

ALASKA TRANSPORTATION ISSUES: 1976

Prepared for
Federal-State Land Use Planning Commission
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Introduction

The purpose of this paper is to summarize and direct attention to some major Alaskan transportation issues. Hence, rather than be a conclusive statement upon transportation issues, it will hopefully lead responsible agencies into policy analysis and programming of capital investments.

The paper develops three major themes in the following sections.

First, it is demonstrated that the state of Alaska is entering into a time where it will, given current federal-aid formulas and ceilings, not be able to even keep up with the need for reconstruction of its existing highway system based on a twenty-year design life. This negates the construction of major new linkages between population centers by the state. Second, the reservation of easements by the federal government for future needs will serve primarily transportation for the export of the state's natural resources and be developed by private capital; in this regards, there are then a number of easements that would appear rational. Third, the need for coordinated transportation planning, together with land use, is vital to the well-being of the state; the vast holdings of land by private native corporations, the federal government, the state of Alaska, and the private citizen, together with the vastness of Alaska and the low population density, requires that an ongoing comprehensive transportation planning programming agency be established for Alaska. In that the development of mineral production is not

anticipated to the late 1990's, this agency should be given the authority of eminent domain across both federal, native, and state lands with a ceiling upon its mileage and with guidelines to meet the requirements of federal and state codes. The twenty-year easement life is not sufficient.

Transportation Development

The development of Alaska's transportation system and infrastructure of the state is dependent upon a number of factors--the most important in this discussion being the level of funding available for expansion of the surface transportation system. The accounting for benefits in an area as vast as Alaska, with a total population comparable to the city of Toledo, Ohio, shows that where the magnitude of the benefits to the individual household may be significant; the aggregate benefits to the residents of an area from an improved transport highway linkage cannot justify the expense of the system. Examples in the state are the Anchorage-Bristol Bay road, the western access road connecting Bettles with Nome, or the Rex-McGrath-Bethel road. In these instances, the ratio of benefits to costs given by a cursory analysis is less than a tenth! Hence, the construction of new highways to remote areas must be justified by other factors. This does not mean to imply that the reduction of costs to residents is not a goal, but that to justify the great expense of building the above highways, there should be some co-purpose which will have to be the primary justification.

In these instances, if the only purpose of the transport system is to reduce costs, the state could save vast sums of money by providing a subsidized air service giving free travel to rural residents. This argument is based on the state placing its federal Highway Trust Fund matching

dollars for the above projects in the bank and using the interest alone to provide the service to and from the railbelt area.

We now proceed in the discussion to review the capability of the state to meet its obligations to keep the existing highway system operative. It will be shown that the state of Alaska has an extensive highway system¹ which, given inflation and current trends and discussions with respect to the Highway Trust Fund in the U.S. Congress, will become more of an economic burden upon the state. This further suggests that new roads will have to be carefully reviewed from a cash flow point of view by the state with respect to maintenance and the required capital to build the road with respect to other demands upon the available construction dollars.

The state of Alaska, from 1956 through 1974, has received \$676,082,000 (\$63,979,000 in 1974) in apportionments from the Highway Trust Fund. It has contributed over this period \$76,466,000 (\$7,408,000 in 1974). Hence, the ratio of apportionments to payments is 8.84; for every payment dollar the state gives the Trust Fund, it receives \$8.84 in return when it matches that with \$1.14, its 11-1/2 percent matching requirement. The net return to the state is then \$2.95 federal construction dollars for every one it contributes. Alaska's apportionment/payment ratio is the highest in the nation with Wyoming the next highest at 2.85; California is 0.81 and New York is 0.97.² The Alaska posture with respect to the other states will most likely change in the direction of a unity ratio between apportionments and payments.

Three different federal funding levels, assuming 88-1/2 percent federal matching, are shown in Figure 1 and Tables 1 through 3. The levels assume

slight growth curve "tracking" with the historical funding and, in addition, over the next five years, the state receives \$300,000,000 for improving the existing system as a result of the Trans-Alaska Pipeline System construction.

The tables present the financial picture of the state's highway expenditures over the next fifteen years. The basic premise is that the state will continue, as its first priority, to keep its existing highway system operative. This, as shown, will demand all available highway funds after 1980. Additional available money, after meeting the assumed 7 percent reconstruction schedule, will result in new right-of-way. The average cost of a mile of primary highway in 1976 is taken as \$735,000 per mile. The tables naively show that the state will not meet its reconstruction schedule without available federal money; in reality the state will have to take the burden of meeting these costs out of its general fund.

