High Speed Ferry and Coastwise Vessels: Assessment of a New York / Boston Service

(Program Element 3-17, F

R O B E R T A L L A N L T D .

NAVAL ARCHITECTS AND MARINE ENGINEERS
230 - 1639 West 2nd Avenue
Vancouver, BC V6J 1H3 Canada

Vessel	-	**Single Decked Trailer Ferry**
Length overall	-	417' (127 metres)
Beam over guards	-	85' (25.8 metres)
Depth, moulded	-	20' (6.1 metres)
Draft	-	10.5' (3.2 metres)
Propulsion	-	two marine diesels (i.e. CAT 3608)
	-	total horsepower: 6,600 bhp
	-	two azimuthing Z-drives (i.e. Rolls-Royce US305) fitted with Nautican high speed nozzles
Bow Thruster	-	retractable 1,600 bhp Z-drive or 1,600 bhp tunnel thruster, depending on required manoeuverability
Capacity	-	58 unaccompanied trailers (50' average) stowed on the main deck
Speed	-	18 knots
Crew	-	10
Supernumeries	-	10

* * *

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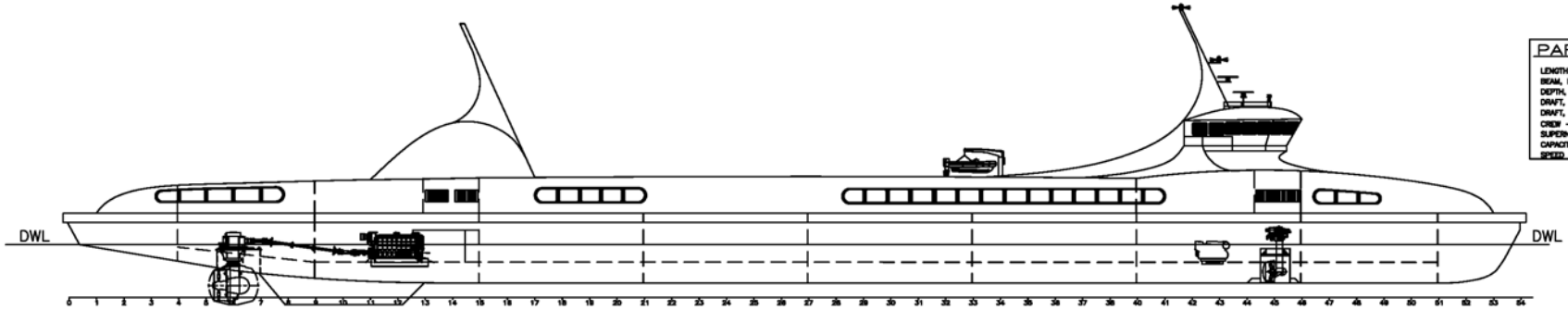
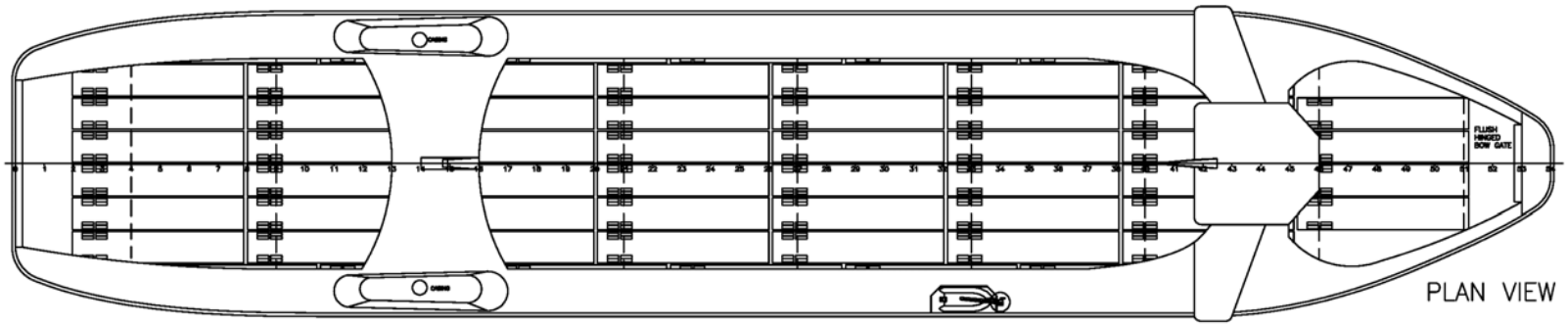
(604) 736-9483

