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A Technical Report on a East-West Highway in Maine

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A Technical Report On An East-West Highway In Maine

Prepared by:
Maine Department of Transportation
September 1999

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Table of Contents

	Page
Introduction	*1*
Chapter I - Travel Demand and Travel Characteristics	*3*
Chapter II - Improving Existing East-West Highways	*16*
Chapter III - Concept of a 4-Lane Limited Access East-West Highway	*48*
Chapter IV - Innovative Financing Opportunities for Maine's East-West Highway	*64*
Application For Funding Under The National Corridor Planning and Development and Coordinated Border Infrastructure Programs	*74*
Appendix	*78*

Introduction

This report has been prepared in response to a law enacted by the 118th Maine Legislature requiring the Maine Department of Transportation (MDOT) to conduct a study of the costs, benefits, and social and environmental impacts relative to the development of an east-west highway in Maine, linking to the east with the Canadian Maritime Provinces and to the west, with the larger markets of Quebec, Ontario, and the Midwestern United States. It is thought by some that a modern and efficient east-west highway corridor across Maine will prompt an economic paradigm shift by using improved transportation infrastructure to capitalize on geographic opportunities for international trade and tourism.

In a parallel and related effort, the legislatures of New Hampshire and Vermont have coordinated efforts with Maine for the purpose of establishing an international trade corridor linking Quebec to the Maritimes through northern New England. This also is seen as an opportunity to deliver strategically planned and coordinated infrastructure improvements along an east-west corridor that could fundamentally change the economic outlook of northern New England and Atlantic Canada.

There are many and diverse opinions regarding the concept of, and need for, an east-west highway through Maine that will undoubtedly be widely debated in the months ahead. This report is intended to provide policy makers with fundamental information on matters relative to the east-west highway concept, and to help enable well-informed decisions.

The Maine State Planning Office, in cooperation with MDOT and the Maine Department of Economic and Community Development, has conducted comprehensive research on the potential economic opportunities and benefits to the State of Maine that could result from the development of a modern east-west highway corridor in Maine.

Public Laws of 1997, Chapter 643, Part BB
As amended by Public Laws of 1999, Chapter 4, Part J

Sec. BB-1. Study. The Commissioner of Transportation shall study and develop a west-east highway in the State. The commissioner shall make a preliminary report to the joint standing committee of the Legislature having jurisdiction over transportation matters by January 1, 1999 and a final report by July 1, 1999 on matters including, but not limited to:

1. A comprehensive plan to reconstruct to current standards existing west-east highways and existing highways that provide direct access to Canada;

2. Plans to expand highway or bridge capacity to a 4-lane limited access roadway. These plans must consist of cost estimates, routes, project scopes and improvement schedules as well as early identification of economic, environmental and community issues;

3. An analysis of opportunities to fund the construction of highways along west-east corridors by means of innovative financing, including but not limited to public-private partnerships, tax increment financing and toll revenue financing. This analysis must include discussion of mechanisms used or proposed to finance new highway construction in the Province of New Brunswick as well as a synthesis of innovative financing resources and options provided by the 1998 reauthorization of the Intermodal Surface Transportation Efficiency Act of 1991; and

4. To make application for funds provided by the 1998 reauthorization of the Intermodal Surface Transportation Efficiency Act of 1991 and NEXTEA for the purpose of planning and improving border crossings, border corridors and trade corridors.

Sec. BB-2. Legislative intent. This project may neither detract from nor diminish the commitment of the Department of Transportation or the State to the maintenance and upkeep of existing roadways.

Sec. BB-3. Study. The State Planning Office, in cooperation with the Department of Transportation and the Department of Economic and Community Development, must study and report on economic and trade issues associated with the development of a west-east highway in the State. The study must examine the projected increase in the Canadian highway traffic across Maine as well as the projected economic impact of the Canadian highway traffic. The State Planning Office shall report its findings along with any implementing legislation to both the joint standing committee of the Legislature having jurisdiction over appropriation and financial affairs and the joint standing committee of the Legislature having jurisdiction over transportation matters no later than July 1, 1999.

This report presents a plan for improving *existing* east-west highways in Maine, as well as a plan for developing a *new* highway corridor. It addresses the scope, costs, and impacts of those plans, and identifies innovative alternatives to finance their implementation.

Chapter I - Travel Demand and Traffic Characteristics presents statistics on existing and projected international, interstate, and interprovincial traffic patterns and volumes.

Chapter II - Improving Existing East-West Highways outlines the effects of improving *existing* highways in the east-west corridor, including improvement types, costs, and social and environmental impacts.

Chapter III - Concept of a 4-Lane Limited Access East-West Highway estimates the costs, as well as the social and environmental impacts of two alternative corridor alignments for a *new* limited access east-west highway.

Chapter IV - Innovative Financing Opportunities for Maine's East-West Highway identifies several innovative alternatives for funding identified improvements, including a comprehensive evaluation of toll financing.

This study is based primarily on information readily available to MDOT and should thus be considered preliminary. If it is determined that the concept of an east-west highway in Maine should advance through a more comprehensive planning, project development, and decision-making process, more detailed information will need to be developed and evaluated.

An executive summary of the findings of this report, together with the findings of the several technical reports issued by the Maine State Planning Office relating to the economic impact analysis, is presented in a separate companion document.

Chapter I - Travel Demand and Traffic Characteristics

A. EXISTING TRAFFIC

This chapter presents summary information on the characteristics of traffic presently traveling the east-west highway corridors in Maine, specifically addressing automobile and truck flow, growth in traffic, cross-border and interprovincial travel. This chapter does not include traffic statistics on those Interstate highway segments (I-95, I-395, I-495) which are considered to be part of Maine's overall east-west highway system.

Daily Traffic Flow

Estimates of current (1999) annual average daily traffic (AADT) along Maine's existing east-west highway corridors are depicted graphically in Figure 1.1 and summarized in Table 1.1. As demonstrated by this information, the extent of travel on Maine's east-west highways varies dramatically depending on the specific highway corridor or region of the state. Likewise, commercial truck traffic varies depending upon the nature and level of economic activity in a particular region, and with the association of the highway corridor with established trade corridors, whether regional, state, or international.

The variation in volume of traffic on these highways is clearly demonstrated in Table 1.1, with AADT volumes ranging from a low of 400 vehicles per day on rural segments such as Route 6 in Vanceboro, to a high of 31,000 vehicles per day on urban segments such as Route 1 in Ellsworth. These figures represent annual average traffic flows. Daily traffic during the summer peak months are generally greater as the result of factors such as the influx of visitors to the state, seasonal residents, and seasonal businesses.

Traffic Composition

The quality and stability of traffic flow along a highway corridor is affected, to a great extent, by the composition of traffic using the facility, with heavy trucks having the greatest influence. The volume of heavy trucks traveling the east-west highway corridors is summarized in Table 1.1. As with overall traffic flow, daily truck volumes also demonstrate a significant variation depending upon corridor and region, ranging from a low of 100 trucks per day on Route 6 in Vanceboro, to a high of nearly 1,600 trucks per day on Route 2 in the Farmington area. From a different perspective, the 1,600 trucks per day on Route 2 in Farmington represent approximately 7 percent of the total traffic, while on Route 9 in Beddington, 900 trucks per day represent 32 percent of the total traffic at that location.

- ✓ ***Average daily traffic volumes on existing east-west highways range from 400 to 31,000 vehicles per day - Commercial truck volumes range from 100 to 1,600 per day.***
- ✓ ***Over 4.6 million vehicles a year pass through the five principal US/Canada border crossings serving the east-west highway corridors - over 550,000 of these are commercial trucks.***
- ✓ ***The Calais/St. Stephen crossing accounts for over 67 percent of this total cross-border travel.***
- ✓ ***Automobiles entering the US at the five principal crossings have declined during the 1990's - while truck traffic has steadily increased.***

Figure 1.1
1999 Annual Average Daily Traffic (AADT) Volumes On Existing East-West Highway Corridors

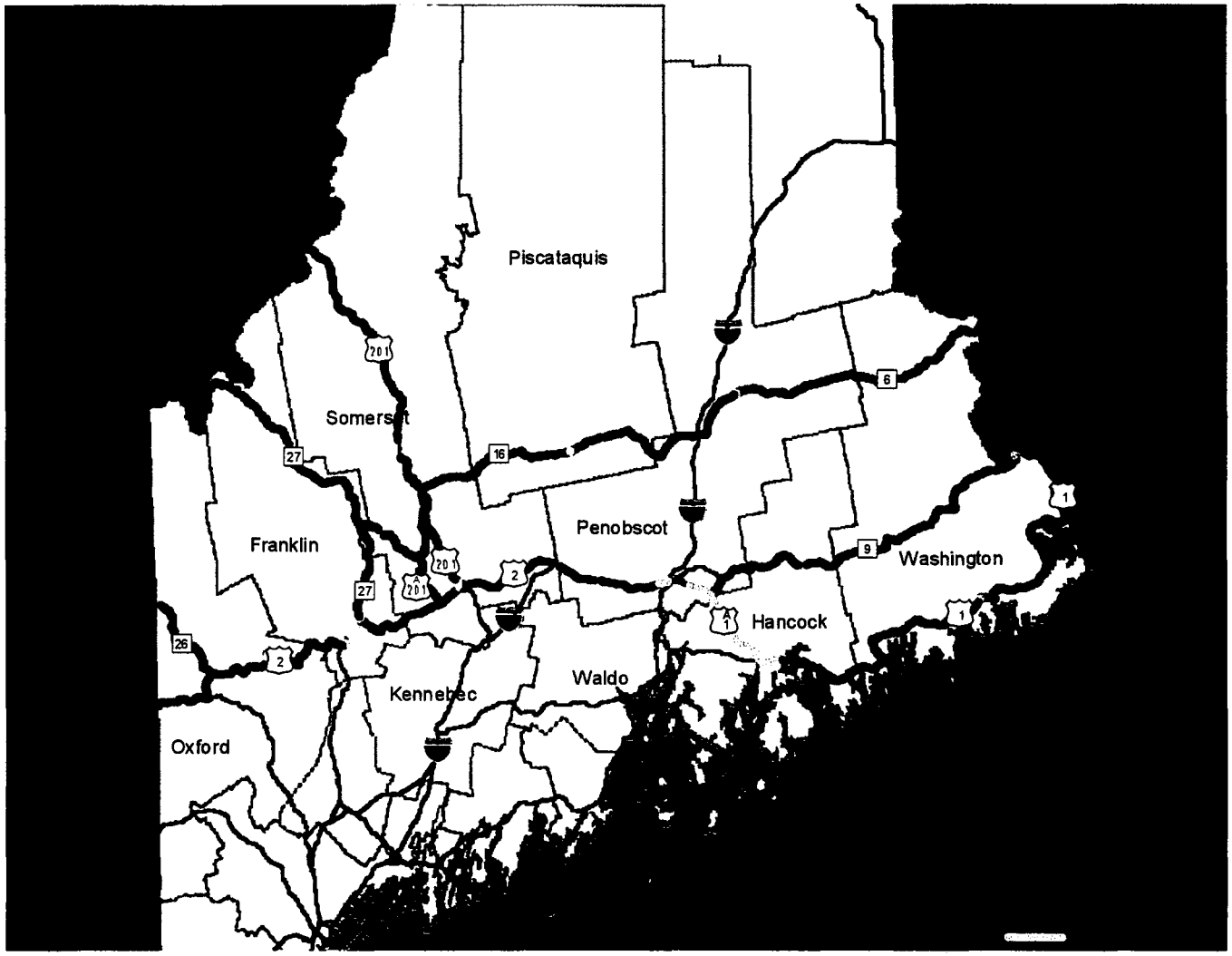


Table 1.1
1999 Annual Average Daily Corridor Traffic Volumes

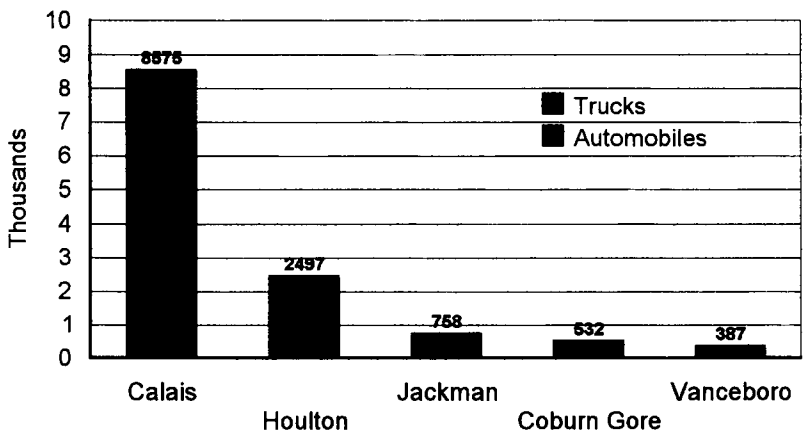
East-West Corridor	Segment	Total Volume	Truck Volume	Percent Trucks
Route 9	Calais (urban) to Wesley	2400 - 9600	800 - 1100	11 - 33
	Wesley to Beddington	2100 - 2800	800 - 900	32 - 38
	Beddington to Amherst	2600 - 3200	800 - 900	28 - 31
	Amherst to East Eddington	2500 - 4800	800 - 900	19 - 32
Route 46	East Eddington to East Holden	1700 - 2500	500 - 550	22 - 29
Route 2	Newport at I-95 to Skowhegan	3200 - 7200	450 - 650	9 - 14
	Skowhegan (urban)	6000 - 24100	450 - 1550	6 - 8
	Skowhegan to Norridgewock	5700 - 9700	700 - 800	8 - 12
	Norridgewock to Farmington	4000 - 8600	500 - 1050	12 - 13
	Farmington (urban)	7600 - 22400	1050 - 1550	7 - 14
	Farmington to Mexico	4200 - 21600	1400 - 1550	7 - 33
	Mexico-Rumford (urban)	6700 - 14800	400 - 1400	6 - 10
	Rumford to Bethel	3100 - 10300	600 - 700	7 - 19
	Bethel to Gilead	3500 - 6600	600 - 700	11 - 17
Route 1	Calais to Perry	1800 - 8000	250 - 300	4 - 14
	Perry to Dennysville	2000 - 2600	150 - 200	7 - 8
	Dennysville to East Machias	1400 - 3500	200 - 250	7 - 14
	East Machias to Milbridge	2500 - 12700	200 - 500	4 - 8
	Milbridge to Gouldsboro	3000 - 7100	350 - 400	6 - 12
	Gouldsboro to Sullivan	3300 - 7000	400 - 450	6 - 12
	Sullivan to Ellsworth	6800 - 31100	450 - 1000	3 - 7
Route 1A	Ellsworth to East Holden	8600 - 8700	800 - 1200	9 - 14
	East Holden to I-395	11300 - 17100	1100 - 1200	7 - 10
Route 26	Newry to Upton	700 - 1400	100 - 150	11 - 14
Route 27	Farmington (urban)	7200 - 13000	500 - 600	5 - 7
	Farmington to Kingfield	2200 - 6900	200 - 350	5 - 9
	Kingfield to Stratton	2200 - 6900	300 - 350	5 - 14
	Stratton to Coburn Gore	700 - 2000	150 - 350	18 - 21
Route 201	Skowhegan (urban)	10900 - 24000	800 - 1000	4 - 7
	Skowhegan to Bingham	3500 - 9500	400 - 800	8 - 11
	Bingham to Jackman	1300 - 4700	400 - 500	11 - 31
	Jackman to Sandy Bay	1300 - 5200	250 - 400	8 - 19
Route 201A	Norridgewock to Madison	3900 - 9100	400 - 600	7 - 10
	Madison to North Anson	3900 - 13800	200 - 400	3 - 5
Route 16	Abbot to Bingham	400 - 1700	100 - 150	9 - 25
	Bingham to North Anson	400 - 8800	150 - 200	2 - 38
	North Anson to Kingfield	1100 - 3300	200 - 250	8 - 18
Route 6	Vanceboro to Topsfield	400 - 700	50 - 100	13 - 14
	Topsfield to Lincoln	1200 - 6800	250 - 300	4 - 21
	Lincoln to Howland	1900 - 3800	300 - 350	9 - 16
	Howland to Guilford	800 - 1700	200 - 400	24 - 25

Border Crossings

There are five principal U.S./Canada border crossings serving east-west highway corridors—Houlton, Vanceboro, Calais, Jackman, and Coburn Gore. In 1997, over 4.6 million vehicles passed through these border stations, of which nearly 12 percent (551,820) were heavy trucks. Figure 1.2 shows that the Calais/St. Stephen crossing is clearly the most heavily traveled crossing, accounting for over 67 percent of this total traffic. This crossing also ranks seventh in auto traffic entering the U.S. on the Canadian border, and in truck volume it ranks as the ninth busiest U.S./Canada crossing.

US Route 2 at the Maine/New Hampshire border, although not a US/Canadian crossing, carries over 3,000 vehicles per day including

Figure 1.2
1997 Daily Traffic Volumes At East-West Border Crossings
4,653,000 Annual Total

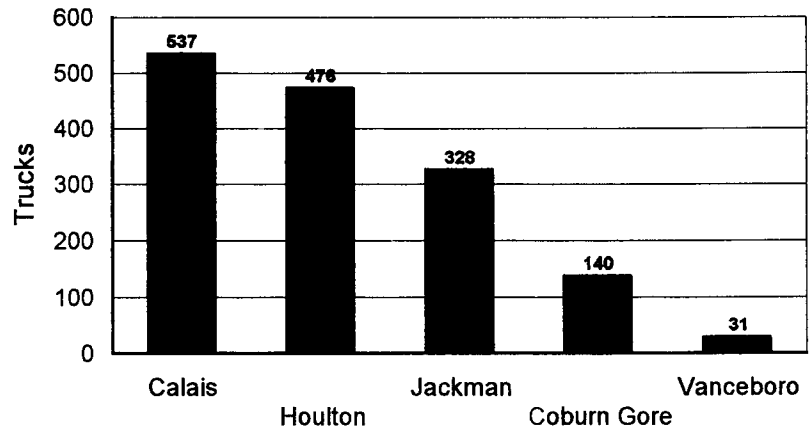


Source: US Customs, Statistics Canada

560 heavy trucks. It is the second heaviest border crossing of east-west highways, placing it ahead of the Houlton/Woodstock crossing.

As shown in Figure 1.3, truck traffic to and from Canada is greatest along the Maine/New Brunswick border, with the Calais and Houlton crossings accounting for more than two thirds of the total truck

Figure 1.3
1997 Daily Truck Volumes At East-West Border Crossings
551,820 Annual Total



Source: US Customs, Statistics Canada

volume. The relative volume of truck traffic at the five crossings varies considerably. For example, while the Calais crossing experiences the greatest truck volumes, it represents only 6 percent of the total traffic crossing at that location. On the other hand, at Jackman, truck traffic accounts for 43 percent of the traffic. A more detailed profile of the traffic at each of the five east-west border-crossing stations is provided in the Appendix.

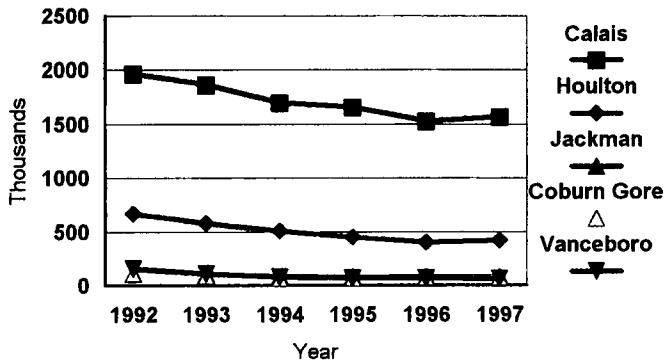
While traffic crossing the border at Calais represents a significant share of Maine's cross-border travel, only a small amount of

that travel can be categorized as long distance through travel. In 1992, the Maine and New Brunswick Departments of Transportation conducted a comprehensive survey of vehicles crossing the border at Calais/St. Stephen. That survey found that approximately 39 percent of the cross-border traffic was inter-local (i.e trip origin and destination both *inside* the Calais/St. Stephen area) and 26 percent of the traffic was through traffic (i.e. trip origin and destination both *outside* the Calais/St. Stephen area). Another 35 percent is locally oriented traffic with either an origin or destination in Calais or St. Stephen.

Border-Crossing Trends and Issues Over the Last Five Years

Over the last five years, there have been two distinctly opposite trends at Maine's major east-west U.S./Canada border

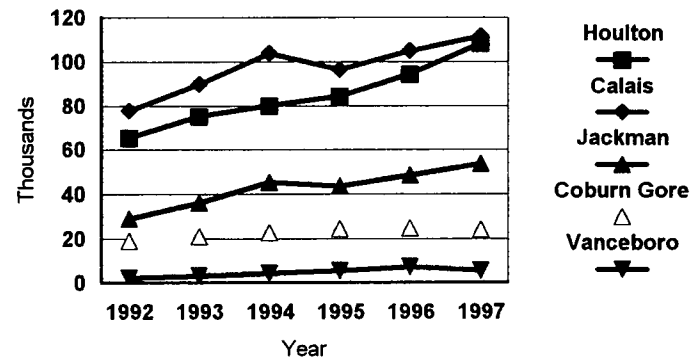
Figure 1.4
Total Cars Entering the U.S
1992-1997



Source: U.S. Customs

crossings, as shown in Figure 1.4. The number of *cars* entering the United States has dropped steadily at every crossing during this period. The most likely explanation for this sharp decrease is the decline in value of the Canadian dollar versus the U.S. dollar. Because of this condition, Canadian consumers have relatively low purchasing power when buying goods and services in the United States. Conversely, as shown in Figure 1.5, the number of *trucks* entering the United States has risen steadily during the same period. This trend is also tied to the value of the Canadian dollar. U.S. companies and individuals have found Canadian products to be very price-competitive because of the devalued Canadian dollar. This currency situation, along with the implementation of the U.S./Canada Free Trade Agreement in 1989, has caused more Canadian products to be imported into the United States.

Figure 1.5
Total Trucks Entering The U.S.
1992-1997



Source: U.S. Customs

It is also important to recognize that the Calais and Houlton border crossings are, by far, the busiest Canadian points of entry into Maine. For example, more cars enter in Calais than in Houlton, Jackman, Coburn Gore, and Vanceboro *combined*. In 1997, both the Calais and Houlton crossings had more truck traffic than any of the other border crossings.

B. MAINE, INTERPROVINCIAL, and CROSS-BORDER TRAVEL PATTERNS

Travel Demand Model

The Department's *Statewide Travel Demand Forecasting Model* was the primary resource used in this study to estimate travel patterns and forecast traffic growth. This model uses the results of an econometric forecast model, developed by Regional Economic Models, Inc. (REMI), that forecasts population and employment growth for nine specific economic regions (Aroostook County, Washington and Hancock Counties, Penobscot and Piscataquis Counties, Kennebec and Somerset Counties, Knox and Waldo Counties, Lincoln and Sagadahoc Counties, Cumberland County, Androscoggin, Franklin and Oxford Counties, and York County). The forecasts produced by REMI are used by the traffic model to estimate travel demand for trips with origins and destinations within the state.

Because the available *Statewide Model* focused primarily on travel within the state, it was necessary, for this study, to modify the model to better reflect the travel patterns for trips which could potentially use any or all of the east-west highway alternative concepts. The result is a model that includes interprovincial and cross-border travel patterns, in addition to intrastate travel. This enhanced model provides an analytical tool to forecast growth of both commercial and auto travel to the year 2030. The model has been used in this study to assess traffic impacts (on both existing and new highway alignments of the various east-west highway corridor improvement scenarios) and in the study of toll financing feasibility (to estimate the revenue potential of alternative toll rates, tolling configurations, and roadway alignments).

The following text summarizes key assumptions used in creating the enhanced *Statewide Model*, lists the data sources used to refine the model, and presents several summary tables depicting current travel patterns potential to the various east-west highway corridors.

Trip Types

The trip types incorporated into the model can be grouped into ten types. These include trips between:

- the Canadian Maritime provinces and Maine
- the Canadian Maritime provinces and the rest of Canada
- the Canadian Maritime provinces and northern New Hampshire and Vermont
- the Canadian Maritime provinces and the rest of the U.S.
- Washington County and the rest of Maine
- Washington County and non-Maritime Canada
- Washington County and northern New Hampshire and Vermont
- Washington County and the rest of the U.S.
- Maine and non-Maritime Canada
- Maine and northern New Hampshire and Vermont

These trip types represent all of the trips which are potential long-distance users of an east-west highway. Potential short-trip users (e.g. Bangor to Skowhegan) are already included in the calibrated *Statewide Model*.

Separate trip tables were prepared for auto trips and truck trips, for two reasons. First, trucks and autos have different patterns in this corridor. Second, subsequent analysis of the east-west highway corridors will require separate analyses for trucks and autos.

Data Sources

The primary data sources to create the modified external trip tables are as follows:

- *Statistics Canada*
  - Border-Crossing Surveys
  - Canadian Travel Survey
  - National Truck Roadside Survey
  - Border-Crossing Counts

- MDOT
  - Skowhegan Origin-Destination (O-D) Survey
  - Eddington O-D Survey
  - Rumford/Mexico O-D Survey
  - Calais/St. Stephen O-D Survey
  - Ellsworth O-D Survey
  - Canadian Border-Crossing Counts
  - AADT Data at New Hampshire Border

- New Brunswick
  - Fredericton-Moncton O-D Survey
  - Historic Traffic Counts on Trans-Canada Highway

- Quebec
  - Historic Traffic Counts on Trans-Canada Highway

- New Hampshire DOT
  - Route 2 O-D Survey

Traffic Volume Estimates

Current estimated daily traffic volumes for trip patterns which use, or could conceivably use, an east-west highway east of Bangor are shown in Table 1.2. For example, the table shows the average number of autos and trucks currently traveling daily between various regions of Maine and the St. John/St. Stephen area in New Brunswick on an average day. The table shows an average of 830 **daily** passenger vehicle trips and 50 daily truck trips between St. John/St. Stephen, and Penobscot and Piscataquis Counties.

These travel patterns can be used to estimate the potential usage of an east-west highway. A significant number of passenger vehicles and trucks travels between Moncton (and Nova Scotia and Prince Edward Island), and southern New England and beyond (an average of 1,470 passenger vehicles and 400 trucks daily). These trips may currently either (1) cross the border in Calais and take Route 1 or Route 9 from Calais to Bangor; *or* (2) cross the border in Vanceboro and take Route 6 from New Brunswick to I-95; *or* (3) cross the border near Houlton and drive on I-95. If an east-west highway alternative offers a route more advantageous than these existing routes (considering travel time, travel cost, and travel distance), then some of the 1,470 daily autos and 400 daily trucks will likely divert to the new highway.

The number of daily trips to and from Quebec, Ontario, and other points west constitutes another source of trips which could potentially divert to an east-west highway. For example, Table 1.2 indicates that there are presently 980 passenger auto and 360 truck trips between Moncton and Quebec/Ontario, or 450 passenger auto and 70 truck trips between Fredericton and Quebec/Ontario . These figures provide an indication of what portion of the trips currently using the Trans-Canada Highway to bypass Maine might potentially divert to an east-west highway.

Table 1.2
Current Travel Patterns Along Eastern Section of East-West Highway Corridor
Annual Average Daily Traffic (AADT)
(daily autos/ daily trucks)

	St. John & St. Stephen	Moncton, PEI & Nova Scotia	Fredericton	Washington County
Penobscot & Piscataquis Counties	830 / 50	120 / 10	70 / 10	2010 / 60
Oxford, Franklin & Somerset Counties	30 / 10	10 / 0	10 / 0	150 / 50
Southern Maine Coast	400 / 40	60 / 10	90 / 20	690 / 210
Quebec, Ontario, New Hampshire & Vermont	240 / 70	980 / 360	450 / 70	40 / 0
Southern N.E. & Remainder of U.S.	240 / 120	1470 / 400	150 / 20	60 / 40

Yet another set of travel patterns which could make use of an east-west highway is comprised of the trips between the Province of Quebec and points in central or southern Maine (for example, between Quebec and Penobscot County). Table 1.3 presents current daily auto and truck volumes between Quebec, Ontario, and other Canadian points to the west, and four regions within Maine—Hancock County, Penobscot and Piscataquis Counties, Oxford and Franklin Counties, and the southern Maine coast (from the Penobscot River south, encompassing an area which includes Kennebec, Androscoggin, Cumberland, and York Counties).

Table 1.3
Current Travel Patterns Along Western Section of East-West Highway Corridor
Annual Average Daily Traffic (AADT)
(daily autos/ daily trucks)

	Trips to/from Northern New Hampshire & Vermont	Trips to/from Quebec, Ontario, and Points Further West
Hancock County	320 / 40	140 / 30
Penobscot and Piscataquis Counties	460 / 50	210 / 20
Oxford and Franklin Counties	1700 / 170	70 / 10
Southern Coast	660 / 80	1530 / 280

Canadian truck volumes were derived from a 1997 National Truck Roadside Survey conducted by Statistics Canada, supplemented with traffic volume information obtained from the New Brunswick Department of Transportation and Transports Quebec. The Statistics Canada survey estimated the yearly tonnage for ***truck shipments*** with either Canadian origins or Canadian destinations. In past analyses, Statistics Canada has converted ***truck shipments*** to ***trucks***, using 22 metric tons per truck as a conversion. Application of this conversion factor to shipments correlates well with known truck volumes in New Brunswick and Quebec.

