential development. This corridor segment is the most easterly of the three under consideration in the southern study area and avoids an underwater crossing of Knik Arm.

(ii) Corridor Two - Willow to Point MacKenzie via Red Shirt Lake

Corridor ADFC, consisting of Segments ADF and FC, commences again at the point of intersection with the Intertie in the vicinity of Willow; but immediately turns to the southwest, first crossing the railroad, then the Parks Highway, then Willow Creek just west of Willow. The land in the vicinity of this part of the segment is very flat, with wetlands dominating the terrain.

Southwest of Florence Lake, the proposed corridor turns, crosses Rolly Creek, and heads nearly due south, passing through extensive wetlands west and south of Red Shirt Lake. The corridor in this area parallels existing tractor trails crossing very flat lands with significant amounts of tall-growing vegetation in the better drained locations.

Northwest of Yohn Lake, the corridor segment turns to the southeast, passing Yohn Lake and My Lake before crossing the Little Susitna River. Just south of My Lake, the corridor turns in a generally southerly direction, passing Middle Lake, and east of Horseshoe Lake before finally intersecting the existing Beluga 230 kV transmission line at a spot just north of MacKenzie Point. From here, the corridor parallels MacKenzie Point's existing transmission facilities before crossing under Knik Arm to emerge on the easterly shore of Knik Arm in the vicinity of Anchorage. The land in the vicinity of this segment is extremely flat and very wet, supporting dense stands of tall-growing vegetation on any of the higher or better drained areas.

(iii) Corridor Three - Willow to Point MacKenzie via Lynx Lake

Corridor AEFC is very similar to and is a derivation of Corridor ADFC; it consists of Segments AEF and FC. This corridor also extends to the southwest of Willow. West of the Parks Highway, however, just north of Willow Lake, this corridor turns and travels southwest of Willow and east of Long Lake, passing between Honeybee Lake and Crystal Lake. The corridor then turns southeastward to pass through wetlands east of Lynx Lake and Butterfly Lake before crossing the Little Susitna River. The land is well developed in this area. It is very flat and, while it is wet, also supports dense stands of tall-growing vegetation on the better drained sites. Corridor Three rejoins Corridor Two at a point south of My Lake.

(b) Central Study Area

The central study area encompasses a broad area in the vicinity of the damsites. From Watana, the study area extends to the north as far as the Denali Highway and to the south as far as Stephan Lake. From this point westward, the study area encompasses the foothills of the Alaska Range and, to the south, the foothills of the Talkeetna Mountains. Included in this study area are lands under consideration by the Intertie Project investigators. The alternative corridors would connect both Devil Canyon and Watana dams with the Intertie at one of four locations, which are identified in Figure 5.2.

As for the southern study area, individual corridor segments are listed in the text. This is to aid the reader both in determining corridor locations in the figures and in examining the environmental inventory data listed for each segment in Tables 5.1, 5.2, and 5.3.

(i) Corridor One - Watana to Intertie via South Shore, Susitna River

Corridor ABCD consists of three segments: AB, BC, and CD. This corridor originates at the Watana Dam site and follows the southern boundary of the river at an elevation of approximately 2,000 feet from Watana to Devil Canyon. From Devil Canyon, the corridor continues along the southern shore of the Susitna River at an elevation of about 1,400 feet to the point at which it connects with the Intertie, assuming the Intertie follows the railroad corridor. The land surface in this area is relatively flat, though incised at a number of locations by tributaries to the Susitna River. The relatively flat hills are covered by discontinuous stands of dense, tall-growing vegetation.

(ii) Corridor Two - Watana to Intertie via Stephan Lake

ABECD, the second potential corridor, is essentially a derivation of Corridor One and is formed by replacing Segments BC with BEC. Originating at Point B, Corridor Segment BEC leaves the river and generally parallels one of the proposed Watana Dam access road corridors. This corridor extends southwest from the river, passing near Stephan Lake to a point northwest of Daneka Lake. Here the route turns back to the northwest and intersects Corridor One at the Devil Canyon Dam site. The terrain in this area, again, is gently rolling hills with relatively flat benches. Vegetation cover ranges from sparse at the higher elevations to dense along the river bottom and along gentler slopes of the Susitna River and its tributaries.

(iii) Corridor Three - Watana to Intertie via North Shore, Susitna River

Corridor Three (AJCF), located on the north side of the river, consists of Segments AJ and CF. Starting at the Watana Dam site, the corridor crosses Tsusena Creek and heads westerly, following a small drainage tributary to the Susitna River. Once crossing Devil Creek, the corridor passes north and west of High Lake.

The corridor stays below an elevation of 3,700 feet as it crosses north of the High Lake area, east of Devil Creek, on its approach to Devil Canyon. From Devil Canyon, the corridor again extends to the west, crossing Portage Creek and intersecting the Intertie in the vicinity of Indian River. In the drainages, to elevations of about 2,000 feet, tree heights range to 60 feet. Between Devil Creek and Tsusena Creek, however, at the higher elevations, very little vegetation grows taller than three feet. Once west of Devil Creek, discontinuous areas of tall-growing vegetation exist.

(iv) Corridor Four - Watana to Intertie via Devil Creek Pass/East Fork Chulitna River

Another means of connecting the two dam schemes with the Intertie is to follow Corridor One from Watana to Devil Canyon and then exit the Devil Canyon project to the north (ABCJHI). This involves connecting Corridor Segments AB, BC, CJ, HJ, and HI. With this alternative, the corridor extends northeast at Devil Canyon past High Lake to Devil Creek drainage. From there, it moves northward to a point north of the south boundary of the Fairbanks Meridian. The corridor then follows the Portage Creek drainage beyond its point of origin to a site within the Tsusena Creek drainage. Likewise, it follows the Tsusena Creek drainage to a point near Jack River, at which point it parallels this drainage into Caribou Pass. From Caribou Pass, the corridor turns to the west, following the Middle Fork Chulitna River until meeting the Intertie in the vicinity of Summit Lake.

While along much of this corridor the route follows river valleys, the plan also requires crossing high mountain passes in rugged terrain. This is especially true in the crossing between Portage Creek and Tsusena Creek drainages, where elevations of over 4,600 feet are involved. Tall-growing vegetation is restricted to the lower elevations along the river drainages with little other than low-growing forbs and shrubs present at higher elevations.

(v) Corridor Five - Watana to Intertie via Stephan Lake and the East Fork Chulitna River

A variation of Corridor Four, Corridor Five (ABECJHI) replaces Segment BC with Corridor Segment BEC (of Corridor Two) with the previously described corridor. This results in a corridor that extends from the Watana Dam site southwesterly to the vicinity of Stephan Lake, and from Stephan Lake into the Devil Canyon Dam site. From Devil Canyon to the Intertie, the corridor follows the Devil Creek, Portage Creek, and Middle Fork Chulitna drainages previously mentioned. As before, the corridor crosses rolling terrain throughout the length of the paralleled drainages, with some confined, higher elevation passes encountered between Portage Creek and Tsusena Creek.

(vi) Corridor Six - Devil Canyon to the Intertie via Tsusena Creek/Chulitna River

Another option (CBAHI) for connecting the dam projects to the Intertie involves connecting Devil Canyon and Watana along the south shore of the Susitna River via Corridor Segment CBA, then exiting Watana to the north on Segments AH and HI along Tsusena Creek to follow this drainage to Caribou Pass. The corridor then contains the previously described route along the Jack River and Middle Fork Chulitna until connecting with the Intertie near Summit Lake. The terrain in this corridor proposal would be of moderate elevation with some confined, higher elevation passes between the drainages of Tsusena Creek and the Jack River.

(vii) Corridor Seven - Devil Canyon to Intertie via Stephan Lake and Chulitna River

This alternative uses Corridor Six but replaces Segment BC with

Segment BEC from Corridor Two. This route would thus be designated CEBAHI. Terrain features are as described in Corridors Two and Six.

(viii) Corridor Eight - Devil Canyon to Intertie via Deadman/Brushkana Creeks and Denali Highway

Yet another option to the previously described corridors is the interconnection of Devil Canyon with Watana via Corridor One (Segment CBA), with a segment then extending from Watana northeasterly along the Deadman Creek drainage (Segment AG). The segment proceeds north of Deadman Lake and Deadman Mountain, then turns to the west and intersects the Brushkana Creek drainage. It then follows Brushkana Creek north to a point east of the Kana Bench Mark. This segment of the corridor would parallel one of the proposed access roads. From there, the corridor turns west, generally parallel to the Denali Highway, to the point of interconnection with the Intertie in the vicinity of Cantwell. The area encompasses rolling hills with modest elevation changes and some forest cover, especially at the lower elevations.

(ix) Corridor Nine - Devil Canyon to Intertie via Stephan Lake and Denali Highway

Corridor Nine (CEBAG) is exactly the same as Corridor Eight with the exception of Corridor Segment BEC, utilized to replace Segment BC. Each combination of segments has been previously described.

(x) Corridor Ten - Devil Canyon to Intertie via North Shore, Susitna River, and Denali Highway

Corridor Ten connects Devil Canyon-Watana with the Intertie in the vicinity of Cantwell by means of Corridor Segments CJAG. Segment CJA is part of Corridor Three and, as such, has been previously described. Segment AG has also been described above as part of Corridor Eight. As noted earlier, the Corridor Ten terrain consists of mountainous stretches with accompanying gently rolling to moderately rolling hills and flat plains covered in places with tall-growing vegetation.

(xi) Corridor Eleven - Devil Canyon to the Intertie via Tsusena Creek/Chulitna River

Another northern route connecting Devil Canyon with Watana is that created by connecting Corridor Segment CJA (part of Corridor Three) with Segment AHI of Corridor Six.

(xii) Corridor Twelve - Devil Canyon-Watana to the Intertie via Devil Creek/Chulitna River

Another route under consideration is Corridor JA-CJHI. From north to south, this involves a corridor extending from the Intertie near

Summit lake, heading easterly along the Middle Fork Chulitna drainage into Caribou Pass. From here, it parallels the Jack River and connects with the Portage Creek-Devil Creek route, Segment HJ. At point J, located in the Devil Creek drainage east of High Lake, the corridor splits, with one segment extending westerly to Devil Canyon and the other extending east to the Watana Dam site along previously described Corridor Segments JC and JA, respectively. Terrain features of this route have been previously described.

(xiii) <u>Corridor Thirteen - Watana to Devil Canyon via South Shore, Devil Canyon to Intertie via North Shore, Susitna River</u>

Corridor Segments AB, BC, and CF are combined to form this corridor. Descriptions of the terrain crossed by these segments appear in discussions of Corridor One (ABCD) and Corridor Three (AJCF).

(xiv) <u>Corridor Fourteen - Watana to Devil Canyon via North Shore, Devil Canyon to Intertie via South Shore, Susitna River</u>

This corridor would connect the damsites in the directionally opposite order of the previous corridor, and include Corridor Segment AJCD. Again, as parts of Corridors One and Three, the terrain features of this corridor have been previously described.

(xv) <u>Corridor Fifteen - Watana to Devil Canyon via Stephan Lake, Devil Canyon to Intertie via North Shore, Susitna River</u>

Corridor Two (ABEC) and Corridor Three (CF) form to create this study-area corridor. Terrain features have been presented under the discussions of each of these two corridors.

(c) <u>Northern Study Area</u>

In the northern study area, four transmission line corridor options exist for connecting Healy and Fairbanks (Figure 5.3).

(i) <u>Corridor One - Healy to Fairbanks via Parks Highway</u>

Corridor One (ABC), consisting of Segments AB and BC, starts in the vicinity of the Healy Power Plant. From here, the corridor heads northwest, crossing the existing Golden Valley Electric Association Transmission Line, the railroad, and the Parks Highway before turning to the north and paralleling this road to a point due west of Browne. Here, as a result of terrain features, the corridor turns northeast, crossing the Parks Highway once again as well as the existing transmission line, the Nenana River, and the railroad, and continues northeasterly to a point northeast of the Clear Missile Early Warning Station (MEWS).

Continuing northward, the corridor eventually crosses the Tanana River east of Nenana, then heads northeast, first crossing Little Goldstream Creek, then the Parks Highway just north of the Bonanza Creek Experimental Forest. Before reaching the drainage of Ohio Creek, this corridor turns back to the northeast, crossing the old Parks Highway and heading into the Ester Substation west of Fairbanks.

Terrain along this entire corridor segment is relatively flat, with the exception of the foothills north of the Tanana River. Much of the route, especially that portion between the Nenana and the Tanana River crossings, is very broad and flat, has standing water during the summer months and, in some places, is overgrown by dense stands of tall-growing vegetation. This corridor segment crosses the foothills northeast of Nenana, also a heavily wooded area.

An option to the above (and not shown in the figures), that of closely paralleling and sharing rights-of-way with the existing Healy-Fairbanks transmission line, has been considered. While it is usually attractive to parallel existing corridors wherever possible, this option necessitates a great number of road crossings and an extended length of the corridor paralleling the Parks Highway. A potentially significant amount of highway-abutting land would be usurped for containment of the right-of-way. These features, in combination, preclude this corridor from further evaluation.

(ii) Corridor Two - Healy to Fairbanks via Crossing Wood River

The second corridor (ABDC) is a variation of Corridor One and consists of Segments AB and BDC. At point B, east of the Clear MEWS, instead of turning north, the corridor continues to the northeast, crossing Fish Creek, the Totatlanika River, Tatlanika Creek, the Wood River, and Crooked Creek before turning to the north. At a point equidistant from Crooked and Willow Creeks, the corridor turns north, crosses the Tanana River east of Hadley Slough, and extends to the Ester Substation. North of the Tanana River, this corridor segment also crosses Rose Creek and the Parks Highway.

Where it diverges from the original corridor, this corridor traverses extensive areas of flat ground, with standing water very prevalent throughout the summer months. Heavily wooded areas occur in the broad floodplain of the Tanana River, in the vicinity of the river crossing, and in the foothills around Rose Creek.

(iii) Corridor Three - Healy to Fairbanks via Healy Creek and Japan Hills

Corridor Three (AEDC), consisting of Segments AE and EDC, exits the Healy Power Plant in an easterly direction. Instead of p[illegible]ceeding northwest, this corridor, following its interconnection [illegible]h the

Intertie Project, heads east up Healy Creek, passing the Usibelli Coal Mine. Near the headwaters of Healy Creek, the corridor cuts to the east, crossing a high pass of approximately 4,700 feet elevation and descending into the Cody Creek drainage. From Healy to the Cody Creek drainage, the terrain is relatively gentle but bounded by very rugged mountain peaks. The elevation gain from the Healy Power Plant to the pass between the Healy Creek-Cody Creek drainages is approximately 3,300 feet. From here, the segment turns to the northeast, following the lowlands accompanying the Wood River. The corridor next parallels the Wood River from the Anderson Mountain area, past Mystic Mountain, and out into the broad floodplain of the Tanana River east of Japan Hills. Near the confluence of Fish Creek and the Wood River, the corridor turns north and intersects the north-south portion of Corridor Two (Segment DC), after first passing through Wood River Buttes. Much of the area north of Japan Hills is flat and very wet with stands of dense, tall-growing vegetation.

(iv) Corridor Four - Healy to Fairbanks via Wood River and Fort Wainwright

Corridor Four (AEF) is a derivation of Corridor Three and is composed of Segments AE and EF. Point E is located just north of Japan Hills along the Wood River. From here, the corridor deviates from Corridor Three by running north across the Blair Lake Air Force Range, Fort Wainwright, and several tributaries of the Tanana River, before reaching the crossing of Salchaket Slough. Corridor Four passes Clear Creek Butte on the east. A new substation would be located on the Fairbanks side of the Tanana River just north of Goose Island. From Point E to Point F, the terrain of the corridor is flat and very wet, and again, dense stands of tall-growing vegetation exist both in the better drained portions of the flat lands and in the vicinity of the river crossing.

TABLE 5.1: TECHNICAL, ECONOMIC, AND ENVIRONMENTAL CRITERIA USED IN CORRIDOR SELECTION

Type	Criteria	Selection
1. Technical		
- Primary	General Location	Connect with Intertie near Gold Creek, Willow, and Healy. Connect Healy to Fairbanks. Connect Willow to Anchorage.
	Elevation	Avoid mountainous areas.
	Relief	Select gentle relief.
	Access	Locate in proximity to existing transportation corridors to facilitate maintenance and repairs.
- Secondary	River Crossings	Minimize wide crossings.
2. Economical		
- Primary	Elevation	Avoid mountainous areas.
	Access	Locate in proximity to existing transportation corridors to reduce construction costs.
- Secondary	River Crossings	Minimize wide crossings.
	Timbered Areas	Minimize such areas to reduce clearing costs.
	Wetlands	Minimize crossings which require special designs.
3. Environmental		
- Primary	Development	Avoid existing or proposed developed areas.
	Existing Transmission Right-of-Way	Parallel.
	Land Status	Avoid private lands, wildlife refuges, parks.
	Topography	Select gentle relief.
- Secondary	Vegetation	Avoid heavily timbered areas.

Table 5.2
Environmental Inventory - Southern Study Area (Willow to Anchorage/Point MacKenzie)

Corridor Segment	Approx. Length (Miles)	Approx. # Road Crossings	Approx. # River/Creek Crossings	Topography	Soils [a]	Land Ownership/ Status [b]	Existing/Proposed Developments	Existing Rights-of-Way
AB	38	2 hwy (Rt. 3, Glenn) 6 light duty roads 1 unimproved road 2 trails 1 railroad	1 river 17 creeks	Willow (100'), crosses Willow Ck, follows Deception Ck (1000') along ridge of Talkeetna Mts, s.e. into Palmer (200')	Willow to near Palmer-S04 Palmer E01	A to s. of Willow Ck Rd. crossing-mostly P, with some BAP and some SP;... to due n. of Wasilla-mainly SPTA;... to B-mostly P, with some BAP and SP	Ag. uses n. & w. of Palmer; ag/res. use near L. Susitna; proposed capital site; mixed res. area at Willow Ck.; Willow air strip; cabin near A	Follows no known right-of-way for appreciable distance
BC'	35	4 hwy (Glenn, 4x) 3+ light duty roads 7 unimproved roads 1 trail several railroads	4 rivers 11 creeks	Palmer (200'), crosses Knik River to base at Chugach Mts. (500'), along Knik Arm (200'- 300'), to Anchorage (200')	Palmer- E01 Knik Arm - EF1 S. of Eklutna to n. of Anchorage -S05 Anchorage - S04	B to Knik R. - P; ... to Birchwood-mainly VS with some SPTA, P and BAP; Birchwood area-P; s.w. of Birchwood to near C'-U.S. Army Military Wdl; C'-Data void	Urban uses in Anch.; passes through/near several communities: Eagle R, Birchwood Eklutna, Chugiak, Peters Ck.	Parallels trans. line Knik R. to Anch.; parallels Glenn Hwy from Knik R. to Birchwood; parallels RR-Eagle to C'
ADF	26	1 highway (Rt. 3) 3 tractor trails	1 river 6 creeks	Willow (100'), s. along Susitna River plains (flat, wet area, with drier, raised levees, 200'-400'), to F at 150'	Willow-S04 S. of Willow to to F-S01	Near A-P; route fairly even mix of BAP and SPTA; some P near Fish Ck; area surrounding L Susitna R - Susitna Flats Game Refuge; near F-SPTA	Red Shirt Lake-mixed residential use; near residential & recr. areas s.w. of Willow; Susitna Flats State Game Refuge	Generally parallels a tractor trail
AEF	27	1 highway (Parks) 1 tractor Trail	1 river 6 creeks	Willow (100'), s. along flat wet area (200'-400'), to F at about 150'	Near L. Susitna River - S05 Remainder-S04	A, s. to Rainbow L.-mostly P, small parcels BAP; State Selected Fed. Parcel w. of Willow L.; s. to L. Susitna R. - Nancy Lake State Rec. Area; to F - mix of SPTA and BAP	Mixed res. areas; lakes used to land float planes	No known
FC	12	2 tractor trails	2 creeks	F at 150' along flats to C near sea level	Near F - S04 Near C - S01	F to 1 mi. s.-SPTA;... s. to Horseshoe L.-Pt MacKenzie Agr. Sale;... s. to C-mainly SPTA, some BAP	Scattered residential/cabins on Horseshoe Lake; proposed ag. uses in area	Generally follows a tractor trail

a. Source: United States Department of Agriculture, Soil Conservation Service 1979. See Appendix Table B-1 for explanation of soil units.

b. Source: CIRI/Holmes and Narver. 1980. P=Private, SPTA=State Patented or Tentatively Approved, SP=State Patented, BAP=Borough Approved or Patented.

Table 5.2 (Cont'd)

Environmental Inventory - Southern Study Area (Willow to Anchorage/Point MacKenzie)

Corridor Segment	Scenic Quality/ Recreation	Cultural [a] Resources	Vegetation [b]	Fish [c] Resources	Birds [d]	Furbearers [d]	Big Game [d]
AB	Gooding L. - bird-watching; rec. trails e. of Willow-hunting, hiking, x-c skiing, dog sledding, snow-mobiling, snowshoeing; rec. trail by Decep. Ck- snow-mobiling, dog sledding, fishing	Data void	Upland, mixed deciduous-conifer forests (birch-spruce)- open and closed ~~mostly~~ Tall shrub (alder); some woodland black spruce; bogs along Deception Ck.	Willow Ck. - chinook salmon, grayling, burbot, longnose sucker, round whitefish, Dolly Varden, slimy sculpin; lake trout & rainbow trout in lakes; L. Susitna R. - king salmon; Decep. Ck. - king, pink salmon	Data void	Data void	Except near Palmer-black bear summer range, moose winter/ summer range, migrating corridors and calving area; near A also brown bear summer range and feeding area
BC'	Passes near 2 camping grounds; parallels Iditarod racing trail (x-c skiing, sledding, snowmobiling); birdwatching at Eklutna Flats and Matunuska River	Data void	Deciduous forest (balsam poplar) along river, probably birch/spruce forests on uplands in most of area Data void	Sockeye, chinook, pink, chum, coho salmon in large rivers; grayling burbot, longnose sucker, round white-fish, Dolly Varden, slimy sculpin, lake and rainbow trout in lakes & stream; salmon of particular significance in the Matanuska and Knik Rivers	Waterfowl and shore bird nesting areas around Knik Arm and Eagle River Flats	Data void	Data void
ADF	X-c ski & snowmobile trails; recreation area s.w. of Willow	Data void	Higher grounds: Spruce-birch-poplar forests Wet sedge grass bogs and black spruce forests prevalent in lower half	Willow Ck.- chinook salmon; lake and rainbow trout posible in some lakes; also, in streams are grayling, burbot, longnose sucker, round whitefish, Dolly Varden, slimy sculpin; Red Skirt L. - lake trout, sockeye salmon	Waterfowl and shore bird nesting in Willow Creek/ Delta Islands	Data void	Brown and black bear feeding area, moose winter/summer range and calving area
AEF	Mixed rec. areas; Nancy Lake State Rec. area; trails and multiple uses; may cross Goose Bay St. Game Refuge	Data void	Upper half; mostly upland birch, spruce & aspen Lower half: wet sedge-grass bogs and black spruce; some birch, spruce; aspen on higher ground	Lakes may contain rainbow and lake trout; possibly grayling in the region	Same as ADF		Same as ADF
FC	May cross Susitna Flats State Wildlife Refuge	Data void	Spruce forests, spruce-birch forests, sedge-grass bogs and black spruce bogs	Lake may contain rainbow and lake trout; possibly grayling in the region	Waterfowl and shore bird migration route, feeding and nesting area	Furbearer and small mammal summer/ winter range	Black bear summer range and feeding area; moose winter/ summer range, feeding and calving area

a. Coastal area probably has many sites, available literature not yet reviewed.

b. Tall shrub=alder; low shrub=dwarf birch, and/or willow; open spruce=black (wet) or white spruce, 25%-60% cover; woodland spruce=white or black spruce, 10%-25% cover, mixed forest= spruce-birch.

d. Little data available. Source of information in this table: Alaska Department of Fish and Game 1978b.

c. Little data a..llable. Source of information in this table: Alaska Department of Fish and Game 1978a.

Table 5.3

Environmental Inventory - Central Study Area (Dam Sites to Intertie)

Corridor Segment	Approx. Length (Miles)	Approx. # Road Crossings	Approx. # River/Creek Crossings	Topography	Soils[a]	Land Ownership/ Status[b]
AB	7	0	5 creeks	Moderate sloping s. rim of Susitna R. Valley; crosses deep ravine at Fog Ck. at about 2000' contour	SO15	VS
BC	18	0	8 creeks	2000' contour along s. rim of Susitna River; crosses 3 steep gorges	B westward- SO15; near C - SO10	VS
CD	15	1+	1 river 4 creeks	Moderately sloping terrain; crosses Susitna R. near Gold Creek (800')	OS10	C to 1 1/2 mi. e. of Susitna R. - VS; Susitna R. tc 1 1/2 mi. e. - SPTA; ... to D-P
BEC	23	0	8 creeks	Crosses moderate slopes around Stephan Lake; w., then n. to avoid deep ravine at Cheechako Ck., then follows s. rim of Susitna at about 2000'	B, westward - OS15; between B & C - IU3; near C - SO10	VS except where corridor skirts Cheechako Ck. ravine, which is classified SS Suspended
AJ	18	0	11 creeks	A (about 2000') to 3500'; crosses deep ravine at Devil Ck. (2000'); goes by several ponds	A, westward - OS15; remainder, except J - OS16; near J - SO10	SS except at J ar at A westward across Tsusena Ck., which are VS
JC	8	0	1 creek	J (2000'), s.w. through gently sloping High Lake area,to C at Devil Canyon (2000')	OS10	SS except at J an C which are VS
CF	15	0	2 creeks	Devil Canyon (<2000') west across 600' deep Portage Creek gorge; w. across gentle terrain to F (1200')	SO10	C to 1 1/2 mi. e of Miami L. mainl VS with small parcel of SS; ... to F-P
AG	65	0	1 river 35 creeks	A (2000'), n. along Deadman Ck. to 3200'; crosses Brushkana drainage (at 3200'); drops to Nenana River (2400') and fairly flat terrain to G (2200')	Near A and along Denali Hwy - OS15; through mts.-SO16	A - VS; n. of A t s.w. of Big L. - SS; ... to s. of Deadman L. - SPTA ... to Denali Hwy - Fed. D-1 land; data void for 8 mi.; around G - Small Fed. Parcel
AH	22	0	9 creeks	A (2000'), along Tsusena Ck.; past Tsusena Butte; through mt. pass at 3600'	Near A - SO15; mt. base - SO16; mts. - RM1	A - VS; ... to n. ot Tsusena Butte SS; data void beyond here
HI	21	0	15 creeks	H (3400') through mts.; along Jack R. drainage and Caribou Pass; to I at 2400'	Mts. - RM1; along hwy - SO15	I - VS; data voic to east
HJ	23	0	13 creeks	H (3400') through mts. along Portage Ck. drainage, through pass at 3600'; into Devil Creek drainage; to J at 2000'	Near J - SO16; mid elevations- SO17; mts. - RM1	J - VS; Devil Ck drainage - SS; data void beyond here

a. Source: United States Department of Agriculture, Soil Conservation Service 1979. See Appendix Table B-1 for explanation of soil units.

b. Source: CIRI/Holmes and Narver. 1980. P=Private, SPTA=State Patented or Tentatively Approved, SS=State Selection, VS=Village Selection.