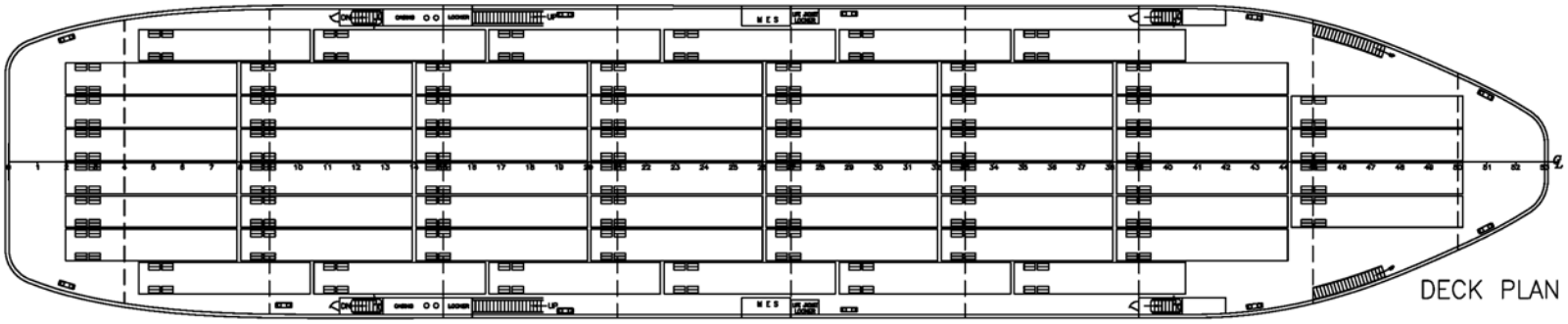


OUTBOARD PROFILE

PARTICULARS	
LENGTH OVERALL –	127.00 metres
BEAM, MOULDED –	25.00 metres
DEPTH, MOULDED –	6.10 metres
DRAFT, MOULDED –	3.2 metres
DRAFT, EXTREME –	4.00 metres
CREW –	10 persons
SUPERNUMERIES –	10 persons
CAPACITY –	58 trailers
SPEED –	18 knots



PLAN VIEW



DECK PLAN

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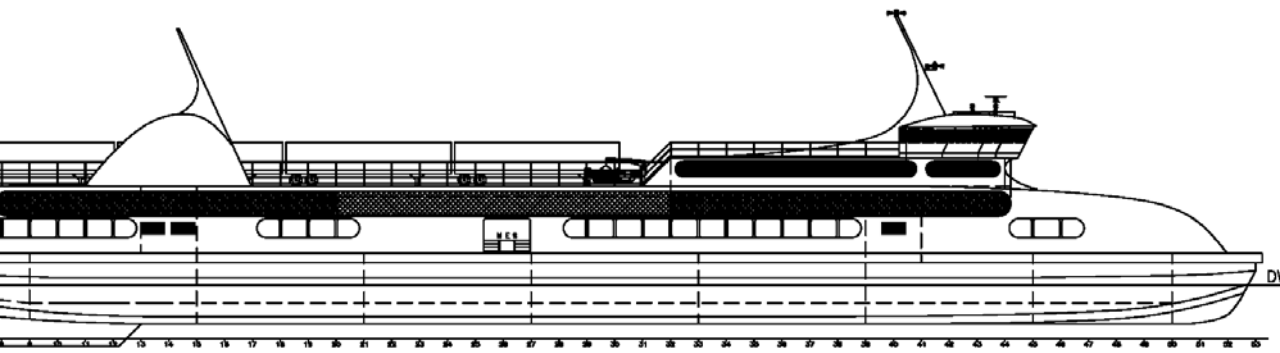
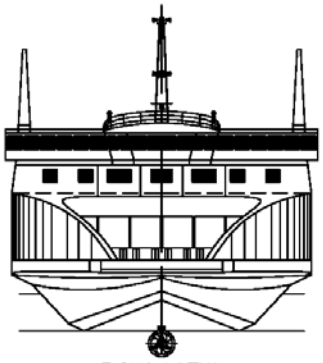
NAVAL ARCHITECTS AND MARINE ENGINEERS
230–1639 WEST 2nd AVE. VANCOUVER, B.C.