The money indicated available for construction and reconstruction is not to be taken as given. The receipt of highway funds requires constant monitoring the changing requirements and different funding purposes of the Highway (Transportation) Trust Fund. Many states maintain personnel in Washington, D.C., for exactly this purpose of grantsmanship. The state's share of the Fund is a function of this monitoring of Congress' apportionment formulas.

At the pessimistic level, Table 1 shows, of federal apportionments, the construction level in 1981 is \$86 million which then declines gradually to \$36 million (\$16.0 million state highway fuel tax plus \$8.5 million state motor vehicle registration plus \$9.1 returned from federal highway fuel tax plus \$1.2 million state-federal matching), the state's generated revenue

for highways. This apportionment represents the worst of the three situations for the state. The federal matching money in 1987 is equal to the state's contribution to the fund. At this level, the state highway mileage past its twenty-year design life is 2,227 miles. The likelihood of the state undertaking major new construction, given this minimum maintenance requirement for reconstruction, is slight.

The expected level, Table 2, assumes that the 1981 funding will continue "tracking" with the pre-TAPS growth rate. This assumes the Highway (Transportation) Trust Fund will continue to operate "as is." Under the expected level, the highway mileage beyond a twenty-year life is 1,564 miles in 1990. Hence, again the likelihood of the state engaging in new major construction beyond this maintenance level is slight.

The optimistic level, Table 3, assumes simply that the federal government will continue the 1980 level of apportionments across remaining years of the period. Even at this high level of funding, there will be 1,104 miles of federal-aid system beyond its twenty-year design life in 1990.

What these three cases show clearly is that the state, unless there is a change of heart with respect to the federal Highway (Transportation) Trust Fund by Congress, will have to commit more of its own money to keep the highway system it now has at current standards. Construction of new right-of-way will add to the state's financial highway burden through debt service (5-6 percent interest) and maintenance of the system estimated at \$3,000 per mile in 1976 or \$11.5 million. At 4 percent inflation, the 1990 expected system will cost \$22 million to maintain.

Another area of concern is the allocation of available funds in a dynamic environment with some regions growing faster than others. There is

a strong correlation between a state's regional populations and the amount of highway investment within a region. This follows in that the demand for facilities is greater for larger populations. In the future of Alaska, the railbelt area will need additional transportation services at a faster rate than other areas of the state due to its anticipated growth. Consequently, this area will receive a larger share of the available dollars due to: the expense of urban transportation improvements; the need for new roads; and the need to alleviate congestion.

The population of Anchorage will increase to 257,000 persons in 1980.³ This increase will require significant additions to the highway system. Improved and expanded transit service may alleviate these problems to some extent. Historically, the railbelt area receives about half of the highway construction dollars with the south central, western, and south eastern highway districts receiving the remainder.

This brings up the question of whether the state wishes to build up its rural transportation system or its urban transportation system. There will be significant pressure on the state to satisfy its growing urban needs. In light of the federal Highway (Transportation) Trust Fund picture, it would appear that the state will have to become more involved in financing its system as the level of demand for facilities increases above the federal Highway Fund contribution.

Based on the above analysis, it would appear that the state of Alaska, with a road density of less than one percent of the average road density (miles of road per square mile) of the density in the nation and with a

road mileage per capita above the nation's average, will not have available federal funds for additional construction, not to mention its ability to meet its anticipated reconstruction schedule based on a twenty-year design life.

Reservation of Easements

Perhaps no other topic in the last five years within the state of Alaska has generated as much paper and controversy as the reservation of easements by the federal government across federal, state, and native corporation lands for the public good. The easements would expire after twenty years if no utilization had occurred. Both the Federal-State Land Use Planning Commission and the Bureau of Land Management have conducted studies of this issue and held public hearings.⁴

The controversy has centered around the definition of "public good." The viewpoints of native corporations, the state of Alaska, the federal government, and the public have been well stated and documented in the files of the FSLUPC and the Department of the Interior.

