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7321 HOUSE TRANSPORTATION

The U.S. and the New Economy of the 1990s

As we rapidly approach the 21st Century, the U.S. faces new economic challenges at home as well as abroad. Our economy is no longer self-sufficient. Rather we now depend on a global economy, where foreign trade in goods and services totals some one-fourth of our economic activity.

Too often we lag in the competitive battles with our largest economic rivals. Our annual trade deficit exceeds \$100 billion a year—larger than the economy of many countries. New rivals appear regularly, such as a united Germany and the new economic strength of the European Community when trade barriers fall in 1992.

At home, growth in consumption continues to outpace savings, making it difficult to increase investment in new capacity and

technology. Growing concern over quality of life issues, such as the environment, divert attention and resources from traditional economic answers.

At the same time, the United States has become a debtor nation, dependent on a steady flow of cash from other countries to finance government spending as well as much of our domestic investment.

Answers to these challenges are beginning to appear in the form of an economy that emphasizes practical innovation, attention to quality, renewed investment, and recognition of the global marketplace. Indeed, these same watchwords are used by our most direct competitors.

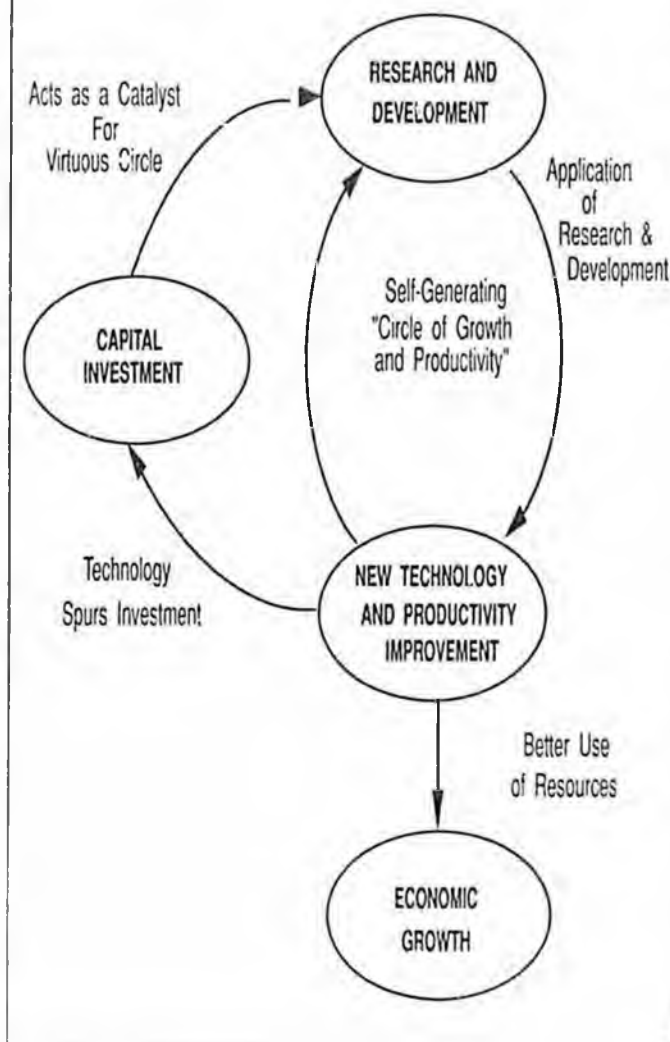
Not surprisingly, many business leaders and economists are calling for

more effective use of our labor and capital resources—in other words, improved economic productivity—as the key to future economic growth. Unlike the past when rapid labor growth or access to new raw materials were the economic forces that drove growth, productivity gains now generate some 80 percent of the nation's economic growth.

The key role played by improved productivity in a modern economy can be seen through what may be called the "circle of economic growth and productivity". Very simply, new capital investment serve as a catalyst for research and development and a series of improvements in new technology and management techniques (Figure 1). As described on page 3, new evidence shows the vital role

Figure 1 CREATING ECONOMIC GROWTH

Growth in Productivity is Key to Economic Growth
Capital investment is Key to Productivity Growth



played by investment in transportation in stimulating this "circle of growth".

Given the clear importance of productivity, it is disturbing to note that our rate of growth in economic productivity has fallen to half what it was just 20 years ago—only 1.4 percent a year versus 2.8 percent annually in the 1960s. A drop of 1.4 percent a year sounds minuscule, but even small changes have dramatic effects on a five trillion dollar economy.

Lower productivity affects everyone—workers, managers, and consumers alike. For example, twenty years of productivity gains at 2.8 percent a year, rather than 1.4 percent, means a more than 40 percent increase in output per worker. Such gains translate directly into higher wages, higher profits, and a better standard of living.

Transportation and Economic Growth

"Less than one percent of the nation's economic resources (0.75 percent) are invested in transportation each year, about half that of just 25 years ago. Recent findings show that it is probably not a coincidence that the nation's rate of growth in productivity has been cut in half at about the same time that the level of national resources devoted to investment in infrastructure has dropped sharply."

Just as we search for new answers to this broad array of challenges, there is growing recognition that traditional tools such as investment in transportation and other public works can once again provide a powerful force for stimulating economic growth and productivity.

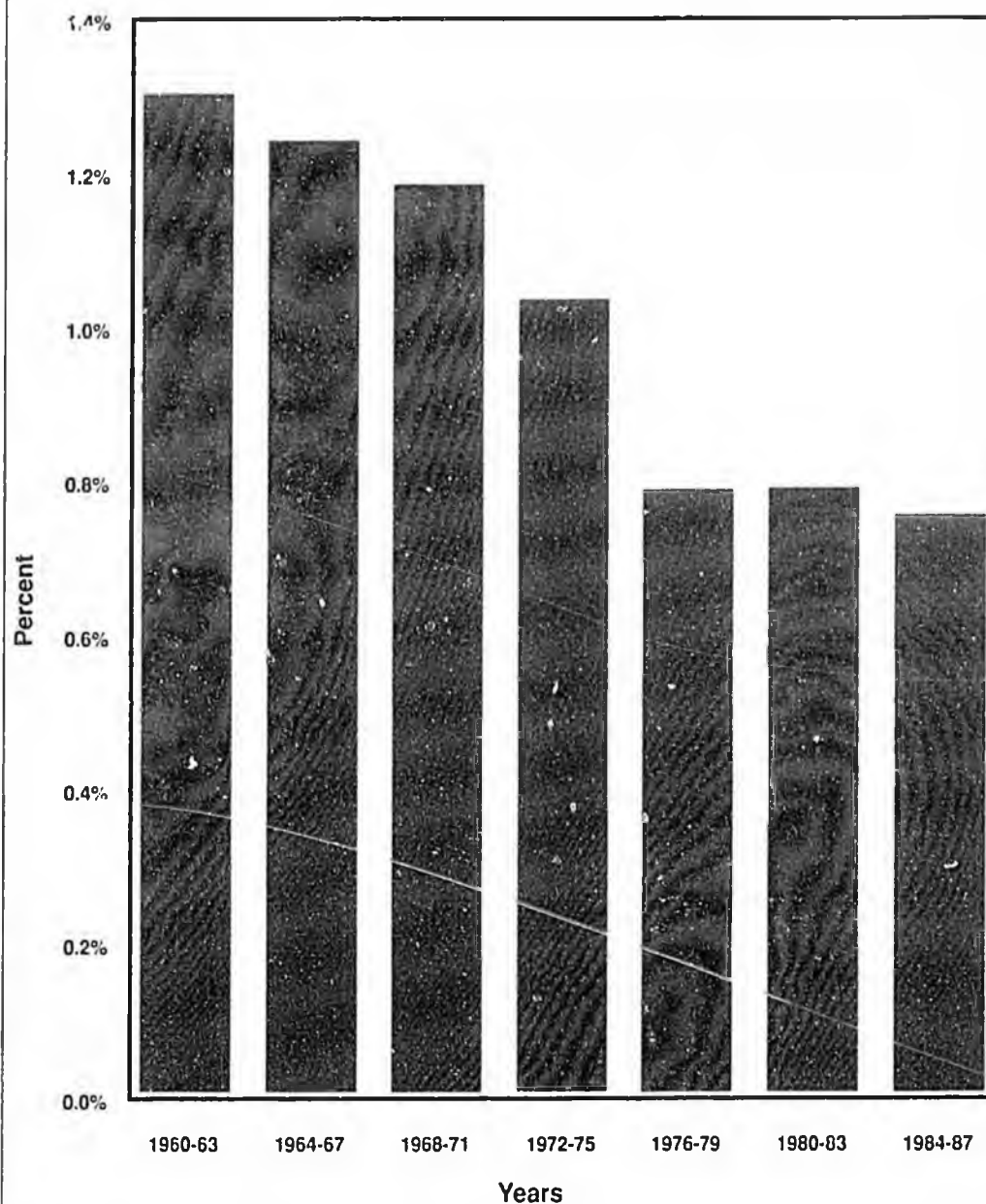
Less than one percent of the nation's economic resources (0.75 percent) are invested in transportation each year, about half that of just 25 years ago (Figure 2). Recent findings show that it is probably not a coincidence that the nation's rate of growth in productivity has been cut in half at about the same time that the level of national resources devoted to investment in infrastructure has dropped sharply. Indeed, reversing the recent national trend toward

disinvestment in public works appears likely to help solve far broader economic problems.

Transportation affects our daily lives more than almost any other public service. It determines how we get to work and where we live; it affects the cost of what we buy and the profitability of our local businesses; it makes it possible to compete in world markets just as it provides access to products from distant points; it is a major force in our quality of life, making it easier to visit friends and to enjoy leisure activities.

Good transportation obviously has more lasting importance as well. This link between transportation and future economic strength was most obvious in earlier times when shipping lanes, post roads, and canals connected the

Figure 2
GOVERNMENT INVESTMENT IN TRANSPORTATION
HAS DECLINED AS A PERCENTAGE OF GNP



colonies. Later in the 19th Century, the transcontinental railroads became a conscious national tool used to speed the development of the West.

In the 20th Century, a national and regional network of roads and bridges became the leading force for economic growth. Starting more than 70 years ago, the federal government,

in partnership with the states, built a high quality national road system including the Interstate and Defense Highway System. Of course, today's transport system is more than just



"Inadequate government infrastructure can impede improvements in productivity growth."

"Taking advantage of productive opportunities to maintain and improve the infrastructure is an important part of federal, state, and local government policies to raise economic growth."

***Michael Boskin, Chairman of the Council of Economic Advisors
Economic Report of the President, 1990***

roads and bridges. It includes an inter-connected network of airports and control towers, urban mass transit, inter-city railroads, and ports and harbors.

But transportation is not just a tool for opening up new regions for economic development. Indeed, an effective transport system may play an even more critical economic role in a modern, time-sensitive economy than it did 100 years ago.

Transportation will always play a leading role in helping business to reduce the costs to produce and

distribute goods and services. With new production methods such as "just-in-time" (JIT) manufacturing, however, failure to deliver a part on time can shut down an entire factory. Because of their geographic dispersion and high-value shipments, the rapidly expanding service and high-tech industries are surprisingly dependent on transportation as well.

Productivity: The Key to Economic Growth

Economic productivity is more than a watchword for the U.S. Given the limited extent of new natural resources to be discovered and exploited and the predictable growth in our available labor force, productivity remains the one key determinant of economic growth that we can influence. It also provides a yardstick to measure our success relative to that of our major economic competitors.

Not only has the rate of U.S. productivity growth fallen in recent years, it remains low relative to our major competitors. For example, between 1965 and 1985, Japan achieved a labor productivity growth rate in excess of 3 percent per year and West Germany's labor productivity grew at an annual rate of more than 2 percent while the U.S. has lagged at close to one

percent.