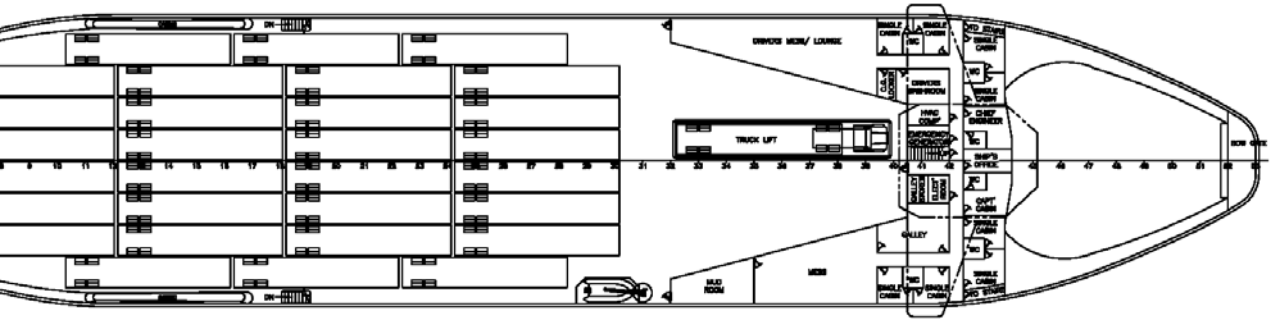
CLIENT		REV. #	REVISIONS		BY	DATE	
VESSEL	127 M TRUCK FERRY – 58 TRAILER UNITS	DRAWN BY DLG	SCALE 1:400	PROJECT 203–030		SHEET 1 OF 1	REV. 1
TITLE	TRUCK FERRY PROPOSAL	CHECKED MM	DATE APR 22, 03	DWG. # 30000			

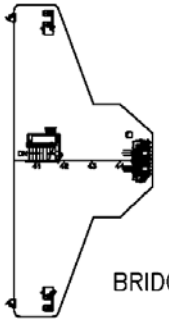


OUTBOARD PROFILE



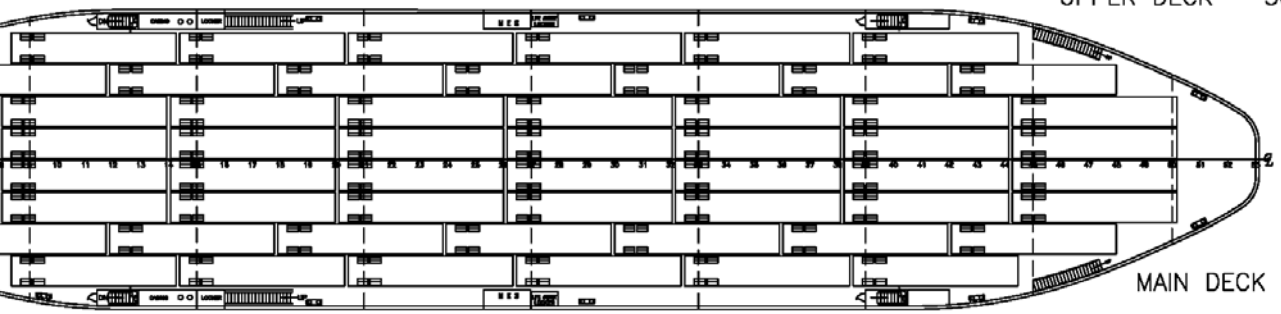
BOW VIEW





BRIDGE

UPPER DECK – 30 TRAILERS



MAIN DECK – 58 TRAILERS

PARTICULARS

LENGTH OVERALL –	127.00 metres
BEAM, MOULDED –	25.80 metres
DEPTH, MOULDED –	8.10 metres
DRAFT, MOULDED –	3.2 metres
CREW –	10 persons
PASSENGERS –	20 persons
CAPACITY –	88 trailers
SPEED –	18 KN

ALLAN LTD.
ID MARINE ENGINEERS
d AVE. VANCOUVER, B.C.