Table 5.3 (Cont'd)
Environmental Inventory - Central Study Area (Dam Sites to Intertie)

Corridor Segments	Fish Resources[a]	Birds	Furbearers	Big Game
AB	Fog Lakes - Dolly Varden, sculpin; Stephan Lake contains lake and rainbow trout, sockeye & coho salmon, whitefish, longnose sucker, grayling; burbot	Potential raptor nesting habitat in Fog Creek area	Excellent fox and marten habitat; Fog Lakes support numerous beavers and muskrat; otters common	Supports large pop. of moose; wolves, wolverine and bear, (especially brown) common; caribou regularly use area
BC	Several small tributaries crossed, perhaps used by grayling	Potential raptor nesting habitat along Devil Canyon	Excellent fox and marten habitat	Area around Stephan Lake & Prairie Ck. supports large pop. of moose; wolves, wolverines, and some bear (especially brown) common; caribou regular users
CD	Same as BC	Potential raptor nesting habitat along Devil Canyon	Area around Devil Canyon has excellent fox and marten habitat	Moose, caribou, and bear habitat
BEC	Several small tributaries crossed, perhaps used by grayling, burbot	Potential raptor nesting habitat along Devil Canyon and along drainages upstream; Stephan Lake area important to waterfowl and migrating swans	Excellent fox and marten habitat, particularly around Stephan Lake	Same as AB
AJ	Dolly Varden; grayling in Tsusena Creek	Data void	Red fox denning sites, numerous beaver, muskrat and mink, especially around High Lake	Mouth of Tsusena Ck. important moose habitat; heavily used by black and brown bear
JC	Burbot; no data for High Lake	Potential raptor hab. by Devil Canyon; golden eagle nest along Devil Ck. s. of confluence of ck. from High Lake	Same as AJ	Important moose and bear habitat; data void
CF	Portage Creek has king, chinook, chum and pink salmon, grayling, burbot	Potential raptor habitat along lower Portage Ck. and from Portage Ck. mouth through Devil Canyon	Area between Parks Hwy and Devil Canyon supports numerous beaver, muskrat, and mink	Probably important moose wintering area and black bear habitat; at least one wolf pack
AG	Dolly Varden; lakes - lake trout, grayling, white- fish; tributaries to Nenana River and Brushkana Creek n. of Deadman Mt, and Jack R. near Denali Hwy considered important fish habitat	Waterfowl numerous at Deadman Lake; impor- tant bald eagle habitat by Denali Hwy and Nenana R. just w. of Monahan Flat; unchecked bald eagle nest along Deadman Ck, s.e. of Tsusena Butte	Population relatively low, although beaver, mink, fox present; Deadman Mt. to Denali Hwy.- moderate pop. red fox	Probably important area for caribou, expecially in the north
AH	Dolly Varden; grayling	Known active bald eagle nest s.e. of Tsusena Butte	Population along Tsusena Ck. pro- bably relatively low; with beaver, mink, and fox probably present	Data void
HI	Lake trout, Caribou Pass area; Jack River s. of Caribou Pass considered important fish habitat; data void	Data void	Data void	Data void
HJ	Portage Creek - king, chinook, chum, and pink salmon, grayling, burbot	Data void	Numerous beaver, muskrat, and mink around High Lake	Data void

a. Little data available. Sources of information in this table: Alaska Department of Fish and Game 1978a, Friese 1975, and Morrow 1980.

Table 5.3 (Cont'd)

Environmental Inventory - Central Study Area (Dam Sites to Intertie)

Corridor Segment	Existing/Proposed Developments	Existing Rights-of-Way	Scenic Quality/ Recreation	Cultural Resources	Vegetation [a]
AB	Follows general route of proposed Susitna access rds.; cabins on Fog Lakes; planes use lakes	No known	Fog Lakes - high aesthetic quality; fishing in Fog Lakes	Arch. sites identified near Watana Dam site and w. shore of Stephan Lake; potential for more sites around Fog Lakes and Stephan Lake	Mostly woodland black spruce (wet); some low shrub
BC	Follows general route of Susitna proposed access rds.; cabins and lodge on Stephan L.	No known	Stephan Lake - high aesthetic quality	Arch. sites near Stephan Lake	Open and woodland spruce forests, low shrub, open and closed mixed forest in about equal amounts
CD	Follows proposed Susitna access rd.-Devil Canyon to Susitna R.; scattered cabins in Canyon/Gold Creek area	Old Corps trail, Gold Ck. to Devil Canyon	Scenic area; possible fishing	Hist. sites near Gold Ck.; data void	Mostly closed mixed forests
BEC	Follows general route proposed Susitna access rd.; cabins and lodge on Stephan Lake	No known	Stephan Lake - high aesthetic quality; major recreation area for fishing/boating/ planes	See AB	Woodland spruce and bogs around Stephan Lake; low shrub, mat & cushion and sedge-grass tundra at upper end of Cheechako Ck. drain- age; tall shrub (alder) and mixed forest along Cheechako Ck. and towards Devil Canyon
AJ	Follows a proposed Susitna access rd. from Watana westward for approx. 8 mi.; lodge at High Lake	No known	High Lake and other lakes - high aesthetic quality; fishing/ hunting in High Lake area	Arch. sites at Portage Ck. and Susitna R. con- fluence and near Watana Dam site	Mostly low shrub, mat & cushion, sedge-grass tundra some tall shrub (alder)
JC	Generally follows proposed Susitna access rd.; lodge at High Lake	No known	Same as AJ	No known arch. sites	Tall shrub (alder), low shrub and open mixed forest
CF	Follows a proposed Susitna access rd. for about 3 mi. from Devil Canyon to Portage Ck.; mining, cabins	No known	Boating in Susitna; hunting, fishing, hiking	Arch. sites at Portage Ck.; hist. sites near Canyon	Open & closed mixed forest, tall shrub, low shrub.
AG	Follows a proposed Susitna access rd. - Watana to just n. of Deadman Mt.; occasional cabins; landing strip along Denali Hwy; airport near G	Parallels Denali Hwy beyond Brushkana Ck. drainage to G	Remote flat areas - high visibility; Deadman L. and Mt., Alaska Range - high aesthetic quality; fishing, float planes; major rec. areas by Brushkana and Nenana R., Drasher L.	Arch. sites along Deadman Ck.	Mostly low shrub in southern end; northern end - data void
AH	Cabins near Tsusena Butte	No known	Tsusena Butte - aesthetic quality; major sheep hunting area	Arch. site n. of Tsusena Butte along Tsusena Ck; data void	Low shrub, tall shrub, woodland spruce
HI	Cabins near Summit	No known	Major sheep hunting area; bird watching at Summit L.	Data void	Data void
HJ	Susitna access rd. along Devil Ck. for about 4 mi.; cabins along Devil Ck. drainage	No known	Scenic drainage; Sheep hunting in n.	Data void	Mat & cushion, sedge-grass tundra, tall shrub and open mixed forest in southern end

a. Tall shrub=alder; low shrub=dwarf birch, and/or willow; open spruce=black (wet) or white spruce, 25%-60% cover; woodland spruce=white or black spruce, 10%-25% cover, mixed forest= spruce-birch.

Table 5.4
Environmental Inventory - Northern Study Area (Healy to Fairbanks)

Corridor Segment	Approx. Length (Miles)	Approx. # Road Crossings	Approx. # River/Creek Crossings	Topography	Soils [b]	Land Ownership/ Status [c]	Existing/Proposed Developments	Existing Rights-of-Way
AB	40	2 highway (Park) 3 trails (1 winter) 2 unimproved rds. 1 railroad	3 rivers 15 creeks	Follows Nenana River north at 1000' to Browne-crosses River; n.w. to Clear MEWS at 500'	IR10	A to e. of Dry Ck.-small Fed. Parcel; ...to s. of Clear MEWS and at B-mostly SPTA, small parcels of P, small Fed. Nat. Allot. along Nenana R.; Clear MEWS area-parcel CIRI Selection, and U.S. Army Wdl. Land	Scattered residential and other uses along Parks Hwy; cabin near Browne; air strip at Healy	Generally parallels Parks Hwy, RR and trans. line- Healy to Browne
BC	50	Parks Highway 1 winter trail	1 river 25 creeks	Clear MEWS (500') north across plain (400'), n.e. across Tanana River Valley to Ester (600')	Near B - IR10; flats s. of Tanana River-IQ2; Tanana River-IQ3; Tanana R. to Ester-IR14	B to 1 1/2 mi n. - SPTA; ... to s. to Tanana R. - SS; ... to Tanana R. - P; ... to crossing L. Goldstream Ck. - mostly SPTA; ... to Bonanza Ck. Crossing - SS; ... to near C - SP; remainder - data void	Scattered residential and other uses along Parks Hwy; cabin at Tanana R. crossing	Follows w/in several mi. Parks Hwy, RR, and trans. line; more closely follows Parks Hwy. and trans. line and sled rd. n. of Tanana R.
BDC	46	1 winter trail	2 rivers 29 creek	Clear MEWS (500'), n.e. across plain to a point about 24 mi. due s. of Ester; n. across plain to Tanana R. (400') and n. to Ester	Near B - IR10 Remainder - IQ2	B area - SPTA; Fish Ck to Tanana R. - data void; remainder - SPTA, BAP with P at C and just n. of Tanana R.	Ft. Wainwright Mil. Reservation	No known
AE	65	1 hwy. (Parks) 1 trail	1 river [a] 50 creeks	Up Healy Ck. to pass at 4500'; down Wood R. drainage to Japan Hills (1100'); steep mts.; valleys	Near A - IR10; mt. base - IQ25; mt. area - RM1; near E - IR1	A to Nenana R. - small Fed. Parcel; ...to e. of Gold Run - SPTA... remainder - data void	Air strips - Healy and Cripple/Healy Cks. confluence; cabins-Cody Ck/ Wood R., Snow Mt. Gulch	Parallels small rd. - near Healy to Coal Ck.; small RR - Healy to Suntrana; trail at pass between Healy and Cody Cks.
EDC	50	7 trails	2 rivers 22 creeks	Japan Hills (1100') n.w. on plain along Wood R.; through Wood R. Buttes area, n. across Tanana R.; n. to Ester	Near E - IR1; between E and open flats - IR10; open flats IQ2; Tanana R. -IQ3; Ester - IR14	Same as BDC north of the Tanana River	Ft. Wainwright Mil. Res.; Wood R. Butte VABM	No known
EF	40	Several roads in Fairbanks, depending upon exact route; 3 trails	2 rivers 10 creeks Salchaket Slough	Japan Hills (1100') n. across plain to Tanana R.(500'); n. to Fairbanks	Near E - IR1; s. section of flats-IR10; flats - IQ2; Fairbanks - IQ3	Data void	Ft. Wainwright Mil. Res.; cabin - Wood R. crossing s. of Clear Butte	Parallels Bonnifield Trail-Clear Ck. Butte to Fairbanks; trans. line just s. of Fairbanks

a. Assumes corridor is located on n. side of Healy Ck. for most of its length, n. side of Cody Ck., and n.w. side of Wood R.

b. Source: United States Department of Agriculture, Soil Conservation Service 1979. See Appendix Table B-1 for explanation of soil units.

c. Source: CIRI/Holmes and Narver. 1980. P=Private, SPTA=State Patented or Tentatively Approved; SP=State Patened, SS=State Selection, BAP=Borough Approved or Patented.

Table 5.4 (Cont'd)
Environmental Inventory - Northern Study Area (Healy to Fairbanks)

Corridor Segment	Scenic Quality/ Recreation	Cultural Resources	Vegetation [a]	Fish Resources [b]	Birds [c]	Furbearers [c]	Big Game [c]
AB	Parks Hwy-scenic area; rafting, kayaking on Nenana R.	Dry Ck. arch. site near Healy; good possibility for other sites; data void	Southern end - data void Northern end - low shrub, sedge-grass tundra	Grayling, burbot, longnose sucker, Dolly Varden, round whitefish, slimy sculpin	Important golden eagle habitat near A	Prime habitat - 15 mi. from Nenana to B	From Nenana R. to B-prime moose and important black bear habitat; from A northward about 10 mi.-prime moose habitat
BC	Parks Hwy - scenic area; hunting, fishing	Good possibility for arch. sites; data void	S. of Tanana River - wet old river floodplain, low shrub and sedge-grass bogs; Tanana R. crossing-willow and alder shrub types, white spruce, balsam poplar forests along river; n. of Tanana R. - open and closed deciduous (birch and aspen) forests on slopes, w/woodland spruce and bogs, low shrub, and wet sedge-grass on valley bottoms	Grayling, burbot, longnose sucker, Dolly Varden, round whitefish, slimy sculpin, salmon (coho, king, chum), sheefish; lake chub possible	Prime peregrine habitat at Tanana R.; prime waterfowl habitat along Tanana R. s. of corridor	Prime habitat - from Clear MEWS across the Tanana	Clear MEWS to across Tanana R - prime moose and important black bear habitat; n. of Bonanza Ck. Exp. Forest - prime black bear habitat
BDC	Wide open flat-high visibility; snowmobiling in flats s. of Fairbanks	Good possibility for arch. sites; data void	Probably wet, low shrub, bogs, wet sedge-grass, alder shrub, lowland spruce; n. of Tanana-upland deciduous forests	Same as BC	Near Totatlanika Ck. to Tanana R. - prime waterfowl habitat; near Wood R. - important raptor habitat; between D & C by Tanana R. - prime peregrine habitat	Prime habitat from B to across Tanana River	B to across Tanana R - prime moose, important black bear habitat; Wood R. to just s. of the Tanana R.- prime black bear habitat
AE	Scenic quality data void; Healy Ck - rafting area	Dry Ck. arch. site near Healy; few arch. sites in mountains; maybe near Japan Hills; data void	Data void	Same as AB	Important golden eagle habitat at A & along Healy Ck. s. of Usibelli Pk; prime peregrine habitat on Keevy Pk.	Prime habitat from E to the s. about 15 mi.	Usibelli to Japan Hills-prime moose & caribou habitat; between A & Mystic Mt.- prime sheep habitat; E to the s. - import. black bear hab.
EDC	Wide open flats - high visibilty; snowmobiling in flats s. of Fairbanks	High possibility for arch. sites; data void	Probably similar to BDC	Same as AB, lake chub possible	From Wood R. Buttes to n. of Tanana R.- prime waterfowl habitat; between D & C along the Tanana R.- prime peregrine habitat.	Prime habitat from E to just n. of Tanana River	E to just n. of Tanana R.- prime moose, important black bear habitat; Wood R. to just s. of Tanana R.- prime black bear habitat.
EF	Wide open flats - high visibility	Arch. sites have been identified for the Ft. Wainwright and Blair Lakes areas	Probably similar to EDC; wet	Same as BC with the exception of coho salmon, which is not recorded	N. of Blair Lake Air Force Range to the Tanana R. - prime waterfowl habitat; s. of Fairbanks along Tanana R.- prime bald eagle habitat	Prime habitat from E to Tanana River	E to Tanana R.- prime moose and important black bear habitat; Clear MEWS to Tanana R. - prime black bear habitat

a. Tall shrub=alder; low shrub=dwarf birch, and/or willow; open spruce=black (wet) or white spruce, 25%-60% cover; woodland spruce=white or black spruce, 10%-25% cover, mixed forest= spruce-birch.

b. Little data available. Sources of information in this table: Alaska Department of Fish and Game 1978a and Morrow 1980.

c. Source: VanBallenberghe personal communication. Prime habitat=minimum amount of land necessary to provide sustained yield for that species; based upon knowledge of that species' needs from experience of ADF&G personnel. Important habitat=land which the ADF&G considers not as critical to a species as is Prime habitat but is valuable.

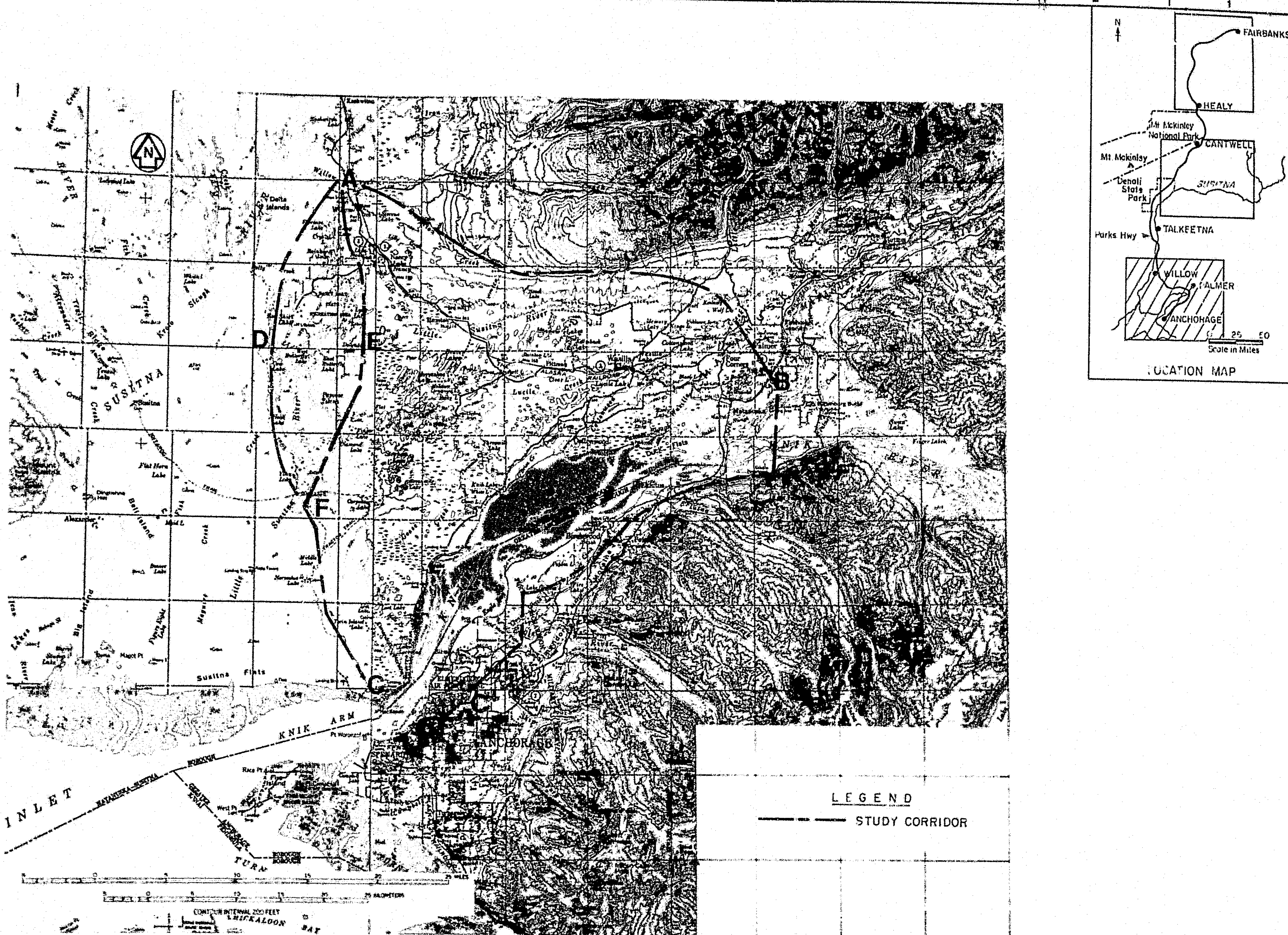


FIGURE 5.1

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

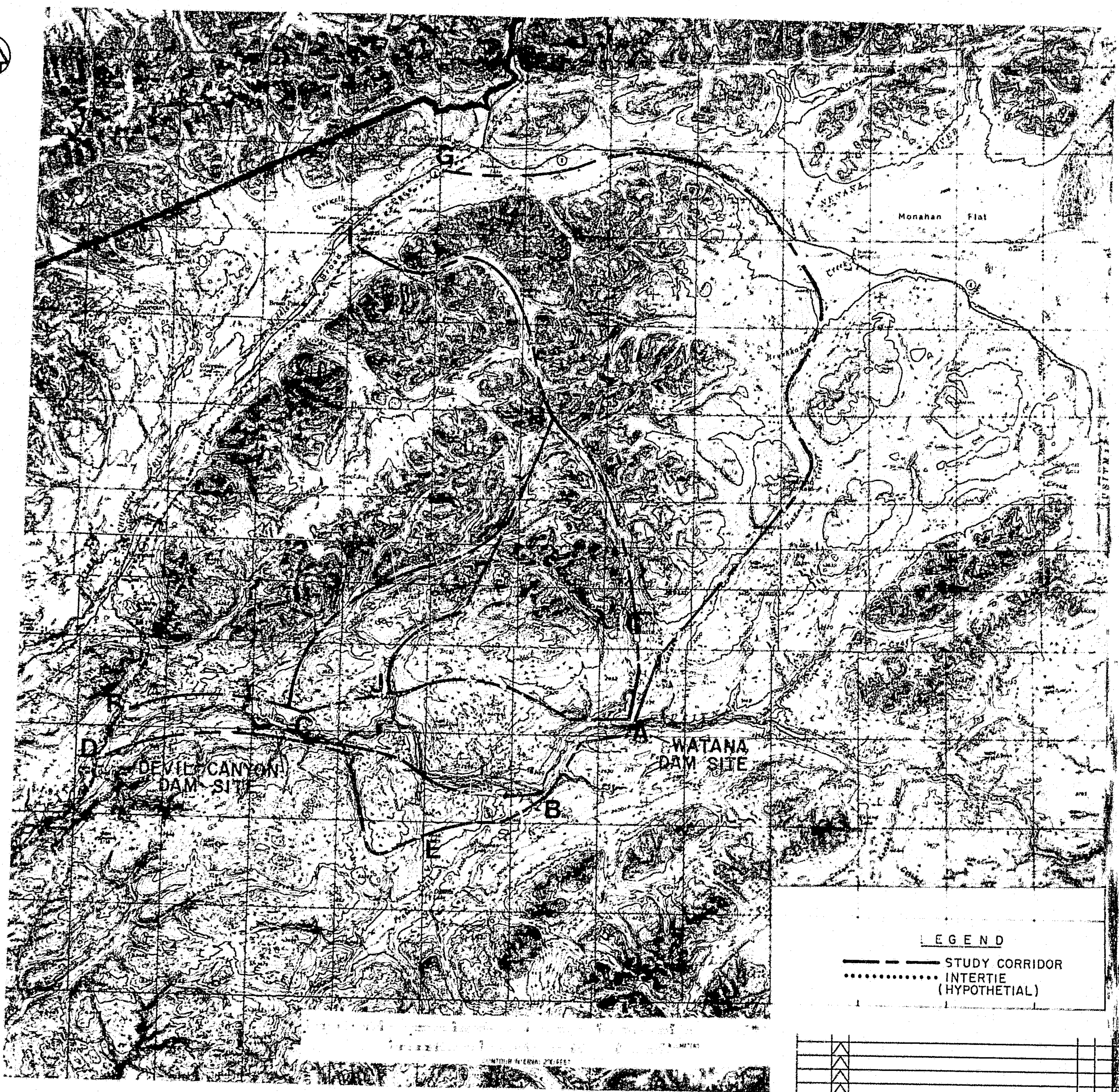
ANCHORAGE – FAIRBANKS
ALTERNATIVE T.L. CORRIDORS
(SOUTHERN STUDY AREA)

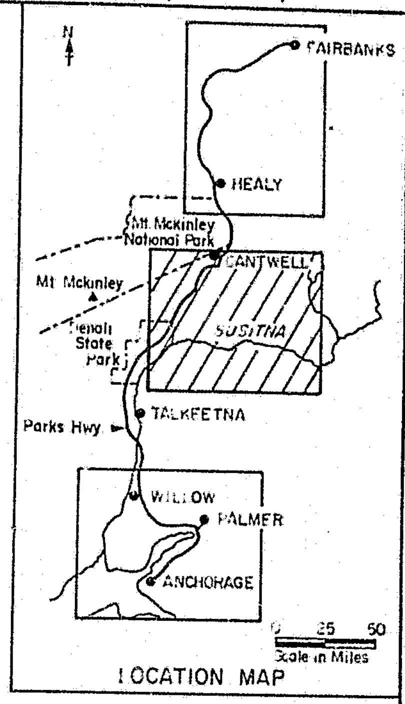
DATE FEB, 1981	SCALE AS SHOWN

SEP 8 1981

Alternative Transmission Line Corridors - Southern Study Area

00340





LEGEND

- STUDY CORRIDOR
- INTERTIE (HYPOTHETIAL)

FIGURE 5.2

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

ANCHORAGE - FAIRBANKS
ALTERNATIVE T.L. CORRIDORS
(CENTRAL STUDY AREA)

