U.S. Department
of Transportation

**Federal Highway
Administration**

*Intermodal Surface Transportation Efficiency Act
Section 6015 Study: Assessment of Border Crossings
and Transportation Corridors for North American
Trade (Northeast)*

An Assessment of the Adequacy of U.S–Canadian Infrastructure to Accommodate the Trade through Eastern Border Crossings

Appendix: Descriptive Profiles of Niagara Frontier

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The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 calls for a study of U.S. international border crossings. The objective of the study is to identify existing and emerging trade corridors and transportation subsystems that facilitate trade between the United States, Canada, and Mexico.

This appendix contains a series of border crossing profiles covering the major crossings and in some cases minor crossings in the border frontier. The frontier itself is a definition created for the 6015 Study to aid in the analysis of trade and traffic flows. The crossings included in this discussion include all commercial ports in the frontier, all ports identified as having infrastructure needs, and most of the smaller ports if traffic volumes warranted. These latter predominantly serve local needs.

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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
	AREA			
in^2	square inches	645.2	square millimeters	mm^2
ft^2	square feet	0.093	square meters	m^2
yd^2	square yards	0.836	square meters	m^2
ac	acres	0.405	hectares	ha
mi^2	square miles	2.59	square kilometers	km^2
	VOLUME			
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft^3	cubic feet	0.028	cubic meters	m^3
yd^3	cubic yards	0.765	cubic meters	m^3
NOTE: Volumes greater than 1000 l shall be shown in m^3.				
	MASS			
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5(F-32)/9 or (F-32)/1.8	Celcius temperature	°C
	ILLUMINATION			
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m^2	cd/m^2
	FORCE and PRESSURE or STRESS			
lbf	poundforce	4.45	newtons	N
lbf/in^2	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
	LENGTH			
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
	AREA			
mm^2	square millimeters	0.0016	square inches	in^2
m^2	square meters	10.764	square feet	ft^2
m^2	square meters	1.195	square yards	yd^2
ha	hectares	2.47	acres	ac
km^2	square kilometers	0.386	square miles	mi^2
	VOLUME			
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m^3	cubic meters	35.71	cubic feet	ft^3
m^3	cubic meters	1.307	cubic yards	yd^3
	MASS			
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
	TEMPERATURE (exact)			
°C	Celcius temperature	1.8C + 32	Fahrenheit temperature	°F
	ILLUMINATION			
lx	lux	0.0929	foot-candles	fc
cd/m^2	candela/m^2	0.2919	foot-Lamberts	fl
	FORCE and PRESSURE or STRESS			
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in^2

* SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

(Revised September 1993)

An Assessment of the Adequacy of U.S–Canadian Infrastructure to Accommodate the Trade through Eastern Border Crossings

Appendix: Descriptive Profiles of Niagara Frontier

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Federal Highway Administration

August 1994

PREFACE

Congress, under Section 6015 of the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), mandated an international border crossing study regarding trade and transportation between the United States, Canada, and Mexico. Specifically, the study's objectives were to identify existing and emerging trade corridors and transportation subsystems that have been facilitating trade between the three countries. This study was conducted by the Federal Highway Administration (FHWA) of the U.S. Department of Transportation.

In the conduct of the Section 6015 study, available data were collected from Canadian, U.S. and Mexican public and private sources. The study team undertook an extensive outreach effort to bring local and state interests into the process. Shippers and carriers participated in meetings across the country to identify issues and to provide recommendations and suggested solutions. Meetings were held in Canada and Mexico to gain a more comprehensive understanding and perspective on border related concerns.

For practical purposes, the study was divided into several regional activities. This was to reflect separately some of the concerns and problems presumed to be unique to those regions. The John A. Volpe National Transportation Systems Center (Volpe Center) was tasked to perform the assessment of the adequacy of the border infrastructure, both physically and operationally, and its ability to accommodate current and future trade and transportation needs throughout the northeastern U.S. region, from Sault Ste. Marie, Michigan to Calais, Maine.

This document is one of five containing infrastructure inventories of facilities along the eastern U.S.-Canadian border. This work, conducted by the Volpe Center and Wayne State University, draws upon previous studies and data collection efforts. These sources were augmented by data from border crossing authorities, facility operators, and the federal inspection services, and from on-site visits to border crossing facilities. The effort of this study, is a first step in the development of a more comprehensive understanding of trade and traffic flows in North America.

TABLE OF CONTENTS

INTRODUCTION

This appendix contains a series of border crossing profiles covering the major crossings in the border frontier. The frontier itself is a definition created for the 6015 Study to aid in the analysis of trade and traffic flows. The crossings included in this discussion are commercial ports. Where infrastructure needs have been identified, they are cited in the discussion.

Information for these profiles was collected from available reports and summary statistics; responses to data requests from the General Services Administration (GSA), U.S. and Canadian Customs Services, Immigration and Naturalization Services (INS), Bridge and Tunnel Authorities and Operators, and State Transportation Departments. Discussions and on-site visits were conducted with these agencies for most of the border crossings.

The profiles provide information on ownership and operation, traffic and activity levels, physical infrastructure and associated problems, and staffing levels. Where available, maps and photographs are included.

The profiles contained in this appendix are all in the Buffalo, New York district. They are listed below by the border group as used in the study, with the U.S. Customs port codes indicated.

Niagara Frontier

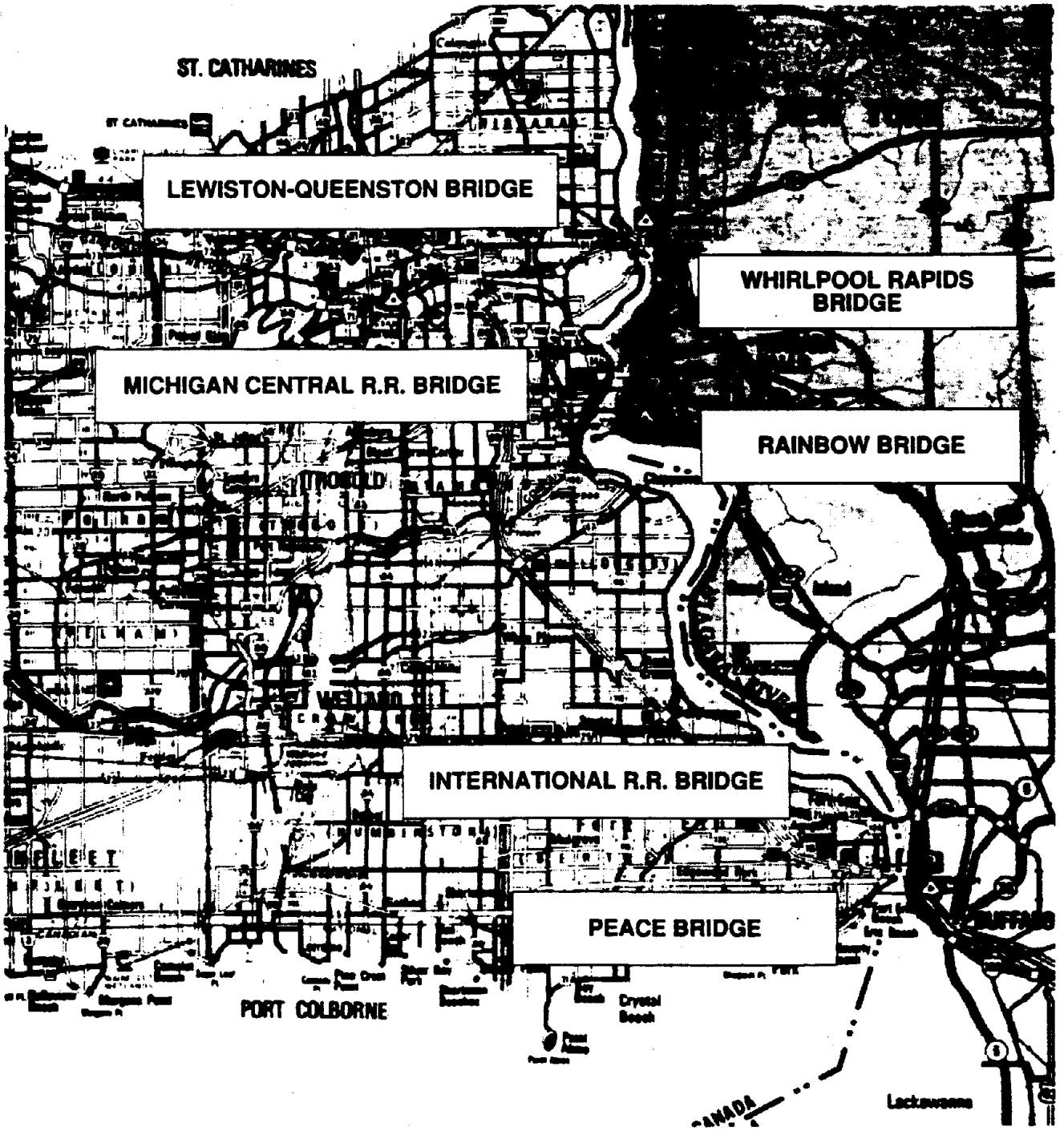
Highways

1. Buffalo-Niagara, NY (10901)
   a. Peace Bridge, Buffalo

2. Niagara Falls, NY (10901)
   a. Lewiston-Queenston Bridge, Lewiston
   b. Rainbow Bridge, Niagara
   c. Whirlpool Rapids Bridge, Niagara

Rail

1. Niagara Frontier Railroad Bridges



Niagara Frontier Bridges

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Parsons, Brinckerhoff, Quade, & Douglas, Inc.
Niagara Frontier U.S.-Canada Bridge Study,
March 1993.

U.S./CANADIAN BORDER PORT PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: PEACE BRIDGE, NIAGARA FALLS, NEW YORK

PROFILE

Customs Port Code: 10903 **Customs Region:** Northeast

Customs District: Buffalo, New York

INS Region: Eastern **INS District:** Buffalo, New York

Collateral Duties for Border Agencies: Other highway, rail, air and maritime facilities.

Total Staff: Customs: There are a total of 238 positions overall for the Port of Niagara for FY1992.

INS: There are 24 permanent and 28 temporary positions as of March 20, 1993.

Nearest U.S. Ports: The Detroit Ambassador Bridge and Highway Tunnel are the nearest crossings to the west, and to the east is the Rainbow Bridge. The nearest ports are Buffalo to the west and Oswego to the east.

Hours of Operation: The facility is open 24 hours a day although Canadian customs brokers are not generally as available at night and on weekends for processing of trucks. This has been attributed to regulations which reduce the ability of a carrier to use alternate brokers, thus reducing the incentive for brokers to provide 24 hour service. U.S. brokers are subject to such competitive pressure and are generally available on a full service basis at all hours.

Seasonality: Peak auto months are June to August, with holiday weekends being the heaviest travelled days. July and August auto travel months are each almost double that of any other month. There is almost no seasonality in truck traffic.

U.S. Primary Inspection:

Passenger Vehicles - There are 12 inspection booths on the U.S. side including one express lane. The 1990 Niagara Falls Bridge Commission (NFBC) Study estimated a primary inspection time of 30 seconds per vehicle. At this rate, the hourly capacity per booth capacity is 120 vehicles, and the 12 booths have a total hourly capacity of 1,440 vehicles.

The U.S. primary inspection lanes have the lowest capacity of any crossing element in the clearance process, and are thus the constraining factor in the system. Given 1990 hourly flows of 2,143 passenger vehicles during maximum summer Saturdays, and 1,692 passenger vehicles during average summer weekday DHV, this element is currently over capacity. The traffic levels are based on the 1993 Niagara Frontier study.

Commercial Vehicles - There are 3 truck booths available. Neither the 1993 Niagara Frontier Study nor the 1990 Niagara Falls Bridge Commission Study calculated processing times for trucks at the Peace Bridge. The NFBC estimate of 30 seconds used at the Lewiston-Queenston Bridge, and assumed in the NFBC's 30 year plan seems to be low, compared to experience at the Detroit crossings. Given summer weekday design hour volume (DHV)[1] levels of 141 trucks in 1990, the capacity of this element is close to being reached already.

U.S. Secondary Inspection: The truck secondary capacity on the U.S. side is highly inadequate. As such, the Authority secured ISTEA funding for an off-site facility. However, to date they have not been successful in negotiating a workable plan with the General Services Administration (GSA) and this plan has been abandoned. The current plan calls for having trucks enter a pre-entry complex on the Canadian side, where more space is available, and arranging for clearance electronically before proceeding to the U.S. side.

Facility Operator: Buffalo and Fort Erie Public Bridge Authority

Operator Contact:

Mr. Stephen F. Mayer
Operations Manager
Buffalo and Fort Erie Public Bridge Authority (BFEPBA)
Peace Bridge Plaza
Buffalo, New York 14213
Phone: 716 884-6752
Fax: 716 884-2089

Operator Information: The Buffalo and Fort Erie Public Bridge Authority is a ten member Authority. Half of the members are appointed by the Governor in Council of Canada, in conjunction with the Minister of Finance. The other half is comprised of two appointees by the Governor of New York, and three statutory appointments. A predecessor company was incorporated in 1922 under New York legislation. A Canadian company of the same name was created by Parliament in 1923, and the U.S. Government gave federal approval to the U.S. entity in 1924. The companies were amalgamated in 1925, and New York created a replacement public authority in 1933. This Authority was approved by the U.S. and Canadian governments in 1933 and 1934 respectively.