CLIENT		REV. #	REVISIONS		BY	DATE	
VESSEL	SELF–PROPELLED TRAILER FERRY – 88 TRAILERS	DRAWN BY DLG	SCALE 1:200	PROJECT 203–030		SHEET	REV.
TITLE	TRAILER FERRY PROPOSAL	CHECKED MM	DATE 22 APR 03	DWG. # 30000		1 OF 1	1

APPENDIX B:

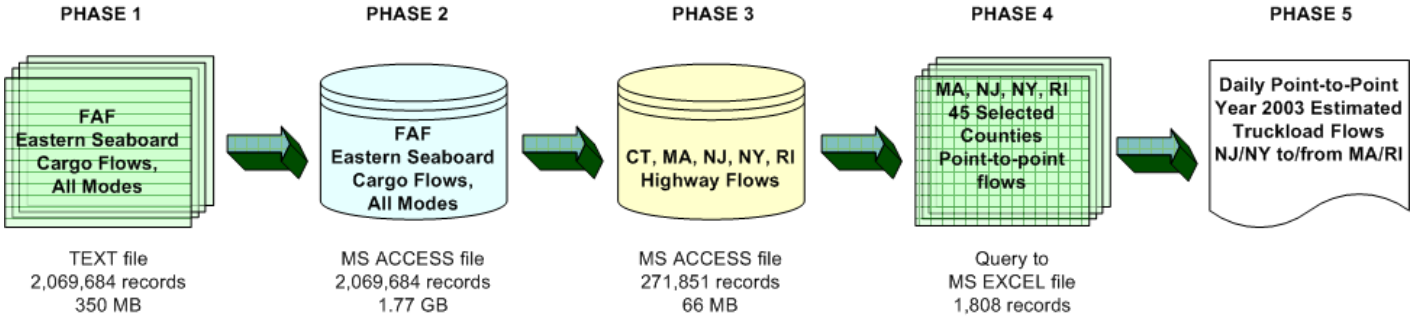
Truck Traffic Analysis

Appendix B: Truck Traffic Analysis

Source of Information and Data Manipulation

MARAD provided the "FAF Eastern Seaboard Flows" database for analysis of localized, point-to-point flows. This database contains cargo flows between eastern seaboard points for all transportation modes for the year 1998 and base, high and low projections for the years 2010 and 2020. Due to the massive amount of data, successive manipulations were needed to compile information relevant to our analysis (see figure below).

After the conversion of original data (Phase 1) to a relational database in MS Access format (Phase 2), a subset of all the records were filtered out for easier manipulation (Phase 3). This subset contains highway flows for five northeastern states: Connecticut, Massachusetts, New Jersey, New York and Rhode Island, on a county-to-county basis (Appendix A presents the list of these states' counties). Based on the requirements of our analysis, where two terminal sites (Newark, NY, and Providence, RI) have been selected to illustrate the technical characteristics of a coastal shipping service, a subsequent query was performed to obtain point-to-point highway flows between selected counties in four states: Massachusetts, New Jersey and New York and Rhode Island (Phase 4). Therefore, final flow calculation does not represent state-to-state figures but county-to-county. The selected counties, located approximately in a 50-mile radius of these two terminals, are listed in the table below.



Selected Counties for Point-to-point Flow Calculation

State	County
Massachusetts (10 counties)	Barnstable
	Norfolk
	Plymouth
	Bristol
	Suffolk
	Dukes
	Middlesex
	Worcester
	Essex
	Nantucket
New Jersey (13 counties)	Hudson
	Bergen
	Hunterdon
	Somerset
	Mercer
	Sussex
	Middlesex
	Union
	Monmouth
	Warren
	Morris
	Essex
	Passaic
New York (17 counties)	Suffolk
	Bronx
	Sullivan
	Nassau
	New York
	Ulster
	Westchester
	Columbia
	Orange
	Delaware
	Dutchess
	Putnam
	Queens
	Richmond
	Rockland
	Greene
	Kings
Rhode Island (5 counties)	Bristol
	Kent
	Newport
	Providence
	Washington

Final Data Aggregation and Results

Summary of yearly flows in short tons were converted into daily truckload flows by assuming a truckload of 20 tons and 6-day weeks. Current (year 2003) daily flows can be estimated by interpolation of 1998 and 2010 results (Phase 5).

The following tables present state-to-state flows for the selected counties. These detailed summaries are for northbound flows (NJ/NY to MA/RI), the dominant one. The last table shows expected daily trucks between NY/NJ and RI/MA, both north and southbound. Figures add up to 964 trucks per day northbound and 531 truck per day southbound.