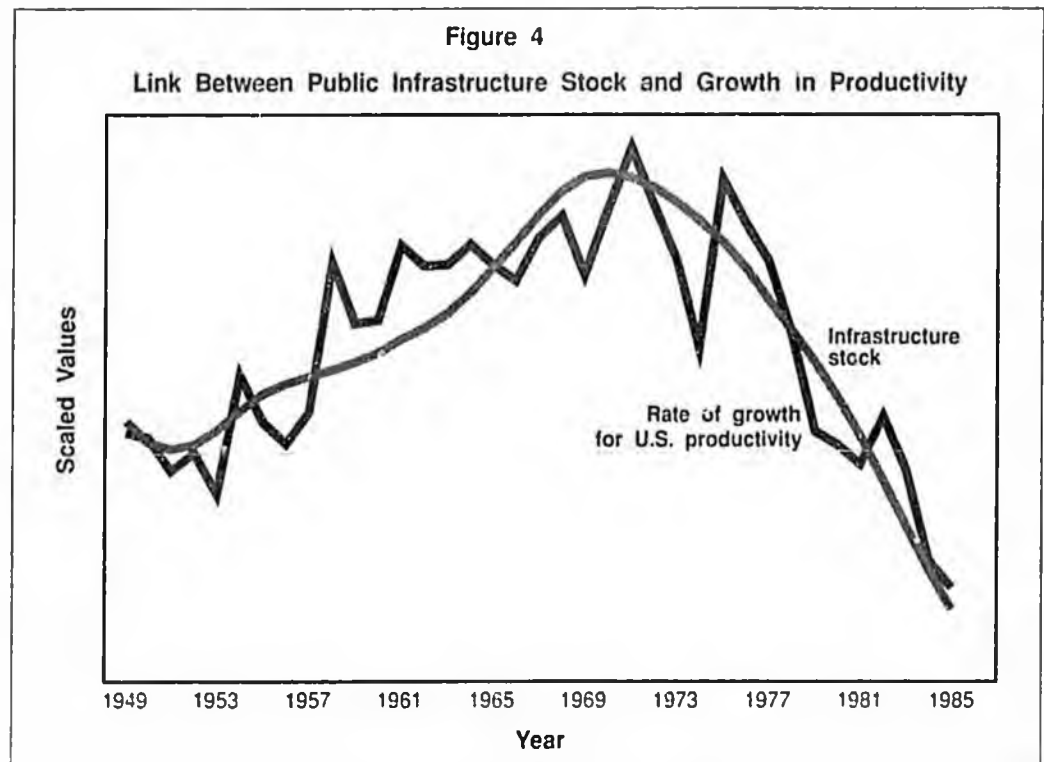
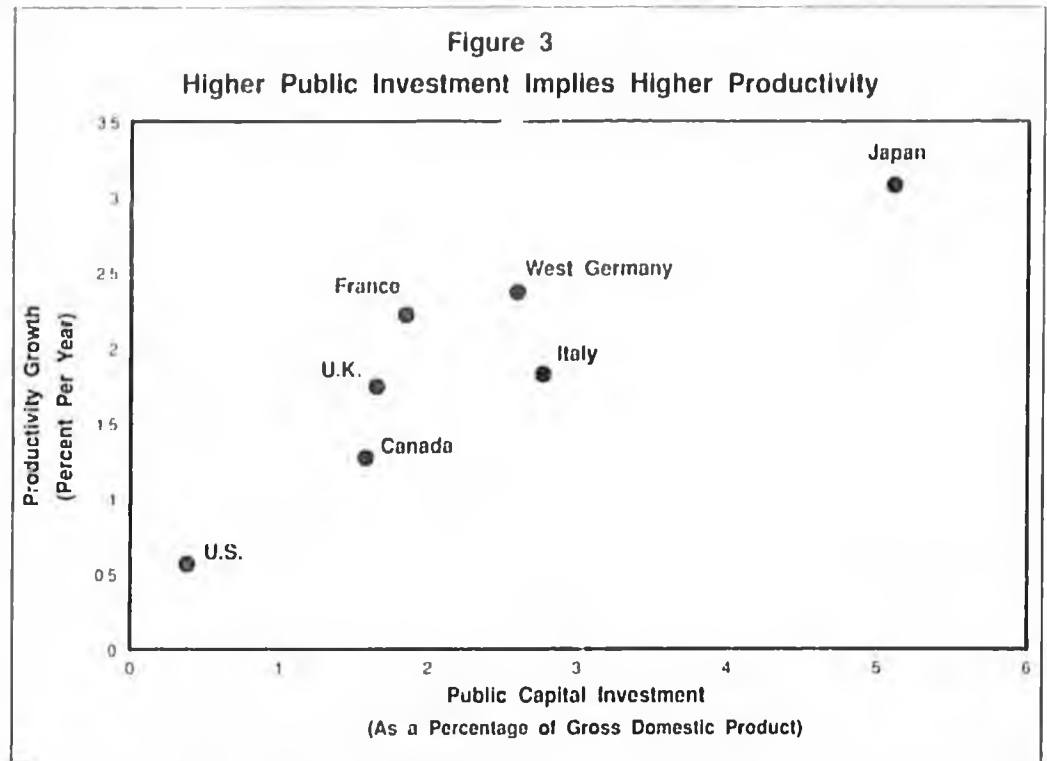
This low growth in U.S. productivity, coupled with persistently high consumption growth, helped to change our position during the 1980s from the world's largest creditor to the world's largest debtor nation.

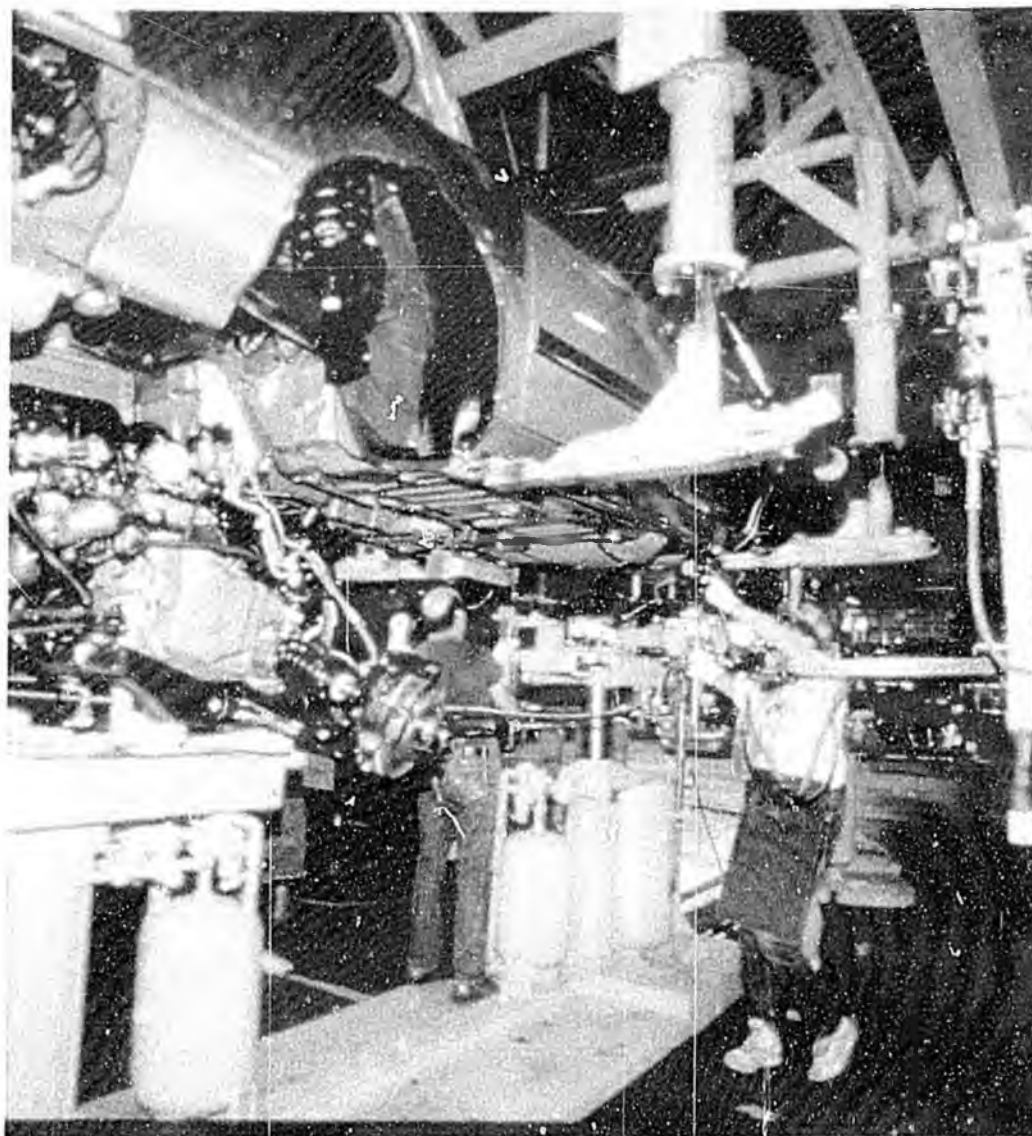
Figure 3 compares the recent trends in productivity for each of the seven major industrialized nations with the rate at which they have invested in public capital. The estimates of public capital spending exclude depreciation and are shown as a percent of gross national product. Spending by other countries has been adjusted downward to reflect the fact that some activities that are private in the U.S. (telecommunications and airlines, for example) are public in some countries.

"Very simply, public investment improves the effectiveness of the overall economy."

Even after recognizing the major differences in the economic and social structures of each country, the data imply a striking relationship between the ability and willingness of countries to invest in public capital and the productiveness of their overall economy. Very simply, *public investment improves the effectiveness of the overall economy.*

Just as future economic growth depends on increased economic productivity, so does our domestic standard of living. Declining productivity means that our future consumption opportunities will rise more slowly than





otherwise. This means that people must work harder and longer to obtain the same basket of goods or must live at a lower standard of living than they could achieve if the economy were more productive. Over

time, even small percentage changes in productivity can add up to large sums.

From 1950 to the mid-1980s, there has been a close relationship between the trend in U.S. productivity

and the trend in the nonmilitary public capital stock (Figure 4). Increases and decreases in public capital stock have changed along with increases and decreases in productivity.

The Need for Public Investment: The Evidence Is In

New research shows that public capital can be just as important as private capital investment in stimulating a more productive economy. Indeed, after two decades of reduced public investment, it should not be surprising that many public investments may even provide higher rates of return than some private investments.

Dr. David Aschauer, while with the Federal Reserve Bank of Chicago, and Dr. Alicia Munnell, Director of Research for the Federal Reserve Bank of Boston, have quantified the link between public infrastructure investment and long-term economic productivity. Their nation-wide findings provide persuasive statistical evidence that the slowdown

in public works investment over the past two decades may well be the most significant single force behind the relative decline in U.S. productivity. A later section provides real-world examples of how firms have taken advantage of transportation to improve their productivity.

This research shows that:

There is a robust, positive linkage between public capital—particularly infrastructure capital—and private sector productivity,

There exists a positive linkage between public capital and private sector profitability, and

There is a long-run positive relationship between public, nonmilitary investment and business investment.

Aschauer estimates that more than half of the total fall-off in productivity growth from the 1950s to

the mid-1980s can be attributed to insufficient public infrastructure investment. Just as potholes

in the streets would have jarred many fewer motorists had our nation invested more in infrastructure, our

"New research shows that public capital can be just as important as private capital investment in stimulating a more productive economy."

productivity slump would have been much less noticeable for the nation's economy.

While the statistical results vary depending on data used and specific assumptions, the effect is strong, with each 1 percent increase in public capital stock improving overall national productivity by between 0.15 percent and 0.35 percent.

Aschauer finds that each 1 percent increase in the nation's capital stock should raise the rate of return to private capital by about one-tenth of 1 percent. At current rates, a one-tenth of a percent increase in profit rates translates into more than \$4 billion a year in profits. This, in turn, means higher private sector investment in plant and equipment—one of the classic ways to improve productivity. Over time, this same increase in public investment will stimulate private investment in plant and equipment, having the net effect of raising the national investment rate by a substantial amount.

Even at the state and local level, where economic gains can be disbursed through neighboring states, Munnell finds that each additional dollar of public capital stimulates private investment by 45 cents. Her research also shows that productivity is not an abstract concept, with an additional \$1,000 per capita in infrastructure assets adding roughly 0.2 percent to the average annual rate of employment growth—or about 230,000 new jobs per year.

Such an increase in public investment raises the growth rate of labor productivity directly by allowing the available private capital stock to be utilized more efficiently—and indirectly by promoting private investment, making more private capital available per worker. The effect on productivity is substantial.

The basic idea linking infrastructure and private economic activity is simple. An adequate and well maintained public stock of infrastructure capital is essential to the profitable

and efficient production and distribution of private sector goods and services.

Without question, a limited, or inefficient transportation network acts as a drag on overall private economic activity. Private business relies heavily on public infrastructure capital, such as roads, bridges, and airports, to support productive activity. Consider, for example, how the Interstate Highway System provides truck access to virtually every large- and medium-sized market and major port in the United States.

How does this link between transportation investment and economic productivity work in practice? The next section provides a sample of real-world examples taken from more than a hundred identified by state DOTs and the Federal Highway Administration. This report presents these examples for the first time.

"An adequate and well maintained public stock of infrastructure capital is essential to the profitable and efficient production and distribution of private sector goods and services."

Transportation: A Partner in Business Productivity

As with our daily lives, business decisions are continually influenced by the nature and quality of available transportation services. Improved transportation facilities, however, often act as a catalyst in business decisions, allowing and

encouraging firms to change their internal operations to take advantage of new production and marketing opportunities. These changes have effects well beyond the loading dock and influence how firms organize their production activities.

Firms today operate in a complex economy, with suppliers and markets disbursed throughout the country and even the world. Corporate decisions regarding location, capital investment, production methods, relationships with suppliers and customers, and overall organization must be based on the constant need to improve profitability.

Underlying these decisions

are concerns with costs, production efficiency, labor productivity, and market demand. Transport changes affect each of these factors, not just those associated with the obvious concerns with reduced transport costs. Thus, transportation has leverage throughout the firm, creating a *cascade of benefits* to the firm, its customers, its employees, and its suppliers.

The following table provides a summary of the case studies presented here. A brief review of these examples, reveals three major findings:

- First, there is a clear *interaction between high technology and transportation*. Electronic



Summary of Case Studies of the Link Between Transportation and Economic Productivity

Name of Case Study	Industry	Type of Productivity Effect
Koley's Medical Supply, Inc., Omaha, NE	Wholesale Distribution	Productivity improvements achieved by their hospital customers through stockless purchasing depend on good transportation access
Coca-Cola Midwest Eagan, MN	Soft Drink	High quality highways facilitate the use of rolling warehouses, creating productivity gains by reducing product handling costs and allowing the elimination of remote warehouses
James River Corporation Berlin, NH	Paper	Improvements to Route 115 increased transportation reliability and encouraged more carriers to come to the plant, allowing the plant to increase production and operate more efficiently
Campbell Soup Company Camden, NJ	Food	Higher productivity achieved through JIT deliveries by suppliers depends on reliable transportation
Dole Fresh Fruit Wilmington, DE	Food	Improved access roads to the Port of Wilmington improved truck traffic flow to port facilities, leading to more effective operations at their banana importing terminal
Aladdin Mills Dalton, GA	Carpet	An effective highway network helps make the company more competitive and facilitates labor access from adjacent communities
R.D. Werner Company Mercer County, PA	Metal Parts	Relocation of State Route 4017 allowed more efficient organization of production and also will allow expansion of plant
General Motors Corporation	Auto	Production system based on JIT shipping of components substantially increased dependence on effective highway transportation
Xerox Corporation Rochester, NY	Copier	The Interstate highway network facilitates nationwide shipping of its product by long haul trucking from a single manufacturing site
Hewlett Packard Palo Alto, CA	Computer	Because of high housing costs, employees must commute longer distances making good highways essential for labor access
Digital Equipment Corporation, MA and NH	Computer	An effective transportation network between their headquarters in MA and NH, allowed cost-effective expansion into NH
Wal-Mart Stores, Inc. Bentonville, AR	Discount Retail	Productivity gains and improved customer service achieved through its quick response program are facilitated by the Interstate Highway network
Federal Express, Ltd. Memphis, TN	Small Package	Good ground access to airports is essential to efficient operation of its "hub and spoke" system
Bank of Boston Canton, MA	Financial	Construction of Route 128 and access to commuter rail allowed the bank to increase efficiency by locating its back office activities away from the bank headquarters in downtown Boston

communication plays just as important a role in an effective supply chain as does the timely movement of goods. Indeed, the case studies show that private firms have already taken the lead in using technology to maximize the gains from improved transportation;

•Second, the success stories show a *chain-reaction type of effect* that links transport improvements to a series of productivity gains that can even affect the structure of how firms do business. For example, in addition to cost savings, "just-in-time" inventory systems improve quality and make it easier for the firm to react to market forces. These, in turn, generate new sales and make greater cost savings possible.