During analysis of travel patterns relative to Canadian trucking, it became apparent that truck volumes are not balanced. For example, the number of truck trips from the Maritimes to southern New England is significantly greater than the volume returning to the Maritimes from southern New England. The 'missing' trips are assumed to travel from southern New England (or somewhere else outside Maine) to Quebec or Ontario (or somewhere to the west in Canada), and then to return to the Maritimes. This pattern is evidenced by the excess eastbound 'Quebec-to-Maritimes' truck volume compared to the westbound 'Maritimes-to-Quebec' truck volume.

C. ECONOMIC IMPACT AND TRAFFIC FORECAST

Overview of Economic Impact Forecasting Methodology

The basic approach to estimating the economic impacts of the east-west highway was the same for each of the potential corridors examined. Economic impacts are driven by:

- Induced trips by tourists into Maine from Canada, and the purchase of goods and services associated with them
- Savings in transportation costs which accrue to shippers of goods to and from Maine
- Incidental purchases of goods and services by "induced-trip" travelers using the highway
- The relocation to Maine of firms that seek to take advantage of the altered transportation costs made possible by the highway

Of these four elements of economic impact, the first three can be readily modeled using standard econometric models. The fourth element requires assumptions about the possible changes in the industrial composition of regions. These assumptions are necessarily speculative as to both type and size. For this reason, these impacts are not estimated here, but are discussed in general terms elsewhere.

Estimates of the values for the first three economic impacts were derived as discussed below and then entered into the University of Southern Maine's (USM) regional economic models. These models are developed by Regional Economic Models Inc. (REMI) of Amherst, Massachusetts, and maintained by USM. They are standard models used for analyses of this type. The USM REMI model consist of nine interlinked models of county and multi-county regions in Maine. These regions are:

Aroostook
Hancock-Washington
Penobscot-Piscataquis
Kennebec-Somerset
Waldo-Knox
Lincoln-Sagadahoc
Cumberland
Androscoggin-Oxford-Franklin
York

For purposes of estimating economic impacts, construction of the east-west highway is assumed to begin in 2008 and end in 2015. Economic effects are then estimated over the period from 2015 to 2030.

Estimation of economic impacts depends first on the changes in travel patterns. These were estimated through recalculations of the *Statewide Model*, which showed changes in both auto and truck trips, in miles traveled, and in hours of travel along each of the possible east-west highway corridors. The changes in travel demand are determinants of economic impacts, and in turn, the economic impacts influenced travel demand. That is, if an east-west highway is built, changes in travel will occur which save time and distance. These changes will induce additional trips, to and through Maine, which will have economic effects as noted above. The economic changes, with their assorted indirect and induced effects on the economy (the "multiplier effect"), will in turn encourage additional trips on the highway.

This sequence of events requires a five-step economic and travel impact model process:

1. Prepare a baseline economic forecast for Maine and its regions to 2030. The 1998 annual long-term forecast for Maine and the nine regions prepared by USM was used for this purpose.

2. Use the statewide travel demand model to estimate the number of auto and truck trips in 2015 and 2030 under the base (no-build) case, and for each of the possible alternate routes.

3. Estimate the changes in tourist activity, transportation costs, and expenditures resulting from the changes in travel indicated by the travel demand model.

4. Input the changes into the REMI model and reforecast the economy to 2030

5. Input the economic changes from the reforecast of the economy to the *Statewide Model* to prepare final estimates of highway traffic.

The following section describes the procedures that were used to prepare the initial forecasts of traffic on an east-west highway and the inputs to the REMI model.

Traffic Forecasts

Forecasts of travel within the State were developed based on year 2015 and 2030 forecasts of population and employment for the nine Maine REMI regions. The forecasts were used to estimate the number of auto and truck trips originating within or destined for each

Maine community. For the year 2030, separate REMI forecasts were prepared for each potential east-west highway alternative, because it is assumed that a new highway will induce additional growth and potentially change the mix and geographic distribution of employment within corridor communities. These volumes are reported in Chapter III.

Between the years 1995 and 2015, it is forecast that total employment in the State of Maine will increase by approximately 107,000 jobs (or 15 percent) to a total of approximately 813,000. During the same time period, total population in the state is forecast to grow roughly 108,000 persons (or 9 percent) to reach a year 2015 population of 1.35 million persons. The year 2030 statewide forecast is for a population of 1.48 million and nearly 850,000 jobs.

Table 1.4
Year 2030 Forecast of
Travel Patterns Along Eastern Section of East-West Highway Corridor
Annual Average Daily Traffic (AADT)
(daily autos/ daily trucks)

	St. John & St. Stephen	Moncton, PEI & Nova Scotia	Fredericton	Washington County
Penobscot, Piscataquis & Somerset Counties	1150 / 110	160 / 20	100 / 30	2500 / 100
Oxford & Franklin Counties	50 / 20	10 / 0	20 /10	180 / 70
Southern Maine Coast	550 / 90	80 / 30	130 / 50	900 / 340
Quebec, Ontario, New Hampshire & Vermont	440 / 270	1700 / 1320	810 / 270	60 / 10
Southern N.E. & Remainder of U.S.	340 / 300	2060 / 1060	210 / 30	60 / 40

- ✓ ***By the year 2030, Maine's population is expected to grow to 1.48 million people - employment is expected to grow to 850,000 jobs***
- ✓ ***Significant traffic growth is forecast - Auto trips between Maine and the Maritimes will grow by nearly 40 percent - truck trips will grow at an even faster rate - 100 percent in some cases***
- ✓ ***Auto trips between Southern Maine Coast and Quebec are expected to grow by roughly 50 percent - truck trips are forecast to increase by 150 percent***

Traffic forecasts for trips entering or exiting Canada, or going through Maine, were developed with the aid of historical Maine/Canada border-crossing counts by vehicle classification, Canadian Gross Domestic Product (GDP) history and forecasts, the Canadian/U.S. currency exchange rate, historical traffic counts on the Trans-Canada Highway, and Canadian population and employment forecasts.

The results of the forecast indicate that between the years 1995 and 2015 overall statewide travel is expected to grow at a rate of 0.86% per year and, between the years 1995 and 2030 at a rate of 0.73% per year. As shown in Figure 1.6 the greatest growth in travel is associated with external truck trips (trucks traveling between Maine and the Canadian provinces). The next greatest rate of growth is associated with external auto trips (autos traveling between Maine and the Canadian provinces), followed by internal truck trips (trucks traveling within Maine) and internal auto trips (autos traveling within Maine). In developing the forecast, the 30-year average Canadian/U.S. currency exchange rate was assumed. The influence of this assumption is reflected in the fact that external auto trips will grow at a greater rate than internal auto travel.

Figure 1.6
Projected Growth In Travel
By Trip Type

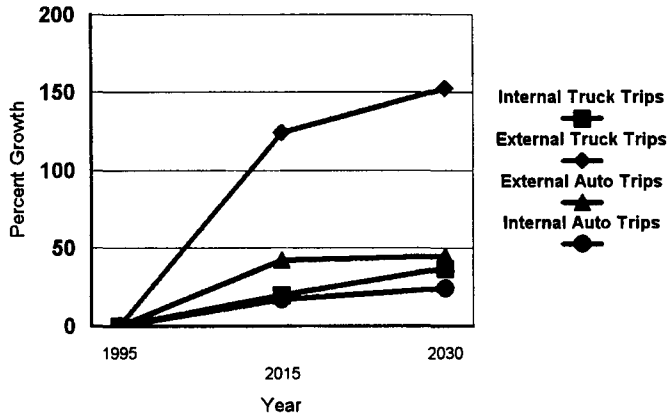


Table 1.4 presents the year 2030 forecast for travel patterns which are likely to be affected by east-west highway corridor improvements east of Bangor (western section forecasts are shown in Table 1.5). Comparison between these tables and comparable tables prepared for year 1995 travel patterns (Tables 1.2 and 1.3) demonstrates that significant traffic growth is forecast. Daily auto traffic between Maine and the Maritime Provinces is forecast to grow nearly 40 percent (for example, auto trips between Penobscot/Piscataquis and St. John/St. Stephen are forecast to grow from 830 daily to 1,150 daily). Truck trips are forecast to grow at an even faster rate, in some cases roughly 100 percent. For example, truck trips between Southern New England and St. John/St. Stephen are forecast to double from 120 in 1995 to 300 in 2015.

Travel patterns between Maine and Quebec are also forecast to grow significantly. Auto trips between Southern Maine Coast counties and the Province of Quebec, for example, are forecast to grow roughly 50 percent. Truck trips are forecast to increase by 170 percent.

Table 1.5
Year 2030 Forecast of
Travel Patterns Along Western Section of East-West
Highway Corridor
Annual Average Daily Traffic (AADT)
(daily autos/ daily trucks)

	Trips to/from Northern New Hampshire & Vermont	Trips to/from Quebec, Ontario, and Points Further West
Hancock County	490 / 120	220 / 110
Penobscot and Piscataquis Counties	720 / 140	330 / 70
Oxford and Franklin Counties	2630 / 550	110 / 20
Southern Coast	1020 / 250	2370 / 940

D. DIVERSION OF INTERPROVINCIAL TRAVEL

Although new or improved east-west highways in Maine will reduce the travel time and distance for many motorists and commercial vehicles traveling between the provinces of Atlantic Canada, Quebec, Ontario, and points west, the diversion of this travel to Maine's east-west highways will depend on a number of factors, all of which can be related to cost. These include the cost associated with delays at the border, the cost associated with transporting reduced loads on Maine's highways, and the cost of highway user tolls. The aggregate of these costs can easily offset the cost savings resulting from reduced travel time and distance. To maximize the diversion of Canadian travel to Maine's highways, these obstacles will need to be addressed.

Delay At The Borders

Commercial and manufacturing interests require consistency and reliability in transportation, a need that is inconsistent with unpredictable delays due to customs and immigration clearance. Although this is seen as an obstacle to efficient east-west travel, a study completed for the Eastern Border Transportation Coalition in 1997 found that while delays do occur, especially at peak travel hours, the frequency and severity of the problems is not as great as it once was. This is especially true for auto delays. It is expected that continued efforts to address identified deficiencies in infrastructure, and in institutional and operational procedures, will result in further efficiency in cross-border travel.

Truck Weights

Canadian trucks' choice of an east-west route of travel in Maine may be constrained by disparities between gross and axle weight limits allowed in Canada, versus those allowed on state and Interstate highways in Maine.

Gross vehicle weight limits and tolerances for the larger and heavier five- and six-axle trucks are significantly higher in the Atlantic Canadian provinces than those allowed on Maine's state and Interstate highways. Of the two provinces bordering Maine, Quebec's are from 36 to 53 percent higher than Maine's Interstate highway limit for these trucks, while New Brunswick's are approximately 36 percent higher (see Appendix). Limits and tolerances for axle groups and smaller trucks are varied. Some limits are higher in eastern Canada; others are higher in Maine. In general, the constraining factor for Canadian trucks traveling on Maine roads would be in the area of gross weight limits for heavy five- and six-axle trucks. This is particularly true for Quebec trucks carrying forest products, which have the highest allowable gross weights in eastern Canada.

Both gross and axle weight limits on the Maine Interstate Highway System are lower than Maine's General Law limits and therefore also much lower than many limits in eastern Canada. The disparity between U.S. Interstate and Canadian weight limits is examined in the draft Volume III of the Truck Size & Weight Study conducted by the Federal Highway Administration. This portion of the study analyzes the costs and benefits of various policy "scenarios" in truck size and weight, includes one scenario called "North American Trade". This scenario is designed to look at vehicle configurations that are closer to Canadian road limits than those currently allowed, including a six-axle vehicle at 97,000 pounds gross weight.

Based on data obtained for this study, it is estimated that roughly 25 percent of the long-distance trucks traveling on the Trans-Canada Highway at the New Brunswick/Quebec provincial border exceed current weight limits for trucks traveling on Maine Interstate highways.

Toll Rates

Chapter IV of this report examines various alternatives for financing improvements to Maine's east-west highways. One of those alternatives would be to collect tolls for financing new or improved infrastructure. Maine generally has not relied on tolls to support its major capital improvement projects and there will likely be some reluctance on the part of the highway user to use a toll facility if there is a viable toll-free alternative available. If toll financing is to be successful, it is critically important that toll rates be perceived as reasonable by the traveling public.

Perception of Shippers

The subject of commercial traffic diversion to a proposed east-west highway in Maine was addressed as part of a comprehensive survey of Maine and Canadian businesses thought to have the potential to benefit from reduced transportation costs as a result of a more direct connection through the state. Selected survey participants were considered likely to have customer or supplier relationships in Canada or the northeastern US, and were located in regions of the state that could be serviced by one or more of the conceptual east-west corridors.

Respondents were asked to rate the perceived importance of four specific issues that could possibly have an impact on the volume

of trade between the US and Canada - the cost of tolls, cost of fuel, border crossing congestion and differential US/Canadian truck weights. None of the four issues were found to be of significant importance in terms of being an impediment to commerce. Congestion and delay at the border generated the most concern from respondents followed by the cost of tolls, differential truck weights, and cost of fuel. Lower permitted truck weights on US Interstate highways compared to provincial highways, was more of a concern to Canadian firms than Maine businesses.

With respect to tolls, survey participants were asked how various hypothetical toll rates might impact their decision to use a tolled east-west highway. More than 50 percent of the respondents indicated that toll rates of less than 10 cents per mile would not influence their usage of the highway, compared to 22 percent who responded that they would be very likely to reduce their travel or not use a tolled highway. At an average rate of 16-20 cents per mile, nearly 64 percent of the respondents stated they would not likely use the highway, and at a rate of 20 cents per mile, the majority of respondents would definitely not use the highway.

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[1] Maine East-West Highway: Economic Impact Analysis, Phase II Technical Report, Survey Research and Commodity Forecasts, RKG Associates, July 1999

Chapter II - Improving Existing East-West Highways

A. OVERVIEW

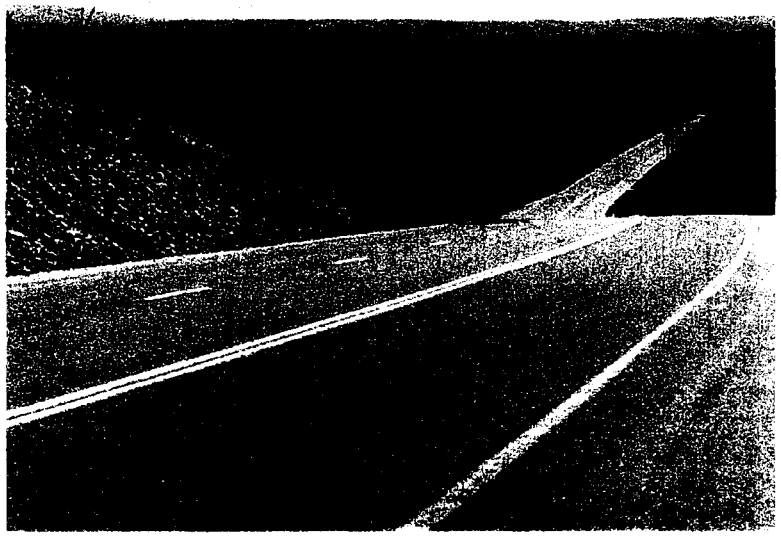
One of the requirements of the legislative directive regarding this study is that the Department develop ***"a comprehensive plan to reconstruct to current standards west-east highways and existing highways that provide direct access to Canada".*** This chapter presents the methodology used to guide the assessment and identification of highway improvement needs along these corridors. It then recommends a plan of systematic and cost-effective improvements intended to achieve the goal of a safe and efficient highway system that adequately serves existing, as well as projected, travel demand.

The highway corridor segments included in this plan are depicted in the adjoining map. The corridors covered are:

- ***Corridor "A" - The Alternate Trans-Maine Trail***
  Beginning at the Canadian border in Vanceboro, proceeding westerly via Route 6 through Lincoln, Milo, Dover-Foxcroft, and Guilford to Abbot, then westerly via Route 16 to Bingham. The trail then proceeds northerly along Route 201 to Jackman and Sandy Bay at the Canadian Border. (Includes Routes 6, 16 & 201).

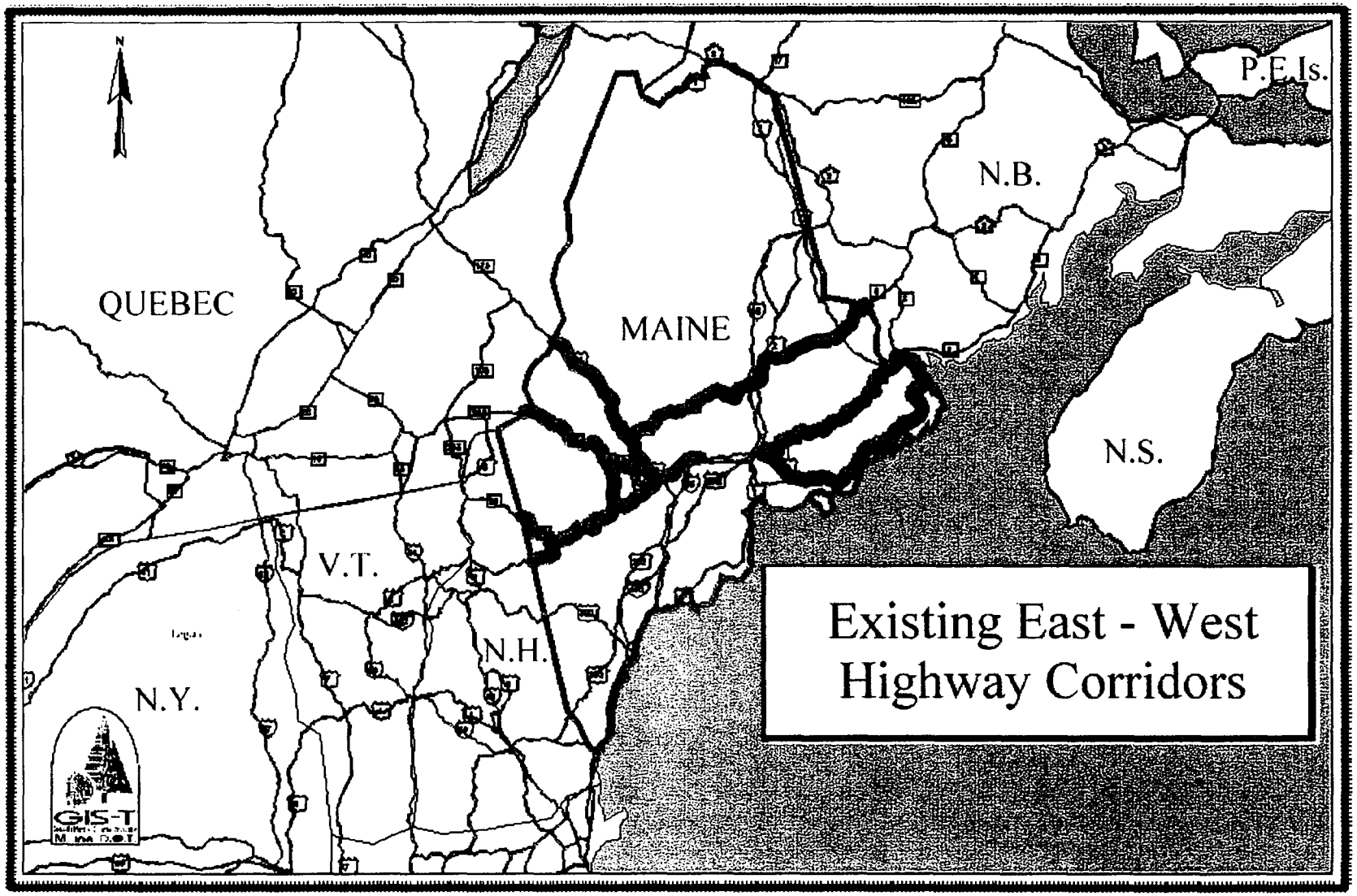
- ***Corridor "B" - The East-West Highway***
  Beginning at the Maine/New Brunswick border proceeding westward along Route 9 to 46 in East Eddington. The corridor continues southerly along Route 46 to Route 1A in East Holden, then westerly along Route 1A to I-395 in Brewer, connecting with I-95 at or near Bangor. It then continues southwesterly along existing I-95, leaving I-95 in Newport. From this point, it continues westerly along route 2 to the Maine/New Hampshire border at Gilead. (Includes Routes 9, 46, 1A, I-395, I-95 & 2)

- ***Corridor "C" - The East-West Highway (Alternate)***
  Beginning at the Maine/New Brunswick border proceeding westward along Route 9 to Route 46 in East Eddington. The corridor continues southerly along Route 46 to Route 1A in East Holden, then westerly along Route 1A to I-395 in Brewer, connecting with I-95 at or near Bangor. It then continues southwesterly along existing I-95, leaving I-95 in Newport. From this point, it continues westerly along Route 2 to Route 27 in Farmington. It then continues northwesterly along Route 27 to the Maine/Quebec border at Coburn Gore, linking Sherbrooke and Montreal via Quebec Route 10. (Includes Routes 9, 46, 1A, I-395, I-95, 2 and 27)



- ***Route 1/1A Alternative Eastern Segment for Corridors "B" and "C"***
  - Route 1 - Calais to Ellsworth
  - Route 1A - Ellsworth to Route 46

- ***Other Western Corridor Segments***
  - Connector Linking Corridor "A" - Route 201 at Bingham to Route 2 in Skowhegan (for connectivity to NH)
  - Northern "Branch" for Corridor "B" - Route 26 extending from Route 2 at Newry to the New Hampshire Border at Upton.
  - Alternative "shortcut" routing for Corridor "C" - Route 201A/16 linking Norridgewock to Kingfield.


N
QUEBEC
MAINE
N.B.
P.E.Is.
N.S.
V.T.
N.H.
N.Y.
GIS-T
Maine DOT
Existing East - West
Highway Corridors

B. STANDARDS

As previously stated, the fundamental objective in developing this analysis is to identify potential improvements to existing east-west highways which will result in a highway system that is both safe and efficient, and capable of serving the existing and projected traffic volume at an acceptable level of service. To achieve this objective, a set of highway performance standards, focused on geometric design (width of travel lanes, width of shoulders, vertical and horizontal alignment), safety, average travel speed, and highway capacity, was established. Existing roadway geometry and performance conditions along the selected east-west highway corridors were compared with the established standards to identify highway deficiencies and improvement needs.

C. CORRIDOR PLANS

For the purposes of this report, this plan is presented as a number of individual corridor plans. Corridors have been evaluated independently since each has unique characteristics, issues, and solutions. On the following pages each highway corridor is described along with a summary of the assessment of its existing conditions and level of performance. Most importantly, a summary of individual corridor improvements is provided. This summary identifies the scope of work and the costs of the improvements considered necessary to meet the physical and performance standards established for this study.

In developing this plan, four basic types of improvement were considered: roadway reconstruction, roadway widening, traffic operational enhancements, and construction of new highway infrastructure.

Reconstruction - Highway segments not meeting *East-West Highway Geometric Design Standards* (12' travel lanes and 8' paved shoulders) have been identified, and a cost to improve them to meet these standards estimated. This work, designed for a 20-year life, consists of new or reclaimed base, new full-depth pavement, replacement of drainage structures, rehabilitation or construction of roadway ditches, and modification or replacement of guardrail. This work may also involve minor vertical or horizontal changes in alignment.

PHYSICAL AND PERFORMANCE STANDARDS

Factor	Measure of Effectiveness	Standard
Design	National Highway System design standards	12' travel lanes 8' paved shoulders
Safety	Accident rate	Accident rate lower than statewide average
Speed	Average operating speed	Average rural speed 55 mph or greater
Capacity	Peak-hour volume/capacity ratio	Peak-hour volume/capacity ratio 0.40 or less

Widening - Minor widening of travel lanes and shoulders is recommended on those highway segments having appropriate horizontal and vertical alignment but not meeting the design standard (12' travel lanes and 8' shoulders).

Operational Enhancements - Most of the existing highways which form the basis of this plan provide for one lane of travel in each direction. Efficient mobility is the principal function of major two-lane highways, as they primarily serve long-distance travel and are often located in rural environments where there are few traffic control interruptions. Consistent high-speed operations and infrequent passing delays are desirable for these facilities. Although most of the

two-lane highways discussed in this plan carry light traffic and experience few operational problems, there are situations where operational and safety problems do exist, for a variety of reasons. In these cases, the frequent result is reduced level of service, increased vehicle platooning, increased delay, increased questionable passing maneuvers, and driver frustration. Nevertheless, these conditions do not necessarily justify the expense of reconstructing a two-lane highway to a multi-lane facility. A variety of design and operational solutions should be considered first. This plan focuses on three: truck climbing lanes, passing lanes, and intersection turning lanes.

Truck Climbing Lanes - Generally applied as a spot improvement, most often on the steep, sustained grades which cause heavy vehicles to travel at low speed and result in platoon formation and increased delay

Passing Lanes - A three-lane roadway design which assigns the third lane to one direction of travel for a short distance and then alternates the assignment of the passing lane to the other direction. In a rural setting, intermittently spaced passing lanes have been demonstrated to be successful in breaking up vehicle platoons and reducing delay. In this plan, passing lanes of approximately 1 mile in length with a spacing of 5 to 9 miles (depending on traffic volume) were assumed.

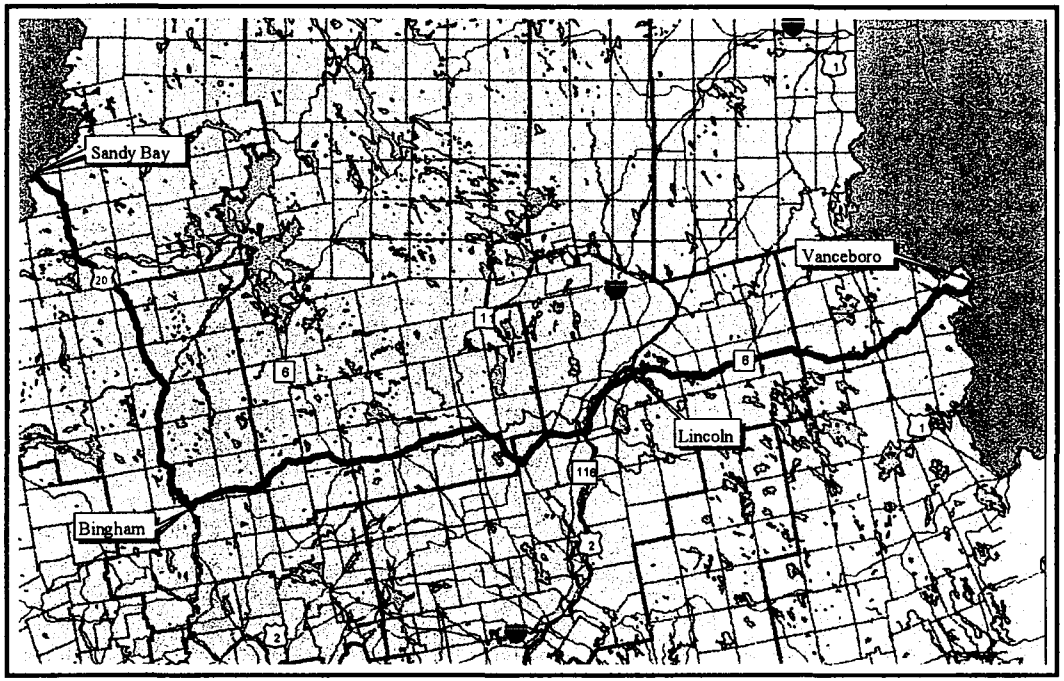
Intersection Turning Lanes - To minimize the disruption of turning traffic on through traffic flow, protected turning lanes for both left and right turns at major intersections along the highway corridors have been considered.

New Construction - In situations where the established travel speed performance standard is not met, such as through built-up areas, consideration is given to the construction of new controlled access highway corridors on new alignments. Such facilities will enable the continuous, uninterrupted, and unimpeded flow of regional traffic. Examples of new construction might include a village bypass, a new Interstate interchange, or a new river crossing.

Environmental Considerations - Each corridor plan identified only major environmental considerations or areas where construction impacts should be avoided. No detailed analysis, impact assessments, permitting or associated cost estimates have been performed.

Service Centers - Throughout the description of corridors in the following pages, we refer to functionally urban towns and cities under the classifications outlined in the Maine State Planning Office publication Reviving Service Centers - Volume 1, September 1998. These designations refer to municipalities which can be regarded as regional centers, though they vary in size and the amount of services they provide. There are 69 such regional *Service Centers* broadly organized into three categories, which are referred to as *Primary, Secondary,* and *Small Service Centers*. A fourth grouping of minor centers includes 26 *Specialized Centers*, which are characteristically urban in nature but do not meet the criteria to be classified as regional centers. These classifications were derived by analyzing the extent to which communities provide retail services, support more jobs than resident workers, contain federally assisted housing, and support a predominance of service sector jobs. The designations help characterize the economic importance of these centers in the various possible corridors.