From NJ to MA, selected counties

YERALY SHORT TONS

		MA - Selected Counties										
		25001	25005	25007	25009	25017	25019	25021	25023	25025	25027	Grand Tota
NJ - Selected Counties	34003	1,107	15,590	0	17,107	154,855	0	13,409	6,245	11,420	78,465	298,197
	34013	1,344	8,487	3	9,927	49,598	0	7,726	3,175	8,324	24,253	112,838
	34017	1,222	20,148	0	24,278	67,334	0	15,732	8,665	13,501	444,302	595,182
	34019	19	507	0	390	5,857	0	921	349	454	387	8,884
	34021	216	5,046	4	5,763	23,924	6	3,717	2,000	3,528	8,036	52,239
	34023	1,910	27,634	3	33,756	102,514	1	25,004	11,690	19,288	39,430	261,230
	34025	106	3,445	0	3,307	15,010	0	2,758	1,035	1,936	4,137	31,734
	34027	494	10,989	1	16,088	56,579	0	8,959	3,866	6,432	14,600	118,008
	34031	716	11,654	0	12,598	50,382	0	10,816	3,567	10,051	25,516	125,300
	34035	492	7,270	1	7,800	29,997	2	5,519	2,445	4,176	10,285	67,988
	34037	97	563	0	414	945	0	367	423	545	596	3,949
	34039	5,826	36,368	8	48,448	119,463	2	42,645	17,146	28,458	51,643	350,007
	34041	40	1,098	0	715	9,684	0	505	227	438	1,200	13,905
	Grand Total	13,588	148,799	20	180,592	686,140	10	138,077	60,833	108,552	702,849	2,039,460

DAILY TRUCKLOADS

		MA - Selected Counties										
	NY	25001	25005	25007	25009	25017	25019	25021	25023	25025	25027	Grand Tota
NJ - Selected Counties	34003	0	2	0	3	25	0	2	1	2	13	48
	34013	0	1	0	2	8	0	1	1	1	4	18
	34017	0	3	0	4	11	0	3	1	2	71	95
	34019	0	0	0	0	1	0	0	0	0	0	1
	34021	0	1	0	1	4	0	1	0	1	1	8
	34023	0	4	0	5	16	0	4	2	3	6	42
	34025	0	1	0	1	2	0	0	0	0	1	5
	34027	0	2	0	3	9	0	1	1	1	2	19
	34031	0	2	0	2	8	0	2	1	2	4	20
	34035	0	1	0	1	5	0	1	0	1	2	11
	34037	0	0	0	0	0	0	0	0	0	0	1
	34039	1	6	0	8	19	0	7	3	5	8	56
	34041	0	0	0	0	2	0	0	0	0	0	2
	Grand Total	2	24	0	29	110	0	22	10	17	113	327

From NJ to MA, selected counties

YERALY SHORT TONS

		MA - Selected Counties										
		25001	25005	25007	25009	25017	25019	25021	25023	25025	25027	Grand Total
NY - Selected Counties	36005	276	3,154	2	3,726	24,112	0	3,958	1,732	2,632	9,451	49,044
	36021	21	3,149	1	2,310	6,206	1	4,996	1,496	1,626	9,023	28,830
	36025	541	150	1	1,661	5,984	2	262	111	65	513	9,290
	36027	54	1,494	0	1,509	6,667	0	1,505	624	5,610	5,221	22,686
	36039	34	1,154	0	1,129	12,026	0	1,358	725	1,379	3,006	20,813
	36047	10,212	64,711	64	78,829	1,161,719	21	53,963	55,790	111,329	96,760	1,633,398
	36059	544	5,272	0	4,114	42,808	0	3,855	1,900	3,300	25,326	87,117
	36061	1,060	11,111	1	11,479	37,376	0	7,330	3,984	8,293	70,444	151,077
	36071	108	1,943	3	550	11,012	5	986	900	794	7,984	24,286
	36079	97	474	0	482	1,561	0	298	153	1,106	1,063	5,234
	36081	703	7,461	1	6,688	49,668	1	6,037	3,146	4,985	26,466	105,156
	36085	5	162	0	10	2,367	0	4	210	226	1,592	4,576
	36087	131	2,146	2	1,277	16,325	1	1,087	302	1,145	6,896	29,312
	36103	601	7,835	0	7,529	65,212	0	5,762	3,392	6,256	11,103	107,689
	36105	18	277	0	331	1,565	0	216	112	182	573	3,274
	36111	28	989	0	491	8,048	0	350	276	636	3,179	13,998
	36119	546	6,075	3	6,485	661,820	5	5,256	2,854	27,633	20,421	731,099
	Grand Tota	14,981	117,557	79	128,601	2,114,476	36	97,223	77,708	177,198	299,019	3,026,879