•Third, the large number of examples identified illustrate that the relationship between transportation and productivity is robust and widespread and covers most major industries, every region of the country, and all modes of transportation.

Four general types of changes in firm operations, all of which improve productivity, can be induced by improvements in transportation facilities:

Reducing bottlenecks in production and management,

Adding flexibility to what gets produced and how this is accomplished,

Improving access to labor, and

Permitting greater specialization of corporate functions.

Each category of productivity enhancements is discussed in more detail below with selected case studies illustrating the effect that transportation improvements can have on firms' productivity.

Reducing bottlenecks in production and management

Bottlenecks, usually limited production inputs or product flows, are a natural occurrence in every production process. Firms strive to avoid and overcome bottlenecks, with their decisions dependent on whether the limitation is short-term or long-term in nature. Short-term problems require adjustments to the production process, such as increasing inventories or beginning over-time production. Longer term bottlenecks often have to be solved with more dramatic changes, including capital investments, a new location, or a new set of suppliers.

Either type of bottleneck reduces a firm's productivity by decreasing the efficiency or increasing the cost of a production process. Transportation improvements can remove some bottlenecks, creating productivity gains.

A typical short-term bottleneck is a shortage of certain inputs at the right time and place. To overcome such bottlenecks, firms maintain inventories or require suppliers to make more frequent and smaller deliveries (which simply shifts the burden of inventories elsewhere). Maintaining inventories is

expensive—there are costs of purchasing inputs before they are needed, costs to plan and manage inventories, and costs of any facilities or production processes resulting directly from having to hold large inventories (such as nearby warehouses). An increase in transportation reliability along with a better structured logistics system may remove input shortages, allowing firms to reduce inventories. Reducing inventories frees up money, manpower, and space, increasing the productivity of a firm's production process.

General Motors—Just-in-Time (JIT) Production

An efficient, effective transportation system is vital to the production and distribution of GM's vehicles and service parts. GM has 141 facilities in the U.S. that ship or receive component parts, raw materials, and/or finished vehicles. Of GM's 141 facilities, 29 are car and truck assembly plants located throughout the U.S. Based on its estimates for a typical assembly plant, described below, GM estimates approximately 7,000 trucks provide daily support to its 29 assembly plants. Also, GM estimates another 7,000 trucks are involved daily for its manufacturing and stamping plants.

According to GM, approximately 240 trucks are required to support the daily activity of a typical assembly plant (materials and supplies inbound and finished vehicles outbound). A typical plant receives and unloads an average of 120 truckloads of component parts and supplies daily. The plant then ships approximately 480 vehicles (one-half of its daily production) directly to dealers using 60 trucks. The other 480 vehicles are shipped from the plant on railcars to rail unloading ramps located in major market areas. Upon arrival, the railcars are unloaded and the 480 vehicles are delivered to dealers using another 60 trucks.

GM's dependence on effective highway transportation has increased substantially in the past decade. According to GM, much of its increased dependence upon highway transportation is the result of efforts to remain competitive. Operational changes to meet this goal revolve around GM's quality network production system that facilitates just-in-time (JIT) shipping of components to meet very precise production schedules. Smaller, more frequent shipments of components using JIT are also a method to control and reduce in-plant inventory. Likewise, in-transit inventory can be minimized by reducing the time that component shipments are in transit. Generally, truck transportation is faster than rail and GM consequently transports more of its component shipments over the highways.

**General Motors
Efficient
transportation
system allows GM to
institute a
"just-in-time"
delivery system:
Inventories are
reduced and
production
efficiencies
increased.**

To stay competitive, firms today are increasingly differentiating their product lines and shortening the life cycle of individual products. In order to achieve this, firms require a wider variety of inputs from a wider variety of suppliers. In addition, firms increasingly market their product to

more diverse consumers over a larger area. As a result, both the amount of inputs and products being transported and the importance of speed and reliability of deliveries has increased.

The availability of an effective transportation

network provides firms with better and more reliable access to both suppliers and consumers. Productivity gains often arise from more efficient internal operations made possible, in part, by good access through an effective transportation network.

**Increasing
flexibility in
what gets
produced and
how**

To compete in today's rapidly changing business environment, firms increasingly depend on their ability to make rapid transformations among

products, suppliers, and markets. This flexibility increases productivity by allowing firms to take advantage in changes in both input and product

markets. Transportation can play an important, but perhaps less obvious role in enhancing the flexibility of a firm.

James River Corporation
Road improvements allow year-round shipments: Efficient use of equipment is increased

James River Corporation—Increased Manufacturing Productivity

James River Corporation in Berlin, New Hampshire, manufactures paper rolls, paper towel products, and wood flour. Eighty percent of its products are shipped by truck. Recent improvements to Route 115 encouraged more carriers to come to the plant. Widening the road allowed bigger trucks to use Route 115, which offers more direct access to the plant from the interstate than alternative routes. The road improvements also allowed trucks to use Route 115 year-round, where previously it could not be used for several months in the spring.

With improved transportation access and reliability, the company decided to increase production at the plant by picking up the speed of existing machinery. Consequently, the company began making more efficient use of its equipment leading to increased productivity at the plant. With higher production, the company also increased sales.

In addition to productivity gains achieved at James River's plant, the improvements to Route 115 allow James River's customers to achieve inventory savings. Their customers generally do not want to keep large inventories of paper products. Improved transportation access and reliability allows carriers to make more frequent, smaller deliveries to James River's customers. As a result, their customers can reduce inventories, lowering their inventory carrying costs.

Improving access to labor

Labor is an essential input to virtually every product or service, and so access to cost-effective labor is a major consideration for private businesses. Good ground transportation is essential for access to a workforce. If transportation access is poor, the labor

costs may increase or firms may have to relocate.

Many types of businesses, such as research and development firms, require access to highly skilled labor. Attracting these employees may bring "quality of life"

considerations into play. In terms of transportation, these considerations include ground transportation quality (comfort, length of commute), as well as proximity or access to high-frequency air services, good schools, and attractive communities. Inadequate or

congested transportation systems may serve to raise the cost of highly skilled

workers, thus reducing the productivity of the firms that rely on them.

Hewlett Packard—Labor Access

Labor access is an important concern at some Hewlett Packard (HP) facilities. In the San Francisco Bay area, high housing costs cause many HP employees to commute long distances to work. The long-distance commuters, as well as many short-distance commuters, depend on good highways to get to work. Forty-eight percent of HP employees in the San Francisco Bay area commute over 10 miles one way, with 6 percent travelling over 30 miles one way to get to work.

"Quality of life" considerations are important to HP's employees. HP's highly skilled employees often place great importance on their residential environment. While some employees prefer an urban environment, other employees prefer a rural environment. Some employees are willing to commute long distances to be able to live in their preferred residential environment. To attract and retain highly skilled labor, HP locates its facilities where a highway network allows good access from both urban and rural environments. At HP's facility in Roseville, California, for example, employees can commute on Interstate 80 from Sacramento, California or from smaller, rural communities in the Sierra Nevada Mountains.

**Hewlett Packard
Road access is
important to firm's
siting decisions
because employees
commute long
distances**

Transportation improvements, along with improvements in telecommunications, may allow firms to become more specialized in the location of different corporate activities. Firms can locate certain activities, such as corporate headquarters, away from production centers to reduce costs. Specializing the location of different firm functions also allows firms more flexibility to remain

competitive in a national or international market.

Specializing functions in different locations may require inputs to be moved over greater distances during the production process, leading to an overall increase in traffic.

In many cases, it also causes an increase in individual travel because of management needs to travel more to monitor production

and marketing activities.

Even when the major transportation mode affected by this increase in travel is aviation, there are significant inputs of highway facilities in order to provide ground access to airports.

**Permitting
greater
specialization
of corporate
functions**

**Digital Equipment
Easy transportation
access allows firm
to expand
manufacturing
away from
headquarters:
Production costs are
reduced**

Digital Equipment Corporation—Corporate Expansion

Digital Equipment Corporation (DEC) has its headquarters in Massachusetts. Further expansion in Massachusetts was not possible because of high real estate costs and traffic congestion. DEC looked for an area with lower property values but easy access to its headquarters, both in terms of employee travel and ease of installing fibre optic cables between that location and its headquarters.

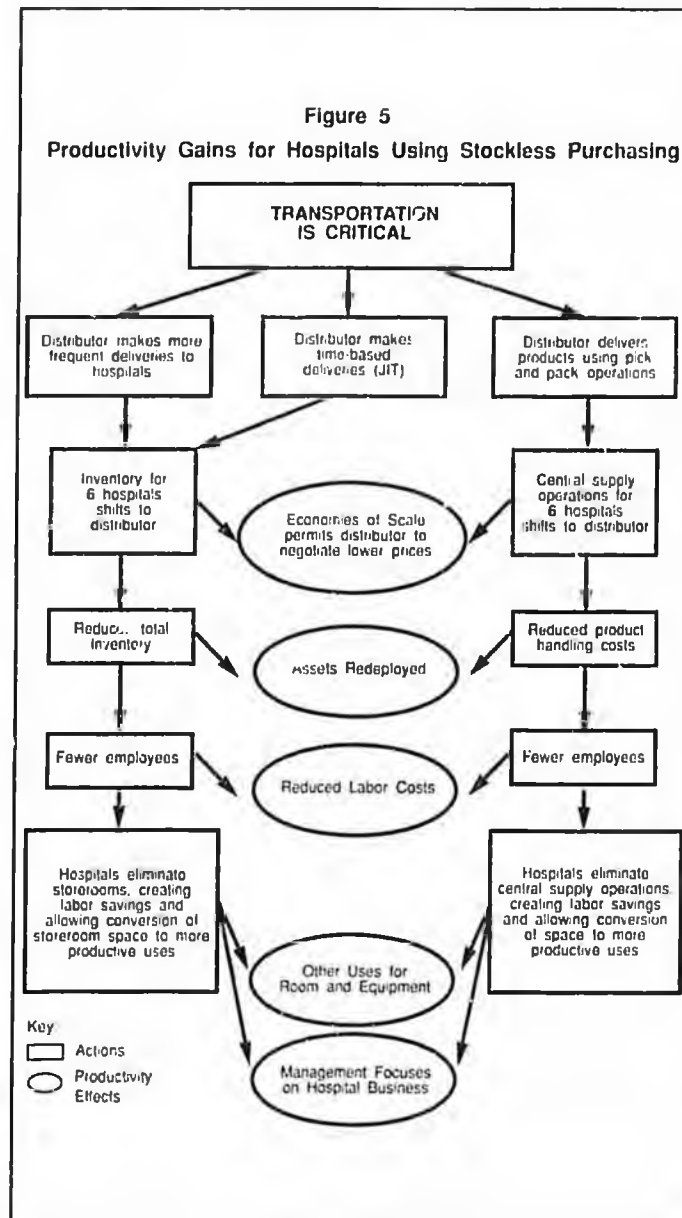
DEC purchased a large parcel of land in southern New Hampshire along the F.E. Everett Turnpike. An interchange was constructed on the turnpike for easy access to the site. DEC installed underground fibre optic cables from the new site to its headquarters. Both good highway access and telecommunications allowed DEC to expand its operations into New Hampshire.

Productivity Case Studies

Koley's Medical Supply, Inc. is the wholesale distributor for a coalition of six hospitals in Omaha, Nebraska and southwest Iowa that have converted to a stockless purchasing system. In the hospital industry, stockless purchasing goes further than just-in-time by offering pick-and-pack operations in addition to frequent deliveries of medical products to hospitals. The distributor packages medical products for delivery directly to hospital carts or supply closets in hospital departments. In the Omaha area, Koley's packs items in their proper units of issue and delivers them in bins several times a day to user departments in the hospitals. Koley's makes daily deliveries to the smaller hospitals in Iowa.

Transportation access is critical to meeting the

Koley's Medical Supply, Inc. *Stockless Purchasing for Hospital Customers*



frequent order cycles of a stockless purchasing system. Generally, the distributor must be no more than three hours by truck from the hospital. Adequate access makes such frequent deliveries efficient and reduces costs over the whole hospital materials supply chain from manufacturer to patient. Completion of the Storz Freeway improved Koley's access to its more distant customers in Iowa.

Through streamlining operations, stockless reduces inventory storage and handling costs for the hospitals (Figure 5). With very frequent deliveries, hospitals can eliminate inventory storerooms and central supply operations. Although these costs shift to the distributor, a distributor often can manage those operations at a lower overall cost through economies of scale not possible in an

individual hospital. Stockless also lowers the costs of product flow by reducing the number of times the product is handled.

Labor savings can be significant as fewer employees can achieve faster, more efficient distribution of hospital supplies. Hospitals can eliminate labor involved in warehouse and central supply functions and the distributor can leverage labor for those functions over many hospitals. In addition, hospitals often can convert space previously used for inventory storage to more productive use.

Other savings are achieved through standardization of high-volume items among participating hospitals. Inter-hospital standardization of materials can achieve cost savings beyond the already common standardization of materials

among various departments within a hospital. Koley's negotiates for all six hospitals collectively to get lower prices from manufacturers.

At Bishop Clarkson Memorial in Omaha, stockless purchasing allowed the hospital to reduce inventories, reduce its receiving and distribution staff by 12 full-time employees, eliminate trucks and drivers associated with their off-site warehouse, and streamline payment schedules. Bergan Mercy Hospital in Omaha eliminated its storeroom, converting it and other space formerly used for receiving and warehousing to more productive uses. Mercy Hospital in Council Bluffs, Iowa, reduced inventory and purchasing costs through its stockless system.