DATE FEB. 1981 | SCALE AS SHOWN

SEP 8 1981

Alternative Transmission Line Corridors - Central Study Area

000340

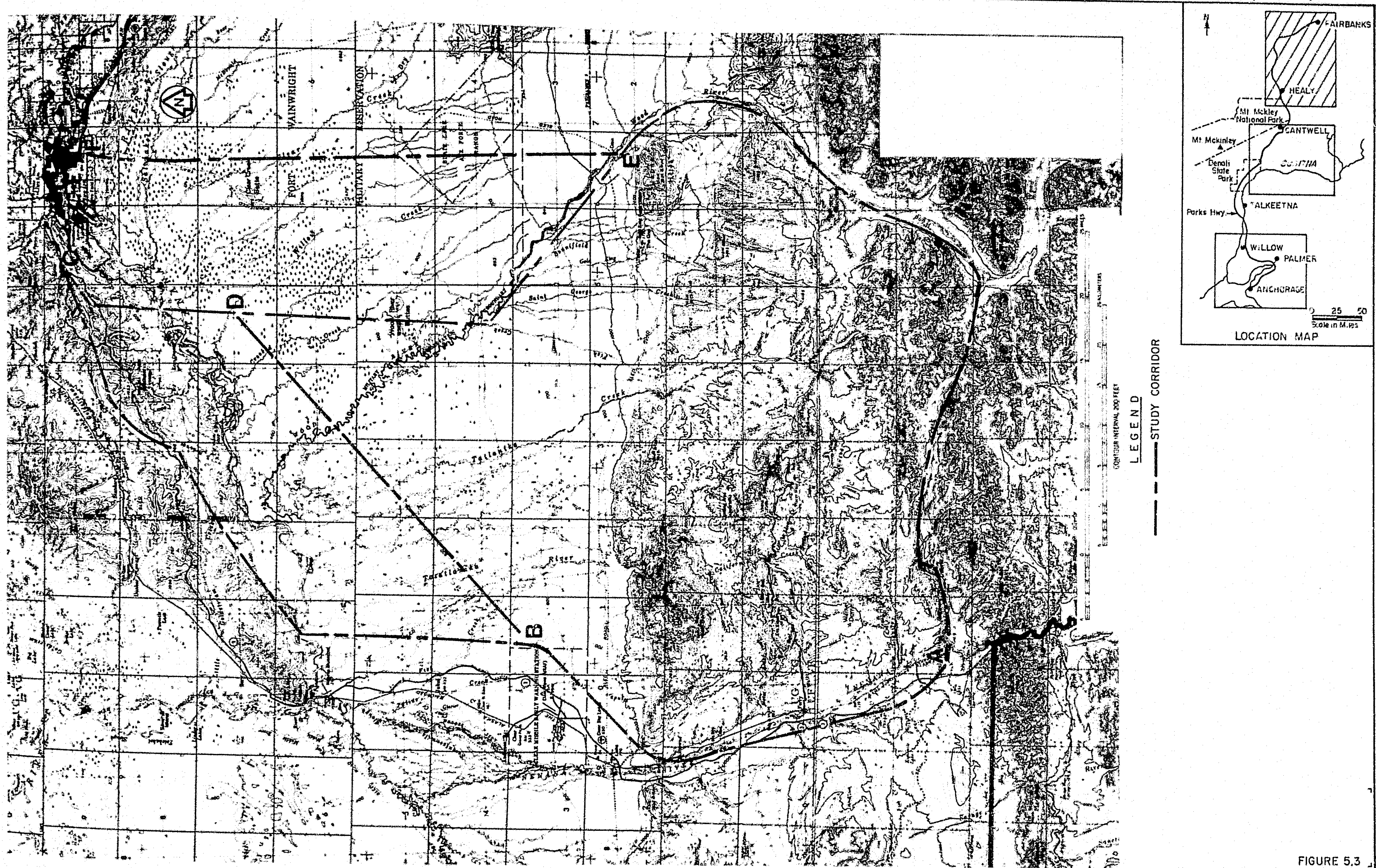


FIGURE 5.3

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

ANCHORAGE - FAIRBANKS ALTERNATIVE T.L. CORRIDORS (NORTHERN STUDY AREA)

DATE FEB. 1981 | SCALE AS SHOWN

SEP 8 1981

Alternative Transmission Line Corridors - Northern Study Area

6 - SCREENING OF CORRIDORS

6.1 - Objective

The objectives of the screening process were to focus on the previously selected corridors and select those best meeting technical, economic, and environmental criteria; more specifically:

- To eliminate the less eligible corridors identified in the selection process;

- To select initial corridors for further study;

- To identify sensitive areas within the selected corridors that may require additional studies; and

- To provide a basis for the 1981 field data collection.

6.2 - Data Base

In addition to the data base used for the selection of alternative corridors, the following data were used in the screening process:

- Additional field studies to cover the environmental aspects;

- An up-to-date land status map;

- Larger scale aerial photos for sensitive segments of the potential corridors;

- Preliminary input from other Susitna project subtasks;

- Discussions and information from public utilities personnel and agencies and their experience and comments on previous transmission lines built in Alaska; and

- Input from Intertie public participation program.

6.3 - Assumptions

The same assumptions as mentioned in the previous chapter for the selection of alternative corridors were used in the screening process.

6.4 - Reliability

The purpose of electric transmission lines is to provide electrical power. Reliability was introduced at this stage of the study as a critical element in the screening process, as described below.

Reliability is an uncompromising factor in screening alternative transmission line corridors. Many of the criteria utilized for economic, environmental, and technical reasons also relate to the selection of a corridor within which a line can be operated with minimum power interruption. Six basic factors were considered in relation to reliability:

- Elevation: Lines located at elevations below 4,000 feet will be less exposed to severe wind and ice conditions, which can interrupt service.

- Aircraft: Avoidance of areas near aircraft landing and takeoff operations will minimize risks from collisions.

- Stability: Avoidance of areas susceptible to land, ice, and snow slides will reduce chance of power failures.

- Existing Power Lines: Avoidance of crossing existing transmission lines will reduce the possibility of lines touching during failures and will facilitate repairs.

- Topography: Lines located in areas with gentle relief will be easier to construct and repair.

- Access: Lines located in reasonable proximity to transportation corridors will be more quickly accessible and, therefore, more quickly repaired if any failures occur.

6.5 - Screening Criteria

(a) Technical Screening Criteria

Corridor location objectives are to obtain an optimum combination of reliability and cost with the fewest environmental problems. In many cases, these objectives are mutually compatible.

Throughout the corridor screening and evaluation, the question arises whether it is more desirable to place lines relatively close to existing surface transportation facilities, where an easily accessible line could assure reliability of service during the line's operating life, or to pioneer new corridors across lands where the line would be seen by few people. In the final analysis, when choosing the final line route, there will be enough room in a three-to-five-mile corridor to adjust the centerline to meet the technical, economical, and environmental objectives.

Four primary and two secondary technical factors were considered in the screening of alternative corridors.

(i) Primary Aspects:

- Topography

Topography plays a key role in corridor selection, since it affects construction, operating, and maintenance. Areas of broken or steep terrain add to access difficulties and thus reduce reliability. Also, conditions in which the slope of the terrain exceeds the angle of repose of the soil increase the chances of land, rock, or mud slides. Snow, rock, or mud slides are an additional hazard on steep slopes. During the screening process, therefore, emphasis was placed on screening out those corridors that did not have gentle terrain.

- Climate and Elevation

Low temperatures, snow depth, icing, and severe winds are very important parameters in transmission design, operation, and reliability.

The climatic factors become more severe in the mountains, where extreme winds are expected for exposed areas and passes. Alaska Power Administration believes that elevations above 4,000 feet in the Alaska Range and Talkeetna Mountains are completely unsuitable for locating major transmission facilities. Significant advantages of reliability and cost are expected if the lines are routed below 3,000 feet in elevation. This elevation figure was used in the screening process.

- Soils

Although transmission lines are less affected by soils and foundation limitations than railroads and pipelines, it is more reliable to build a transmission line on soil that does not appear to be underlain by seismically induced ground failures or on a swampy area where maintenance and inspection may create problems. These factors were utilized in the screening process. Because of the vast areas of wetlands in the study area, particularly in the southern portion, it was not possible to locate a corridor that would avoid all wetland areas.

- Length of Corridors

The ideal distance between two load centers is the straight line joining them. In many cases, this idealistic situation cannot be achieved because of geographic or environmental obstacles. A shorter line, in general, will be easier to maintain and will have fewer technical obstacles than a longer one.

(ii) Secondary Aspects:

- Vegetation and Clearing

Heavily forested areas must be cleared prior to construction of the transmission line. Clearing the vegetation will cause some disruption of the soil. If not properly stabilized through restoration and vegetation, increased erosion will result. If the vegetation is cleared up to river banks on stream crossings, it may result in additional sedimentation. During the corridor screening, those corridors crossing through large expanses of heavily timbered areas were eliminated.

- Other

Highway and river crossings should be avoided as much as possible. These crossings may require additional temporary structures to protect the cable while permitting the uninterrupted flow of traffic.

(b) Economic Screening Criteria

The purpose of this exercise is to compare the conditions under which corridors for each study area would be economically feasible. Several economic criteria are important in screening the transmission line corridors.

Three primary and one secondary aspect of the economic criteria were considered.

(i) Primary Aspects:

- Length

Length of transmission line corridors has a definite influence on the capital cost of the line. A longer line will require additional right-of-way clearing, structures, foundations, electrical conductors, and hardware. At a cost of approximately $350,000/mile (1981 dollars) for a 345 kV single-circuit line, it is economically preferable to build the shortest line possible. A shorter line will also require less maintenance and, hence, lower operating costs.

- Right-of-Way

Right-of-way is an important factor in transmission line costs. Although the shortest line is more desirable from a point of view of capital cost, it may sometimes be more economical to avoid existing developments, residential areas, and agricultural lands. This will result in easement purchases being kept to a minimum.

Whenever possible, existing rights-of-ways should be shared or paralleled to avoid the problems associated with pioneering a corridor in previously inaccessible areas.

The transmission line corridor should also avoid areas of heavy forest to reduce the cost of clearing the right-of-way. However, this should be carried out only if it does not add significantly to the length of the line.

- Access Roads

Corridors in relative proximity to existing surface transportation routes will require minimal access roads. This will reduce the cost of transmission lines and make it easier for maintenance purposes.

(ii) Secondary Aspects:

In addition to the major considerations concerning economic screening of corridors, some other aspects were also considered. These include topography, since it is more economical to build a line on a flat corridor than on a rugged or a mountainous one; and limiting the number of stream, river, highway, road, and railroad crossings in order to minimize costs.

(c) Environmental Screening Criteria

Because of the potential, adverse environmental impacts from transmission line construction and operation, environmental criteria were carefully scrutinized in the screening process. Past experience has shown the primary environmental considerations to be:

- Aesthetic and Visual (including impacts to recreation)
- Land Use (including ownership and presence of existing rights-of-way)

Also of significance in the evaluation process are:

- Length
- Topography
- Soils
- Cultural Resources
- Vegetation
- Fishery Resources
- Wildlife Resources

A description and rationale for use of these criteria are presented below:

(i) Primary Aspects:

- Aesthetic and Visual

The presence of large transmission line structures in undeveloped areas has the potential for adverse aesthetic impacts. Furthermore, the presence of these lines can conflict with recreational use, particularly those nonconsumptive recreational activities such as hiking and bird watching where great emphasis is placed on scenic values. The number of road crossings encountered by transmission line corridors is also a factor that needs to be inventoried because of the potential for visual impacts. The number of roads crossed, the manner in which they are crossed, the nature of existing vegetation at the crossing site (i.e., potential visual screening), and the number and type of motorists using the highway all influence the desirability of one corridor versus another. Therefore, when screening the previously selected corridors, consideration was focused on the presence of recreational areas, hiking trails, heavily utilized lakes, vistas, and highways where views of transmission line facilities would be undesirable.

- Land Use

The three primary components of land use considerations are: 1) land status/ownership, 2) existing rights-of-way, and 3) existing and proposed development.

- Land/Status/Ownership

The ownership of land to be crossed by a transmission line is important because certain types of ownership present more restrictions than others. For example, some recreation areas such as state and federal parks and areas like game refuges and military lands, among others, present possible constraints to corridor routing. Private landowners generally do not want transmission lines on their lands. This information, when known in advance, permits corridor routing to avoid such restrictive areas and to occur in areas where land use conflicts can be minimized.

- Existing Rights-of-Way

Paralleling existing rights-of-way tends to result in less environmental impact than that which is associated with a new right-of-way because the creation of a new right-of-way may provide a means of access to areas normally accessible only on foot. This can be a critical factor if it opens sensitive, ecological areas to all terrain vehicles.

Impact on soils, vegetation, stream crossings, and others of the inventory categories can also be lessened through the paralleling of existing access roads and cleared rights-of-way. Some impact is still felt, however, even though a right-of-way may exist in the area. For example, cultural resources may not have been identified in the original routing effort. Wetlands present under existing transmission lines may likewise be negatively influenced if ground access to the vicinity of the tower locations is required.

There are common occasions where paralleling an existing facility is not desirable. This is particularly true in the case of highways that offer the potential for visual impacts and in situations where paralleling a poorly sited transmission facility would only compound an existing problem.

- Existing and Proposed Developments

This inventory identifies such things as agricultural use; planned urban developments, such as the proposed capital site; existing residential and cabin developments; the location of airports and of lakes used for float planes; and similar types of information. Such information is essential for locating transmission line corridors appropriately, as it presents conflicts with these land use activities.

(ii) Secondary Aspects:

- Length

The length of a transmission line is an environmental factor and, as such, was considered in the screening process. A longer line will require more construction activity than a shorter line, will disturb more land area, and will have a greater inherent probability of encountering environmental constraints.

- Topography

The natural features of the terrain are significant from the standpoint that they offer both positive and negative aspects to transmission line routing. Steep slopes, for example, present both difficult construction and soil stabilization problems with potentially long-term, negative environmental consequences. Also, ridge crossings have the potential for visual impacts. At the same time, slopes and elevation changes present opportunities for routing transmission lines so as to screen them from both travel routes and existing communities. When planning corridors then, the identification of changes in relief is an important factor.

- Soils

Soils are important from several standpoints. First of all, scarificacion of the land often occurs during the construction of transmission lines. As a result, vegetation regeneration is affected, as are the related features of soil stability and erosion potential. In addition, the development and installation of access roads, where necessary, are very dependent upon soil types. Tower designs and locations are dictated by the types of soils encountered in any particular corridor segment. Consequently, the review of existing soils information is very significant. This inventory was conducted by means of a Soil Associations Table, found in Appendix Table B.1, of this report. Appendix Table B.2 presents the related definitions as they apply to the terms used in Appendix Table B.1.

- Cultural Resources

The avoidance of known or potential sites of cultural resources is an important component of the routing of transmission lines. In planning for Susitna Project transmission lines, however, information on the presence of cultural resources is, for the most part, unavailable at present. Identification of data-voids for this category highlights the need for further evaluation of this resource, not only in the planning stage but also in the final route selection analysis. Further identification of known, as well as potential, sites will be accomplished as the routing and impact analyses continue.

- Vegetation

The consideration of the presence and location of various plant communities is essential in transmission line siting. The inventory of plant communities, such as those of a tall-growing nature or wetlands, is significant from the standpoint of construction, clearing, and access road development requirements. In addition, identification of locations of endangered and threatened plant species is also critical. While several Alaskan plant species are currently under review by the U.S. Fish and Wildlife Service, no plant species are presently listed under the Endangered Species Act of 1973 as occurring in Alaska. Murray (1980) has published a state listing of endangered and threatened species. No corridor currently under consideration has been identified as traversing any location known to support these identified plant species.

- Fishery Resources

The presence or absence of resident or anadromous fish in a stream is a significant factor in evaluating suitable transmission line corridors. The corridor's effects on a stream's resources must be viewed from the standpoint of possible disturbance to fish species, potential loss of habitat, and possible destruction of spawning beds. In addition, certain species of fish are more sensitive than others to disturbance.

Closely related to this consideration is the number of stream crossings. The nature of the soils and vegetation in the vicinity of the streams and the manner in which the streams are to be crossed are also important environmental considerations when routing transmission lines. Potential stream degradation, impact on fish habitat through disturbance, and long-term negative consequences resulting from siltation of spawning beds are all concerns that need evaluation in corridor routing. Therefore, the number of stream crossings and the presence of fish species and habitat value were considered when data were available.

- Wildlife Resources

The three major groups of wildlife which must be considered in transmission corridor screening are big game, birds, and furbearers. Of all the wildlife species to be considered in the course of routing studies for transmission lines, big game species (together with endangered species) are most significant. Many of the big game species, including grizzly bear, caribou, and sheep, are particularly sensitive to human intrusion into relatively undisturbed areas. Calving grounds, denning areas, and other important or unique habitat areas as identified by the Alaska Department of Fish and Game were identified and incorporated into the screening process.

Many species of birds such as raptors and swans are sensitive to human disturbance. Identifying the presence and location of nesting raptors and swans permits avoidance of traditional nesting areas. Moreover, if this category is investigated, the presence of endangered species (viz, peregrine falcons) can be determined.

Important habitat for furbearers exists along many potential transmission line corridors in the railbelt area, and its loss or disruption would have a direct effect on these animal populations. Investigating habitat preferences, noting existing habitat, and identifying populations through available information are important steps in addressing the selection of environmentally acceptable alternatives.

6.6 - Screening Methodology

(a) Technical and Economical Screening Methodology

The parameters required for the technical and economical analyses were extracted from the environmental inventory tables (Tables 5.2 through 5.4). The tables, together with the topographic maps, aerial photos, and existing published materials, were used to compare the alternative corridors from a technical and economical point of view. The parameters used in the analysis were: length of corridors, approximate number of highway/road crossings, approximate number of river/creek crossings, land ownership, topography, soils, and existing rights-of-way. The main factors contributing to the economical and technical analyses are combined and listed in Tables 6.1, 6.2, and 6.3. It should be noted that most of the parameters are in miles of line length, except the tower construction. In this analysis, it was decided to assign 4.5 towers for each mile of 345-kV line.

In order to screen the most qualified corridor, it was decided to rate the corridors as follows:

Corridor rated A - recommended
Corridor rated C - acceptable but not preferred
Corridor rated F - unacceptable

From the technical point of view, reliability, as discussed in Section 5, is the main objective. An environmentally and economically sound transmission line was rejected if the line was not reliable. Thus, any line which received an F technical rating, was assigned an overall rating of F and eliminated from further consideration.

The ratings appear in each of the economical and technical screening tables (Tables 6.1, 6.2, and 6.3) and are summarized in Table 6.7.

(b) Environmental Screening Methodology

In order to compare the alternative corridors (Figures 5.1, 5.2, and 5.3) from an environmental standpoint, the environmental criteria discussed in Section 6.4 were combined into environmental constraint tables (Tables 6.4, 6.5, and 6.6). These tables combine information for each corridor segment into the proper corridors under study. This permitted the assignment of an environmental rating, which identifies the relative rating of each corridor within each of the three study areas. The assignment of environmental ratings is a subjective, qualitative technique intended as an aid to corridor screening. Those corridors that are recommended are identified with and "A," while those corridors that are acceptable but not preferred are identified with a "C." Finally, those corridors that are considered unacceptable are identified with an "F."

6.7 - Screening Results

Table 6.7 summarizes the comparisons of the 22 corridors studied in the southern, central, and northern study areas. Environmental, economical, and technical ratings are presented as well as a summary rating for each corridor. Because of the critical importance of environmental considerations, any corridor which received an F rating for environmental impacts was assigned a summary rating of F. Thus, a corridor which may be excellent from a technical and economic viewpoint was considered not acceptable if the environmental rating was unacceptable. As discussed previously, the same reasoning related to reliability was used to reject all corridors which received an F technical rating.

Descriptions of the rationale for each corridor's rating are presented below.

(a) Southern Study Area

Three alternative corridors were evaluated in the southern study area. As previously identified, two corridors connect Willow with Point MacKenzie. The third corridor connects Willow with Anchorage.

(i) Corridor One (ABC') - Willow to Anchorage via Palmer

- Technical and Economical

This 73-mile corridor is the longest of the three being considered for the southern area. As a consequence, there will be more clearing of right-of-way required, more miles of line, and more towers. Several highway and railway crossings will also be encountered, including crossing of the Glenn Highway. The corridor is located in a well-developed, inhabited area which will require easements on private properties. There also could be a problem of radio and television interference.

- Environmental

Several constraints were identified in evaluating this corridor, chief among which were constraints under the land use category.

A new right-of-way would be required from Willow to a point in the vicinity of Palmer. This would necessitate the development of a pioneer access road and, since this area is wooded, attendant vegetation clearing and opening of a previously inaccessible area. The corridor also bisects lands in the vicinity of Willow that have been proposed for use as the new capital site.

Between Eklutna and Anchorage, this route parallels an existing transmission line that now crosses extensively developed areas. Paralleling existing corridors usually is the most appropriate means of traversing developed areas. Because homes and associated buildings abut the right-of-way, however, additional routes through this developed area present problems, among which aesthetics is most important. In addition, this corridor alternative crosses 5 rivers and 28 creeks, potentially affecting not only the rivers and streams but also fish species inhabiting these water courses. From the standpoint of aesthetics, a transmission line in the vicinity of Gooding Lake would negatively affect an existing bird-watching area. However, because this area is not heavily utilized and routing variations are available within the corridor, it is considered environmentally acceptable.

Ratings:

Technical	Economical	Environmental	Summary
C	C	C	C

(ii) Corridor Two (ADFC) - Willow to Point MacKenzie via Red Shirt Lake

- Technical and Economical

Corridor ADFC crosses the fewest number of rivers and roads in the southern study area. It has the advantage of paralleling an existing tractor trail for a good portion of its length, thereby reducing the need for new access roads. Easy access will allow maintenance and repairs to be carried out in minimal time. This corridor also occurs at low elevations and is approximately one-half the length of Corridor One.

- Environmental

This corridor crosses extensive wetlands from Willow to Point MacKenzie. At higher elevations or in the better drained sites, extensive forest cover is encountered. Good agricultural soils have been identified in the vicinity of this corridor; the state plans an Agricultural Lands Sale for areas to be traversed by this corridor. The corridor also crosses the Susitna Flats Game Refuge. The presence of an existing tractor trail near considerable portions of this corridor diminishes the significance of some of these constraints. Furthermore, its short length and the fact that it crosses only one river and eight creek crossings increases its environmental acceptability.

Ratings:

Technical	Economical	Environmental	Summary
A	A	A	A

(iii) Corridor Three (AEFC) - Willow to Point MacKenzie via Lynx Lake

- Technical and Economical

This corridor has the same physical features as Corridor Two. Both corridors have extensive wetlands. AEFC cuts across a developed recreational area and hence will require special routing procedures to circumvent some of the private property it will traverse. This corridor is very accessible. Technically, because of its short length and low elevation, it is a desirable corridor, but economically it would be costly to obtain easements and to route the line through the several privately owned properties.

- Environmental

As with the previous corridor, this route crosses extensive wetlands requiring, in the better drained areas, extensive clearing of associated forest. Just south of Willow, this route passes through the Nancy Lakes recreation area. Substantial development of both residential and recreational facilities has occurred in the past and is continuing. These facilities would be affected by the presence of the transmission line, not only from a land use standpoint, but also from an aesthetics standpoint. Because of this unavoidable land use conflict associated with this corridor, particularly in the Nancy Lake area, it is not considered to be environmentally acceptable.

Ratings:

Technical	Economical	Environmental	Summary
A	C	F	F

(b) Central Study Area

Fifteen corridors utilizing different combinations of corridor segments were identified in the central study area. These corridors connect the damsites with the Intertie at four separate locations. These locations are in the vicinity of Indian River near its confluence with the Susitna River and near the communities of Chulitna, Summit, and Cantwell.

Because of the range in length of the corridors, those with long lengths were assigned low economic ratings. These corridors, numbers Four (ABCJHI), Five (ABECJHI), Seven (CEBAHI), Eight (CBAG), Nine (CEBAG), Ten (CJAG), and Twelve (JACJHI), have lengths of 76 to 97 miles. In addition to these, Corridors Four and Six (CBAHI) were assigned an F technical rating because they cross mountainous areas over 4,000 feet in elevation.

Corridors Four and Six were rated unacceptable technically and therefore were eliminated because reliability cannot be compromised. The remaining six corridors, although unacceptable economically (F rating), were evaluated on an environmental basis. This was done to determine whether one of these long corridors was much more acceptable environmentally than a shorter one.

Therefore, environmental information is presented for the eight above-mentioned corridors. This is followed by a discussion of the economic, technical, and environmental features of the remaining seven corridors in the central study area.

Corridors Technically and/or Economically Unacceptable

(i) Corridor Four (ABCJHI) - Watana to Intertie via Devil Creek Pass/East Fork Chulitna River

This corridor connects Devil Canyon with Watana and exits the Devil Canyon project to the north following the drainages of Devil, Portage, and Tsusena Creeks. To route this corridor to the Intertie as required, the line crosses some mountain passes over 4,000 feet in elevation with steep slopes and shallow bedrock areas (Corridor Segment CJHI).

The transmission line would interrupt the existing viewshed of the recreation facility at High Lake. Existing patterns of land use in the vicinity of High Lake may also be significantly disrupted by the transmission line. Once on the north side of the river, this corridor crosses 42 creeks between Devil Canyon and the connection with the Intertie. Potential for stream degradation exists because of the lack of existing access. Sensitive wildlife species, such as caribou, wolves, and brown bear, as well as a golden eagle nest site, could be potentially harmed by this corridor.

Ratings:

Technical	Economical	Environmental	Summary
F	F	F	F

(ii) Corridor Five (ABECJHI) - Watana to Intertie via Stephan Lake and the East Fork Chulitna River

This corridor crosses areas of high elevations and shallow soils underlain by bedrock. Land use constraints are encountered in the vicinity of both High Lake and Stephan Lake, two significant recreation and lodge areas. Relatively important waterfowl and migrating swan habitat would be affected, as would habitat for some of the major big game species. In addition, this corridor makes 42 creek crossings. Extensive vegetation clearing would be required, opening areas to access. Because of the visual impacts and increased access, this corridor received an F rating.