One of the major problems is the uncertainty that accompanies the reservation of these easements. From the previous section, it is apparent that the state of Alaska is not about to proceed across the landscape with road building. The population base and economy are not there to justify the capital expense, and there are other transport means more economical. This suggests that the utilization of any easements has to be justified by the transporting of natural resources to either tidewater or along inland corridors to markets within the Midwest. These projects are capital intensive and privately financed. There is then the requirement of capital

recovery and profit. Other benefits to Alaskans would be "attached" to the primary efforts of mineral and petroleum extraction. For example, access to recreational areas, to other mining areas, and to population centers would be goals that would be considered in the design of a comprehensive transport system. These would be considered to the extent that they would not jeopardize the return on the main investment.

A recent study for the Federal Railroad Administration by CONSAD with ISEGR included a study of the mineral development potential of the state and showed that it will not be until the late 1990's that copper will be economic to mine in Alaska and that will be in the Wrangell Mountains area.⁵ It will not be until the 2000's that copper in the Bornite area will be marketable. Hence, it is apparent that, although Alaska is rich in minerals, little, if any, major developments in mineral access will be required in the twenty-year life of the easements because of the costs of wages, production, transportation, limited working season, and the competitive world market.

A further development is the question of subsidy in the exploration and production of these minerals. If the corporation that is producing the minerals for market has to pay for the construction of the road or railbed and its maintenance, then it might well find other modes of transportation attractive (e.g., air). Air transport is very attractive in that the capital investment is small compared to that of road or rail systems. If the volume of material is significant then the economics of scale will favor roads and then rail. This is only if the magnitude of production is large. A corporation may find it economical to perform some degree of concentration or even smelting at the mine site and then fly the material out.

The remaining objective for the corridors is then that of petroleum extraction. This problem was addressed by the Bureau of Land Management's transportation study team who recommended forty corridors in the state [see note 4(b) and 4(f)] including navigable rivers. The FSLUPC [see note 4(d)] recommended that a north-south corridor on the west coast of Alaska be reserved. From a purely export sense, there would appear to be a vast number of corridors within the BLM's system that would meet the two primary export requirements: transport to a gulf of Alaska port and transport to the Midwest.

A north-south corridor easement is given in Figure 2. This easement collects the gas and oil along the coast and delivers it to a port to the south of Cook Inlet. Total material wise, it is an economic alinement. Figure 3 shows only one possible Midwest collection system. Depending on the magnitude of the production at each field on the coast, including Petroleum Reserve #4, a different collection system may be defined. The major point is that the role of easements should be looked upon as a system with its consequent economics of scale. Given the knowledge that we have today of the possible reserves, estimates can be made but these are highly suspect. In the ISEGR report on the future tonnages for the Alaska Railroad,⁶ the western Alaska pools are estimated to be on line in the late 1990's and more realistically in the 2000's. This puts the reservation of these easements out of the time period when they actually would be coming on line and needed.

A Comprehensive Transportation Process

Within Alaska there are numerous agencies responsible for transportation, with the federal government and state of Alaska playing the dominant roles. Historically, transport planning in Alaska has been singular in mode for both the federal and state governments. The highway systems developed were constrained only by the federal government share, and little attention was paid to competing modes or land use or development. A good example is the construction of the Anchorage-Fairbanks highway immediately adjacent to the Federal Alaska Railroad's alignment; this is not to say that the road is not without benefits--one only needs look at the development along the highway compared to the pre-highway days and the travel time saved by the highway--but that in the planning there was no consideration of other modes with resultant mode splits and diversions. The suggestion that a highway be built from Fairbanks to Nome takes into little account that air may, from the state's point of view, be a better mode to subsidize than to subsidize a highway for a demand that is not sufficient to justify its construction.

Discussion of transportation policy cannot proceed rationally without development of goals and objectives that define the reference point of the analysis and the purpose of the transportation system. There are various levels of analysis or points of reference: the user, the state, the federal government, and the individual modal agency, etc. A state's transport objective may be to minimize the total cost of providing a given level of service across all modes over a period of time. Another formulation would be to maximize the aggregate level of service across all modes over a period of time within a fixed budget. The latter formulation would appear to be

the best suited to the programming and budget system utilized in state governments. Still another possible formulation would be the maximization of a level of service within a state modal agency against a fixed budget--typical of highways--or the minimization of costs to maintain a given level of service (e.g., marine highways, air, and harbors within the state). These two different ways of transportation analysis yield different programs of action.

A planned program that was based on the optimal allocation at the multi-modal point of view would be quite different from one at a single-modal point of view summed. Individual mode maximization does not recognize other modes' economics of scale. This is precisely the point of comprehensive planning.