Coca-Cola Midwest Rolling Warehouse

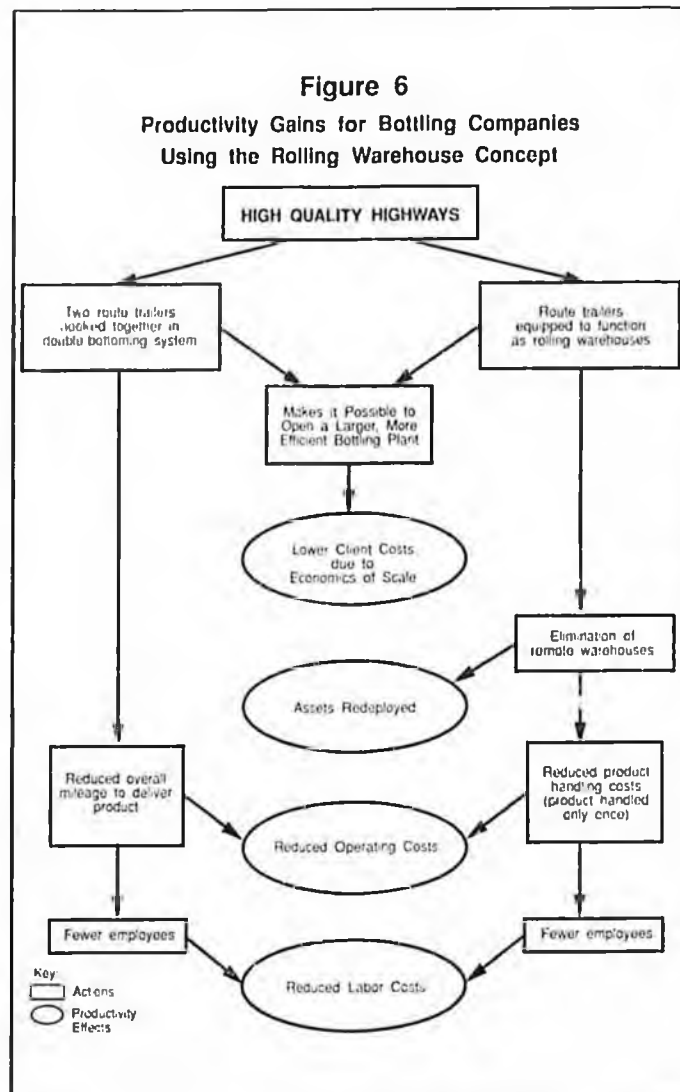
The Coca-Cola Midwest bottling plant, part of Johnston Coca-Cola Bottling Group, serves a market area covering Minnesota, Wisconsin, eastern North Dakota, and the upper peninsula of Michigan. Among its strategies to

achieve higher efficiencies, Coca-Cola Midwest ships their product using a transportation system the company developed called "double-bottoming." Midwest Coca-Cola also consolidated its production at a larger, more efficient

bottling plant in Eagan, Minnesota.

Double-bottoming involves using two route trailers that are hooked together to transport the product from the bottling plant to distribution points within its

Figure 6
Productivity Gains for Bottling Companies
Using the Rolling Warehouse Concept



double-bottoming derive from reduced product handling costs, reduced overall mileage, and increased route driver productivity (Figure 6). The product is handled only once, instead of loading the product onto trucks at the bottling plant, unloading it at a warehouse or distribution center, and reloading it onto route trucks for delivery to retail outlets. Using tandem trailers on deliveries to distribution points creates savings on total mileage the product is transported. Route drivers can immediately begin deliveries and no longer incur the waiting time previously necessary for loading route trucks at warehouses. Other savings arise from the ability to eliminate remote warehouses and their associated costs, including inventory and labor costs as well as property taxes.

market area. Such tandem trailers require high quality highways to operate efficiently and safely. In fact, current regulations restrict tandem trailers to Interstate highways, specified distances from Interstate highways, and to certain state highways.

Orders for route drivers already are loaded onto route trailers when they leave the production plant.

At the distribution point, the route drivers pick up a trailer and drive their routes with their own tractors. Because the trailers are insulated and have a self-contained heating system, they also serve as rolling warehouses. The route trailers are picked up after retail deliveries are completed and brought back to the bottling plant.

The efficiencies from

Campbell Soup Company *Supply Chain*



Over the last four-five years, Campbell has embarked on a just-in-time (JIT) delivery program for its food production operations. Part of a wider corporate program to improve quality and productivity, the goal of JIT is to receive incoming materials just prior to production in appropriate quantities and meeting quality standards. Accompanying the JIT program is Campbell's Select Supplier program, whereby Campbell works with vendors to achieve quality assurance from its ingredient and packaging suppliers.

Optimizing productivity gains from JIT deliveries requires reliable

transportation. Because rail transportation did not provide the needed reliability, Campbell gradually switched from rail to truck. Much of the incoming supplies to Campbell's production plants are now delivered by truck and some plants actually have eliminated rail deliveries. Because most of Campbell's production plants are not located in urban areas, highway congestion has not been a serious problem for its JIT delivery program.

Together, Campbell's JIT and Select Supplier programs have reduced costly inventories, waste, and handling costs. The greater reliability and

reduced travel time achieved with truck transportation allowed Campbell plants to achieve faster turnover of inventory and as a result, carry less inventory. Previously, Campbell's quality control program involved repetitive inspections of supplies after delivery, with rejections that could disrupt production and necessitate large inventories. Now JIT delivery of quality assured supplies contributes to overall productivity gains in the production process. Campbell also believes that using fresher raw materials results in the highest quality product and increases customer satisfaction.

Because the Port of Wilmington, Delaware, has excellent highway access, the majority of all general cargo moves in and out of the port by truck. Improvements to secondary roads serving the port have complemented the growth of banana importing operations at Wilmington. As a result, Wilmington is

now the largest banana port in the world.

There are two access roads to the port. Terminal Avenue connects to Interstate 495 within 1/4 mile of the port and Christina Avenue provides truck access via local roads. These access roads have been widened to accommodate truck traffic, regraded, and

resurfaced. Smoother traffic flow because of these improvements leading to more efficient operations for all companies using the port. Dole Fresh Fruit is the major commercial enterprise at the port. Improved truck traffic flow led to more effective operations at their banana importing terminal.

Dole Fresh Fruit Highway Access to a Port



Aladdin Mills is a carpet manufacturer in Dalton, Georgia. Dalton has excellent access to a major Interstate (I-75), nearby railyards in Chattanooga, Tennessee, air services in Atlanta, Georgia, and ports in Savannah, Georgia, and Charleston, South Carolina. Because of its highly developed transportation

infrastructure and high manufacturing base, Dalton also has a very competitive trucking market with unrivaled freight rates.

Aladdin takes full advantage of the dependable transportation system available to the company. Aladdin owns its own warehouses (mini-dis-

tribution centers) in New Jersey, Ohio, Illinois, and Florida. Most of the carpet produced by the company is shipped long distance by truck to these warehouses. The Interstate highway network is very important to making Aladdin's carpet competitive in its U.S. market. Aladdin recently increased its exports of

Aladdin Mills Effective Transportation Network

**R.D. Werner
Company
*Reduce
Bottlenecks in
Production***

carpet. Excellent highway access to the ports of Savannah and Charleston via the Interstate highway network also helps make the company competitive in its overseas market. Highway access to railyards

(Norfolk-Southern and CSX) and air services in Atlanta is also excellent, when needed by the company.

Although not as obvious as these other transportation advantages, the good highway

system allows labor access from adjacent communities. This gives the company, which employs roughly 1,700 at the Dalton mill, access to a wide labor pool.

R.D. Werner Company is located in Mercer County in northwest Pennsylvania. The company manufactures metal extrusions for ladders, radios, and car alternators, among other products. With the relocation of State Route 4017 (Werner Road), Werner will be able to increase efficiency in production and expand its operations to producing finished products (ladders). Previously, orders for finished products had to be contracted to other companies.

Werner receives raw materials at the north end of the plant and ships products

from the southern end. Until one year ago, State Route 4017 ran through the middle of the quarter mile long, two building plant. As Werner's production increased, the limited space restricted options for efficiently organizing production and caused bottlenecks in production.

Bottlenecks in production occurred when an extrusion was completed at one end of the plant and had to be transported the long distance of the plant to the southern end to be shipped. This wasted labor and machinery hours as large extrusions were moved with

fork lifts to the other end of the plant to get them out of the way, while other parts scheduled for the same shipment had to be transported later when they were finished. With State Route 4017 now rerouted around the side of the plant, Werner will be able to increase its plant size by 30 percent—a 140,000 square foot increase. This will enable them to organize production in a more efficient manner. Expansion of the plant also will add flexibility to what gets produced by allowing Werner to begin production of finished products.

**Xerox
Corporation
*Long Haul
Trucking***

Xerox manufactures photocopiers in Rochester, New York. To serve a nationwide market, Xerox has three distribution centers in Rochester, New York, Dallas, Texas, and Sante Fe, California. Xerox ships copiers from its

manufacturing plant to the two outlying distribution centers by long haul trucking. The Interstate highway network makes it possible for Xerox to ship its copiers by truck over long distances on time and in undamaged condition.

Because customer satisfaction is a high priority for Xerox, the efficiency and reliability of long haul trucking over the Interstate highway network contributes to more productive operations for the company.



Wal-Mart currently operates its discount retail stores (Wal-Mart stores, and its newer Hypermarts and Supercenters) in 29 states. The company is aggressively expanding its discount store business into new markets, with plans to be in 36 states at the end of 1990. Wal-Mart's legendary success derives from delivering better quality merchandise at lower prices and providing customers better in-stock conditions than competitors.

Wal-Mart's superior merchandise in-stock conditions depend on its distribution system to

deliver merchandise to the stores. The Interstate highway network is a strategic part of Wal-Mart's distribution system. Most of Wal-Mart's merchandise moves through its regional distribution centers. Wal-Mart sites its distribution centers based on the availability of good north-south and east-west access in the nation's Interstate highway network. Merchandise is shipped from the distribution centers to the stores by truck, using the company's private fleet.

Wal-Mart's quick response program involves partnerships with suppliers

to manage inventory levels in the distribution centers and stores. The goal is to electronically exchange forecasting and sales information to keep a model stock inventory in the store by using automatic merchandise replenishment. Quick response also allows the supplier to better schedule production and reduce its inventory. Although quick response can hold down inventory costs, it increases distribution costs because it requires making more frequent deliveries. Overall, the most important benefit is higher sales from better customer service.

Wal-Mart Stores, Inc. *Quick Response*

Federal Express, Ltd. *Ground Access to Airports*

Federal Express operates on a "hub and spoke" system, which the company developed. Express mail is carried—usually by truck—from its local stations to a local or regional airport, and flown to a "hub," where the mail is sorted. When sorted mail leaves the hub, it is carried in the same fashion along the "spokes" to its destination. The major hub for Federal Express is Memphis, Tennessee, where the company originated. In addition, there are three "sub-hubs" in Newark, New Jersey; Indianapolis, Indiana; and Los Angeles, California.

Federal Express offers two types of deliveries: the P1 or overnight service, and the P2 service that promises delivery by the day after. Delivery times at hub airports are staggered or "pulsed" to make unloading and sorting at the hub more efficient. Therefore, closing times for drop-off points are also staggered, first regionally and then at stations within a given region. With so many stations throughout the nation, precise planning and arrival times are of utmost importance to the company.

Because timing is crucial, traffic congestion and ground access to airports

have a major effect on efficient operation of the "hub and spoke" system. Where traffic congestion is a problem, Federal Express has trucks make fewer stops in order to arrive at stations or hub airports on time. This adds costs in terms of using more trucks and drivers as well as increasing fuel and truck maintenance costs. Where ground access to airports is inadequate, Federal Express must close its stations early to make timely truck deliveries to the airport from those stations. As such, the delivery of a Federal Express package depends on good highway access to airports.

Bank of Boston *Relocation of Back Office Activities*

With construction of Route 128 around Boston, the Bank of Boston was able to increase productivity by relocating its back office activities away from its headquarters in downtown Boston. Because of the size and nature of its financial operations, the Bank of Boston has a large number of back office employees doing paperwork. Before construction of Route 128, the bank's back office operations were scattered throughout the City of

Boston because it was not possible to find affordable office space of the size required.

Construction of Route 128 and access to a commuter rail station allowed the bank to relocate its back office activities (and a few hundred employees) to Canton, a suburb of Boston. A new building is able to accommodate the entire back office operations in one location, increasing productivity by making it

easier for employees to communicate with each other. In addition, office space at the new location is much less expensive than the previous downtown locations. Lower costs also result from office supplies being delivered to one location, rather than all over the city. Finally, the new location allows employees easy access by auto along Route 128 or by commuter rail.

Selected References

Measuring the effect of transportation on economic productivity is a dynamic field of research with few analytic studies older than two or three years. As a result, there are a limited number of published papers on the subject and the number grows at a rapid pace. Reports used as a source for this report are listed below.

Apogee Research, "Case Studies of the Link Between Transportation and Economic Productivity," draft report prepared for the Federal Highway Administration, (September 1990).

Apogee Research, "Enhancing U.S. Competitiveness Through Highway Investment: A Strategy for Economic Growth," prepared for The American Road and Transportation Builders Association, (June 1990).

David A. Aschauer, "Does Public Capital Crowd Out Private Capital," *Journal of Monetary Economics*, (October 1989), pp. 171-188.

David A. Aschauer, "Is Public Expenditure Productive?" *Journal of Monetary Economics*, (March 1989), pp. 177-200.

Alicia H. Munnell, "How Does Public Infrastructure Affect Regional Economic Performance?" *New England Economic Review*, (September/October 1990), pp. 11-32.

Alicia H. Munnell, "Why Has Productivity Growth Declined? Productivity and Public Investment," *New England Economic Review*, (January/February 1990), pp. 3-22.

Policy Implications

The link between transportation and economic productivity examined in this report has two important policy implications. First, it shows the potential gains that can be obtained by redressing the two decades of underinvestment in the nation's highways and bridges. Secondly, it shows that an effective transportation network has economic importance well beyond the immediate benefits of improved transportation services. As a result, significant increases in the overall level of investment (federal, state, local, and private) in the nation's transportation infrastructure is likely to produce high economic returns.

The report shows the

importance of focusing America's transportation infrastructure policy on the long-term economic impact of an adequate national transportation infrastructure. The short-term effects of infrastructure investment already are well known. Spending on infrastructure leads to new jobs or new business locations, spreading ripple effects throughout the economy. However, because much of the nation's future economic growth will depend on using its existing resources more efficiently, providing an adequate transportation system to support gains in productivity will become increasingly important. Indeed, the effect on productivity, and in turn, long-term economic growth are the primary reasons

Americans should be concerned about infrastructure investment.

More importantly, the report highlights the need to understand the importance of public capital for the profitability of private firms. Good highways serve multiple functions, allowing for access to labor and other key inputs, just-in-time inventory management, as well as reliable shipment to local, national, and international customers. Without good public infrastructure, private business would be a difficult—in some cases, impossible—task. The case studies presented in this report illustrate how an effective highway network plays an important role in private economic activity.