Ratings:

Technical	Economical	Environmental	Summary
F	F	F	F

(iii) Corridor Six (CBAHI) - Devil Canyon to the Intertie via Tsusena Creek/Chulitna River

Reversing the sequence by which the damsites are connected, Corridor Six extends from Devil Canyon to Watana (Corridor Segment CBA) and from Watana north along Tsusena Creek to the point of connection with the Intertie near Summit Lake (Corridor Segment AHI). Access roads are presently absent along most of this corridor, and a pioneer route would need to be established. This corridor also traverses elevations above 4,000 feet above sea level and encounters shallow soils underlain by bedrock. Wetlands, extensive forest cover, and 32 creek crossings also constrain the development of this corridor. A bald eagle nest in the vicinity of Tsusena Butte, as well as the presence of sensitive big game species such as caribou and sheep, present additional constraints to the routing of the corridor. This corridor was rated F, primarily because of increased access and potential negative impact on sensitive wildlife species.

Ratings:

Technical	Economical	Environmental	Summary
F	C	F	F

(iv) Corridor Seven (CEBAHI) - Devil Canyon to Intertie via Stephan Lake and Chulitna River

The primary environmental constraints associated with this corridor are the result of visual and increased access impacts. The corridor crosses near residential and recreational facilities at Stephan Lake and is in the viewshed of the Alaska range. Access road construction would be necessary through wetlands and areas of heavy timber.

In addition, the corridor crosses 45 creeks, including some with valuable spawning areas. It also crosses habitat for wolves and bears, including Prairie Creek which is heavily used by brown bears during salmon runs. This offers the potential for increased bear-human contacts.

Again, because of potential for visual impacts and increased access, this corridor received an F rating.

Ratings:

Technical	Economical	Environmental	Summary
C	F	F	F

(v) <u>Corridor Eight (CBAG) - Devil Canyon to Intertie via Deadman/ Brushkana Creeks and Denali Highway</u>

Constraints in the categories of land use, aesthetics, and fish and wildlife resources are present in this corridor. Among the longest of corridors under consideration, this route passes near recreation areas, isolated cabins, lakes used by float planes, and land-based airstrips. In traversing lands from the Watana Dam site to the point of connection with the Intertie, the route also intrudes upon some scenic areas. Along much of its length, the corridor crosses woodlands and, since a pioneer access road probably would need to be developed, vegetation clearing would likely be extensive. Once north of the Watana Dam site, the transmission line corridor makes 35 creek crossings and traverses the habitat not only for a variety of sensitive big game species but also for waterfowl and raptors. In addition, the line passes near the location of an active bald eagle nest on Deadman Creek.

For these reasons, a rating of F was assigned.

Ratings:

Technical	Economical	Environmental	Summary
C	F	F	F

(vi) <u>Corridor Nine (CEBAG) - Devil Canyon to Intertie via Stephan Lake and Denali Highway</u>

Corridor Nine is the longest under construction in the central study area and, hence, would require disturbance of the largest land areas. It also crosses areas of shallow bedrock, important waterfowl migratory habitat at Stephan Lake, and 48 creeks, including valuable spawning areas.

The corridor passes near Stephan Lake, utilized heavily for recreation, and any line constructed in this area would be visible when looking towards the Alaska range. Although one of the proposed access roads to the damsites does occur in this area offering the potential for parallel rights-of-way, the extreme length of this corridor and the potential for unavoidable adverse land use and aesthetic impacts result in its being unacceptable. Thus, an F rating was assigned.

Ratings:

Technical	Economical	Environmental	Summary
C	F	F	F

(vii) Corridor Ten - Devil Canyon to Intertie via North Shore, Susitna River, and Denali Highway

This is the second longest of the corridors under investigation by this study. Routing above 3,000 feet and its concomitant bedrock and steep slopes are important restrictions of this corridor. It would also encounter the land use constraints identified in Corridor Nine, as well as several other drawbacks, most notable of which are in the areas of aesthetics and fish and wildlife resources. Forty-seven creek crossings would be required by this corridor.

This corridor could also parallel one of the proposed access roads. However, as with Corridor Nine, its long length, land use, and visual impacts do not make it an acceptable corridor.

All of the above and particularly the aesthetic constraints result in an F rating.

Ratings:

Technical	Economical	Environmental	Summary
C	F	F	F

(viii) Corridor Twelve (JA-CJHI) - Devil Canyon - Watana to Intertie via Devil/Chulitna River

This corridor has a number of environmental constraints which together make it environmentally unacceptable. Land use conflicts would likely occur, since much of the land crossed is privately owned. The lack of existing rights-of-way and clearing of vegetation would result in new access. In addition, aesthetic impacts would occur in the High Lakes area and because the corridor is in the viewshed of the Alaska Range. Finally, the corridor crosses 40 creeks, including valuable salmon-spawning grounds, and crosses near a golden eagle nest.

This corridor, primarily because of impacts to access, private lands, and aesthetics, received an F rating.

Ratings:

Technical	Economical	Environmental	Summary
C	F	F	F

Corridors Technically and Economically Acceptable

Review of the environmental ratings for the eight corridors above shows all of them to be environmentally unacceptable. Therefore, the screening in the central study area process was continued with the seven remaining corridors with lengths or elevations that did not rule them out economically or technically. The results of this screening for technical, economical, and environmental factors follow.

(i) Corridor One (ABCD) - Watana to the Intertie via South Shore of the Susitna River

- Technical and Economical

Corridor One is one of the shortest corridors considered, approximately 40 miles long, making it economically favorable. No technical restrictions were observed along the entire length of this corridor.

- Environmental

Because of its short length, environmental disturbance caused by transmission line construction would be reduced. The more noteworthy constraints are those identified under the categories of land use and vegetation. Corridor One would require the development of a new right-of-way between Watana and Devil Canyon with some opportunity existing to utilize the COE-developed road for access between the Intertie and Devil Canyon. The potential does exist in this corridor to use one of the proposed access roads currently under consideration. Wetlands and discontinuous forest cover occur in the corridor, especially in the eastern third of the route. Access road development, if required in this area, and the associated vegetation clearing present additional constraints to this corridor.

Ratings:

Technical	Economical	Environmental	Summary
A	A	A	A

(ii) Corridor Two (ABECD) - Watana to Intertie via Stephen Lake

- Technical and Economical

This corridor is approximately five miles longer than Corridor One and would require an additional five miles of access road for construction purposes. The corridor will rise to a maximum elevation of 3,600 feet, and also crosses wetlands and extensive forest cover. This higher elevation, increased clearing, and longer length result in a lower technical and economic rating than Corridor One.

- Environmental

This corridor is identical to Corridor One with the exception of

Corridor Segment BEC. Because of this deviation, several additional problems arise in this corridor as compared with Corridor One. First, an access road about nine miles longer than that required for the construction of Corridor One would be needed. A new road may also have to be developed along most of this route, which would also cross wetland and forested areas. Residential and recreational facilities at Stephan Lake and the much higher visibility of the transmission facilities to the users of this recreation area would be a major constraint posed by this corridor.

The corridor would also intrude upon habitat for wolves, bear, and caribou, as well as for raptors and waterfowl. Of note, brown bears utilizing the fish resources of Prairie Creek would likely encounter this alternative corridor more frequently than they would Corridor One, thus potentially bringing bears and people into close contact.

These potential impacts to aesthetics and creation of new access road result in this corridor being environmentally unacceptable.

Ratings:

Technical	Economical	Environmental	Summary
C	C	F	F

(iii) Corridor Three (AJCF) - Watana to Intertie via North Shore of the Susitna River

- Technical and Economical

This corridor is similar in length to Corridor Two and shares the same technical and economical considerations. There are no existing roads for nearly the entire length, and it does encounter some steep slopes. These will reduce the reliability of the line and add to the cost of construction.

- Environmental

The corridor in this area would likely require a pioneer access road. This route would also be impeded by the existence of recreation facilities in the vicinity of High Lake and, more significantly, Otter Lake. The corridor is within sight of recreation facilities at these lakes and may also interfere with the use of High Lake by planes during certain weather conditions. The route also crosses Indian River and Portage Creek; both streams support significant salmon resources. Potential damage to spawning areas could occur as a result of construction along this corridor. An active golden eagle nest exists in the Devil Creek vicinity. This species is sensitive to development activities and could be adversely affected by Corridor Three.

Ratings:

Technical	Economical	Environmental	Summary
C	C	C	C

(iv) Corridor Eleven (CJAHI) - Devil Canyon to the Intertie via Tsusena Creek/Chulitna River

- Technical and Economical

This corridor has a disadvantage over the others discussed because of its 70-mile length. New access roads and vegetative clearing would be required for a considerable portion of the corridor, thereby increasing costs of construction.

- Environmental

Corridor Segments CJA (part of Corridor Three) and AHI (part of Corridor Six) comprise this alternative and, as such, have been previously discussed. The long length of this corridor, its crossing of 36 creeks, and development of a new right-of-way and land use conflicts contribute to an unacceptable environmental rating.

Ratings:

Technical	Economical	Environmental	Summary
C	C	F	F

(v) Corridor Thirteen (ABCF)- Watana to Devil Canyon via South Shore, Devil Canyon to Intertie via North Shore, Susitna River

- Technical and Economical

This corridor, 41 miles in length, is one of the shorter ones being considered. Although it crosses deep ravines, and forest clearing will be required over a considerable portion of its length, it is rated high technically because of its short length and low elevation.

- Environmental

Since this corridor combines segments from Corridor One (ABC) and Corridor Three (CF), the same constraints for those two routes apply which have been previously described. This corridor presents a few environmental problems. Conflicts with recreation near Otter Lake can be resolved through careful selection of one final right-of-way.

Ratings:

Technical	Economical	Environmental	Summary
A	C	A	A

(vi) Corridor Fourteen (AJCD) - Watana to Devil Canyon via North Shore, Devil Canyon to Intertie via South Shore, Susitna River

- Technical and Economical

This corridor is also one of the shortest among the fifteen studied in the central area. Some access roads will be required for this corridor and some clearing necessary. Advantage will be taken of the proposed project access road where possible to locate the transmission line close by.

Corridor Fourteen is rated as recommended both economically and technically, because of gentle relief, short length, and small amounts of clearing.

- Environmental

This corridor reverses the routing between damsites and the Intertie proposed by Corridor Thirteen. Constraints are, therefore, the same as those presented for Corridors Three and One, and are not great. However, the unavoidable conflict with land use at High Lake results in a C rating.

Ratings:

Technical	Economical	Environmental	Summary
A	A	C	A

(vii) Corridor Fifteen (ABECF)- Watana to Devil Canyon via Stephan Lake, Devil Canyon to Intertie via North Shore, Susitna River

- Technical and Economical

This corridor is approximately 45 miles long and would require construction of new access roads and forest clearing for almost its entire length. These negative economical points contribute to the low rating of this corridor.

- Environmental

This corridor combines segments from Corridor Two (ABEC) and Corridor Three (CF). The constraints for these corridors have been presented under their respective discussions. Extensive new access and detrimental visual impacts near Stephan Lake were the primary constraints along the corridor segment from Corridor Two which resulted in an unacceptable environmental rating.

Ratings:

Technical	Economical	Environmental	Summary
C	C	F	F

(c) Northern Study Area

Constraints appeared in the routing of all four corridors evaluated in the northern study area. The shortest route was 85 miles and the longest was 115 miles. Topography and soils restrictions are constraints to each of the corridors evaluated. In addition, the two eastern corridors of the study area cross mountain slopes. Each of the corridors would be highly visible in the floodplain of the Tanana River. Major highways skirt these floodplains at some distance to the north, however; and only scattered, isolated residential areas would be encountered by the corridors. Little information has been collected concerning the cultural resources in the vicinity of any of the four corridors of this study area. The Dry Creek archaeologic site near Healy has been identified; however, the presence of numerous sites in the foothills of the Alaska Range and in the vicinity of the Tanana River are suspected. Additional constraints peculiar to the four separate corridors are presented below.

(i) Corridor One (ABC) - Healy to Fairbanks via Parks Highway

- Technical and Economical

This corridor crosses the fewest water courses in the northern study area. Although it is approximately four miles longer than Corridor Two, it is technically favored because of the existence of potential access roads for almost the entire length.

- Environmental

Because it parallels an existing transportation corridor for much of its length, this corridor would permit line routing that would avoid most visually sensitive areas. The three proposed road crossings for this corridor (as opposed to the 19 road crossings of the Healy-Fairbanks transmission line) could occur at points where roadside development exists, in areas of visual absorbtion capability or in areas recommended to be opened to long-distance views (D.N.R. 1981).

Four rivers and 40 creeks are crossed by this corridor, with potential for impacts. It crosses the fewest number of water courses of any route under consideration in the northern study area. In addition, the inactive nest site of a pair of peregrine falcons occurs within this proposed corridor.

As with visual impacts, land use, wildlife, and fishery resource impacts can be lessened through careful route location and utilization of existing access. Impacts on forest clearing can also be lessened through the sharing of existing transmission line corridors.

Ratings:

Technical	Economical	Environmental	Summary
A	A	A	A

(ii) Corridor Two (ABDC) - Healy to Fairbanks via Wood River Crossing

- Technical and Economical

This is the shortest corridor (86 miles) studied in this area. Although comparable to Corridor One, it crosses additional wetlands, increasing the technical difficulty of transmission line construction. Development of roads will also pose a major constraint.

- Environmental

Corridor Two is the shortest under consideration in the northern study area. As it is a variation of Corridor One, many of the same constraints apply here. The lack of existing rights-of-way is a constraint throughout much of this route. Prior to crossing the Tanana River, this corridor deviates farther to the northeast than does Corridor One, thereby crossing additional wet soils; thus, access-road development poses a major constraint. Forest clearing would be necessary in the broad floodplain of the Tanana River. While it is the shortest route, this corridor still crosses 5 rivers and 44 creeks as well as prime habitat and important habitat for peregrines and golden eagles. These constraints, and visual and public land conflicts, result in a C rating.

Ratings:

Technical	Economical	Environmental	Summary
C	A	C	C

(iii) Corridor Three (AEDC) - Healy to Fairbanks via Healy Creek and Japan Hills

- Technical and Economical

This 115-mile corridor is the longest in the northern study area. Its considerable length would contribute substantially to increased costs of construction. The crossing of areas over 4,500 feet in elevation results in the corridor's being technically unacceptable for reasons discussed in Section 6.4.

- Environmental

This corridor crosses a high mountain pass and, in some locations, encounters bedrock overlaid with shallow, wet soils. Access is a problem because, except for the road into the Usibelli coal fields, no rights-of-way exist along the route. Crossing the broad floodplain of the Tanana and Wood Rivers would require extensive forest clearing and result in aesthetic impacts. In addition, this corridor involves 3 river and 72 creek crossings. Prime habitat for caribou, peregrine falcons, sheep, and waterfowl as well as important habitat for golden eagles and brown bear would be affected.

The increased length and increased visual impacts result in this corridor's being environmentally unacceptable.

Ratings:

Technical	Economical	Environmental	Summary
F	C	F	F

(iv) Corridor Four (AEF) - Healy to Fairbanks via Wood River and Fort Wainwright

- Technical and Economical

The technical and economical constraints associated with this corridor are the same as those in Corridor Three. The long distance of this corridor (105 miles) and the crossing of areas over 4,500 feet in elevation reduce its attractiveness from a technical and economical viewpoint.

- Environmental

Corridor Four is very similar to Corridor Three in that it parallels Healy Creek drainage north. Therefore, impacts to this mountainous region would be identical to those described for this corridor segment in Corridor Three. In the vicinity of Japan Hills, however, the corridor parallels an existing sled road for part of its length as it traverses the wet, heavily forested floodplain of the Tanana and Wood Rivers. Clearing requirements might, therefore, be reduced, as would be the need for access roads in this area. Important habitat or prime habitat for peregrine falcons, bald eagles, sheep, caribou, and brown bear exists within this corridor. This corridor is unacceptable from a land use standpoint because it is within the Blair Lake Air Force active bombing range, precluding further consideration of this corridor.

Ratings:

Technical	Economical	Environmental	Summary
F	C	F	F

TABLE 6.1: ECONOMICAL AND TECHNICAL SCREENING
SOUTHERN STUDY AREA (WILLOW TO ANCHORAGE/POINT MACKENZIE)

	(1) ABC'	(2) ADFC	(3) AEFC
- Length (miles)	73	38	39
- Max. Elev. (ft)	1400	400	400
- Clearing (miles) =			
Medium & Light	61	20	15
None	12	18	24
- Access (miles) =			
New Roads	20	0	12
4-Wheel	53	38	27
- Tower Construction*	329	180	176
- Rating:			
Economical	C	A	C
Technical	C	A	A

A = recommended corridor
C = acceptable but not preferred
F = unacceptable

* Approximate number of towers required for this corridor, assuming single-circuit line.

TABLE 6.2: ECONOMICAL AND TECHNICAL SCREENING
CENTRAL STUDY AREA (DAM SITES TO INTERTIE)

	(1) ABCD	(2) ABECD	(3) AJCF	(4) ABCJHI	(5) ABECJHI	(6) CBAHI	(7) CEBAHI	(8) CBAG	(9) CEBAG	(10) CJAG	(11) CJAHI	(12) JACJHI	(13) ABCF	(14) AJCD	(15) ABECF
- Length	40	45	41	77	82	68	75	90	95	91	69	70	41	41	45
- Max. Elevation, ft.	2500	3600	3500	4300	4300	4300	3500	3300	3600	3500	3800	3900	2500	3500	3600
- Clearing															
Medium & Light	38	30	26	18	30	20	27	45	37	40	55	17	39	26	35
None	2	15	15	59	50	48	46	45	60	51	14	53	2	15	10
- Access															
New Roads	28	33	41	66	57	47	56	60	70	63	50	50	41	29	45
4-Wheel	12	12	0	0	0	0	0	28	27	28	0	15	0	12	0
- Tower Construction*	180	203	185	347	369	306	329	405	428	410	311	315	180	185	203
- Rating:															
Economical	A	C	C	F	F	C	F	F	F	F	C	F	C	A	C
Technical	A	C	C	F	F	F	C	C	C	C	C	C	A	A	C

A = recommended
C = acceptable but not preferred
F = unacceptable

* Approximate number of towers required for this corridor, assuming single-circuit line.

TABLE 6.3: ECONOMICAL AND TECHNICAL SCREENING
NORTHERN STUDY AREA (HEALY TO FAIRBANKS)

	(1) ABC	(2) ABDC	(3) AEDC	(4) AEF
- Length	90	86	115	105
- Max. Elevation	1600	1600	4500	4500
- Clearing				
Medium & Light	48	50	40	50
None	42	36	75	55
- Access				
New Roads	0	0	54	42
4-Wheel	90	43	42	16
- Tower Construction*	405	387	518	473
- Rating:				
Economical	A	A	C	C
Technical	A	C	F	F

A = recommended
C = acceptable but not preferred
F = unacceptable

* Approximate number of towers required for this corridor, assuming single-circuit line.

Table 6.4

Environmental Constraints - Southern Study Area (Willow to Anchorage/Point MacKenzie)

Corridor	Length	Topography/Soils	Land Use	Aesthetics	Cultural Resources [a]	Vegetation	Fish Resources	Wildlife Resources	Environmental Rating [b]
1 (ABC')	73	Some soils with severe limitations to off road travel; some good agricultural soils	No existing ROW in AB; residential uses near Palmer; proposed capital site; much U.S. Military Wdl.,Private, and Village Selection Land	Iditarod Trail; trail paralleling Deception Ck.: Gooding L. bird-watching area; 5 crossings of Glenn Hwy, 1 crossing of Parks Hwy	Archeologic sites-data void	Wetlands along Deception Ck. and at Matanuska River crossing; extensive clearing in upland, forested areas needed	5 river and 28 creek crossings; valuable spawning sites, especially salmon: Knik area Matanuska area data void	Passes through or near waterfowl and shorebird nesting and feeding areas, and areas used by brown bear	C
2 (ADFC)	38	Most of route potentially wet, with severe limitations to off road travel; some good agricultural soils	Trail is only existing ROW; residential and recreational areas; Susitna Flats Game Refuge; agricultural land sale	Susitna Flats Game Refuge; Iditarod Trail; 1 crossing of Parks Hwy	Archeologic sites-data void	Extensive wetlands; clearing needed in forested areas	1 river and 8 creek crossings; valuable spawning sites, especially salmon: L. Susitna R. data void	Passes through or near waterfowl and shorebird nesting, feeding, and migration areas, and areas used by furbearers and brown bear	A
3 (AEFC)	39	Same as Corridor 2	No known existing ROW; residential and recreational use areas, including Nancy Lakes; lakes used by float planes; agricultural land sale	Lake area south of Willow; Iditarod Trail; 1 crossing of Parks Hwy	Archeologic sites-data void	Extensive wetlands; clearing needed in forested areas	1 river and 8 creek crossings; valuable spawning sites, especially salmon: L. Susitna R. data void	Same as Corridor 2	F

a. Coastal area probably has many sites; available literature not yet reviewed.

b. A = recommended
C = acceptable but not recommended
F = unacceptable

Table 6.5

Environmental Constraints - Central Study Area (Dam Sites to Intertie)

Corridor	Length (Miles)	Topography/Soils	Land Use	Aesthetics	Cultural Resources	Vegetation	Fish Resources	Wildlife Resources	Environmental Rating[a]
1 (ABCD)	40	Crosses several deep ravines; about 1000' change in elevation; some wet soils	Little existing ROW except Corps rd.; mostly Village Selection and Private Lands	Fog Lakes; Stephan Lake; proposed access road	Archeologic sites near Watana dam site, Stephan Lake and Fog Lakes; data void from Gold Creek to Devil Canyon; historic sites near the communities of Gold Creek and Canyon	Wetlands in eastern third of corridor; extensive forest-clearing needed	1 river and 17 creek crossings; valuable spawning areas, expecially grayling: data void	Unidentified raptor nest located on trib. to Susitna; passes through, habitat for: raptors, furbearers, wolves, wolverine, brown bear, caribou	A
2 (ABECD)	45	Crosses several deep ravines; about 2000' change in elev.; some steep slopes; some wet soils	Little existing ROW except Crops rd. and at D; rec. and resid. areas; float plane areas; mostly Village Selection and Private Lands	Fog Lakes; Stephan Lake; proposed access road; high country (Prairie & Chulitna Ck. drainages) and viewshed of Alaska Range	Same as Corridor 1	Wetlands in eastern half of corridor; extensive forest-clearing needed	1 river and 17 creek crossings; valuable spawning areas, especially grayling: data void	Passes through habitat for: raptors, waterfowl, migrating swans, furbearers, caribou, wolves, wolverine, brown bear	F
3 (AJCF)	41	Crosses several deep ravines; about 2000' change in elevation; some steep slopes; some wet soils	No existing ROW except at F; rec. areas; float plane areas; mostly Village Selection and Private Land; resid. & rec. development in area of Otter L. and old sled rd.	Viewshed of Alaska Range & High Lake; proposed access rd.	Archeologic sites by Watana dam site, & near Portage Ck./Susitna R. confluence; possible sites along Susitna R.; Historic sites near communities of Gold Ck. and Canyon	Forest-clearing needed in western half	14 creek crossing; valuable spawning areas, especially grayling and salmon: Indian River Portage Creek data void	Golden eagle nest along Devil Ck. near High L.; active raven nest on Devil Ck.; passes through habitat for: raptors, furbearers, wolves, brown bear	C
4 (ABCJHI)	77	Crosses several deep ravines; >2000' change in elevation; routing above 4000'; steep slopes; some wet soils; shallow bed-rock in mts.	No existing ROW; rec. areas and isolated cabins; lakes used by float planes; much Village Selection Land	Fog Lakes; Stephan Lake; proposed access rd; viewshed of Alaska Range	Archeologic sites near Watana dam site, Stephan L. and Fog Lakes; possible sites along pass between drainages; data void between H and I	Small wetland areas in JA area; extensive forest-clearing needed; data void	1 river and 42 creek crossings; valuable spawning areas, especially grayling	Golden eagle nest along Devil Ck. near High L.; caribou movement area; passes through habitat for: raptors, waterfowl, furbearers, wolves, wolverine, brown bear	C

a. A = recommended
C = acceptable but not recommended
F = unacceptable

Table 6.5 (Cont'd)

Environmental Constraints - Central Study Area (Dam Sites to Intertie)

Corridor	Length (Miles)	Topography/Soils	Land Use	Aesthetics	Cultural Resources	Vegetation	Fish Resources	Wildlife Resources	Environmental Rating
5 (ABECJHI)	82	Crosses several deep ravines; changes in elevation >2000'; routing above 4000'; steep slopes; some wet soils; shallow bedrock in mts	Same as Corridor 4	Fog Lakes; Stephan Lake; High Lake; proposed access rd; viewshed at Alaska Range	Same as Corridor 4	Wetlands in JA and Stephan Lake areas; extensive forest-clearing needed	42 creek crossings; valuable spawning areas, especially grayling and salmon: data void	Same as Corridor 4 with important waterfowl and migrating swan habitat at Stephan Lake	F
6 (CBAHI)	68	Crosses several deep ravines; changes in elevation of about 1600'; routing above 4000'; steep slopes; some wet soils; shallow bedrock in mts.	No known existing ROW; rec. areas and isolated cabins; float plane area; Susitna area and near I are Village Selection Land	Fog Lakes and Stephan Lake; proposed access rd.; Tsusena Butte; viewshed of Alaska Range	Archeologic sites near Watana dam site, Fog Lakes and Stephan L.; data void between H and I	Extensive wetlands from B to near Tsusena Butte; extensive forest-clearing needed	32 creek crossings; valuable spawning areas, especially grayling: data void	Bald eagle nest s.e. of Tsusena Butte; area of caribou movement; passes through habitat for: raptors, waterfowl, furbearers, wolves, wolverine, brown bear	C
7 (CEBAHI)	73	Crosses several deep ravines; change in elevation of about 1600'; routing above 3000'; steep slopes; some wet soils; shallow bedrock in mts.	Same as Corridor 6	Fog Lakes and Stephan Lake; proposed acess rd.; high country (Prairie-Chunilna Cks); Tsusena Butte; viewshed of Alaska Range	Same as Corridor 6	Extensive wetlands in Stephan L., Fog Lakes, Tsusena Butte areas; extensive forest-clearing needed	45 creek crossing; valuable spawning areas, especially grayling: data void	Same as Corridor 6, with important waterfowl and migrating swan habitat at Stephan Lake	F
8 (CBAG)	90	Crosses several deep ravines; change in elevation of about 1600'; routing above 3000'; steep slopes; some wet soils; shallow bedrock in mts.	No existing ROW; rec. areas and isolated cabins; float plane areas; air strip and airport; much Village Selection and Federal Land	Fog Lakes; Stephan Lake; access rd; scenic area of Deadman Ck.; viewshed of Alaska Range	Archeologic sites near Watana dam site, Fog Lakes, Stephan Lake and along Deadman Ck.	Wetlands between B and mountains; extensive forest-clearing needed	1 river and 43 creek crossings; valuable spawning areas, expecially grayling: data void	Important bald eagle habitat by Denali Hwy. and Deadman L.; unchecked bald eagle nest near Tsusena Butte; passes through habitat for: raptors, furbearers, wolves, wolverine, brown bear	C