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[1]DHV is the 30th busiest hour in a year, a representation of peak hour traffic.

Each side of the bridge will revert to federally designated agencies in the year 2020 or when bonds are paid off, whichever comes later. The U.S. designee is the Niagara Frontier Transportation Authority.

The BFEPBA makes payments to municipalities on each side on a voluntary basis. The BFEPBA also makes payments of $200,000 per year to the Government of Canada and the Niagara Frontier Transportation Authority under terms of 1957 and 1970 legislation. No federal, state or provincial taxes have ever been assessed on the operation.

Facility Location: The bridge crosses the Niagara River between Fort Erie, Ontario and Buffalo, New York. Bridge is located near the center of downtown Buffalo.

Facility Description: The bridge is 3,580 feet long from abutment to abutment and has a roadway width of 36 feet over three lanes. The middle lane is reversible. Sidewalks on each side result in an overall width of 50 feet.

Facility Restrictions: Vehicles in excess of 8 axles or 130,000 pounds are restricted.

Year Built: 1925 to 1927.

U.S. Ingress/Egress: The principal access roads on the U.S. side are the New York Thruway I-190, and Porter Avenue. Based on the following capacity and forecast volumes, I-190 will be over capacity well before 2020.

ROUTE	CAPACITY LOS "D"[2] AADT	1990 AADT	2010 AADT
New York Thruway I-190			
S.Grand Island to Porter(4)	52000	38000	73000
South of Porter(6 lanes)	81000	59000	90000
Porter Avenue (4 Lane)	30200	14000	22000

Source: Niagara Frontier U.S.-Canada Bridge Study, March 1993. Assumes alternate maximum, more conservative forecast.

[2]LOS "D" is the level of service at which there is high density but a stable flow of vehicles. Speed and freedom to maneuver are severely restricted, and drivers and pedestrians experience poor levels of comfort and convenience. A small increase in traffic will greatly increase operational problems at this level.

Tolls: As of July 1, 1993, tolls are $1.25 for autos and are collected only in the westbound direction. The previous toll level was $.50 each way. Canadian and U.S currency is accepted at par. Truck tolls are approximately $6.00 for a typical truck, and continue to be collected both directions.

U.S. Toll Booths: Historically, tolls have been collected in both directions with all booths located on the U.S. side. Toll booths for traffic entering the U.S. were located in front of U.S. Customs primary inspection booths. Beginning July 1, 1993 the Authority quit collecting tolls eastbound so these booths are no longer used. However, traffic counter loops in the pavement lanes at these booths continue to be used to count eastbound traffic. Two truck eastbound toll booths on the U.S. side continue to be used. There continue to be westbound toll booths for autos and 2 westbound truck toll booths. There are currently 3 automatic coin booths for autos and 3 manual toll booths. These 6 auto booths and 2 truck booths will provide adequate capacity. Auto capacity will be about 3000 vph.

Roadbed Capacity: The two lane directional capacity of the Peace Bridge (with only one lane of traffic in the opposite direction) at LOS "E"[3] is 2700 equivalent vehicles per hour. This capacity will be reached in 1994 during maximum summer Saturday flows, and by 1996 for average summer weekday flows under the alternate maximum, more conservative traffic volume forecast according to the Niagara Frontier U.S.-Canada Bridge Study completed in March, 1993. The third lane for traffic flowing the opposite direction would reach capacity of 1,600 equivalent vehicles per hour in 1998 during maximum summer Saturday flows and in 2000 during average summer weekday flows.

Canadian Port: Fort Erie, Ontario

Canadian Ingress/Egress: On the Canadian side, the principal access roads are the QEW/Highway 3 which is 4 lane, and the Niagara Parkway. These highways will adequate capacity to the year 2020 however the QEW will require 6 lanes between Highway 420 and Regional Road 47.

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[3]LOS "E" is level of service at which operating conditions are at or near capacity level. All speeds are reduced to a low, relatively uniform value. Freedom to maneuver in the traffic stream is extremely difficult and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accomodate such maneuvers. Comfort and convenience levels are extremely poor and driver/pedestrian frustration is generally high. Operations at this level are generally unstable because small increases in flow or minor perturbances in the traffic stream cause breakdowns.

ROUTE	CAPACITY LOS "D" AADT	1990 AADT	2010 AADT
QEW/3	59000	14000	55009
Niagara Parkway	30000	10000	33000

Source: Niagara Frontier U.S.-Canada Bridge Study, March 1993. Assumes alternate maximum, more conservative forecast.

Canadian Toll Booths: There are no toll booths on the Canadian side. See information on U.S. toll booths.

Canadian Inspection Facility: Facilities must be provided by the operator free of charge, under Section 6 of the Customs Act.

Canadian Primary Inspection Lanes:

Passenger Vehicles - There are 21 auto inspection booths on the Canadian side. The 1993 Niagara Frontier report does not estimate inspection capacity of booths. However, Canadian inspection times were estimated to be 27 seconds at the Rainbow Bridge by the NFBC in 1990, or 133 vehicles per hour per booth. This processing estimate leads to a capacity of 2,793 autos per hour on the Canadian side. This capacity exceeds current auto peak travel levels but is substantially below forecasted peaks in traffic for 2020.

Commercial Vehicles - There are 4 truck booths on the Canadian side including one overflow lane. Using a 44 second estimate for truck primary inspection, the per booth capacity equals 82 trucks, and the total booth capacity would therefore be 328 trucks per hour. This capacity exceeds the 1990 summer weekday DHV for trucks of 141. The year 2020 forecast truck DHV for summer weekdays is 301.

Canadian Secondary Inspection: The Canadian secondary lot is considered adequate given a 75% line release rate by Canadian Customs, and sufficient parking space. Given the weekday DHV of 141 trucks in 1990 this leads to a likelihood of 35 trucks per hour using the facility. The 2020 weekday DHV of 301 trucks would result in hourly use by 75 trucks. There are 110 parking spots in the truck secondary yard. The auto secondary yard can hold 20-25 vehicles and is inadequate.

Canadian Staff: Canadian border staff consists of 72 inspectors and 16 managerial/clerical staff at this location.

Traffic:

PEACE BRIDGE
OPERATOR PROVIDED TWO-WAY TRAFFIC LEVELS
(1000'S OF VEHICLES)

YEAR	AUTOMOBILE	TRUCK/BUS	TOTAL
1950	2939	61	3000
1960	4787	252	5039
1970	5501	377	5878
1980	8032	568	8600
1981	9580	591	10171
1982	6149	558	6707
1983	5873	648	6521
1984	5615	727	6342
1985	5637	760	6397
1986	5869	804	6673
1987	6217	841	7058
1988	6383	872	7255
1989	6509	877	7386
1990	7171	874	8045
1991	7234	855	8089
1992	7192	950	8142

Source: Peace Bridge Summary Sheet

PEACE BRIDGE
INSPECTION SERVICES DATA
(1000'S OF VEHICLES)

	AUTOMOBILE	TRUCK/BUS	TOTAL
ENTRY TO U.S.:			
1989	3246	440	3686
1990	3492	432	3924
1991	3591	429	4020
1992	3594	454	4053
ENTRY TO CANADA:			
1989	2679	330	3009
1990	3604	442	4046
1991	3623	442	4065
1992	3598	491	4089

Note: U.S. data was provided by port customs officials for automobiles and trucks during the 1989-1991 period. National data provided by U.S. Customs did not break out the four Niagara port crossings. For 1992, U.S. entry is based on calculation using two way operator data less Canadian Customs data on entry to Canada.

PEACE BRIDGE FORECASTS

TYPE	1990	2000	2010	2020
AUTO	7203	NA	NA	15504
TRUCK	842	NA	NA	1644
TOTAL	8045	NA	NA	17148

Source: Niagara Frontier U.S.-Canada Bridge Study, March 1993.

CURRENT AND FORECASTED HOURLY PEAK TRAFFIC PEACE BRIDGE

	1990	2000	2010	2020
WEEKEND MAX HOURLY				
PASSENGER	2143	NA	NA	4609
TRUCK	36	NA	NA	71
TOTAL	2179	NA	NA	4680
VEHICLE EQUIV'S	2397	3290	4080	5104
WEEKDAY DHV 30TH HOUR				
PASSENGER	1692	NA	NA	3606
TRUCK	141	NA	NA	301
TOTAL	1833	NA	NA	3907
VEHICLE EQUIV'S	2260	3090	3840	4809

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993.

U.S./CANADIAN BORDER PORT PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: PEACE BRIDGE, NIAGARA FALLS, NEW YORK

BACKGROUND

DESCRIPTION

The Peace Bridge is a three lane bridge that is 3580 feet long from abutment to abutment. The middle lane is reversible allowing for 2 lane operation in one direction at directional peaks. Operated by the Buffalo and Fort Erie Public Bridge Authority, a public benefit corporation chartered by New York State in the U.S. and by the Federal Government in Canada. It opened in 1927.

LOCATION

The Peace Bridge is located at Buffalo, New York and Fort Erie, Ontario where it crosses the Niagara River.

ACTIVITY

In 1992 the Peace Bridge was the busiest auto crossing on the U.S.-Canada border, and the second busiest overall crossing. For total traffic it was second only to the Ambassador Bridge on the U.S.-Canada border. Auto traffic totaled 7.192 million vehicles in 1992, and truck traffic reached .950 million, for a total of 8.142 million vehicles. Auto traffic was down .042 million vehicles from 1991. The majority of traffic moves less than 600 miles according to the 1993 Niagara Frontier study. Sixty six percent of passenger trips were for the Niagara area O-D in 1990, and less than 5% of trips were by commuters. Shopping trips accounted for 9.4% of traffic in the summer of 1990, while recreational trips accounted for 61.8% of trips. The balance were classified as other purposes. Canadian shopping traffic has declined somewhat in recent months.

HIGHWAYS

The Peace Bridge is part of a critical economic corridor between Ontario and New York, and a wider corridor extending from Canada all the way to Mexico.

The main approaches on the U.S. side are the I190 New York Thruway and Porter Avenue, a four lane arterial. The Thruway is 4 lanes between South Grand Island and Porter, and 6 lanes south of Porter to the I90 interchange. The Niagara Frontier 1993 report indicates the Thruway will need to be expanded to 6 and 8 lanes respectively before the year 2020. Porter Avenue will not need to be expanded.

On the Canadian side the principal approach highways include the QEW/Highway 3 system and the Niagara Parkway. The QEW will need to be expanded to 6 lanes between 420 and Regional Road 47 according to the Niagara Frontier report some time prior to 2020. The Parkway has adequate capacity until about 2020.

Local officials have also called for expansion of Highway U.S. 219 between Buffalo and Washington D.C. to a 4 lane freeway. They indicate this is an emerging U.S.-Canada trade corridor and that improvements would save approximately 3 hours on this trip. Local officials have also called for a Southtown Connector project and a Grand Island Bypass.

DELAYS

The 1993 Niagara Frontier U.S.-Canada Bridge Study Phase I report estimated delays were costing passenger and commercial travelers $12 million per year. During 1990 there were 31 major backups entering the U.S., and 67 entering Canada.

CAUSE OF DELAYS

Delays are primarily due to the peak hour physical capacity and operations of primary inspection lanes and plazas. Current delays are not due to toll or roadbed capacity.

IMPROVEMENTS

The most recent change and improvement at the Peace Bridge involves implementation of the 1993 Niagara Frontier report's call for auto one way toll collection. Beginning July 1, 1993 auto tolls are only collected westbound into Canada and the toll has been changed from $.50 each way to $1.25 Canadian or U.S. dollars westbound with no auto toll eastbound. A second improvement relates to the opening in December, 1992 of a new ramp connection from the northbound thruway to the U.S. plaza. This ramp takes traffic off the city streets. The Authority has $US100 million of borrowing capacity and plans on borrowing $US88 million for work on approaches and plazas.

The Authority has also tentatively decided to abandon efforts to obtain an off-site truck secondary facility on the U.S. side. The new plan envisions a pre-arrival truck yard on the Canadian side where space is available. Trucks would arrange clearance electronically from this facility and then proceed to the U.S. side where most could pass through with a minimum of delay. No customs staff would be located on the Canadian side.

The 1993 Niagara Frontier report recommends the addition of 3 lanes to the current Peace Bridge. The capacity of the current 2 lanes for one direction will be reached in 1994 for maximum summer weekend traffic flows, and by 1996 for average summer weekday DHV

flows, assuming the alternate maximum forecast. The report also calls for providing 20 primary inspection lanes on each plaza by the year 2000. The Niagara report also calls for access road widening by the year 2020.

ANTICIPATED GROWTH

Truck traffic is forecast to grow by 3.4% per year to the year 2020 based on the historic relationship of truck traffic to Ontario population. Using a commodity forecasting methodology, truck traffic is forecast to grow 3.3 percent. These forecasts are for the high growth scenario. Truck traffic is forecast to grow from 950,000 trips in 1992 to 1,644,000 by 2020. These forecasts are reported in the 1993 Niagara Frontier study.

Auto traffic is expected to grow from 7.192 million trips in 1992 to 17.147 million trips by the year 2020 according to the alternate maximum forecast in the 1993 Niagara Frontier study. Growth from 1979 to 1992 averaged a 2.5% compound annual rate for autos, and 4.0% for trucks. A trend line based on these rates would result in 8.75 million autos by the year 2000, and 1.5 million trucks.