At a further level of analysis, what may be optimal in a transport cost or level of service sense may negate or be detrimental to the attainment of land use or development goals.

Hence, a careful determination of what specifically the transport system is to accomplish, what constraints are upon the system, what minimum levels of performance are required, what the demands are, what the cost with respect to each mode are, and what future requirements will be is required for solid transportation planning coordinated with land use.

Normative goals are also possible with respect to transportation programming-planning: for example, the development of a mineral-rich area; the improvement of the defense posture (the initial basis for the interstate highway system); access to recreational areas, population centers, mining areas; and the attainment of land use and development goals, to name a few.

One of the major points brought out in the above discussion is that the expiration of the corridor easements will occur just before the corridors are needed. In addition, it was brought out by the FSLUPC that there is insufficient information available at this time to adequately define the corridors. A further dimension to the problem is the problem with D-2 lands that will be set aside in the wilderness and park categories and require both the signature of the Secretary of the Interior and the Secretary of Transportation before a road can be constructed. If an easement is in the wrong location upon state or native corporation land or private land, then Eminent Domain may be applied if agreement cannot be reached. However, in the case of D-2 lands, the acquisition of right-of-way is not an easy matter.

The solution to the easement problem is not possible at this point in time; it is perhaps part of a larger problem which encompasses comprehensive land-use and transportation planning, programming, and budgeting.

Information is needed which may not be available for years to come; the development of the land and transportation to serve the needs of the various land uses will require detailed coordination between the four interested parties in Alaska: the native corporations, the state of Alaska, the federal government, and the private citizen. The coordination of land use and development, the ironing out of grievances, and the setting of mutual priorities, or at least supportive priorities, all suggest that a comprehensive land-use and transportation planning, programming, and budgeting process be instituted for Alaska. This process would monitor the land use and transportation systems of the state, create land-use and transportation plans both

on a short- and long-term basis, program improvements on a multi-modal basis, and define needed budgets to meet the objectives and goals of Alaskan transportation and land use.

The benefits of such a process would come from savings in real money and time that the process would provide. Fees, land costs, courts, planning, acquisition time, and petition time would be cut down to a minimum. More important would be the ability to define the needs as they arise with the best information available at the time. The process would study the transport needs and coordinate transportation where it may aid development and define appropriate levels of service. The process would be given the power to approve easements across D-2 and state lands and the power of eminent domain over private land; the process would obviously be subject to federal and state codes.

At this moment there is no coordination between modes in the state. And there certainly is no coordination between transportation and land use at both the federal and state levels. This process would be a clearing house that would have the ability to plan, program, and budget transportation investments and land-use development.

Figure 1.