DEVELOPING A STATE TRANSPORTATION PLAN



*Office of Strategic Management, Planning and Policy
April 30, 1991*

OVERVIEW

Over the course of the last few months, department staff has been working on preparation of the State Transportation Plan. The plan is not intended to replace the capital improvement program, nor is it to be project specific. The plan is meant to be a brief, concise summary of where the department is headed and how it intends to deal with the major issues facing it in the years ahead. More importantly, what is being proposed is as much a new process as it is a written plan or product. In this respect, the project to develop the State Transportation Plan can be viewed as an effort to change the culture of the organization to be more forward looking.

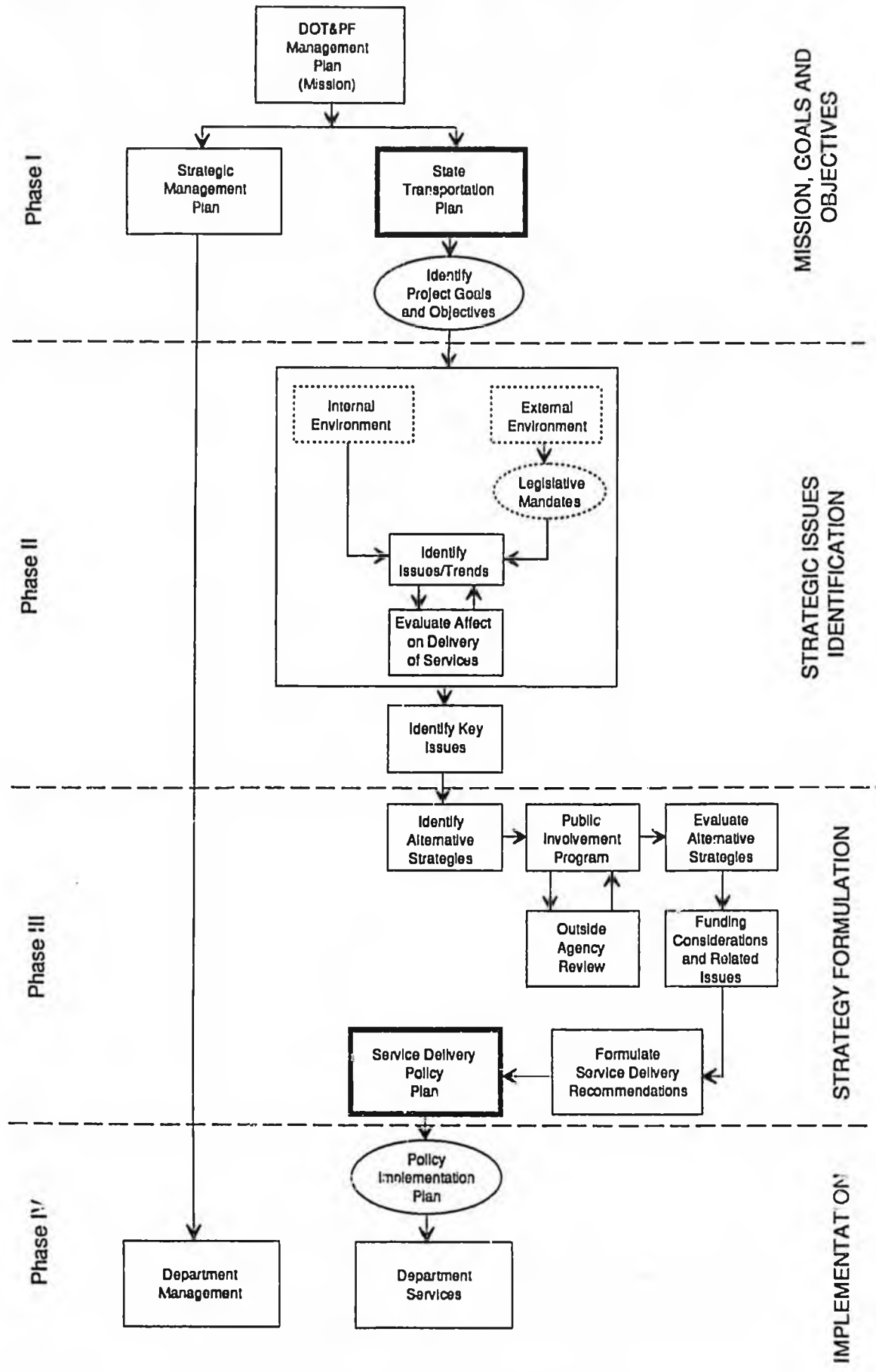
The process that is being used to build the State Transportation Plan began last June. The first task in the initial planning effort was to focus efforts on the issues expected to have the greatest impact on development of the transportation system. Four critical issues were identified: 1) What should be done to support economic development and diversification of our state's economy; 2) How can a stable and adequate funding source for capital development, replacement, and operations be created; 3) What is "appropriate" state responsibility and what can be done to facilitate the transfer of transportation facilities in which there is "no compelling state interest;" and, 4) What actions can be taken to minimize the impact of state and federal laws and regulations?

As part of the process, a strong public involvement effort was initiated. During February and March, the department solicited comments from consumers, the transportation industry, labor, business, government agencies, elected officials, environmental groups and many others to help identify options to address the four key issues. This was done by:

- Publication of a newsletter distributed to more than 300 community leaders and organizations throughout the state.
- A series of open houses held at various locations throughout the state.
- Establishment of an Inter-agency Review Committee.

Using information gathered during the outreach effort strategies will be identified to deal with each of the key issues. It is important that the plan be a document that responds to these issues with specific recommendations for action. The issuance of the plan will not mark the end of this process. The plan will become an integral part of the department's strategic management process.

STRATEGIC MANAGEMENT PROCESS STATE TRANSPORTATION PLAN



**STATE TRANSPORTATION PLAN
STRATEGIC MANAGEMENT PROCESS/NARRATIVE**

Phase I/Goals and Objectives

"What is the goal of the plan?"

Identify project mission, goals and objectives. This will establish the strategic direction for the development of the policy plan.

The mission statement, goals and objectives will be prepared by the Project Manager and submitted to the Strategy Managers for a preliminary review. The document will then be transmitted to the Policy Committee.

Phase II/Strategic Issues Identification

"What is going on that affects the delivery of transportation services."

Identify issues/trends important for the department if it is to meet its service delivery mission. This involves taking a quick look at what is going on in the state. This initial review will be accomplished by the Technical Review Committee. The list will be consolidated according to service delivery objectives by the Project Manager and resubmitted to the Technical Review Committee for subsequent analysis.

"How do the issues affect us?"

This task will use the Technical Review Committee to evaluate the **short-list of issues and how they affect the department's ability to deliver transportation services.** This process will analyze and forecast which of the issues/trends will be challenges and which will be opportunities, as well as assess internal strengths and weaknesses of the department in addressing these issues.

"What things are the most important?"

On the basis of the analysis conducted by the Technical Review Committee, the Policy Review Committee will then **identify a few key (strategic) issues** whose successful resolution are critical to the mission of the department.

**Phase III/Identify Alternative Strategies
and Formulate Recommendations for Policy Plan**

"What are we going to do about it?"

The Technical Review Committee will identify alternative strategies for each of the key issues. This discussion will include development of criteria (brainstorming) and then some analysis of each alternative strategy using the approved criteria. This process will help define what can be achieved with respect to each key issue and how it can be achieved (strategy).

The alternative strategies will then be distributed for outside agency review and public comment. Review comments will be

consolidated by the Project Manager and transmitted to the Policy Review Committee.

The Policy Review Committee will evaluate the alternative strategies. During this review the committee will identify funding constraints and related issues needed to successfully implement the strategies. The Policy Review Committee will then formulate service delivery recommendations and transmit the draft document to the Policy Committee.

The recommendations will be transmitted to the Policy Committee. The final result will be release of a policy plan to guide the delivery of transportation services in the Alaska. The time horizon to be encompassed is long-term (i.e. the next fifteen to twenty years), but is intended to be reviewed and revised remain flexible so that shorter-term changes can be addressed.

Phase IV/Implementation Plan

"Who does what when, and what will it cost?"

Finally, an implementation plan will be prepared for the department. As a supplement to the transportation policy plan, this document will identify recommendations that require legislation, funding, or further study. This document will be specific about timelines, resources, and responsibilities for carrying out actions recommended in the policy plan. This document is not intended to take the place of the capital improvement program but rather guide its development. This plan will provide an initial guide for future legislative and agency actions.

**DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
STATE TRANSPORTATION PLAN
INTERNAL DEVELOPMENT AND REVIEW COMMITTEES**

Policy Committee

Frank G. Turpin, Commissioner
M. Clyde Stoltzfus, Chief, Office of Strategic Management, Planning and Policy
Kit Duke, Regional Director, Central Region
Jim Ayers, Director, Alaska Marine Highway System

Policy Review Committee

David Hawes, Office of Strategic Management, Planning and Policy
John Martin, Chief, Planning, Research & Administrative Services, Northern Region
Mike McKinnon, Chief, Planning, Southeast Region
John Tolley, Chief, Planning & Administrative Services, Central Region
Helvi Sandvik, Manager, Statewide Aviation

Technical Review Committee

Sandy Anderson, Transportation Planner, Office of Strategic Management Planning & Policy
Bob Boyd, Maintenance and Operations, Central Region
John Campbell, Technical Services, Central Region
Dawn Mach, Transportation Planner, Plans, Programs and Budget
Stanley McAlister, Planner, Alaska Marine Highway System
Tom Middendorf, Transportation Planner, Alaska International Airport System
Jenny Olendorff, Planner, Statewide Aviation
Jerry Rafson, Transportation Planner, Northern Region
Jonathan Widdis, CIP Planning Chief, Northern Region

State Transportation Plan Notes

Issue No. 3

January, 1991

WHAT IS IN STORE FOR THE FUTURE FOR OUR ROADS, AIRPORTS, AND HARBORS?

Providing a safe and efficient transportation system to serve Alaskans in the future is a priority. But limited funding, combined with the addition of a significant number of miles to the road network, and increased aviation and marine traffic are placing increasing demands on the transportation system. Unless action is taken now, our transportation system will not meet the demand.

WHAT ARE THE MOST CRITICAL ISSUES WE MUST FACE?

Four important issues related to transportation need to be addressed by state policymakers.

Support of Economic Development and System Expansion

As Alaska works to diversify its oil-dependent economy, we look to our other natural resources and how we can make our strategic Pacific Rim location work for us. Well-planned harbors, docks, roads, and airports will help us toward that diversification.

However, experience has shown that, in the absence of other economic incentives, the presence of infrastructure alone does not lead to development. We must plan for a transportation system that targets market opportunities, allows for growth and flexibility, and most importantly, one that isn't based on wrong assumptions. The state can't afford to build transportation infrastructure on speculation any more--we can't afford the financial risk.

What actions should the department take to support economic growth in Alaska given the number and variety of available transportation improvements associated with economic development opportunities and competing demands for public funding to support those improvements?

Stable and Adequate Funding for Capital Development, Replacement and Operations

Unlike most states where user taxes and fees--motor fuel taxes, motor vehicle registration fees and other special taxes--are the funds used to support transportation system improvements, Alaska's user taxes and fees meet only a small fraction of the cost. The state receives approximately 85 percent of its general revenue from petroleum taxes and royalties.

Alaska's good fortune resulting from the oil finds of recent years is well-known. The wealth was so great at one time that the state eliminated personal income taxes. In early 1986, however, the price of oil dropped. Oil industry employment declined rather than increased, and state government was in a tenuous financial situation. Then, in August, 1990, Iraq invaded Kuwait and oil prices soared once again.

The department is limited to funds from general appropriations to finance on-going investment in capital improvements as well as maintenance and replacement of facilities. The repeated episodes of "boom and bust", as the price of oil moves up and down, do not provide stability of resources to meet this need.

What actions should the department take to pursue stable and adequate funding for capital development, replacement and operation of the transportation infrastructure?

State and Federal Laws and Environmental and Regulatory Impacts

Several important environmental and regulatory issues continue to be of concern to transportation, including: failure to meet air quality standards in urban areas; clean-up of surface contamination and leaks from submerged tanks and containers in transportation rights-of-way; and wetlands preservation activities.

What actions should the department take to minimize the impact of state and federal laws and regulations on the cost of development of the transportation system while still maximizing the benefits of an efficient transportation system?

State Transportation Plan Notes

Volume 1, No. 2

December 1, 1990

ALASKA IS UNIQUE

One of the greatest differences between Alaska and the rest of the nation is that the majority of Alaska's communities are not connected by a road system. The remoteness of some places, the water barriers and the difficulty of crossing the terrain have made road connections either impossible or too expensive to construct. Instead, Alaska has come to rely on a system of ferry routes and an extensive system of airports to help meet transportation needs.

While service needs and statutory mandates to provide services have continued to expand, revenues to support this diverse system have declined. The challenge is to find ways to ensure the provision of high quality services in an era characterized by continuing cost increases and declining revenues.

STATE TRANSPORTATION PLAN TO FOCUS ON FUTURE NEEDS

To meet this challenge, the department has initiated preparation of a State Transportation Plan. The intent is to focus actions on the fundamental responsibilities of the department so that investments are made wisely in the future.

This project is being undertaken in an effort to anticipate and better understand the significant issues which are likely to impact the delivery of services and performance of the system in the future. An understanding of these issues is essential if the department, and state government as a whole, is to identify a strategy that meets transportation needs in the future.

In this period of change, perhaps the worst mistake that can be made is assuming that things will stay as they are. Limited resources require careful choices to be made. New directions may be necessary.

STRATEGIC PLANNING PROCESS

Developing and implementing a plan will not be an easy job. It will require the cooperation of all levels of government, business, labor, and transportation users.

Above all, in developing the plan, we must think *strategically*. Strategic planning is a technique which focuses

resources on a handful of things that are most important to future success. This type of planning also requires one to examine resource use and economics regionally, nationally, and even internationally. Business has long used strategic planning to prepare for the future. Government planning--transportation planning, in particular--can benefit by strategic thinking as well.