According to the 1993 Niagara Frontier study, weekend maximum passenger demand is expected to increase from 2,143 vehicles per hour in 1990 to 4,609 vehicles per hour in 2020 under the alternate maximum scenario. During weekdays auto traffic is expected to grow from 1692 vehicles per hour to 3606 per hour at the DHV level. Truck traffic during weekdays is expected to grow from a 1990 DHV of 141 to 301.

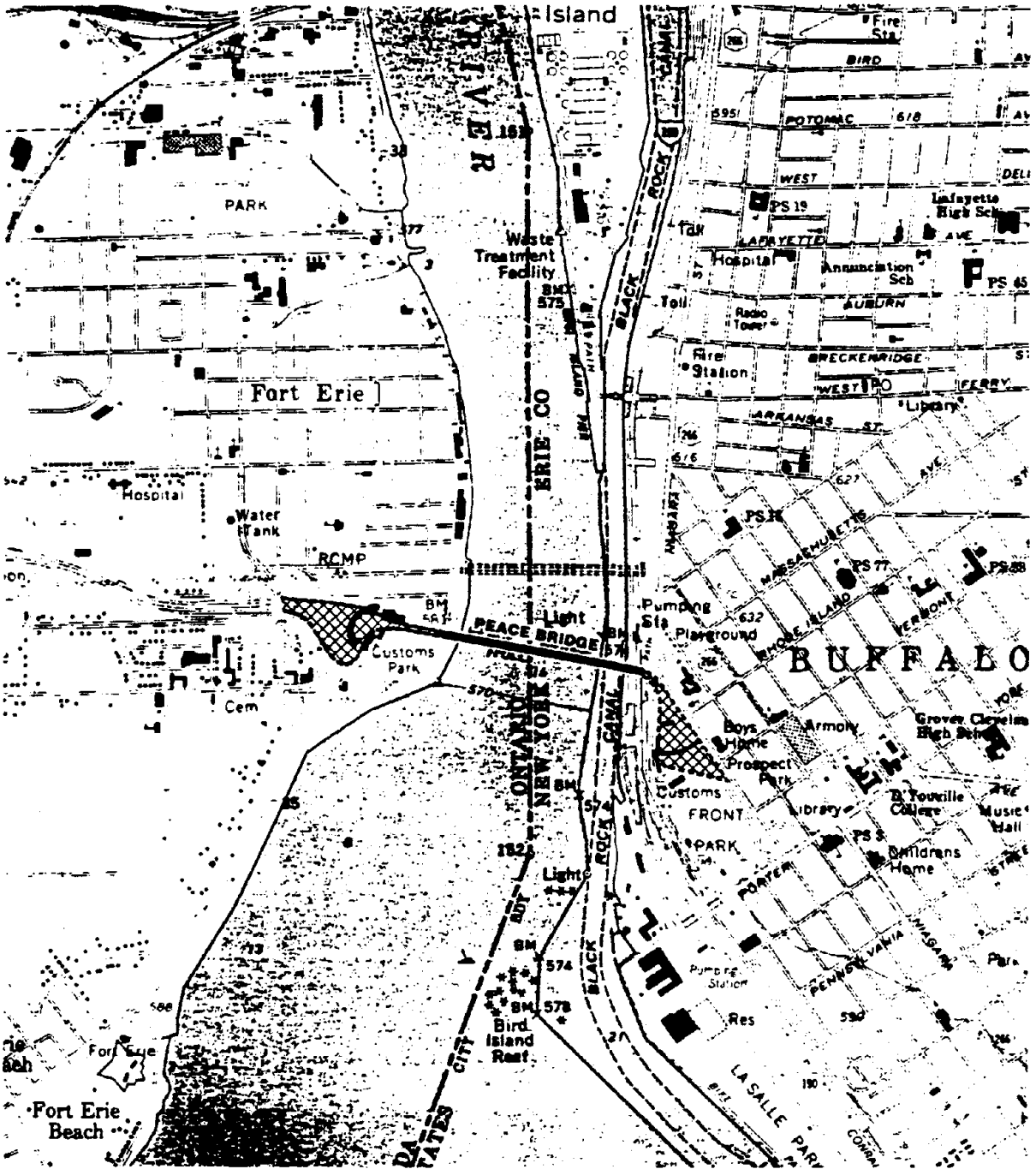
CAPACITY ISSUES

The most current capacity issue relates to peak hour staffing on each side by the inspection service agencies. Staff increases since 1990 have helped. The second most urgent need relates to the number of primary inspection booths on each side, and to the need for an off-site secondary truck facility on the U.S. side. The 1993 Niagara Frontier report calls for a total of 20 primary booths on each side. Current booth capacity is extremely inadequate. The bridge roadbed capacity will be exceeded by 1996 assuming the alternate maximum forecast and planning based on average summer weekday DHV traffic levels. Roadway capacity issues come into play after the year 2000, and will require widening of expressways and expressway bridges (Grand Island) before 2020.

Institutionally, there is an ongoing need for additional peak hour inspection service staffing of current inspection lanes. There are physical expansion needs for additional primary inspection booths in both the U.S. and Canada, and an immediate need for a secondary truck facility that would provide efficient secondary processing of truck traffic. Any possible declines in traffic levels would not affect these requirements.

The need for additional roadbed bridge capacity before the year 2000 is somewhat dependent on the continuation of growth in traffic. A decline in Canadian passenger traffic levels could postpone the need for additional capacity beyond the current 1996 weekday forecast. Such traffic declines occurred near the end of 1992 and are continuing in 1993. However, if growth resumes at the 1950-1992 level of about 3% a year, additional capacity would be needed not long after the year 2000. Given that the earliest possible opening of additional capacity would be about 2000, it seems prudent to continue this project.

Area economic development officials have also discussed the need for several roadway improvements that would increase efficiency. These include the need for a Southtown Connector, a Grand Island Bypass, and expansion of U.S. 219 from 2 lane to four lanes between Buffalo and Washington D.C. These proposals should be fully considered.



Peace Bridge
Buffalo, New York

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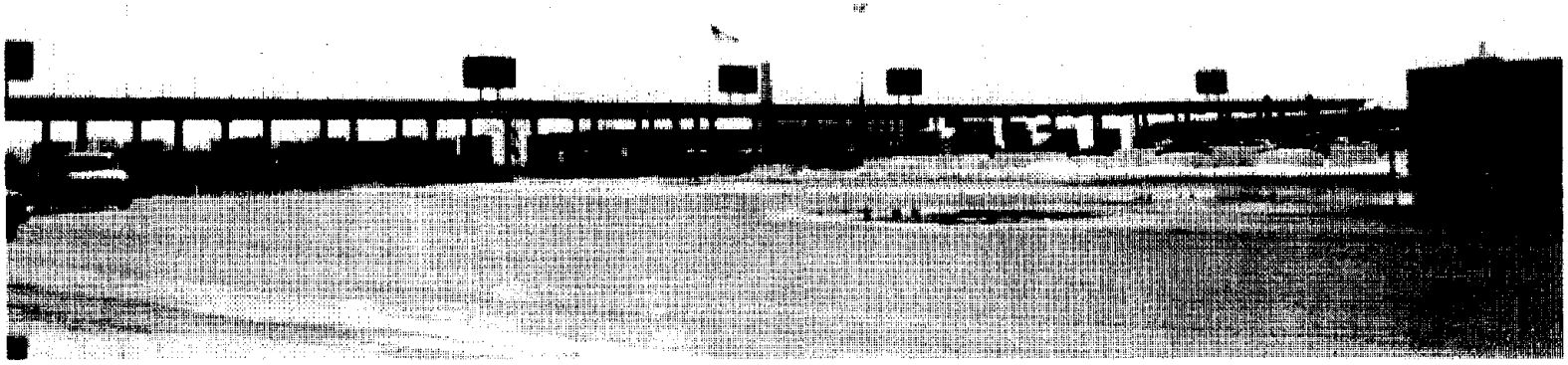
Niagara Frontier U.S.-Canada Bridge Study,
March 1993.



Peace Bridge: Above, U.S. Customs primary inspection lanes; below, Canadian primary lanes

Niagara Frontier

U.S./CANADIAN BORDER PORT PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: LEWISTON-QUEENSTON BRIDGE, LEWISTON, NEW YORK

PROFILE

Customs Port Code: 10903 **Customs Region:** Northeast

Customs District: Buffalo, New York

INS Region: Eastern **INS District:** Buffalo, New York

Collateral Duties for Border Agencies: Other highway crossings in the Port of Buffalo/Niagara, rail, air and maritime facilities.

Total U.S. Staff: Customs: There are a total of 40 positions.

INS: For the three NFBC bridges combined, there are 38 permanent and 43 temporary positions as of March 20, 1993.

Nearest U.S. Ports: The nearest crossings to the Lewiston-Queenston Bridge are the Whirlpool Rapids Bridge to the west, and the Thousand Islands Bridges to the east. The nearest ports are Detroit to the west and Thousand Islands to the east.

Hours of Operation: The facility is open 24 hours a day but there is a restriction on commercial vehicles during the night and over weekends because Canadian customs brokers are not available, as are U.S. brokers, during these times. Limited Canadian brokers hours has been attributed to regulations which reduce the ability of a carrier to use alternate brokers. This reduces the incentive for brokers to provide 24 hour service. U.S. brokers are subject to such competitive pressure and are generally available on a full service basis at all hours. The NFBC has written a full 24 hour-a-day service requirement into all broker space leases.

Seasonality: Summer peaks in traffic are seen throughout July and August. During these months, traffic volume is almost double that of the lowest travelled month of January.

U.S. Inspection Facility: The principal need is for more primary inspection booths.

U.S. Primary Inspection:

Passenger Vehicles - There are 7 automobile lanes. Using the 30 second processing time as estimated in the NFBC's 30 year plan, 120 vehicles can be cleared per hour per lane, for a total capacity of 840 vph. The 1990 peak maximum traffic levels of 1,212 automobiles on summer weekends already exceeds capacity. The 1990 design hourly volume (DHV), a representation of peak hour volume, was 970 vehicles. This also exceeds current capacity. The NFBC's 30 year plan provides adequate additions to capacity.

Commercial Vehicles - There are 2 truck booths. The NFBC estimate of 30 seconds processing time for the Lewiston-Queenston, and assumed in the NFBC's 30 year plan seems to be low based on experience at the Detroit crossings. If one assumes the truck processing times required at the Ambassador Bridge, or 64 seconds per truck entry to next truck entry, the per booth capacity is 56 trucks, and the total booth capacity at this location equals 112 trucks per hour. Given summer weekday design hour volumes (DHV)[4] of 82 trucks in 1990, and a forecast of 172 vph for 2020, the truck booth capacity will not be reached until at least 2010. The NFBC plan provides for adequate increases in capacity.

U.S. Secondary Inspection: The auto secondary capacity is 12 vehicles and truck capacity is 55 vehicles. There are some problems with this capacity level. The 1990 NFBC Study addresses these needs in its 30-year plan.

Operator: Niagara Falls Bridge Commission (NFBC)

Operator Contact: Mr. Allen Gandell
General Manager
Niagara Falls Bridge Commission
P.O. Box 1031
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Operator Information: The Lewiston-Queenston Bridge is owned and operated by the NFBC which is an 8 member Commission established by Congress in 1938. Refer to the Rainbow Bridge profile for further detail on the NFBC.

Facility Location: The bridge crosses over the Niagara River between Queenston, Ontario and Lewiston, New York.

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[4]DHV is a representation of peak hour traffic, using the 30th busiest hour in a calendar year.

Facility Description: The Lewiston-Queenston bridge is 1,600 feet long and the deck is 370 feet above water. The bridge consists of two 24 foot roadways which provide a total of 4 lanes. There is an 8 foot sidewalk on the South side.

Facility Restrictions: None

Facility Built: Acquired by NFBC in 1959 and rebuilt in 1962.

U.S. Ingress/Egress: Based on the forecast above, I190 will have adequate capacity through the year 2020.

ROUTE	CAPACITY LOS "D"[5] AADT	1990 AADT	2020 AADT
I190 4 Lane	52,000	21,300	38,000

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993. Assumes alternate maximum, or conservative forecast.

Tolls: Tolls are US$.75 or C$1.00 for autos.

U.S. Toll Booths: There are 3 westbound and 3 eastbound toll booths with a capacity of 500-1,500 vehicles per hour (vph) for autos and 250 vph for trucks. Combined, there are 6 booths available which can be reversed to accomodate traffic for 2 lanes in one direction and 4 lanes in the other, or vise versa. According to the 1993 Niagara Bridge Study, toll booth capacity will be exceeded by the year 2020. The NFBC has imminent project plans to add 2 toll booths to this plaza. The plan calls for these booths to collect a one-way toll with the elimination of Canadian toll booths for eastbound traffic.

Roadbed Capacity: The roadbed capacity at LOS "E"[6] is 3,020 vehicles in each direction. This capacity exceeds all forecasts through 2020.

Canadian Port: Queenston, Ontario

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[5]Refer to the Peace Bridge profile for an explanation of level of service "D" as defined in the Highway Capacity Manual.

[6]Refer to the Peace Bridge profile for an explanation of level of service "E" as defined in the Highway Capacity Manual.

Canadian Inspection Facility: The principal need is for more primary inspection booths. Facilities must be provided by the operator free of charge under Section 6 of the Customs Act.