Federal Aid Highway System
Federal-State Funding Levels

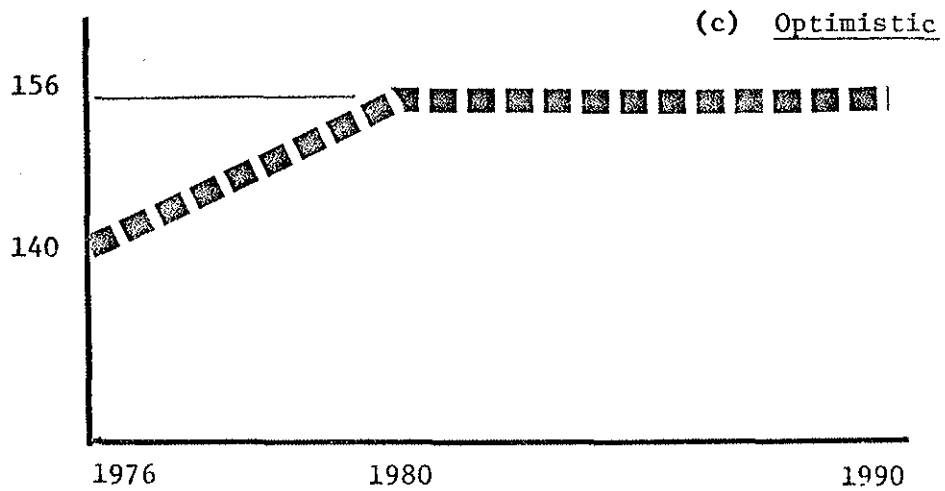
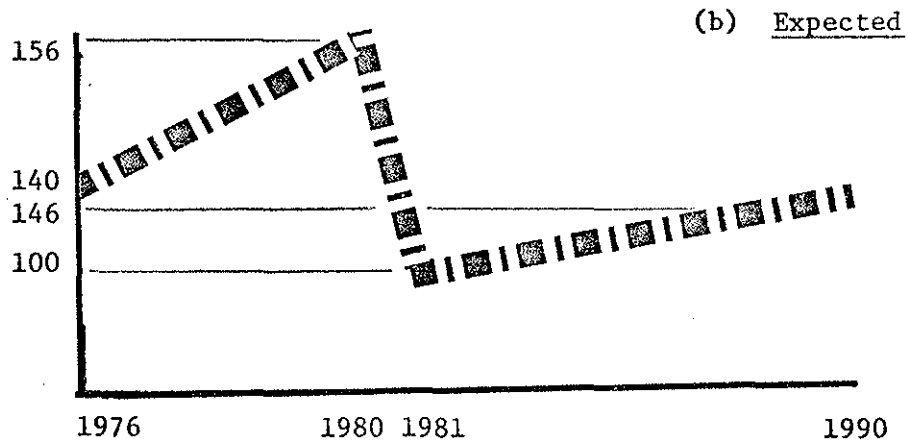
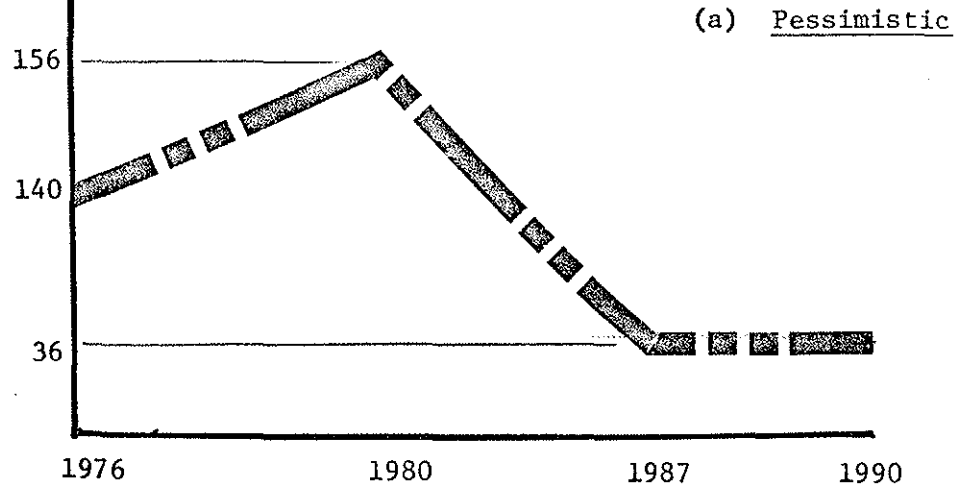


Figure 2.

