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Management and Economic Counsel

Assessment of Infrastructure Required to Support Short Sea Shipping in Providence

Final Report

Prepared for: Providence Department of Planning and Development

Prepared by: Reeve & Associates, ConsultEcon & Portscape

January 9, 2011

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Project Objective & Key Issues Addressed

Overall project objective

- Identify the infrastructure needs and required capacity within the Port of Providence waterfront and along the Allens Avenue corridor connecting the port to I-95 and regional trucking outlets

Key issues addressed in Phase 1: Market Analysis & Site Research

- Potential short sea shipping traffic volumes through the Port of Providence (ProvPort) over the next 20 years
- Ability of the existing physical infrastructure within the port and Allens Avenue corridor to effectively handle the projected traffic volumes

Key issues addressed in Phase 2: Infrastructure Capacity Assessment

- Identification of any critical gaps in infrastructure in order to effectively support short sea shipping operations in Providence
- Steps required to eliminate any identified capacity gaps – terminal space, marine berths and access, cargo-handling capabilities, and ground transportation
- Impact of the projected volume of short sea traffic on the landside to/from the port by road and rail on the Allens Avenue corridor – particularly for commuter traffic for the Rhode Island Hospital area and surrounding "Knowledge District"
- Possible infrastructure development options depending on factors such as market conditions, technology, and neighborhood impact

Key issues addressed in Phase 3: Capital Funding Requirements

- Likely capital funding required to develop the infrastructure capacity options identified in Phase 2
- Relative strengths and weaknesses of the different options in terms of land use, required infrastructure, capital investment requirements, and transportation impact
- Potential sources of public/private financing to fund development including federal funding

Market Analysis & Site Research

Market Potential

- Market potential for two types of short sea services were evaluated – relatively short haul service (e.g. Northern New Jersey/Providence) and long-haul (e.g. Northern Florida/ Providence)
- Short haul service costs found to be noncompetitive with direct trucking – long haul service appears to be competitive on cost basis
- Relatively low penetration of direct trucking market (6.4 percent) is necessary for long haul service to achieve critical mass – could support two sailings a week initially with frequency increasing to five calls per week by 2028 moving around 1,600 trailer loads weekly through the Port of Providence

Capacity of Current Basic Port Infrastructure

- Three sites within the Port (ProvPort, Promet Marine, and Motiva Enterprises) have the basic infrastructure and potential capabilities required to support short sea shipping in Providence

Infrastructure Capacity Assessment

Marine Terminal Infrastructure

- Additional capital investment required to develop required terminal facilities to support short sea shipping in Providence at the three leading sites was estimated on the following basis:
  - ProvPort/Waterson Terminals: $4-5 million
  - Promet Marine: $5-6 million
  - Motiva Enterprises: 10-12 million
- Both ProvPort and Motiva have sufficient ground space and berth capacity to add a short sea shipping operation to their current business activities – Promet Marine would need to convert part or all of its current ship repair facilities to short sea shipping or acquire additional ground space from contiguous lots

Impact of Short Sea Shipping Truck Impact on the Allens Avenue Corridor

- Impact of projected short sea shipping traffic volumes moving to and from the port area by truck on the Allens Avenue corridor would be relatively limited – increasing current daily flows by 1.3 percent
- Likely primary direction of short sea truck traffic will be to and from points north of Providence (estimated at 67 percent of total short sea traffic) – I-95 access for these flows is direct with minimal increase on existing truck traffic on Allens Avenue
- While projected short sea truck traffic moving south are less than northbound, southbound traffic may create more impact – access to I-95 South is more circuitous, requiring travel on more local streets, some in the Rhode Island Hospital area and surrounding “Knowledge District”, and existing heavy truck traffic in parts of this area is higher.
- Air pollution is a significant environmental impact of truck transport, producing more harmful emissions than freight transport by water or rail – short sea shipping substitutes water for truck transport for a very large portion of the total long haul freight movement but trucking is still required for local distribution with consequent local environmental impact

Infrastructure Capacity Assessment (continued)

Options to Mitigate Environmental Impact

- Time short sea-generated truck traffic movements within the Allens Avenue corridor to avoid peak traffic hours – the timing of this traffic may also be coordinated with vessel arrivals and departures as well as terminal operations to facilitate rapid pick-up and delivery of through trailer traffic
- Improve access to I-95 south – this option would both mitigate identified impacts on sensitive areas and increase the efficiency of southbound truck transport
- Locate short sea shipping terminal at a site that minimizes truck access routes to I-95 via local roads
- Develop “Cold Ironing” (or AMP - Alternative Maritime Power) for vessels moored at the short sea terminal – replaces emissions from vessel power plant with shore electrical power thereby reducing air pollution in the neighborhood of the port

Capital Funding Requirements

Recommended Approach to Fund Capital Investment in Terminal Improvements

- The optimum approach to funding the RoRo short sea shipping infrastructure is through grants, direct allocation of government funds, or general obligation bonds. It is recommended that these be pursued as the lowest cost options to the port. Government grants and direct allocations, however, can be difficult to obtain due to the competition for funds.
- Alternatively, the port may chose to internally fund some or all of the capital expenditures for short sea infrastructure with current or future retained earnings. The use of retained earnings would depend on their availability currently and commitment to other activities, such as existing debt payments or capital projects.
- In addition, the port may issue revenue bonds based on the anticipated port revenues. Based on the capital funding evaluation, a RoRo short sea shipping service has the potential to generate sufficient port revenues to support repayment of revenue bonds used for infrastructure development. Moreover, future port revenues at assumed levels and at levels up to the entire cost of bond payments would not have a significant impact on the overall cost of shipping.
- Finally, a mix of capital funding may be required. Attracting government grants, a direct allocation of government funds, and/or general obligation bonds, or using the port's retained earnings to cover a portion of the overall development costs would lower any future revenue bond payments and mitigate the risk involved in start-up operations and cost variances elsewhere in the supply chain (e.g. cost of short-haul truck movement to destination).

Economic impact

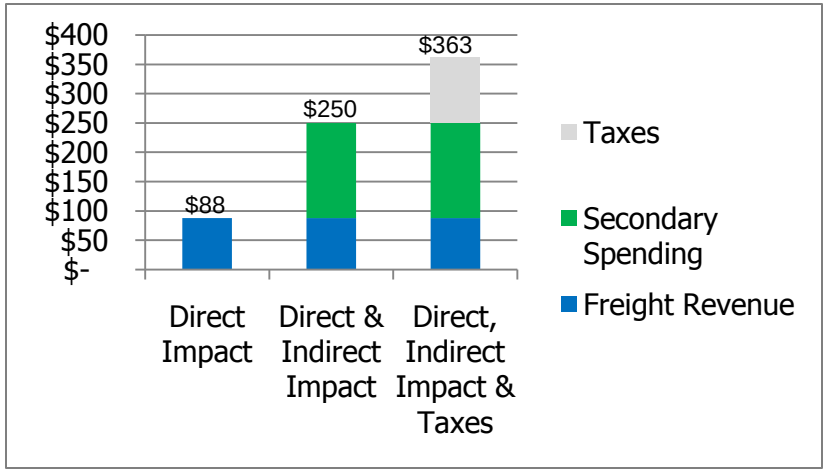
Shared Impact

- Economic impact would be shared between Providence and the other region served by the short sea shipping service (calculations below assume 50/50 sharing of economic impact)