Canadian Toll Plaza: See description of U.S. toll plaza, above

Canadian Ingress/Egress: The current 4 lane QEW through St. Catherines is about at LOS "D" capacity today, and will be called upon to serve more than double its current capacity by the year 2020. As such this section of the QEW will need to be expanded to 8 lanes between Highways 405 and 406.

ROUTE	CAPACITY LOS "D" AADT	1990 AADT	2020 AADT
QEW 4 lane St. Catherines	59,000	52,000	132,000

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993. Assumes alternate maximum, more conservative forecast.

Canadian Primary Inspection:

Passenger Vehicles - There are 8 auto inspection booths on the Canadian side. The 1993 Niagara Frontier report does not estimate inspection capacity of booths. However, Canadian inspection times were estimated to be 27 seconds at the Lewiston-Queenston Bridge by the NFBC in 1990, or 133 vehicles per hour per booth. This processing estimate leads to a capacity of 1,064 autos per hour on the Canadian side. Alternatively, if the Canadian side processing times at the Ambassador Bridge and reported in the A.T. Kearney Detroit and St. Clair River Crossing Study are used, or 33 seconds per vehicle, the booth capacity equals 109 vehicles per hour, and total capacity equals 1,308 vehicles per hour. This capacity falls short of the 1990 weekend peak volume of 1,212 vph. The weekday 1990 volume of 1,692 vph at the DHV point also would exceed capacity. The NFBC plan addresses this shortfall.

Commercial Vehicles - There are 3 truck booths on the Canadian side. Using an inspection time of 44 seconds[7], the per booth capacity equals 82 trucks, and the total booth capacity equals 246 trucks per hour. However, using the 1990 NFBC Study estimate of 90 seconds per vehicle, the capacity per booth is just 40 trucks per hour, and total capacity is 120 trucks per hour. This latter capacity exceeds the 82 unit 1990 summer weekday DHV for trucks. The year 2020 DHV forecast for trucks during summer weekdays is 172. This forecast

[7] As reported for truck inspection on the Canadian side of the Ambassador Bridge, in the A.T. Kearney report entitled, "Detroit and St. Clair River Crossing Study."

exceeds capacity at the 90 second processing time but is within the capacity at the 44 second processing time.

Canadian Secondary: The Canadian secondary area is marked for 75 trucks but can hold approximately 100 trucks The auto secondary area can hold 20 vehicles and also presents capacity problems at peak volumes. The 1990 NFBC Study addresses these needs in its 30-year plan.

Canadian Staff: For 1992 there were 46 inspectors and a total of 54 staff at this location.

Traffic: In 1992, passenger traffic totaled 4.694 million vehicles, and truck traffic totaled .642 million vehicles, for a total of 5.336 million vehicles. Compared to 1991, auto traffic declined by .148 million vehicles, following increases of .3-1.0 million vehicles per year since 1986. Truck traffic showed an increase in 1992, following three years of decline.

BRIDGE CROSSING FORECASTS
ANNUAL TRAFFIC LEVELS
(000'S OF VEHICLES)

TYPE	1990	2000	2010	2020
AUTO	4,496	NA	NA	8,069
TRUCK	653	NA	NA	1,255
TOTAL	5,149	NA	NA	9,324

Source: Niagara Frontier U.S.-Canada Bridge Study 1993, conservative or "alternate maximum" forecast.

LEWISTON-QUEENSTON BRIDGE
OPERATOR PROVIDED TWO-WAY TRAFFIC LEVELS
(1000'S OF VEHICLES)

YEAR	AUTOMOBILE	TRUCK/BUS	TOTAL
1980	1699	377	2076
1981	1794	409	2203
1982	1783	418	2201
1983	1940	520	2460
1984	1914	573	2487
1985	1918	622	2540
1986	2073	653	2726
1987	2360	668	3028
1988	2822	688	3510
1989	3577	673	4250
1990	4496	653	5149
1991	4842	619	5461
1992	4694	642	5336

Source: U.S.-Canada International Bridge Crossing Traffic, 1991 Report, Niagara Frontier Transportation Committee.

Note: Beginning in 1991 the NFBC began reporting pickups and 4x4's as autos. Prior to 1991 such vehicles were considered trucks.

LEWISTON-QUEENSTON BRIDGE
INSPECTION SERVICES DATA
(1000'S OF VEHICLES)

	AUTOMOBILE	TRUCK/BUS	TOTAL
ENTRY TO U.S.:			
1989	1717	352	2069
1990	2055	350	2405
1991	2393	309	2702
1992	2434	302	2736
ENTRY TO CANADA:			
1989	1636	246	1882
1990	2562	326	2888
1991	2532	304	2836
1992	2260	340	2600

Note: U.S. data provided by port customs officials as auto and truck for 1989-1991. National data provided by U.S. Customs did not break out the four Niagara port crossings. U.S. entry data for 1992 is an estimate based on operator provided 2-way data less Canadian Customs data on traffic entering Canada.

CURRENT AND FORECAST HOURLY PEAK TRAFFIC
LEWISTON-QUEENSTON BRIDGE

ITEM	1990	2000	2010	2020
WEEKEND MAX HOURLY				
PASSENGER	1212	NA	NA	2571
TRUCK	42	NA	NA	81
TOTAL	1254	NA	NA	2652
VEHICLE EQUIV'S	1297	NA	NA	2733
WEEKDAY DHV 30TH HOUR				
PASSENGER	1692	NA	NA	1693
TRUCK	141	NA	NA	172
TOTAL	1833	NA	NA	1865
VEHICLE EQUIV'S	2260	3090	3840	2037

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993.

U.S./CANADIAN BORDER PORT PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: LEWISTON-QUEENSTON BRIDGE, LEWISTON, NEW YORK

BACKGROUND

DESCRIPTION

The Lewiston-Queenston Bridge is 1,600 feet long and the deck is 370 feet above water. The bridge carries two 24 foot roadways with 4 traffic lanes, and a sidewalk on the south side. The bridge was acquired by the Niagara Falls Bridge Commission (NFBC) in 1959 and rebuilt in 1962. The Commission operates two other Niagara area bridges.

LOCATION

The Lewiston-Queenston Bridge is located at Lewiston, New York and Queenston, Ontario where it crosses the Niagara River.

ACTIVITY

In 1992 the Lewiston-Queenston Bridge carried 4.694 million automobiles and .642 million trucks. Auto traffic declined .148 million vehicles, following 4-5 years of annual growth of .3-1.0 million vehicles a year. Truck traffic resumed growth following several years of slight declines. The truck traffic level makes this the fourth busiest truck crossing on the U.S.-Canada border behind the Blue Water Bridge. Compared to other Niagara area bridges, the Lewiston-Queenston carries a greater portion of traffic that is external to the region. In 1989 31.1% of the passenger traffic had an origin or destination internal to the area in terms of a "next stop and last stop" methodology. During 1990 shopping trips accounted for 23.8% of the passenger trips, while 54.6% of trips had a recreational purpose.

HIGHWAYS

On the U.S. side the I-190 provides direct access to the bridge. The I190 has adequate capacity through 2020 in the vicinity of the bridge. However, additional lanes will be needed by 2020 on sections between South Grand Island and the Peace Bridge. On the Canadian side the QEW through St. Catherines provides the principal access. This 4 lane expressway is already near its LOS "D" capacity and traffic is expected to double by 2020. The additional traffic will necessitate a widening to 8 lanes between Highways 405 and 406.

DELAYS

No specific delay information was available for the Lewiston-Queenston Bridge but it should be noted that the 1993 Niagara Frontier study indicated that delays on the four bridges together had a cost exceeding $12 million a year. Since the bridge carries a large amount of truck traffic it can be assumed that a good deal of these delay costs relate to this bridge.

CAUSE OF DELAYS

Delays are primarily due to the peak hour physical capacity and operations of primary inspection lanes and plazas. Current delays are not due to toll or roadbed capacity.

IMPROVEMENTS

The 1993 Niagara Frontier report recommends increasing the bridge plaza and inspection booth capacity to the roadbed capacity level of 3020 directional vehicles per hour. At processing times of 109 vph for automobiles, a total of some 25 booths would be needed to accommodate passenger vehicles. Since traffic levels are forecast to reach a weekend maximum DHV of 2571 vph in 2020, it would appear that this capacity will be needed by 2020. However, the more urgent need is for truck primary booths and secondary processing capability. The widening of the QEW to 8 lanes is also being recommended in current plans.

ANTICIPATED GROWTH

Based on 1979 to 1991 annual compound growth of 9.6% per year for autos and 4.2% per year for trucks, auto and truck traffic would be expected to reach 11.0 million and 1.00 million vehicles respectively by the year 2000 if historical trend lines continue. However, it is doubtful that recent growth levels would be maintained over that period. In fact 1992 auto traffic declined by .148 million vehicles, and this may represent the beginning of a period of traffic decline related to Canadian shopping.

Forecasts based on changes in relevant auto and truck traffic independent variables suggest volumes will reach just 9.382 million auto units by 2020, and 1.255 million truck units by the year 2020. These forecasts by the 1993 Niagara Frontier study team are well below trend line but are more realistic than trend line.

Forecasts of peak hour weekend and weekday traffic levels conducted for the 1993 Niagara Frontier report indicate that maximum weekend auto traffic will grow from 1212 vph to 2571 vph by 2020. Weekday DHV auto traffic is expected to grow from 806 vph to 1693 vph by 2020. Weekday truck DHV traffic levels are expected to increase from 82 vph to 172 vph

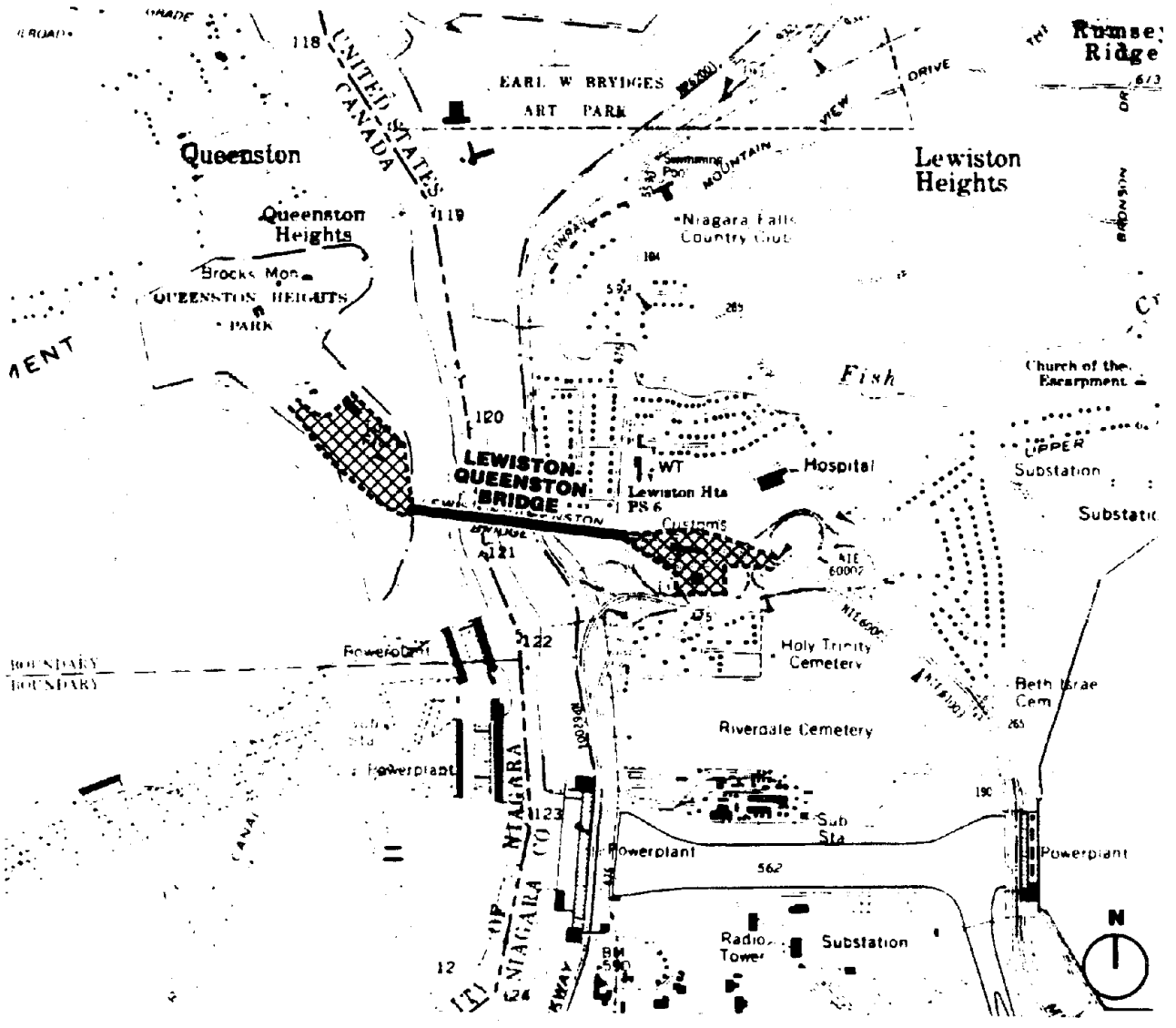
by 2020. These forecasts are based on the Niagara Frontier report's alternate maximum somewhat more conservative forecasts for auto, and the high forecast for truck traffic.