Table 6.5 (Cont'd)

Environmental Constraints - Central Study Area (Dam Sites to Intertie)

Corridor	Length (Miles)	Topography/Soils	Land Use	Aesthetics	Cultural Resources	Vegetation	Fish Resources	Wildlife Resources	Environmental Rating
9 (CEBAG)	95	Crosses several deep ravines; changes in elevation of about 1600'; routing above 3000'; steep slopes; some wet soils; shallow bedrock in mts.	Same as Corridor 8	Fog Lakes; Stephan Lake; proposed access rd; high country (Prairie and Chunilna Cks.); Deadman Ck.; viewshed of Alaska Range	Same as Corridor 8	Wetlands in Stephan L./Fog Lakes areas, extensive forest-clearing needed	1 river and 48 creek crossings; valuable spawning areas, expecially grayling: data void	Same as Corridor 8, with important waterfowl and migrating swan habitat at Stephan Lake	F
10 (CJAG)	91	Same as Corridor 8	No existing ROW; rec. areas and isolated cabins; float plane areas; air strip and airport; mostly Village Selection and Federal Land	High Lakes area; proposed access rd.; Deadman Ck. drainage; view-shed at Alaska Range	Archeologic sites near Watana dam site and along Deadman Ck.	Small wetlands in JA area; extensive forest-clearing needed	1 river and 47 creek crossings; valuable spawning areas, expecially grayling: data void	Golden eagle nest along Devil Ck. near High Lake; unchecked bald eagle nest near Tsusena Butte; area of caribou move-ment; passes through habitat for: raptors, waterfowl, furbearers, brown bear	C
11 (CJAHI)	69	Crosses several deep ravines; changes in elevation of 1000'; routing above 3000'; steep slopes; some wet soils; shallow bedrock in mts.	No existing ROW; rec. areas and isolated cabins; float plane areas; mostly Village Selection and Private Land	High Lakes area; proposed access rd,; viewshed of Alaska Range	Archeologic sites near Watana dam site	Small wetland areas in JA area; some forest-clearing needed	36 creek crossings; valuable spawning areas, especially grayling and salmon: data void	Golden eagle nest along Devil Ck. near High Lake; bald eagle nest s.e. of Tsusena Butte; passes through habitat for: raptors, furbearers, brown bear	C
12 (JA-CJHI)	70	Same as Corridor 11	No existing ROW; rec. areas and isolated cabins; float plane area; mostly Village Selection and Private Land	High Lakes area; proposed access rd.; Tsusena Butte; viewshed of Alaska Range	Archeologic site near Watana dam site; possible sites along pass between drainages	Small wetland areas in JA area; fairly extensive forest clearing needed	40 creek crossings; valuable spawning areas, especially grayling and salmon: data void	Golden eagle nest along Devil Ck. near High Lake; passes through habitat for: raptors, furbearers, wolves, brown bear	F

Table 6.5 (Cont'd)

Environmental Constraints - Central Study Area (Dam Sites to Intertie)

Corridor	Length (Miles)	Topography/Soils	Land Use	Aesthetics	Cultural Resources	Vegetation	Fish Resources	Wildlife Resources	Environmental Rating
13 (ABCF)	41	Crosses several deep ravines; about 1000' change in elevation; some wet soils	No known existing ROW except at F; rec. areas; float plane areas; resid. and rec. use near Otter L. and old sled rd.; isolated cabins; mostly Village Selection Land; some Private Land	Fog Lakes, Stephan L.; proposed access rd.	Archeologic sites near Watana dam site, Portage Ck./Susitna R. confluence; Stephan L., and Fog Lakes; historic sites; near communities of Canyon and Gold Ck.	Wetlands in eastern third of corridor; extensive forest-clearing needed	15 creek crossings; valuable spawning areas, especially grayling and salmon: Indian River Portage Creek data void	Unidentified raptor nest on tributary to Susitna; passes through habitat for: raptors, furbearers, wolves, wolverine, brown bear, caribou	A
14 (AJCD)	41	Crosses deep ravine at Devil Ck.; about 2000' change in elevation; routing above 3000'; some steep slopes; some wet soils	Little existing ROW except old Corps rd. and at D; rec. areas; isolated cabins; much Village Selection land; some Private Land	Viewshed of Alaska Range and High Lake; proposed access road	Archeologic sites by Watana dam site, possible sites along Susitna R.; historic sites near communities of Canyon and Gold Ck.	Forest-clearing needed in western half	1 river and 16 creek crossings; valuable spawning areas, especially grayling: data void	Golden eagle nest in Devil Ck./High Lake area; active raven nest on Devil Ck.; passes through habitat for: raptors, furbearers, wolves, brown bear, caribou	A
15 (ABECF)	45	Crosses several deep ravines; about 2000' change in elevation; some wet soils	No known existing ROW except at F; rec. areas; float plane areas; resid. and rec. use near Otter L. and old sled rd.; isolated cabins; mostly Village Selection land with some Private Land	Fog Lakes; Stephan Lake; proposed access road; high country (Prairie and Chunilna Cks. drainages); viewshed of Alaska Range	Same as Corridor 13	Wetlands in eastern half of corridor; extensive forest-clearing needed	15 creek crossings; valuable spawning areas, especially grayling and salmon: Indian River Portage Creek data void	Important waterfowl and migrating swan habitat at Stephan L.; passes through habitat for: raptors, waterfowl, furbearers, wolves, wolverine, brown bear, caribou	F

Table 6.6

Environmental Constraints - Northern Study Area (Healy to Fairbanks)

Corridor	Length (Miles)	Topography/Soils	Land Use	Aesthetics	Cultural Resources	Vegetation	Fish Resources	Wildlife Resources[a]	Environmental Rating[b]
1 (ABC)	90	Some wet soils with severe limitations to off-road traffic	Air strip; residential areas and isolated cabins; some U.S. Military Withdrawl and Native land	3 crossings of Parks Hwy; Nenana R.-scenic area	Archeologic sites probable since there is a known site nearby; data void	Extensive wetlands; forest clearing needed mainly north of the Tanana River	4 river and 40 creek crossings; valuable spawning sites: Tanana River data void	Passes through or near prime habitat for: peregrines, waterfowl, furbearers, moose; passes through or near important habitat for: peregrines, golden eagles	A
2 (ABDC)	86	Severe limitations to off-road traffic in wet soils of the flats	No existing ROW n. of Browne; scattered residential and isolated cabins; airstrip; Fort Wainwright Military Reservation	3 crossings of Parks Hwy; high visibility in open flats	Dry Creek archeologic site near Healy; possible sites along river crossings; data void	Probably extensive wetlands between Wood and Tanana Rivers; extensive forest clearing needed n. of Tanana River	5 river and 44 creek crossings; valuable spawning sites: Wood River data void	Passes through or near prime habitat for: peregrines, waterfowl, furbearers; passes through or near important habitat for: golden eagles, other raptors	C
3 (AEDC)	115	Change in elevation of about 2500'; steep slopes; shallow bedrock in mts.; severe limitations to off-road traffic in the flats	No existing ROW beyond Healy/Cody Ck. confluence; isolated cabins; airstrips; Fort Wainwright Military Reservation	1 crossing of Parks Hwy; high visibility in open flats	Dry Creek archeologic site near Healy; possible sites near Japan Hills and in the mts.; data void	Probably extensive wetlands between Wood and Tanana Rivers; extensive forest clearing needed n. of Tanana River; data lacking for southern part	3 river and 72 creek crossings; valuable spawning sites: Wood River data void	Passes through or near prime habitat for: peregrines, waterfowl, furbearers, caribou, sheep; passes through or near important habitat for: golden eagles, brown bear	F
4 (AEF)	105	Same as Corridor 3	Airstrips; isolated cabins; Fort Wainwright Military Reservation	High visibility in open flats	Archeologic sites near Dry Creek and Fort Wainwright; possible sites near Tanana River; data void	Probably extensive wetlands between Wood and Tanana Rivers	3 river and 60 creek crossings; valuable spawning sites: Wood River data void	Passes through or near prime habitat for:peregrines, bald eagles, waterfowl, furbearers, caribou, sheep; passes through or near important habitat for: golden eagles, brown bear	C

a. Source: VanBallenberghe personal communication. Prime habitat = minimum amount of land necessary to provide a sustained yield for a species; based upon knowledge of that species' needs from experience of ADF&G personnel. Important habitat = land which ADF&G considers not as critical to a species as is Prime habitat, but is valuable.

b. A = recommended
C = acceptable but not preferred
F = unacceptable

TABLE 6.7: SUMMARY OF SCREENING RESULTS

Corridor	RATINGS Env.	Econ.	Tech.	Summary
- Southern Study Area				
(1) ABC'	C	C	C	C
(2) ADFC	A	A	A	A
(3) AEFC	F	C	A	F
- Cental Study Area				
(1) ABCD	A	A	A	A
(2) ABECD	F	C	C	F
(3) AJCF	C	C	C	C
(4) ABCJHI	F	F	F	F
(5) ABECJHI	F	F	F	F
(6) CBAHI	F	C	F	F
(7) CEBAHI	F	F	C	F
(8) CBAG	F	F	C	F
(9) CEBAG	F	F	C	F
(10) CJAG	F	F	C	F
(11) CJAHI	F	C	C	F
(12) JACJHI	F	F	C	F
(13) ABCF	A	C	A	C
(14) AJCD	C	A	A	C
(15) ABECF	F	C	C	F
- Northern Study Area				
(1) ABC	A	A	A	A
(2) ABDC	C	A	C	C
(3) AEDC	F	C	F	F
(4) AEF	F	C	F	F

A = recommended
C = acceptable but not preferred
F = unacceptable

7 - CONCLUSIONS AND RECOMMENDATIONS

7.1 - Conclusions

(a) Previous Reports

The Interim Feasibility Report of the COE, together with the feasibility report prepared by IECO/RWRA, have been thoroughly reviewed. The COE discussed a number of alternative transmission line corridors in considerable depth; however, no specific route was indicated. The IECO/RWRA report indicated a specific route, but gave no detailed study on how a determination had been reached. However, the report discussed in detail the economic feasibility of alternative transmission voltage and system configurations. The two reports provided excellent data and background for Acres' initial studies.

(i) COE 1975 Report

The COE report concluded that Segments 1, 3, 7, 8, 9, 10, 13, and 16 (shown in Figure C.1) were the preferred corridors. Of these, only Segments 1, 7, 8, 9, and 16 apply to Acres' area of study. The COE preference resulted primarily from the fact that the chosen corridors fall within existing highway and rail corridors and likely present the least construction impacts of all the alternatives they considered. While problems of scenic impact exist along these corridors, these problems have the potential for mitigation because of existing terrain features and vegetation and through careful tower placement and access procedures. It should be noted that the preferred corridors selected by the COE are general in nature with no definitive boundaries.

(ii) IECO/RWRA, 1979 Report

The IECO/RWRA report presents a determination of the economic feasibility for the Anchorage-Fairbanks transmission line. In their report, IECO/RWRA stated that alternative corridors were reviewed along or near the railbelt region between Anchorage and Fairbanks. However, the report gave no details on the methods of corridor evaluation used. In their evaluation, IECO/RWRA relied heavily on their experience and knowledge of the railbelt area and their field visits to specific sites. The preferred corridor selected by IECO/RWRA is almost the same as the preferred corridor selected by the COE, except here it is more defined.

(b) Acres Study

The APA decision to proceed with the Intertie has resulted in a split of this study into three separate geographical entities; namely, the southern, central, and northern areas. For each area, one corridor has been selected as feasible and therefore recommended. These are:

- Southern Study Area: Corridor ADFC
- Central Study Area: Corridor ABCD
- Northern Study Area: Corridor ABC

Specifics of these corridors and reasons for rejection of others are discussed below.

(i) Southern Study Area

In the southern study area, Corridor Segment AEF and, hence, Corridor Three (AEFC) were determined unacceptable. This results primarily from the routing of the segment through the relatively well-developed and heavily utilized Nancy Lake state recreation area. Adjustments to this route to make it more acceptable were attempted but no alterations proved successful. Consequently, it was recommended this corridor be dropped from further consideration.

Corridor One (ABC') was identified as acceptable but not preferred, thus given the C rating. Its great length, its traversing of residential and other developed lands, and the numerous creek crossings and extensive forest clearing involved relegate this corridor to this environmental rating. Economically and technically, this corridor has more difficulties than the other two considered. This is a longer line and crosses areas which may require easements in the area north of Anchorage.

Corridor Two (ADFC) was identified as the candidate which would satisfy most of the screening criteria. This corridor is shown in Figures 7.1 and 7.2, and stretches from an area north of Willow Creek to Point MacKenzie in the south. The corridor is located east of the lower Susitna River and crosses the Little Susitna River. The corridor also crosses an existing 138 kV line owned and operated by Chugach Electric Association (CEA), which starts at Point MacKenzie and extends to Teeland Substation.

Up to this point in the corridor selection study, Point MacKenzie has been considered a terminal point for Susitna power. It was assumed that an underwater cable crossing would be provided at this location. Upon further study and data-gathering it has become known that the existing crossing at Point MacKenzie has experienced power interruptions caused by ship's anchors snagging the submarine cables. CEA, which owns the submarine cables, required additional transmission capacity to Anchorage. After thoroughly studying the matter, it has opted for a combined submarine/overhead cable transmission across Knik Arm and onto Anchorage. This was the most desirable option to CEA, both from the environmental and technical point of view.

The CEA crossing will be located approximately eight miles northeast of Point MacKenzie on the west shore of the Knik Arm and across from Elmendorf Air Force Base in the vicinity of Six Mile Creek. This crossing is located northeast of the Anchorage Harbor, away from the heavy ship traffic, thereby reducing risk of anchor damage to the cable.

It is intended to terminate Corridor ADFC at this new crossing point and extend the transmission corridor to Elemendorf Air Force Base and beyond to Anchorage.

Although the crossing is approximately eight miles northeast of Point MacKenzie, it does not influence the results of this corridor selection and screening process. The best corridor has been selected and screened. During routing studies (see Section 7), minor deviations outside the corridor will have to occur in order to terminate at the revised crossing point. However, preliminary investigations indicate it will be possible to select a technically, economically, and environmentally acceptable route, particularly since an existing transmission line can likely be paralleled from the selected corridor to the revised crossing point. Furthermore, CEA has received the necessary permits and is constructing an underwater crossing at Knick Arm, indicating acceptable levels of environmental impact.

(b) Central Study Area

In the central study area, several corridor segments and, hence, their associated corridors were determined to be unacceptable. The first of these, Corridor Segment BEC, appears as part of Corridors Two (ABECD), Five (ABECJHI), Seven (CEJAHI), Nine (CEBAG), and Fifteen (ABECF). The reason for rejecting this segment is primarily that the developed recreation area around Stephan Lake would be needlessly harmed--needless because viable options exist to avoid intruding into this area. Again, modifying this route to something more acceptable failed. Consequently, it is recommended that these five corridors be dropped from further consideration.

Corridor Segment AG was also determined not to warrant further consideration because of its approximate 65-mile length, two-thirds of which would possibly require a pioneer access road. Also, extensive areas of clearing would be required, opening the corridor to view in some scenic locations. Finally, the impacts on fish and wildlife habitats are potentially severe. These preliminary findings, coupled with the fact that more viable options to Segment AG exist, suggest that consideration of this corridor segment and, therefore, Corridors Eight (CBAG) and Ten (CJAG) should be terminated.

Corridors Eleven (CJAHI) and Twelve (JA-CJHI) were identified as acceptable. This rating arose from the fact that, as shown in Environmental Constraint Table 6.5, numerous constraints affect this routing. Information from recently completed field investigations suggest that these constraints cannot be overcome and the routes should be rejected. Furthermore, the technical and economical ratings preclude these corridors from further consideration.

Corridor Segment HJ has been moved so that it no longer parallels the Devil Creek drainage; the new location HC is selected to avoid both High Lake and the Devil Creek drainage. It then follows the Portage Creek drainage to the point of intersection with Corridor Segment JH, near the creek's headwaters. Subsequent investigations have confirmed that this corridor segment is not viable and, consequently, Corridors Four and Five are eliminated from further consideration.

Corridors Six intrudes on valuable wildlife habitat and would cross numerous creeks, none of which are currently crossed by existing access roads. In addition, a high mountain pass and its associated shallow soils, steep slopes, and surficial bedrock constrain this routing. Finally, its crossing of areas over 4,000 feet in elevation makes it technically unacceptable, so this corridor is dropped from further consideration.

Corridors Three (AJCF) and Fourteen (AJCD) have been identified as acceptable but not recommended because of the CJ Corridor Segment. This corridor segment intrudes upon an existing recreation area at High Lake and contravenes existing views of the Alaska Range; it also crosses valuable habitat for sensitive big game species.

Corridor One (ABCD), as shown in Figure 5.2, was one of the three recommended corridors. Constraints to this routing do exist, however, and will need to be further evaluated before modifications to this corridor are suggested. This corridor is one of the shortest in length (38 miles) of all corridors considered in this area. It is recommended, therefore, because of its technical and economical rating.

Corridor Thirteen (ABCF) is also an acceptable but not preferred corridor. With the presence of the developed recreation area at Otter Lake, Corridor Thirteen could require special attention in Segment CF. The technical rating for this corridor is attractive because of the short length of transmission line and the fact that the lines could be constructed within a reasonable distance to the access roads. Because of crossings of deep ravines and forest clearing, this corridor is not recommended economically.

Figures 7.3 and 7.4 show the location of the recommended corridor in the area from Watana to an area in the vicinity of Gold Creek, and it essentially straddles the Upper Susitna River. The area of the corridor between Watana and Devil Canyon may be extended to the north and is dependent on the route the access road may take. Every effort will be made to coordinate the transmission lines with the access road.

(c) Northern Study Area

Corridors Three (AEDC) and Four (AEF) were determined unacceptable because of many constraints, and thus, rated F. They include: the lack of an existing access road; problems in dealing with tower erection in shallow bedrock zones; the need for extensive wetland crossings and forest clearing; the 75 river or creek crossings involved; and the fact that prime habitat for waterfowl, peregrine falcons, caribou, bighorn sheep, golden eagle, and brown bear would be crossed. In addition, Corridor Four crosses areas of significant land use constraints and elevations of over 4,000 feet.

Corridor Two (ABDC) was identified as acceptable but not preferred, and thus, rated C. Certain constraints identified for this corridor suggest that an alternative is preferable. Compared with Corridor One, Corridor Two crosses additional wetlands and requires the development of more access roads and the clearing of additional forest lands.

Corridor One (ABC), shown in Figures 7.5 to 7.8, was the only recommended corridor in the northern study area. While many constraints were identified under the various categories, it appears possible to select a route within this corridor to minimize constraint influences. This corridor is attractive economically, because it is close to access roads and the Parks Highway. The visual impact can be lessened by strategic placement of the line. This line also best meets technical and economical requirements.

7.2 - Recommendations

As stated above, three general corridors were identified as the most recommended. These corridors will be subjected to additional studies so that a transmission line route of one-half-mile width can be identified. The following studies will be continued under Subtask 8.03.

(a) Technical

(i) Performance of photo interpretation and terrain analysis of the transmission line corridors and the identification of adverse geological features and geotechnical conditions that significantly affect the design or construction.

(ii) Identification of the terrain and soil conditions such as wet marshland and soft overburden to dry, sloping-rock hillsides.

(iii) The completion of surface and subsurface investigations to the extent necessary to provide adequate data to confirm project feasibility and for the submission of the FERC license application.

(iv) Identification of areas along the routes that appear to be underlain by soils susceptable to seismically induced ground failure such as liquifaction or land sliding.

(v) Collection of preliminary ground motion data for the transmission lines and switching stations.

(b) Environmental

Subtask 7.09 will continue to analyze data pertinent to the avoidance routing scheme specified in the POS, and refine the corridor route location, based upon environmental considerations. Following this, an environmental impact assessment of the preferred route will be conducted. At the same time, techniques to mitigate identified impacts will be developed. Mitigation techniques which can diminish the construction impact are described below.

(i) Mitigation of Construction Impacts

Given the existence of routing-constraints in all corridors, the assignment of a C and an A environmental rating considers the potential environmental impact in developing corridors so designated. In fact, consideration of construction techniques as mitigative measures has been a part of the evaluation process and, in some instances, such construction methods have permitted a corridor to carry a C or an A rating. A consideration in the development of any corridor should be the prescription of impact-mitigating construction techniques. These techniques could include the following on a prescription basis.

- Use of winter construction in wetland, rather than developing roadways that would have undesirable direct and indirect impacts;

- Use of helicopter-based construction in particularly remote areas or in areas judged too wet for summer access;

- Use of existing rights-of-way, wherever possible;

- Use of techniques that allow minimum vegetation clearing, such as "feathering" of rights-of-way edges and topping rather than clear-cutting tall-growing trees; and

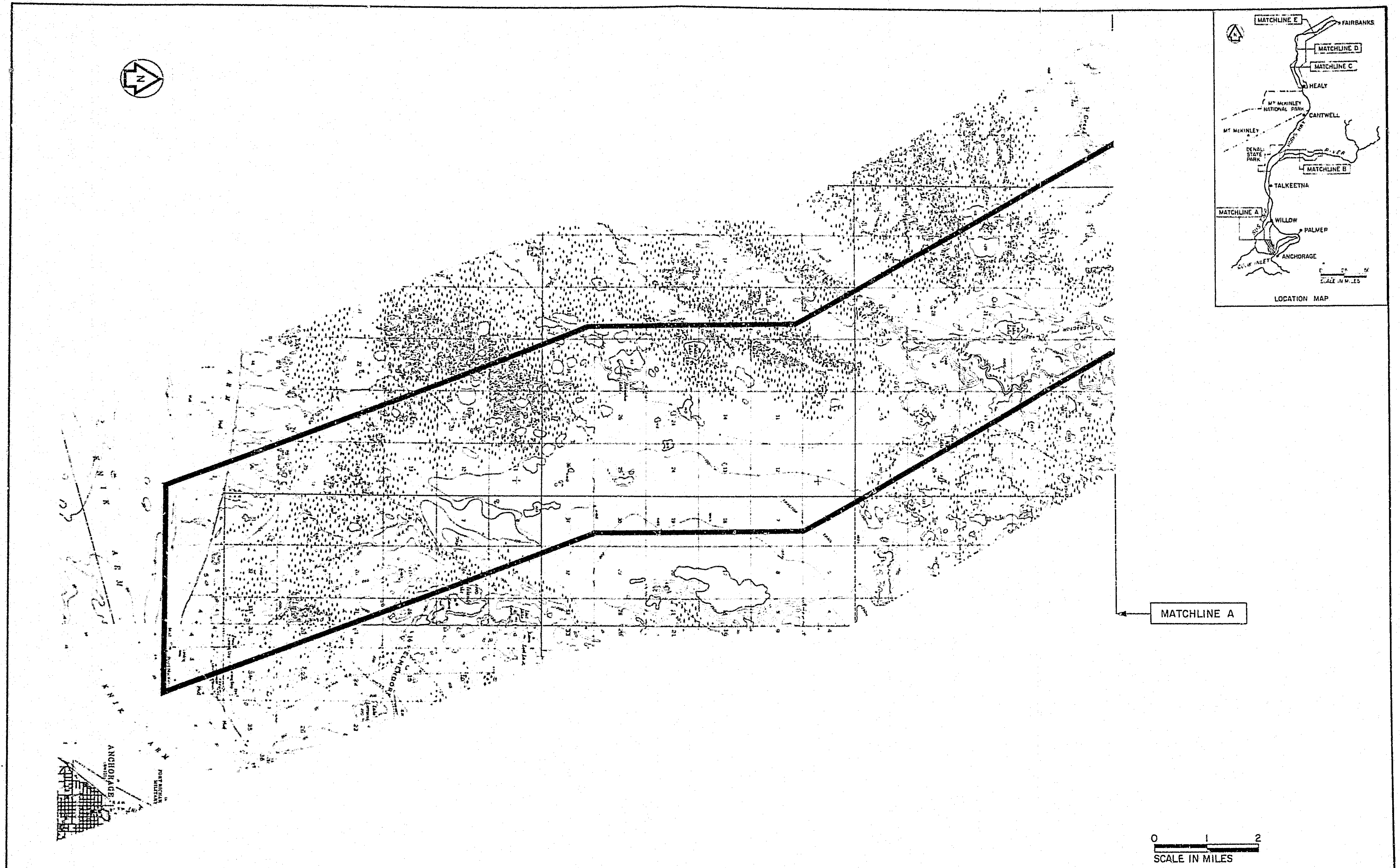
- Use of tower designs that will minimize conspicuousness in particularly sensitive scenic areas.

- Reseeding of areas disturbed by construction equipment.

By considering these and other impact mitigating measures, constraints to routing project transmission lines, regardless of the route followed by the preferred corridor, can be diminished.