Potential for Growth

- Estimated economic impact is based on Providence/South Atlantic service by 2028 – addition of other regional services such as with Gulf Coast ports would increase the economic impact

Total Annual Economic Impact of Long-Haul Providence Short Sea Shipping Service by 2028 ($ Millions)



Projected Total Jobs Created by Long-Haul Providence Short Sea Shipping Service by 2028

Direct Jobs in Full Time Equivalents (FTE)	FTE
Ship's Crew	120
Ship Operator Shore Staff	30
Terminal Labor & Administration	80
Drayage Operators	300
Marine Support Services (Tugs, etc.)	20
Total Direct	550
Total Indirect	790[1]
Total Jobs Created	1,340

Providence economic impact would be around $180 million and 670 jobs – based on 50% of the total impact

Next Steps

The City of Providence can take a number of steps to move the process forward

- Align with Rhode Island state and U.S. congressional government representatives to help facilitate the needed dialogue between ocean carriers, DOD, DOT (Maritime Administration) and shipyards to commence building appropriately priced vessels as well as with U.S. Coast Guard and labor to put in place efficient and economical shipboard manning and marine terminal labor agreements
- Develop a dialogue with potential short sea shipping operators, port partners (e.g. ports in the South Atlantic such as Jacksonville or Fernandina Beach) and inter-regional truckload operators to further develop the business case for Providence as a short sea shipping hub and to identify needed infrastructure improvements
- Become involved in regional activities of the Short Sea Shipping Cooperative Program (SCOOP) that includes representatives of the transportation industry and government organizations including U.S. DOT

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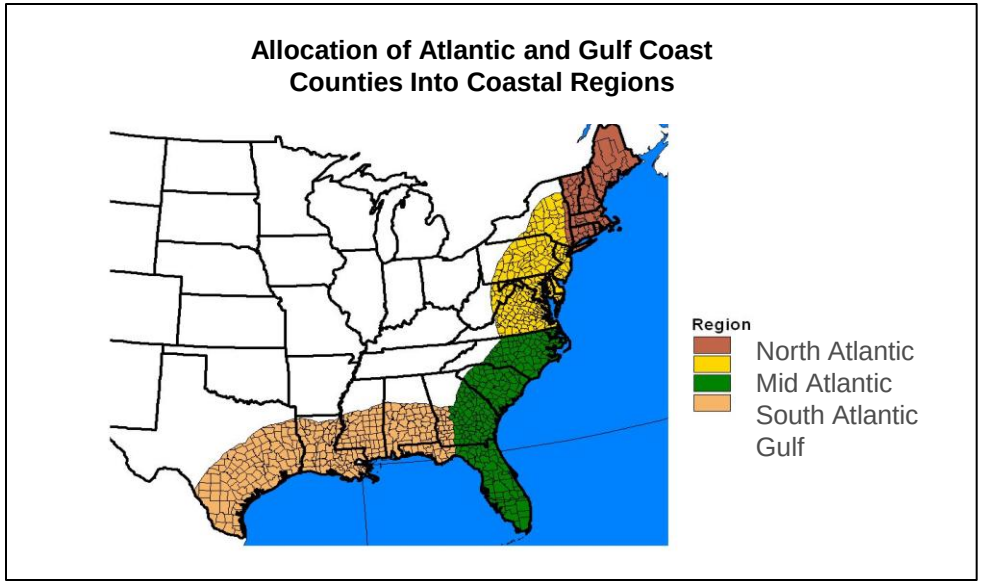
Potential future short sea traffic volumes

Market Analysis Methodology

- Data on truck traffic drawn from Global Insight 2004 published statistics – roughly comparable to current US intercity truck traffic volumes given declines in 2008-2009
- Hinterland for Providence and potential short sea port partners limited to 250 miles
- Two types of routes evaluated for Providence short sea services: short-haul (e.g. Northern New Jersey) and long-haul (e.g. Jacksonville, Florida)
- Container and roll-on/roll-off (RoRo) modes considered as well as lift-on/lift -off (LoLo) barge versus vessel
- Hinterland calculations for short sea shipping allow cargo to flow as much as 250-miles over land when moving towards its ultimate destination to a load port or from a discharge port, but only 50-miles when moving over land in the opposite direction to its destination

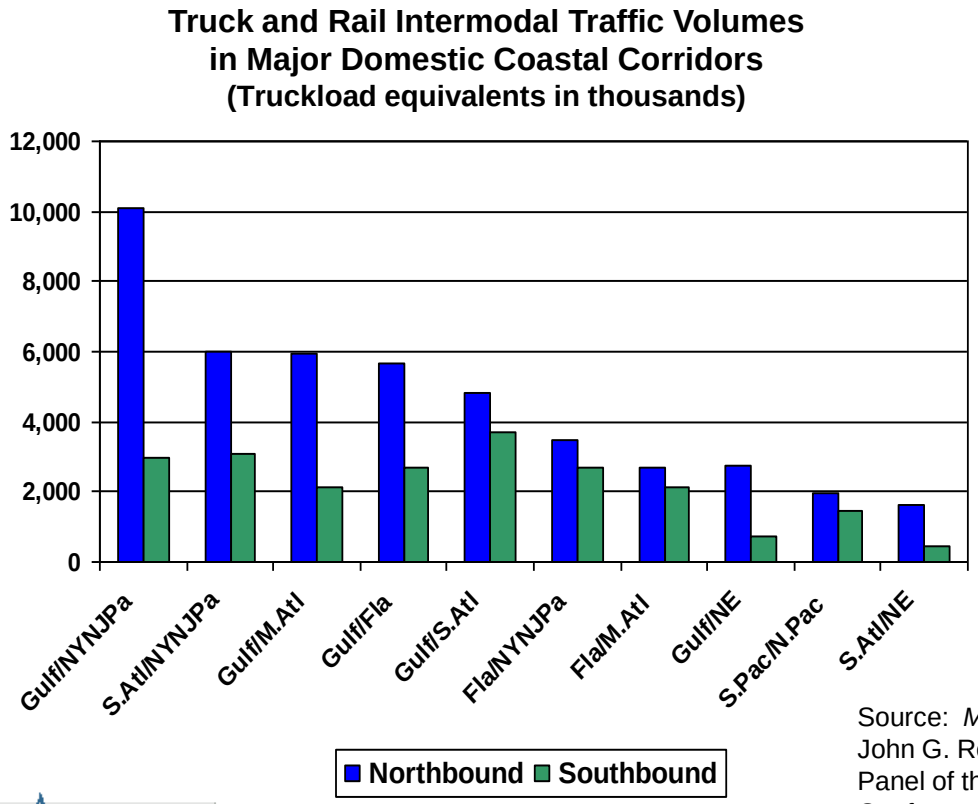


[1] Source: **Short Sea Shipping – *Intermodal Transportation's Newest Partner*, John G. Reeve, 3rd Annual Short Sea Shipping Conference, March 20 & 21, 2006**

Around 80 million trailer loads of road freight currently move along U.S. coasts

Total Potential US Short Sea Market

- Current estimate of 80 million trailer loads of ground freight moving between coastal origins and destinations over 500 miles apart along the U.S. contiguous coasts (15% of total US intercity market)
- Flows are significantly imbalanced – northbound flows of 53 million trailer-loads versus 27 million trailer-loads southbound