CAPACITY ISSUES

The principal capacity issue relates to primary inspection capacity for autos on both the U.S. and Canadian plazas. Current peak traffic levels already exceed the capacity of existing booths, so the need for additional inspection booth capacity is immediate.

The need for additional peak hour inspection service staffing of current inspection lanes is ongoing. Without a resolution to this need, the benefit of additional physical capacity cannot be realized.

The QEW also presents a capacity constraint and must be expanded to 8 lanes between Highways 405 and 406.



Lewiston-Queenston Bridge
Niagara Falls, New York

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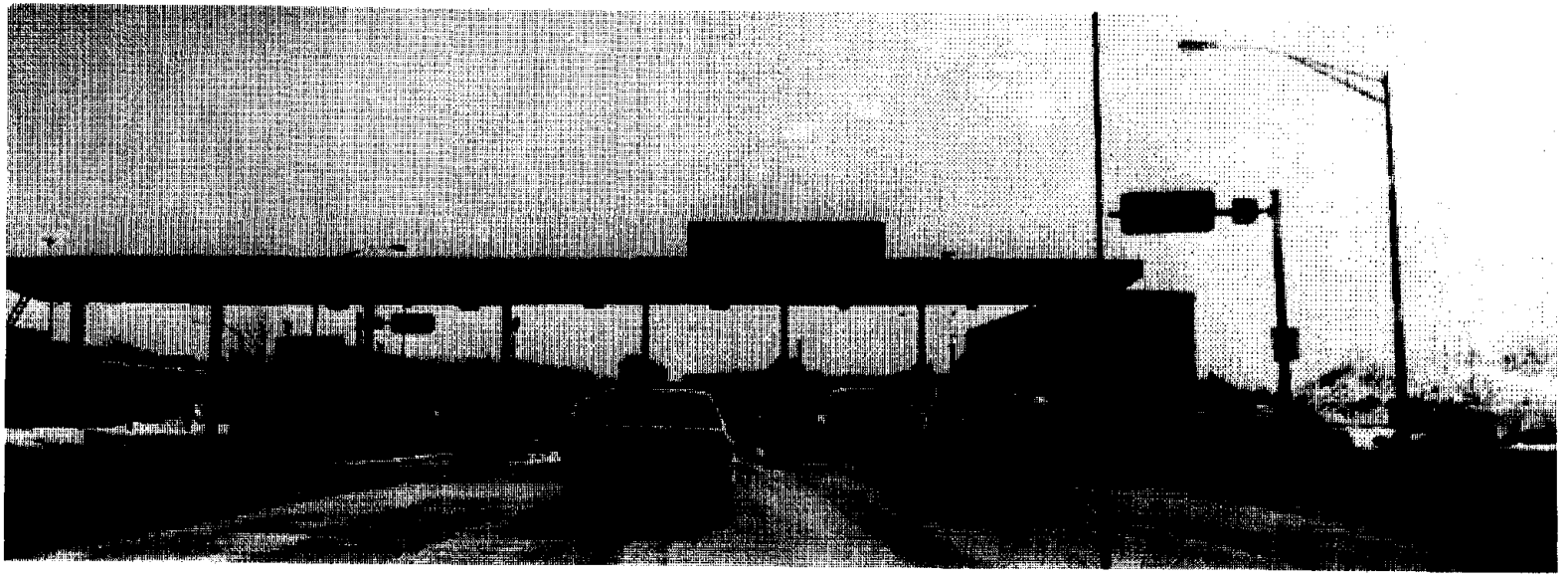
Parsons, Brinckerhoff, Quade, & Douglas, Inc.
Niagara Frontier U.S.-Canada Bridge Study,
March 1993.

Lewiston-Queenston Bridge: Above, U.S. Customs primary inspection lanes; below, Canadian toll plaza



U.S./CANADIAN BORDER PORT PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: RAINBOW BRIDGE, NEW YORK

PROFILE

Customs Port Code: 10903 **Customs Region:** Northeast

Customs District: Buffalo, New York

INS Region: Eastern **INS District:** Buffalo, New York

Collateral Duties for Border Agencies: Other highway, rail, air and maritime facilities.

Total Inspection Staff: Customs: There are a total of 25 staff.
INS: There are 38 permanent and 43 temporary positions for all NFBC bridges combined as of March, 1993.

Nearest U.S. Ports: The nearest crossings are the Peace Bridge to the west and the Whirlpool Rapids Bridge to the east. The nearest ports are Detroit to the west and Thousand Islands to the east.

Hours of Operation: The facility is open 24 hours a day.

Seasonality: Peak auto months are June to August, with holiday weekends being the heaviest travelled days. July and August auto travel accounts for some 33% of annual traffic.

U.S. Inspection Facility:

The principal need at this facility is for full staffing of booths at peak traffic hours, and for additional primary inspection booths.

U.S. Primary Inspection:

Passenger Vehicles - There are 8 auto inspection lanes. Based on the 1990 NFBC's 30-Year Plan, primary inspection per vehicle is estimated to be 30 seconds, yielding a per booth capacity of 120 vehicles per hour. In this scenario the 8 booths have a total hourly capacity of 960 vehicles. This crossing element has the lowest capacity of any element and thus has the potential to be the constraining factor in the system. Given 1990 hourly flows of 940 passenger vehicles during maximum summer Saturdays, and 655 passenger vehicles during

average summer weekday design hour volume (DHV)[8], this element is currently over capacity. The traffic levels are based on the 1993 Niagara Frontier Study. An addition of 10 booths is planned for 1994 to increase the booth capacity. The 18 booth capacity will be 2,160 vehicles per hour, using the 30 second processing time.

U.S. Secondary Inspection: The auto secondary area now holds 8 autos and requires additional parking space and detention/search space. This space will be added during 1994 construction when capacity will be increased to 20 vehicles.

Operator: Niagara Falls Bridge Commission (NFBC)

Operator Contact:

Mr. Allen Gandell
General Manager
Niagara Falls Bridge Commission
P.O Box 1031
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Phone: 416 384-8641
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Operator Information: The Niagara Falls Bridge Commission (NFBC) is an 8 member Commission established by Congress in 1938. The NFBC operates all three Niagara Falls area bridges, the Rainbow, Whirlpool Rapids, and Lewiston-Queenston Bridges. The Commission consists of 4 appointees by the Governor of New York and 4 appointees by the Lieutenant Governor in Council on the advice of the Minister of Transportation. There is no Canadian authorizing legislation. In 1939, Ontario issued a license to the NFBC under the terms of the Extra-Provincial Corporations Act.

Upon repayment of all indebtedness, the Canadian side will revert to the province of Ontario, and the U.S. side will revert to the State of New York. A recent bond issue means the reversion date is at least 20 years away.

The Commission makes payments to the municipalities of Niagara Falls and Niagara on the Lake under the terms of the Ontario International Bridges Municipal Payments Act of 1981. The U.S. enabling legislation states that the Commission is tax exempt, however, it does make payments to U.S. municipalities in lieu of taxes.

Facility Location: The Rainbow Bridge crosses the Niagara River between Niagara Falls, Ontario and Niagara Falls, New York. The bridge is located near the center of the cities on each side, and adjacent to the Niagara Falls attraction.

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[8]DHV is a representation of peak hour traffic, using the 30th busiest hour in a year.

Facility Description: The bridge is 1450 feet long and is 202 feet above normal water level. There are 2 roadways 22 feet long and a 10 foot sidewalk on the south side facing the falls.

Facility Restrictions: The facility is limited to autos and buses for all intents and purposes.

Facility Built: 1940-1941.

U.S. Ingress/Egress: The principal access roads on the U.S. side are the Niagara Falls Boulevard and Robert Moses Parkway. City streets which connect the approach roads to the plaza are Niagara Street and Main Street.

The data below compares Annual Average Daily Traffic (AADT) levels for 1990 and those anticipated for 2010, to current capacity at Level of Service (LOS) "D"[9]. Traffic volumes for the year 2020 also fall within this level of service.

ROUTE	CAPACITY LOS "D" AADT	1990 AADT	2010 AADT
Approach			
Niagara Falls Boulevard	30,200	22,500	26,000
Robert Moses Parkway	30,200	15,000	26,000
City Streets to Plaza	30,200	9,900	26,000

Source: Niagara Frontier U.S.-Canada Bridge Study, March 1993.
Assumes the "alternate maximum", or more conservative forecast.

Tolls: Tolls are US$.75 or C$1.00 each way.

U.S. Toll Booths:

The NFBC has agreed on a plan to switch to one-way westbound toll collection but this will not be implemented until the U.S. plaza is rebuilt in 1994. There are currently 5 toll booths with a capacity of 2,500 vph, and this will be increased by 1 booth to provide a total of 6 booths in 1994. This far exceeds forecast 2020 traffic levels.

[9]Refer to the Peace Bridge Profile for a detailed explanation of LOS "D" as defined in the Highway Capacity Manual.

Roadbed Capacity: The roadbed capacity of 2,420 vph per direction far exceeds anticipated 2020 traffic levels of 1,877 vehicles per hour on summer weekends under the alternative maximum scenario.

Canadian Port: Niagara Falls, Ontario

Canadian Ingress/Egress: According to the 1993 Niagara Frontier U.S. -Canada Bridge Report, there is adequate capacity on these roads through the year 2020. However, the Queen Elizabeth Way (QEW) between Highway 405 and 420 will need to be widened to 8 lanes.

ROUTE	CAPACITY LOS "D" AADT	1990 AADT	2010 AADT
Highway 420	59000	NA	NA
Niagara Parkway/Falls Ave.	15000	NA	NA

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993. Assumes alternate maximum, more conservative forecast.

Canadian Toll Booths: There are 6 toll booths with a capacity of 3,000 vehicles per hour (vph). This capacity exceeds forecast volumes to the year 2020. The toll booths at this plaza will be eliminated following the 1994 conversion to one way toll collection on the U.S. side.

Canadian Primary Inspection:

Passenger Vehicles - There are 8 auto inspection booths on the Canadian side. The 1993 Niagara Frontier report does not estimate inspection capacity of booths, however, Canadian inspection times were estimated to be 27 seconds at the Rainbow Bridge by the NFBC Study in 1990. This yields 133 vehicles per hour per booth. This processing estimate leads to an 8 booth capacity of 1,064 autos per hour on the Canadian side. Given current DHVs of 940 passenger vehicles on summer Saturdays, and 655 for weekdays, this element is currently over or near capacity on Saturdays. With traffic growth to 1,267 to 1,816 vehicles per hour by 2020, under the alternative maximum scenario in the Niagara Frontier 1993 study, it is clear that additional capacity will be needed relatively soon. The NFBC 30 year plan calls for an increase to 20 booths in 1996. This would provide capacity of 2,180 vehicles per hour.

Canadian Secondary: Canadian auto secondary will need more space due to their collections activity and the level of shopping traffic. The auto secondary area can currently hold 40-50 cars (spaces for 20) and will be increased to 50 legitimate spots in 1996.

Canadian Inspection Facility: The principal need is for more primary inspection booths and auto secondary area. Facilities must be provided by the operator free of charge under Section 6 of the Customs Act.

Canadian Staff: For 1992 there were 41 inspectors and 9 managerial/clerical staff at this location.

Traffic: In 1992 auto traffic totaled 4.614 million vehicles, a decrease of .3 million vehicles compared to 1991. This decline in traffic follows five years of growth in excess of .250 million vehicles per year.

BRIDGE CROSSING FORECASTS
ANNUAL TRAFFIC LEVEL
(1000s VEHICLES)

TYPE	1990	2000	2010	2020
AUTO	4486	NA	NA	8293
TRUCK/BUS	30	NA	NA	66
TOTAL	4516	NA	NA	8359

Source: Niagara Frontier Study 1993, assuming alternative maximum forecast.

U.S./CANADIAN BORDER PORT PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: RAINBOW BRIDGE, NEW YORK

BACKGROUND

DESCRIPTION

The Rainbow is a four lane bridge that is 1450 feet long and 202 feet above normal water level. The Bridge is one of 3 bridges operated by the Niagara Falls Bridge Commission (NFBC), a Congressionally authorized entity. The bridge was opened in 1941. It should be noted that the NFBC has issued a 30 year development plan for upgrading of its facilities, and that the Commission has issued bonds to finance the first phase of this work. The plan concludes that tolls will be sufficient to finance all necessary improvements.

LOCATION

The Rainbow Bridge is located at Niagara Falls, New York and Niagara Falls, Ontario where it crosses the Niagara River.

ACTIVITY

In 1991 the bridge carried 4.614 million autos, a decline of .3 million vehicles following several years of major traffic growth. The Rainbow Bridge is used almost exclusively for passenger auto traffic, with trucks banned for all intents and purposes. The facility is primarily used for recreational travel. In 1990, 56% of passenger trips on an August weekend had a Niagara area origin or destination. Most of these trips had both an origin and destination internal to the area. Overall, less than 5% of travel at Niagara area bridges was commuter related.

HIGHWAYS

Access roads on both sides have adequate capacity through 2020. However, as noted in the Peace Bridge profile, the I-190 from South Grand Island to the Peace Bridge will need widening before 2020. On the Canadian side, the QEW will require widening between Highway 405 and 420 before 2020.

DELAYS

1989 traffic reports maintained by NFBC indicate that Canada bound there were 77 incidents when traffic was backed up all the way across the bridge. For U.S. bound travel there were 69 such incidents in 1989. During the study team's visit to the facility, traffic

bound for Canada was backed up almost all the way across the bridge.