The strategic planning process we are using to build the State Transportation Plan consists of a variety of activities:

Identify Key Transportation Issues

The first step, which the department has already begun, involves taking a look at what is going on in the state that affects the delivery of transportation services. Our first product, *Challenges Facing The Delivery of Transportation Services in Alaska: An Identification of the Issues* is an overview of the current situation. There is considerable diversity in the issues affecting the department: system expansion needs; environmental concerns; safety concerns; stable funding sources; support to economic development activities; and preservation needs.

The second step is to evaluate how these issues affect the department's ability to deliver transportation services. This step will identify opportunities as well as challenges facing the department in the delivery of services. It is important to examine economic trends within the state, trends in the regulatory environment, as well as numerous other factors. This type of analysis provides a realistic look at the relationship between opportunities and challenges facing the department.

On the basis of the evaluation, a few key (strategic) issues will be identified. The key issues will become the focus of the plan. This focus will help set priorities so efforts can be concentrated on those issues thought to have overriding importance and which the department can affect.

Solicit the Views of Transportation Users and Providers to Identify Alternative Strategies

The private sector as well as local governments are essential partners in building a State Transportation Plan. Consumers, the transportation industry, labor, business, government agencies, elected officials, environmental groups and many others have valuable knowledge and perspectives to contribute to this effort. So does the State Legislature, its key transportation committees, and other state agencies.

It is our goal, by reaching out to all transportation users and providers, to broaden the department's knowledge and heighten our awareness to the needs that our state-wide transportation system must serve.

During the late fall and winter, the department will solicit the views of these groups to help identify alternative strategies to address each of the key issues. Various outreach efforts, such as this newsletter, will be used to reach as many people as possible. In addition, a series of meetings will be held at various locations around the state. Meeting dates and locations will be announced later.



Formulate Recommendations for the State Transportation Plan

Using the information gathered from the agencies, transportation users and providers, and other groups the department will prepare a draft State Transportation Plan for presentation to the new Governor and the Legislature early in 1991. The draft document will be used to help facilitate the transition to the new administration.

Alaska Department of Transportation
& Public Facilities
P.O. Box Z
Juneau, Alaska 99811

The plan is viewed as a beginning step more than an end product. Our goal is to lay the groundwork so that the new administration will have a headstart on the difficult job ahead.

Implement the Strategies and Plans

The final phase of the project will be to prepare an Implementation Plan. It will identify specific recommendations that require legislation, funding or further study to complement the department's capital improvement program. The Implementation Plan will serve as a guide to identify actions for addressing the transportation strategies developed in the plan.

WHAT YOU CAN DO TO PARTICIPATE

You are invited to participate in this effort. You can: Attend a community meeting; provide written comments to the department (see address below); or, write or call Janet George, Project Manager, at (907) 266-1442.

There will be difficult trade offs in the future allocation of our limited transportation resources. It is important that the resources available to the department be directed to meet the department's mission "to cost effectively provide, operate and maintain safe, environmentally sound and reliable transportation systems and public facilities for the State of Alaska".

I hope that all interested groups and individuals will take advantage of this opportunity to contribute their views on the future of transportation in Alaska.

Mark S. Hickey,
Commissioner

STATE TRANSPORTATION PLAN NOTES

Volume I, No. I

September, 1990

The Alaska Department of Transportation & Public Facilities is one of the most comprehensive transportation agencies in the United States. The state has responsibility for 5,500 miles of roads, two international airports, 270 smaller airports, a fleet of ferry vessels, 80 ports and harbors, and more than 500 public buildings.



You cannot pick up a newspaper today without some reference to the crumbling, deteriorating condition of our highways, airports,

ports and harbors. The host of issues that has been laid on the table is mind-boggling: environmental concerns; system expansion needs; safety concerns; stable funding; reconstruction; and so on.

In Alaska, issues relating to our transportation system are becoming so complex and so costly that we must face up to the situation if we are to survive economically. It is no longer a matter of trying to get "a little more for a little less". Economic growth and a stable quality of life will rely upon the existence of an adequate transportation system.

Too often in the past we have looked at airport or highway development separately from their relationships to other modes. We have dealt with our transportation system and our public facilities as if they were all operating in isolation. That is clearly short-sighted. The relationships are very intricate. They must be recognized and built upon.

The published *State Transportation Policy Plan* has not been revised for almost a decade. This causes an unfortunate lapse in communication with the legislature and the public. There are two major activities in which the department has recently engaged to overcome this problem.

NEW UNIT ESTABLISHED AT DOT&PF

First, a new unit has been established within the Commissioner's Office by reassigning existing department resources. Major duties of the Office of Strategic Management, Planning and Policy will be to oversee and coordinate statewide planning, and provide policy development support for the department.

TRANSPORTATION POLICY PLAN INITIATED

Second, development of a multimodal state transportation policy plan has been initiated. The intent in this strategy is to focus on the fundamental responsibilities of the department so that investments and resource allocation decisions are made wisely in the future.

Overall responsibility for preparation of the state transportation plan is being shared by Clyde Stoltzfus (465-3900) and Kit Duke (266-1440). Clyde is the Chief of the new Office of Strategic Management, Planning and Policy, and Kit is the Regional Director, DOT&PF Central Region. Preparation of the document is to be aided by the help of a technical committee of department personnel. Janet George is the Project Manager (266-1442).

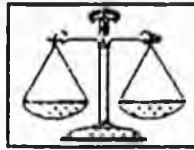
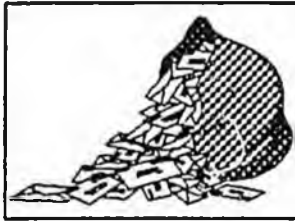
A draft of the plan is to be available in December. This first phase is viewed as a beginning step more than an end product. Our concentration is in laying the groundwork so that the new administration and legislature will have a framework for stating their own transportation policy.

Publication of the statewide transportation plan will not end with this effort. The plan is to become a biennial activity of the department, better communicating information on development needs to the Governor, the Legislature, and the public.

An effective transportation plan is more than bricks and mortar. It is more than airports and highways, or ports and harbors. It is more than railroads and pipelines. A balanced transportation system is one that recognizes the relationship between transportation facilities, land use, economic development, urban and rural development and environmental protection. A healthy transportation system contributes greatly to the quality of our lives.

A long-range plan is important since it can identify priorities for funding so that in future years the department can focus limited state and federal financial resources where state government responsibility is most appropriate, and where the greatest public benefit can be achieved.

Over the course of the next four months there will be a variety of opportunities to exchange information and discuss issues regarding future transportation policy planning.



There will be difficult trade-offs in the future allocation of our limited transportation resources. It is important that the resources available to the department be directed to help meet the department's mission *"to cost effectively provide, operate and maintain safe, environmentally sound and reliable transportation systems and public facilities for the State of Alaska"*.

Over the course of the next few months we will use this newsletter format to inform you of our progress.

Mark S. Hickey
Commissioner

Mark S. Hickey, Commissioner
Department of Transportation
and Public Facilities
P.O. Box Z
Juneau, AK 99811

STEVE COWPER, GOVERNOR

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

OFFICE OF THE COMMISSIONER

P.O. BOX Z
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PHONE (907) 465-3900

July 30, 1990

TO: Local Elected Officials
FROM: Mark S. Hickey, Commissioner *M&H*
RE: State Transportation Plan

You cannot pick up a newspaper today or a major weekly or monthly magazine without some reference to the crumbling, deteriorating infrastructure of our highways and airports. The host of issues that has been laid on the table is mind-boggling: environmental concerns; safety concerns; funding; restoration, and so on. But I do not need to say this to you. As community leaders you are well aware of the problems.

In Alaska, problems relating to our transportation system are becoming so complex and so costly that we must face up to the situation if we are to survive economically. It is no longer a matter of trying to get "a little more for a little less". The state has responsibility for 5,500 miles of roads, two international airports, 270 smaller airports, a fleet of ferry vessels, 80 docks and harbors, 500 public buildings, and a railroad. If you look 20 years from now in transportation, hundreds of millions of dollars are at stake.

Too often in the past we have looked at airport or highway development, or facility construction separately. Rarely have we taken into account their interrelationships. We have dealt with our transportation system and our public facilities as if they were all operating in isolation. That is clearly short-sighted. The relationships are very intricate. We need to recognize and build on these relationships.

To put "our house in order", especially on a tight budget, we need a plan. We can't simply go in and replace the plumbing, electricity, and the boiler. We don't have the resources to do everything we want right away. So like any family on a budget, we must identify our needs carefully and make prudent investments. Only by operating in this way will our transportation policy promote long-term efficiency and better management of the transportation system.

The published State Transportation Policy Plan has not been revised for almost a decade. This is an unfortunate lapse in

communication with the legislature and the public. There are two major activities in which the department has recently engaged to overcome this problem. First, a new unit has been created within the Commissioner's Office by reassigning existing department resources. Major duties of the Office of Strategic Management, Planning and Policy will be to manage the department's strategic management process, oversee and coordinate planning statewide, and provide policy development support for the department. I believe this change will result in a more focused and responsive organization.

Second, I have identified the need to develop a multi-modal state transportation plan as a high priority. Overall responsibility for preparation of the state transportation plan is being shared by Clyde Stoltzfus, Chief, Office of Strategic Management, Planning and Policy and Kit Duke, Director, Central Region. Janet George, DOT&PF Central Region Planning, has been selected to act as Project Manager for preparation of the initial document.

One goal of the effort is to devise a systematic means whereby the general public have the opportunity to provide input into the department's planning and policy processes. A draft of the plan is to be available in December. The draft document will be used to help facilitate the transition to the new administration. This first phase is viewed as a beginning step more than an end product. Our concentration is in laying the groundwork so that the new administration will have a head-start on the effort.

We must recognize that an effective state transportation plan is more than bricks and mortar. It is more than airports and highways. It is more than ports and harbors. It is more than railroads and pipelines. A healthy transportation system makes possible the efficient exchange of products and services, allows greater opportunities for tourism and recreation, boosts economic activity, and affords an important source of existing and new jobs. A specific goal of the new plan will be to provide policy guidelines on the role of transportation in economic development activities.

Public participation, as any elected or appointed government official can tell you, is absolutely key to the success of such an effort. As policymakers and transportation officials we cannot ignore the importance of the public in this effort. I believe that you, locally elected officials, can be especially helpful in informing the public about this transportation planning effort and encouraging their participation.

Over the course of the next six months there will be a variety of opportunities to exchange information and discuss issues regarding future transportation policy planning. Your support in this effort is important to me and to the future of the state. I hope you will give some thought to the difficult trade-offs we must face in the allocation of our limited transportation resources. The decisions ahead will not be easy to make and many people will be affected by what we do today to solve our problems.

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CHALLENGES FACING THE DELIVERY OF TRANSPORTATION SERVICES IN ALASKA: AN IDENTIFICATION OF THE ISSUES

GENERAL CATEGORIES	SPECIFIC CATEGORIES	ISSUES
GEOGRAPHY	Geographic Diversity	Should the department establish guidelines or standards to determine the minimum level of service required to adequately serve these diverse communities? Can the department afford to provide multimodal transportation services to each of these communities in the future?
	Global Location	How can the department ensure that there is adequate and adequately maintained infrastructure to meet transportation needs, including the need to connect with the global marketplace and the evolving world economy? How can the transportation system support national security goals and emergency transportation requirements in the event of armed conflict?
	Intermodal Demands	How can the department improve intermodal connections?
DEMOGRAPHIC AND ECONOMIC GROWTH	Population Growth	What are the impacts of population and economic growth on the delivery of services?
LAND OWNERSHIP AND USE	Federal Ownership	What are the most effective ways of dealing with land use conflicts on federal inholdings?
	ANCSA	To what extent do the ANCSA provisions stimulate or impair development of the rural transportation network?
	Adequate Title Interest	Should the department reevaluate the need for fee title acquisition of lands for transportation infrastructure?
	Surveying, Mapping & Monumentation	How does the department ensure that there is adequate surveying, mapping and monumentation of public rights of way?
	Real Property Management	Should the department promote a system of real property management? And, how can this be done fairly?
	Public Land Order and Other Right-of-Way Reservations	To what extent do these reservations impact the development of the transportation system?

JURISDICTIONAL
RESPONSIBILITY

Reserved Estates

What role should the department take in securing these estates? And, at what cost?

Local Platting & Zoning Compliance

How can the department improve coordination with local governments in the course of project development?

DNR/DOT&PF Land Management Responsibilities

How can this duplication of service be minimized?

Transfer of Responsibility

How should the financing responsibility be allocated between local and state government and the private sector?

Functional Classification and Administrative Jurisdiction

Should there be a more active department role in standardizing functional classification of the transportation system to identify more important facilities or more critical needs?

FINANCIAL RESOURCES

Budget Crisis

Should the department pursue a stable funding source?

What are the barriers to establishment of such a funding source?

Federal Program Receipts

Should the state augment its current improvement capabilities through the establishment of a state funded transportation improvement program?

Federal Program Criteria

How does the department ensure that there is an adequate operating budget to maintain the federally-funded capital improvements and meet our grant obligations?

Design Standards

How much flexibility is available to the department to apply innovative design solutions to construction?

How would any deviation from standards affect liability?

User Costs

Are user charges applied appropriately?

How should costs of transportation services be assigned between users and non-users?

To what extent could innovative financing techniques, including developer's fees, contribute to infrastructure financing?

Tax Policy

To what extent should the department

ENGINEERING AND
ENVIRONMENTAL
CONSTRAINTS

	lobby for changes in state tax policy to finance capital and operating costs of the transportation system?
	To what extent do existing policies stimulate or impair competition between and within modes?
Deferred Maintenance/Infrastructure Disinvestment	How do the department ensure that there is adequate and adequately maintained infrastructure to meet transportation needs?
Distribution of Resources Within the State for Construction of Capital Improvements	How can the department ensure that investment is directed wisely and that financing decisions balance competing priorities—capacity expansion versus rehabilitation, urban highways versus village airports?
Local Service Roads & Trails Program	Should the department pursue reestablishment of the LSR&T program?
Alaska Constitution	Should the department propose a constitutional amendment that dedicates transportation revenues solely for transportation purposes?
System Expansion	What are the barriers to expanding the existing systems, and how might those barriers be overcome?
Provision of Emergency Transportation Services	How can the development of the transportation system help meet the needs of emergency transportation service providers?
Provision of Transportation Services to Major Recreation Facilities	Should the department enter into cooperative agreements with other agencies to provide specialized services, such as maintenance of park roads and parking areas, etc?
Climate	What further research is needed to meet the climatic challenges of this state?
Permafrost	How should the department use its resources to promote innovation in ways to deal with this engineering hurdle?
Global Warming	What is the effect of global warming on performance of the transportation system?
Earthquakes	How can the department mitigate the risks associated with this phenomenon?