Source: *Markets for Short-Sea Shipping in the United States,* by John G. Reeve, Product Design and Material Technologies Panel of the National Shipbuilding Research Program Conference, 2007

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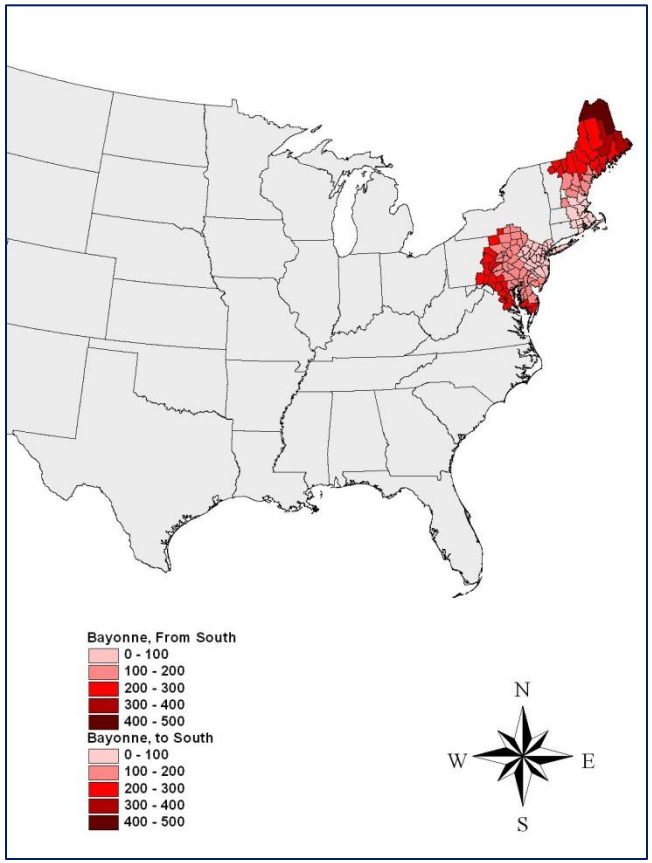
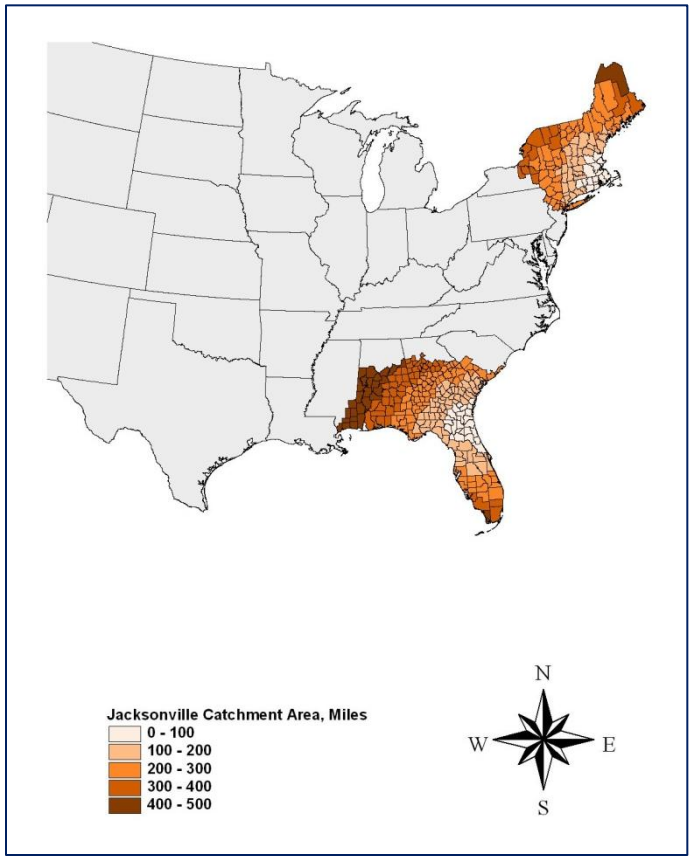
Port hinterlands are “skewed” to reflect trucker resistance toward backtracking

Providence/Bayonne, NJ



Providence/Jacksonville, FL



Source: Global Insight Inc. TRANSEARCH database. Hinterland extends up to 250-miles on the side away from the port-pair connection but only 50-miles where backtracking would be required to make the short-sea connection.

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Northbound traffic dominates on all port pairs, although the extent varies considerably

Potential Providence Short Sea Market

Truckload Freight Movements between Providence Hinterland and Other Ports

	Southbound	Northbound	Total
Bayonne, NJ	190,342	596,972	787,314
Norfolk, VA	24,409	47,038	71,447
Wilmington, NC	20,909	91,637	112,546
Charleston, SC	41,517	222,536	264,053
Savannah, GA	66,267	218,970	285,237
Jacksonville, FL	140,773	277,086	417,859
Port Canaveral, FL	109,935	160,907	270,842
Tampa, FL	56,677	149,828	206,505
Pensacola, FL	24,711	113,975	138,686
Mobile, AL	70,539	307,285	377,824
New Orleans, LA	53,824	212,519	266,343
Port Arthur, TX	52,059	206,148	258,207
Galveston, TX	94,100	284,813	378,913
Corpus Christi, TX	158,594	258,382	416,976

Source: Global Insight Inc. TRANSEARCH 2004 database. Note that flow data for different potential port partners may overlap where geographic coverage of hinterlands overlap at the margins within the total 50 to 250-mile hinterland coverage.
See detailed tables in the Appendix.

Providence is one of the leading potential partners for a South Atlantic service with Jacksonville

Major port partners of Jacksonville in loads per day (5 sailings per week) for 100-mile hinterland and 200-mile hinterland

Northbound Destinations

	100-Miles	200-Miles
• Bridgeport, CT:	259	1,519
• New York/New Jersey:	283	1,471
• New Haven, CT:	201	1,414
• Camden/Philadelphia:	180	1,372
• Wilmington, DE:	125	1,341
• Quonset Point, RI:	53	1,059
• **Providence, RI:**	**56**	**940**
• Fall River, MA:	48	712
• Richmond, VA:	118	613
• Norfolk, VA:	90	446