CAUSE OF DELAYS

According to the 1993 Niagara Frontier study, the principal cause of delays is capacity and operational constraints at primary inspection on both sides. In 1990, primary inspection facilities had an estimated capacity of 872 vehicles on the U.S. side, while the maximum Saturday weekend demand reached 940 vehicles. Similar capacity/demand ratios exist on the Canadian side and it is estimated that 1993 weekday DHV demand exceeds booth capacity. However, delays also occur at times when inspection services are not staffing all available booths, according to the 1990 NFBC report.

IMPROVEMENTS

The NFBC has issued approximately $125 million in bonds to begin the first of four phases in their 30 year development plan. The plan was issued in September, 1990 and is being revised to reflect recent traffic growth and additional needs that have resulted. Phase I calls for expansion of the plazas on both sides to accommodate additional primary inspection booths, and expansion of the concrete bridge approaches on each side. In the U.S., improvements are scheduled for early 1994 and will result in 18 customs booths, an increase of 10, and one additional toll booth, for a total of 6. On completion of this work toll collections will be switched to one-way westbound and collected on the U.S. side. The plan calls for an increase from 8 to 20 booths on the Canadian side in 1996. In addition, the very crowded secondary space will be expanded to 50 parking spaces.

ANTICIPATED GROWTH

Based on 1979 to 1991 annual compound growth of 6.0% per year, auto traffic at the Rainbow Bridge could be expected to reach just over 8.0 million vehicles in the year 2000, compared to 1991 traffic volume of 4.916 million vehicles. However, 1992 auto traffic declined by .3 million vehicles compared to 1991, following several years of .3-.5 million vehicle annual increases. Should the Canadian dollar remain weak, and if Canadian retailers continue to become more competitive, there is the potential for declines in traffic levels.

Forecasts based on an analysis of independent variables suggest traffic will reach a total of 8.359 million vehicles by the year 2020. This forecast assumes the 1979-1991 historical growth will not be matched. These forecasts were prepared for the 1993 Niagara Frontier study using the more conservative alternative maximum scenario.

Forecasts of peak hour traffic levels conducted for the Niagara Frontier 1993 study indicate maximum summer weekend hourly demand will increase from 971 equivalent passenger vehicles in 1990 to 1847 units per hour in 2020.

CAPACITY ISSUES

The principal capacity issue relates to a lack of primary inspection booths on both sides of the bridge. This element was at or over capacity in 1990 and is now clearly over capacity. The capacity problem will be resolved by planned improvements in 1994 and 1996. All other elements have adequate capacity through 2020. Roadbed capacity of 2,420 directional vehicles exceeds anticipated 2020 hourly volume of 1,877 vehicles per hour on maximum weekends.

OTHER ISSUES

In the short term, there is a need for additional staffing of primary inspection booths during peak traffic periods to assure all available booths are open. This was a principal recommendation of the 1993 Niagara Frontier report. There is also a need for better traffic control measures. The Niagara Frontier 1993 report also calls for implementation of the 1990 NFBC 30-year plan. This plan calls for expansion of the plazas on both sides of the Rainbow in order to add inspection booths.

Given the recent decline in traffic levels officials should carefully monitor traffic trends to assure capacity is not added prematurely.

RAINBOW BRIDGE
OPERATOR PROVIDED TWO-WAY TRAFFIC LEVELS
(1000'S OF VEHICLES)

YEAR	AUTOMOBILE	TRUCK/BUS	TOTAL
1980	3289	66	3355
1981	3237	57	3294
1982	3073	46	3119
1983	3195	45	3240
1984	3105	39	3144
1985	3058	39	3097
1986	3102	39	3141
1987	3510	37	3547
1988	3914	41	3955
1989	4245	38	4283
1990	4486	30	4516
1991	4912	4	4916
1992	4614	2	4618

Source: U.S.-Canada International Bridge Crossing Traffic, 1991 Report, Niagara Frontier Transportation Committee.

Note: Prior to 1991 NFBC classified pickups and 4x4's as trucks. For 1991 and forward they will be considered autos.

RAINBOW BRIDGE
INSPECTION SERVICES DATA
(1000'S OF VEHICLES)

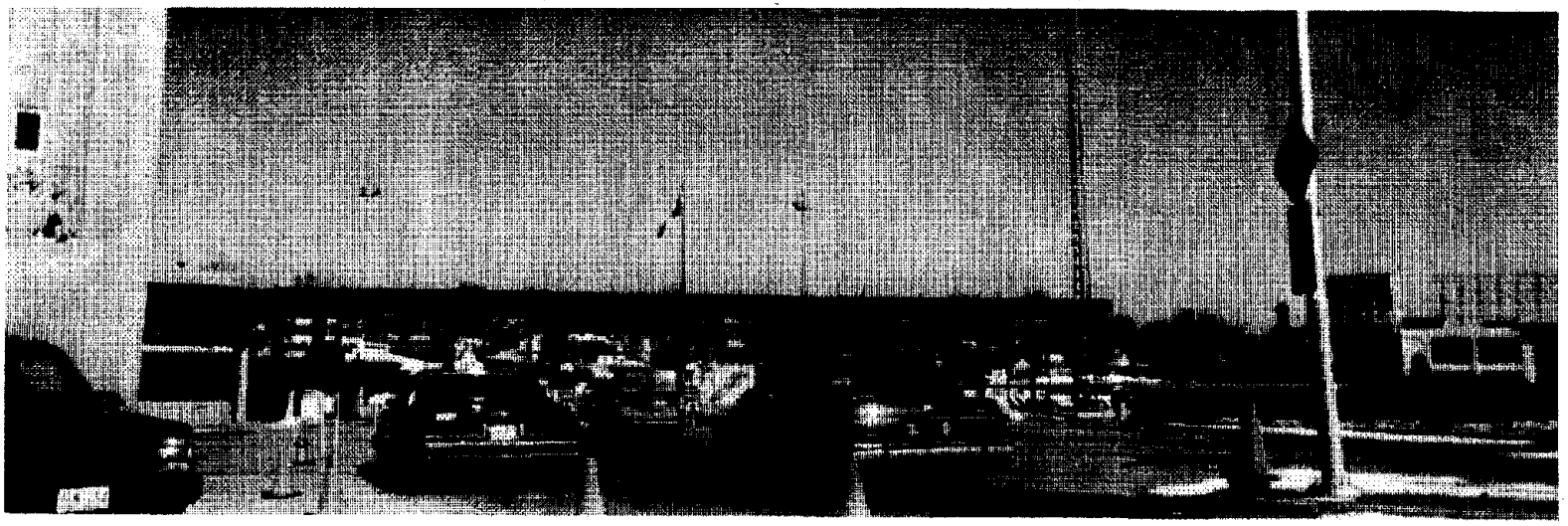
	AUTOMOBILES	TRUCKS	TOTAL
ENTRY TO U.S.:			
1989	2122	46	2168
1990	2277	44	2321
1991	2392	29	2421
1992	2380	NA	2380
ENTRY TO CANADA:			
1989	1709	26	1735
1990	2104	41	2145
1991	2454	30	2484
1992	2234	29	2263

Note: U.S. data provided by port customs officials as auto and truck for 1989-1991. National data provided by U.S. Customs did not break out the four Niagara port crossings. The 1992 U.S. entry figure is an estimate based on operator provided 2-way traffic data less the Canadian Customs provided entry data for traffic entering Canada.

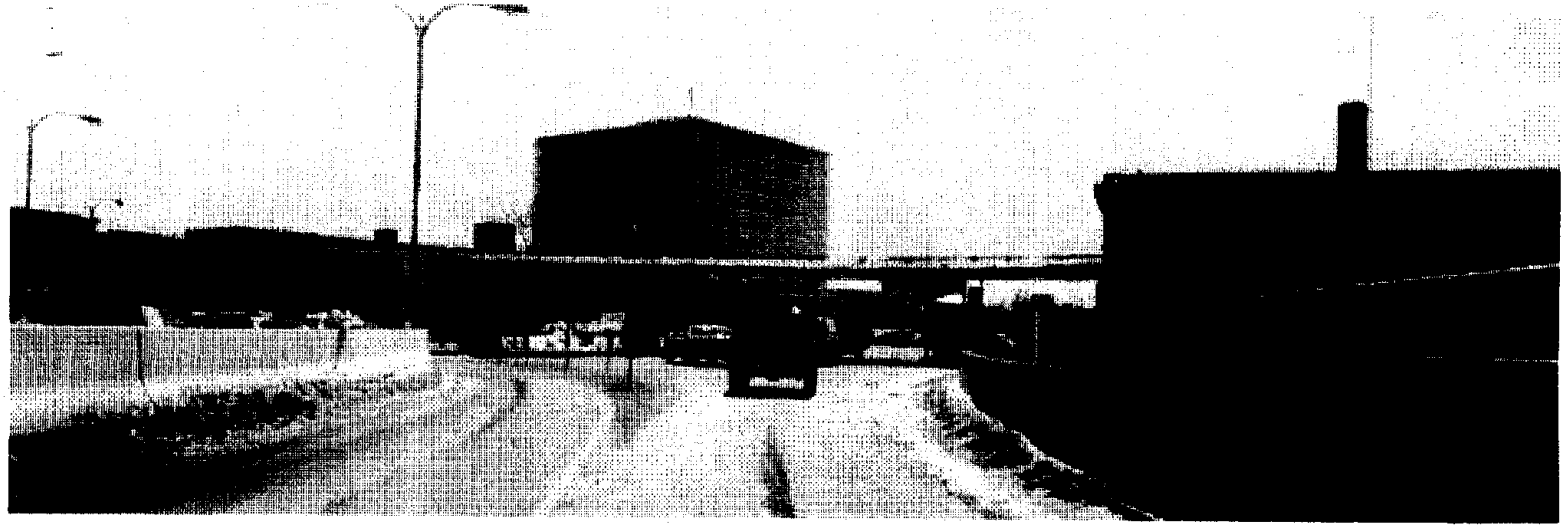
CURRENT AND FORECAST HOURLY PEAK DIRECTIONAL TRAFFIC
RAINBOW BRIDGE

YEAR	1990	2000	2010	2020
WEEKEND MAX HOURLY				
PASSENGER	940	NA	NA	1816
TRUCK	16	NA	NA	31
TOTAL	956	NA	NA	1847
VEHICLE EQUIV'S	971	NA	NA	1877
WEEKDAY DHV 30TH HOUR				
PASSENGER	655	NA	NA	1267
TRUCK	17	NA	NA	32
TOTAL	672	NA	NA	1299
VEHICLE EQUIV'S	689	NA	NA	1331

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993. Alternative maximum, more conservative scenario.



Rainbow Bridge: Above, Canadian Customs primary inspection; below, U.S. primary inspection



U.S./CANADIAN BORDER CROSSING PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: WHIRLPOOL RAPIDS BRIDGE, NEW YORK

PROFILE

Customs Port Code: 10903 **Customs Region:** Northeast

Customs District: Buffalo, New York

INS Region: Eastern **INS District:** Buffalo, New York

Collateral Duties for Border Agencies: Other highway, rail, air and maritime facilities.

Total U.S. Staff: Customs: There are a total of 15 staff per GSA/Customs report.

INS: For all three NFBC facilities combined, there are 38 permanent and 43 temporary positions as of March 20, 1993 per INS report.

Nearest U.S. Ports: The nearest crossings to the Whirlpool Rapids Bridge are the Rainbow Bridge to west and the Lewiston-Queenston Bridge to the east. Nearest ports are Detroit to the west and Thousand Islands at Alexandria Bay, to the east.

Hours of Operation: The facility is open 24 hours a day.

Seasonality: Traffic is not as seasonal as at the Peace and Rainbow bridges. The August peak of 125,440 vehicles compares to the lowest month of February when 81,617 cars used the bridge.

U.S. Inspection Facility: A shortage of primary inspection booths is the principal deficiency on the U.S. side of the Whirlpool Rapids facility. There is also a need for a personal search room and a detention room.

U.S. Primary Inspection:

Passenger Vehicles - There are 3 regular lanes/inspection booths and one turn around lane that can be staffed for primary inspection at peak traffic hours. At the average processing time of 30 seconds per vehicle, as reported by the 1990 NFBC study, each booth can process 120 vehicles per hour (vph), rendering a total capacity of 360 vph. The 1990 maximum summer weekend volumes of 566 vph exceed the capacity at this bridge crossing.

The design hour volume (DHV) is a measure of traffic that is based on the 30th busiest hour in a year. Conservative forecasts to the year 2000 indicate a weekday DHV of 460 vehicles which will also exceed the current capacity. The NFBC's 30 year plan anticipates sufficient increases in primary inspection booths.

U.S. Secondary Inspection: U.S. automobile secondary inspection is inadequate in most respects. At full capacity it can only accommodates 6 vehicles.

Operator: Niagara Falls Bridge Commission (NFBC).

Operator Contact:
Mr. Allen Gandell
General Manager
Niagara Falls Bridge Commission
P.O. Box 1031
Niagara Falls, New York 14302
Phone: 416 384-8641
Fax: 416 384-3256

Operator Information: The Whirlpool Rapids Bridge, as both the Rainbow and Lewiston-Queenston Bridges, is operated by the Niagara Falls Bridge Commission (NFBC). Refer to the Rainbow Bridge profile for information on the NFBC.