REGULATORY POLICIES

Construction Camps

How can the department best balance the concerns of labor and the work place?

National Environmental Policy

How can the department balance the conflicting demands for a quality environment with the need for responsive, inexpensive transportation?

FAA Security/Safety Programs

If the department is forced to comply with the more stringent regulatory requirements, our operating costs at many airports would increase substantially. What course of action should the department pursue in complying with this regulation? And, at what cost?

Disadvantaged Business
Enterprise/External EEO Programs

How can the department fairly meet DBE/ExEEO goals in the future?

Encroachments/Trespass

What are the most effective means of dealing with violations?

Utility Relocation

Should the department continue to bear the entire financial burden for utility relocation within state right-of-way? And, at what cost to other transportation improvements?

Motor Carrier Regulation

Given the differences among modes and their user fees (taxes), how can enforcement be done fairly, without inappropriate competitive advantages for one mode over another?

POLITICAL
ENVIRONMENT

Short Time Horizons for Decision making

What strategy is available to the department to minimize this shortcoming?

Rights-vs-Responsibilities

A key transportation issue is what level of transportation service is a public sector responsibility, and how should that responsibility be divided among local and state government?

Environmental Activism

How can the department work cooperatively with environmental activists in achieving environmental goals?

ORGANIZATIONAL
ENVIRONMENT

Leadership Turnover

How can the length of this transition period be minimized?

Strategic Management Process

What innovative techniques are available through this process to improve the organizational management?

General Efficiency

To what extent should management information system be used to improve planning, design and construction management?

Program Development Cycle

What changes might be accomplished in the budget or management process to reduce this lengthy development cycle?

Training and Productivity

How can the department meet the manpower loss of the RIP program?

System Management

Are there significant other gaps in current data resources that hamper research and development efforts and innovations?

Accountability to the Public through
Improved Reporting

How can the department improve the assembly, management, transmission, and analysis of transportation-related data to make it more understandable too the public?

DOT&PF Legal Services

What are the barriers to overcoming the fragmentation between the two departments?

AVAILABILITY OF ENERGY
FOR TRANSPORTATION

How should the department address the need to conserve the use of transportation energy within the state in the next decade?

SPECIAL
TRANSPORTATION NEEDS

How can the transportation network better respond to the special needs of elderly, disabled and low-income travellers? Who should bear the cost of such service?

TECHNOLOGY

How can the department better prepare itself to be responsive to technological innovation and impact on the transportation system?

STATE TRANSPORTATION PLAN

Background Report

CHALLENGES FACING THE DELIVERY OF TRANSPORTATION SERVICES IN ALASKA: AN IDENTIFICATION OF THE ISSUES

Department of Transportation & Public Facilities
Mark S. Hickey, Commissioner

Revised
November, 1990

STATE TRANSPORTATION PLAN

Background Report

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Disadvantaged Business Enterprise/External EEO Programs	20
Encroachments/Trespass	20
Utility Relocation	20
Motor Carrier Regulation	20
ISSUE AREA: POLITICAL ENVIRONMENT	21
Short Time Horizons for Decision Making	21
Rights-vs-Responsibilities	21
Environmental Activism	22
ISSUE AREA: ORGANIZATIONAL ENVIRONMENT	22
Leadership Turnover	22
Strategic Management Process	22
General Efficiency	22
Program Development Cycle	23
Training and Productivity	23
System Management	23
Accountability to the Public through Improved Reporting	23
DOT&PF Legal Services	23
ISSUE AREA: AVAILABILITY OF ENERGY FOR TRANSPORTATION	24
ISSUE AREA: SPECIAL TRANSPORTATION NEEDS	24
ISSUE AREA: TECHNOLOGY	25

CORRECTION

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STATE TRANSPORTATION PLAN

Background Report

CHALLENGES FACING THE DELIVERY OF TRANSPORTATION SERVICES IN ALASKA: AN IDENTIFICATION OF THE ISSUES

Department of Transportation & Public Facilities
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TABLE OF CONTENTS

1982 STATE TRANSPORTATION POLICY PLAN	2
ISSUE IDENTIFICATION PROCESS	2
CURRENT ISSUES/AN OVERVIEW	4
ISSUE AREA: GEOGRAPHY	5
Geographic Diversity	5
Global Location	5
Intermodal Demands	6
ISSUE AREA: DEMOGRAPHIC AND ECONOMIC GROWTH	6
Population Growth	6
Trends in Employment	8
Other Economic Trends	8
ISSUE AREA: LAND OWNERSHIP AND USE	9
Federal Ownership	9
Alaska Native Claims Settlement Act	10
Adequate Title Interest	10
Surveying, Mapping & Monumentation	10
Real Property Management	11
Public Land Orders and Other Right-of-Way Reservations	11
Reserved Estates	11
Local Platting & Zoning Compliance	11
DNR/DOT&PF Land Management Responsibilities	11
ISSUE AREA: JURISDICTIONAL RESPONSIBILITY	12
Transfer of Responsibility	12
Functional Classification and Administrative Jurisdiction	12
ISSUE AREA: FINANCIAL RESOURCES	13
Budget Crisis	13
Federal Program Receipts	13
Federal Program Criteria	14
Design Standards	14
User Costs	15
Tax Policy	15
Deferred Maintenance/Infrastructure Disinvestment	15
Distribution of Resources Within the State for Construction of Capital Improvements	15
Local Service Roads & Trails Program	16
Alaska Constitution	16
System Expansion	16
Provision of Emergency Transportation Services	17
Provision of Transportation Services to Major Recreation Facilities	17
ISSUE AREA: ENGINEERING/ENVIRONMENTAL CONSTRAINTS	17
Climate	17
Permafrost	18
Global Warming	18
Earthquakes	18
Construction Camps	18
ISSUE AREA: REGULATORY POLICIES	18
National Environmental Policy	19
FAA Security/Safety Programs	19

Disadvantaged Business Enterprise/External EEO Programs	20
Encroachments/Trespass	20
Utility Relocation	20
Motor Carrier Regulation	20
ISSUE AREA: POLITICAL ENVIRONMENT	21
Short Time Horizons for Decision Making	21
Rights-vs-Responsibilities	21
Environmental Activism	22
ISSUE AREA: ORGANIZATIONAL ENVIRONMENT	22
Leadership Turnover	22
Strategic Management Process	22
General Efficiency	22
Program Development Cycle	23
Training and Productivity	23
System Management	23
Accountability to the Public through Improved Reporting	23
DOT&PF Legal Services	23
ISSUE AREA: AVAILABILITY OF ENERGY FOR TRANSPORTATION	24
ISSUE AREA: SPECIAL TRANSPORTATION NEEDS	24
ISSUE AREA: TECHNOLOGY	25

CHALLENGES FACING THE DELIVERY OF TRANSPORTATION SERVICES IN ALASKA: AN IDENTIFICATION OF THE ISSUES

The first half of the 1980's brought Alaska a tremendous economic boom. Alaska's state government created that boom by pumping tens of billions of dollars in oil revenues into the economy within a few years. High North Slope oil production and high oil prices made the State of Alaska wealthy during the first part of the decade, and it spent its oil wealth in ways that reached throughout the economy. During that time, the transportation infrastructure grew at an unprecedented rate.

By late 1985 Alaska's economic picture was changing. Oil prices had been drifting down since 1982, and by mid-decade a drop in state spending had already started an economic slowdown. In particular, construction began a steep decline. In the spring of 1986 oil prices crashed, and the slowdown quickly became a recession as state revenues and spending dropped.

The 1990's have produced a clearly different environment for the state. Service needs and demands have continued to grow, while revenue increases have declined in absolute and real terms. At the same time, statutory mandates to provide services have increased. Management's present challenge has been to find creative ways to ensure the provision of high quality services in an era characterized by continuing cost increases and stable or declining revenues.

The effort to maintain and expand the transportation infrastructure is complicated by the impact of a growing number of complex issues. As a result, the department has initiated the preparation of a State Transportation Plan that will provide a comprehensive, multimodal policy review of Alaska's transportation system from a statewide perspective. This is being done in an effort to anticipate and better understand significant issues which are likely to impact services and performance in the near future.

An understanding of these issues is essential if the Department of Transportation and Public Facilities (DOT&PF) and state government as a whole are to identify a realistic strategy to meet its total transportation

needs in the future. These issues will influence the development and implementation of state policies, plans, and programs, extending far beyond the transportation system.

1982 STATE TRANSPORTATION POLICY PLAN

The 1982 State Transportation Policy Plan identified a number of major issues affecting the development of Alaska's transportation system. Those issues are identified in Table 1.

The issues, as identified in the 1982 Policy Plan, still exist. What has changed--the economic climate, energy and environmental concerns, demographic trends and population distribution--does not mandate wholesale adjustments because of those changes. They do indicate, however, a need to reexamine the previous analysis, and perhaps to redirect, expand, or change emphasis.

ISSUE IDENTIFICATION PROCESS

The function of forecasting the future is often less a matter of scientific precision than of human judgment and intuition. To aid in the issue identification process the department has established both a Technical and Policy Review Committee. This multiple team approach is intended to build on the knowledge of many people within the department who can bring a variety of points of view to the process.

The first step in the issue identification process is to review previously published reports (i.e., system and regional planning studies, Transition Report, Management Plan, Crossroads Report, etc.). Numerous issues have been identified in the reports that impact the department's ability to deliver transportation services. This report is a compilation of that material.

Next, the Technical Review Committee will review the background report and identify and describe any issues that should be incorporated in the document. To develop a workable list, the "long-list" will be narrowed by the Project Manager to concentrate on those issues that relate to the service delivery objectives which frame the project's goals and objectives. The "short-list" will be returned to the Technical Review Committee for subsequent analysis.

The Technical Review Committee will identify the forces affecting these issues and identify strengths and weaknesses (internal), along with opportunities and challenges (external). The Technical Review Committee evaluation will be transmitted to the Policy Review Committee. On the basis of the information presented in the evaluation, the Policy Review Committee will identify a few *key issues*. The key issues will become the focus of the plan.

Table One

STATE TRANSPORTATION POLICY PLAN, 1982
Major Issues

State Transportation Related Issues: Regional and local issues were identified in the modal, regional and local planning studies and reports.

Development of an Integrated Transportation System in Alaska: Many cases have been identified where the service between communities in Alaska is not convenient, not available on an equal basis, or otherwise lacks high quality.

Role of the Public and Private Sectors in Providing Transportation: Which roads should be state highways or which airports should be financed by the federal government.

Distribution of Transportation Development Resources Between Rural and Urban Areas: Most of Alaska's population growth is expected to occur in the metropolitan areas. Yet, tourism, agriculture, mining, forest products, fisheries and other industries vitally important to Alaska's economy are largely located in rural areas.

Energy Considerations: Alaska's transportation system consumes about thirty-eight percent of the total energy used in the state. This suggests a fertile area for energy conservation.

Economic Development and Land Use: Population growth, economic development and land use patterns are primary determinants of future travel. Because of these interrelationships, public policies and statutes concerning growth and land use are extremely important in providing future directions for the transportation system.

Consideration for Transportation Access Across Federal Lands: Access is a legal right to use certain lands for a specific purpose and access across federal to state, native and privately held lands is a prominent issue.

Transportation for the Disadvantaged: Disadvantaged persons include the handicapped, elderly, young and those with low incomes. Many of these persons are unable to use automobiles and do not have alternative forms of transportation available to them.

Socio-Economic Considerations: With vast areas of undeveloped and unsettled lands, many Alaskans follow a lifestyle that includes varying degrees of subsistence. The movement of people and goods needed to compliment this lifestyle must be considered when evaluating transportation demands.

This process will help set priorities so efforts can be concentrated on those issues thought to have overriding importance and which the department can affect. The issue agenda is expected to evolve and change with time but this initial effort offers a framework to begin work.

CURRENT ISSUES/AN OVERVIEW

Will today's transportation policies and infrastructure meet tomorrow's needs? Indeed, how well are we meeting today's needs? Transportation plays a vital role in advancing Alaska's future economic development. A responsive, well-maintained, and efficient transportation system can further economic growth and increase the state's competitiveness in the global market place. The desired goal "the department is committed to achieve in the future" was described in the FY'90 & '91 Management Plan:

MISSION STATEMENT

**To cost effectively provide, operate and maintain safe, environmentally sound
and reliable transportation systems and public facilities for the State of Alaska.**

Alaska needs a transportation policy that will help meet this goal. The policy must be a strategic approach based on cooperative public and private action. Businesses rely on strategic planning to think ahead, to identify priorities, and to position themselves for the future. Government policy--transportation policy--must be driven by strategic thinking as well.

Strategic management focuses attention on the recognition and resolution of "strategic issues." Strategic issues include "actual or anticipated conditions, internal or external to the department, that have or will have a significant influence on the department in terms of its functioning or its ability to achieve a desired goal in the future." This document provides an overview of the trends and factors that shape transportation in Alaska both now and in the future. The issues are arranged according a few broad categories to stimulate and focus discussion:

- Geography
- Demographic and Economic Growth
- Land Ownership and Use
- Jurisdictional Responsibility
- Financial Resources
- Engineering/Environmental Constraints
- Regulatory Policies
- Political Environment
- Organizational Environment

- Availability of Energy for Transportation
- Special Transportation Needs
- Technology

ISSUE AREA: GEOGRAPHY

Adequate transportation services are essential for the residents of Alaska to maintain and expand the economy of the state. Providing adequate transportation services in Alaska is more difficult than in most areas of the United States, or even the world, because of the geographic diversity of the state and the impacts of its strategic global location.

Geographic Diversity

The total land area of Alaska is 586,412 square miles--approximately one fifth the total area of the 48 contiguous states. Its 33,000 miles of coastline is half again that of the continental United States. Alaskan coasts face two oceans (North Pacific and Arctic) and two major seas (Bering and Chukchi). The state stretches out between latitudes of 51 degrees and 72 degrees north and meridians 130 degrees west and 173 east--an east-west span of 2,400 miles and a north-south span of 1,400 miles. Because of this subcontinental size, Alaska is not a single homogenous region but several distinct regions.