Southbound Origins

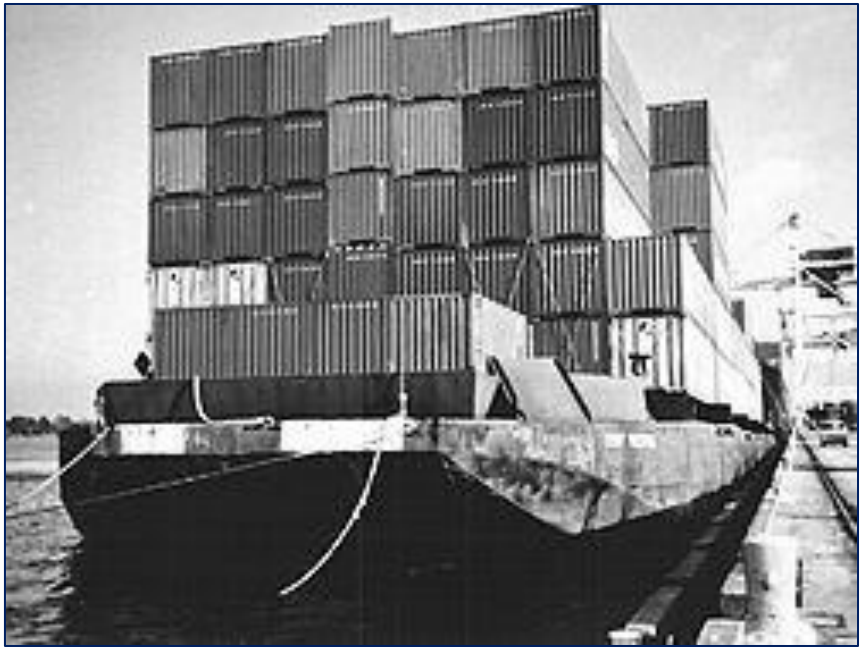
	100-Miles	200-Miles
• Camden/Philadelphia:	271	1,151
• New York/New Jersey:	145	1,129
• Wilmington, DE:	251	1,122
• Bridgeport, CT:	131	921
• New Haven, CT:	91	775
• Quonset Point, RI:	42	586
• Richmond, VA:	29	535
• **Providence, RI:**	**38**	**473**
• Fall River, MA:	39	280
• Norfolk, VA:	24	241

Source: Reeve & Associates, Global Insight

Short-haul service for international containers is a possibility

Characteristics of Short-Haul International Container Service

- Container on barge service such as between New York and Portland ME could produce around 500 TEU of inbound/outbound movements per week (annual throughput of around 50,000 TEU) – require stacking area for approximately 1,200 TEU
- Likely weekly frequency
- Primarily feeder service for international containers bypassing highway congestion around New York City
- Economics remains an issue due to double-handling of containers in hub port (e.g. New York) and additional lift in Providence



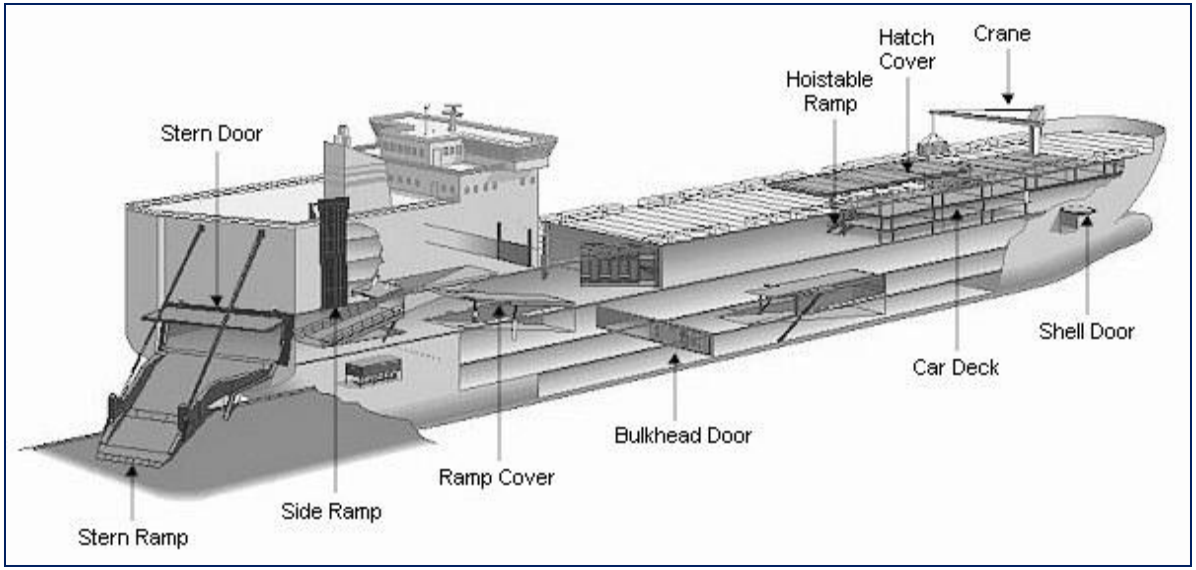
Vessel parameters for long-haul service (e.g. South Atlantic)

RoRo Mode for Long-Haul Service

- RoRo vessel for domestic short sea service is the most likely type – similar economics to container vessel on same route plus has ability to carry trucker's trailers rather than dedicated to containers

Characteristics of Typical 200 Trailer RoRo Vessel

- Length overall: 600 ft
- Beam: 82 ft
- Draft: 22 ft
- Deadweight: 12,000 tons
- Speed: 22-25 knots
- Stern or quarter ramp
- No requirement for shore cranes



Port of Providence has adequate capacity for such a vessel

Vessel parameters for short-haul container barge service (e.g. New Jersey/Providence)

LoLo Mode for Short-Haul Container Service

Characteristics of Typical 500 TEU Container Barge

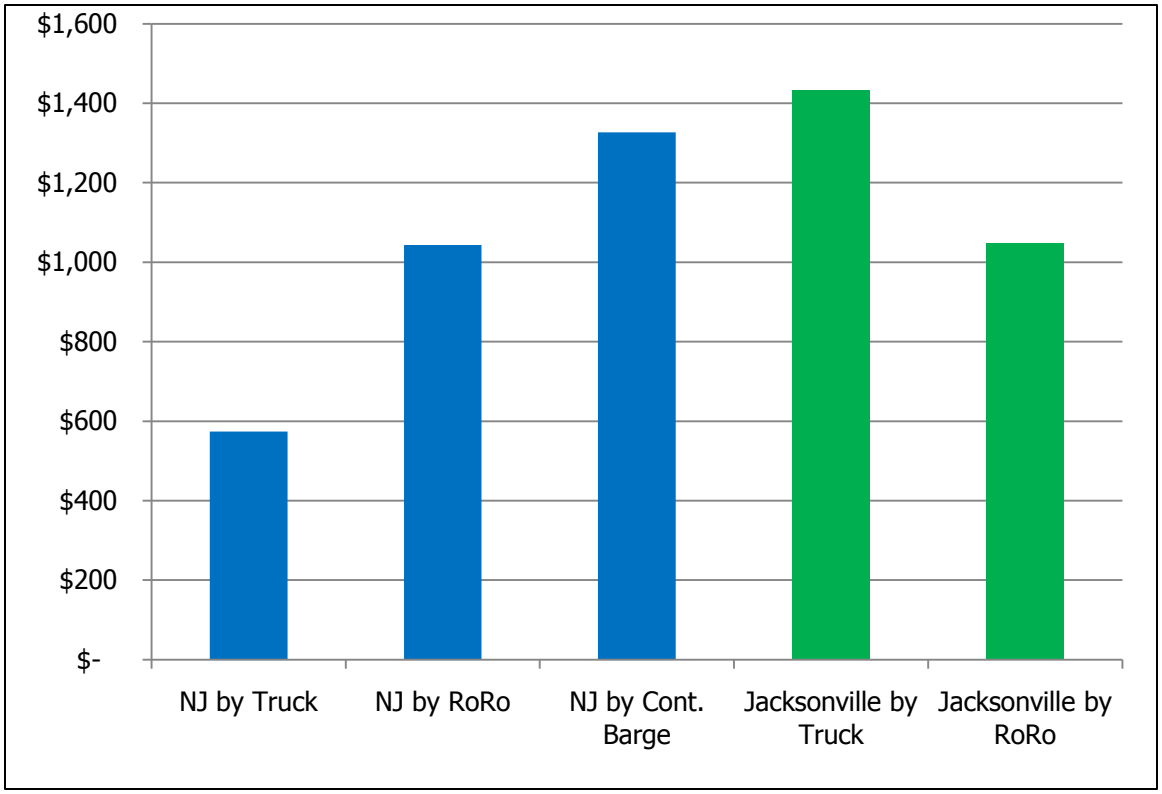
- Length overall: 350 ft plus berth for tug (130 ft LOA)
- Beam: 85 ft
- Draft: 20 ft
- Deadweight: 7,000 tons
- Speed: 10 knots
- Shore cranes required for lift on/lift off