The Land Use Regulation Commission. (LURC) - Several unorganized townships and plantations in the possible corridors and their various segments fall under the planning jurisdiction of Maine's Land Use Regulation Commission (LURC). While none of the LURC townships are identified as having special planning needs, all LURC lands are subject to LURC infrastructure goals and policies intended to protect the natural character of remote areas and channel growth to appropriate areas.



Corridor "A"

The "Alternate Trans-Maine Trail"
Routes 6, 16, 201

The "Alternate Trans-Maine Trail"

This possible corridor, substantially follows the "Alternate Trans-Maine Trail" as described in M.S.R.A. 23 § 1951 (1979 - see Appendix), and includes segments of three major state routes. From its easternmost point at Vanceboro, Route 6 connects with McAdam, Fredericton, and Moncton via New Brunswick Route 4. From Vanceboro, the corridor proceeds westerly via Route 6 through Lincoln, Milo, Dover-Foxcroft, and Guilford to Abbot, then westerly via Route 16 to Bingham. From Bingham it proceeds northerly on Route 201 to Jackman and then to Sandy Bay at the Canadian Border. From Sandy Bay, Route 201 connects to Quebec City via Quebec Routes 173 and 73 which run northwesterly. Corridor "A" is generally characterized by a number of small economic centers separated by significant stretches of rural highway. Several townships and plantations in this possible corridor fall under the jurisdiction of LURC. The "Alternate Trans-Maine Trail" is approximately 211 miles in total length with an average driving time of 4 hours and 55 minutes.

The Route 6 segment, from Vanceboro to Lincoln is a designated a *Major Collector*; and from Lincoln to Abbot it is classified a *Minor Arterial* highway. The total length of this segment is approximately 121 miles. Roughly 115 miles are below the established *East-West Highway Design Standard.* Roughly 7 miles in Washington County, and 6 miles in Piscataquis County are prioritized for improvement in MDOT's FY 2000-2005 Six-Year Plan. Traffic along the rural portions of the corridor range from a low of 400 vehicles per day to a high of 6,800, with truck traffic accounting for up to 21% of that total. Current capacity of the highway is approximately 20,000 vehicles per day. Average travel speeds along the route range from 40 to 50 mph except when passing through the downtowns of economic centers en route, resulting in an average travel time over the length of this segment of 2 hours and 40 minutes. Few access/mobility conflicts exist between Vanceboro and Abbot. There are several *High Accident Locations* documented along the corridor.

Route 6 is naturally constrained by rolling to moderate topography and the existence of wetlands and other surface water bodies along much of the route. Route 6 provides access to numerous Maine Public Lands properties utilized for recreational opportunities, historic resources identified in the National Register of

Historic Places, and potential archaeological sites. There is one known uncontrolled hazardous waste site, (as identified by the Maine Department of Environmental Protection - MDEP) within the Route 6 corridor. East Musquash Lake lies parallel to Route 6 in Topsfield. Mattanawcook Lake in Lincoln and other lakes and streams in close proximity are also accessible via Route 6. Between Lincoln and West Enfield, the highway runs parallel to the Penobscot River. In Milo, the Sebec River flows into the Piscataquis River, which runs generally parallel to Route 6 towards Abbott, northwest of Guilford. The Piscataquis River is an *Outstanding River Segment* from Howland to Blanchard Township, and then runs parallel to Route 6 from Dover-Foxcroft to Abbott Village. The river, in this vicinity and continuing to Kingsbury, is designated *Essential Fish Habitat* for Atlantic salmon.

Development patterns along Route 6 are dispersed and range from very low to medium density. Small, compact economic centers through which this segment passes include the *Primary Service Centers* of Lincoln and Dover-Foxcroft, and the *Small Service Centers* of Milo and Guilford. Economic activity served by the highway is primarily natural resource-based, supplemented by small retail and service businesses serving the industry and passersby. A

Key "Stats" - Corridor "A"

	Route 6	Route 16	Route 201
Existing Daily Traffic (year 1999)	Total Vehicles 400 - 13,800* Trucks 50 - 400*	Total Vehicles 400 - 1,700 Trucks 100 - 150	Total Vehicles 1,300 - 5,200 Trucks 250 - 500
Projected Daily Traffic (year 2030)	Total Vehicles 600 - 18,100 Trucks 200 - 850	Total Vehicles 400 - 1,800 Trucks 300 - 450	Total Vehicles 2,600 - 7,700 Trucks 800 - 1,600
Average Daily Capacity of Corridor (veh.)	20,000	16,000	24,000
% of Corridor not meeting Capacity Standard	3	0	0
% of Corridor not meeting NHS Standard	95	100	91
% of Corridor not meeting 55 mph Standard	72	100	33
% of Corridor not meeting Safety Standard	37	51	46
Overall Travel Time	2 hours 40 minutes	30 minutes	1 hour 45 minutes
Approximate Road Length	121 Miles	25 Miles	65 Miles

* Range includes urban traffic in Lincoln

paper mill exists in Lincoln, while a textile mill exists in Guilford. Small regional hospitals exist in both Dover-Foxcroft and Lincoln. The Route 6 segment also provides access to winter and summer camps for snowmobiling, fishing, camping, hiking, and other pastime activities.

The Eastern Maine Railroad crosses the Maine/New Brunswick border in Vanceboro and connects with the Guilford Rail System at Mattawamkeag, and then connects with the Bangor and Aroostook Railroad System at Brownville Junction. From Brownville Junction, the Bangor and Aroostook System provides service to Aroostook County, and then extends on to Quebec.

Route 16 segment, between Abbot and Bingham is classified as a *Major Collector*. The entire length of this approximately 25-mile segment would require improvement to meet the *East-West Highway Design Standard*. The condition of the road is variable and includes some portions recently resurfaced under routine maintenance schedules. No portion of this segment is currently prioritized for improvement in the FY 2000-2005 Six-Year Transportation Improvement Plan, and no *High Accident Locations* have been identified along this route in the last three years. Public concerns about safety on the Route 16 approach into Bingham from Abbot have resulted in discussions with MDOT about the extent and nature of the problem. Average travel speed along this portion of Route 16 is approximately 49 mph, and average travel time over the length of the route is approximately 30 minutes. Total vehicle traffic along the rural portion of Route 16 is approximately 400 vehicles per day. Truck traffic is approximately 25% of that total. Current capacity of the highway is approximately 16,000 vehicles per day.

The topography of this portion of Route 16 is rolling to moderate and includes a relatively minor coverage of wetlands. Midway through the segment, Kingsbury and Mayfield Ponds run close to the the highway on its southern side, where associated camp roads connect intermittently to the highway. The Bingham Public Water Reservoir is located in the vicinity of the intersection of Route 16 and Route 201.

Development density along this segment of Route 16 is very low. Residences are scattered along the route, concentrating at intersections, and development achieves significant density only at the route segment endpoints at Abbott Village to the east, and to the west at Bingham, a *Secondary Service Center*. Kingsbury Plantation, in Piscatiquis County and Mayfield Township in Somerset County both fall within the planning jurisdiction of LURC. No additional information was found at MDOT that would indicate special land use concerns for the municipalities on this part of Route 16. Economic activity on this portion of Route 16 is primarily forest products-related, and the route supports logging and forest products truck traffic. The number of service business along the route is very small. However, the route segment does provide access to winter and summer camps for snowmobiling, fishing, camping, hiking, and other recreational activities.

The Route 201 segment, running northerly from Bingham through Jackman and then to the Maine/Canada border at Sandy Bay is roughly 65 miles long. The route is a designated NHS *Principal Arterial* highway. While the entire segment presently meets the State Standard for geometric design, more than ninety percent of the route does not presently meet *East-West Highway Design Standard*. No portion of this segment of Route 201 is currently prioritized for improvement in the FY 2000-2005 Six-Year Transportation Improvement Plan.

Traffic counts range from a low of roughly 1,300 vehicles per day north of Bingham to a high of 5,200 per day in Jackman. Annual average daily truck traffic is as high as 31% of total traffic volume along the rural portions of this segment of Route 201. Current capacity of the highway is approximately 24,000 vehicles per day. Average travel speeds along the route range from 25 mph in the compact urban areas along the corridor to 55 mph on the rural portions of the route. Few access/mobility conflicts exist, and only one *High Accident Location* was documented for years 1995-1997, that being in Jackman.

This part of Route 201 is physically constrained by rolling to severe topography and the existence of wetlands and important surface water bodies along much of the route, most notably including

an extended stretch of the Kennebec River and Wyman Lake with spectacular water vistas. The Kennebec River is an *Outstanding River Segment* from its confluence with the Sandy River in Norridgewock to the town of Moscow at Wyman Dam. The *Outstanding River* designation continues from just north of Carney Brook north through Caratunk to the The Forks Plantation town line. Route 201 runs parallel to Parlin Pond in Parlin Pond Township, and close to Wood Pond in downtown Jackman. Route 201 is also designated as a *Scenic Byway* beginning at the northerly compact line of the Town of Bingham and running to the Kennebec River Bridge at the Forks/West Forks town line, a distance of 30.7 miles.

The State of Maine, through its Maine Public Lands Program, owns approximately 50 parcels within the Route 201 corridor from Skowhegan to Sandy Bay, and Public Reserve Lands abut the roadway on its northeastern side for approximately 4 miles in Sandy Bay Township on approach to the route's northern terminus. These lands are utilized for recreational purposes. Within the corridor there are also seven recreational sites that have been funded by Land and Water Conservation Funds (LAWCON), and the Appalachian Trail crosses the Kennebec River and Route 201 in the vicinity of the Pleasant Pond Road in Caratunk.

The Jackman Water Company recharge area runs parallel to Route 201 throughout most of Jackman, with a pumping station

Corridor "A" - Improvement Needs

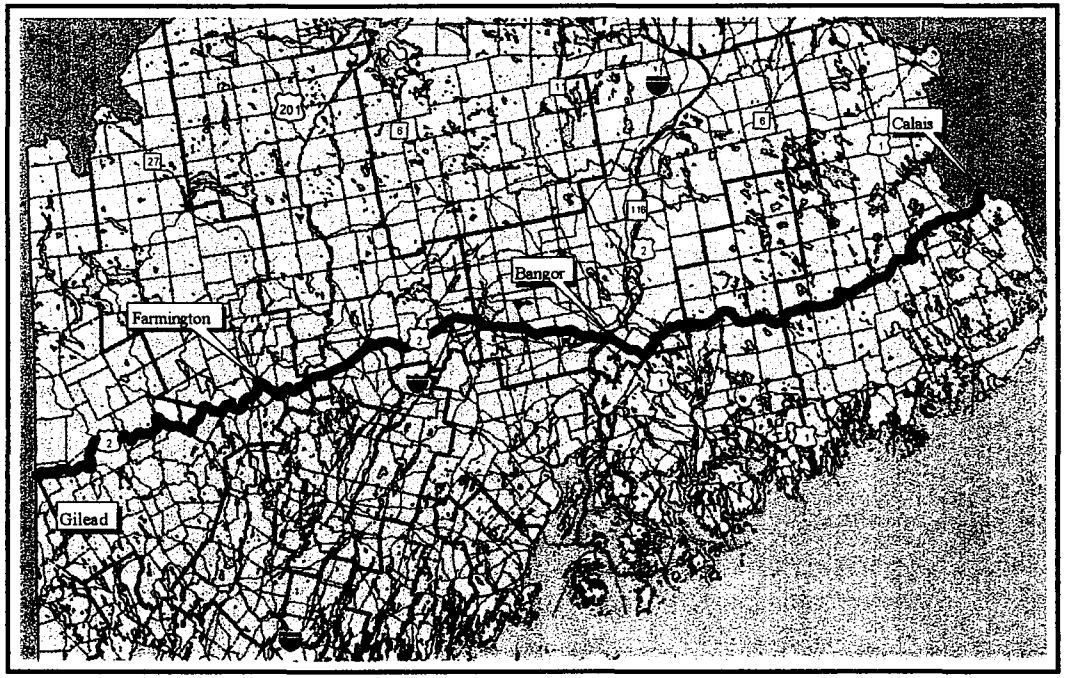
	Route Segments	Reconstruction miles / cost	Operational Enhancements	Lane/Shoulder Widening miles / cost	New Construction
Route 6	Vanceboro to Topsfield	24.59 miles / $20,651,000	Passing Lanes - $2,400,000	-	-
	Topsfield to Springfield	7.35 miles / $3,675,000	Intersections - $4,324,000	3.47 miles / $1,301,000	-
	Springfield to Lincoln	-		14.62 miles / $5,483,000	-
	Lincoln to Howland	-		22.31 miles / $8,366,000	-
	Howland to Abbott	23.80 miles / $43,847,000		19.58 miles / $7,343,000	-
Route 16	Abbott to Bingham	24.37 miles / $24,805,000	Passing Lanes - $2,400,000 Intersections - $395,000	-	-
Route 201	Bingham to Jackman	3.04 miles / $2,432,000	Passing Lanes - $1,800,000	42.57 miles / $15,442,000	-
	Jackman to Sandy Bay	4.05 miles / $2,025,000	Intersections - $282,000	12.18 miles / $4,568,000	-
	Subtotal	87.20 miles / $97,435,000	$11,602,000	114.73 miles / $ 42,503,000	-
	TOTAL CORRIDOR IMPROVEMENT COST - $151,540,000				

located at Wood Pond. The recharge area extends from Route 201 west to Beattie Township, north to the Canadian border, south to Skinner Township, and east to Upper Enchanted Township.

The Kennebec River Corridor is rich in history from the settlement of the State of Maine. There are a number of known historic and archeological resources within the 201 Corridor associated with Benedict Arnold's march to Quebec, with the movement of people and goods during the settlement of the Kennebec River Valley, and with historical travel to and from Canada. A historic and archeological survey would be required to assess the potential of additional resources in the area.

Development patterns along the route are scattered, and range from very low to moderately high density. MDOT is not aware of specific transportation concerns in the comprehensive plans of municipalities along this segment. Several townships and plantations along this segment of Route 201 fall under LURC jurisdiction. The Kennebec River is a LURC protected river segment from The Forks Plantation to Indian Pond, east of Route 201. The Dead River is also a LURC protected river segment from Route 201 west to Flagstaff Lake. The land ownership pattern of the corridor segment lends itself well to planned and managed access points along the route.

The *Secondary Service Centers* of Bingham and Jackman are the only *Service Centers* situated on this the route segment. Economic activity served by the highway is largely natural resource-based with small to medium-sized retail and service businesses serving the industry and passersby. Recreationists and leisure-time travelers also use the highway extensively en route to Quebec City, as Route 201 is the most direct route to Quebec City from Maine. In addition, this entire segment of Route 201 is part of Kennebec/Chaudiere International Corridor, a tourism development corridor designated jointly by the governments of Maine and the province of Quebec. Numerous cultural/historical, natural/scenic, and recreational sites are scattered along the Kennebec/Chaudiere Corridor, which served as the primary route for the historic immigration of French Canadians into Maine during the 19th and early 20th centuries. The route also provides access to both winter and summer camps throughout the region for snowmobiling, fishing, white-water rafting, camping, hiking, and other pastime activities. The border-crossing station at Sandy Bay is scheduled to be redeveloped and realigned by the General Services Administration within the next five years. This will improve the flow of passenger vehicles and trucks through this border crossing.



Corridor "B"

The "East-West Highway"
Routes 9, 46, 1A, I-395, I-95 & 2

westerly through metropolitan Bangor. From Bangor Corridor "B" utilizes I-95 running westerly to the Newport exit. The remainder of Corridor "B" follows Route 2 to Skowhegan, Norridgewock, Farmington, Mexico, Rumford, and Bethel, terminating at the New Hampshire border in Gilead for connectivity to Northern New England and other points west. Corridor "B" runs through many small economic centers. Several townships and plantations in this corridor fall in LURC jurisdiction. The "East-West Highway" is approximately 212 miles in total length, with an average driving time of 4 hours 20 minutes.

The "East West Highway"

This corridor alternative substantially corresponds to the "East-West Highway" as described by the first session of the 113th Maine Legislature in P. & S. L. 1987 c. 42. (see Appendix), and it includes segments of several major highways running east to west. Corridor "B" begins at the Canadian border at Calais. To the east of Calais Route 9 connects to St. John, Fredericton and Moncton via New Brunswick Routes 1 & 2. The Route 9 segment itself proceeds westerly from Calais to East Eddington (approximately 9 miles east of Bangor). At East Eddington the route picks up Route 46 and proceeds southwesterly approximately 5 miles to East Holden where it intersects with route 1A. The route then continues in a northwesterly direction for approximately 6 miles to Brewer, where it connects with Interstate-395, and then immediately with Interstate-95 proceeding

Route 9, between Calais at the Maine/New Brunswick border and Eddington at Route 46, is roughly 85 miles long. The route is a designated National Highway System (NHS) *Principal Arterial* highway. Upgrade of this corridor has been, and continues to be, a priority of MDOT. Much of Route 9 has already been improved to *NHS Standard* over the course of recent bienniums. Completion of those improvements is scheduled as a priority in the MDOT's FY 2000-2005 Six-Year Plan. By 2000, the great majority of Route 9 described above will have two 12' lanes with 8' paved shoulders. Exceptions will remain in areas where natural constraints, such as the Whalesback area in Aurora, prevent cost-effective, environmentally sound improvement. (The Whalesback is a 2-1/2 mile segment of Route 9 where the roadway runs along the ridge of a steep esker with scenic views of an expansive glacial plain).

Auxiliary truck climbing lanes have been built in Alexander, Crawford, Wesley, T31, Devereaux, Beddington, T28, Amherst, and

Clifton. Additional climbing lanes are programmed for areas in Devereaux, T24, T30, and Wesley.

Traffic counts range from a low of 2,100 vehicles per day in the Beddington area of the corridor to a high of 9,600 in the Calais urban area. Truck traffic accounts for up to 38% of the rural Route 9 traffic. Current capacity of the highway is approximately 24,000 vehicles per day. Average travel speed is on this segment is 52 miles per hour.

The number of *High Accident Locations* on this part of Route 9 is small, and few access/mobility conflicts exist between Baring Plantation and Eddington. The land ownership pattern lends itself well to planned and managed access points. The roadway is physically constrained with rolling to moderate topography and extensive wetlands along much of the route.

The Route 9 Corridor supports significant natural resources. These resources include the Moosehorn National Wildlife Refuge in Baring Plantation, and *Outstanding River Segments* on the St. Croix, River, Machias River, East Machias River, Narraguagus River, and the West Branch of the Union River. This area also supports waterways that provide *Atlantic Salmon Essential Habitat* at the Mopang Stream, Machias River, Narraguagus River, and Union River.

*Key "Stats" - Corridor "B"**

	Route 9	Route 46	Route 1A	Route 2
Existing Daily Traffic (year 1999)	Total Vehicles 2,100 - 9,600 ‡ Trucks 800 - 1,100 ‡	Total Vehicles 1,700 - 2,500 Trucks 500 - 550	Total Vehicles 11,300 - 17,100 Trucks 1,100 - 1,200	Total Vehicles 3,100 - 24,100 ‡ Trucks 400 - 1,550 ‡
Projected Daily Traffic (year 2030)	Total Vehicles 6,700 - 14,200 Trucks 1,400 - 1,700	Total Vehicles 6,900 - 7,700 Trucks 1,000 - 1,100	Total Vehicles 16,600 - 22,400 Trucks 1,800 - 1,900	Total Vehicles 4,900 - 27,900 Trucks 1,000 - 2,200
Average Daily Capacity of Corridor	24,000	16,000	24,000	25,000
% of Corridor not meeting Capacity Standard	2	0	97	12
% of Corridor not meeting NHS Standard	24	100	0	25
% of Corridor not meeting 55 mph Standard	34	100	100	67
% of Corridor not meeting Safety Standard	28	50	26	53
Overall Travel Time	1 hour 35 minutes	7 minutes	8 minutes	2 hours 30 minutes
Approximate Road Length	85 Miles	5 Miles	6 Miles	116 Miles

*Corridor "B" also includes sections of I-395 and I-95 between Brewer & Newport ‡Upper range includes urban traffic in Calais & Skowhegan

The Route 9 corridor is characterized by scattered low-density residential development between the several towns on the route. Water district properties, that support residential development, extend from Clifton, in the vicinity of Parks Pond, westerly to Eddington by Chemo Road. Economic activity along the route is primarily forest products-related, with a number of small retail businesses serving the forest products industry and through travelers. Route 9 is Maine's most direct and heavily traveled east-west connection for trucks and passenger vehicles from Bangor to St. Stephen, New Brunswick and ultimately to St. John and the Port of Halifax.

Calais, a *Primary Service Center*, is experiencing strained river-crossing capacity, and discussions between MDOT and local officials have been under way for several years to address this need. A preliminary engineering and environmental documentation project to address border-crossing improvements commenced in 1999. A recent review of 1994 land use and transportation concerns for communities along Route 9 reveals that the town of Aurora has had concerns regarding the blind hill near Mace's Store, and the sharp curve and narrowness of the highway near the junction of the Great Pond Road. Baileyville has designated Route 9 for "general purpose" land use activities. Aurora has designated both sides of Route 9 east of Route 179 as a "growth area". No additional documentation was found at MDOT to indicate community transportation and land use planning concerns for other communities along the route. LURC *Protected River Segments* are located at Old Stream in T31MD, the Machias River, Mopang Stream, and the Narraguagus River.

Route 46, from its junction of Route 9 in East Eddington, to its junction with Route 1A in East Holden, is roughly 5 miles long. Although this is the preferred existing connector route between Routes 9 and IA for truck traffic, Route 46, a *Minor Arterial*, is generally a two-lane, gravel-shoulder highway, which does not meet *East-West Highway Design Standard*. The Route 46 segment is accessible to metropolitan Bangor, and serves a rural residential pattern of development. This route also serves the Holbrook Community School, and provides access to Blackcap Mountain and Fitts Pond, in Clifton. Fitts Pond is the home of Camp Roosevelt, the Katadhin Council Boy Scout Reservation, one of two such visitor destinations in Maine. Route 46 also provides access to Holbrook Pond in Holden, and to Hatcase and Mountainy Ponds in Dedham. Route 46 is also located within the Orono-Veazie Water District recharge area.

Prior discussions with between MDOT and the towns of East Eddington and East Holden to designate the route as a truck route have failed to achieve consensus. The preference of local residents appears to be to maintain the use of the highway primarily for local traffic.

Travel speeds along the route average 45 mph. Traffic counts range from 1,700 at Route 9 to 2,500 at Route 1A. Truck traffic accounts for as much as 29% of this total. Average daily capacity of this highway segment is 16,000 vehicles per day. A feasibility study to explore a potential new alignment between Route 9 at Eddington, and I-395 and IA in Brewer is under way at MDOT. That study is in its very early stages and this report includes no assumptions about whether such a new alignment will be recommended in the future.

Route 2, between Newport near the junction of I-95 and Gilead at the New Hampshire border, is roughly 115 miles long. The route is designated as an *NHS Principal Arterial* highway. 85 miles of the route meet the *East-West Highway Design Standard*, with the remaining 30 miles requiring improvement to reach that standard. Roughly half of the mileage needing improvement is prioritized for completion in MDOT's current Six-Year Plan. By 2006, an additional 16 miles of Route 2 described above will have two 12' wide lanes with paved shoulders 8' wide.

Route 2 is the main travel route from Maine to Burlington, Vermont and other points to the west. Route 2 is naturally constrained by rolling topography and the existence of extensive wetlands and other bodies of water along the route. The Route 2 Corridor is rich in both natural and man-made resources, including numerous known public water supplies. Archeological sites, historic sites and historic districts, exist in Skowhegan, New Sharon, and West Bethel. The Sandy River, from Farmington to its confluence with the Kennebec River, is classified as an *Outstanding River.* LAWCON sites, and

extensive holdings of Maine Public Lands also exist within this corridor segment. Route 2 also follows Maine's northern boundary of the White Mountain National Forest in the town of Gilead. Traffic counts range from a high of roughly 24,000 per day in Skowhegan's urban area to 3,100 per day in the Rumford/Bethel area. Truck traffic accounts for as much as 33% of the rural Route 2 traffic. Current

Corridor "B" - Improvement Needs

	Route Segments	Reconstruction miles / cost	Operational Enhancements	Lane/Shoulder Widening miles / cost	New Construction
Route 9	Calais to Wesley	-	Intersections - $1,469,000	2.69 miles / $1,009,000	New Border Crossing $5,900,000
	Wesley to Beddington	-		1.95 miles / $731,000	-
	Beddington to Aurora/Amherst	-		2.42 miles / $908,000	-
	Aurora/Amherst to East Eddington	5.28 miles / $7,920,000		6.67 miles / $2,543,000	Route 9 / I-395 Connector $17,550,000
Route 46	East Eddington to East Holden	4.92 miles / $7,380,000	Intersections - $504,000	-	-
Route 1A	East Holden to I-395 to I-95	-	Passing Lanes - $960,000	-	-
Route 2	Newport @I-95 to Skowhegan	3.96 miles / $5,629,000	Passing Lanes - $15,840,000	0.49 miles / $184,000	-
	Skowhegan to Norridgewock	5.00 miles / $7,500,000	Intersections - $7,414,000	-	Skowhegan Area Relief Rte. $53,730,000
	Norridgewock to Farmington	-		-	-
	Farmington to Mexico	4.98 miles / $7,470,000		-	-
	Mexico to Rumford	1.06 miles / $530,000		0.36 miles / $135,000	-
	Rumford to Bethel	-		-	
	Bethel to Gilead	11.52 miles / $19,574,000		-	-
	Subtotal	36.72 miles / $56,003,000	$26,187,000	14.58 miles / $5,510,000	$77,180,000
	TOTAL CORRIDOR IMPROVEMENT COST - $164,880,000				

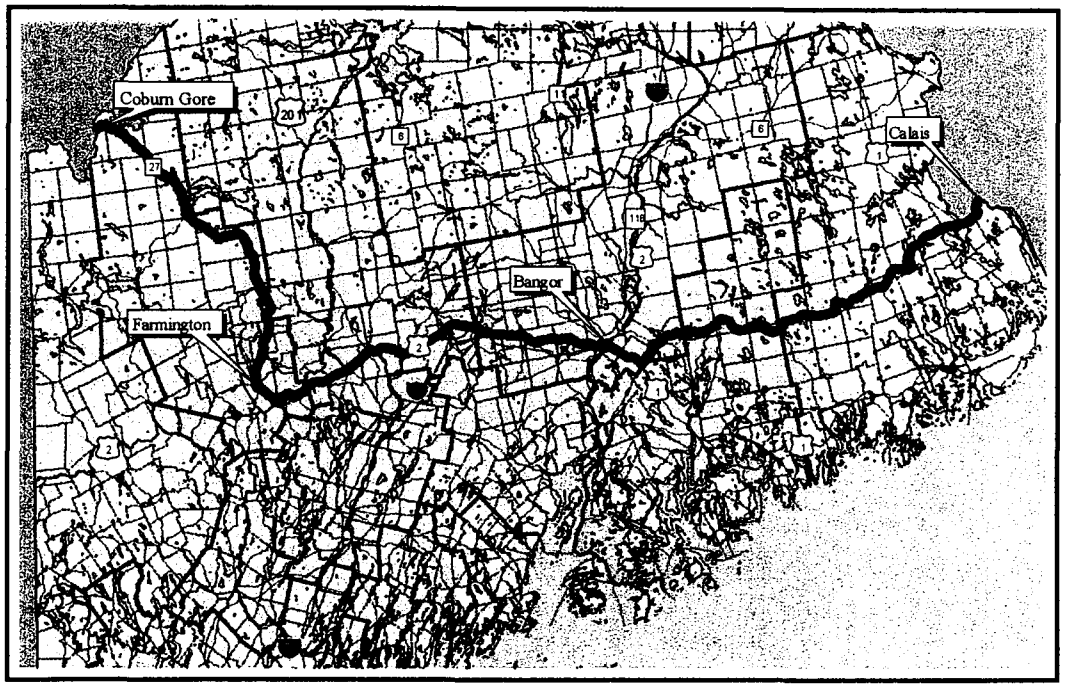
capacity of the highway is approximately 25,000 vehicles per day. Average travel speeds along the route range from 35 to 55 mph. A small number of *High Accident Locations* are distributed along the length of the Route 2 segment.

Except within the *Service Centers* described below, development patterns along the route are scattered and generally of low density. Farmington and Skowhegan are considered *Primary Service Centers*, Pittsfield and Newport are classified as *Secondary Service Centers*, Bethel and Rumford are considered *Small Centers*, and Dixfield and Wilton are viewed as *Specialized Centers*.

The University of Maine at Farmington, the International Paper Mill in Jay, the Mead Paper Mill in Rumford, and the Sappi's Somerset Mill in Skowhegan are among the major traffic generators. Additional year-round traffic generators include a portion of the White Mountain National Forest near Gilead, and the Sunday River Ski Resort located just off Route 2 in Newry. Other seasonal traffic generators include Titcomb Mountain in Farmington, Mt. Abram in Locke Mills, the Bethel Inn Touring Center, and other similar activity centers. The St. Lawrence & Atlantic Railroad parallels Route 2 from the New Hampshire border to Bethel, where it diverges from Route 2 and then runs essentially parallel to Route 26 in a southeasterly direction to Lewiston/Auburn.