Facility Location: The Whirlpool Rapids Bridge crosses the Niagara River between Niagara Falls, Ontario and Niagara Falls, New York. The bridge is adjacent to the Whirlpool Rapids falls.

Facility Description: The Whirpool Rapids bridge is a two deck structure that is 1080 feet long. The upper deck is 245 feet over the water. The upper deck is 32 feet wide and carries two rail tracks. These tracks are used by two Amtrak trains per day, and the track is leased to Canadian National. The lower deck is 47'6" wide and consists of two highway lanes with a sidewalk on each side.

Facility Restrictions: Restricted to autos only for all intents and purposes.

Facility Built: Built in 1897 and bought by the NFBC in 1959.

U.S. Ingress/Egress: Several city streets will exceed the LOS "D"[11] capacity between now and 2020, however there is no room to increase capacity to 4 lanes. The 1993 Niagara Frontier study recommends consideration of a proposal to build a grade separation between

[11]Refer to the Peace Bridge Profile for an explanation of LOS "D" as defined in the Highway Capacity Manual.

the bridge and Hyde Park Boulevard. This would result in a direct link between the bridge and Hyde Park Boulevard, and Route 31 and Route 182.

ROUTE	CAPACITY LOS "D" AADT	1990 AADT	2010 AADT
City Streets 2 Lane	15100	5600-13000	17000

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993. Assumes alternate maximum, more conservative forecast.

Tolls: Tolls are US$.75 or C$1.00 for autos.

U.S. Toll Booths: Tolls are currently collected for both west and eastbound travel, but all booths are on the U.S. side. There are 2 westbound and 2 eastbound booths. The booth capacity is 1,000 vehicles per hour (vph) in each direction. This is approximate to the roadbed capacity. The long term NFBC plan calls for conversion to one way westbound tolls.

Roadbed Capacity: The roadbed on the bridge has a capacity of 1,000 vehicles each direction. Based on 1990 data, current volumes at maximum summer weekend levels equal 566 equivalent vehicles per hour. The 2020 alternate maximum forecast calls for maximum summer weekend volumes of 1,129 equivalent vehicles per hour. As such, it appears that capacity should be adequate until nearly 2010.

Canadian Port: Niagara Falls, Ontario

Canadian Inspection Facility: The Canadian facility needs more primary inspection booths and secondary parking space. Facilities must be provided by the operator free of charge under Section 6 of the Customs Act.

Canadian Toll Booths: Toll booths for both directions are on the U.S. side.

Canadian Ingress/Egress: Current traffic levels on Bridge Street and River Road, the approach and egress roads on the Canadian side, are nearing capacity. Due to space constraints, there is little opportunity to widen these roads. The NFBC has proposed a link between an improved Whirlpool Corridor and Highway 405 via a reconstructed Stanley Avenue and a new roadway paralleling the CN trackage, according to the 1993 Niagara Frontier report.

ROUTE	CAPACITY LOS "D" AADT	1990 AADT	2010 AADT
Bridge Street	7500	7100	18000
River Road	7500	6600	18000

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993. Assumes a more conservative forecast, referred to as "alternate maximum" forecast.

Canadian Primary Inspection:

Passenger Vehicles - There are also 3 primary inspection lanes on the Canadian side. Assuming the 27 second processing time, as reported in the 1990 NFBC study, each lane has a capacity of 130 vph. This yields a total capacity of 390 vehicles per hour. Current 1990 weekday and weekend volumes already exceed this capacity. The NFBC's 30 year plan provides for sufficient increases in capacity.

Canadian Secondary Inspection: Canadian secondary is especially inadequate, with space for only 6 autos under the canopy.

Canadian Inspection Staff: For 1992 there were 25 inspectors and 4 managerial/clerical positions at this location.

Traffic: Auto traffic in 1992 totaled 2.458 million vehicles. Compared to 1991 traffic data, this represents a flat growth, and compared to growth over the last 5 years, 1992 auto traffic represents a substantial decrease.

BRIDGE CROSSING FORECASTS
ANNUAL TRAFFIC LEVELS
(000'S OF VEHICLES)

TYPE	1990	2000	2010	2020
AUTO	2462	NA	NA	4951
TRUCK	51	NA	NA	107
TOTAL	2513	NA	NA	5058

Source: Niagara Frontier U.S.-Canada Bridge Report, 1993. Alternate maximum forecast.

WHIRLPOOL RAPIDS BRIDGE
OPERATOR PROVIDED TWO-WAY TRAFFIC LEVELS
(1000'S OF VEHICLES)

YEAR	AUTOMOBILE	TRUCK/BUS	TOTAL
1980	1982	116	2098
1981	2138	122	2260
1982	974	48	1022
1983	1007	46	1053
1984	1228	70	1298
1985	1260	73	1333
1986	1367	78	1445
1987	1374	58	1432
1988	1619	66	1685
1989	2075	63	2138
1990	2462	51	2513
1991	2420	21	2441
1992	2458	17	2475

Source: U.S.-Canada International Bridge Crossing Traffic, 1991 Report, Niagara Frontier Transportation Committee.

Note: Prior to 1991 NFBC classified pickups and 4x4's as trucks. For 1991 and forward they will be classified as autos.

WHIRLPOOL RAPIDS BRIDGE
INSPECTION SERVICES DATA
(1000'S OF VEHICLES)

	AUTOMOBILE	TRUCK/BUS	TOTAL
ENTRY TO U.S.:			
1989	1076	27	1103
1990	1256	21	1277
1991	1262	8	1270
1992	1311	8	1319
ENTRY TO CANADA:			
1989	814	30	844
1990	1187	29	1216
1991	1139	15	1154
1992	1147	9	1156

Note: U.S. data provided by port customs officials as auto and truck for 1989-1991. National data provided by U.S. Customs did not break out the four Niagara port crossings. The 1992 U.S. entry figure represents an estimate based on operator provided 2-way data less Canadian Customs provided data on traffic entering Canada.

CURRENT AND FORECAST HOURLY PEAK TRAFFIC
WHIRLPOOL RAPIDS BRIDGE

ITEM	1990	2000	2010	2020
WEEKEND MAX HOURLY				
PASSENGER	548	NA	NA	1091
TRUCK	9	NA	NA	19
TOTAL	557	NA	NA	1110
VEHICLE EQUIV'S	566	830	1020	1129
WEEKDAY DHV 30TH HOUR				
PASSENGER	298	NA	NA	595
TRUCK	8	NA	NA	16
TOTAL	306	NA	NA	611
VEHICLE EQUIV'S	315	460	570	627

Source: Niagara Frontier U.S.-Canada Bridge Study, March, 1993.
Alternate maximum forecast.

U.S./CANADIAN BORDER CROSSING PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSING: WHIRLPOOL RAPIDS BRIDGE, NEW YORK

BACKGROUND

DESCRIPTION

Open since 1941, the Whirlpool Rapids Bridge is a two deck bridge with a total length of 1080 feet, and a height over the water of 245 feet to the upper deck. The upper deck carries two rail tracks which are leased to the Canadian National railroad. Rail traffic is limited to 2 Amtrak trains a day. The lower deck provides for 2 highway lanes, one each direction.

The bridge is operated by the Niagara Falls Bridge Commission (NFBC), a congressionally authorized Commission. A comprehensive 30 year development plan has been proposed by the NFBC to increase traffic capacity at this facility and at the Rainbow and Lewiston-Queenston bridge facilities. The Commision has issued bonds to finance the first portion of the plan.

LOCATION

The Whirlpool Rapids Bridge is located at Niagara Falls, New York and Niagara Falls, Ontario where it crosses the Niagara River.

ACTIVITY

In 1992, the Whirlpool Rapids Bridge carried 2.458 million autos and .017 million buses and trucks. Traffic levels held steady compared to 1991, following several years of major growth. The bridge is, for all intents and purposes, restricted to auto traffic. In August 1990, an O-D survey was performed which was based on the travellers' "previous stop and next stop". The survey indicated that 80.8% of these trips had an origin or destination within the Niagara area. In terms of the trip purposes in 1990, 34.8% were for shopping and 41.3% were for a recreational purpose. Less than 5% of the trips over the four Niagara Frontier bridges were commuters. Cross-border shopping traffic has declined in recent months.

HIGHWAYS

Many city streets on the U.S. side will exceed their capacity before the year 2020. Unfortunately, there is little room for expansion. The NFBC 30 year plan calls for construction of a grade separation connector between the bridge and Hyde Park Boulevard.

This would create a direct link between the bridge, Hyde Park Boulevard, and Routes 31 and 182. On the Canadian side, present traffic levels almost exceed the capacity of city streets. The NFBC has proposed a link between an improved Whirlpool Corridor and Highway 405 via a reconstructed Stanley Avenue, and a new roadway paralleling the CN trackage, according to the 1993 Niagara Frontier report[12].

DELAYS

The 1990 NFBC study indicates that during July, 1989 alone traffic backed up all the way across the bridge 145 times in the Canada bound direction. There were 33 such incidents for U.S. bound traffic.

CAUSE OF DELAYS

Delays are primarily due to the peak hour physical capacity and operations of primary inspection lanes and plazas, and the capacity of city streets. Current delays are not due to toll or roadbed capacity.

IMPROVEMENTS

A 1993 Niagara Frontier U.S.-Canada Bridge Study prepared by Parsons, Brinckerhoff, Quade, & Douglas, Inc., recommends replacement of the upper railroad deck with an orthotropic deck that would be continuous beneath the railroad track.[13] They suggest rehabilitation of the remainder of the structure to accommodate 2-way, 2-lane passenger vehicle and restricted truck operation on cantilevered sections of the upper deck, as well as single track 2-way Amtrak operations. This plan provides an option to remove the track at some time in the future, supplying 2 additional center lanes for motor vehicles. It is also recommended in the study that the lower deck be rehabilitated for a variety of low traffic uses.

In terms of the inspectional plaza, both the Niagara Frontier study and the NFBC 30 year plan suggest construction of additional plaza space and inspection booths, and access road improvements. The two studies disagree about the need for a commercial truck processing facility. However, they agree on the implementation of a demand management system that will divert traffic from facilities that are operating above capacity at any given time, to facilities operating below capacity at that time.

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[12]The 1993 Niagara Frontier U.S.-Canada Bridge Study was prepared by Parsons, Brinckerhoff, Quade, & Douglas, Inc., in association with KPMG Peat Marwick.

[13]Reference to this study does not imply endorsement or concurrence by the Department of Transportation.

The most urgent need at the Whirpool Rapids Bridge and terminal facility, is the construction of additional primary inspection facilities, and improvements to the roadbed. The additional roadbed capacity will be required within the next 15 years; the current forecasted date could be postponed due to a reduction in shopping trips.

ANTICIPATED GROWTH

In 1991, traffic volume over the Whirpool Rapids Bridge was 2.441 million vehicles. Based on an annual compound growth rate of 6.7% between 1979 and 1991, traffic at the Whirlpool Rapids Bridge could be expected to exceed 4.0 million vehicles by the year 2000. The 1993 Niagara Frontier study alternate maximum, or more conservative scenario, forecasts 4.951 million vehicles by 2020. This forecast is below the trend line.

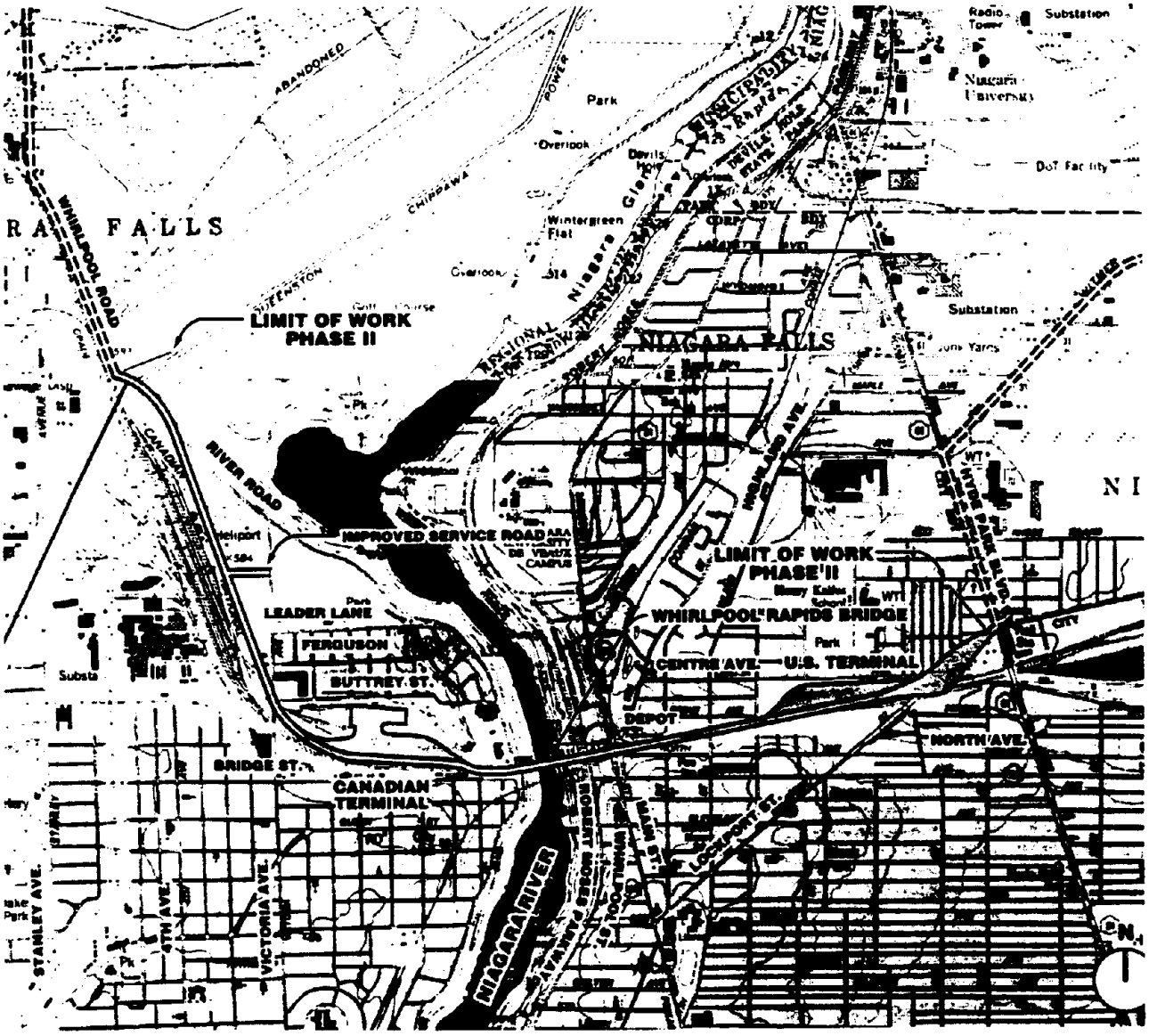
Due to a recent reduction in Canadian cross-border shopping, passenger vehicle traffic in 1992 did not show an increase, and in 1993 actually reflected a decline in passenger vehicle traffic.
Forecasts of peak hourly traffic demand conducted as part of the 1993 Niagara Frontier study predict that weekend maximum traffic levels will increase from 566 per hour in 1990, to 830 in 2000, 1,020 in 2010, and 1,129 per hour in 2020.