DAILY TRUCKLOADS

		MA - Selected Counties										
	NY	25001	25005	25007	25009	25017	25019	25021	25023	25025	25027	Grand Total
NY - Selected Counties	36005	0	1	0	1	4	0	1	0	0	2	8
	36021	0	1	0	0	1	0	1	0	0	1	5
	36025	0	0	0	0	1	0	0	0	0	0	1
	36027	0	0	0	0	1	0	0	0	1	1	4
	36039	0	0	0	0	2	0	0	0	0	0	3
	36047	2	10	0	13	186	0	9	9	18	16	262
	36059	0	1	0	1	7	0	1	0	1	4	14
	36061	0	2	0	2	6	0	1	1	1	11	24
	36071	0	0	0	0	2	0	0	0	0	1	4
	36079	0	0	0	0	0	0	0	0	0	0	1
	36081	0	1	0	1	8	0	1	1	1	4	17
	36085	0	0	0	0	0	0	0	0	0	0	1
	36087	0	0	0	0	3	0	0	0	0	1	5
	36103	0	1	0	1	10	0	1	1	1	2	17
	36105	0	0	0	0	0	0	0	0	0	0	1
	36111	0	0	0	0	1	0	0	0	0	1	2
	36119	0	1	0	1	106	0	1	0	4	3	117
	Grand Tota	2	19	0	21	339	0	16	12	28	48	485

From NY to RI, selected counties

YERALY SHORT TONS

		RI - Selected Counties					
		44001	44003	44005	44007	44009	Grand Tota
NJ - Selected Counties	34003	1,573	12,385	5,464	57,079	4,973	81,475
	34013	116	5,805	1,759	22,283	8,072	38,036
	34017	1,620	12,709	8,477	49,741	4,538	77,085
	34019	78	90	0	1,540	17	1,725
	34021	117	3,494	2,183	15,964	1,365	23,123
	34023	2,408	18,325	8,331	70,116	7,114	106,294
	34025	41	1,642	684	8,909	735	12,011
	34027	1,034	10,068	2,414	35,473	3,694	52,683
	34031	397	7,117	2,830	28,086	2,969	41,399
	34035	610	5,040	2,332	19,508	1,909	29,398
	34037	1	368	88	1,215	252	1,924
	34039	1,592	13,741	4,898	45,856	5,115	71,202
	34041	73	1,275	70	6,799	536	8,753
	Grand Tota	9,659	92,059	39,531	362,568	41,291	545,108

		MA - Selected Counties					
		25001	25005	25007	25009	25017	Grand Tota
NJ - Selected Counties	34003	0	2	1	9	1	13
	34013	0	1	0	4	1	6
	34017	0	2	1	8	1	12
	34019	0	0	0	0	0	0
	34021	0	1	0	3	0	4
	34023	0	3	1	11	1	17
	34025	0	0	0	1	0	2
	34027	0	2	0	6	1	8
	34031	0	1	0	5	0	7
	34035	0	1	0	3	0	5
	34037	0	0	0	0	0	0
	34039	0	2	1	7	1	11
	34041	0	0	0	1	0	1
	Grand Tota	2	15	6	58	7	87

From NY to RI, selected counties

YERALY SHORT TONS

		RI - Selected Counties					
		44001	44003	44005	44007	44009	Grand Tota
NY - Selected Counties	36005	31	402	107	5,963	170	6,672
	36021	237	620	183	5,209	920	7,169
	36025	7	43	7	1,165	41	1,263
	36027	124	1,714	90	5,519	325	7,772
	36039	18	122	0	2,538	119	2,797
	36047	1,159	21,645	2,694	160,531	6,799	192,828
	36059	195	5,513	161	21,312	1,393	28,574
	36061	229	5,579	627	24,042	1,243	31,719
	36071	124	476	50	3,426	270	4,346
	36079	0	24	20	944	10	999
	36081	95	2,238	486	18,058	987	21,863
	36085	0	46	0	582	3	631
	36087	76	2,756	46	10,517	549	13,945
	36103	106	3,347	519	20,659	1,046	25,677
	36105	13	237	24	1,450	194	1,918
	36111	26	738	44	2,981	127	3,916
	36119	704	13,451	357	33,842	2,313	50,666
	Grand Tota	3,143	58,952	5,414	318,738	16,509	402,755