A review of adopted municipal comprehensive plans showed that Canaan has indicated a goal of concentrating its growth in its "village area". Newport discussed interest in amending land use regulations to include access management provisions. Farmington wishes to assure unimpeded traffic flow by maintaining higher travel speeds, by limiting the extent of commercial development, and by managing access. New Sharon has expressed a desire to improve the intersections at Route 2 and 27, and at Route 2 and the Starks Road. All of Route 2 through New Sharon has been designated as a "growth area". A redesignation of Route 2 across the Ridlonville Bridge, running westerly on Route 108 to the intersection of Route 2 has been explored, but is not currently supported by the town of Mexico. Newry and Gilead have expressed a desire to manage strip development. Additional river-crossing capacity and/or other types of traffic management are needed in Skowhegan.

As previously noted, a need for access management has been expressed in a number of communities through which the route travels. Retrofitting, where feasible along the route where reconstruction is planned, and management of proposed new access points, are crucial for maintaining the mobility needs of this corridor.



Corridor "C"

The Alternate "East-West Highway"
Routes 9, 46, 1A, I-395, I-95, 2, & 27

The Alternate "East West Highway"

This corridor alternative is identical to Corridor "B", as described previously, *except* that from Farmington, Corridor "C" does *not* continue in a westerly direction on Route 2. Rather, Corridor "C" turns decisively in a northerly, and then a northwesterly direction, following Route 27 through Kingfield and Stratton, to Coburn Gore and the Canadian border. The Route 27 terminus at Coburn Gore provides Maine's most direct connectivity of any east-west highway upgrade alternative to Montreal and other points west via Quebec Route 10. (Please refer to the description of Corridor "B" above for an account of the route segments from Calais to Farmington.) Only the Route 27 segment of Corridor "B", from Farmington to Coburn Gore, is described below. Corridor "B", an alternate "East-West Highway" upgrade scenario, is approximately 221 miles in total length, and has an average driving time of approximately 4 hours and 25 minutes.

Route 27, between Farmington and Coburn Gore at the Maine/Canada border is roughly 74 miles long. The route, a *Minor Arterial*, is not presently designated as an NHS highway. Roughly 4 miles have been improved to *East-West Highway Design Standard*. The remainder of the route, some 70 miles, would require some level of reconstruction to meet *East-West Highway Design Standard*, although some 63 of those miles do presently meet *State* standard. Based on regional priority and cost effectiveness, approximately 4.5 miles of Route 27 in Farmington, Kingfield, and Eustis is prioritized for improvement in the MDOT's current Six-Year Plan. The improvements will result in a roadway with two 12'-wide lanes with paved shoulders 8' wide.

Route 27 is naturally constrained with rolling to severe topography (the most severe of which is in the Chain of Ponds area), and the existence of extensive wetland systems and other significant surface water bodies along much of the route. The Carrabassett River is an *Outstanding River Segment* and a LURC *Protected River Segment*. Maine Public Lands has large holdings in the vicinity of the Bigelow Range and other areas in the Route 27 corridor. The Appalachian Trail crosses Route 27 at Carrabassett Valley and continues east through T4R3.

Non-urban traffic counts range from a high of roughly 6,900 per day in Kingfield to 700 per day in the Coburn Gore area. In some areas of the corridor, truck traffic accounts for nearly 21% of the Route 27 traffic. Current capacity of the highway is 20,000 vehicles per day. Average travel speeds along the route range from 29 mph in the Farmington urban area to 52 mph in the rural portions. Posted speeds range from 35 to 55 mph.

Development patterns along the rural route are scattered and very low density. Economic activity served by the highway is primarily forest products-related with a number of small retail and service businesses serving the industry and passersby. Recreationists use the highway en route to Sugarloaf USA, an all-season resort. Route 27 also provides access to winter and summer camps for snowmobiling, fishing, camping, hiking and other pastime activities. The Route 27 entry into Canada is Maine's most direct connection for visitor and business traffic to and from Montreal.

Few access/mobility conflicts exist between the outskirts of Farmington, a *Primary Service Center*, and Coburn Gore, except on occasion during the winter months when the ski season is peaking.

*Key "Stats" - Corridor "C"**

	Route 9	Route 46	Route 1A	Route 2	Route 27
Existing Daily Traffic (year 1999)	Vehicles 2,100 - 9,600 Trucks 800 - 1,100 ‡	Vehicles 1,700 - 2,500 Trucks 500 - 550	Vehicles 11,300 - 17,100 Trucks 1,100 - 1,200	Vehicles 3,200 - 24,100 Trucks 450 - 1,550 ‡	Vehicles 700 - 13,000 ‡ Trucks 150 - 600 ‡
Projected Daily Traffic (year 2030)	Vehicles 7,200 - 14,700 Trucks 1,400 - 1,700	Vehicles 7,500 - 8,300 Trucks 1,000 - 1,050	Vehicles 17,500 - 23,300 Trucks 1,800 - 1,900	Vehicles 4,900 - 28,600 Trucks 1,000 - 2,300	Vehicles 4,100 - 17,200 Trucks 650 - 1,100
Average Daily Capacity of Corridor	24,000	16,000	24,000	24,000	20,000
% of Corridor not meeting Capacity Standard	2	0	97	3	3
% of Corridor not meeting NHS Standard	42	100	0	26	94
% of Corridor not meeting 55 mph Standard	46	100	100	63	56
% of Corridor not meeting Safety Standard	28	50	26	49	73
Overall Travel Time	1 hour 35 minutes	7 minutes	8 minutes	1 hours 5 minutes	1 hour 30 minutes
Approximate Road Length	85 Miles	5 Miles	6 Miles	51 Miles	74 Miles

*Corridor "B" also includes sections of I-395 and I-95 between Brewer & Newport ‡Upper range includes urban traffic in Calais, Skowhegan, and Farmington

Land uses along the route are primarily residential, generating few mobility disruptions due to turning movements. It is desirable at this stage of the route's evolution that access points for new development, or for conversions from residential to commercial development, be planned and managed. The land ownership patterns generally lend themselves well to planned and managed access points. The junction of Route 16 and Route 27 in Kingfield, a *Small Service Center*, is constrained by traditional downtown development patterns and the Carrabassett River. At the present time, no major border-crossing improvements are planned for the station at Coburn Gore.

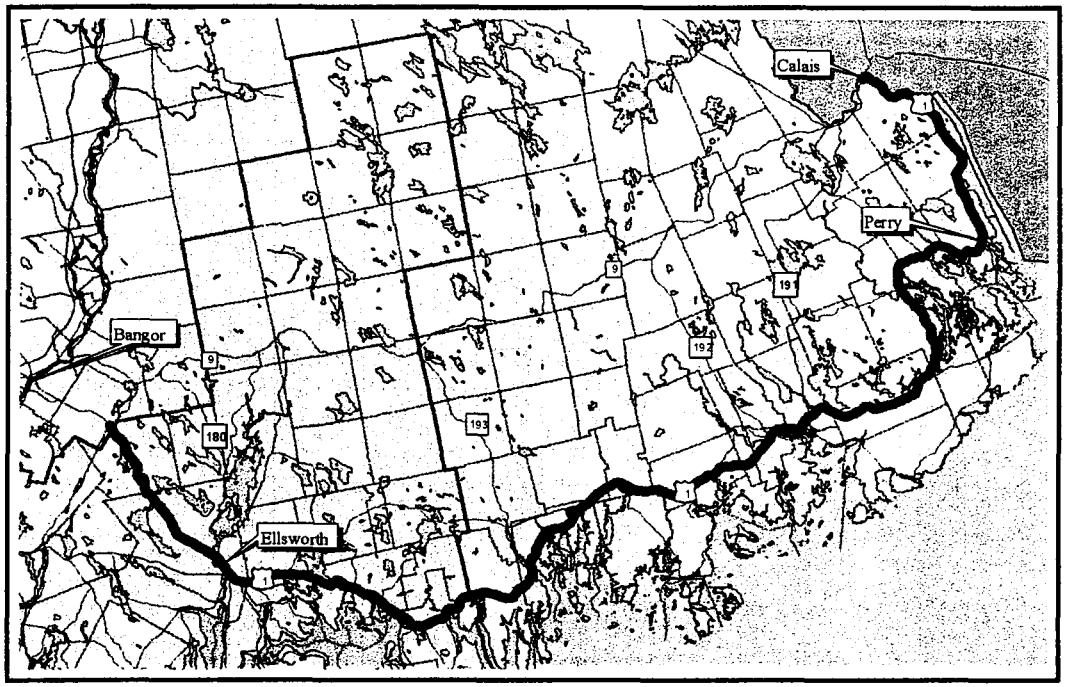
Areas along the route that will require special consideration include several cemeteries, the Bigelow Preserve in Wyman, and a historic site in Eustis involving the Cathedral Pines. Severe S-turns in the Chain of Ponds area present considerable environmental constraint. Alignment issues exist in Carrabassett Valley between the village area and the entrance to Sugarloaf Mountain. As with most any river closely paralleling a roadway, such as those that exist on many portions of the Carrabassett from Kingfield to Carrabassett Valley, flood management measures must be considered.

From its junction with Route 2 in Farmington, Route 27 travels through downtown Farmington, where on-street parking, medium to high-density development (including retail and service businesses as well as the University of Maine at Farmington campus), and traffic signals hamper mobility preferences. A bypass of Farmington could possibly be considered to address these problems.

Route 27 enjoys a *Scenic Byway Designation* running for approximately 46 miles, described as beginning .8 miles northerly of the junction of Routes 16 and 27 in Kingfield and extending northerly through the Towns and/or Townships of Kingfield, Carrabassett Valley, Wyman, Coplin Plantation, Eustis, Jim Pond, Alder Stream, Chain of Ponds, and Coburn Gore (excluding the built up areas in the Stratton and Eustis Village *Compact Urban Zones*), to a point in Coburn Gore Township, about .75 miles south of the Canadian border.

Corridor "C" - Improvement Needs

	Route Segments	Reconstruction miles / cost	Operational Enhancements	Lane/Shoulder Widening miles / cost	New Construction
Route 9	Calais to Wesley	-	Intersections - $1,469,000	2.69 miles / $1,009,000	New Border Crossing - $5,900,000
	Wesley to Beddington	-	-	1.95 miles / $731,000	-
	Beddington to Aurora/Amherst	-	-	2.42 miles / $908,000	-
	Aurora/Amherst to East Eddington	5.28 miles / $7,920,000	-	6.67 miles / $2,543,000	Route 9 / I-395 Connector $17,550,000
Route 46	East Eddington to East Holden	4.92 miles / $7,380,000	Intersections - $504,000	-	-
Route 1A	East Holden to I-395 to I-95	-	Passing Lanes - $960,000	-	-
Route 2	Newport @I-95 to Skowhegan	3.96 miles / $5,629,000	Passing Lanes - $5,280,000	0.49 miles / $184,000	-
	Skowhegan to Norridgewock	5.00 miles / $7,500,000	Intersections - $3,658,000	-	
	Norridgewock to Farmington	-	-	-	-
Route 27	Farmington to Kingfield	18.73 miles / $13,699,000	Passing Lanes - $5,280,000	-	-
	Kingfield to Stratton	17.92 miles / $15,291,000	Intersections - $1,691,000	2.75 miles / $1,031,000	-
	Stratton to Coburn Gore	26.93 miles / $51,502,000	-	-	-
	Subtotal	82.74 miles / $108,921,000	$15,482,000	16.97 miles / $6,406,000	$77,180,000
	TOTAL CORRIDOR IMPROVEMENT COST - $207,989,000				



Alternative Eastern Segment for Corridors "B" and "C"

"1/1A" Segment

This alternative eastern corridor segment connects to either Corridor "B" or to Corridor "C", (as described previously), at East Eddington, just east of Bangor. Either corridor could include Segment "1/1A" (as an alternative to, or in addition to, the combination of Routes 9 and 46 from Calais to East Eddington). This possible corridor segment proceeds in a generally southerly, and then a generally westerly direction from Calais to East Eddington following a combination of Routes 1 and 1A . This description will not repeat the Corridor "B" and Corridor "C" accounts of those route segments running from East Eddington to Gilead or Coburn Gore (presented earlier in this document), but rather refers only to the segments of Route 1 from Calais to Ellsworth, and then from Ellsworth to East Eddington on Route 1A. The total length of this segment is 145 miles and the average driving time on this segment is approximately 3 hours. (In Harrington, the preferred and shorter route is 1A to Milbridge, a routing which would slightly reduce the length of this corridor.)

Route 1, between Calais and Ellsworth is roughly 122 miles long. The route is a designated *Principal Arterial* from Calais to Perry, and *a Minor Arterial* from Perry to Ellsworth. Roughly 55 miles of the 122 meet the *East-West Design Highway Standard* while 67 miles are considered below that standard, of which 14 miles are also below *State* standard for lane and shoulder width. Based on regional priority and cost effectiveness, roughly 9.5 miles are prioritized for reconstruction in MDOT's Six-Year Plan. Improvements will result in a roadway with two 12'-wide lanes with paved shoulders 8' wide.

The route is naturally constrained by rolling to moderate topography and the existence of wetlands and other surface water bodies along much of the route. There are three water companies with recharge areas or wells in this Route 1 corridor segment, located in Perry, Machias and Harrington. The Route 1 corridor supports a number of *Atlantic Salmon Essential Habitat* waters. These waters include the St. Croix River, Little River, Crane Mill Brook, East Machias River, Pleasant River, Union River and Narraguagas River. The Pleasant River is also a LURC *Protected River Segment*. A U.S. Fish and Wildlife Service *Wildlife Refuge Area* exists in Edmunds Township. Man-made resources along the corridor include archeological sites, properties within historic districts, and historic

sites, both known and unknown. Historic areas in communities such as East Machias and Milbridge, for example, will be taken into consideration when planning for improvements.

Traffic counts range from a high of 31,000 per day in Ellsworth to a low of 1,400 per day in Dennysville. At some locations along the corridor truck traffic accounts for nearly 14% of Route 1 traffic. Current capacity of the highway is approximately 23,000 vehicles per day. Average travel speeds along the route range from 40 to 55 mph.

Route 1 is considered the route to "Downeast" Maine. Calais, Ellsworth, Milbridge, and Machias are considered *Primary Service Centers*, while Eastport (Route 190) and Cherryfield are considered *Small* and *Specialized Service Centers* respectively. Route 1 is the primary commerce route for Hancock and Washington Counties, serving inland, coastal, and peninsular communities. It is also the main route for visitor travel to Bar Harbor, Acadia National Park, and a variety of other unique and natural areas. Natural resource-based industries include agriculture and fishing.

The Calais Branch Rail line parallels portions of the route passing through Ellsworth, Cherryfield, Columbia Falls, Machias, and

Key "Stats" - Route 1/Route 1A Alternative Eastern Segment for Corridors "B" and "C"

	Route 1	Route 1A
Existing Daily Traffic (year 1999)	Total Vehicles 1400 - 31,100 Trucks 150 - 1,000	Total Vehicles 8,800 - 18,700 Trucks 800 - 1,200
Projected Daily Traffic (year 2030)	Total Vehicles 3,800 - 34,200 Trucks 200 - 1,200	Total Vehicles 14,800 - 24,600 Trucks 1,600 - 1,900
Average Daily Capacity of Corridor	23,000	24,000
% of Corridor not meeting Capacity Standard	6	47
% of Corridor not meeting NHS Standard	55	50
% of Corridor not meeting 55 mph Standard	46	100
% of Corridor not meeting Safety Standard	28	29
Overall Travel Time	2 hours 30 minutes	30 minutes
Approximate Road Length	122 Miles	23 Miles

Dennysville before culminating in Calais. Ayers Junction, just north of Pembroke on Route 214 has been identified as an important location in considering rail service for the Port of Eastport.

Applications seeking Scenic Byway designation have been submitted for Routes 186, 187 and Route 3 (Trenton to Bar Harbor), all highways connecting to Route 1. These applications are in various stages of the review process.

Route 1A, between Ellsworth and Brewer, is roughly 23 miles long. The route is a designated *Principal Arterial* highway. Roughly 11 miles are as considered "backlog". Based on regional priority and cost effectiveness, about 3.5 miles of Route 1A are prioritized for improvement in MDOT's current Six-Year Plan. This will leave roughly 7.5 miles to upgrade to *East-West Highway Design Standard.* Improvements will result in a roadway with two 12'-wide lanes with paved shoulders 8' wide.

Route 1A is a gateway route between Bangor and Ellsworth for access to Bar Harbor on Route 3. The route is naturally constrained by rolling to moderate topography and the existence of wetlands and other surface water bodies along much of the route. Within this corridor the Pleasant River is designated an *Atlantic Salmon Essential Habitat* Waters. There are within three water district holdings along the corridor located in Ellsworth, Dedham, and East Holden.

Traffic counts range from 8,600 per day in Holden to 18,700 per day in Ellsworth. Truck traffic accounts for as much as 14% of Route 1A traffic. Current capacity of the highway is approximately 24,000 vehicles per day. Average travel speeds along the route range from 40 to 45.

Brewer, considered a *Small Center*, and Ellsworth, a *Primary Center* are the regional centers which anchor this route. Development patterns along the route are scattered, and range from low to moderately high density. Recreationists and leisure-time travelers also use the highway en route to Bar Harbor and Acadia National Park, as well as to public access points on Phillips Lake, Green Lake, Branch Lake, and Graham Lake. The route also provides access to winter and summer camps for snowmobiling, fishing, camping, hiking and other pastime activities. Portions of the corridor present access/mobility conflicts that affect safety and travel speeds. Holden's development regulations prohibit more than one driveway entrance permit per lot of record. Similar mobility and safety management techniques would prove beneficial along other portions of the corridor.

Route 1/Route 1A Alternative Eastern Segment for Corridors "B" and "C" - Improvement Needs

	Route Segments	Reconstruction Miles / cost	Operational Enhancements	Lane/Shoulder Widening miles / cost	New Construction
Route 1	Calais to Perry	2.27 miles / $2,554,000	Passing Lanes - $12,960,000	-	-
	Perry to Dennysville	4.05 miles / $3,240,000	Intersections - $ 3,979,000	3.56 miles / $1,335,000	-
	Dennysville to East Machias	14.36 miles / $5,218,000		-	-
	East Machias to Harrington	5.68 miles / $4,653,000		16.34 miles / $6,128,000	-
	Harrington to Milbridge (Rte 1A)	3.64 miles / $3,148,000		1.02 miles / $383,000	-
	Milbridge to Gouldsboro	-		-	-
	Gouldsboro to Sullivan	-		-	-
	Sullivan to Ellsworth	4.48 miles / $3,584,000		8.03 miles / $3,011,000	-
Route 1A	Ellsworth to East Holden	11.34 miles / $7,724,000	Passing Lanes - $2,880,000 Intersections - $ 509,000	-	-
	Subtotal	45.82 miles / $30,121,000	$20,328,000	28.95 miles / $10,857,000	-
	TOTAL CORRIDOR IMPROVEMENT COST - $ 61,306,000				

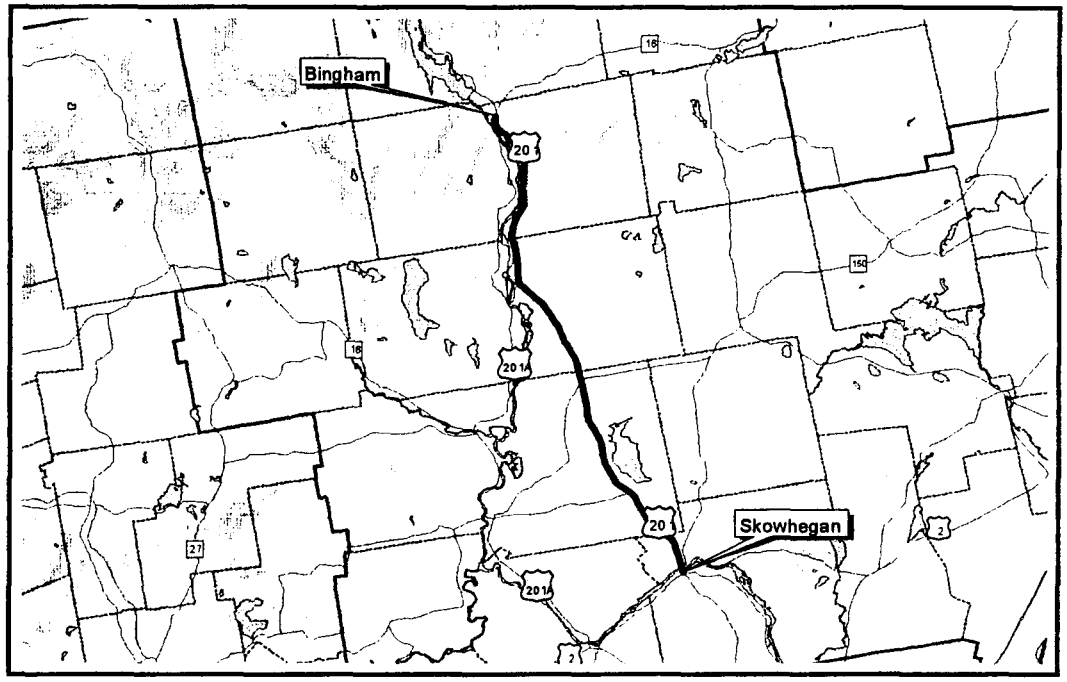
Other Western Maine Corridor Segments

Route 201

Segment from Skowhegan to Bingham

Route 201, between Skowhegan and Bingham is roughly 23 miles long. The route is a designated NHS *Principal Arterial* highway. Fifty-eight percent of the route has been improved to *East-West Highway Standard,* leaving roughly 9 miles below NHS standard. Based on regional priority and cost effectiveness, about 2 miles of Route 201 "backlog" in Madison and Solon are slated for improvement in the Six-Year Plan. Improvements will result in a roadway with 12'-wide lanes with paved shoulders 8' wide.

Route 201 is the most direct route to Quebec City from Maine. The route is physically constrained by rolling to severe topography and the existence of wetlands and other surface water bodies along much of the route. The Kennebec River from Bingham south is designated an *Outstanding River Segment* and a LURC *Protected River Segment.* The Skowhegan Water Company has holdings in the south end of the Route 201 corridor.



Traffic counts range from a high of roughly 16,000 per day in urban Skowhegan to 3,500 per day in Bingham. Truck traffic accounts for up to 31% of the Route 201 traffic. Current capacity of the highway is approximately 24,000 vehicles per day. Average travel speeds along the route range from 25 mph in the Skowhegan urban area to 50 mph in the rural portions of the route.

Development patterns along the route are scattered and range from very low to moderately high density. Economic activity served by the highway is primarily natural resource-based with small-

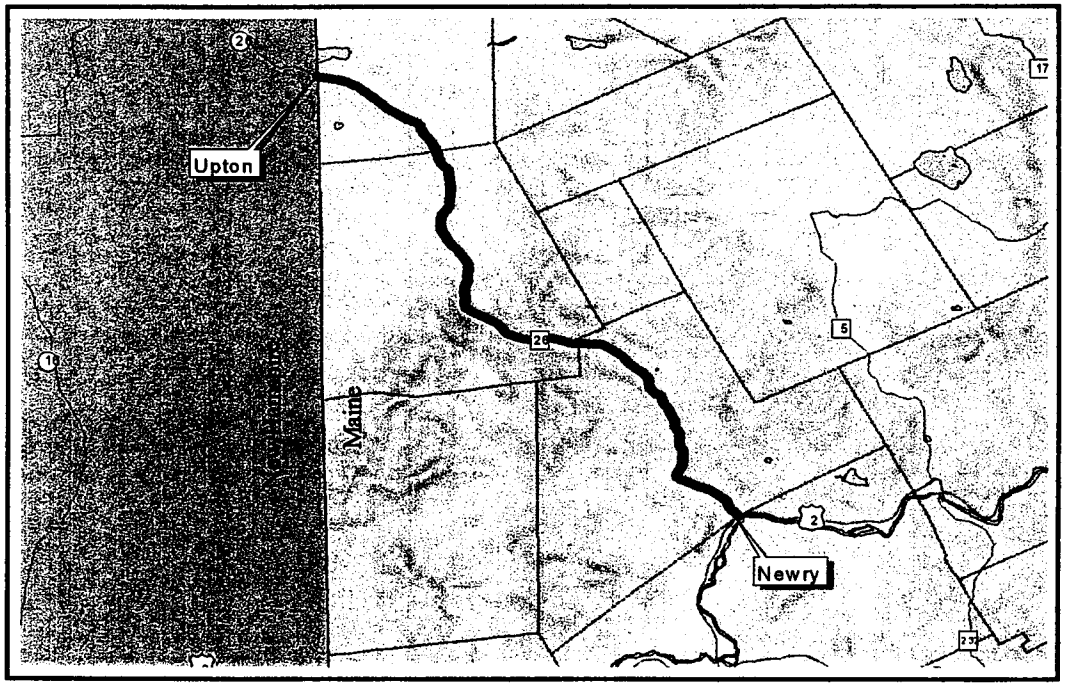
to medium-sized retail and service centers serving the industry and passersby.

In terms of the State Planning Office Service Center report, Skowhegan is considered to be a *Primary Service Center*, while Bingham is considered to be *Secondary Service Center, and* Madison is classified as an *Other Urban Place*.

Recreationists and leisure-time travelers use the highway en route to Quebec City. The route also provides access to winter and summer camps for snowmobiling, fishing, whitewater rafting, camping, hiking and other pastime activities.

Few access/mobility conflicts exist between Skowhegan's rural area and Bingham. The land ownership pattern lends itself well to planned and managed access points along the route.

The entire segment of Route 201 beginning at the northerly compact line of the Town of Solon through to Bingham is a designated *Scenic Byway*, (which continues on to the Kennebec River Bridge at the Forks/West Forks town line.)



Route 26

Segment from Newry to Upton

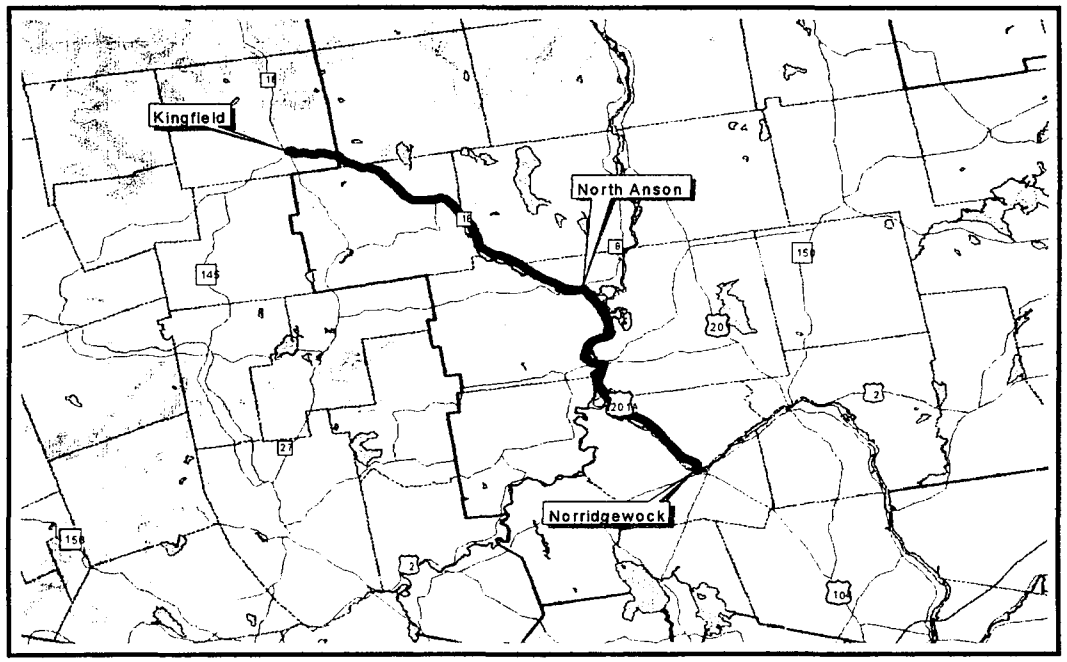
Route 26, between Newry at Route 2 and Upton at the Maine/New Hampshire border is roughly 22 miles long and is classified as a *Major Collector*. It is currently a 2-lane (22' travel way) highway with 6' gravel shoulders. Improving the route to *East-West Highway Standard* will require additional ROW and potentially significant environmental mitigation. Truck climbing lanes would be beneficial along this corridor.

Route 26 is naturally constrained with rolling to severe topography (Grafton Notch) and the existence of sandy soils, wetlands and other water bodies such as the Bear River along many portions of the route. Development patterns along the route are scattered and very low density. Economic

activity served by the highway is primarily forest products-related with a few small retail businesses serving the industry and passersby. Grafton Notch State Park, including several gorges and waterfalls, attracts visitors annually as part of the Appalachian Mountain Trail System.

Traffic counts range from 700 to 1,400 per day. Truck traffic accounts for approximately 14% of the Route 26 traffic. Current capacity of the highway is 16,000 vehicles per day.

Average travel speeds along are roughly 53 mph with posted speed limits ranging from 35 to 50 mph. Few access or mobility conflicts currently exist between Bethel and Upton. The presence of the natural resources noted above along many areas of the route limit land use options while providing good opportunities for well planned and managed access points. The sparse development that exists is fairly near the road. No documentation of community concerns has been found to assist with directing improvement plans. Route 26 is designated as a *Scenic Byway* for approximately 18 miles, beginning 4.9 miles southerly of the junction of Route 2 and Route 26 near Branch Brook in North Newry, and extending northerly on Route 26 through the Towns and/or Townships of Newry, Grafton, and Upton, including the area through Grafton Notch State Park, to a point 1.2 miles north of the Grafton-Upton town line. A *Corridor Management Plan* is currently under development.