CAPACITY ISSUES

The principal capacity constraint is with primary inspection booths on both sides. 1990 demand of 566 vph on weekends already exceeds the likely booth capacity of 436 vph on the U.S. side. The Canadian capacity of 390 vph is even more over capacity. Roadbed capacity would not be needed until just before 2010 under the Niagara Frontier alternate maximum forecast. Area streets are nearing capacity today.

ISSUES

The 1993 Niagara Frontier Study recommends increasing the plaza size and the number of inspection booths, constructing access improvements, and modifiying the existing bridge, by the year 2000. These modifications would add lanes but are less urgent than the plaza construction and primary lanes. The NFBC bond issue and tolls will be capable of financing these improvements. Before any major additions to roadbed capacity are made, traffic forecasts should be reviewed. Declines in traffic levels during 1992 and early 1993 may be an indicator of declines in the future.



Whirlpool Rapids Bridge
Niagara Falls, New York

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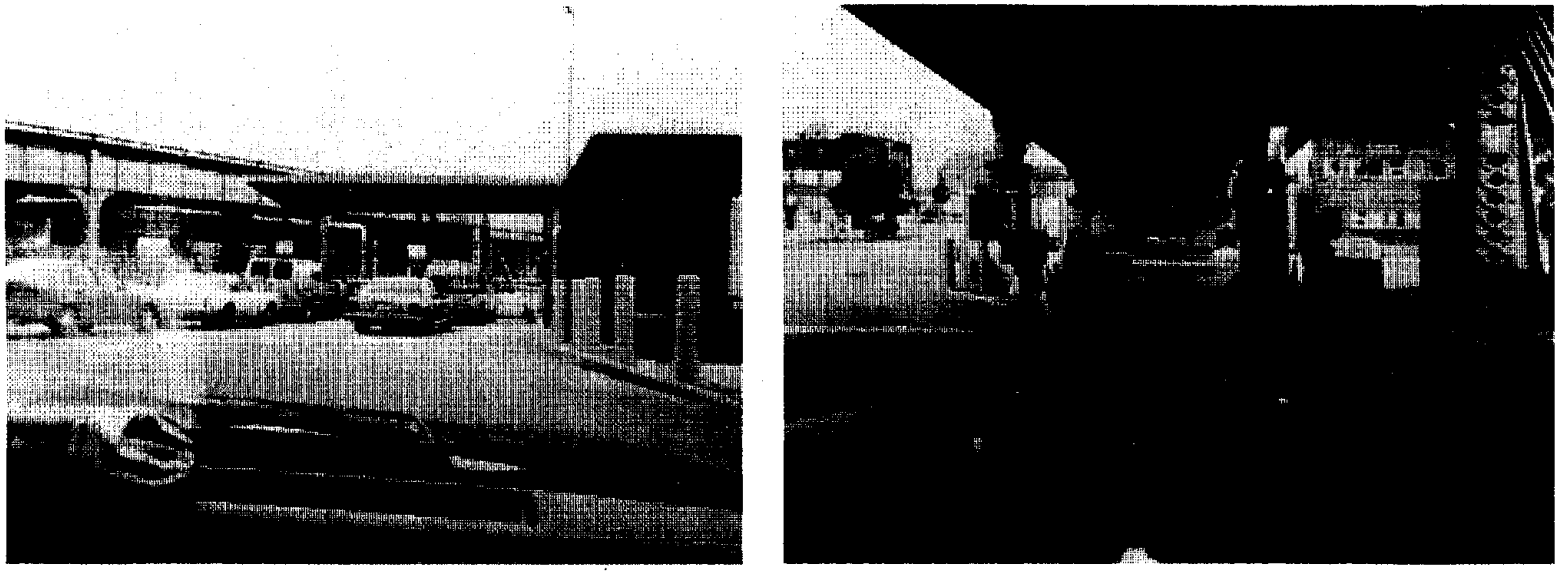
Parsons, Brinckerhoff, Quade, & Douglas, Inc.
Niagara Frontier U.S.-Canada Bridge Study,
March 1993.



Whirlpool Rapids Bridge: Left, approaching U.S. toll plaza; right, approaching Canadian primary inspection

Whirlpool Rapids: Rail bridge in foreground, highway/rail 2 deck in rear

U.S./CANADIAN BORDER CROSSING PROFILE
PORT: BUFFALO/NIAGARA FALLS, NEW YORK
CROSSINGS: NIAGARA FRONTIER RAILROAD BRIDGES

CROSSING SUMMARY

LOCATION

The rail bridges at the Niagara Frontier are located in Buffalo and Niagara Falls, New York. The bridges cross the Niagara River.

DESCRIPTION

CN Fort Erie/Buffalo International Bridge

This multi-span bridge carries CN traffic, including the 20'6" double stack traffic. CP has rights but does not use this crossing. The bridge does not cross a navigable waterway.

CP Whirlpool Rapids Bridge

This steel-arch bridge crosses the Niagara Gorge and is several hundred feet over the Niagara River. This bridge is in the process of being retracked.

Joint Highway/Rail Whirlpool Rapids Bridge

This joint highway/rail bridge over the Niagara River Gorge is owned and operated by the Niagara Falls Bridge Commission, a U.S. federally-constituted agency. The lower deck carries automobile traffic and the upper deck is leased to Conrail/CN for rail use. The upper deck contains two sets of tracks. Currently, this rail deck is not used for freight service but is used by Amtrak for passenger service. However, the Niagara Falls Bridge Commission is currently negotiating with the railroads in order to obtain the right to use the upper deck as a highway.

ACCESS AND SERVICE

CN Fort Erie/Buffalo International Bridge

Both Canadian National and Norfolk Southern use this crossing. Canadian Pacific has rights but does not use this crossing.

CP Whirlpool Rapids Bridge

The Whirlpool Rapids bridge is Canadian Pacific's primary crossing.

Joint Highway/Rail Whirlpool Rapids Bridge

This bridge is used by Amtrak/Via Rail for passenger service and is not currently used for freight service.

ACTIVITY

Volume data for the individual bridges was not available. However, U.S. Customs Service data on inbound movements at the Niagara/Buffalo crossings show that in 1992 there were 3,486 trains and 131,114 rail cars that entered through these crossings. In 1990, there were a total of 3,327 trains and 128,422 rail cars that entered through the crossings.

This crossing is used for all double stack service between the U.S. and Canada, including Asian container traffic bound for markets in Ontario and Quebec and double stack traffic moving between the U.S. and Europe via Montreal. In 1989, there were eight double stack trains per week at the CN Fort Erie International Bridge. CN operated three trains per day in each direction, and NS operated one train per day in each direction.

DELAYS

Delays at these crossings occur occasionally.

CAUSE OF DELAYS

Delays are generally due to the unavailability of Customs staff when trains arrive and the occasional need to cut rail cars out for inspection at the crossing.

IMPROVEMENTS

No major structural improvements have been made in recent years. However, the International Bridge was closed for some time in 1993 for structural work. In addition, the CP Whirlpool Rapids Bridge was retracked during 1993.

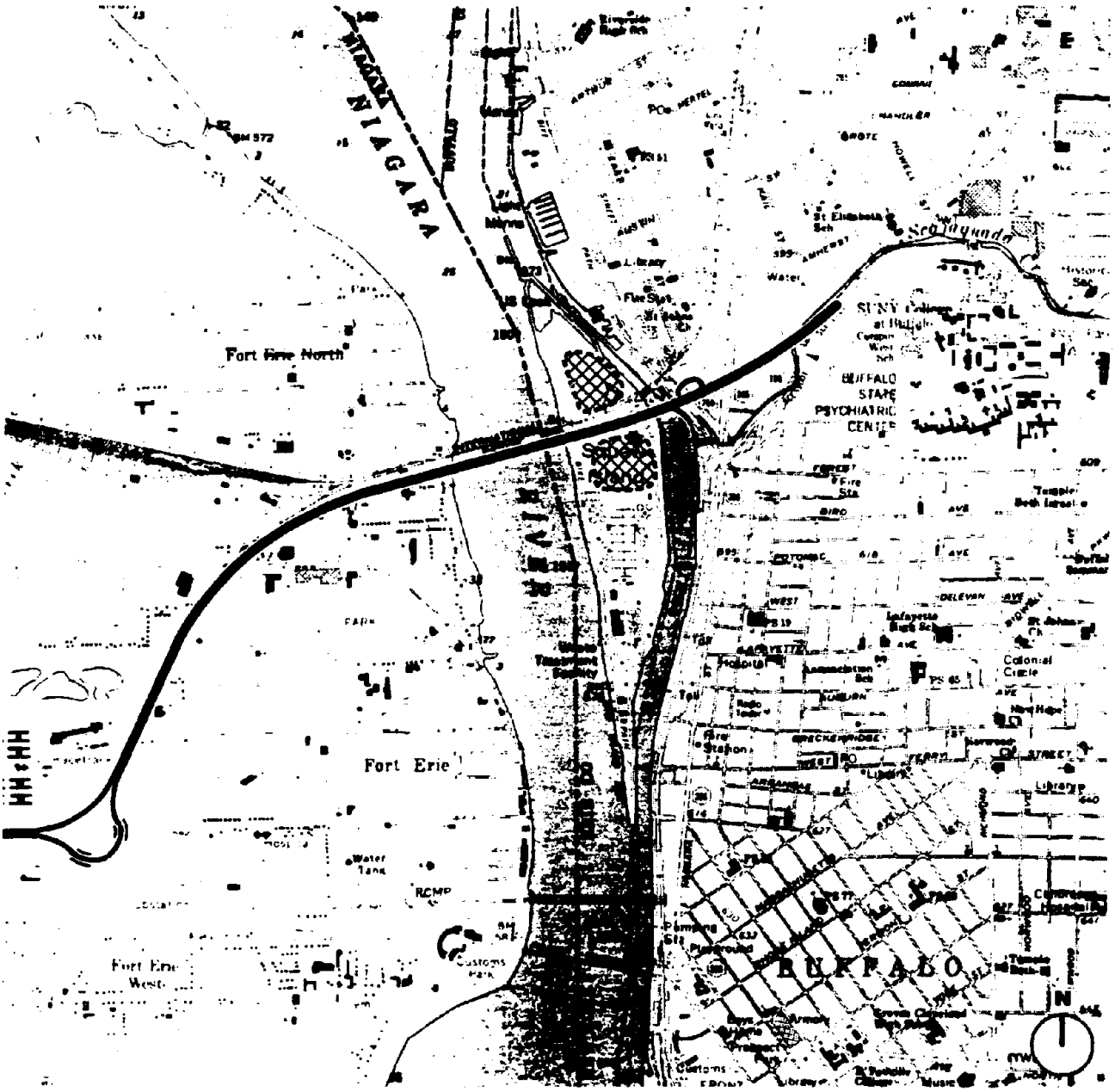
ANTICIPATED GROWTH

An increase in traffic is most likely to occur on the CP Whirlpool Rapids bridge. CP hopes to compete with trucks and U.S. rail companies on the routes from Chicago to the Eastern U.S. ports. Using their Delaware and Hudson subsidiary in the U.S., CP plans to run a line

from Chicago through Detroit and Ontario to Niagara Falls and the East Coast.

RECOMMENDATION

No major actions are required.



Railroad Bridge
Buffalo/Niagara Area

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Parsons, Brinckerhoff, Quade, & Douglas, Inc.
Niagara Frontier U.S.-Canada Bridge Study,
March 1993.