7.3 - Other

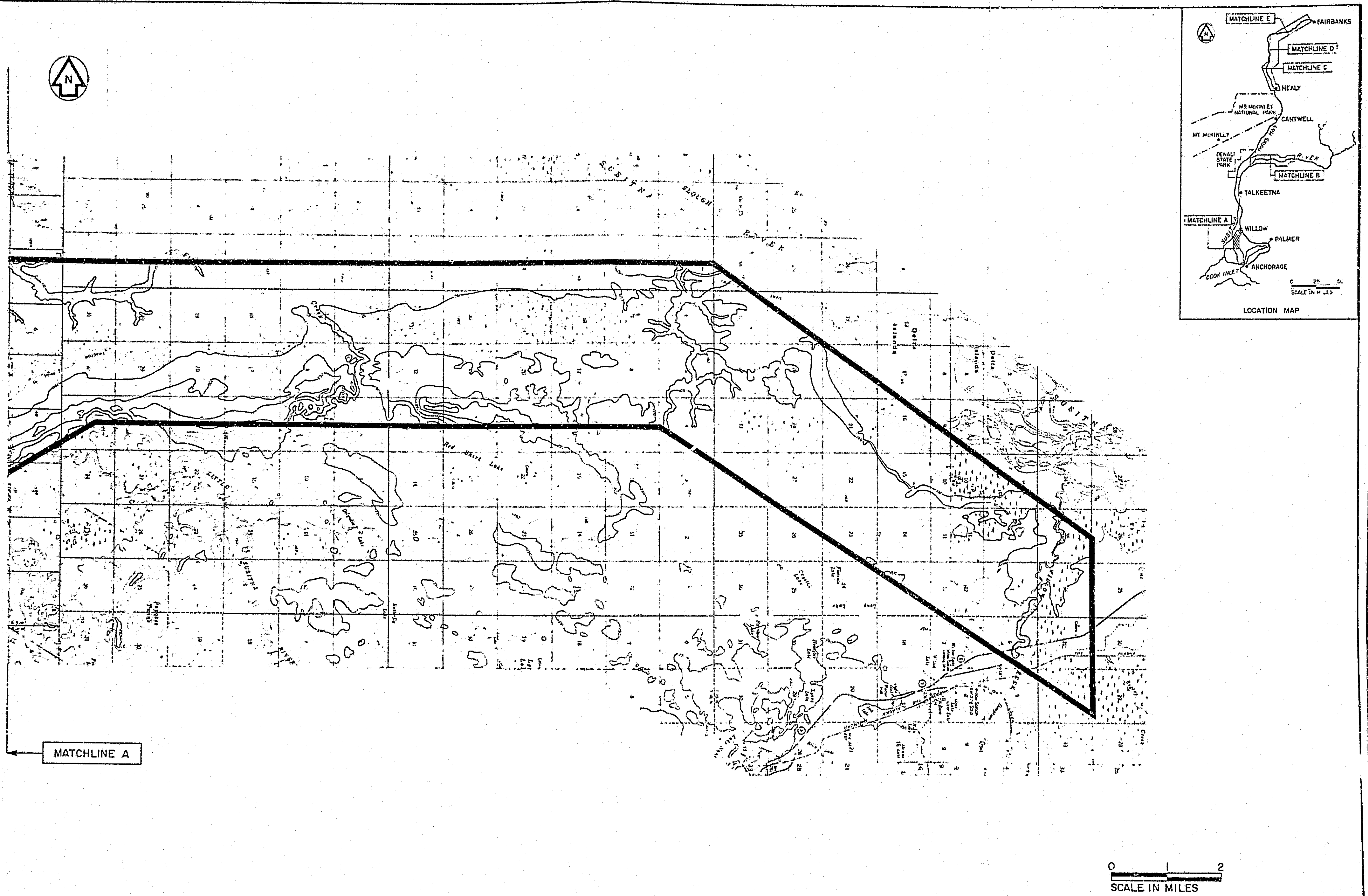
It is also recommended that appropriate state and federal agencies and the general public be permitted to review and comment on this report and the recommended corridors.



RECOMMENDED TRANSMISSION CORRIDOR
SOUTHERN STUDY AREA

FIGURE 7.1

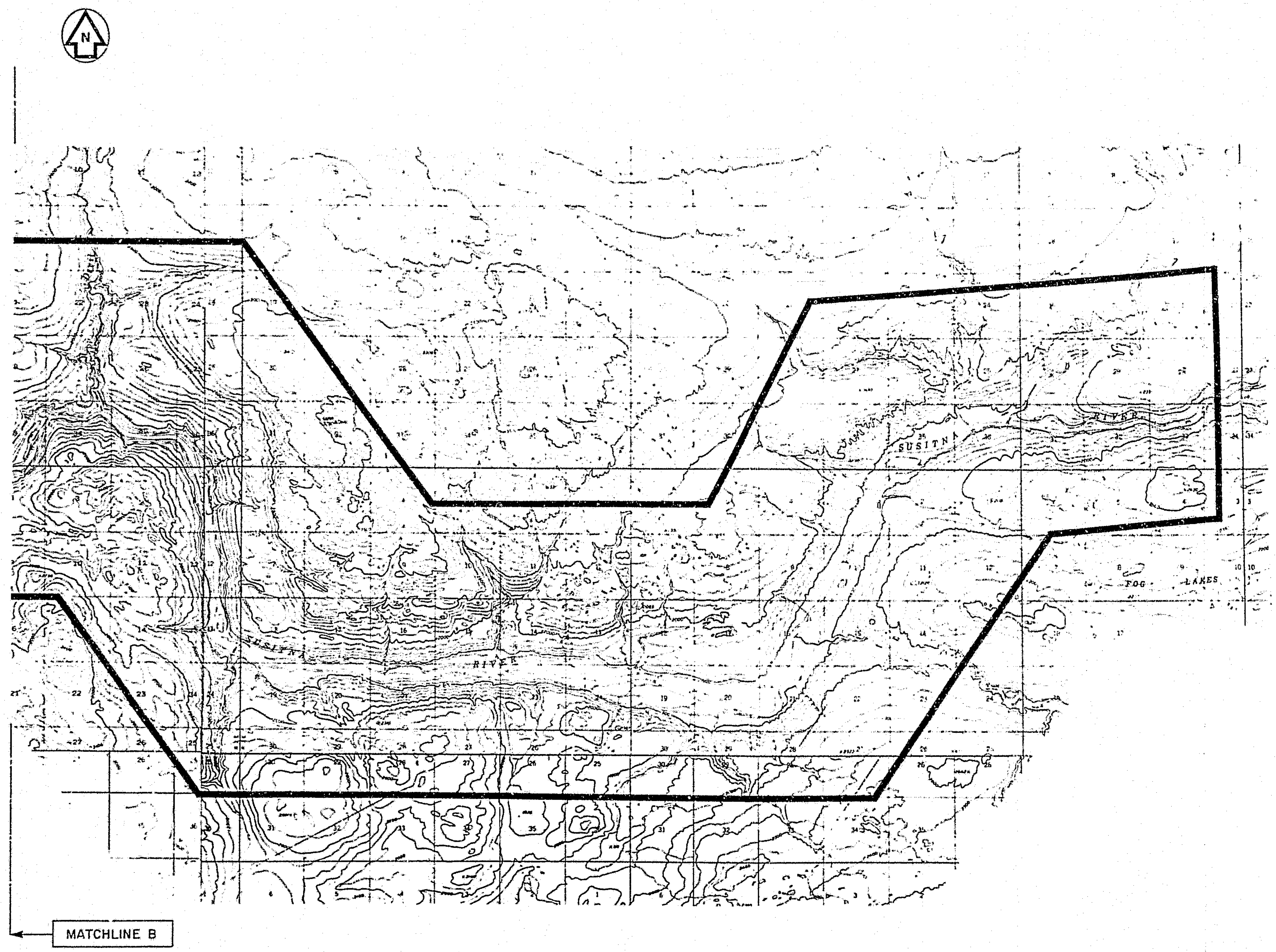
ACRES

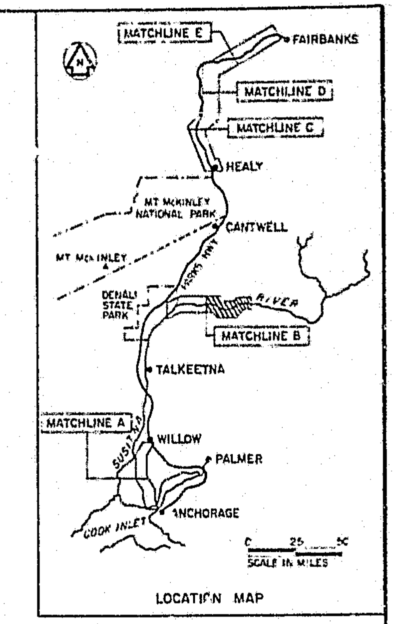


RECOMMENDED TRANSMISSION CORRIDOR
SOUTHERN STUDY AREA

FIGURE 7.2

ACRES



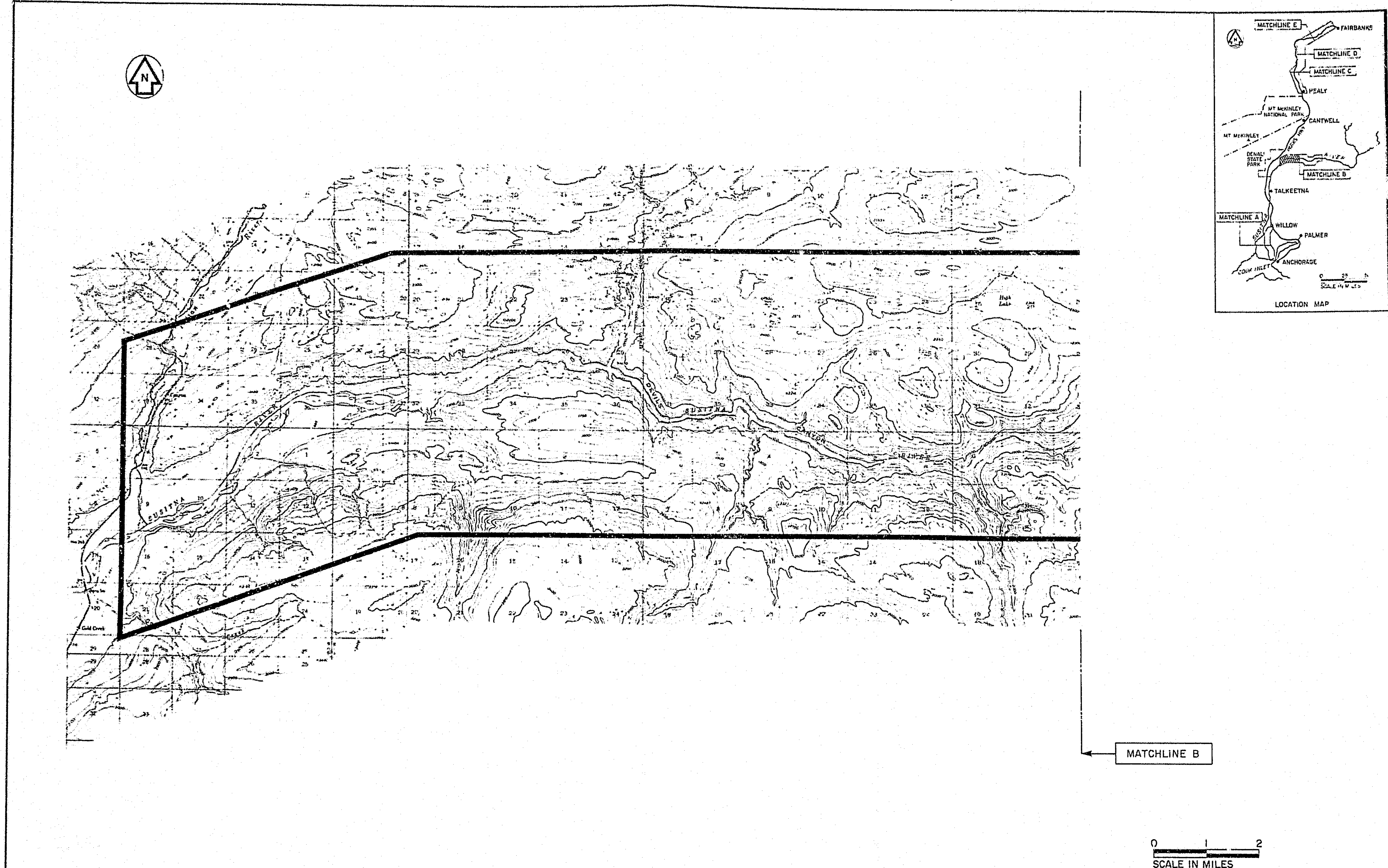


0 1 2
SCALE IN MILES

RECOMMENDED TRANSMISSION CORRIDOR
CENTRAL STUDY AREA

FIGURE 7.3

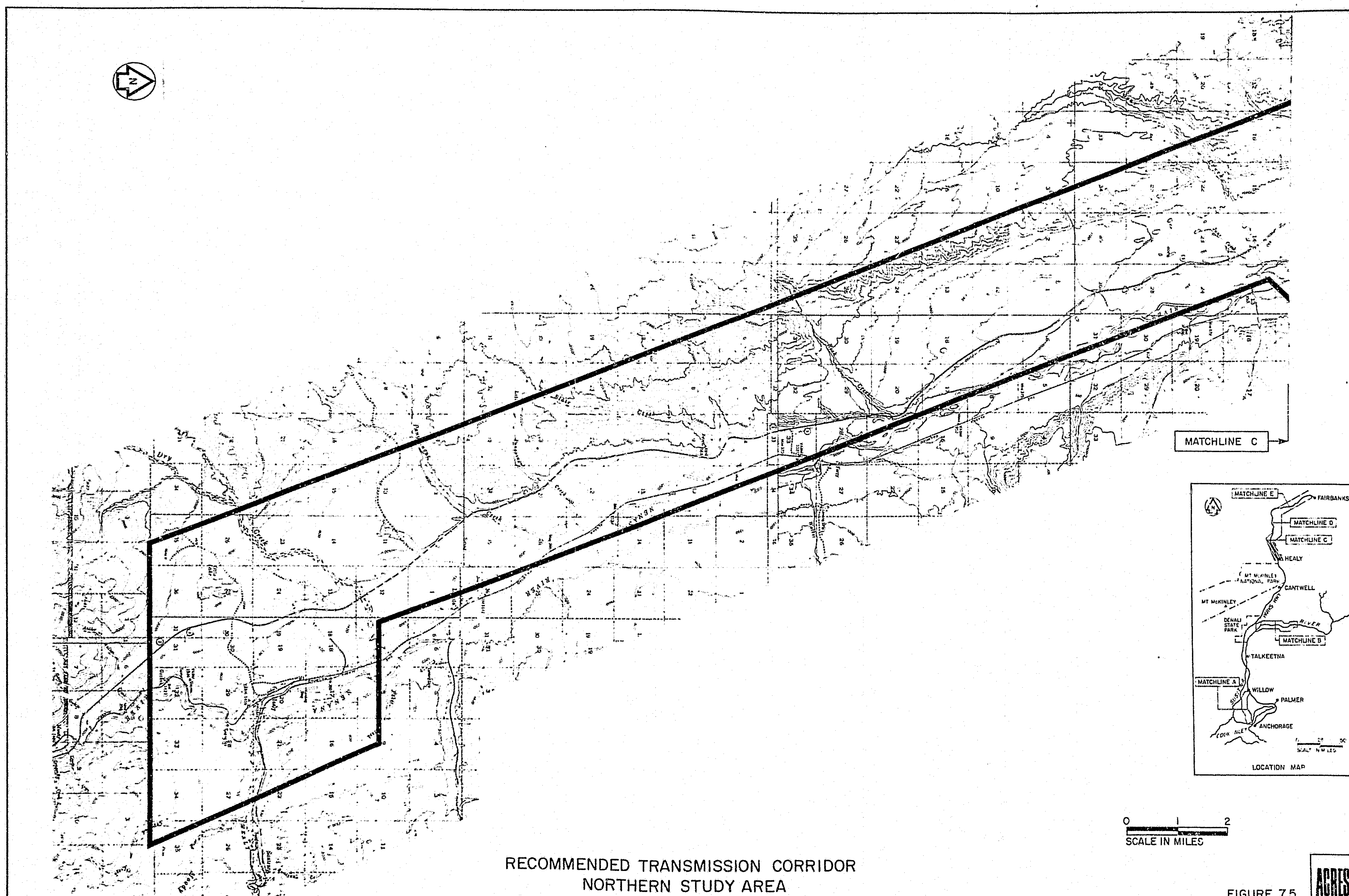
ACRES



RECOMMENDED TRANSMISSION CORRIDOR
CENTRAL STUDY AREA

FIGURE 7.4

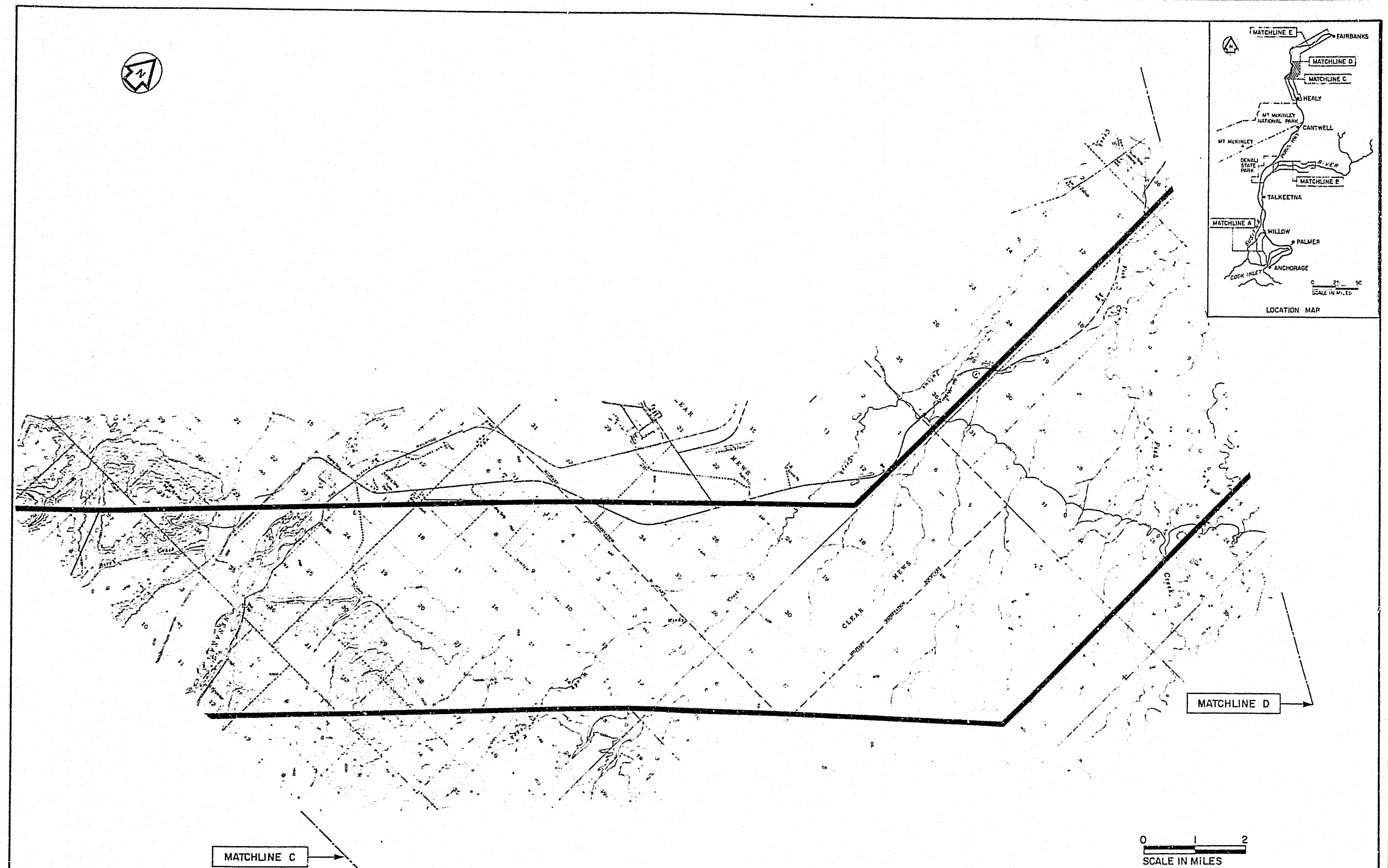
ACRES



RECOMMENDED TRANSMISSION CORRIDOR
NORTHERN STUDY AREA

FIGURE 7.5

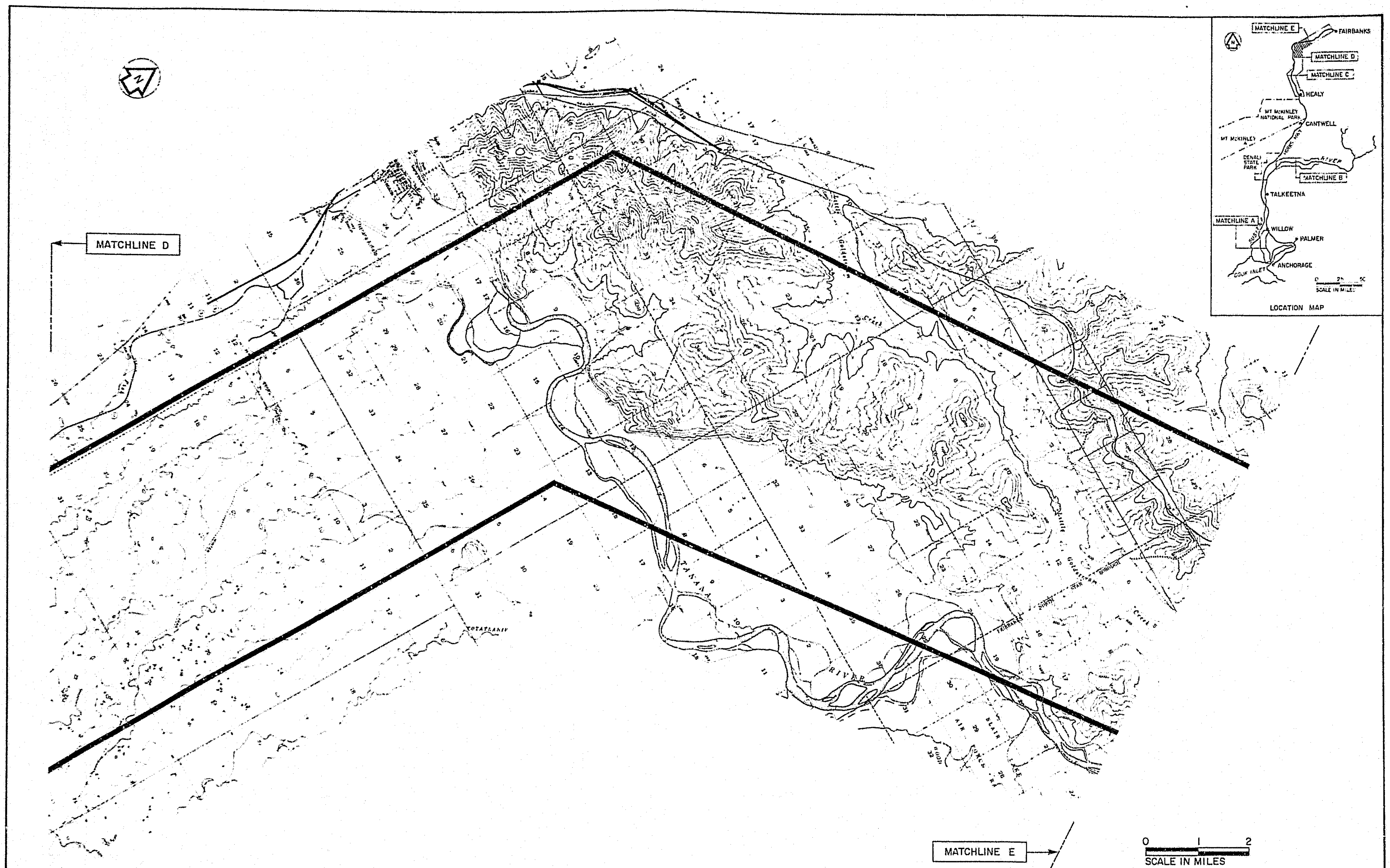
ACRES



RECOMMENDED TRANSMISSION CORRIDOR
NORTHERN STUDY AREA

FIGURE 7.6

ACRES

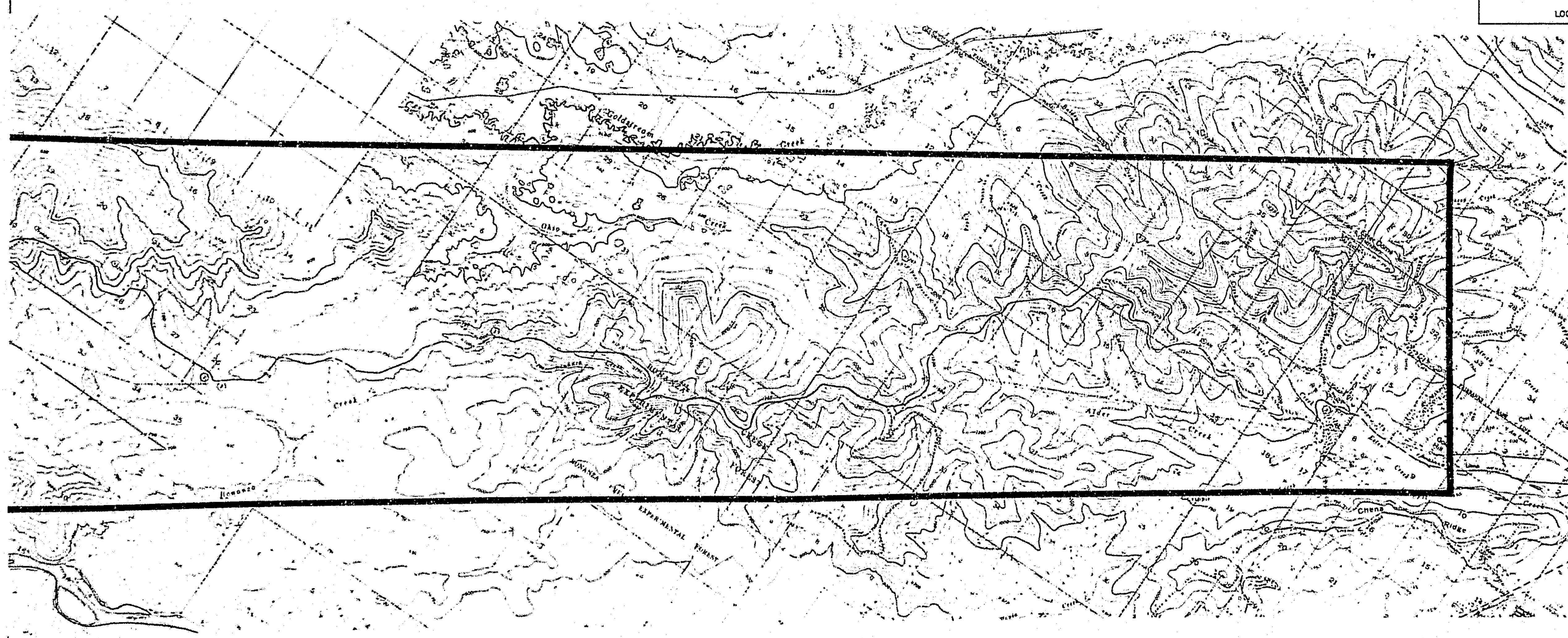


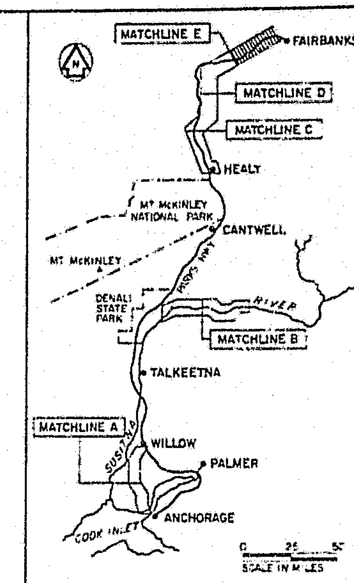
RECOMMENDED TRANSMISSION CORRIDOR
NORTHERN STUDY AREA

FIGURE 7.7

ACRES

MATCHLINE E





LOCATION MAP

0 1 2
SCALE IN MILES

RECOMMENDED TRANSMISSION CORRIDOR
NORTHERN STUDY AREA

FIGURE 7.8

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State Agencies

Alaska Department of Fish and Game
Anchorage, Alaska

Dimitri Bader
Received, during personal vist on January 21, 1981, maps showing habitat essential for fish and wildlife on state lands.