North-South Easement

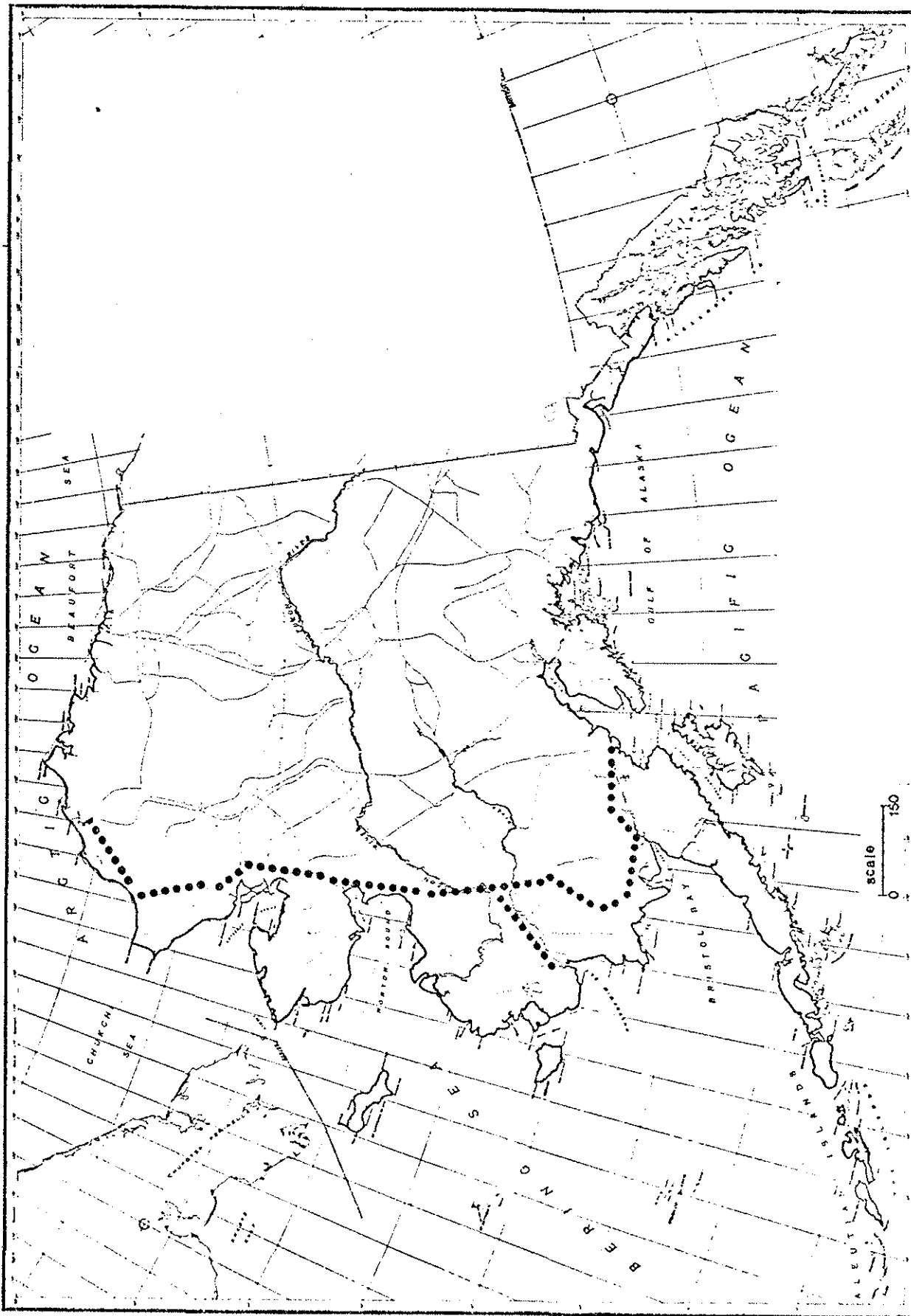


Figure 3.