Thousands of acres of forest and tundra, miles and miles of rivers and streams, valleys, bays, coves and mountains, are spread across a vast area. Current assessments indicate that approximately 160,000 acres of Alaska have been cleared, built on or otherwise directly altered by man, either by settlement or resource development, including mining, pipeline construction and agriculture. In comparison to the 365 million acres of land which comprise the total of the state, the settled area currently amounts to less than 1/20th of a percent.

The remoteness of some places, the water barriers and the difficulty of traversing the terrain have made overland connections between communities either impossible or inordinately expensive. To meet this diverse need the department has developed a comprehensive transportation network, including 5,500 miles of roads, two international airports, 270 smaller airports, a fleet of ferry vessels, 80 ports and harbors, and more than 500 public buildings.

Should the department establish guidelines or standards to determine the minimum level of service required to adequately serve these diverse and distant communities? Can the department afford to provide multimodal transportation services to each of these communities in the future?

Global Location

Foreign air carriers have traditionally used Alaskan international airports when they fly between Europe and Asia. While the political climate of the past forty years has caused the major countries of Europe and East Asia to avoid Soviet airspace, recent political changes within the USSR have resulted in a revised airspace policy which allows foreign airlines to consider overflying that country as a viable alternative to operating through Alaskan airports. How can the department ensure that there is adequate and adequately maintained

infrastructure to meet transportation needs, including the need to connect with the global marketplace and the evolving world economy?

In addition to the civilian use of Alaska as a center of operations, the military has developed a number of strategic bases in the state to support critical missions. The location of these bases has provided opportunities for the development of the civilian transportation network. However, combined operations create additional demands on the department to maintain 24-hour service. How can the transportation system support national security goals and emergency transportation requirements in the event of an armed conflict?

Intermodal Demands

No matter how good the individual parts of the transportation system may be, the effectiveness of the overall system depends on the effectiveness of the connections a traveler or a carrier can make in getting from origin to destination. Intercity passenger travel frequently involves use of air or rail service in combination with a shorter trip by automobile, taxi, or local bus. For freight, many shipments are picked up and delivered by truck, but piggybacked onto the railroad for the long-distance journey. Millions of shipping containers each year are moved on linerships across the ocean and transferred to rail or truck to get between a port and other points in the state.

The transportation system that serves this diverse state cannot work effectively if critical segments in the system are not connected. When trips involve transfers from one form of transportation to another, good connections between modes are essential from local streets and arterials to the interstate highways, from air travel to shorter distance ground transportation, from truck to rail, from rail to ship. Too often in the past we have looked at airport or highway development separately from their relationships to other modes. We have dealt with our transportation system and our public facilities as if they were all operating in isolation. How can we improve intermodal connections?

ISSUE AREA: DEMOGRAPHIC AND ECONOMIC GROWTH

The strategic planning process must also start with a review of factors affecting the state's future mobility needs. Many of these trends are demonstrated in the changing patterns of people and the movement of goods. The state has a history of rapid growth, both in population and the economy, punctuated by periods of short, but severe declines. Major population shifts are often associated with these cycles, both within the state and into and out of the state. Possible consequences of these changes include increases in the growth of personal travel and tourism and growth in demand for specialized transportation services and improved transportation amenities

Population Growth

In the last fifteen years, the population of Alaska has grown at an average annual rate of 4 percent (Alaska Department of Labor). Alaska's rate of increase during the decade was the third highest among all states, but with a population of just over half a million people (537,800), it still ranks fiftieth among all states in total population.

Natural Increase (Births and Deaths)

Alaska has had and continues to have, a crude rate of natural increase (births minus deaths per thousand persons) greater than any other state in the U.S. This reflects both the highest crude birth rate (births per thousand persons) and the second lowest crude death rate (deaths per thousand persons) in the U.S. The low crude death rate is primarily due to the unusual age distribution in Alaska--a concentration of population in ages fifteen to thirty-four where death rates are low.

In 1987, the birth rate for Alaska Natives was 32.6 per 1000; the death rate in that same year was 6.7 per 1000; together these rates made for a natural increase of 2.6 per year. The birth rate for white Alaskans in 1987 was 19.6 per 1000; the death rate was 3.4 per 1000; together this made for a natural increase of 1.6 percent. Nationwide the birthrate is 16 per 1000 and the death rate is 9 per 1000 making a natural increase of .7 per year.

Over the period since 1960, the major trends and differentials in vital rates in Alaska can be summarized as follows:

- General declining fertility among all groups and all regions of the state, with non-white fertility (particularly Native) declining faster, but still staying at a higher level than white.
- Mortality declines of modest proportions among most groups and regions.
- Slowing rates of natural increase, as birth rates fall faster than death rates, for Natives and whites, and for all regions of Alaska.

Migration

Patterns of migration within Alaska and between Alaska and the Lower 48 can be summarized as follows:

- Although the gross migration flows were very large, Alaskan population growth during the last twenty years was not primarily the result of net migration to the state. Net migration accounted for less than one-fourth of the total population change.
- Alaskan mobility is characterized by the Native population migrating within the state and the white population moving between states. More Alaska Natives now live in Anchorage than in any other borough or census areas in the state. This area held 57 percent of the state's total population in 1987, compared to 48 percent in 1960. Young adults have been the most mobile, as is true elsewhere.
- The pattern of intrastate and interstate migration during the last twenty years has markedly changed the regional distribution of

population, with both non-whites and whites concentrating in the Anchorage/Southcentral urbanized regions.

- This pattern of growth and mobility took place during a continued decline of the highly mobile armed forces population. In 1980, the military accounted for 15.7 percent of the total population. While the military gradually increased during the early 1980's, the non-military population in Alaska grew so rapidly that by 1985 the military represented only 12.5 percent of the total population.

In the past decades, military migration to Alaska was an important component of both net migration and total population increase. The decreasing proportion of military population to total population reflects the relative decline in the role of the military in the Alaska economy, though the size of the military population is still substantial.

Regional and urban growth patterns will play a significant role in influencing future travel trends and determining transportation investment requirements.

Trends in Employment

The general economy of Alaska reflects its vast federal, state and native land holdings, government employment, military importance, natural resources, construction, tourism and agriculture. There is very little manufacturing in Alaska. Most finished products must be transported to the state from the other states or foreign markets. Therefore, the condition of Alaska's transportation delivery system is a critical factor in enhancing the state's productivity and Alaska's ability to compete and survive in today's demanding economic environment.

The greatest number of jobs in 1989 was in the government sector (66,000) followed by seafood processing (9,000) and oil and gas mining (8,100). Employment is but one measure of activity within the state. In terms of labor force, there are some prominent patterns. Since 1950, the labor force participation rate of females has increased substantially. The retail trade and service sectors of the economy have high relative growth rates, and women comprise a relatively large part of employment in these sectors. There has been a trend toward early retirement. And, the unemployment rate has fluctuated seasonally and annually.

Other Economic Trends

Development of Alaska's natural resources--fuel, energy, and minerals--take on national importance not only because of the energy crisis but also relative to unstable international markets and the international balance of payments deficit. While the availability of transportation does not assure development, it is a necessary condition and consideration for resource development.

Alaska's potential for petroleum production has been recognized for a long time. Exploration activities began early in this century, and in 1923, a large area in northern Alaska was designated Naval Petroleum Reserve #4. It was in the late 1950's and early 1960's that the first significant production began on the Kenai Peninsula in southcentral Alaska, and in adjacent waters of Cook Inlet. These developments were of moderate size and although they caused a flurry of local activity, had only a minor influence on the growth of the state as a whole. Then,

with the discovery of oil on the North Slope and the Prudhoe Bay lease sale in 1969, Alaska entered fully into the age of petroleum. The state was catapulted into an entirely new phase of economic growth.

There are many natural resources in Alaska beyond oil and gas. According to the Mineral Industry Research Laboratory at the University of Alaska in Fairbanks, there are two "World Class" mineral deposits in the United States and both of them are in Alaska. One is found in the Kobuk Region east of Kotzebue, and the other is in a large band on the north side of the Alaska Range extending generally east from the Usibelli Coal Mine toward Delta Junction. A resurgence in the minerals market continues to impact Alaska's mining industry.

In recent years, some of the most significant transportation improvements have involved the development of public/private sector partnerships (e.g. the 360-mile Dalton Highway built by oil interests, the 52-miles of Red Dog Mine Access Road being financed by the Alaska Industrial Development and Export Authority, and the \$1.3 million contribution by a trucking firm for the upgrade of the Klondike Highway to allow heavy-laden ore trucks to gain access from Canadian mines to the port of Skagway).

While much of Alaska's future is difficult to predict because of its heavy ties to resource development, Alaska's picturesque scenery and exceptional hunting, fishing and camping opportunities are certain to continue attracting national and international visitors. International commerce and travel are growing at unprecedented rates. Tourism brought in \$800 million in 1987.

In general, Alaska's employment, labor force and population will grow very slowly between now and the year 2000, more slowly than the U.S. as a whole. Also, the population and labor force will grow older and more female. Higher levels of economic activity will mean more jobs, more goods to be shipped, higher incomes, and greater demand for travel. Even under a slow-growth forecast, Alaska's needs for transportation services is likely to continue expanding. Higher incomes, growth in the active elderly population, and global economic interdependence will also generate greater demands for transportation services.

ISSUE AREA: LAND OWNERSHIP AND USE

The issue of land ownership is an important key to the development of the state's transportation infrastructure. Specifically, if transportation systems are to be extended in Alaska, provision must be made for access and rights-of-way through various use classifications of federal and native lands.

Federal Ownership

In most places, the free market affects patterns of land ownership, but in Alaska, all land ownership patterns until recently were the result of a century-long process of a single landowner, the United States government. Since the purchase by the United States of Alaska from Russia in 1867, the federal government has exerted a predominant influence on the territory and the state.

Prior to statehood, about 99 percent of Alaska was federally-owned. With the passage of the Statehood Act, the new state was given the authority to select 104 million acres of lands from the public domain of some 365 million acres. The Statehood Act also gave Alaska title to submerged offshore lands to the limits of the territorial sea.

The 1980 Alaska National Interest Lands Conservation Act (ANILCA) or (d)(2) provision authorized the Secretary of the Interior to withdraw up to 80 million acres of land for possible inclusion in the National Park, Forest, Wildlife Refuge, and Wild and Scenic Rivers Systems. Under these systems, the development of the natural resource potential of the land would be prohibited or restricted to varying degrees. Thus, the possibility for land use conflicts arise. What are the most effective means of dealing with this issue?

Alaska Native Claims Settlement Act

The Statehood Act did not deal with the territorial claims of Alaska's natives. In 1966, the Secretary of Interior ordered a halt to further state land selections until the native claims could be resolved by Congress. In 1971, Congress passed the Alaska Native Claims Settlement Act (ANCSA), giving natives the right to select 44 million acres of land.

ANCSA recognized the rights that the Alaska Natives had to the lands they traditionally occupied. Village corporations, comprised of village residents, were entitled to the lands around their villages. The village corporations could not select lands which had already been transferred by patent from the federal government to people or to the state of Alaska.

Section 14(c)(3) of ANCSA requires that the village corporations obtain their land they are to transfer some of it to individuals, non-profits organizations and cities or the state in trust for future cities and federal, state and municipal governments. Typically, such lands are the remaining improved lands in the village, additional community expansion lands, appropriate village rights-of-way and lands for other foreseeable community needs.

The Section 14(c)(4) provision requires the reconveyance of land used for airports and air navigation and related purposes as such existed on December, 1971 to the present airport operator. In most cases, DOT&PF has been the recipient of 14(c)(4) land since it is the leading operator of Alaska airports. To what extent does this policy stimulate or impair development of the rural transportation network?

Adequate Title Interest

In order that the department may properly perform its functions, and to protect the public investment, it is essential that an adequate title interest be acquired and retained not only to construct but to operate and/or maintain transportation facilities. It has been the traditional view that the department will always acquire a fee simple interest. This view often conflicts with the expectations of land owners. Should the department reevaluate the need for fee title acquisition of lands for transportation infrastructure?

Surveying, Mapping & Monumentation

Existing facilities including highway rights of way, airport boundaries, and public facilities are inadequately surveyed, mapped, and monumented. The result is that airport and highway property managers cannot effectively control encroachments and trespass, adjoining

property owners cannot define their boundaries, and M&O forces are unable to determine the limits of their operation. How does the department ensure that there is adequate surveying, mapping and monumentation of public rights of way?

Real Property Management

There are a growing number of unresolved issues related to property management that should not be addressed on a piecemeal, case-by-case, emergency basis as problems erupt (e.g. RS 2477, section line easements, fee vs. less-than-fee acquisitions, surface/subsurface estates, lack of easement document records, etc.). So long as the department lacks a uniform property management system, the state will suffer from inconsistent decision making, the loss of potential revenue and unnecessary litigation expenses. Should the department promote a system of real property management? And, how can this be done fairly?

Public Land Orders and Other Right-of-Way Reservations

Many rights of way for existing facilities throughout the state were initially created by federal Public Land Orders (PLO), or by other Patent Reservations. These rights of way are utilized, as valid existing rights, by the department in its efforts to both improve existing transportation facilities and to develop new ones. To what extent do these reservations impact the development of the transportation system?

Reserved Estates

This is a variation on the issue of whether sand and gravel are part of the surface estate or part of the subsurface estate. It is an issue in national Wildlife Refuges where the department owns a surface interest while subsurface interests are reserved to a federal agency. In cases currently being debated, the federal agency contends that sand and gravel are automatically part of the subsurface estate and, even when such materials are extracted to support the dedicated use of the surface estate, the maximum practical revenue should be generated. What role should the department take in securing these estates? And, at what cost?

Local Platting & Zoning Compliance

Various Alaska Statutes require the department to comply with local platting and zoning authorities in the course of project development. The statutes generally require that the state be treated in the same manner and extent as other land owners. The statutes do not consider the fundamental differences between the process of acquiring right of way for public facilities and the concept of land subdivision and development as addressed by the local ordinances. Local compliance without special consideration can have the effect of limiting the use of eminent domain proceedings for acquisitions, substantially increasing project costs, delaying schedules, and limiting the department's ability to efficiently manage airport facilities and lease lots. How can the department improve coordination with local governments in the course of project development?

DNR/DOT&PF Land Management Responsibilities

DNR takes an excessively active role in the management of DOT&PF airport properties, material source permitting and highway rights-of-way. This requires an inordinate