Alaska Department of Fish and Game
Fairbanks, Alaska

Francis Van Ballenberghe
Received information during a personal visit in January 1981, on habitat data covering an area from Fairbanks/Healy to Ester.

Federal Agencies

U.S. Department of Agriculture, Soil Conservation Service
Anchorage, Alaska

Sterling Powell
Received, during personal visit on October 28, 1980, soils information, lower Susitna basin, and a copy of an Alaska Department of Natural Resources publication, "Susitna Basin Land Use/Recreation Atlas Planning Background Report."

U.S. Department of Engergy, Alaska Power Administration
Juneau, Alaska

Robert Cross
Received, during personal visit on November 4, 1980, maps and information on Alaska Power Administration Susitna Project transmission line studies.

Utilities

Golden Valley Electric Association, Inc., (GVEA)
Fairbanks, Alaska

Fairbanks Municipal Utilities System (FMUS)
Fairbanks, Alaska

Anchorage Municipal Light & Power (AML&P)
Anchorage, Alaska

Chugach Electric Association (CEA)
Anchorage, Alaska

Matanuska Electric Association (MEA)
Anchorage, Alaska

APPENDIX A

GENERIC PLAN FORMULATION AND SELECTION METHODOLOGY

APPENDIX A - GENERIC PLAN FORMULATION AND SELECTION METHODOLOGY

On numerous occasions during the feasibility studies for the Susitna Hydroelectric Projects, it is necessary to make decisions in which a single or a small number of courses of action are selected from a larger number of possible alternatives.

This appendix presents a generalized framework for this decision-making process that has been developed for the Susitna planning studies. It outlines, in general terms, the approach to be used in screening a large multitude of options and finally establishing the best option or plan. It is comprehensive in that it takes into account not just economic aspects but also a broad range of environmental and social factors.

The application of this generalized methodology is particularly relevant to the following decisions to be made during the Susitna studies:

- Selection of alternative plans involving thermal and/or non-Susitna hydroelectric developments in the primary assessment of the economic feasibility of the Susitna Basin development plan (Task 6).

- Selection of the preferred Susitna Basin hydroelectric development plan (i.e., identification of best combination of damsites to be developed) (Task 6).

- Selection of the preferred railbelt generation expansion plan (i.e., comparison of railbelt plans with and without Susitna).

- Optimization of the selected Susitna Basin development plan (i.e., determining the best dam heights, installed capacities, and staging sequences) (Task 6).

- Selection of the preferred transmission line routes (Task 8).

- Selection of the preferred mode of access and access routes (Task 2).

- Selection of the preferred location and size of construction and operational camp facilities (Task 2).

It is recognized that the above planning activities embrace a very diverse set of decision-making processes. The generalized methodology outlined here has been carefully developed to be flexible and readily adaptable to a range of objectives and data availability associated with each decision.

The following sections briefly outline the overall decision-making process and discuss the guidelines to be used for establishing screening and evaluation criteria.

A.1 - Plan Formulation and Selection Methodology

The methodology to be used in the decision process can generally be subdivided into five basic steps (Figure A.1):

- Step 1: Determine basic objectives of planned course of action.
- Step 2: Identify all feasible candidate courses of action.
- Step 3: Establish basis to be used and perform screening of candidates.
- Step 4: Formulate plans incorporating preferred alternatives.
- Step 5: Reestablish basis to be used, evaluate plans, and select preferred plan.

Under Step 2, the candidate courses of action are identified so that they satisfy, either individually or in combinations, the stated objectives (Table A.1). In Step 3, the basis of screening these candidates is established in items of redefined, specific objectives; assumptions; data base criteria; and methodology. This process follows a subseries of seven steps as shown in Table A.2, to produce a short list, ideally of no more than five or six preferred alternatives. Plans are then formulated in Step 4 to incorporate single alternatives or appropriate combinations of alternatives. These plans are then evaluated in Step 5, using a further redefined set of objectives, criteria, and methodology to arrive at a selected plan. This 6-step procedure is illustrated in Table A.3. Tables A.2 and A.3 also indicate the review process that must accompany the planning process.

It is important that within the plan formulation and selection methodology, the objectives of each phase of the decision process be redefined as necessary. At the outset, the objectives will be broad and somewhat general in nature. As the process continues, there will be at least two redefinitions of objectives. The first will take place during Step 3 and the second during Step 5. As an example, the basic objectives at Step 1 might be the development and application of an appropriate procedure for selection of a single preferred course of action. Step 2 might involve the selection of those candidates which are technically feasible on the basis of a defined data base and set of assumptions. The objectives at Step 3 might be the establishment and application of a defined set of criteria for elimination of those candidates that are less acceptable from an economical and environmental standpoint. This would be accomplished on the basis of appropriately modified data base and assumptions. Having developed under Step 4 a series of plans incorporating the remaining or preferred alternatives, the objectives under Step 5 might be the selection of the single alternative which best satisfies an appropriately redefined set of criteria for economic, environmental, and social acceptability.

A.2 - Guidelines for Establishing Screening and Evaluation Criteria

Definition of criteria for the screening and evaluation procedures will largely depend on the precise nature of the alternatives under consideration. However, in most cases comparison will be based on technical, economic, environmental and socioeconomic factors which will usually involve some degree of trade-off in making a preferred selection. It is usually not possible to adequately quantify such trade-offs.

Additional criteria may also be separately considered in some cases, such as safety or conservation of natural resources. Guidelines for consideration of the more common overall factors are discussed in the following paragraphs.

(a) Technical Feasibility

Basically all options considered must be technically feasible, complete within themselves, and ensure public safety. They must be adequately designed to cope with all possible conditions including flood flows, seismic events, and all other types of normal loading conditions.

(b) Economic Criteria

In cases where a specific economic objective can be met by various alternative plans, the criteria to be used is the least present-worth cost. For example, this would apply to the evaluation of the various railbelt power generation scenarios, optimizing Susitna Basin hydroelectric developments, and selection of the best transmission and access routes. In cases where screening of a large number of options is to be carried out, unit commodity costs can be used as a basis of comparison. For instance, energy cost in $/kwh would apply to screening a number of hydroelectric development sites distributed throughout southern Alaska. Similarly, the screening of alternative access or transmission line route segments would be based on a $/mile comparison.

As the Susitna Basin development is a state project, economic parameters are to be used for all analyses. This implies the use of real (inflation-adjusted) interest rates and only the differential escalation rates above or below the rate of general price inflation. Intra-state transfer payments such as taxes and subsidies are excluded, and opportunity values (or shadow prices) are used to establish parameters such as fuel and transportation costs.

Extensive use should also be made of sensitivity analyses to ensure that the conclusions based on economics are valid for a range of the values of parameters used. For example, some of the more common parameters considered in comparisons of alternative generation plans particularly lend themselves to sensitivity analyses. These may include:

- Load forecasts
- Fuel costs
- Fuel cost escalation rates
- Interest and discount rates
- Economic life of system components
- Capital cost of system components

(c) Environmental Criteria

Environmental criteria to be considered in comparisons of alternatives are based on the FERC requirements for the preparation of the Exhibit E "Environmental Report" to be submitted as part of the license application for the project. These criteria include project impacts on:

- Physical resources: air, water, and land

- Biological resources: flora, fauna, and their associated habitats
- Historical and cultural resources
- Land use and aesthetic values

In addition to the above criteria which are used for comparing or ranking alternatives, the following economic aspects should also be incorporated into the basic alternatives being studied:

- In developing the alternative concepts of plans, measures should be incorporated to minimize or preclude the possibility of undesirable and irreversible changes to the natural environment.

- Efforts should also be made to incorporate measures which enhance the quality aspects of water, land, and air.

Care should be taken when incorporating the above aspects into the alternatives being screened or evaluated to ensure consistency among alternatives; i.e., that all alternatives incorporate the same degree of mitigation. As an example, these measures could include reservoir operational constraints to minimize environmental impact, incorporation of air quality control measures for thermal generating stations, and adoption of access road and transmission line design standards and construction techniques which minimize impact on terrestrial and aquatic habitat.

(d) Socioeconomic Criteria

Similarly, based generally on FERC requirements, the project impact assessment should be considered in terms of socioeconomic criteria which include:

- Impact on local communities and the availability of public facilities and services;
- Impact of employment on tax and property values;
- Displacement of people, businesses, and farms; and
- Disruption of desirable community and regional growth.

A.3 - Plan Selection Procedure

As noted above, for each successive screening exercise, the criteria can be refined or modified in order to reduce or increase the number of alternatives being considered. As a general rule, no attempt will be made to ascribe numerical values to non-quantifiable attributes such as environmental and social impacts in order to arrive at an overall numerical evaluation. It is considered that such a process tends to mask the judgmental tradeoffs that are made in arriving at the best plan. The adopted approach involves utilizing combinations of both quantifiable and qualitative parameters in the screening exercise without making tradeoffs. For example, the screening criteria used might be:

- ".... alternatives will be excluded from further consideration if their unit costs exceed X and/or if they are judged to have a severe impact on wildlife habitat ...."

This approach is preferable to criteria which might state:

- ".... alternatives will be excluded if the sum of their unit cost index plus the environmental impact index exceeds Y ...."

Nevertheless, it is recognized that under certain circumstances, particularly where a relatively large number of very diverse alternatives must be screened very quickly, the latter quantitative approach may have to be used.

In the final plan evaluation stages, care will be taken to ensure that all tradeoffs that have to be made between the different quantitative and qualitative parameters used are clearly highlighted. This will facilitate a rapid focus on the key aspects in the decision-making process.

An example of such an evaluation result might be:

- ".... Plan A is superior to Plan B. It is $X more economical and this benefit is judged to outweigh the lower environmental impact associated with Plan B ...."

Sufficient detailed information should be presented to allow a reviewer to make an independent assessment of the judgmental tradeoffs made.

The application of this procedure in the evaluation stage is facilitated by performing the evaluations for paired alternatives only. For example, if the short-list plans are A, B, and C, then in the evaluation, Plan A is first evaluated against Plan B, and the better of these two is evaluated against C to select the best overall plan.

TABLE A.1: STEP 2 - SELECT CANDIDATES

Step 2.1 - Identification of candidates:

- objectives
- assumptions
- data base
- selection criteria
- selection methodology

Step 2.2 - List and describe candidates that will be used in Step 3.

TABLE A.2: STEP 3 - SCREENING PROCESS

Step 3.1 - Establish:

- objectives
- assumptions
- data base
- screening criteria
- screening methodology

Step 3.2 - Screen candidates, using methodology established in Step 3.1 to conduct screening of alternatives.

Step 3.3 - Identify any remaining individual alternatives (or combinations of alternatives) that satisfy the objectives and meet the criteria established in Step 3.1 under the assumptions made.

Step 3.4 - Determine whether a sufficient number of alternatives remain to formulate a limited number of plans. If not, additional screening via Steps 3.1 through 3.3 is required.

Step 3.5 - Prepare interim report.

Step 3.6 - Review screening process via (as appropriate):

- Acres
- APA
- External groups

Step 3.7 - Revise interim report.

TABLE A.3: STEP 5 - PLAN EVALUATION AND SELECTION

Step 5.1 - Establish:

- objectives
- evaluation criteria
- evaluation methodology

Step 5.2 - Establish data requirements and develop data base.

Step 5.3 - Proceed with the plan evaluation and selection process as follows:

- Identify plan modifications to improve alternative plans

- Based on the established data base and the selection criteria, use a paired comparison technique to rank the plans as (1) the preferred plan, (2) the second best plan, and (3) other plans;

Step 5.4 - Prepare draft plan selection report.

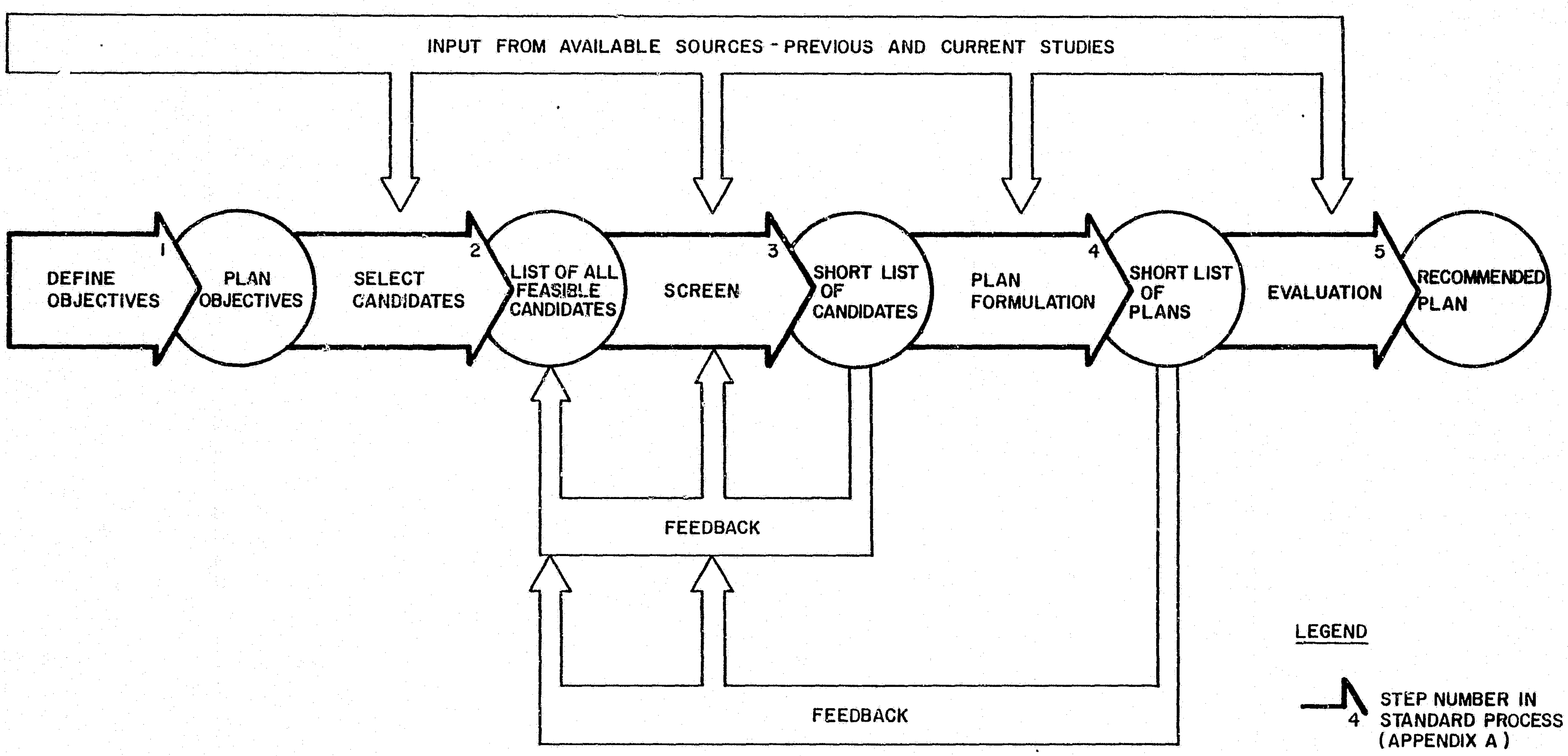
Step 5.5 - Review plan selection process via (as appropriate):

- Acres
- APA
- External groups

Step 5.6 - Prepare final plan selection report.

TABLE A.4: EXAMPLES OF PLAN FORMULATION AND SELECTION METHODOLOGY

Activity	1. Define Objectives	2. Select Alternatives	3. Screen	4. Plan Formulation	5. Evaluation
Susitna Basin Development Selection	Select best Susitna Basin hydropower development plan	All alternative dam sites in the basin, e.g: Devil Canyon High Devil Canyon Watana Susitna III Vee Maclaren Butte Creek Tyone Denali Gold Creek Olson Devil Creek Tunnel Alternative	Screen out sites which are too small or are known to have severe environmental impacts	Select several combinations of dams which have the potential for delivering the lowest cost energy in the basin, e.g.: Watana-Devil Canyon dams; High Devil Canyon-Vee dams; Watana Dam - Tunnel	Conduct detailed evaluation of development plans
Access Route Selection	Select best access route to the proposed hydropower development sites within the basin for purposes of construction and operation	All alternative road, rail, and air transport component links, e.g.: road and rail links from Gold via north and south routes; Road links to sites from Denali Highway; Air links to sites and associated landing facilities	Screen out links which are either more costly or have higher environmental impact than equivalent alternatives. Ensure sufficient links remain to allow formulation of plans	Select several different access plans, e.g.: Gold Creek road access; Gold Creek road/ rail access; Denali Highway road access	Conduct detailed evaluation of development plans



PLAN FORMULATION AND SELECTION METHODOLOGY

FIGURE A.1

ACRES

APPENDIX B

SOILS INFORMATION

APPENDIX TABLE B.1

SOIL ASSOCIATIONS WITHIN THE PROPOSED TRANSMISSION CORRIDORS - GENERAL DESCRIPTION, OFFROAD TRAFFICABILITY LIMITATIONS (ORTL), AND COMMON CROP SUITABILITY (CCS)[a]

EF1 - Typic Gyofluvents - Typic Cryaquepts, loamy, nearly level

- Dominant soils of this association consist of well-drained, stratified, waterlaid sediment of variable thickness over a substratum of gravel, sand, and cobblestones. Water table is high in other soils, including the scattered muskegs. ORTL: Slight - Severe (wet; subject to flooding); CCS: Good - Poor (low soil temperature throughout growing season).

EO1 - Typic Cryorthents, loamy, nearly level to rolling

- This association occupies broad terraces and moraines; most of the bedrock is under thick deposits of very gravelly and sandy glacial drift, capped with loess blown from barren areas of nearby floodplains. Well-drained, these soils are the most highly developed agricultural lands in Alaska. ORTL: Slight; CCS: Good - Poor.

IQ2 - Histic Pergelic Cryaquepts - loamy, nearly level to rolling

- The dominant soils in this association are poorly drained, developed in silty material of variable thickness over very gravelly glacial drift. Most soils have a shallow permafrost table, but in some of the very gravelly, well-drained soils, permafrost is deep or absent. ORTL: Severe - Wet; CCS: Poor

IQ3 - Histic Pergelic Cryaquepts - Typic Cryofluvents, loamy, nearly level

- Soils of this association located in low areas and meander scars of floodplains are poorly drained silt loam or sandy loam; these are usually saturated above a shallow permarfrost table. Soils on the natural levees along existing and former channels are well-drained, stratified silt loam and fine sand; permafrost may occur. ORTL: Severe (wet); CCS: Unsuitable (low temperature during growing season; wet) - Good (but subject to flooding).

IQ25 - Pergelic Cryaquepts - Pergelic Cryochrepts, very gravelly, hilly to steep

- Soils of this association occupying broad ridgetops, hillsides, and

a. Source: U.S. Department of Agriculture, Soil Conservation Service 1979. See Appendix Table B.2 for definitions for Offroad Trafficability Limitations and Common Crop Suitability.

APPENDIX TABLE B.1 (Cont'd)

valley bottoms at high elevation are poorly drained, consisting of a few inches of organic matter, a thin layer of silt loam, under which is very gravelly silt loam; permafrost table is at a depth greater than 2 feet. In locations of hills and ridges above tree line these soils are well-drained. ORTL: Severe (wet, steep slopes); CCS: Unsuitable (wet; low soil temperature; short, frost-free period).

IR1 - Typic Cryochrepts, loamy, nearly level to rolling

- On terraces and outwash plains, these soils are well-drained, having a thin mat of course organic matter over gray silt loam. In slight depressions and former drainage ways, these are moderately well-drained soils, having a thin organic mat over silt loam, with a sand or gravelly substratum. ORTL: Slight-Moderate; CCS: Good.

IR10 - Typic Cryochrepts, very gravelly, nearly level to rolling - Aeric Cryaquepts, loamy, nearly level to rolling

- Generally well- to moderately well-drained soils of terraces, outwash plains, and low moraines. Typically, these soils have a silt loam upper layer over gravelly soils. Pockets of poorly drained soils with a shallow permafrost table occupy irregular depressions. ORTL: Moderate - Severe (wet); CCS: Good - Poor (wet; low soil temperature throughout growing season; short, frost-free period).

IR14 - Alfic Cryochrepts, loamy, hilly to steep - Histic Pergelic Cryaquepts, loamy, nearly level to rolling

- On mid-slopes, these soils are well drained, of micaceous loess ranging to many feet thick over shattered bedrock of mica schist. Bottomland areas are poorly drained with a relatively thick surface of peatmoss. In these soils, permafrost ranges from 5-30 inches in depth. ORTL: Moderate - Severe (steep slope; wet); CCS: Poor (steep slopes; highly susceptible to erosion).

IU3 - Pergelic Cryumbrepts, very gravelly, hilly to steep - rough mountainous land

- On high alpine slopes and ridges close to mountain peaks, these soils have a thin surface mat of organic material beneath which is an 8 to 12-inch-thick, dark brown horizon formed in very gravelly or stony loam. This association also includes areas of bare rock and stony rubble on mountain peaks. ORTL: Severe (short, frost-free period) - Very Severe (steep slope); CCS: Unsuitable (short, frost-free period; shallow bedrock).

RM1 - Rough Mountainous Land

- Rough, mountainous land composed of steep, rocky slopes; icefields; and

APPENDIX TABLE B.1 (Cont'd)

glaciers. Soils on lower slopes are stony and shallow over bedrock. Unsuitable for agriculture. Roads feasible only in major valleys.

S01 - Typic Cryorthods, loamy, nearly level to rolling - Sphagnic Borofibrists, nearly level

- Low hills, terraces, and outwash plains have well-drained soils formed in silty loess or ash, over gravelly glacial till. Depressions have poorly drained, fibrous organic soils. ORTL: Slight - Very Severe; CCS: Good (on well-drained soils) - Unsuitable (wet organic soil).

S04 - pic Cryorthods, very gravelly, nearly level to rolling - Sphagnic Borofibrists, nearly level

- Soils of nearly level to undulating outwash plains are well-drained to excessively well-drained, formed in a mantel of silty loess over very gravelly glacial till. Soils of the association located in depressions are very poorly drained, organic soils. ORTL: Slight - Very Severe; CCS: Good - Unsuitable (wet, organic).

S05 - Typic Cryorthods, very gravelly, hilly to steep - Sphagnic Borofibrists, nearly level

- On the hills and plains, these soils, formed in a thin metal of silty loess over very gravelly and stony glacial drift, are well drained and strongly acid. In muskegs, most of these soils consist of fibrous peat. ORTL: Severe (steep slope); CCS: Unsuitable (steep slopes; stones and boulders; short, frost-free season).

S010 - Humic Cryorthods, very gravelly, hilly to steep

- Generally, these are well-drained soils of foothills and deep mountain valleys, formed in very gravelly drift with a thin mantel of silty loess or mixture of loess and volcanic ash. These soils are characteristically free of permafrost except in the highest elevation. ORTL: Severe (steep slope); CCS: Poor - Unsuitable (low soil temperature throughout growing season; steep slopes).

S015 - Pergelic Cryorthods - Histic Pergelic Cryaquepts, very gravelly, nearly level to rolling

- On low moraine hills, these soils are well drained, formed in 10 to 20 inches of loamy material over very gravelly glacial drifts. On foot slopes and valleys, these soils tend to be poorly drained, with shallow permafrost table. ORTL: Slight - Severe (wet); CCS: Unsuitable (short, frost-free period; wet; stones and boulders).

APPENDIX TABLE B.1 (Cont'd)

S016 - Pergelic Cryorthods very gravelly, hilly to steep - Histic Pergelic Cryaquepts, loamy, nearly level

- On hilly moraines these soils are well-drained; beneath a thin surface of partially decomposed organic matter, the soils have spodic horizons developed in shallow silt loam over very gravelly or sandy loam. In valleys and long foot slopes, these are poorly drained soils, with a thick, peaty layer over a frost-churned loam or silt loam. Here, depth of permafrost is usually less than 20 inches below surface mat. ORTL: Severe (steep slope; wet); CCS: Unsuitable (short, frost-free period) - Poor (wet; low soil temperature).