Route 201A & 16

Segments from Norridgewock to Kingfield

Route 201A, between Norridgewock and North Anson, is roughly 13 miles long. The route is a designated *Minor Arterial* highway. Roughly 7.5 miles of the route are below *East-West Highway Standard* for lane and shoulder widths. No portion of Route 201A is prioritized for improvement in the Six-Year Plan. Improvements will result in a roadway with two 12'-wide lanes with paved shoulders 8' wide.

This portion of Route 201A, in conjunction with a segment of Route 16 from North Anson to Kingfield, is considered an alternate route for

travelers from Route 2 to Route 27. The route is naturally constrained by rolling to severe topography and the existence of wetlands and other surface water bodies along much of the route. The Kennebec River is an *Outstanding River Segment* within the Route 201A Corridor.

Traffic counts range from a high of 9,100 per day in Madison to 3,900 in North Anson at the junction of Route 16. Truck traffic accounts for up to 10% of Route 201A traffic. Current capacity of the highway is approximately 22,000 vehicles per day. Average travel speeds along the route range from 40 to 45 mph.

Development patterns along the route are sprawling and range from very low to medium density. Madison is the largest of the three economic centers. North Anson has a small downtown as well. Economic activity served by the highway is primarily natural resource-based with a few small retail and service businesses serving the industry and passersby. Recreationists and leisure-time travelers also use the highway en route to Sugarloaf USA and Quebec City. The route also provides access to winter and summer camps for snowmobiling, fishing, camping, hiking, and other pastime activities. Few access/mobility conflicts exist between Norridgewock's rural area and North Anson. The land ownership pattern lends itself well to planned and managed access points along the route.

Another portion of Route 201A, and connecting North Anson and Route 201 in Solon, considered part of the Trans-Maine Trail, is roughly 9 miles long, and is classified as a *Major Collector*.

A Maine Central Railroad spur from North Anson parallels the route to Norridgewock, until it converges with the Springfield Terminal line which runs to Oakland. The Kennebec River also parallels the route from Norridgewock to North Anson where it is joined by the Carrabassett River.

Route 16, between North Anson and Kingfield, is roughly 16 miles long. The route is a designated *Major Collector* highway. The other portion of this route is part of the Trans-Maine Trail beginning in Abbott, traveling westerly to Bingham, (described previously as part of Corridor "A"). The portion from Bingham to Solon uses Route 201; in Solon Route 16 is picked up again (along with Routes 8 and 201A) to North Anson. Most of the route exists below *East-West Highway Standard* for lane and shoulder widths. (not included in Six-Year Plan). Improvements will result in a roadway with two 12'-wide lanes with paved shoulders 8' wide.

Route 16, where it leaves Route 201A in North Anson, is considered an alternate route for travelers from Routes 2 to 27. The route is naturally constrained by rolling to moderate topography and the existence of wetlands and other surface water bodies along much of the route. It parallels the Carrabassett River from North Anson to New Portland, and Gilman Stream to North New Portland. Traffic counts range from 1,100 per day in North Anson to 3,300 in Kingfield at the junction of Route 27. Current capacity of the highway is approximately 22,000 vehicles per day. Average travel speeds along the route range from 45 to 50 mph.

Development patterns along the route are scattered and are very low to low density. Economic activity served by the highway is primarily natural-resource based with a few small retail and service businesses serving the industry and passersby. Recreationists and leisure-time travelers also use the highway en route to Sugarloaf USA and Quebec City. The route also provides access to winter and summer camps for snowmobiling, fishing, camping, hiking and other pastime activities. Few access/mobility conflicts exist between North Anson and Kingfield. The natural features and land ownership pattern lend themselves well to planned and managed access points along the route.

A Maine Central Railroad spur from North Anson parallels the route to Norridgewock where it converges with the Springfield Terminal line into Oakland. The Kennebec River also parallels the route to North Anson where it is joined by the Carrabasset River.

Key "Stats" - Other Western Segments

	Route 201	Route 26	Routes 201A/16
Existing Daily Traffic (year 1999)	Total Vehicles 3,500 - 16,000 Trucks 400 - 1,000	Total Vehicles 700 - 1,400 Trucks 100 - 150	Total Vehicles 1,100 - 13,800 Trucks 200 - 600
Projected Daily Traffic (year 2030)	Total Vehicles 5,000 - 21,900 Trucks 1,100 - 2,100	Total Vehicles 1,200 - 1,900 Trucks 200 - 250	Total Vehicles 3,900 - 14,400 Trucks 600 - 800
Average Daily Capacity of Corridor	24,000	16,000	22,000
% of Corridor not meeting Capacity Standard	15	0	2
% of Corridor not meeting NHS Standard	42	100	89
% of Corridor not meeting 55 mph Standard	46	100	79
% of Corridor not meeting Safety Standard	24	75	54
Overall Travel Time	32 minutes	25 minutes	40 minutes
Approximate Road Length	23 Miles	22 Miles	29 Miles

Other Western Corridor Segments - Improvement Needs

		Route Segments	Reconstruction miles / cost	Operational Enhancements	Lane/Shoulder Widening miles / cost	New Construction
Connector linking Corridor "A" at Bingham to Route 2 (Skowhegan - for connectivity to NH)	*Route 201*	Bingham to Skowhegan	1.89 miles / $1,593,000	Passing Lanes - $600,000 Intersections - $671,000	-	-
Northern "Branch" for Corridor "B" extending from Route 2 at Newry to the New Hampshire Border at Upton	*Route 26*	Newry @ Route 2 to Upton/N.H. border	22.04 miles / $16,819,000	-	-	-
Alternative "shortcut" routing for Corridor "C" linking Norridgewock to Kingfield	*Route 201A*	Norridgewock to Madison	-	Passing Lanes - $1,440,000	6.52 miles / $2,445,000	-
		Madison to North Anson	5.96 miles / $4,768,000	Intersections - $1,197,000	4.34 miles /$1,628,000	-
	Route 16	North Anson to Kingfield	15.90 miles / $13,758,000	Intersections - $141,000	-	-
		Segment Total	45.79 miles / $36,938,000	$4,049,000	10.86 miles / $4,073,000	-

TOTAL OTHER WESTERN CORRIDOR ALTERNATIVES COST - $45,060,000

Corridor Upgrade Summary

(costs in thousands)*

	Reconstruction		Minor Widening		Operational Enhancements		New Construction		Total Cost
Highway Corridor	Miles	Cost	Miles	Cost	Miles	Cost	Miles	Cost	
Route 9	5.28	$7,920	13.84	$5,191	9.00	$1,469	7.90	$23,450	$38,030
Route 1	34.48	$22,397	28.95	$10,857	27.00	$16,939	-	-	$50,193
Route 1A	11.34	$7,724	-	-	8.00	$4,349	-	-	$12,073
Route 46	4.92	$7,380	-	-	1.00	$504	-	-	$7,884
Route 2	26.52	$40,703	0.85	$319	64.00	$23,254	14.80	$53,730	$118,006
Route 26	22.04	$16,819	-	-	-	-	-	-	$16,819
Route 27	63.58	$80,492	2.75	$1,031	11.00	$3,611	-	-	$85,134
Route 6	55.74	$43,847	59.98	$22,493	22.00	$6,724	-	-	$73,064
Route 201	8.98	$6,050	54.75	$20,010	8.00	$2,753	-	-	$28,813
Route 201A	5.96	$4,768	10.86	$4,073	7.00	$2,637	-	-	$11,478
Route 16	49.08	$51,778	0.91	$341	1.00	$141	-	-	$52,260
Total	287.92	$289,875	172.89	$64,315	158.00	$62,381	22.70	$77,180	$493,751

*** Excludes costs associated with projects that are funded but not yet completed**

D. OTHER PLAN ELEMENTS

Corridor Management

There is growing awareness that transportation improvements affect land use decisions, and that land use decisions in turn affect transportation needs. Proponents of an east-west highway suggest that an important purpose for such a highway relates to economics. It is expected that travel-time savings and increased economic development activity will result. Careful planning is thus needed to assure that any unintended consequences of unplanned economic development do not erode these gains over time. Corridor management practices must be explored and appropriately implemented to assure that the benefits expected from such a public investment is maximized for the long term.

Corridor management involves coordinating land use planning and development with transportation planning. Its goal is to plan development in areas to avoid loss of land likely to be required to meet transportation needs in the future. In the context of an east-west highway, these areas include lands adjacent to existing roadways which are projected to require capacity expansion, or areas which might be needed to construct entirely new routes for urban bypasses or to serve a new alignment. Corridor management promotes orderly development of a transportation network to serve land development. It helps to assure that transportation facilities will be adequate to serve existing and planned development.

A variety of corridor management tools exist. These include:

- *Right-of-way Preservation* to prevent or minimize development within the right-of-way of a planned transportation facility or improvement
- *Advance Acquisition* to acquire right-of-way well in advance of construction need
- *Access Management* to preserve the safety and efficiency of existing facilities

Right-of-way preservation, a technique used to protect space for transportation corridors to accompany development, is often accomplished by regulation at the state and or local levels.

Communities within the LURC jurisdiction and local governments can place limitations on land uses, allowable building density and setback requirements, among some of the most commonly used preservation tools. Some less common land use tools include flexible or cluster zoning, transfer of development rights, and overlay zones.

In some instances, development rights may be purchased by state or local governments separately from underlying fee ownership. This method of preserving right-of-way compensates the property owner for maintaining the property in an undeveloped state. The purchase of these rights in the form of a development easement would be permanently recorded with the deed to the property, thereby ensuring that development will never occur. This strategy preserves right-of-way from development, without condemning an entire property.

Right-of-way acquisition, through eminent domain or throughout voluntary proceedings, is used when land is needed for transportation purposes. A detailed process is outlined in the State of Maine Department of Transportation Land Owner's Guide to the Property Acquisition Process.

If land for new roads and highways is not set aside as development occurs, then the corridor may be blocked by development and a new location may be required. The corridor may need to be relocated into more environmentally sensitive areas that could otherwise have been avoided or cause greater damage and disruption to communities. In turn, plans must be redrawn, project development is delayed, administrative costs go up, and inflation consumes more of the budget. Allowing development in planned rights-of-way also increases costs of acquiring right-of-way.

Access management is a process for providing access to land development, while preserving traffic flow on surrounding roadways in terms of safety, capacity and speed. This is achieved by

managing the location, design and operation of driveways, median openings, and street connections to a roadway. It also involves the use of auxiliary lanes, such as turn lanes or bypass lanes, to remove turning vehicles from through-traffic movement.

Highways are generally classified for access management based upon their importance to local and regional mobility. In Maine, three levels of access management are applied. The greatest level of access management is applied to highways intended to serve more through traffic. Access to the Interstate is "controlled" and permitted only at interchange areas. Fully "controlled" access highways have no at-grade crossings and have carefully designed access connections. In terms of this study, controlled access highways include portions of I-95 and 1-395. Access to certain bypass highways, such as the Route 1 bypass in Belfast, are "controlled" access as well.

The next level is considered partial control of access or "limited" access. For example, sections of Route 3 in South China and in Stockton Springs are under "limited" access control. Through traffic is given preference with some at-grade access provided for selected public roads and some private driveways. The legislation initiating this study suggests this type of treatment for a new East-West highway facility.

Full or limited access control is generally accomplished by legally obtaining right-of-access from abutting property owners or by use of frontage roads. Right-of-access is purchased through the same process used for right-of-way acquisition. Frontage roads provide access to the land immediately adjacent to the "controlled" or "limited" access facility. Placement and design of frontage roads must be carefully planned to manage operational problems that may arise at intersections particularly if the frontage road serves high traffic volumes associated with commercial and high density residential areas.

A third level of access management used in Maine includes physical modification of the highway such as development of medians, jug-handles, turn lanes, and other similar treatments intended to improve the safety and mobility operations of a highway.

In addition, access management can be affected by regulation. Title 23 Section 704 MSRA regulates entrances to highways. This law, amended in the most recent session of the 119th Legislature directs the department and authorizes towns "to make such rules and regulations as to design, location and construction of driveways, entrances and approaches on said highways as will adequately protect and promote the safety of the traveling public...". To date, MDOT has not fully exercised its authority to regulate reasonable access.

Access management jurisdiction resides at the local level for all highways - including State highways - within urban compact areas. In 1994, MDOT published Access Management, Improving the Efficiency of Maine Arterial, A Handbook for Local Officials. This guide has been used by a number of communities around the state to develop and adopt access management standards as part of their land use management tools. Other communities are in the process or have identified the need to develop such standards.

For all State Highways outside the urban compact areas, access management jurisdiction resides with MDOT. Each of MDOT's Maintenance and Operations Division Engineers have the responsibility of issuing permits for entrances assuring that sight distance and entrance width meet established standards. LD 304 enacted in the 119th Legislature creates a study commission to develop legislation for the year 2000 legislative session considering highway access management.

On other access management technique which may be used to the acquisition of control of access over time to prevent additional access points to be built. This technique has the effect of freezing the status quo for access on a highway, allows one entrance per lot and allows the MDOT to retrofit access when a highway project is undertaken.

Once a decision is made regarding development of an East-West Highway, the variety of corridor preservation mechanisms will be investigated and applied where most appropriate.

Corridor Signage and Other Enhancements

A 1997 Resolve of the Legislature designated Routes 9 and 2 as the east-west highway. That Resolve contained language regarding signing the East-west highway. The following year, the 118th Legislature initiated this study. Based on this action MDOT will refrain from signing the "designated" corridor until the debate on the issue is complete.

Once a formal decision is made, MDOT will design a signage program for the official East-West Highway. In consideration of the various signage requirements, programs and opportunities this corridor will present, design of the signage program will be coordinated with communities participating in MDOT's "Community Gateway" and Scenic Byway programs as well as with other State agencies such as Maine's Office of Tourism at the Department of Economic and Community Development to create or support integrated efforts and partnering opportunities that may exist throughout the corridor.

Guidelines for the Corridor Signage program will consider not only the message but also the delivery of that message. The image presented by such a signage program should consider uniformity of its various design elements including but not limited to size, height, shape, color, logo, material, placement/orientation and associated landscaping.

Other enhancements associated with an East-West Highway project should be included in its design as well. Such highway amenities as landscaping and buffering, lighting, scenic overlooks, rest areas and other similar or associated facilities will be carefully considered in designing for improvements to existing facilities or for construction of a new alignment.

E. MULTIMODAL CONNECTIVITY

Improvements to existing east-west corridors, or the construction of a new limited access east-west highway across Maine, could potentially have both positive and negative impacts on Maine's *intermodal* freight transportation system. Approximately 87% of Maine's freight is moved by motor carrier transportation, and this mode share is expected to continue, for the most part, into the future.

The ability of trucks, (primarily Canadian), to move more freely across Maine would greatly improve the free flow of freight, and potentially lower freight costs for Maine shippers who use trucks for their transportation. This could improve the competitiveness of Maine businesses in global markets, as their transportation costs would be lowered, and their access to Canadian markets improved.

Improving the connectivity of the east-west highway to the ports of Eastport and Searsport would serve to improve the long-term viability of these ports. However, east-west highway improvements could also allow shippers to reach *out-of-state* and *Canadian* ports more quickly, and thus reduce the competitiveness of Maine ports for Maine shippers.

However, any improvements to, or the construction of, an east-west highway could also have a negative effect on the competitiveness of the state's three major freight railroads (two of which operate major east-west rail lines). Railroads typically compete more favorably with trucks when the distance to be hauled is longer. Both the St. Lawrence & Atlantic Railroad and the Bangor & Aroostook Railroad/Canadian American Railroad are currently experiencing substantially increased traffic levels in their east-west lines.

Benefits of an east-west highway to the intermodal system could include improved access to the Bangor International Airport and to the proposed rail link to Mt. Desert Island and Acadia National Park. MDOT is currently evaluating such a rail link. Direct access to intermodal passenger facilities could increase travelers' willingness to utilize modes other than the private automobile.

A far more comprehensive analysis would be needed to more accurately predict the effects of an east-west highway on other modes.

Chapter III - Concept of a 4-Lane Limited Access East-West Highway

A. INTRODUCTION

As stated previously, it is thought that a modern and efficient east-west highway corridor across the State of Maine will prompt an economic paradigm shift by using improved transportation infrastructure to capitalize on geographic opportunities for international trade and tourism. In response to this notion, the Legislature, in 1997, directed MDOT to prepare a plan, in cooperation with the Maine State Planning Office, and Department of Economic and Community Development, that would estimate the cost, routes, and project scopes of a *new 4-lane limited access east-west highway* and assess the economic, environmental, and community impacts of such a facility. This chapter describes the methodology employed in developing this plan and presents an assessment of alternative concepts for a *new 4-lane limited access east-west highway*.

B. CORRIDOR ANALYSIS CONSIDERATIONS

General

Two conceptual highway corridors on which to focus the required economic research, engineering, and environmental assessment were selected, based on preliminary findings of the economic, market, commodity, and traffic flow research conducted by the Maine State Planning Office. The factors considered in proposing these conceptual corridors were limited to the following general economic and market issues:

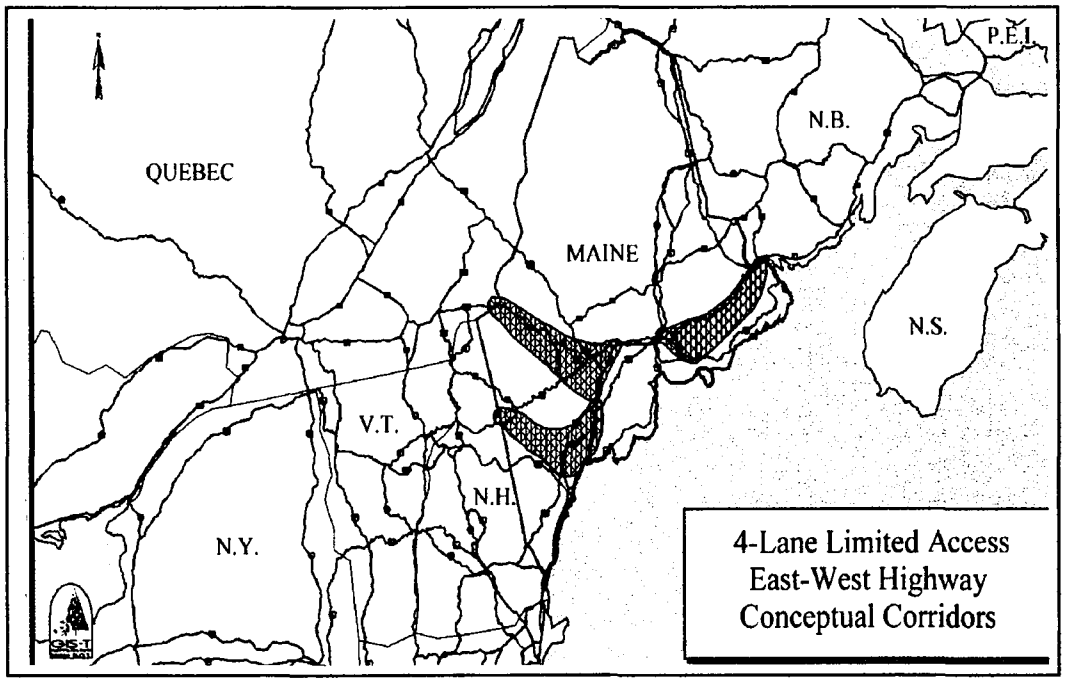
- The characteristics of the existing economic base within those regions of the state which could be served by potential east-west highway corridor(s)
- The economic characteristics of the major Canadian and northeast U.S. hubs which could be expected to generate passenger and commercial travel demand for each alternative
- The quality, capacity and traffic volumes on highway systems located beyond Maine's borders, and the nature of cross-border traffic that could be serviced by various corridors
- Estimated travel time savings to/from major hubs that might be achieved by each corridor
- The probability that each corridor would produce measurably different economic impacts from the remaining alternatives.

The resulting corridors are broad concepts and should not be characterized as highway alignments. It is assumed that a variety of possible alignments could be developed to implement each concept. ***Any assumptions based on this study, as to location or type of highway required, are premature, and beyond the scope and limitations of this study.***

The two corridors selected for analysis in this study are shown in the adjoining Figure.

The selected conceptual corridors include a mix of 4-lane limited access northern, central and southern options for providing a border-to-border, east-west highway connection across the state. These options serve different regions within the state, and connect to different hubs to the east and west of Maine.

The <u>new alignment</u> alternatives presented in this Chapter, together with the <u>upgrade</u> alternatives presented in Chapter II, represent the low and high end of the spectrum of



possible improvement to Maine's east-west highway system. It is intended that the information and analysis associated with all of these alternatives will provide decision-makers with a good understanding of the range of possible project scopes, costs, benefits, and impacts. It is important to understand that the extent of improvement to Maine's east-west system depends, to a large part, on relative costs, benefits, and expected usage. Therefore, it is reasonable to assume that ultimate scope of improvement will, most likely, consist of a combination of project types ranging from a 4-lane limited access roadway - to a 2-lane limited access roadway on a 4-lane right-of-way - to a "twinned" 2-lane roadway - to an upgraded 2-lane roadway with new highway segments such as a localized bypass - to an upgraded 2-lane roadway.

Engineering

The engineering investigations conducted in this study were confined to the assessment of topographic and resource features, and their constraints, on a 4-lane limited access east-west highway. United States Geological Survey (7.5 minute series) maps were used as the basis for this study. These maps provide detailed topographical information, and are adequately detailed with respect to major resource areas such as lakes, rivers, bogs, communities, built-up areas, etc., With these major engineering obstacles identified, potential broad study corridors which provide the most efficient east-west traffic flow were identified to avoid as many constraints as possible. These study corridors provide the basis for assessing potential environmental, natural, and human, impacts and construction costs.

The specific location of new highway alignments will be subject to much more comprehensive planning and environmental assessment processes. Any studies at those levels of detail will have to satisfy the Maine Sensible Transportation Policy Act (STPA), National Environmental Policy Act (NEPA), and the U.S. Army Corps of Engineers, New England Division, Highway Methodology decision-making process. All of these processes require extensive public involvement and much more detailed levels of actual resource identification.

Cost

Approximate per-mile costs for each new corridor were calculated for the construction of new sections of highway as well as for improvements to existing sections. These costs were based on an assumed average roadway cross section, average number of crossings of water bodies, and number of major interchanges or access points. These costs provide reasonable 'order-of-magnitude' estimates of construction costs, and serve as a basis for comparison

of alternatives. They do not include the costs associated with such items as operations, maintenance, and social impacts.

Environment

The environmental investigation in this study consisted of the identification of natural and man-made features in each corridor, and the classification of these features in relation to the potential effect from a considered action. The classifications of impact are:

- **Beneficial Impact** - positive impact resulting from the potential action.
- **Adverse Impact** - negative impact resulting from the potential action
- **Irreversible and Irretrievable effects** - impacts that result in a commitment of resources that cannot be reversed, except perhaps in the extreme long term, or a commitment for resources that will be lost for a period of time
- **Significant effect** - consideration of *context* and *intensity*. *Context* means that the action must be analyzed in several areas, such as human and natural resources, and using national, regional, and local perspectives. *Intensity* refers to the severity of impact. A *significant effect* may be beneficial and/or adverse

  Potential Significant Resource: A natural or man-made feature that is protected by State or Federal law; potentially rare in nature; may be of national or state significance; has unique characteristics; and could be a fatal flaw for project development. These resources must be considered for total avoidance when determining the location of potential alternatives.

  Potential Area of Concern: A natural or man-made resource that will require careful consideration to avoid and/or minimize impacts during the analysis of corridors/alternatives.

The above-mentioned impacts and effects have the potential to directly or indirectly impact proposed actions. Direct effects are caused by the action, and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are reasonably foreseeable.

The environmental issues identified in this preliminary assessment should not be interpreted as being the only natural and man-made features of importance, but only those of a regulatory nature that can be a "fatal flaw" in future steps required in the National Environmental Policy Act (NEPA) process and the subsequent permitting process. This analysis was conducted at a broad conceptual level. If the decision is ultimately made to proceed with further consideration of a new location corridor or alternative, more detailed environmental study, including NEPA documentation, will be required to assess both direct and indirect impacts upon social, economic, and environmental resources.

Traffic

MDOT's *Statewide Model* was used to estimate the amount of intrastate, cross-border, and interprovincial traffic that could potentially be diverted to each alternative east-west corridor. Traffic was developed for the base year of 1999 and forecast for the future years of 2015 and 2030 for both commercial and auto travel. Model output was used to assess each corridor's impact on statewide and regional vehicle-miles of travel and vehicle-hours of travel, as well as in estimating the toll revenue potential of each alternative.

Economic Impact

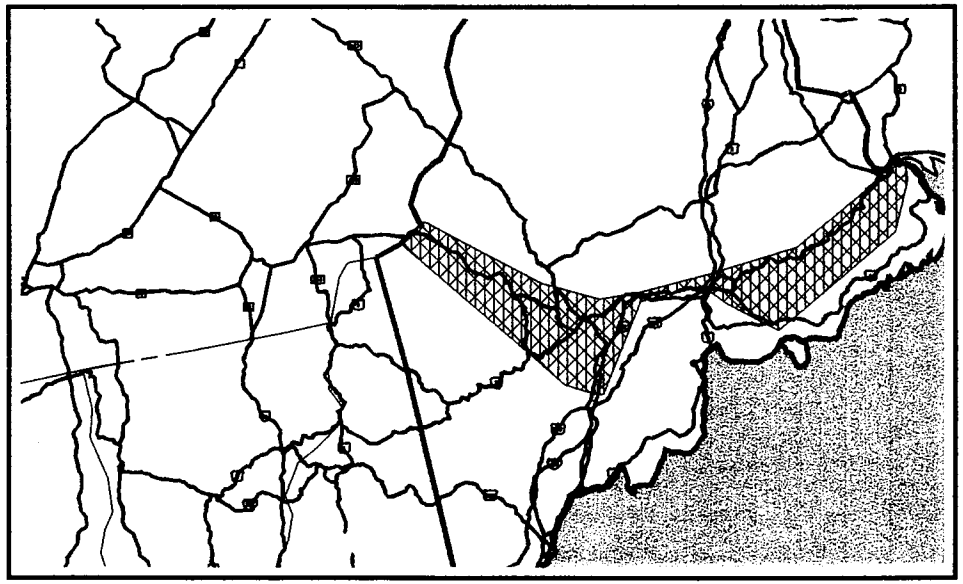
Forecasts of the economic impacts that would be likely to result from the construction of a 4-lane, limited access, east-west highway across the State of Maine have been developed. The potential for the state as a whole, and for regions within Maine, to capture economic benefits from increased tourism expenditures and increased competitiveness of Maine businesses, and the resulting potential for increased investment activity along the proposed corridors are quantified in these forecasts. The results of these economic forecasts have also been used to isolate and predict specific land use and real estate impacts which could accompany any increased in-state economic activity which results from the project.

The economic impacts relative to each corridor are summarized in this chapter. A more comprehensive presentation of the economic research methodology, databases, and results can be found in the separate report (Maine East-West Highway: Economic Impact Analysis, Phase III Technical Report: Economic Impacts, RKG Associates, August 1999) issued by the Maine State Planning Office.

C. GENERAL CORRIDOR DESCRIPTIONS

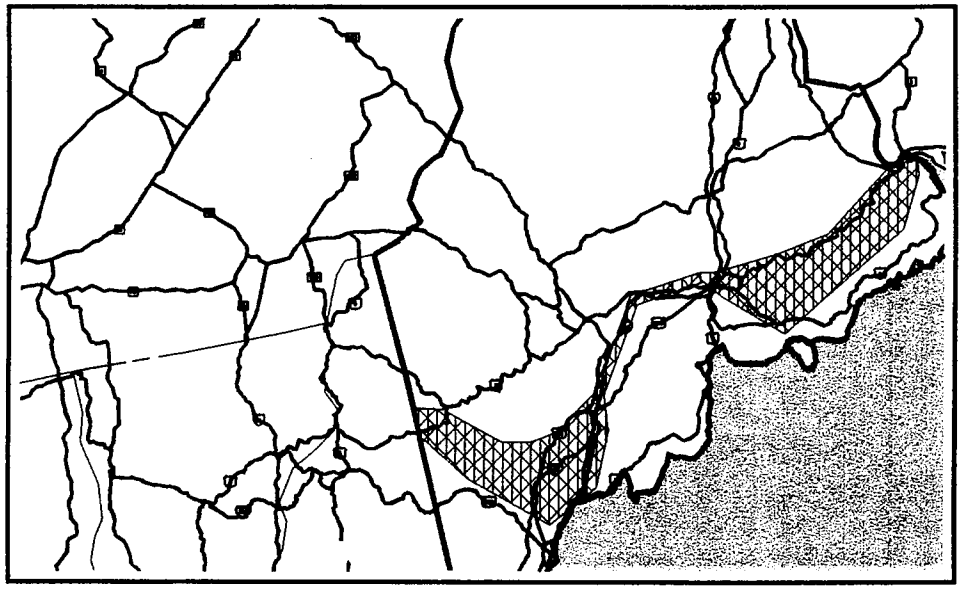
Corridor "D"

A limited access 4-lane highway, predominately on new alignment beginning at the Maine/New Brunswick border, at a location somewhere in the vicinity of the Calais/Baileyville area connecting to Saint John, Fredericton, and Moncton via NB Routes 1 and 2. The corridor then proceeds westward along or south of Route 9, connecting with I-95 at or near Bangor, and continues southwesterly along existing I-95, leaving I-95 anywhere between Newport and Augusta. From this point, it continues northwesterly to the Maine/Quebec border at or near Coburn Gore, linking Sherbrooke and Montreal via Quebec Route 10.