Port of Providence has adequate capacity for such a vessel

Door to door transport cost analysis indicates that long-haul service may be competitive…not so for the short-haul

Competitive Economics of Short Sea versus Truck

Average One-Way Cost for Move to/from Providence on Short-Haul and Long-Haul Coastal Shipping Service



Source: Reeve & Associates, Global Insight. See Appendix for basis of calculations of shipping costs.

Comments

- High cargo-handling costs for short-haul move make short-sea non-competitive versus truck
- Short-haul may only be competitive for overweight cargoes (note: Columbia Coastal NJ/Boston barge service recently discontinued - primarily focused on overweight cargoes)
- Longer haul Jacksonville service is competitive with truck as per mile shipping advantage offsets terminal handling costs

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Relatively low market penetration is necessary for long-haul short sea service to achieve critical mass

Potential Diversion to Short Sea

- Required market penetration for high utilization (150 trailers per voyage direction) of service providing two sailings a week in each direction between Providence and the Jacksonville area (proxy for South Atlantic) is 6.4 percent
- Long-haul vessel (e.g. Providence/Jacksonville) likely to be in 150-200 trailer size range
- Likely service would begin with 2 sailings per week, possibly increasing to 4-5 weekly calls delivering and picking up a total of 800 trailers in each direction per week
- Trailers likely to be delivered in and out of terminal on same day
- Long term annual growth trend in US trucking volumes is 1.5%

Potential Market Penetration for Providence Short Sea Shipping Service

Weekly Trailer-Loads in Providence/Jacksonville Lane			
Direction	Total Market	2 Sailings per Week	Required Penetration
Northbound	4,700	300	6.4%
Southbound	2,365	150 loads/150 empty	6.4%
Key Assumptions:	Market based on 200-mile Hinterland		
	Average of 150 Truck-Loads carried per NB voyage		
	SB voyage likely to be 50/50 mix of full and empty trailers		

Source: Reeve & Associates

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Long-haul short sea service has much greater potential than short-haul

Projected Round-Voyage Liftings by Providence Short Sea Services
(Containers in FEU / Trailers in TL)

Service	Potential Route	Near Term 2012-2017	Medium Term 2018-2027	Long Term 2028-2032	Remarks
Short-Haul Container Barge	Port Newark NJ/ Providence	Sailing: 300 FEU Weekly: 600 FEU Annual: 30,000 FEU	Sailing: 400 FEU Weekly: 800 FEU Annual: 40,000 FEU	Sailing: 550FEU Weekly: 1,100 FEU Annual: 55,000 FEU	• Given non-competitiveness versus trucking, likelihood that short-haul service will be initiated is low (5-10%) • Forecast volumes are based on similar service to recent Newark/ Boston barge service with 2 weekly calls
Long-Haul Roll-On/Roll-Off Vessel	Jacksonville FL/ Providence	Sailing: 280 TL Weekly: 560 TL Annual: 28,000 TL	Sailing: 300 TL Weekly: 900 TL Annual: 45,000 TL	Sailing: 320 TL Weekly: 1,600 TL Annual: 80,000 TL	• Much higher probability for long-haul service (80%+) • However, service may not begin until 2014 due to lack of qualified vessels • Growth in volumes based on similar rate to market penetration for rail intermodal over 1980-2007 period • Relatively small share of market required to fill 2 ships per week in near term and 5 ships per week in long term – around 1 % in 2032 • Other regional ports also likely to be established as short sea hubs – increasing overall regional rate of market penetration by short sea

Source: Reeve & Associates

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Projected terminal requirements for short sea shipping in Providence

Domestic Short Sea RoRo Service

- Projected weekly throughput (2020): 2,000 trailers in each direction
- Freight only operation – no passenger facilities required
- Marine berth: 650 linear ft and water depth of 25 ft
- Parking area for 300 to 400 trailers: requires 6 to 7 acres for staging of outbound trailers and receiving of inbound equipment
- Gates for inbound and outbound traffic – need for prompt receipt/delivery of domestic trailer traffic likely to require multiple gates (minimum 3) for movement of trailers at peak hours
- Possible shore ramp for vessel loading/unloading – alternatively stern or quarter ramp on vessels