DAILY TRUCKLOADS

		RI - Selected Counties					
		25001	25005	25007	25009	25017	Grand Tota
NY - Selected Counties	36005	0	0	0	1	0	1
	36021	0	0	0	1	0	1
	36025	0	0	0	0	0	0
	36027	0	0	0	1	0	1
	36039	0	0	0	0	0	0
	36047	0	3	0	26	1	31
	36059	0	1	0	3	0	5
	36061	0	1	0	4	0	5
	36071	0	0	0	1	0	1
	36079	0	0	0	0	0	0
	36081	0	0	0	3	0	4
	36085	0	0	0	0	0	0
	36087	0	0	0	2	0	2
	36103	0	1	0	3	0	4
	36105	0	0	0	0	0	0
	36111	0	0	0	0	0	1
	36119	0	2	0	5	0	8
	Grand Tota	1	9	1	51	3	65

Final Summary

Highway Flows - trucks

DAILY

tons/truck	20
days/yr	312

1998	Destination				
Origin	MA	NJ	NY	RI	Total
MA	13,473	228	201	657	14,559
NJ	275	8,780	1,035	74	10,163
NY	396	1,454	7,409	53	9,312
RI	2	1	11	46	60
Total	14,146	10,464	8,656	829	34,094

2010	Destination				
Origin	MA	NJ	NY	RI	Total
MA	18,046	356	287	872	19,561
NJ	400	13,482	1,581	107	15,569
NY	610	2,227	11,223	81	14,141
RI	3	1	13	73	90
Total	19,060	16,066	13,104	1,132	49,362

2003	Destination				
Origin	MA	NJ	NY	RI	Total
MA	15,379	**282**	**237**	746	16,644
NJ	**327**	10,739	1,262	**87**	12,416
NY	**485**	1,776	8,998	**65**	11,324
RI	3	**1**	**12**	57	73
Total	16,193	12,798	10,509	955	40,456

NJ/NY to MA/RI ==>	**964**
MA/RI to NJ/NY ==>	**531**

Source: FHWA, manipulated by NPVM.

APPENDIX C:

Summary of other Relevant Studies

Appendix C: Summary of other Relevant Studies

Southwest Corridor Commodity Flow Study

This study was conducted by the Connecticut Department of Transportation, Office of Intermodal Project Planning, and was released in May of 2000. The study assesses the transportation issues regarding the movement of goods via truck in the southwest corridor of the State of Connecticut (CT) and the alternative modes of transportation.

While the study does not provide the detailed type of origin/destination data that is needed for this phase of the Coastal Shipping Study, it does provide some examples of coastal cargo flow data. For instance, the study shows that, on an annual basis, just under 1.6 million trucks move north through Connecticut on highway I-95 and just under 1.3 million trucks move south through Connecticut on highway I-95. Unfortunately, the origin/destination points for these trucks are, for the most part, aggregated by state.

The influence of factors such as distance, commodity, and geographic trading partners on cargo diversion is briefly outlined. For example, the study points out that high value commodities are less likely to travel by modes other than truck, and that shipments traveling less than 500 miles are less likely to be diverted from trucks due to their higher efficiency. The study also claims that short line rail carriers are more aggressively pursuing commodities that are shipped in corridors of less than 300 miles.

The study uses models developed by Reebie Associates to analyze both trucking and intermodal (truck/rail) costs over several routes. In nearly all of the shorter routes examined (less than 1,000 miles), the intermodal cost estimates were higher than the trucking cost estimates, and on those of longer routes (over 1,000 miles), intermodal costs were lower than trucking costs. However, these cost estimates were developed at least three years ago and they cannot be relied upon for precise analysis. For comparison, a route from Boston to Newark, with an empty return, the estimated cost per trailer via truck is $438.55 ($1.75 per mile). The intermodal cost is estimated to be $780 per trailer ($3.12 per mile). In summary this study provided:

- Examples of traffic density in the Northeast highway corridor.
- Definition of comparative areas of trucking and intermodal (truck/rail) options as a function of distance.
- Examples of trucking rates.

This study represents an attempt to introduce rail intermodal operation, which has been successful in cross-country movements, to coastal areas. The study

material can be used for comparison of intermodal rail and intermodal maritime options as well as a comparison with data generated in this study.

Container Barge Feeder Service Study

This study was conducted by the Connecticut Department of Transportation, Office of Intermodal Planning, and was released in March of 2001. The study examines the service parameters of both a Ro/Ro service from Bridgeport to New York/New Jersey and a Lo-Lo service from New Haven to New York/New Jersey. While the major conclusions of this study are not *directly* applicable to a coastal shipping in High Speed Ferries, the report does provide some information, which is illustrative.