Corridor "E"

A limited access 4-lane highway, predominately on new alignment beginning at the Maine/New Brunswick border, at a location somewhere in the vicinity of Calais/Baileyville connecting to Saint John, Fredericton and Moncton via NB Routes 1&2. The corridor then proceeds westward along or south of Route 9, connecting with I-95 at or near Bangor, and continues southerly along existing I-95/I-495, leaving I-95/I-495 anywhere between Augusta and Gray. It then continues generally northwesterly to the Route 2 corridor crossing into New Hampshire at or near Gilead linking New Hampshire, Vermont, and Montreal via Route 2 and I-89.



D. DESIGN/ENGINEERING CONSIDERATIONS

- Location - Geological/Topographical Constraints

Corridor "D"

The eastern portion of the State of Maine contains numerous lakes, ponds, streams and swamps interspersed among a rough mountainous landscape. The Moosehorn National Wildlife Refuge located near the Maine/New Brunswick border and a large wetland along a natural esker in Aurora, known as the "Whalesback" are two significant areas that will affect the location of a proposed new highway.

As Corridor "D" progresses westward from I-95 towards Farmington, the corridor location is affected by the many communities that dot this area. Farmington to the Canadian border is a mountainous region with many small ponds, streams and rivers. One major body of water in this western section of Corridor "D" is Flagstaff Lake.

This region supports three *Outstanding River Segments* which include: a portion of the Kennebec, Sandy and Rapid Rivers. Also in this region are numerous man-made features that are either on, or eligible for, the National Register of Historic Places as well as archaeological resources that will require further investigation.

Corridor "E"

The eastern portion of Corridor "E" from the Maine/New Brunswick Border to Bangor has engineering constraints similar to Corridor "D". The western portion of Corridor "E" has to weave through many lakes, ponds, rivers, towns, cities and large wetland areas that limit the area available for a proposed new highway. Corridor "E" adjacent to the New Hampshire border enters a very mountainous area that is part of the White Mountain National Forest.

- Right of Way

The new roadways, located within Corridors "D" and "E", would be designed as a 4-lane limited access highway. As such, it would include a median of varying widths and at-grade intersections at the junction of important major streets and roads. It would not provide access to abutting property and would not require interchanges.

- Interchange/Intersection Location Criteria

Full service interchanges would be limited, located only at the junctions of the east-west highway with the Interstate system (in the Bangor/Brewer area, the Newport to Augusta area, and the Augusta to Gray Area) where they would be the only means of providing a safe and efficient exchange of traffic. High-type at-grade intersections with exclusive turn lanes and other design features consistent with the level and composition of traffic would be provided at all routed highways and other regionally significant roadways.

E. IMPACT ON TRAVEL

Improvement of existing east-west highways, as well as the development of new limited access east-west highway corridors, will produce savings in travel time and result in greater overall travel efficiencies. These efficiencies, in turn, can serve as a stimulus to Maine's overall economy resulting in increased tourism and business activity. The increase in traffic generated by this potential increase in economic activity is referred to as "induced" travel. This section summarizes the anticipated savings in travel time associated with trips from Maine's eastern border to its western border, the magnitude of induced travel, and the resulting change in statewide travel as measured by vehicles-miles of travel and vehicle-hours of travel.

Travel Time Savings

Travel times for the "no-build" alternative and the five east-west highway alternatives were estimated using the *Statewide Model*. Travel time savings were derived as the difference between the travel time associated with the "no-build" option and the five "build" options. As shown in Table 3.1 time savings vary from a low of 5 minutes for a trip from Calais to Gilead via Corridor "B" to a high of 81 minutes for a trip between Calais and Coburn Gore via Corridor "D".

Table 3.1
Travel Time Savings (Eastern Border to Western Border)
By Alternative Corridor

	Corridor "A"	Corridor "B"	Corridor "C"	Corridor "D"	Corridor "E"
Vanceboro-Sandy Bay	54 minutes				
Calais-Gilead		5 minutes			39 minutes
Calais-Coburn Gore			21 minutes	81 minutes	

Induced Travel

Overall, statewide travel is forecast to grow as the result of the increased economic activity generated by the five east-west highway alternatives. Table 3.2 shows the magnitude of "induced" travel and percent change from the base condition of "doing nothing" relative to each of the alternatives. As shown in this table, induced travel is forecast to range from a low of 6,800 trips per day under Corridor "A" to a high of 24,400 trips per day under Corridor "D". Most of the induced growth is the result of increased auto travel - primarily travel with origins and destinations within Maine. However, the greatest percentage increase in travel is associated with auto travel between Maine and Canada, ranging from 5.3 percent under Corridor "A" to 9.8 percent under Corridor "E". This increase is the direct effect of an increase in Canadian tourism projected to occur as the result of improved east-west highway access. There is little, or no, expected induced growth in truck travel.

Table 3.2
Travel Induced By East-West Highway Alternatives
Peak Season Average Weekday Traffic - Year 2030

	Corridor "A"		Corridor "B"		Corridor "C"		Corridor "D"		Corridor "E"	
Type of Travel	Volume	% Change	Volume	% Change	Volume	% Change	Volume	% Change	Volume	% Change
Autos - Maine/Canada	2,400	5.3	2,800	6.1	3,000	6.5	4,400	9.2	4,700	9.8
Autos - Within Maine	4,400	0.1	8,000	0.1	7,400	0.1	19,900	0.4	17,700	0.3
Trucks	0	0.0	0	0.0	0	0.0	100	0.3	100	0.3
Total	6,800	0.1	10,000	0.2	10,000	0.2	24,400	0.4	22,500	0.4

Vehicle-Miles and Vehicle-Hours of Travel

One measure of the effectiveness of new or improved highway infrastructure is the change in the amount of travel on the overall highway network and the amount of time vehicles spend in this travel. Two statistics commonly used to evaluate system effectiveness are vehicle-miles of travel (VMT) and vehicle-hours of travel (VHT). Both of these statistics are standard output of the *Statewide Model*. Table 3.3 summarizes year 2030 VMT and VHT for each of the five east-west alternatives, for both auto and truck travel. The upper half of the table presents the forecast VMT and VHT assuming there is no induced growth as a result of the corridor improvements. In other words, these values reflect the effects of an improved highway system on a common set of future year trips. For all of the alternatives, there is a reduction in VHT because the corridor improvements produce faster routes to travel within and through the state. The most significant reductions in VHT are produced by Corridors "D" and "E" which both include new four-lane limited-access highways with posted speed limits of 65 mph.

Table 3.3
Change In Daily Vehicle-Miles (VMT) and Daily Vehicle-Hours of Travel (VHT) By Alternative Corridor
Year 2030

	Corridor"A"	Corridor"B"	Corridor"C"	Corridor"D"	Corridor"E"
Non- Induced Travel					
VMT - Autos	7,250	-50,010	-97,730	-710	36,070
VMT - Trucks	-5,760	1,690	2,090	-104,870	-11,720
VHT - Autos	-780	-740	-1,050	-18,340	-17,390
VHT - Trucks	-50	-290	-400	-2,750	-1,350
Induced Travel					
VMT - Autos	545,660	572,370	541,590	1,024,960	1,272,740
VMT - Trucks	-3,640	660	2,940	-95,480	-3,420
VHT - Autos	10,360	12,240	12,470	135	5,120
VHT - Trucks	-20	-300	-380	-2,580	-1,220

With the introduction of corridor improvements, there is forecast to be some shift of Maritimes-to-Quebec trips from the Trans-Canada Highway to a path through Maine. The miles traveled by these trips will therefore be reduced. However, many intra-state trips when diverted to the faster East-West Highway route, will actually travel a longer distance. As a result, the forecast changes in VMT are sometimes negative and sometimes positive. The most significant VMT reductions occur with Corridor "C" which includes roadway capacity improvements along the most direct paths between New Brunswick and Bangor (i.e., Route 9) and between I-95 and Montreal/Sherbrooke (i.e., Route 27).

The bottom half of Table 3.3 presents the forecast changes in VMT and VHT as a result of the alternative corridor improvements, and of the new economic development and new tourist trips induced by improved east-west accessibility. Auto VMT increases under all the alternative scenarios ranging from a low of 541,590 under Corridor "C" to a high of 1,272,740 under Corridor "E". This is not an unanticipated result, as it reflects the finding that nearly all the trips "induced" by the five alternatives are auto trips. Forecast truck VMT shows a different result. Several of the alternatives actually result in a reduction of truck VMT - the greatest (-95,480) occurs under Corridor "D". Because there is little expected induced truck travel this result indicates that truck trips through and within the state will divert

from their present routes of choice to the more efficient east-west highway alternatives. And, as shown in Table 3.3, this reduction in truck VMT will generate a total daily truck VHT savings of 2,580 hours.

Traffic Assignments

Table 3.4 presents a summary of the traffic impacts of the two four-lane limited access east-west highway alternatives which have been evaluated. Along the eastern section of Corridor "D", nearly all of the forecast traffic on Route 9 (5,000 of the year 2030 daily volume of 5,100) and roughly half of the forecast traffic for Route 1 (3,600 of the year 2030 daily volume of 6,900) will be diverted to the new highway. The remaining traffic on the new roadway (roughly 2,800 vehicles) would be diverted from other parallel corridors through Maine (e.g., Route 6, I-95) and around Maine (the Trans-Canada Highway).

West of Bangor, construction of Corridor "D" would add another 4,700 vehicles to I-95 on a daily basis. This nearly 12 percent increase in daily traffic would consist of both new traffic passing through Maine and new traffic generated by jobs and housing induced by the new highway. In western Maine, Corridor "D" would result in roughly 1,900 more daily vehicles on Route 27 near the Canadian border (roughly a 65 percent increase over the year 2030 "no-build" volume).

Corridor "E" produces results similar to those for Corridor "D". East of Bangor, the new roadway attracts much of the traffic from Routes 9 and 1, as well as from outside the immediate corridor. West of Bangor, the daily traffic increase on I-95 is again nearly 12 percent. Near its western terminus, between Gilead and Bethel, the forecast traffic on Corridor "E" is estimated to be 5,200 vehicles per day. At this similar location along Route 2 the traffic is estimated to be 400 vehicles, a reduction of 4,500 vehicles per day. The resulting growth and diversion of traffic at the western terminus of Corridor "E" is expected to result in an overall increase in forecast traffic of 700 vehicles per day. Even though Corridor "E" does not include roadway improvements along Route 27, Corridor "E" still causes a significant traffic increase (1,500) vehicles). This growth is a result of the increased accessibility of Route 27 to eastern Maine and New Brunswick via the new roadway east of Bangor.

Table 3.4
Summary Of Traffic (AADT) Impacts
Year 2030

Region	Location	"No-Build" 1999	"No-Build" 2030	"Build" 2030	Change 2030
	Corridor "D"				
Eastern Maine	• Route 9, Beddington, e/o Rte. 193	2,100	5,100	100	-5,000
	• Route 1, Harrington, e/o Rte. 1A	5,700	6,900	3,300	-3,600
	• Corridor "D", Cherryfield, s/o Rte. 182	-	-	11,400	11,400
Central Maine	• I-95, Hampden	27,500	40,100	44,800	4,700
Western Maine	• Corridor "D", (Rte. 27) Stratton area, n/o Rte.16	1,200	2,900	4,800	1,900
	• Route 2, Gilead, e/o Route 113	3,000	4,700	4,700	0
	Corridor "E"				
Eastern Maine	• Route 9, Beddington, e/o Rte. 193	2,100	5,100	100	-5,000
	• Route 1, Harrington, e/o Rte. 1A	5,700	6,900	3,400	-3,500
	• Corridor "E", Cherryfield, s/o Rte. 182	-	-	11,600	11,600
Central Maine	• I-95, Hampden	27,500	40,100	44,700	4,600
Western Maine	• Route 27, Stratton, n/o Rte. 16	1,200	2,900	4,400	1,500
	• Route 2, Gilead, e/o Rte. 113	3,000	4,900	400	-4,500
	• Corridor "E", (Rte. 2) Gilead area, e/o Rte. 113	-	-	5,200	5,200

ENVIRONMENT (Natural and Man-Made)

Corridor "D"

Besides the environmental resources discussed above in the section concerning Engineering Considerations, within Corridor "D" there are numerous man-made and natural resources that must be considered when determining a highway alignment within the corridor. Those resources listed below are a preliminary baseline that would be expanded in any further studies.

These resources included but are not limited to:

Three *Outstanding River Segments*: portions of the Kennebec, Sandy, and Rapid Rivers. Known *Historic Resources* in Pittsfield, Hinckley, Peru, Dixfield, Rumford, and other surrounding areas. Water Districts and well heads in Skowhegan, Norridgewock, New Sharon, Farmington, Mexico vicinity and Rangeley.

The Appalachian Trail crisscrosses through western Maine. Maine Public Lands owns large tracts of lands west of I-95 that are utilized for recreational purposes including land in the vicinity of the Bigelow Range adjacent to Flagstaff Lake. Mount Avery Peak, within the Maine Public Lands at Bigelow is a *National Natural Landmark*.

The Chain of Ponds area consists of significant wetland resources that will require considerable avoidance and minimization efforts during the selection and analysis of corridors and alternatives determined for further study.

Corridor "E"

Resources in the vicinity of Corridor "E" are similar to Corridor "D" at the east end of the corridor. Those resources listed below are a preliminary baseline that would be expanded in any further studies.

To the west additional resources include:

Maine Public Lands owns large tracts of lands west of I-95 that are utilized for recreational purposes, including lands in the vicinity of Grafton Notch State Park. Water Districts and Well Heads in Augusta, China, Oakland to Smithfield, Auburn and Norway.

There have been numerous archaeological sites located within the central Maine corridor identified by Corridor "E".

Table 3.5 summarizes the more important environmental resources within the alternative corridors that need to be ultimately considered in a future project decisions.

Table 3.5
Summary of Potential Environmental Concerns

	Alternative "A"	Alternative "B"	Alternative "C"	Alternative "D"	Alternative "E"
Potential Significant Resource	• *Wetlands* - Milo, Orneville, Monson • *Atlantic Salmon* - Piscataqua River • Moosehead Lake • Appalachian Trail	• Moosehorn National Wildlife Refuge • White Mountain National Forest • *Atlantic salmon* - Various rivers • *Historic Districts* - Pittsfiled, Skowhegan, Rumford	• Moosehorn National Wildlife Refuge • *Atlantic salmon* - Various rivers • *Historic Districts* - Pittsfiled, Skowhegan • Appalachian Trail • *National Natural Landmark* - Bigelow Mountain • Chain of Ponds • *Historic Site* - Cathedral Pines	• Moosehorn National Wildlife Refuge • *National Natural Landmark* - Bigelow Mountian • Chain of Ponds • *Historic Site* - Cathedral Pines • Appalachian Trail • *Atlantic salmon* - Various rivers • *Historic Districts* - Pittsfiled, Skowhegan • US Fish & Wildlife refuge - Edmunds	• Moosehorn National Wildlife Refuge • *Atlantic salmon* - Various rivers • White Mountain National Forest • US Fish & Wildlife refuge - Edmunds • Grafton Notch State Park • *Historic Districts* - Rumford
Potential Areas of Concern	• *Outstanding River Segments* - Kennebec, Piscataqua Rivers • *Public Lands* - Springfield, Carroll Plt. • *Aquifers* - Lincoln, Long Pond, Jackman	• *Outstanding River Segments* - St. Croix, Kennebec, East Machais, Narraguagus, and West Branch Union Rivers • *Archoeology Sites* - along Route 9 • "Whalesback" in Aurora	• *Outstanding River Segments* - Carrabasset, St. Croix, Kennebec, East Machais, Narraguagus, and West Branch Union Rivers • *Archoeology Sites* - along Route 9 • "Whalesback" in Aurora	• *Outstanding River Segments* - Carrabasset, Sandy, Rapid, St. Croix, Kennebec, East Machais, Narraguagus, and West Branch Union Rivers • *Archoeology Sites* - along Route 9 • "Whalesback" in Aurora	• *Outstanding River Segments* - St. Croix, East Machais, Narraguagus, and West Branch Union Rivers • *Archoeology Sites* - along Route 9 • "Whalesback" in Aurora

G. ECONOMIC IMPACT

The implications of projected corridor traffic conditions on the Maine economy, measured in terms of future job creation, output and income levels has been assessed[1]. This analysis focused on the broader direct, indirect and induced impacts of different corridor locations on Maine's overall economy. For each conceptual corridor, the implications of future transportation cost savings to businesses, including the competitive position of the State's major industrial sectors, were addressed using an economic model which was also used to distribute these impacts among nine regions of the State.

Table 3.6 shows the projected year 2015 and year 2030 change in employment, personal income, real disposable income, gross state product, and population for conceptual Corridors "D" and "E". The analysis of economic impacts assumed a no-toll financing option, with 80% federal and 20% state funding. This scenario was selected for presentation because it generates the highest potential economic impact among the various financing scenarios tested. As shown in Table 3.6, conceptual Corridor "D" has a somewhat greater economic impact than that generated from Corridor "E". By the year 2030 statewide employment is forecast to increase to 3,685 jobs under the Corridor "D" scenario. Other outputs of the economic model, relative to Corridor "D" show potential annual gain of $216 million on gross state product and $196 million in real disposable personal income. The population effects of Corridor "D" indicate a potential net population difference of more than 6,312 people.

Table 3.6
Summary of Economic Impacts

	Corridor "D"		Corridor "E"	
	Year 2015	Year 2030	Year 2015	Year 2030
Employment	1,927	3,685	1,804	3,226
Personal Income ($Million/year)	114	328	102	291
Real Disposable Personal Income ($Million/year)	92	196	82	171
Gross State Product ($Million /year)	83	216	79	192
Population	2,694	6,312	2,054	5,484

Table 3.7
Distribution of Year 2030
Employment Impact By Region

Region	Corridor "D"	Corridor "E"
Aroostook	2.2%	1.4%
Hancock-Washington	29.0%	23.2%
Penobscot-Piscataquis	20.8%	12.4%
Kennebec-Somerset	14.0%	6.4%
Waldo-Knox	10.5%	4.2%
Lincoln-Sagadahoc	0.8%	2.1%
Cumberland	10.1%	27.3%
Androscoggin-Franklin-Oxford	10.4%	15.1%
York	2.2%	7.9%

When analyzing employment gain realized from both Corridors "D" and "E" , approximately 65% of the gain is forecast to occur in service and retail trade. As shown in Table 3.7, the regional distribution of the employment gain associated with Corridor "D" indicates that it is concentrated primarily in the northern and central portions of Maine (Hancock-Washington-Penobscot-Piscataquis Counties) where the highway corridor would be located. The majority of the job impacts associated with Corridor "E" are shown to benefit the southern and western most counties of the State. The income and population effects of each corridor exhibit similar regional distributions.

[1] Maine East-West Highway: Economic Impact Analysis, Phase III Technical Report: Economic Impacts, RKG Associates, August 1999

H. COST ESTIMATE

Based on consideration of such factors as known geological and topographical constraints, access to population centers, and highway network configuration, hypothetical roadway alignments were established within each corridor for the purpose of estimating relative highway mileage and construction cost. These costs, expressed in terms of constant 1999 dollars are summarized Table 3.8 below.

Table 3.8
Construction Cost Estimate

Corridor "D"	Calais to Brewer	Pittsfield to Coburn Gore	Total Corridor
Length	106 miles	121 miles	227 miles
Roadway, 4-lanes	$265,000,000	$302,500,000	$567,500,000
Interchanges		$4,500,000	$4,500,000
Bridges	$70,000,000	$120,000,000	$190,000,000
Engineering	$100,500,000	$128,100,000	$228,600,000
Right of Way	$18,550,000	$24,200,000	$42,750,000
Environmental Mitigation	$63,600,000	$72,600,000	$136,200,000
Corridor Total	$517,650,000	$651,900,000	$1,169,550,000

Corridor "E"	Calais to Brewer	Auburn to Gilead	Total Corridor
Length	106 miles	50 miles	156 miles
Roadway, 4-lanes	$265,000,000	$125,000,000	$390,000,000
Interchanges		$4,500,000	$4,500,000
Bridges	$70,000,000	$50,000,000	$120,000,000
Engineering	$100,500,000	$53,850,000	$154,350,000
Right of Way	$18,550,000	$15,000,000	$33,550,000
Environmental Mitigation	$63,600,000	$30,000,000	$93,600,000
Corridor Total	$517,650,000	$278,350,000	$796,000,000

would have been completed with traditional government financing by committing $58 million of provincial funds per year for 26 years.

Public/private ventures can take several forms, with varying degrees and types of private capital at risk. Most public/private transportation infrastructure projects depend heavily on tolls or other dedicated revenue streams for financing, construction, and maintenance and operations. **Innovative financing measures generally shift the burden of costs from the current users of highways in general—payers of taxes on motor fuels, and other taxes and fees imposed on motorists—to future general taxpayers, motorists in general, and users of the specific projects built with innovative financing.** It must be recognized however, that such public/private ventures can create new problems and risks for both the private and government entities involved in the project.

Lastly, findings and conclusions will be presented in order to focus the discussion about financing the improvements and/or construction of an east-west highway in Maine.

B. FINANCING THROUGH PUBLIC SOURCES OF REVENUE

The National Corridor Planning & Development Program and the Coordinated Border Infrastructure Program

Two new opportunities are available to states for trade corridor and border-crossing-region construction and improvements as a result of the recently passed TEA-21 legislation. They are Section 1118, the National Corridor Planning and Development Program, and Section 1119, the Coordinated Border Infrastructure Program. Both programs are new initiatives and have a combined appropriation of approximately $124 million annually for each of the fiscal years 1999 through 2003 for programs nationwide.

Section 1118 authorizes the United States Secretary of Transportation to make grants to states for the planning, design, and construction of national trade corridors. The corridors eligible are (a) the high priority corridors listed in section 1105 of ISTEA (Maine is not within any of the corridors listed), and (b) any other significant regional corridor selected by the Secretary. Funds are available for corridor planning activities, feasibility studies, multistate and intrastate coordination for corridors, and routing studies. Funds are also available for environmental review and construction, but only after the completion of a corridor development and management plan. The criteria for selection are very competitive. They include the increase in annual truck volume since NAFTA, a projected increase in traffic on the corridor, the volume of international trucks that move through the state, the use of innovative financing, the reduction of travel time, and the degree of multistate and international planning.

Section 1119 designates funds for border-crossing infrastructure in order to "improve the safe movement of people and goods at or across the border between the United States and Canada..." This is a new program, and funds may only be used in a "border region." The term "border region" is defined as being within 100 km (62 miles) of the U.S./Canada or U.S./Mexico border. Eligible uses include: improvements to transportation infrastructure, construction of highways and related safety and safety-enforcement facilities, operational improvements (such as the implementation of Intelligent Transportation Systems (ITS) technology, modifications to regulatory procedures to expedite cross-border vehicle and cargo movements, and activities of federal inspection agencies. Selection is based upon expected reduction in travel time, improvements in safety, strategies to increase the use of existing underutilized border-crossing facilities, the degree of multinational involvement and coordination, and the demonstration of local support and coordination with federal inspection agencies.

As noted above, the Legislature required MDOT to submit an application for funds under this program. Maine, New Hampshire, and Vermont submitted an application for a $12 million grant for improvements to the Route 9/Route 2 corridor. The Federal Highway Administration set a submission deadline of January 11, 1999 for applications. FHWA rules discourage applications greater than $13 million. A total of 151 applications totaling over $2 billion were evaluated. Since the amount available for allocation is about $124

million, many applications were not funded while others were funded at less than the total requested. As stated above, Maine, New Hampshire, and Vermont received $1.5 million under this program in May 1999.

The Transportation Infrastructure Finance & Innovation Act (TIFIA)

In recent years, the gap between revenues available from traditional sources, and the costs of expanding and maintaining transportation infrastructure has been growing ever wider. Another new possibility for public financing of a large transportation infrastructure project is seen in Sections 1501-1504 of TEA-21, the Transportation Infrastructure Finance & Innovation Act (TIFIA). This new program allows the U. S. Department of Transportation to provide credit assistance (direct loans, loan guarantees, and lines of credit) directly to public/private sponsors of major surface transportation markets to assist them in gaining access to the capital market. FHWA will evaluate and select eligible projects based on a variety of factors, including national significance, creditworthiness, the generation of economic benefits, and private participation. Under this program, the federal government provides credit, not cash, for projects with a dedicated revenue stream. The benefit for a state is that it can access bonds and capital at lower rates than it can usually obtain.

TEA-21 authorized $80 million in appropriations from the Highway Trust Fund in fiscal year 1999 for up to $1.6 billion in principal amounts of federal credit instruments. Over the five-year life of TEA-21, approximately $10.6 billion of direct loans, loan guarantees, and lines of credit to support up to 33 percent of project costs is available under this program. Eligible projects include United States Title 23 highway projects, United States Title 49 capital transit projects, international bridges and tunnels, intercity bus and rail projects, and publicly owned intermodal freight transfer facilities on or adjacent to the National Highway System. The requirements for participation for this program are that the financed project must cost at least $100 million or 50 percent of the State's annual apportionments (currently, Maine's annual apportionment is approximately $120 million), and the project must be supported by user charges or other dedicated revenue streams.

State Infrastructure Bank (SIB) Pilot Program

Section 350 of the National Highway System Designation Act of 1995 enacted a State Infrastructure Bank (SIB) Pilot Program. A SIB is an investment fund that provides loans, or other forms of financial assistance, to public or combined public/private sponsors of transportation projects. Such loans or forms of financial assistance can be credit enhancements, subsidized interest rates, letters of credit, or debt financing. As loans are repaid through tolls, user fees, or other dedicated revenue, the proceeds can be re-lent to fund additional projects. SIBs give states greater flexibility in financing transportation projects than they have under the standard financial regulations of the federal-aid highway program. By providing flexibility, SIBs can help states get projects under way sooner. For example, only the first round of SIB projects must comply with federal conditions on financial aid such as the prevailing-wage requirements of the Davis-Bacon Act. Subsequent rounds of projects would be exempt from these and other traditional conditions of federal aid. SIBs help make federal aid go farther because loan repayments are available for additional projects. TEA-21 authorized SIB programs for a small number of states. Pending federal legislation would extend SIBs to all states.

Maine currently has a $2.54 million SIB account. Maine law restricts state loans under the Maine SIB to loans for municipalities. State law would need to be amended to allow loans to a toll authority or a private franchise operator. It appears that SIBs are of limited usefulness for financing major projects in Maine, since the state would have to turn to capital from bond markets for such projects. For example, Maine's SIB would be unable to finance a $200 million loan if the state does not have $200 million in its SIB account. Amendments to federal law allowing additional federal capitalization of the SIB would benefit Maine and might allow modest use of the SIB for projects such as an east-west highway. The SIB program requires a nine-year disbursement rate for capitalization of highway funds. For example, state highway agencies, such as Maine DOT, may only capitalize their SIBs with FY 1996 & 1997 apportionments.

The current Maine SIB program, as structured under state and federal law, assists in a small portion of Maine's highway improvement program.

Federal Grant Anticipation Revenue Vehicle (GARVEE) Bonds

Another avenue for states to finance large infrastructure improvements is through a Federal Grant Anticipation Revenue Vehicle (GARVEE) bond. A GARVEE refers to any financing instrument for which principal and/or interest is repaid with future federal-aid highway funds. The debt is issued in anticipation of the receipt of future federal-aid grant reimbursements. The general GARVEE bond concept can be applied in one of two ways. First, a 'direct' GARVEE bond is a bond for which federal assistance directly reimburses debt service paid to investors in a debt-financed federal-aid project. The 'direct' GARVEE may be structured to establish a direct relationship between debt service payments and liquidating cash from the federal-aid highway program. Secondly, through an 'indirect' GARVEE reimbursement, federal funds reimburse expenditures on other federal-aid projects, and the state then uses a portion of those funds for debt service on the debt-financed project. Some states using GARVEEs have structured their debt so that other state funding sources may be sought in the event of unexpected shortfalls. For example, the Commonwealth of Massachusetts could potentially be required to direct 10 cents of its 21-cent state fuel tax toward payment of debt if federal-aid falls below a certain threshold nationwide and other circumstances occur. The indirect reimbursement strategy might not work well in cases where a state has comparatively few advance construction projects and a short construction season. These conditions suggest a less liquid stream of federal-aid reimbursements, and the unpredictability of the funds might limit the apparent security of the credit. GARVEEs must be reconciled with the stated legislative intent to not diminish commitment to the existing Maine road system. It would appear that GARVEEs would, by definition, commit funds MDOT would otherwise use for its normal road and bridge program. Similar to GARVEEs, grant anticipation notes (GANs) may be issued to obtain funding prior to the receipt of guaranteed grant revenues.