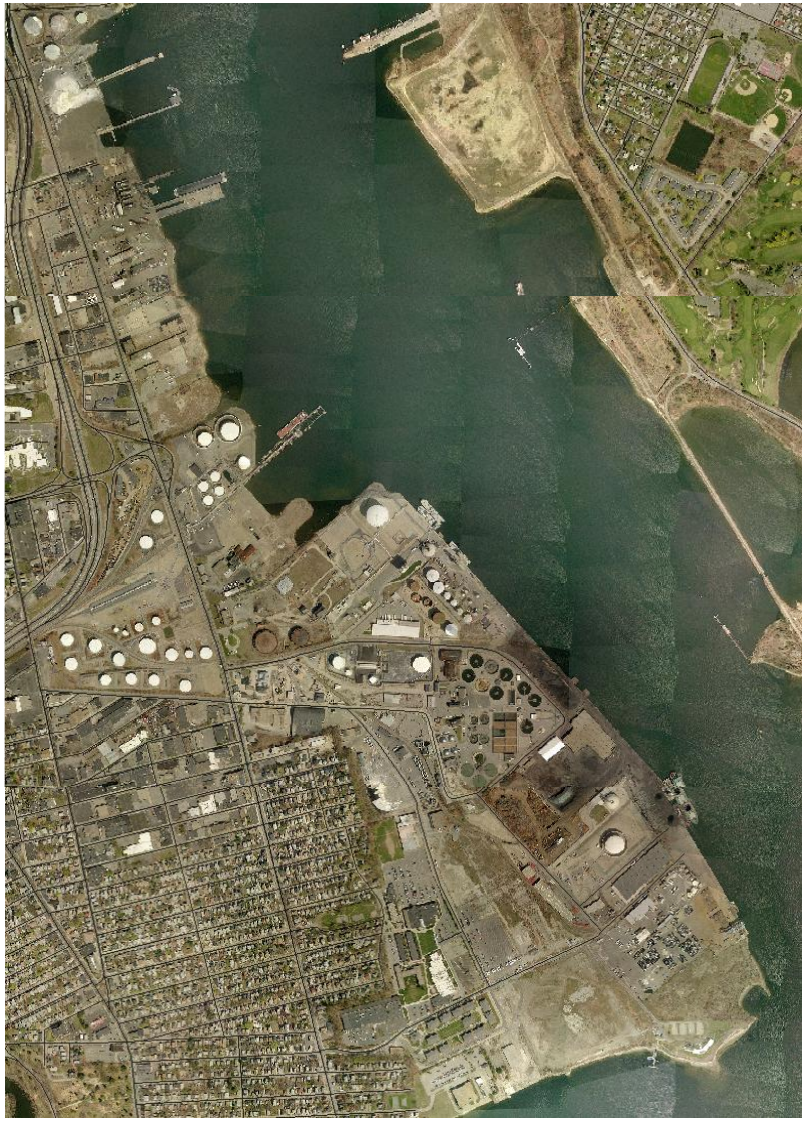
Container Barge Service

- Projected weekly throughput (2020): 500 to 600 TEU in each direction
- Freight only operation – no passenger facilities required
- Marine berth: 500 linear ft and water depth of 22 ft
- Container stacking area for up to 1,500 TEU plus chassis storage, yard equipment, maintenance sheds requires approximately 6-7 acres depending on storage/handling system
- Customs security for international traffic
- Gates for inbound and outbound traffic
- Cranes for barge loading and discharge plus yard handling equipment (toplifting fork lifts or rubber tired gantries)

Evaluation of existing Providence port infrastructure

Current Providence Marine Infrastructure

- Current marine uses of the Providence waterfront range from general cargo (e.g. used vehicles) to liquid and dry bulk cargo as well as ship repair facilities, port services (e.g. tugs), and harbor construction services
- Existing marine terminal infrastructure was evaluated on the basis of physical capacity to accommodate short sea shipping services in terms of berth availability, water depth and sufficient back-up space for the storage and handling of trailers and/or containers
- Interviews conducted with ProvPort/ Waterson Terminals, Motiva, Sprague, Promet, Cumberland Farms, and Conley's Wharf



Of potential sites, ProvPort appears to have the advantage in basic infrastructure

Primary Waterfront Locations

Existing Providence Port Facilities	Berth Depth	Acreage	Berths	Remarks
Sprague Energy	34-40’	NA	Finger jetties for bulk liquids	Lacks available space No suitable berths
Promet Marine	25-35’	9	Vessel repair slips	Lacks needed space unless use switched to marine terminal Has adequate berths
Motiva Enterprises	24-30’	65	Finger jetties for bulk liquids	South berth may be able to accommodate vessel with stern ramp – need to schedule around tanker calls
Narragansett Improvement	NA	2.5	None	Lacks available space
Waterson Terminals (ProvPort)	26-35’	20 (open area)	6 marginal berths (3,500 ft)	Has adequate berth and landside capacity

Sources: Army Corps of Engineers, company documents

However, some infrastructure improvement will also be required at the ProvPort site

ProvPort Situation

- Although the berth facilities appear to be adequate, capital investment in yard paving, cranes and ramps, lighting, and gate facilities will be necessary to upgrade the existing facility
- Level of such investment is likely to be less than at other locations within the port

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Several key assumptions determine the requirements for short sea terminal infrastructure in Providence

Domestic Short Sea RoRo Service

- Turnaround time for domestic trailers is very fast – matter of hours. Consequently, as vessel calls increase from 2/week to 5/week, the initial infrastructure should generally be able to handle the increase.
- Freight only operation – no passenger facilities required
- Marine berth: 650 linear feet and water depth of 25 feet
- Parking area for 300 to 400 trailers: requires 6 to 7 acres for staging of outbound trailers and receiving of inbound equipment
- Gates for inbound and outbound traffic – need for prompt receipt/delivery of domestic trailer traffic likely to require multiple gates (minimum 3) for movement of trailers at peak hours
- Possible shore ramp for vessel loading/unloading – alternatively stern or quarter ramp on vessels

Container Barge Service

- Projected weekly throughput (2022): 800TEU
- Container dwell time considerably longer than trailers if international traffic included
- Freight only operation – no passenger facilities required
- Marine berth: 500 linear feet and water depth of 22 feet
- Container stacking area for up to 1,500 TEU plus chassis storage, yard equipment, maintenance sheds requires approximately 6-7 acres depending on storage/handling system
- Customs security for international traffic
- Gates for inbound and outbound traffic
- Cranes for barge loading and discharge plus yard handling equipment (toplifting fork lifts, straddle carriers or rubber tired gantry cranes)

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Projected requirements for short sea shipping terminal infrastructure in Providence

	Initial (2012)	Medium Term (2022)	Long Term (2032)	Remarks
Weekly Traffic Volume[1]	560 TL	900 TL	1,600 TL	
Terminal Infrastructure				
Marine Berths & Channels	650' Berth 30' Depth	650' Berth 30' Depth	650' Berth 30' Depth	Initial terminal capacity geared to 2 sailings/week should be able to handle increase to 5 per week
Terminal Yard Area	7-8 acres	7-8 acres	7-8 acres	Initial terminal capacity geared to 2 sailings/week should be able to handle increase to 5 per week
Cranes	1	1	2	Mobile Harbor Crane only required for container terminal
Yard Equipment	20	22	25	Primary equipment are yard hustlers to move trailers.
Gates, Security, Maintenance & Administrative Facilities	18,000 sq. ft	18,000 sq. ft	20,000 sq. ft	Only relatively small increase in capacity required as volumes increase
Land Transport Access	-	-	-	Relatively minor traffic impact. But growth could require southbound I-95 interchange by 2032

[1]Traffic projections for "most likely" case of RoRo terminal

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Circumstances of the several potential waterfront sites differ substantially

Company	People Interviewed	Potential for SSS Development	Remarks
Motiva Enterprises	**Mike Sullivan, General Manager**	**Medium**	• South Berth able to accommodate 650' vessel • 9-10 acres available contiguous to berth • Need dredging next to shore and construction of yard area
ProvPort/Waterson Terminals	**Bruce Waterson, President & Chris Waterson, Operations Manager**	**High**	• 8-10 acres available • Require minor resurfacing of yard area and improvements to gate facility
Sprague Energy	**Burt Russell, VP of Operations**	**Low**	• Site fully developed as oil terminal
Promet Marine Services	**David & Joel Cohen, President & VP**	**Medium to High**	• Site currently fully utilized for marine repair • Would require complete conversion to terminal operations from marine repair • Adjacent 2-4 acres possible for use
Cumberland Farms	**Mark Russell, Director Real Estate**	**Medium**	• 9.5 acres available • Requires demolition of existing structures • Requires dredging & wharf construction
Providence Piers/ Conley's Wharf	**Patrick Conley, President Erik Bright, Property Manager**	**Low**	• Insufficient area • Committed to other uses (artists studios, light manufacturing)

Capital expenditure to build short sea shipping marine terminal infrastructure could be as high as $40 million

Indicative Capital Costs to Build Infrastructure for RoRo/Container Short Sea Shipping Terminal