The major incompatibility of the system in this study with the proposed coastal shipping system is that the container feeder service ships *international* containers. The ILA fees for moving containers in the feeder service are listed as approximately $500 (for all moves). A coastal shipping system would not be cost effective using the lift on/lift off charges associated with international containers. Furthermore, the study indicates that most domestic cargo is more time sensitive than international containers, a fact that bolsters the need for a high-speed vessel in a coastal shipping system.

The study does provide cargo estimates for the container feeder services. It is estimated that, at 80% efficiency, the container service from Bridgeport to New York/New Jersey would move 90 trucks per day, and the Lo-Lo service would move from 300 to 400 containers per week. However, these volumes consist entirely of international containers and may not be particularly useful for planning a coastal shipping system. The study estimates that the truck costs from the port of New York/New Jersey to Hartford are $935 per container. Comparatively, the Ro/Ro service at Bridgeport, with final delivery via truck, is estimated to cost $873 per container. Alternatively, the Lo-Lo service at New Haven is estimated to cost $1,370. In summary this study provided:

- Feasibility of distribution of international containers by barges between several points connecting Connecticut and New York/New Jersey.
- Examples of trucking rates and potential volume of trucks for barge services.

This study addressed one more intermodal option, which may compete or complement the introduction of high speed freight ferry services. The study material can be used for a comparison of market share between different options of coastal shipping.

Mid Atlantic Rail Operations Project

This study was produced by Cambridge Systematics for the I-95 Corridor Coalition and was released in February of 2001. The main objective of this study was to analyze the investment needed to eliminate rail bottlenecks throughout the Mid-Atlantic Corridor. Since the study is geared towards relieving congested highways by diverting more truck traffic to rail, the study is similar to those analyzing freight diversions for a coastal shipping system. For example, the rail study points out that Mid-Atlantic States are more dependent on long-haul trucking than the nation as a whole (16% nationally versus 18% for the Mid-Atlantic region). The study claims that the elimination of rail bottlenecks would allow the Mid-Atlantic region to lower its reliance on longhaul trucking (by as much as 25%). While overall tonnages are supplied (e.g., 11,000 trucks/day from Washington to Baltimore), the study does not include any specific origin/destination information. In summary this study:

- Addresses similar concepts of intermodal services in coastal areas, but for rail option.
- Provides examples of trade traffic density.

The focus of this study is on investment needs for rail to divert trucks from roads in the Mid-Atlantic area; estimates of traffic density is however at the very preliminary level. The study material can be used for comparison of investments needed for rail and water offering similar intermodal options.

Identification of Massachusetts Freight Issues and Priorities

This study was produced by the Massachusetts Highway Department and Louis Berger & Associates, and was released in 1998. This study summarizes the primary modes of freight transportation in Massachusetts and discusses many planning issues, which affect the State. While this study does not provide the specific origin/destination data needed for the Coastal Shipping study, it does provide some freight flow data for Massachusetts and other regions throughout the United States.

There are ten rail freight carriers, which operate more than 1000 route miles throughout Massachusetts, with five operating intrastate lines. CSX operates a Boston/Albany line, which connects to the CSX rail network at Selkirk, NY with intermodal terminals in Springfield, Palmer, Worcester, and Boston. Another major connection point is in Worcester, where Rhode Island and Connecticut are linked to the CSX system.

The study also discusses freight transportation at various seaports throughout Massachusetts. While Boston is the major seaport in the State, two smaller ports,

Fall River and Salem, also rank among the top 150 U.S. ports in terms of total tonnage. A main competing port for Massachusetts' ports is the port of New York/New Jersey. The study points out that CSX offers a "short" double stack service from the dock at New York/New Jersey to Worcester. Additionally, there has been a significant backhaul via truck from the port of New York/New Jersey to Boston.

The flow data included in this study use models developed by Reebie and Associates using 1995 statistics. The data show that just under 10 million trucks (TL) traveled into Boston in 1995, with most of the traffic coming from the Mid-Atlantic and Midwest regions. The data also show the disparity in directional flows, with only about 4 million trucks (TL) leaving Boston in 1995, the largest portion destined for the New England area. In summary this study provided:

- An overall description of the transportation network serving the state of Massachusetts.

Its application to our objectives is limited to the general understanding of transportation issues in that part of the Northeastern corridor.