A Midwest Collection Easement

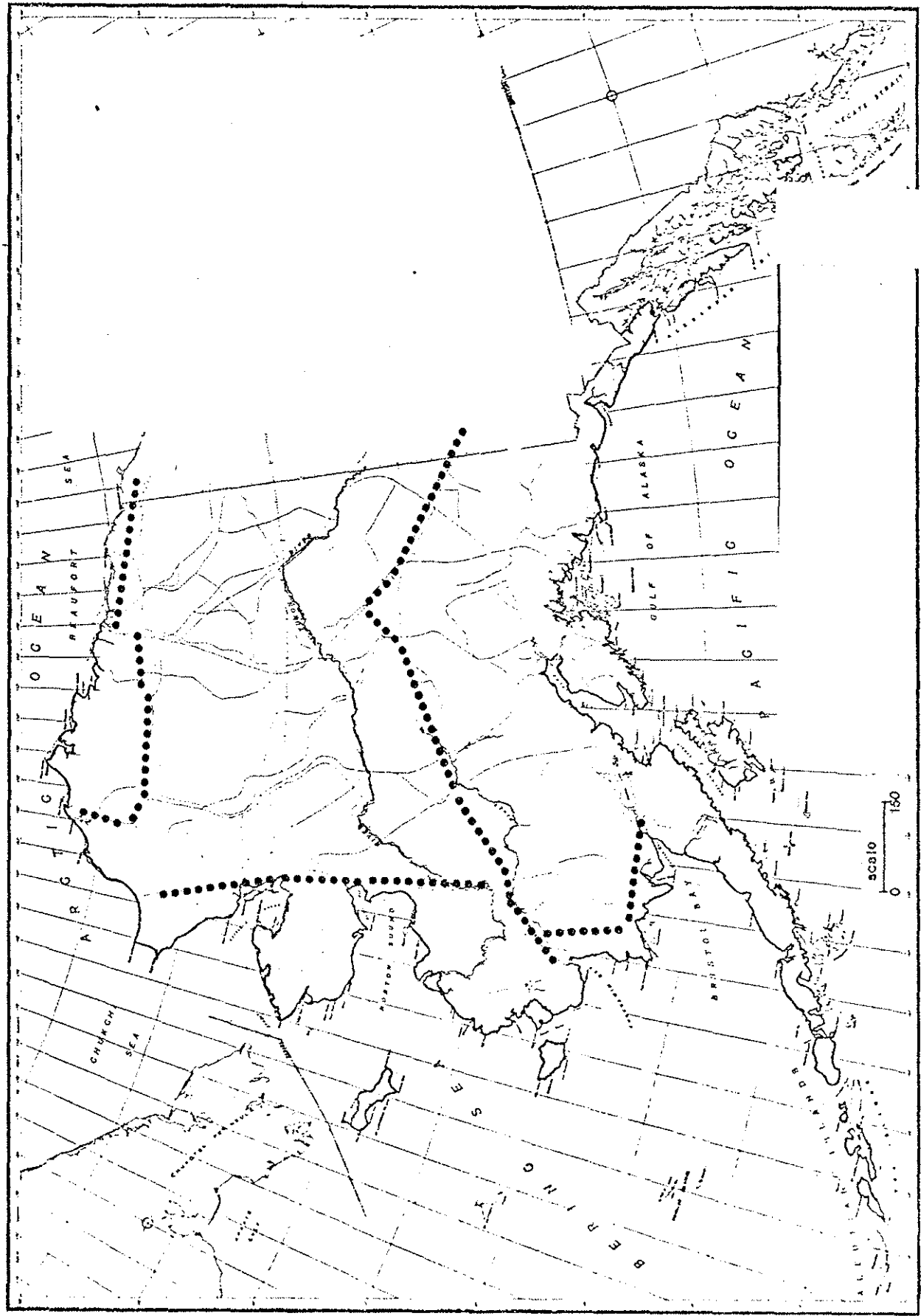


Table 1.

Federal Highway Aid System
Construction Program

PESSIMISTIC FEDERAL-STATE LEVEL

<u>Year</u>	<u>Construction Level (millions)</u>	<u>Total Miles Construction</u>	<u>Re-Construction</u>	<u>New R-O-W Construction</u>	<u>Total Miles System</u>	<u>Road Mileage Beyond Design Life</u>
1976	140	373	267	106	3,926	0
1977	144	349	274	75	4,001	0
1978	148	327	280	47	4,048	0
1979	152	305	283	22	4,070	0
1980	156	285	285	none	4,070	0
1981	86	142	142	none	4,070	143
1982	76	114	114	none	4,070	314
1983	66	90	90	none	4,070	509
1984	56	70	70	none	4,070	724
1985	46	52	52	none	4,070	957
1986	36	37	37	none	4,070	1,205
1987	36	33	33	none	4,070	1,457
1988	36	31	31	none	4,070	1,711
1989	36	28	28	none	4,070	1,968
1990	36	26	26	none	4,070	2,227

Table 2.

Federal Highway Aid System
Construction Program

EXPECTED FEDERAL-STATE LEVEL

<u>Year</u>	<u>Construction Level (millions)</u>	<u>Total Miles Construction</u>	<u>Re-Construction</u>	<u>New R-O-W Construction</u>	<u>Total Miles System</u>	<u>Road Mileage Beyond Design Life</u>
1976	140	373	267	106	3,926	0
1977	144	349	274	75	4,001	0
1978	148	327	280	47	4,048	0
1979	152	305	283	22	4,070	0
1980	156	285	285	none	4,070	0
1981	100	166	166	none	4,070	119
1982	104	157	157	none	4,070	247
1983	108	148	148	none	4,070	384
1984	112	139	139	none	4,070	530
1985	116	131	131	none	4,070	684
1986	120	123	123	none	4,070	846
1987	124	116	116	none	4,070	1,015
1988	128	109	109	none	4,070	1,191
1989	132	102	102	none	4,070	1,374
1990	136	95	95	none	4,070	1,564

Table 3.