Providence Port Short Sea Shipping Infrastructure Construction Costs				
Item	Quantity	Unit Cost	Item Cost	Remarks
Civil site work-grading, paving, fencing, etc.	8 acres	$ 140,000	$ 1,120,000	
Dredging	200,000 Sq. Ft	$ 20	$ 4,000,000	Depends on specific location
Wharf construction	650 linear Ft.	$ 25,000	$ 16,250,000	May be less for finger pier
Site electrical	8 acres	$ 35,000	$ 280,000	Electrical sub-stations, etc.
Site water, sewage, etc.	8 acres	$ 30,000	$ 240,000	Depends on existing infrastructure
Yard lighting	6	$ 25,000	$ 150,000	Standard 60' light poles
Gates	1	$ 500,000	$ 500,000	Gatehouses, scales, utilities
Administration Buillding	3,000 Sq. Ft	$ 110	$ 330,000	Depends on existing infrastructure
Maintenance & Repair Building	10,000 Sq. Ft	$ 85	$ 850,000	M&R for yard equipment, cranes, etc.
Cranes, ramps, etc.	1	$ 7,500,000	$ 7,500,000	Mobile harbor crane
Yard equipment	20	$ 85,000	$ 1,700,000	Yard hustlers, Top-lifters, etc.
Sub-Total			$ 32,920,000	
Contingency (20%)			$ 6,584,000	
Total			$ 39,504,000	

Source: Analysis of recent port construction projects at Norfolk, VA and Redwood City CA, World Bank

Actual amount of expenditure will depend on specifics of site selected

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Of the four sites of medium to high potential, ProvPort will require the lowest capital expenditure to develop

Estimated Capital Expenditure to Build Short Sea Shipping Infrastructure on Potential Allens Avenue Waterfront Sites

Company	Berth & Channel Access	Building Infrastructure	Terminal Equipment	Estimated Capital Expenditure
ProvPort/Waterson Terminals	Current wharf is adequate. Minor improvements to yard area & gates required	Require some upgrades in gates & scales	New equipment required	$4-5 million
Promet Marine Services	Adequate existing berth. Need major reconstruction for yard area	Major reconstruction and conversion for buildings	New equipment required	$5-6 million
Motiva Enterprises	Need to dredge 100' on shore side of South Berth. Pier upgrades & ramp likely	May be able to utilize some existing infrastructure	New equipment required	$10-12 million
Cumberland Farms	Need to demolish existing structures & build wharf and yard area	Need to build – some possible conversion	New equipment required	$31-35 million

[1]Electical power, lighting, water & sewage, buildings, etc.
Source: Estimates by Reeve & Associates based on analysis of existing infrastructure – details of estimates included in appendix

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Impact of projected short sea traffic on the Allens Avenue corridor

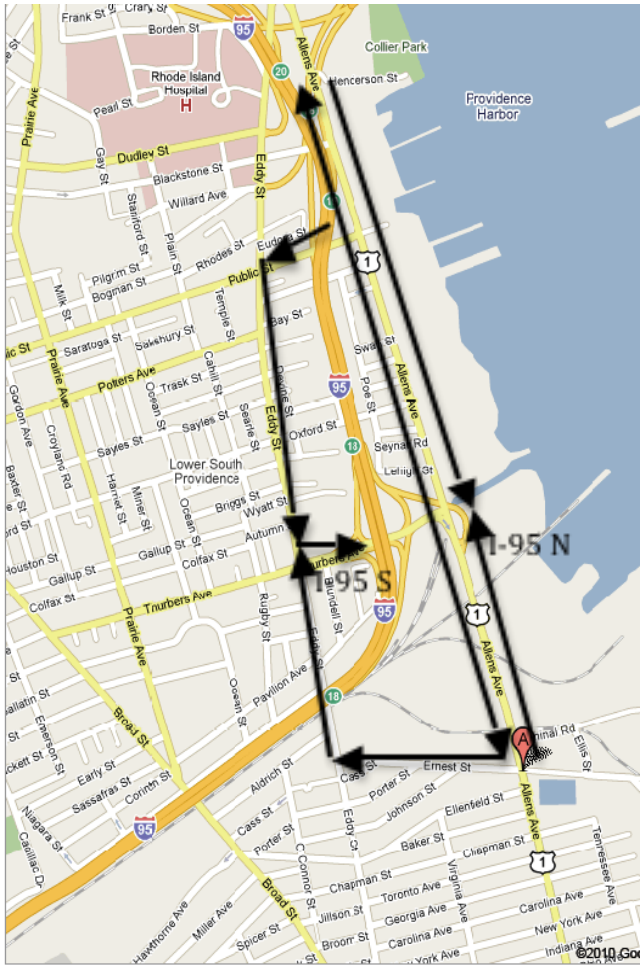
Truck Traffic Impacts

Volumes

- Truck traffic flows generated by projected short sea shipping (SSS) traffic volumes in Providence are estimated to be around 1600 trailers or containers per week by 2032 – 50% or 800 in each direction onto and off vessels. This translates into roughly 320 trailers per day for a 5-day week. About two-thirds or 214 of these trailers are projected to travel to and from cargo origins and destinations north of Providence and one-third or 106 trailers to and from those to its south.

Truck access routes from Allens Avenue to I-95 North and South

- With the majority of truck flows moving to and from the north, the impact of the overall SSS-generated truck traffic on the Allens Avenue corridor is lessened. Access from Allens Avenue to points north is direct – a key ramp to I-95 North is directly off Allens Avenue, just south of Thurbers Avenue. I-95 access from the north to Allens Avenue is via Thurbers Avenue. Access to I-95 South is more circuitous, requiring travel on more local streets, some in the Rhode Island Hospital area and surrounding "Knowledge District", creating more impact.



Impact of projected short sea traffic on the Allens Avenue corridor

Truck access routes from Allens Avenue to I-95 North and South (continued)

- The access route to I-95 South via routes using Eddy Street – typical access routes are via Public, Eddy, and Thurbers or Ernest, Eddy, and Thurbers -- is considered one of the key areas of concern for truck traffic impact. Eddy Street is the location of the main entrance to Rhode Island Hospital. It is also a narrow street, aggravating the impact of truck volumes and making truck turning more difficult on a street in which access is particularly important with the hospital's presence.
- Current average daily traffic flow on Allens Avenue between Thurbers Avenue and Public Street is estimated at 24,300 vehicles, 50% in each direction (based on most recent RI DOT data). Depending on the location of the terminal, all, some, or none of the 320 trailers per day generated by SSS might use this section of Allens Avenue. Assuming the maximum increase of the full amount of the trailers per day, this would translate into around a 1.3% increase in total daily traffic (for 5 days per week). According to RI DOT, heavy trucks represent 2.8% or 680 of the current total average daily traffic in this section of Allens Avenue. With the maximum increase from projected SSS traffic, heavy trucks would represent about 4.1% of total daily traffic (for 5 days per week).
- Current average daily traffic flow on Eddy Street between Thurbers Avenue and Ernest Street is estimated at 13,100 vehicles, 50% in each direction (based on data collected in 2009, RI DOT). Of the total projected 106 trailers per day transporting cargo to and from destinations south of Providence, one-half or 53 per day would be traveling south from Allens Avenue. Again, depending on the site of the SSS terminal, all, some, or none might travel via Ernest and Eddy Streets, and Thurbers Avenue to I-95 South. Again assuming the maximum of 53, the projected truck traffic impact of SSS would translate into around a 0.4% increase in total daily traffic (for 5 days). Heavy trucks represent 5.4% or 707 of the current total average daily traffic in this section of Eddy Street. With the increase from projected SSS traffic, heavy trucks would represent about 5.8% of total daily traffic (for 5 days per week).