APPENDIX TABLE B.2

DEFINITIONS FOR OFFROAD TRAFFICABILITY LIMITATIONS AND COMMON CROP SUITABILITY OF SOIL ASSOCIATIONS[a]

OFFROAD TRAFFICABILITY LIMITATIONS (ORTL)

Offroad Trafficability refers to cross-country movement of conventional wheeled and tracked vehicles, including construction equipment. Soil limitations for Offroad Trafficability (based on features of undisturbed soils) were rated Slight, Moderate, Severe, and Very Severe on the following bases:

- Slight

  Soil limitations, if any, do not restrict the movement of cross-country vehicles.

- Moderate

  Soil limitations need to be recognized but can generally be overcome with careful route planning. Some special equipment may be required.

- Severe

  Soil limitations are difficult to overcome, and special equipment and careful route planning are required. These soils should be avoided if possible.

- Very Severe

  Soil limitations are generally too difficult to overcome. Generally, these soils are unsuitable for conventional offroad vehicles.

Common Crop[b]
Suitability (CCS)

Soils were rated as Unsuitable, Good, Fair, and Poor for the production of common crops on the following bases:

- Unsuitable

  Soil or climate limitations are generally too severe to be overcome. None of the common crops can be grown successfully in most years, or there is danger of excessive damage to soils by erosion if cultivation is attempted.

a. Source: U.S. Department of Agriculture, Soil Conservation Service 1979.
b. The principal crops grown in Alaska--barley, oats, grasses for hay and silage, and potatoes--were considered in preparing ratings. Although only these crops were used, it is assumed that the ratings are also valid for vegetables and other crops suited to Alaskan soils.

APPENDIX TABLE B.2 (Cont'd)

- Good

Soil or climate limitations, if any, are easily overcome, and all of the common Alaskan crops can be grown under ordinary management practices. On soils of this group --

(a) Loamy texture extends to a depth of at least 18 inches (45 cm).

(b) Crop growth is not impeded by excessive soil moisture during the growing seasons.

(c) Damage by flooding occurs no more frequently than 1 year in 10.

(d) Slopes are dominantly less than 7 percent.

(e) Periods of soil moisture deficiency are rare, or irrigation is economically feasible.

(f) Damage to crops as a result of early frost can be expected no more frequently than 2 years in 10.

(g) The hazard of wind erosion is estimated to be slight.

- Fair

Soils or climate limitations need to be recognized but can be overcome. Common crops can be grown, but careful management and special practices may be required. On soils of this group --

(a) Loamy texture extends to a depth of at least 10 inches (25 cm).

(b) Periods of excessive soil moisture, which can impede crop growth during the growing season, do not exceed a total of 2 weeks.

(c) Damage by flooding occurs no more frequently than 2 years in 10.

(d) Slopes are dominantly less than 12 percent.

(e) Periods of soil moisture deficiency are infrequent.

(f) Damage to crops as a result of early frost can be expected no more frequently than 3 years in 10.

(g) There is no more than a moderate hazard of wind erosion.

- Poor

Soils or climate limitations are difficult to overcome and are severe enough

APPENDIX TABLE B.2 (Cont'd)

to make the use questionable. The choice of crops is narrow, and special treatment or managment practices are required. In some places, overcoming the limitations may not be feasible. On soils of this group --

(a) Loamy texture extends to a depth of at least 5 inches (12 cm).

(b) Periods of excessive soil moisture during the growing season do not exceed a total of 3 weeks.

(c) Damage by flooding occurs no more frequently than 3 years in 10.

(d) Slopes are dominantly less than 20 percent.

(e) Periods of soil moisture deficiency are frequent enough to severely damage crops.

(f) Climatic conditions permit at least one of the common crops, usually grasses, to be grown successfully in most years.

APPENDIX C

REVIEW OF PREVIOUS STUDIES

APPENDIX C - REVIEW OF PREVIOUS STUDIES

- The U.S. Army Corps of Engineers (COE) Study

The COE study was contained in a report entitled "South-Central Railbelt Area, Alaska Upper Susitna River Basin, Interim Feasibility Report, Hydroelectric Power and Related Purposes" dated December 1975. Section H and Section I of Appendix 1 of the COE report deal with the transmission system which would interconnect the communities of Anchorage and Fairbanks and transmit power from the project to these load centers. These two sections were originally prepared as reports to the COE by the Alaska Power Administration of the United States Department of the Interior. Each section of the following text consists of a brief summary of certain aspects of the COE's feasibility studies followed by a critical review of the COE's approach and conclusions. This review was prepared with a consideration of changes that have occurred since the COE study was performed and under the assumption that the Alaska Power Authority would begin construction of the Intertie program (Willow to Healy) prior to Susitna transmission line construction.

This section was prepared in conjunction with Terrestrial Environmental Specialists, Inc. (TES).

(a) Methods of Evaluation

The evaluation process presented in the COE report, concerning selection of a preferred corridor for the project, involved several steps. The first step required interpretation of large-scale topographic maps and aerial photo mosaics. The next step involved an aerial reconnaissance to determine which of the mountain passes could accommodate transmission line construction and to review potential corridors. During this overflight, several corridors were found to have constraints that would preclude their use for transmission facilities.

The corridors surviving this review process were then subjected to more detailed analysis. The result of this process was the identification of twenty-two individual corridor segments located within the study area. These corridor segments were then inventoried and environmental impact analysis performed for each alternative corridor. Inventory and impact information was presented in both a tabular and textual format, and was based upon then available information. The selected corridors were Susitna 1 (comprising Corridor Segments 7, 8, and 9) and Nenana 1 (comprising Corridor Segments 7, 8, 9, 10, 13, and 16). (See Figure C.1 which is taken directly from the COE report.)

The use of inventory tables proved very workable in the COE study. While other corridor selection methodologies could have been utilized, the inventory method proved to be a useful mechanism in defining transmission line corridors, as evidenced by the fact that very few letters to the COE (which were subsequently in the Environmental Impact Statement) were critical of the selected corridor.

The inventory seemed quite complete, considering the fact that its intended use was a preliminary feasibility study; preliminary studies are frequently much less comprehensive. The COE was able to categorize the existing baseline condition generally for each of the twenty-two corridor segments in nine different inventory categories. The inventory categories included: topography/geology, soils, vegetation, wildlife, climate, existing developments, land ownership/status, existing rights-of-way, and scenic quality/recreation. Cultural resources were included in the last category.

These categories represent most of the resource areas of major concern in a corridor-routing and environmental impact evaluation process. However, expected future development (other than potential for agriculture and forestry, or implied under land ownership) should also have been inventoried.

(b) Major Factors Considered in Evaluating Corridors

The nine inventory categories mentioned above were identified by the COE to be major factors in evaluating corridors. The nine inventory categories were reduced to five impact categories for purposes of comparing the various alternative corridors. The five impact categories were: soils, vegetation, wildlife, existing developments, and scenic quality/recreation. The objective of the corridor evaluation process was to optimize reliability, cost, and environmental constraint factors in the selection of a preferred corridor.

TES found that the environmental factors considered by the COE represent the major evaluation factors of a transmission line corridor-routing study. Although entitled a preliminary feasibility study, the study became an environmental impact analysis. As a result, the major factors were utilized in the impact analysis process without the benefit of data to support the COE's conclusions about impacts. For example, vegetation is a major evaluation factor in corridor-routing studies, and thus was inventoried, but only in general terms and without quantification. Similarly, the other major evaluation factors were inventoried, for the most part, in broad, unquantified terms. As a result, the depth of impact analysis accorded any of the major evaluation factors is subject to criticism as inadequate.

(c) Alternative Corridors

The study resulted in four feasible corridors connecting Devil Canyon to Anchorage via the Susitna Drainage. The study also identified five feasible corridors connecting the Susitna Project to Fairbanks. In addition, a corridor was identified to connect the project to Fairbanks along the Delta River, and two corridors were identified to connect the project to Anchorage through the Matanuska Valley. Following the identification of these major corridors, corridor segments, or smaller units of the corridors, were identified (see Figure C.1). A segment, as defined by the COE, is "that part of a corridor either between two intersections with other corridors or between an intersection and one of the endpoints near Anchorage or Fairbanks."

The twenty-two corridor segments were the result of a fairly thorough assessment of the major options available for connecting the Susitna Project to the load centers of Anchorage and Fairbanks. However, variations and alternatives to two corridor segments in particular (Segment 1 and Segment 16) should also be considered.

Corridor Segment 1 connects Point MacKenzie with Talkeetna, a distance of approximately 84 miles of relatively flat terrain with some low, rolling hills. Along this segment, the transmission line would encounter the expansion of population centers in the vicinity of the Anchorage-Willow areas and in the vicinity of Talkeetna. In addition, recreation areas in the Big Lake, Nancy Lake, and Rock Lake areas south of Willow would be encountered.

Corridor Segment 16 connects Healy with Ester, paralleling an existing 138 kV transmission line for a distance of approximately 97 miles. The wide, terraced valley of the lower Nenana River and low, rolling hills in the vicinity of the Tanana River are crossed by this corridor segment. However, the COE recognized that within this corridor there is room for other alternatives, rather than closely paralleling this existing right-of-way. In addition, a route east and north from Healy to Ester warrants further investigation.

(d) Comparison of Alternative Corridors

The COE's study reviewed the environmental impacts of the twenty-two corridor segments through the use of the inventory and impact tables. The COE also described by category, in text form, the impacts of each of the different alternative corridors. Then, with certain assumptions, the COE subjectively ranked (numerically from 1 to 4, with 1 being the least-impact option) each inventoried corridor. Tables C.1 and C.2 are taken directly from the COE report.

The assumptions used by the COE in arriving at the subjective ranking were:

(i) with "other factors being equal, cumulative impacts are proportional to length";

(ii) "that joint use and paralleling of existing rights-of-way is preferable to pioneering of a new corridor";

(iii) that transmission lines "always cause an adverse visual impact of varying degree";

(iv) that a corridor "should be located to anticipate future needs"; and

(v) that a transmission line corridor "fulfill its requirements as economically as possible while keeping environmental impacts to a minimum."

As previously discussed, a valuable feature of this corridor comparison was that most options for connecting the project to Anchorage and to Fairbanks were compared. Another favorable point in the impact analysis provided by the COE is that direct comparisons among dissimilar inventory categories were avoided. Although the method was not elaborated in the COE report, the corridor segments were compared within specific impact categories, without attempting to weight one category against another. Of course, in the selection of a preferred corridor, trade-offs and value judgments are unavoidable, whether presented as such or not.

(e) Conclusions

The COE concluded that Susitna S-1 (Segments 1-3-7-8-9) and Nenana N-1 (Segments 7-8-9-10-13-16) were the preferred corridors. Of these, only Segments 1, 7, 8, 9 and 16 fall under the responsibility of the Acres study team. It is our opinion that, of the options studied by the COE, the selected corridor segments represent the best options for connecting the project to the load centers, given the current assumption that an intertie connecting Willow and Healy would be under construction before the Susitna Project. This preference is the result primarily of the fact that Susitna S-1 and Nenana N-1 fall within existing highway and rail corridors and are likely to present the least construction impacts of all the alternatives considered.

- The International Engineering Company, Inc./Robert W. Retherford Associates (IECO/RWRA) Report

The report produced by the joint venture of IECO and RWRA was basically an economic feasibility study for the Anchorage-Fairbanks Transmission Intertie. The report used the COE Susitna Hydroelectric Project Interim Feasibility Report as background information for both the economic feasibility and selection of a transmission line corridor. IECO/RWRA selected a corridor which is almost the same as that recommended by the COE report.

- Method of Evaluation of Corridors

(a) IECO/RWRA reviewed the COE report and concluded that the COE recommended corridor was preferable. IECO/RWRA went further and plotted a preliminary route on USGS maps, 1 inch - 1 mile.

The route was chosen so as to: Where possible;

- Avoid highways;
- Avoid telephone lines;
- Avoid aircraft landing and takeoff corridors;
- Avoid highly subdivided land areas and levels;
- Avoid crossing agricultural lands;

- Provide minimum visibility from highways and homes;
- Avoid heavily timbered lands;
- Provide for as minimal changes in grade as the terrain will allow;
- Parallel alignments with property lines (if not precluded by other considerations);
- Avoid sensitive wildlife areas; and
- Be in reasonable proximity to transportation corridors (to facilitate construction).

(b) Preliminary Environmental Assessment

(i) Description of the Environment

The corridor from Willow to Healy will not be discussed, since it is discussed in the report issued by Commonwealth Associates, Inc.

- Point MacKenzie to Willow

The corridor travels north along the east flank of the Susitna River Valley, an extremely wide and poorly drained plain. Heavy forests of bottomland spruce and poplar, interspersed with muskeg and black spruce, are typical. The soils vary from deep, very poorly drained peat to well-drained soils with the latter being more abundant. Although permafrost is almost absent in this lower part of the Susitna Valley, the poorly drained areas are subject to freezing and heaving in the winter.

A sizeable concentration of moose inhabits the lower Susitna River Valley. This valley also supports black and brown bear and a moderate density of waterfowl.

The proposed transmission line corridor generally follows a "tractor trail" (USGS designation) to three miles northeast of Middle Lake. Here, at the approach to the Nancy Lake area, an alternative route may be used to avoid this area. The proposed route is located in marshes and wetlands, between Papoose Twins and Finger Lakes, across the Little Susitna River. The corridor then travels northward along the east side of Lynx Lake, Rainbow Lake, and Long Lake.

- Gold Creek to Watana

The corridor parallels the Susitna River eastward to the proposed Devil Canyon Dam site and then to the proposed Watana Dam site. The vegetation in the canyons varies from upland spruce-hardwood to alpine tundra. Soils vary from poorly drained river bottoms to unstable talus. Permafrost occurs in this portion of the corridor. Moose populations are present.

- Healy to Ester

The corridor leaves Healy and crosses the Parks Highway near Dry Creek. It then roughly parallels the west side of the highway at an elevation of 1,500 feet, crossing several tributaries to the Nenana River. It crosses the Golden Valley Electric Association (GVEA) line 1-1/2 miles north of Bear Creek, the Alaska Railroad, and the Nenana River at A.R.R. Mile 383, and the Parks Highway. The route then parallels the GVEA line. The corridor crosses the Tanana River at the Tanana P.I. and follows the Tanana River floodplain for several miles until the corridor again crosses the highway where it travels on the west side of the Bonanza Creek Experimental Forest. The corridor parallels the GVEA right-of-way the rest of the way to Ester.

The Healy to Ester portion of the route passes through some private lands (mining claims, homesteads, etc.), as well as near the towns of Healy, Lignite, and Nenana. An archaeological site exists near Dry Creek. Portions of the corridor are heavily forested and provide habitat for moose, caribou, and bear. Poorly drained areas in this corridor are subject to potential permafrost degradation and frost heaving.

(ii) Environmental Impacts

The report points out that construction and maintenance of other Alaskan transmission systems have shown that the most negative environmental impacts caused by a transmission system can be minimized. Golden Valley Electric Association, Matanusak Electric Association, and Chugach Electric Association have constructed and are operating several lines on poor soils and under harsh climatic conditions. The report also points out that except for anticipated slight visual impacts, most environmental impacts caused by a transmission system would be far less than those of many transportation and communication systems.

The environmental impacts discussion is general in nature. The impacts discussed are the ecosystem, recreation, cultural resources, scenic resources, and social environment.

(c) Conclusions

IECO/RWRA concluded that the preferred corridor was close to the one chosen by the COE with further definitions as discussed in paragraph (a). IECO/RWRA selected this route because of its favorable length, accessibility, and environmental consideration. It is our opinion that the IECO/RWRA selection is the best choice when taking into consideration the two load centers being served, Anchorage and Fairbanks. The route is the shortest distance between the load centers and the

Susitna Hydroelectric sites. As stated in our evaluation of the COE report, the route falls within existing highway and railway corridors, which will afford easier access to the lines for maintenance purposes and will present the least construction impact of the other alternative corridors.

The report presents a detailed economic feasibility study for the Anchorage-Fairbanks transmission system. However, it was general in nature when dealing with environmental studies.

APPENDIX TABLE C.1: CORRIDOR ANALYSIS - PROJECT POWER TO ANCHORAGE/COOK INLET AREA

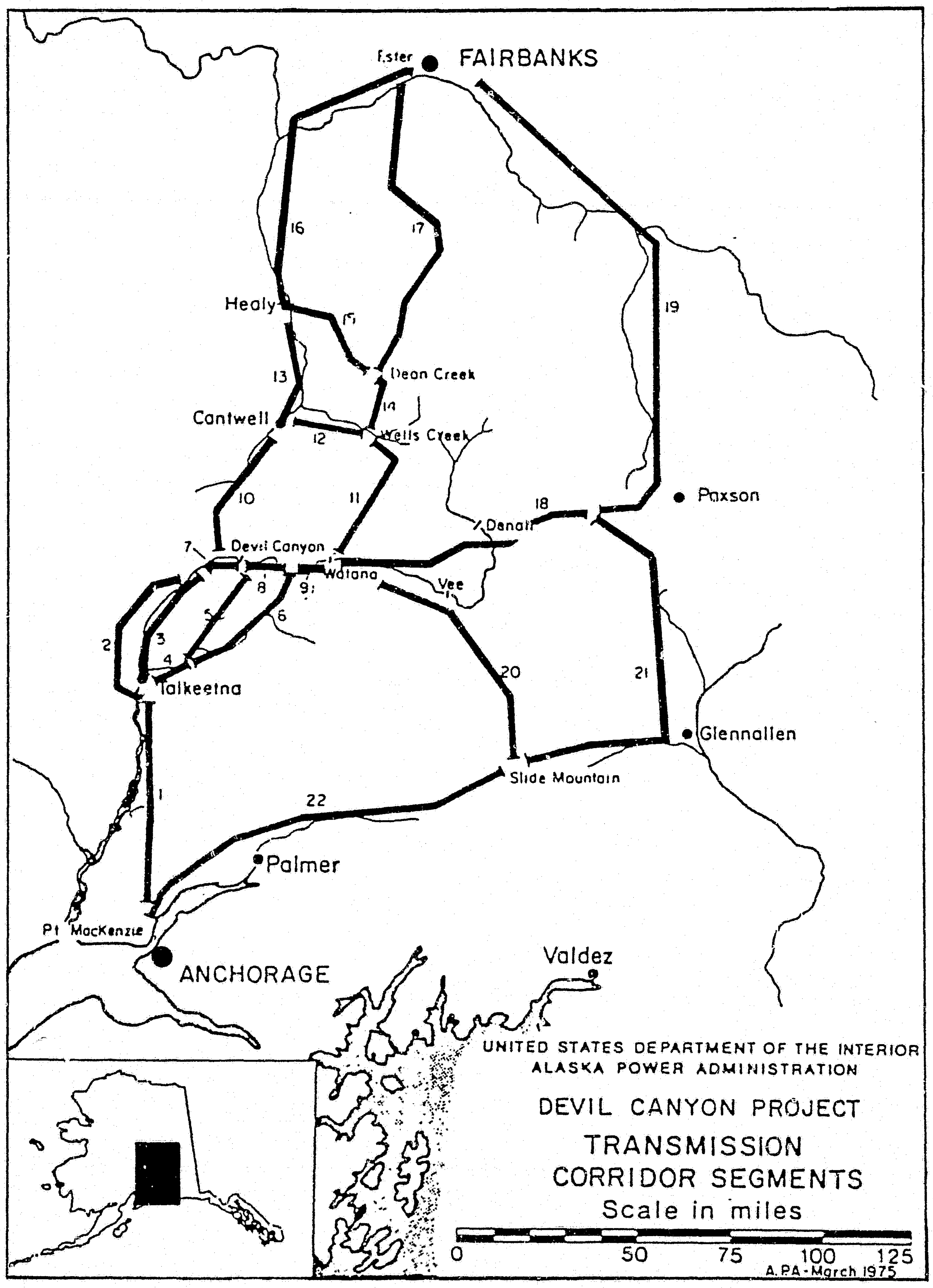
Analysis Factor:	Susitna Corridors S - 1	S - 2	S - 3	S - 4	Mantanuska Corridors M - 1	M - 2
Length, miles	166	170	159	164	258	385
Max. elevation, feet	2,100	2,100	3,800	2,200	3,000	4,000
Ranking	1*	1	2	1	3	4
Environmental Impacts						
Soils	1	2	1	1	2	2
Vegetation	2	3	1	3	4	5
Wildlife	1	2	3	3	4	3
Existing developments	3	3	2	1	3	3
Scenic quality/recreation:						
Developed areas	3	3	2	1	3	3
Remote areas	1	2	3	4	4	3
Ranking	1	3	1	3	4	4
Costs						
Construction	1	1	2	1	3	4
Operation and maintenance	1	1	2	1	3	3
Ranking	1	1	2	1	3	4
Reliability						
Exposure to hazards	1	1	2	1	2	3
Ease of repair	1	2	2	2	3	3
Ranking	1	2	3	2	4	4
Summary Ranking	1 (preferred corridor)	2	3	2	4	4

* 1 = least impact
4 = most impact

APPENDIX TABLE C.2: CORRIDOR ANALYSIS - PROJECT POWER TO FAIRBANKS/TANANA AREA

Analysis Factor:	Nenana Corridors N - 1	N - 2	N - 3	N - 4	N - 5	Delta Corridor D
Length, miles	228	250	261	223	212	280
Max. elevation, feet	2,400	4,300	4,000	4,000	4,300	4,000
Ranking	1*	3	3	2	3	3
Environmental Impacts						
Soils	1	3	2	2	3	3
Vegetation	2	2	3	2	1	3
Wildlife	1	3	2	3	3	3
Existing developments	3	2	2	2	1	2
Scenic quality/recreation:						
Developed areas	3	2	2	1	1	3
Remote areas	1	3	2	2	3	2
Ranking	1	3	3	2	1	3
Costs						
Construction	1	4	2	3	5	6
Operation and maintenance	1	4	2	3	5	3
Ranking	1	4	2	3	5	4
Reliability						
Exposure to hazards	1	4	3	2	4	4
Ease of repair	1	4	2	3	4	3
Ranking	1	3	2	2	3	3
Summary Ranking	1 (preferred corridor)	4	2	2	3	4

* 1 = least impact
4 = most impact



FAIRBANKS
16
17
Healy
15
13
Dean Creek
14
Cantwell
12
Wells Creek
19
10
11
18
Paxson
Denali
7
Devil Canyon
8
9
Watana
Vee
2
3
5
6
4
Talkeetna
20
21
Glennallen
Slide Mountain
1
22
Palmer
Pt MacKenzie
ANCHORAGE
Valdez
UNITED STATES DEPARTMENT OF THE INTERIOR
ALASKA POWER ADMINISTRATION
DEVIL CANYON PROJECT
TRANSMISSION
CORRIDOR SEGMENTS
Scale in miles
0
50
75
100
125
A.PA-March 1975

FIGURE C.1

APPENDIX D

RECORD OF EVENTS

APPENDIX D - RECORD OF EVENTS

A number of events took place in 1980 which had a significant impact on the subtask activities. The major events are summarized below:

(a) May 13, 1980

Acres American Incorporated (Acres) received a letter from APA informing Acres that the Alaska Legislature has appropriated $3.8 million to APA for preconstruction activities related to transmission interconnection between the Anchorage and Fairbanks systems. APA was considering a separate Architectural/Engineering (A/E) contract for the Intertie and requested Acres to identify any activity that is critical to the early route selection study. These activities were to proceed immediately but would require prior APA approval.

(b) May 20, 1980

A meeting was arranged in Anchorage between APA and Acres. APA informed Acres that it has definitely been decided to engage a separate A/E firm to study the Intertie from Healy to Willow. This line will be built to Susitna Project requirements but operated initially at 138 kV. Discussions took place on the best way to coordinate efforts with the new A/E firm and to identify the activities that must be completed to meet the Intertie schedule.

(c) May 19 - 21, 1980

Several meetings were held with IECO/RWRA to clarify the IECO/RWRA proposal of May 8, 1980, to render engineering services to Acres for the Susitna transmission line studies.

(d) June 26, 1980

Acres submitted to APA a letter recommending the following procedures for Intertie coordination:

(i) Acres should proceed with authorization under Subtask 2.08 of the aerial photography of an identified corridor from Healy to Willow. Acres assumed that the aerial photography would be restricted to the corridor selected by IECO/RWRA in their Intertie report.

(ii) Acres should also proceed with authorization under Subtask 2.04 of the land status research for the selected corridor.

(iii) Acres should proceed as soon as possible with the electrical system power studies which will be based on scenarios from 1994 onwards. The studies will determine the recommended voltage and electrical characteristics of the Susitna tranmission lines.

(iv) Acres will also proceed with the remainder of the feasibility study of the transmission line from the project site to the Intertie from Anchorage to Willow and Healy to Fairbanks, in accordance with the schedule contained in the current POS.

(e) June 27, 1980

Commonwealth Associates Incorporated (CAI) contacted Acres to notify them that it has been chosen as the A/E firm for the Intertie contract. A meeting was scheduled at Jackson, Michigan.

(f) July 10, 1980

A meeting was held with CAI. Susitna Project information was supplied, and a coordinated approach for obtaining system data was agreed upon. Other subjects were discussed such as climatic data and Institute of Social and Economic Reserves forecast. Aerial photography was discussed, and CAI proposed to notify Acres of the exact route at a later date.

(g) July 28, 1980

Acres received notification from APA to proceed with the recommended procedure described in Acres' letter of June 26, 1980.

(h) August 18, 1980

Copies of reduced quadrangle maps were received from CAI showing the area that required photographing for the Intertie corridor.

(i) October, 1980

Utilities system data were received in the early part of the month, but final Chugach Electric Association data were not received until October 15, 1980. This information was passed on to APA for transmittal to CAI.

(j) October 13, 1980

APA notified Acres via a copy of a letter from CAI that the Alaska state authorities would permit only one right-of-way for both the Intertie and the Susitna transmission lines.

(k) November 18, 1980

A meeting with APA and CAI was held in Jackson, Michigan, to discuss ways of coordinating and exchanging information between CAI and Acres.

It was agreed that the Intertie between Willow and Healy would be selected in cooperation with Acres in order to consider any Susitna impacts upon the selected Intertie corridor.