Other Initiatives

TEA-21 has many other new provisions that are aimed at giving states like Maine greater flexibility when participating in federal-aid projects. Section 1108 allows federal funds to be matched across a state's full program, whereas previously, funds had to be matched on a project-by-project basis. In Section 1301, TEA-21 allows states, for the first time, to use publicly owned real property donated for the use of a project, to count towards the nonfederal match on all federal-aid highway projects. According to FHWA, this substantially expands prior law that already permitted matching credit for private property donations, and provides more flexible ways for state and local governments to preserve corridors. Thus, the donation of public (i.e. Bureau of Parks and Lands) or private (forest products company) lands to a highway not only decreases the cost of project development, but 100 percent of the savings accrue to the state's share of any state/federal project. Section 1302 allows the federal share to vary over the life of a project as long as it does not exceed the maximum federal-aid limit. In other words, it removes the requirement that the federal matching ratio be applied to each progress payment to the state during the life of the project. This provision was developed to assist states like Maine to address any short-term cash flow issues associated with a long-term project like an east-west highway. Finally, Section 1303, allows income from right-of-way sales and leases to be used for Title 23 purposes. Essentially this means that states can now use income generated from the sale of right-of-way acquired with federal assistance for a project for any other Title 23 activity. While not providing any additional funds, this change does allow the state greater flexibility on how it spends these funds.

TEA-21 also allows for greater flexibility by making approval for 'design-build' contracting for large infrastructure projects easier to obtain from the federal government. The project must have a total cost of no less than $50 million. The term 'design-build contract' means an agreement that provides for design and construction of a project by a contractor, regardless of whether the agreement is in the form of a design-build contract, a franchise agreement, or any other form of contract. The design-build method is meant to reduce total project costs by privatizing the design stage of project development. It typically results in public sector savings, yet is viewed cautiously by

the contracting industry. Design-build, however, is an expected component of most project franchises, as discussed below.

While there is no single answer to innovative financing of large-scale infrastructure projects, there do appear to be many avenues in place that might help make a project happen. It is important to note that what can or has worked in one situation in another state or province may or may not work in Maine. A significant amount of further investigation would need to be performed in order to determine the viability of using any of these programs for the construction and/or improvements to an east-west highway.

C. PROJECT FRANCHISES FOR NEW INFRASTRUCTURE

Public/private partnerships represent a different procurement process for infrastructure than the bond finance and competitive bidding for design and construction traditionally used by the public sector. The same basic franchise structure is used throughout the world, with minor local variations. Development franchise agreements expand on more traditional project delivery methods by allowing private firms to provide a comprehensive package of services including finance, design, construction, operation, and revenue collection. Under a development franchise agreement, a government agency offers a private entity or a quasi-public toll authority an opportunity to finance and build a given facility. In return, the developer is granted rights to operate, maintain, and collect revenues from the facility for a specified period of time. Most development franchise agreements limit this amount of time to some period between 20 and 50 years. After this revenue collection period expires, the developer transfers control of the facility to the tendering agency, usually free of charge.

In this manner, the government acquires at virtually no cost a facility that it would otherwise have had to finance, build, and maintain itself. When public/private partnerships provide transportation infrastructure *gratis* that the government would have eventually had to finance through tax revenues or other fees, public/private partnerships replace taxation with privately collected user fees or other forms of remuneration to pay for infrastructure. This aspect of private finance has not gone unnoticed by the public. That toll financing for highway improvements is little more than a supplement to tax revenue from traditional sources is most succinctly expressed in the acronym chosen by a leading opposition group to the California-modeled public/private partnerships program in Washington State. The group is known as T.R.U.S.T., which stands for "Tolls Represent Unfair State Taxes". Recognizing the public relations problems associated with private revenue collection in lieu of public expenditure, Arizona enabling legislation for public/private partnerships allows for reimbursement of motor vehicle fuel taxes in the amount paid to private-sector toll operators, although the legislature was much less precise about how this would be implemented.

Three phases define the life cycle of a franchise. The ***planning phase*** groups all activities that typically occur prior to groundbreaking, including conceptual planning, design development, engineering, public involvement, government approval, permitting, finance, and land acquisition. The ***construction phase*** follows. The ***operation phase*** typically has the longest duration, since the franchisee is given this period of time to recover its capital invested during the construction phase. Responsibility during the planning phase varies between agreements. On some projects, the government makes the majority of planning and design decisions before involving the private sector. On other projects, the private developer becomes involved very early by submitting a proposal suggesting that a given project be implemented.

The three main types of project franchises are classified below according to the temporal distribution of responsibilities they allocate to the private sector. They are discussed in increasing order of private responsibility. For the purpose of comparing franchise types, responsibility is measured as a function of equity involvement or other financial participation in the benefits and costs associated with any decision in the various phases of a project.

Build-Transfer-Operate

The build-transfer-operate model was pioneered in the 1991 development franchise agreement for the SR91 Express Lanes in California. Adapted from the more common build-operate-transfer model, it was designed to provide additional protection to the private sector from tort liability during the operation phase. In the litigious United States, concerns that inevitable accidents on the toll road during its 35-year franchise would expose the private sector to unacceptable risk prompted the state to assume ownership of the facility immediately after construction. Sovereign protections from liability protect governments from tort claims on public property, but do not apply to private developers. Instead of owning the facility during operations, the private sector enters into an operating lease before the facility opens to traffic.

Build-Operate-Transfer

The build-operate-transfer model is the oldest and most popular form of development franchise worldwide. Under this approach, the private sector acquires right-of-way or an existing facility prior to construction, makes improvements, operates and collects revenues under the terms of the agreement, and transfers the facility back to the public sector upon expiration of the franchise. Early infrastructure development charters evolved into the build-operate-transfer franchises used today.

Build-Own-Operate

The build-own-operate model represents a perpetual franchise in that the private developer is never obligated under the franchise agreement to transfer the project to the public sector. Proponents of the build-own-operate franchise type argue that it is a much simpler transaction to negotiate than other types, because contract language describing acceptable performance and maintenance conditions at transfer need not be codified in the agreement. When the project involves purchasing an existing state-owned facility for upgrade, this type of franchise is very similar to a divestiture of public property. One example of a build-own-operate project franchise is the Maine Turnpike Authority.

Advantages of Project Franchises

- May be planned and constructed more quickly than publicly financed projects; incentive to generate revenue quickly; revenues for upfront financing may be more readily accessible.
- Reduces capital demands on the public treasury.
- Improved response to market forces when user fees are paid at the point of use.
- Private sector may enjoy economies of scale, scope, and experience in production and management of a large portfolio of infrastrucure projects.
- Private sector may be exempted from some government procurement rules, thereby saving on cost.
- Privately developed transportation projects may pay property and income taxes.

Risk Mitigating Strategies

The ***build-transfer-operate*** franchise model mitigates tort liability risk by transferring ownership of the facility to the public between construction completion and opening day. The public sector assumes responsibility for damages due to accidents, weather, or other factors sustained by users of the facility.

Provision of ***geographic protections from competition*** in development franchise agreements reduces competition from the parallel facilities risk. Development franchise agreements protect the private sector from competition by alternate routes, by defining geographic zones within which the government agrees not to make or franchise capacity improvements.

Government guarantees or ***subsidies*** preclude revenue shortfalls or cost overrun effects. When a project is not sufficiently profitable to attract financing on the private capital markets based solely on its own revenue potential, public authorities may choose to retain certain risks at their expense to encourage development. Partial government funding of a public/private partnership project during the construction period or early years of operation can provide shelter from the cost overrun or revenue shortfall effects of many risks, especially in the critical early years of operation. Costs that the government can subsidize can be identified in all phases of a project: planning services, financial credit enhancements, right-of-way, construction bonding requirements, taxes, and operation services.

Provision of ***protections from unilateral government actions*** decreases private sector contract management risk. Many development franchise agreements provide specific assurances to developers that future changes in government policy will not threaten the viability of a transportation investment. Enabling legislation in many states includes forms of contract clauses intended to reduce investors' uneasiness when entering into long-term agreements with the government.

Rate-of-return regulation relieves risks of higher total project cost, public opposition, and inefficiency. Rate-of-return regulation, similar to that applied to public utilities, is used in most development franchises to protect the public from the risk of monopoly behavior by the private sector. Rate-of-return regulation targets excessive returns on the capital employed in developing the project. There are two main approaches to rate-of-return regulation—regulation imposed by a public utility regulatory commission or by provisions within the franchise agreement.

Setting up ***escrow accounts for maintenance*** reduces the public sector contract management risk. Franchisee default risk during operations and contract management risk associated with poor

Risks to the Public Partner

- Higher total project cost risk
- Project selection risk
- Contract management risk
- Public opposition risk
  - ✓ Commingling of public and private funds
  - ✓ Privately-funded road improvements mean tolls.
  - ✓ Noncompetitive developer selection
- Risk of monopoly behavior by the private partner
- Risks due to lack of competition
  - ✓ Gold-plating risk
  - ✓ Technology resistance risk
  - ✓ Franchise perpetualization risk

Risks to the Private Partner

- Public opposition risk
- Approvals and permits risk
- Land acquisition risk
- Competition from parallel facilities risk
- Transportation system changes risk
- Tort liability risk

facility condition at transfer are frequently mitigated by requiring the franchisee to contribute to a maintenance escrow account over the life of the franchise.

Safety enforcement by the public partner alleviates public sector contract management risk. Outsourcing patrolling to the public police department with jurisdiction over the facility has been used to reduce the contract management risk to the public that the private operator will not effectively enforce traffic laws. ***Traditional risk-management techniques*** lessen the public sector contract management risk, revenue shortfall or cost overrun effects, and tort liability risks. To avoid these risks, public and private participants commonly use performance bonds, contingencies, insurance policies, and hedging.

Getting broad-based public support alleviates public opposition and private sector contract management risks. If ***tailored financing for the infrastructure*** is created, the risks of revenue shortfall, cost overrun, and higher total project cost will be allayed. ***Planning should be left to the public partner*** to relieve the risks associated with project selection, public opposition, approvals and permits, land acquisition, and transportation system changes. ***Separating the project selection process from developer selection*** will also relieve risks associated with project selection, public opposition, approvals and permits, and land acquisition.

The risks of revenue shortfalls or cost overruns will be minimized if projects are ***designed to enhance feasibility***. By creatively offering services that competing facilities do not provide, developers may mitigate user-fee revenue risks. For example, toll roads often offer advantages in travel time, travel comfort, or other amenities which distinguish them from their free counterparts. The reliability of reduced travel time may attract customers, as might the benefits associated with development, either peripherally or parallel, to a toll facility. Real estate appreciation is often the largest potential benefit created by a transportation project. Revenue from peripheral development may be captured from appreciation of property located in the airspace above the facility, beneath it, adjacent to it, along routes serving it, or may consist of rights to large tracts of land made developable by general access improvements created by the facility. Whoever owns the land near a newly developed transportation facility has an opportunity to make money, either through sale or rental of land, sale of natural resources, sale of concessions, or through other business ventures. Opportunities for development parallel to the corridor also exist for other transportation operations or utilities.

Public/private partnerships are not applicable to every project. Because only a small minority of all projects are able to support themselves, private capital can only be a supplement to public financing of transportation facilities. Especially in developed countries where existing conditions impose costly construction obstacles and competing routes are commonplace, most projects will still need to be developed by traditionally publicly funded means. In order to employ private capital for as many projects as are eligible, projects with potentially suitable benefit-cost relationships must be selected over the rest. An additional step is added to the traditional public planning process to determine those relationships.

In the Appendix are condensed case studies of several highway construction projects which used innovative financing through public/private partnerships and other financing methods available through federal and state transportation legislation.

CASE STUDY ANALYSIS
HIGHWAY CONSTRUCTION PROJECTS WITH PUBLIC/PRIVATE PARTNERSHIPS

The chart below shows a range of innovative financing approaches and/or public/private partnerships in highway improvements projects in the USA and Canada which compare to the East-West Highway concept in Maine. More expanded descriptions of the case studies appear in following pages.

	New Brunswick Fredericton-Moncton	Massachusetts Central Artery/ Tunnel	Massachusetts Rte. 3 North Expansion	New Mexico Corridor 44 Expansion	California San Joaquin Hills Corridor	Virginia Dulles Toll Road Extension	Nova Scotia Cobequid Pass
Length	195 kilometers	7.5 miles	21 miles	140 miles	15 miles	14 miles	45 kilometers
Scope	Build new 4-lane, controlled access highway.	Build/reconstruct urban highways in Boston, some underground.	Add capacity; improve interchanges; build & reconstruct bridges.	Expand highway from two to four lanes.	Build new 6-lane, limited access tollway w/bridges, interchanges, environmental enhancements.	Built extension of Dulles Toll Road from Dulles Airport to Leesburg.	Built 4-lane, limited access bypass of Trans-Canada Hwy. 104 w/interchanges, bridges, undrpasses.
Enabling Legislation	Yes	To approve bond amt. & create GAN trust fund.	Yes	Annual appropriations must be approved.	Yes	Yes	Yes
Cost	$877 million	$10.8 billion	$200 million	$295 million	$1.5 billion	$326 million	$113 million
Planning	Province	State	State	State	State		Province
Concession / Franchise Agreement	Independent issuer sells bonds; then lends proceeds to developer who designs, builds, operates, maintains facility; subleases to Province which retains ownership of land.	No, project is managed by MHD. Design & construction managed by management consultant.	Development team designs, constructs, operates, & maintains project, with state reimbursing costs. Agreement may permit state to lease the facility, ROW, & its airspace.	State contracts w/private developer to design, construct, warranty, & partially finance. Warranty is secured by surety bond. State performs normal non-pavement maintenance.	Private firm designs and builds the project; state assumes ownership & maintenance upon project completion.	Franchise agmt. authorized TRIP to construct the facility. TRIP has concession to operate for 35 yrs. Low traffic has led to income & debt retirement problems.	Hwy. 104 Western Alignment Corp. owned by prov. govt., established by legis-lation to manage financing, design, construction, opera-tion, & maintenance of facility.
Financing & Revenues	Independent issuer sells bonds, then lends proceeds to developer to finance project. Developer subleases facility to Province & collects tolls to help finance. *Bonds are secured by absolute assignment of lease payments. Assign-ments of lease pay-ments to the Province at $58 million per year for 26 years.*	Financed w/federal & state funds, tolls, & contributions from Mass. Port & Turn-pike authorities. $600M GANs issued, w/pledge of future fed hwy aid to retire debt – ISTEA innovative financing. *Bonds secured by toll funds & federal & state hwy. approp.*	Financed privately, with state paying back costs without toll revenue; however, because it's a lease situation, debt will not constitute debt on the state. *Financing is secured by lease payments by the commonwealth.*	NM Fin. Auth. issued $287M bonds. TEA-21 allows state to pledge future fed. hwy. funds to repay bonds. State used state funds to pay $21M for a 17-mi. section (soft match). *Bonds secured with future federal highway funds.*	SJHTCA Board authorized issuance of $1.2B tax-exempt, nonrecourse toll revenue bonds. *Revenue from tolls will retire debt.*	Privately financed. Plan is that *toll revenue will retire debt.* So far, toll revenue insufficient. State regulates tolls, but can't 'bail out' developer if revenue is insufficient. *Financing secured by first mortgage & security interest in developer's right, title, & interest in the facility.*	No provincial debt, but N.B. contributes $27.5M; federal $27.5M; $5.5M subordinated notes from pension fund; $60.9M from sale of nonrecourse revenue bonds to private investors underwritten by NCG of Toronto. Toll revs give return to investors, pay for O & M.

D. TAX INCREMENT FINANCING & HIGHWAY CONSTRUCTION PROJECTS

Tax increment financing (TIF) is a funding mechanism available to municipalities for creating and improving development districts. Recognizing that the state, as well as municipalities, shares in the benefits of responsible new development, the state may also participate in a local program for improving a district to enhance local efforts for economic or commercial development, or both, and to expand employment opportunities.

A municipality may designate development districts within its boundaries. At least 25%, by area, of the real property within a development district must meet at least one of the following criteria: it must be a blighted area; it must be in need of rehabilitation, redevelopment or conservation work; or it must be suitable for industrial sites. The total area of a single development district may not exceed 2% of the total acreage of the municipality, and all development districts within a municipality may not exceed 5% of the total acreage of the municipality. The aggregate value of equalized taxable property of a tax increment financing district, plus all existing tax increment financing districts, may not exceed 5% of the total value of equalized taxable property within the municipality.

The legislative body of a municipality must adopt a development program for each development district which must be completed within 5 years of the designation of the tax increment financing district. Within the development program, the municipality may acquire, construct, reconstruct, improve, preserve, alter, extend, operate, maintain, or promote development intended to meet the objectives of the development program.

The tax increment is calculated by subtracting the original assessed value of the property from the assessed value of the improved property. All or part of the increment can be used to pay for the district's development and improvement costs through a development program fund consisting of (1) a development sinking fund account pledged to and charged with the payment of the interest and principal due on notes, bonds, or other indebtedness that were issued to fund or refund the cost of the development program fund; and (2) a project cost account that is pledged to and charged with the payment of project costs as outlined in the financial plan.

Because TIFs are a way for *municipalities* to encourage economic development within their boundaries and a method for the *state* to reap some of the tax benefits from increased business activity, TIFs are not an appropriate funding mechanism for the construction of roadways which cross numerous municipal boundaries. An appropriate use of TIF districts, however, might be for municipalities to encourage concession businesses or other types of economic development pursuits in TIF districts *parallel* or *adjacent* to the transportation corridor. TIF funding, as we know it today in the state of Maine, could not be used to pay for the actual construction of public highway improvements which cross municipal borders. Neither has the state of Maine, to this point, enacted legislation which enables the state to join with municipalities to form *transportation benefit districts*, as does the State of Washington.

E. TOLL FINANCING

An analysis of the feasibility of financing all or part of the east-west highway improvements through the collection of tolls has been prepared. The results of this analysis are presented in a separate report.

G. SUMMARY OF FINDINGS

The financing required for new east-west highway infrastructure cannot detract from the maintenance and upkeep of Maine's existing roadways. It is therefore imperative that new sources and opportunities for funding be considered. Many of the financing alternatives presented in this Chapter all have been found to have some application to the types of highway improvement under consideration. However, no single option can practically and reasonably satisfy the total capital need. It is envisioned that the ultimate project financing "package" would consist of a combination of the options presented. Fundamental to all these alternatives is a guaranteed revenue stream such as that which could be derived from the collection of tolls. The ultimate decision to proceed with a capital program to improve Maine's east-west highways will require a more comprehensive analysis of financing options than is presented here.

Application For Funding Under The National Corridor Planning and Development and Coordinated Border Infrastructure Programs

On January 13, 1999, Maine, New Hampshire, and Vermont requested funding under both the National Corridor Planning & Development Program and the Coordinated Border Infrastructure Program. The applicants believed that the proposed projects were eligible for funding under NCPD because of the significance of the Northern New England border corridor to the nation's economy, and under CBI because the projects are within 100 km of the Canadian border and will facilitate cross-border vehicle and cargo movements.

All three states made the proposed projects in the Northern New England border corridor a very high priority. The application had the support of the three state governments involved, as well as letters of support from the governments of the five Canadian provinces from Quebec eastward, (Quebec, New Brunswick, Prince Edward Island, Nova Scotia, and Newfoundland and Labrador). At the federal level, it was supported by the U.S. Customs Service and the U.S. General Services Administration. The application was also supported by a number of commercial and transportation alliances in northern New England and eastern Canada.

The proposed projects were as follows:

1) Calais/St. Stephen Area Border Crossing: $4,800,000

Construction of a new border crossing in the Calais, Maine/St.Stephen, New Brunswick area. The current crossing facilities, the busiest between Maine and Canada, are experiencing significantly increased commercial vehicle traffic. Both of the current facilities are inadequate to handle the current and anticipated future traffic, due to poor road geometry in the congested areas in which they are located. This situation results in unsafe traffic operations and costly delays. Furthermore, there is insufficient space available at the current crossing facilities to conduct meaningful commercial vehicle enforcement operations. Expansion of the current facilities is not an option due to limited available acreage and location. The need for a new facility has been recognized by officials from U.S. Customs, Canadian Customs, the Office of Motor Carriers, the U.S. General Services Administration, the Maine State Police Commercial Vehicle Enforcement Unit, and the transportation departments of Maine and New Brunswick.

2) Route 2 Reconstruction, Gilead, Maine: $2,000,000

Reconstruction is required to bring the road up to NHS standards. Average pavement condition of the current road is a substandard 2.63. MDOT data indicate an above average rate of crashes for the project area, with poor road geometry and insufficient pavement and shoulder widths seen as contributory factors. The project area is a critical link in the Northern New England Border Corridor and carries a significant percentage of commercial vehicle traffic.

3) Route 2 Reconstruction, Jefferson, New Hampshire: $2,400,000

Reconstruction and improved alignment of 4.67 km to bring the project area up to NHS standards. The project area has had a higher than average crash rate, including two fatal crashes. The project segment, which links three newly built roadways, has experienced a significant increase in traffic and is a priority for the New Hampshire DOT.

4) Vermont Route 2 Scoping Studies: $1,296,000

"Scoping" studies for two problem areas on Route 2. This process verifies problem definition with the locality, identifies alternatives, and produces the preferred alternative as a product. The study for the first problem segment, the higher order of priority for the Vermont Agency of Transportation, will address that part of Route 2 from the New Hampshire border to St. Johnsbury. This scoping study will investigate safety issues, identify truck passing lanes and shoulder expansions, as well as other needed improvements. The study for the second segment, from St. Johnsbury to Montpelier, will concern traffic calming, bypasses, and other traffic flow alternatives. The resulting studies will

become the guidance for future investment in these highway segments, which form part of Vermont's east-west corridor.

5) Route 2 Reconstruction, St. Johnsbury-Kirby, Vermont: $1,500,000

Existing capital project plan for reconstructing the worst section of Route 2 between St. Johnsbury and the New Hampshire border. There were 13 crashes on this 9.17 km segment. The application request is for just over one fourth of the $5.3 million total reconstruction cost. Funding has not been identified for the project. If awarded, the funding would move the project to the "definite" schedule and assure Vermont's allocation of state funds to cover the remaining project costs.

The Maine projects are identified in the MDOT's *Twenty-Year* and *Six-Year* plans. The state has already invested over $40 million in the Route 2/Route 9 corridor and plans to spend another $18.9 million there. The proposed projects are needed to ensure safe, efficient personal and commercial transportation on that corridor.

New Hampshire's project is included in New Hampshire DOT's *Ten-Year Transportation Program*. The state has already invested $10 million over the past two decades in the project area.

Vermont's scoping projects are consistent with the state's long-range transportation plan, and the St. Johnsbury/Kirby project is identified in Vermont's capital plan and budget. Vermont has invested $12.5 million on Route 2 in the past ten years. The current capital program contains about $31 million in planned capital improvements.

The Federal Highway Administration set a submission deadline of January 11, 1999 for applications. FHWA rules discourage applications greater than $13 million. A total of 151 applications totaling over $2 billion were evaluated. Since the amount available for allocation is about $124 million, many applications were not funded while others were funded at less than the total requested. As stated above, Maine, New Hampshire, and Vermont received $1.5 million under this program in May 1999.

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Appendix

- ✓ COMPARISON OF MAINE NON-FOREST PRODUCTS TRUCK WEIGHT LIMITS & TOLERANCES WITH THOSE OF THE EASTERN CANADIAN PROVINCES
- ✓ COMPARISON OF MAINE FOREST PRODUCTS TRUCK WEIGHT TOLERANCES WITH THOSE OF THE EASTERN CANADIAN PROVINCES
- ✓ PROFILE OF CROSS-BORDER TRAFFIC AT SELECTED MAINE/CANADIAN PORTS OF ENTRY
- ✓ NATURAL ENVIRONMENT INVENTORY
- ✓ 2-STEP NEPA PROCESS
- ✓ CASE STUDIES IN INNOVATIVE HIGHWAY FINANCE
- ✓ MAINE LAWS RELATING TO THE EAST-WEST HIGHWAY

COMPARISON OF MAINE NON-FOREST PRODUCTS TRUCK WEIGHT LIMITS & TOLERANCES WITH THOSE OF THE EASTERN CANADIAN PROVINCES

	MAINE			ONT	QUE	NB	NS	PEI	NF	*NOTES*
	INTER.	G. LAW	SP. COM.							1
AXLES:										
SINGLE	22,000	22,400	24,200	22,046	22,046	20,062	19,841	20,062	20,062	
TANDEM	34,000	38,000	46,000	42,108	39,682	39,682	39,682	39,682	39,682	5
TRIAXLE	45,000	48,000	54,000	53,792	48,501	57,319	57,319	52,910	59,524	2
GVW:										
2 AXLE	44,000	34,000	37,400	34,171	38,029	31,966	30,864	37,919	40,123	3
3 AXLE	60,000	54,000	59,400	50,705	55,666	51,808	50,705	57,540	57,540	3
4 AXLE	72,000	69,000	75,900	65,917	70,547	57,319	51,808	*Not Allowed*	74,956	3,5
5 AXLE	80,000	80,000	88,000	72,751	91,490	91,490	90,388	91,490	89,286	
6 AXLE	80,000	90,000	100,000	104,497	109,127	109,127	108,025	109,127	109,127	4

NOTES:

General: Tandems used for comparison are assumed to have an 8' spread; tridems, 12'.
Two- to four-axle vehicles are single-unit trucks; five- and six-axle vehicles are tractor-semitrailer vehicles.

1 - Maine: General Law is the maximum weight limit off of the Interstate Highway System; Special Commodity is the maximum weight tolerance allowed for vehicles carrying special commodities.

2 - Maine: Interstate triaxle limit is that allowed under the Bridge Formula for a 12' axle spread.

3 - Maine: Interstate gross vehicle weight limits indicated are those using the widest practicable axle spacing under the Bridge Formula.

4 - Maine: A 100,000 lb. General Commodity Permit is available for a fee.

5 - Prince Edward Island: Maximum spread on tandem is 6'; 4-axle single-unit trucks are prohibited.

INFORMATION CURRENT AS OF OCTOBER 1998.

COMPARISON OF MAINE FOREST PRODUCTS TRUCK WEIGHT TOLERANCES WITH THOSE OF THE EASTERN CANADIAN PROVINCES

(Special forest products limits or tolerances are in bold.)

	ME	ONT	QUE	NB	NS	PEI	NF	*NOTES*
AXLES:								
SINGLE	24,200	22,046	22,046	**21,605**	19,841	20,062	20,062	
TANDEM	46,000	**44,213**	**44,092**	**42,769**	39,682	39,682	39,682	1,2,3,4
TRIAXLE	64,000	53,792	**52,910**	57,319	57,319	52,910	59,524	1,5
G V W:								
2 AXLE	37,400	34,171	38,029	31,966	30,864	37,919	40,123	
3 AXLE	59,400	50,705	**60,075**	51,808	50,705	57,540	57,540	1
4 AXLE	75,900	**69,213**	70,547	57,319	51,808	NA	74,956	2,3,4
5 AXLE	88,000	72,751	**100,309**	91,490	90,388	91,490	89,286	1
6 AXLE	100,000	104,497	**122,355**	109,127	108,025	109,127	109,127	1

NOTES:

General: Tandems used for comparison are assumed to have an 8' spread; tridems, 12'.
Two- to four-axle vehicles are single-unit trucks; five- and six-axle vehicles are tractor-semitrailer vehicles.

1 - Quebec's special forest products tolerances will be eliminated on Jan. 1, 2000.

2 - Ontario: During winter freeze up, tandems may carry 46,319 lbs. and 4-axle trucks may carry 72,509 lbs..

3 - Ontario: These limits apply to Northwest Ontario Log Transportation Association members traveling on a designated system under permit.

4- Prince Edward Island: Maximum spread on tandem is 6'; 4-axle single-unit trucks are prohibited.

5 - Maine: Only applicable on a 4-axle single-unit truck.

INFORMATION CURRENT AS OF OCTOBER 1998.

CANADIAN NON-FOREST PRODUCTS TRUCK WEIGHT LIMITS
PERCENT DIFFERENCE FROM MAINE GENERAL LAW LIMITS

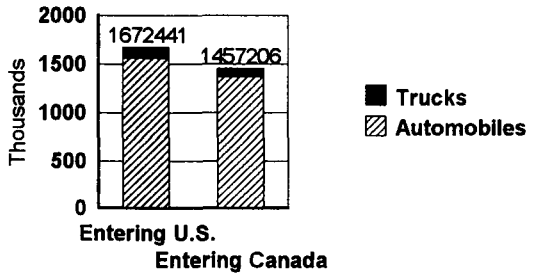
	ONT	QUE	NB	NS	PEI	NF
AXLES:						
SINGLE	-2	-2	-10	-11	-10	-10
TANDEM	11	4	4	4	4	4
TRIAXLE	12	1	19	19	10	24
G V W:						
2 AXLE	1	12	-6	-9	12	18
3 AXLE	-6	3	-4	-6	7	7
4 AXLE	-5	2	-17	-25	NA	9
5 AXLE	-9	14	14	13	14	12
6 AXLE	16	21	21	20	21	21

CANADIAN FOREST PRODUCTS TRUCK WEIGHT LIMITS
% DIFFERENCE FROM MAINE FOREST PRODUCTS LIMITS
(Provinces with special forest products limits or tolerances are in bold.)