Federal Highway Aid System
Construction Program

OPTIMISTIC FEDERAL-STATE LEVEL

<u>Year</u>	<u>Construction Level (millions)</u>	<u>Total Miles Construction</u>	<u>Re-Construction</u>	<u>New R-O-W Construction</u>	<u>Total Miles System</u>	<u>Road Mileage Beyond Design Life</u>
1976	140	373	267	106	3,926	0
1977	144	349	274	75	4,001	0
1978	148	327	280	47	4,048	0
1979	152	305	283	22	4,070	0
1980	156	285	285	none	4,070	0
1981	156	259	259	none	4,070	26
1982	156	235	235	none	4,070	76
1983	156	214	214	none	4,070	147
1984	156	194	194	none	4,070	238
1985	156	177	177	none	4,070	346
1986	156	160	160	none	4,070	471
1987	156	146	146	none	4,070	610
1988	156	132	132	none	4,070	763
1989	156	120	120	none	4,070	928
1990	156	109	109	none	4,070	1,104

FOOTNOTES

1. The state of Alaska in 1973 had 7,611 miles of rural roads and 1,432 miles of municipal mileage for a total of 9,043 miles of roads and streets of which 4,940 miles are surfaced. There are 1,726 miles on the federal-aid primary highway system, 2,011 miles on the federal-aid secondary system, and 71 miles on federal-aid primary urban type II highways. This means that 5,235 miles are not directly financed by the federal-aid system; of these 3,260 are within federal park and forest areas and the remainder are state secondary (1,101 miles) and local streets (874 miles). Of the 9,043 miles of road and streets in Alaska, 433 are classified as urban and the remaining 8,610 miles are classified as rural.
2. Federal Highway Administration. Highway Statistics 1973. U.S. Government Printing Office stock No. 5001-00088.
3. Kresge, David T., "Alaska's Growth to 1990," Review of Business and Economic Conditions, Vol XIII, No. 1, Institute of Social Economic and Government Research, January 1976.
4. (a) The first easement study was a DOT and the Alaska Department of Highways team effort under the FSLUPC. It was presented to the commission for review and was not published.

Ref: Garrett, Walter and Boeglin, Richard, "Statewide Multimodal Transportation Study (Interim)". Anchorage, Alaska: Federal-State Land Use Planning Commission, December 18, 1973.

(b) The next major effort was the transportation team of the Bureau of Land Management who addressed the problem of serving only the transportation needs for extraction of natural resources from the state. Their work was based upon that of the previous study.

Ref: Bureau of Land Management, Transportation Study Team, "Multimodal Transportation and Utility Corridor Systems in Alaska: A Preliminary, Conceptual Analysis." Anchorage, Alaska: October 1974.

Ref: Bureau of Land Management, Transportation Study Team, "Multimodal Transportation and Utility Corridor Systems in Alaska: Generalized Description of the 40 Primary Corridors." Anchorage, Alaska: November 1974.

(c) The Alaskan native corporations have been very vocal upon the easement question. Their opinions are best summarized in the position paper prepared by the Alaska Native Federation entitled "Easement Position Paper," Anchorage, Alaska: undated.

(d) The position on the easements by the FSLUPC is summarized in a letter from the Commission to Secretary of the Interior, Rogers C. B. Morton dated April 7, 1975. In this letter the Commission speaks: of the inadequate information base to define corridors; that their reservation

will require an Environmental Impact Statement; that Eminent Domain is sufficient; that the cost of land is not significant in the total cost of a project.

(e) The U.S. Department of the Interior issued on February 5, 1976, Order No. 2982 which provides policy, guidelines, and procedures for reserving local public easements in the state of Alaska and delegates the state director of the Bureau of Land Management (BLM), Alaska as the authority to determine local needs.

(f) The U.S. Department of the Interior issued on March 3, 1976, Order No. 2987 for the reservation of easements for the transportation of energy, fuel, and natural resources in Alaska. The order establishes a policy for reserving easements and directs the state BLM director to make such easements.

5. CONSAD Research Corporation, "Alaska Natural Resource Profiles and Inventories: Alaska Railroad Study," prepared for the Federal Railroad Administration, January 15, 1976.

CONSAD Research Corporation, "The Prospects for Alaskan Copper Development: Alaska Railroad Study," prepared for the Federal Railroad Administration, January 30, 1976.

CONSAD Research Corporation, "Prospects for Alaskan Coal Resource Development: Alaska Railroad Study," prepared for the Federal Railroad Administration, February 18, 1976.

6. Pernela, Lloyd and Porter, Ed, "Alaska Transportation and Economic Development: The Alaska Railroad--A Case Study." Fairbanks, Alaska: ISEGR, March, 1976, report to FRA.