	ONT	QUE	NB	NS	PEI	NF
AXLES:						
SINGLE	-9	-9	**-11**	-18	-17	-17
TANDEM	**-4**	**-4**	**-7**	-14	-14	-14
TRIAXLE	-16	**-17**	-10	-10	-17	-7
G V W:						
2 AXLE	-9	2	-15	-18	1	7
3 AXLE	-15	**1**	-13	-15	-3	-3
4 AXLE	**-9**	-7	-25	-32	NA	-1
5 AXLE	-17	**14**	4	3	4	2
6 AXLE	5	**22**	9	8	9	9

Calais/St. Stephen Crossing

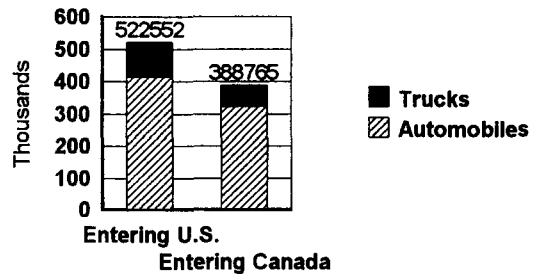
Total Vehicles (1997) - 3,129,647



Source: US Customs, Statistics Canada

Houlton/Woodstock Crossing

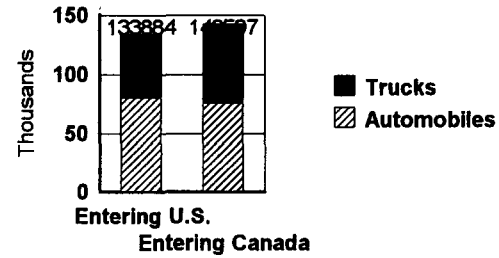
Total Vehicles (1997) - 911,317



Source: US Customs, Statistics Canada

Jackman/Armstrong Crossing

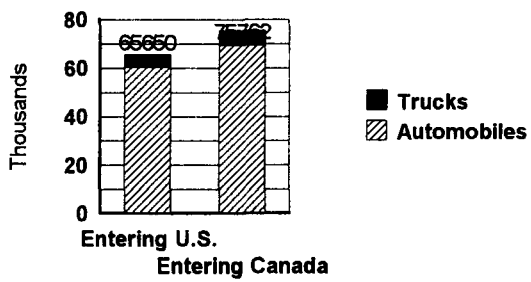
Total Vehicles (1997) - 276,481



Source: US Customs, Statistics Canada

Vanceboro/St. Croix Crossing

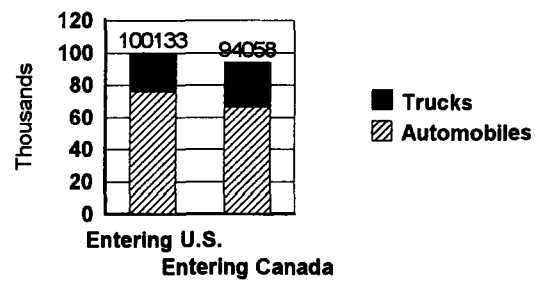
Total Vehicles (1997) - 141,412



Source: US Customs, Statistics Canada

Coburn Gore/Woburn Crossing

Total Vehicles (1997) - 194,191



Source: US Customs, Statistics Canada

Natural Environment Inventory

Resource	Existing Corridors: Calais to I-395 via Rte 9/46	Newport to Gilead via Rte 2	Newry to Upton/NH via Rte 26	Farmington to Coburn Gore via Rte 27
Air Quality Point data	1	5	1	1
Archaeology sites, Known	8	20	1	0
Aquifers w/ 5000m	10	34	10	11
Historic Districts, Known	5	9	0	0
Historic Sites, Known	4	27	0	1
6(f)LAWCON	7	12	3	4
NWI	1491	2621	243	1513
Pond/Lake rating:				
Good	0	1	0	0
Poor/Restorable	0	1	0	0
Priority	2	4	0	1
Sensitive	8	4	0	6
Stable	9	1	1	0
Outstanding River Seg.	5	1	0	2
Maine Public Lands	82	137	15	40
Public Water Supply	0	1	0	0
Refuge/Parks	Moosehorn	0	Grafton St. Park	Bigelow Preserve
Scenic Highways (mi.)	0	0	14.1 linear miles	47 linear miles
Streams within 1000m	374	1832	98	436
Stream classification:				
AA	5	1	0	0
A	32	17	2	19
B	11	58	1	3
C	2	2	0	0
Stormwater sensitive	0	2	0	0
Uncontrolled Haz Site	1	11	0	2

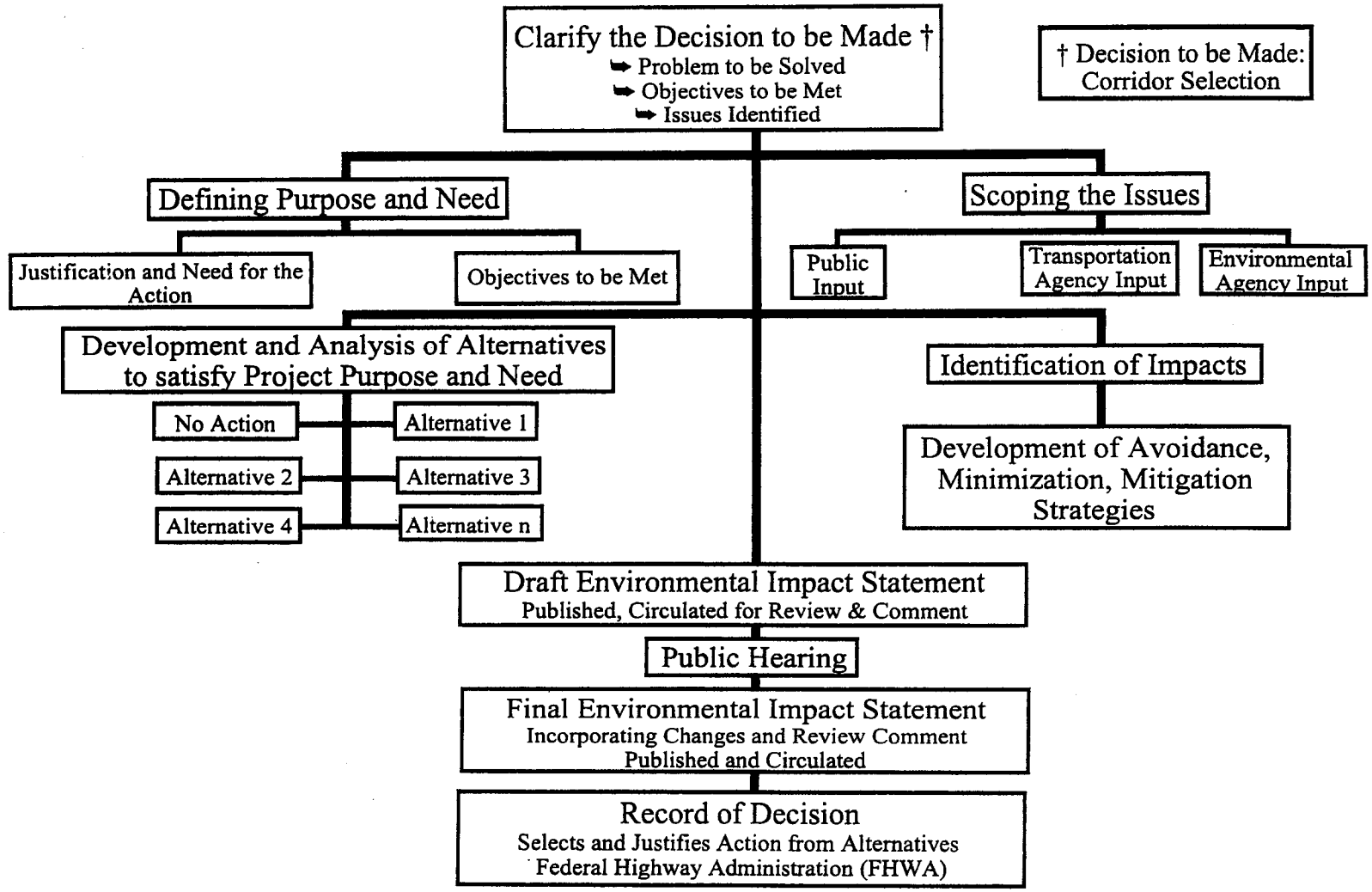
Haz. = Hazardous Waste
LAWCON - Land and Water ConservationFunded facility
m = meters
NWI = National Wetland Inventory
Information provided is based on preliminary investigation of the corridors.

Natural Environment Inventory

Resource	Existing Corridors				
	Skowhegan-Sandy Bay via Rte 201	Norridgewock - Kingfield via Rte 201A/16	Vanceboro-I-95 via Rte 6	Calais-Ellsworth via Rte 1	Ellsworth - I-95 via Rte 1A
Air Quality Point data	3	1	1	3	0
Aquifers w/ 5000m	20	5	8	21	2
Archaeology Sites, Known	5	2	0	1	
Coastal Waters Class.					
SA	0	0	0	4	0
SB	0	0	0	15	0
SC	0	0	0	1	0
Historic Districts, Known	1	1	0	3	3
Historic Sites, Known	6	8	3	7	2
6(f)LAWCON	7	4	8	3	15
National Wildlife Ref.	0	0	0	0	0
NWI	941	417	1583	2185	728
Pond/Lake rating:					
Good	0	0	1	0	4
Poor/Restorable	0	0	0	0	0
Priority	0	0	0	0	2
Sensitive	3	0	5	3	1
Stable	3	0	1	2	0
Outstanding RiverSeg	1	2	5	4	0
Maine Public Lands	50	3	72	134	44
Public Water Supply	0	0	0	0	0
Scenic Highways (mi.)	30.7 linear	0	0	0	0
Streams within 1000m	376	404	232	703	234
Stream classification:					
AA	2	0	0	2	0
A	33	2	7	4	2
B	15	3	7	23	5
C	0	0	0	0	1
Stormwater Concern List	0	0	0	0	1
Uncontrolled Haz Site	1	4	1	7	6

Two-Step NEPA Process - East West Highway

Step One: Corridor Selection & Identification of Environmental Effects



Step Two: Development of Subsequent Construction Projects

Project 1
- Preliminary Engineering
- Env.Assessment
- FONSI *
- Final Design
- Construction

Project 2
- Preliminary Engineering
- Env.Assessment
- FONSI *
- Final Design
- Construction

Project 3
- Preliminary Engineering
- Env.Assessment
- FONSI *
- Final Design
- Construction

Project n
- Preliminary Engineering
- Env.Assessment
- FONSI *
- Final Design
- Construction

* Finding of no significant impact (by FHWA)

CASE STUDIES IN INNOVATIVE HIGHWAY FINANCE

NEW BRUNSWICK - Fredericton-to-Moncton Highway Project

The Project:
The project is a 195-kilometer (121-mile), 4-lane, controlled access highway between Longs Creek, near Fredericton, and Magnetic Hill, near Moncton built to New Brunswick standards. When open to full traffic November 30, 2001, it will provide a time savings of 30-35 minutes, and a reduction of 29 kilometers for trucks.

Enabling Legislation Required?
Yes

The Cost:
$584.4 million guaranteed maximum price (GMP) to build the highway.
$877 million total capital cost includes the GMP, construction already underway, interest costs during construction, and other miscellaneous costs such as land acquisition, project company, independent agent, and closing costs. Lease payments are made by the Province in the amount of $58 million per year for 26 years for a total of $1.5 billion.

Who Plans, Permits, Acquires Right-of-way?
The New Brunswick Highway Corporation (NBHC)

Development/Project Franchise or Concession Agreement?
Yes. A project company, a not-for-profit corporation, will oversee the financing for the highway, issue debt, and make payments to the bondholders. The developer/operator, Maritime Road Development Corporation (MRDC) ensures that the highway is developed, designed, constructed, operated, and maintained according to the terms of the signed agreements, and leases the completed highway to the province. The province retains ownership of the land at all times. MRDC provides completion covenants, $250 million performance bond, $50 million labor and materials bond, and extensive insurance coverage.

Under the terms of the operating lease, the province will have the option to buy the highway for fair market value after 30 or 40 years. If the province does not exercise its right to buy the completed highway after year 30 or year 40, ownership reverts to the province for $1 in year 50.

Financing & Revenue Sources:
An issuer sells bonds to investors for proceeds, which the issuer then lends to MRDC, the developer, to finance the project. The gross proceeds of the highway bonds (including additional bonds) must equal the total project cost + funds from the province + the toll-based debt + toll & ancillary revenue. The developer subleases the facility to the province, and the province pays lease payments to the issuer to help retire the debt. The developer also raises revenue by charging tolls to users which are paid directly to the issuer.

Toll revenues will equal $149.5 million over the 30-year lease, but they will not be sufficient to support the highway. It will be financed through two sources of revenue. The first source is tolls and ancillary revenue from service centers or other commercial enterprises along the route. The second source is a long-term commitment by the province of New Brunswick to support the project through lease-based debt of $58 million per year and to pay operating, managing, maintenance and rehabilitation costs.

MASSACHUSETTS - Central Artery/Tunnel

The Project:
The Central Artery/Tunnel project will build or reconstruct about 7.5 miles of urban highways in Boston—about half of them underground. The project will (1) extend Interstate 90 East, mostly in tunnels, through South Boston, under Boston Harbor (through the Ted Williams Tunnel) to East Boston and Logan International Airport; (2) replace the Central Artery (an elevated portion of I-93 through downtown Boston) with an underground roadway; and (3) replace the I-93 bridge over the Charles River. Tunneling through a densely populated urban area like downtown Boston will entail numerous and complex construction challenges. The Central Artery/Tunnel project will burrow close to buildings and subway tunnels, often with only a few feet to spare. The project's construction plans include underpinning the existing elevated Central Artery structure so that it continues to carry traffic, as well as supporting the railroad tracks leading into the city's main train station, while underground highways are built directly below. The project is planned for completion in 2004.

Enabling Legislation Required?
Yes, for bond amount and to create the GAN trust fund allowing for all future federal highway reimbursements to flow into the trust fund without further state legislative action.

The Cost:
$10.8 billion

Who Plans, Permits, Acquires Right-of-way?
Massachusetts Highway Department

Development/Project Franchise or Concession Agreement?
No franchise agreements with private consortia, as the project is managed by the Massachusetts Highway Department (MHD). Day-to-day design and construction activities are managed by a management consultant—a joint venture of Bechtel/Parsons Brincerhoff, under contract with MGD. The FHWA approves and oversees the expenditure of federal funds.

Financing & Revenue Sources:
Massachusetts plans to finance the project with federal and state funds, contributions from the Mass. Port and Turnpike authorities, and possibly toll-financed revenue bonds. The commonwealth issued $600 million of Grant Anticipation Notes (GANs) in June 1998, with authority from the legislature to issue up to $1.5 billion in total. GARVEE bonds—Grant Anticipation Revenue Vehicles—refer to any financing instrument for which principal and/or interest is repaid with future federal-aid highway funds. In essence, the debt is issued in anticipation of the receipt of federal-aid grant reimbursements in subsequent years. The $600 million issue matures in 8 to 17 years. The commonwealth intends to pay interest from state highway funds, but retire principal with federal-aid reimbursements. Under restrictive circumstances, the commonwealth would direct 10 cents of its 21-cent state fuel tax to the GAN Trust Fund for the purpose of paying debt.

Debt service payments will address interest only, until calendar year 2005, at which point the commonwealth will start repaying principal. From 2005 forward, average annual debt service on the first $600 million issued will be approximately $60 million. By comparison Massachusetts' average annual federal-aid highway apportionments throughout the life of TEA-21 are expected to be approximately $524 million. Massachusetts has structured its debt so that other state funding sources may be sought in the event of shortfalls.

MASSACHUSETTS - Route 3 North Expansion

The Project:
The Route 3 North Expansion project will add one lane and a full breakdown lane in each direction, improve 13 interchanges, and either reconstruct or replace 27 bridges along the 21-mile stretch of Route 3 North between the interchange with Route I-95/128 in Burlington and the New Hampshire border.
Additional projects which may be funded the same way include: the Route 3 South Expansion - $80 million; the Route 128 Expansion - $81 million, the Old Colony Greenbush Rail Extension - $285 million; the Fall River-New Bedford Rail Extension - $410 million; and Automated Fare Equipment - $100 million.

Enabling Legislation Required?
Yes, enabling the project to be funded privately and construction to begin by late 1999 and be completed by 2003 using a design-build methodology.

The Cost:
$200 million

Who Plans, Permits, Acquires Right-of-way?
Massachusetts Highway Department

Development/Project Franchise or Concession Agreement?
A development team would design, construct, operate, and maintain the project, with the commonwealth reimbursing the developer for costs incurred. The agreement may include provisions for the department to lease the facility, its right-of-way, and its airspace to and/or back from the developer, to exercise the power of eminent domain on behalf of the project; to grant development rights and opportunities; to grant necessary easements and rights of access; to issue permits and other authorizations; to provide remedies in the event of default of either of the parties; to grant contractual and real property rights; and to exercise any other power deemed necessary by the parties.

Financing & Revenue Sources:
The project will be financed privately rather than through the traditional sale of government bonds. The commonwealth will repay those costs over time without the use of tolls or any similar user fees. Any type of indebtedness necessary to finance the design, construction, maintenance and operation of the facility shall not constitute a debt of the commonwealth. The developer shall be liable to the same extent and with the same limitations as would be the commonwealth while the developer has operation and control of the facility.

NEW MEXICO - Corridor 44 Expansion

The Project:
Corridor 44 is a 140-mile, 2-lane principal arterial extending between Bernalillo and Bloomfield in the northwest corner of the state. A 121-mile section of the highway will be expanded from 2 to 4 lanes. The Performance Roads Division of Koch Materials will utilize, for the first time in the United States, a pavement design that has been widely used in Europe. The extremely durable design uses very strict specifications for materials in the asphalt mix but has the benefit of needing 20% less pavement, thereby costing less than traditional American designs to build. Construction is expected to be complete in November, 2001. If constructed through the conventional TIP, the project would have been built in roughly 4-mile increments and taken 27 years to complete. Under this contract, the project will be finished in 3½ years.

Enabling Legislation Required?
The full state legislature must approve the annual state appropriation—New Mexico's share of the state-federal bond financing.

The Cost:
$295 million

Who Plans, Permits, Acquires Right-of-way?
The New Mexico State Highway and Transportation Department.

Development/Project Franchise or Concession Agreement?
The New Mexico State Highway and Transportation Department (NMSHTD) will contract with a subdivision of Koch Industries of Wichita, Kansas, a private developer, to design, manage construction, warranty, and partially finance the expansion of a 121-mile section of 2-lane highway to four lanes. Koch will guarantee the overall performance of the highway pavement for 20 years from date of completion. The bridges, drainage, and erosion control will be guaranteed for 10 years. The warranty is secured by a $114 million surety bond. The state will perform normal non-pavement maintenance along the roadway, such as mowing, snow removal, and signage. Koch has an opportunity to earn a profit if the design performs as expected, and the taxpayers are protected if it does not.

Financing & Revenue Sources:
The New Mexico Finance Authority issued approximately $287 million of bonds in four series beginning in July 1998. Through the 'innovative financing' provisions of ISTEA, New Mexico submitted TE-045 and SEP-14 applications to the FHWA to be allowed to pledge future federal-aid highway funds for a term of 18 years to repay the bonds. The bonds will amortize over 15 years, with final maturity in 2015. Average annual debt service will be approximately $28 million. By comparison, New Mexico's average annual highway apportionments throughout TEA-21 are expected to be about $256 million. The issuance of the bonds will have no effect on the state's credit rating or borrowing capacity.

NMSHTD has created a 100% federal-aid project by meeting the requirement to match the federal funds through 'soft match.' By constructing a 17-mile, $21 million section on the south end of the corridor with state funds, the state has leveraged those funds into the match for the $295 million project. The state is also utilizing the waiver of match that is available when highways cross federal lands. NM 44 crosses Indian reservation and Bureau of Land Management properties.

CALIFORNIA - San Joaquin Hills Corridor

The Project:

- 15 miles of divided, limited access, 6-lane freeway and 3.3 miles of roadway improvements
- 58 new bridges, 7 bridges widened, 10 interchanges, 784,000 sq. ft. walls, and 300,000 cubic yards of concrete
- 100 miles of piles, 24 million cubic yards of earthwork, 1.1 million tons of asphalt paving
- 4 wildlife undercrossings, 27 acres of wetlands, 262 acres of coastal sage scrub, costing $67 million
- Projected traffic volume: 70,000-170,000 vehicles per day
- One mainline toll plaza and 10 ramp toll plazas
- . 88' median set aside for high occupancy vehicle (HOV) lanes, and if feasible, transit systems

Enabling Legislation Required?
Transportation Corridor Agencies (TCA) was established in 1986 by local government, business, and community leaders to plan, design, finance, construct, and operate three toll roads covering 68 miles in Orange County: the San Joaquin Hills, Foothill, and Eastern Transportation Corridors. The San Joaquin Hills Corridor is the first public toll road to be completed by TCA in its entirety. Portions of the Foothill Transportation Corridor opened in 1993 and 1995.

The Cost:
$1.5 billion

Who Plans, Permits, Acquires Right-of-way?
The project was designed according to Caltrans standards and specifications.

Development/Project Franchise or Concession Agreement?
The design-build firm, California Corridor Constructors, a joint venture between Kiewit Pacific Co. and Granite Construction Co. completed the project in 1996. The *design-build* approach is a method designed to guarantee construction prices and completion dates in an effort to avoid project cost overruns and delays. The design manager is Corridor Design Management Group (CDMG); the construction engineering manager is Sverdrup Corp.; the general engineering manager is URS Greiner. Upon completion of construction, the state of California (Caltrans) assumed ownership and maintenance responsibility of the corridor.

Financing & Revenue Sources:
The San Joaquin Hills Transportation Corridor Agency Board of Directors authorized the issuance of $1.2 billion tax-exempt, nonrecourse toll revenue bonds in 1993. (Nonrecourse means that bondholders can look only to the San Joaquin Hills Corridor toll revenues for payment of the bond debt.) Other funds for design, administrative and construction costs came from development impact fees, state general funds, and gasoline tax. The bonds were refunded at a lower rate of interest in 1997.

The new road features a state-of-the-art toll collection system—FasTraka—that allows commuters to pass through tollbooths without slowing. With a small, windshield-mounted transponder, motorists travel on the toll road without stopping at toll plazas because the FasTraka system automatically deducts the toll from the motorists' accounts. Tolls range from 25 cents to $2 for two-axle vehicles and motorcycles depending on where motorists enter or exit the road.

VIRGINIA - Dulles Toll Road

The Project:
The Dulles Toll Road Extension is a privately owned 14-mile extension of the state-owned Dulles Toll Road from Dulles Airport to Leesburg.

Enabling Legislation Required?
Yes, a private consortium approached the Virginia legislature in 1988 with an unsolicited proposal to develop the extension. The state crafted enabling legislation and granted a 42.5-year franchise to collect tolls at state-approved rates in exchange for financing, constructing, and operating the facility.

The Cost:
$326 million

Who Plans, Permits, Acquires Right-of-way?
Virginia Department of Transportation

Development/Project Franchise or Concession Agreement?
Authorized by state legislation, the Toll Road Investors Partnership constructed the facility and has a concession to operate it for 35 years, or ten years past debt retirement. The state legislation authorizing the private toll way regulates the amount that can be charged for tolls, but does not allow the state to bail out the investors. If it fails to make debt payments, the facility would revert to its largest creditors—three major insurance companies.

Financing & Revenue Sources:
Investors put up $40 million in cash and secured $310 million in privately placed taxable debt. Ten institutional investors provided $258 million in long-term, fixed-rate notes. Three banks provided part of the construction funding and $40 million in revolving credit. Loans are to be repaid with toll revenues, and the financing is secured by a first mortgage and security interest in the developer's right, title, and interest in the facility.

Initially the toll was $1.75 each way, but when traffic fell short of projected levels, the toll was reduced to $1.00. Lowering the toll attracted more users, but not enough to increase total revenues. Consequently, in July 1997, the Greenway's operators raised the toll to $1.15. Many complain that the one-way fee is too high to save only 20 minutes.

The shortfall in toll revenues from the project has brought problems for its investors. They had projected toll revenues for the first year at $27 million; $7 million was to go for operating costs and $20 million toward the $30 million in annual interest. When those revenues did not materialize, the investors began to miss their quarterly interest payments of $7 million each. However, they won approval from lenders to skip the payments for the rest of the year, avoiding foreclosure through the end of 1997.

NOVA SCOTIA - **Cobequid Pass** (formerly known as Western Alignment)

The Project:
Cobequid Pass is a 45-kilometer bypass of the Trans-Canada Highway between Masstown and Thomson Station which is 9 kilometers or 16 minutes shorter than the existing route. Safety and the elimination of numerous points of ingress/egress and car crashes were the primary reasons for building the new road. The road is a 4-lane, limited access highway with 5 interchanges, 6 major bridges, guardrails, and 5 tunnels for access to land parcels, snowmobile trails and wildlife passages. There are 7 stream crossings with large concrete box culverts. A toll plaza with an automated transponder toll system for frequent users is in place.

Enabling Legislation Required?
Yes.

The Cost:
$113 million

Who Plans, Permits, Acquires Right-of-way?
Province of Nova Scotia Department of Transportation & Public Works

Development/Project Franchise or Concession Agreement?
Highway 104 Western Alignment Corp. is owned by the provincial government and was established by the Highway 104 Western Alignment Act to manage the financing, design, construction, operation, and maintenance of the facility. In this way, the financial obligations of the highway are separate from the province's debt. This is termed *nonrecourse* financing because the private investors have no recourse to government assets or money should toll revenue fail to provide them a return on their investment. Title to the highway is held by the province, but the private partner assumed risk for cost overruns. The financial transactions of the corporation are handled through the construction trustee, Montreal Trust, and Newcourt Credit Group has the right to review these transactions. Highway 104 Western Alignment Corporation contracted with Atlantic Highways Corp. (AHC) for the highway design and construction, who in turn, used several subcontractors for various phases of the project. The operation of the tolling facility has been contracted with Atlantic Highways Management Corp., a subsidiary of AHC, and annual maintenance will be provided through a contract with the Dept. of Transportation and Public Works.

Financing & Revenue Sources:
- Provincial contribution $27.5 million.
- Federal contribution $27.5 million.
- $5.5 million in subordinated notes was invested from the provincial pension fund.
- $60.9 million provided by the sale of bonds to private investors underwritten by Newcourt Credit Group of Toronto.
- Toll revenues over 30 years are projected to provide the investors a return; pay for toll operations; cover the $650,000 for annual maintenance provided by the Nova Scotia Department of Transportation and Public Works; and contribute to long-term maintenance.
- The money borrowed from the private sector by the Highway 104 Western Alignment Corporation through Newcourt Credit Group is borrowed on the security of tolls and not the financial guarantees of the province.
- Toll charges equal $3 per car; $2 per axle for trucks over five tons; $4 per recreational vehicle.

CHAPTER 23
HIGHWAY DESIGNATIONS

23 § 1951. Trans-Maine Trail

1. Designation. The Trans-Maine Trail is designated as follows:
   A. Beginning at the Canadian border in Vanceboro, then westerly via Route 6, through Lincoln, Milo, Dover-Foxcroft and Guilford to Abbot, then westerly via Route 16 to Stratton and via Route 27 to the Canadian border at Coburn Gore. [1979, c. 103 (new).] [1979, c. 103 (new).]
2. Alternate route. In addition, an alternate route shall be as follows:
   A. Beginning at Abbot then northerly via Route 15 through Greenville and Rockwood to Jackman and the Canadian border. [1979, c. 103 (new).] [1979, c. 103 (new).]
3. Signs. Signs designating this as the Trans-Maine Trail shall be erected by the Department of Transportation at proper intervals along the highway trail. [1979, c. 103 (new).]

PRIVATE & SPECIAL LAWS
First Regular Session of the 113th Legislature
S.P. 231 - L.D. 625
AN ACT to Authorize the Construction of an East-West Highway

Be it enacted by the People of the State of Maine as follows:

Sec. 1. East-West highway; authorized. The Department of Transportation is authorized and directed to construct a free highway from the junction of Route 1 in Calais to Gilead. This highway shall, as much as practical, follow existing state highways, including Route 9 and 2, and shall be designed to permit traffic to travel safely at highway speeds.

The plans for the construction of this facility shall be developed by or for the Department.

Sec. 2. **Funding.** Funding for the various phases of the construction of this highway shall be included in the Department's future transportation investment programs.

Effective September 29, 1987

LAWS OF MAINE
First Special Session of the 118th
Resolves
CHAPTER 46
H.P. 1027 - L.D. 1444

Resolve, to Designate an East-West Highway and Install Signs on that Highway

Sec. 1. Designate the East-West Highway; install signs. Resolved: That the Department of Transportation shall designate the following roads in Maine as the East-West Highway and install signs indicating these roads as one highway: Route 9 from Calais to Bangor, Interstate 95 from Bangor to Newport and Route 2 from Newport to Rumford to New Hampshire.

Effective September 19, 1997, unless otherwise indicated.