Impact of projected short sea traffic on the Allens Avenue corridor

Truck access routes from Allens Avenue to I-95 North and South (continued)

- The relatively small impact of SSS-generated truck traffic on Eddy Street between Ernest Street and Thurbers Avenue is nonetheless a concern, given the relatively high percentage of existing heavy truck use – 5.4% compared to 2.8% for Allens Avenue (between Thurbers Avenue and Public Street).

Peak traffic volumes

- Peak morning traffic on Allens Avenue (Thurbers Avenue to Public Street) occurs from 7-8am and is 11.1% of the total average daily flow; peak afternoon traffic is from 3-4pm and is 14% of the total. Peak morning traffic on Eddy Street (Ernest Street to Thurbers Avenue) takes place from 8-9am and is 13.7% of the total average daily flow; peak afternoon traffic is from 2-3pm and is 7% the total. To avoid exacerbating traffic impacts, SSS-generated truck traffic should be timed to take place before or after these peak times, ideally between 5-6am.
- Current truck traffic generated by existing port activities of the Port of Providence, based on interviews of port users, are around a minimum of at least 700 trips per day, and during peak season from fall to winter rising to more than 1100 trips with home heating fuel deliveries, and higher yet to 1400 at the time of peak winter road salt deliveries – cited by ProvPort as around 300 trips per day from its operations. With the short sea shipping service fully established, this peak amount is projected to increase to approximately 1700 trips per day. (Note that the source for port truck traffic data, *Final Report V1*, did not report separate volumes for the construction season from spring to fall for deliveries of cement and asphalt and these amounts were not included in the above data.)

Impact of projected short sea traffic on the Allens Avenue corridor

Peak traffic volumes (continued)

- The impact on this peak truck traffic on local roads would vary with the location of the short sea shipping terminal. Greater truck use of some portion of Eddy Street for access to I-95 South has been discussed above as a key potential impact of concern; if use of one of the routes using Eddy Street, the Public and Eddy Streets and Thurbers Avenue route, for I-95 South access would have greater impact, locations that are likely to lead to more use of this access route would have more impact.

Impact of projected short sea traffic on the Allens Avenue corridor

Environmental Considerations of Truck Traffic (continued)

- Significant environmental impacts of truck transport of freight include air pollution and noise. Such side effects are referred to as external costs, that is, hidden costs imposed on the economy and public in general. Of the various modes of freight shipment, trucking is believed to have the highest external costs in terms of air pollution per ton-mile. As shown in the table below, the main harmful emissions related with freight transportation are: carbon monoxide (CO), nitrogen oxides (NOx), particulate matter (PM), volatile organic compounds (VOC), and sulfur oxides (SOx).
- Relative to other freight transport modes in harmful emissions, trucking is highest in particulate matter, carbon monoxide, and nitrogen oxide.

Summary of Emissions - Grams per Ton-Mile

	Emissions (grams/ton-mile)				
	HC	CO	NO_x	PM	CO_2[35]
Inland Towing	0.01737	0.04621	0.46907	0.01164	17.48
Eastern Railroad	0.02419	0.06434	0.65312	0.01624	24.39
Western Railroad	0.02423	0.06445	0.65423	0.01621	24.39
Truck	0.020	0.136	0.732	0.018	64.96

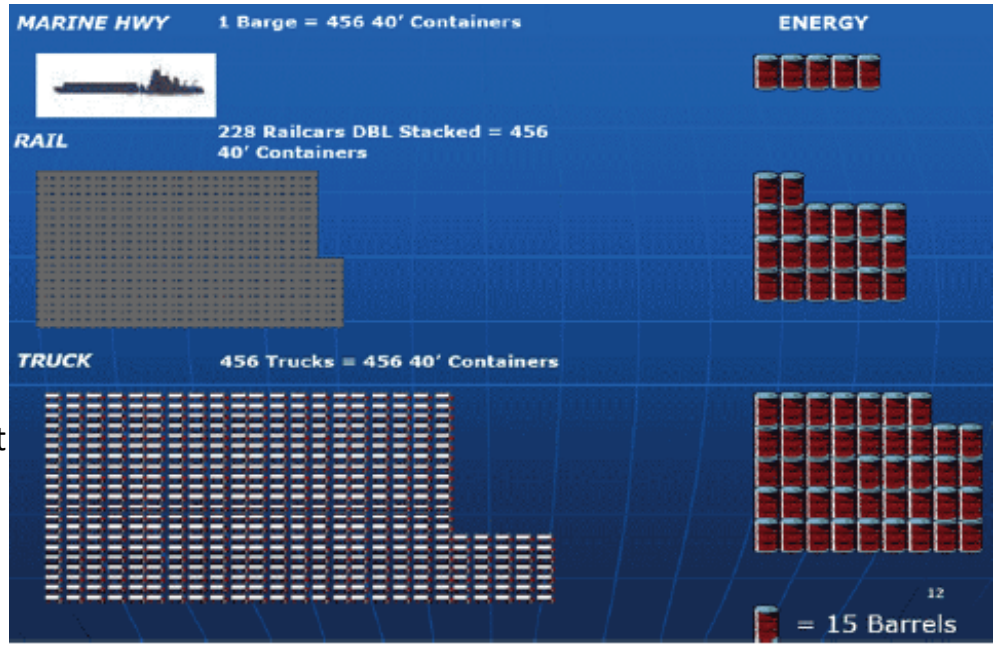
Source: A Modal Comparison of Domestic Freight Transportation Effects on the General Public, 2007 (amended 2009), Kruse et. Al.

Impact of projected short sea traffic on the Allens Avenue corridor

Environmental Considerations of Truck Traffic (continued)

- Truck emissions also include greenhouse gases. The amount of greenhouse gas emissions of freight transport is directly related to energy consumption. Compared to marine barge or rail transport, truck transport is the least fuel-efficient. Where an inland barge gets 576 ton-miles to the gallon, and rail 413, a truck only achieves 155 ton-miles to the gallon. These differences reflect the overall benefit of short sea shipping. But, while short sea shipping substitutes water transport for truck transport for a segment of the total transport of cargo from origin to destination, and thereby reduces total emissions and external costs as a result, truck transport is still a part of the process, producing local environmental impacts.
- However, the difference in air emissions or CO_2 between modes may be diminishing, as regulations require the use of ever-cleaner technologies by trucks and rail locomotives and the fleet age for truck and rail modes is, in general, much lower than that of barges and inland vessels.
- Another source of air pollution from short sea shipping is the emission from a vessel's diesel engines both while underway and while in port - the latter situation may be particularly harmful if the port is in relatively close proximity to heavily populated areas.

Fuel Consumption to Move an Equivalent Amount of Freight



Source: America's Marine Highways Web site

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Management and Economic Counsel

Infrastructure options to mitigate the impact of projected short sea traffic on the Allens Avenue corridor

Infrastructure options to mitigate the impact of short sea shipping on the neighborhood

- Provide more direct access from Allens Avenue to I-95 south, if feasible, to reduce SSS-generated truck traffic on local streets, and its concomitant air pollution and noise, and mitigate identified impacts on Eddy Street, in particular.
  - This option would also increase the efficiency of southbound truck transport making Providence a more attractive short-sea hub.
- Locate short sea shipping terminal at a site that minimizes truck access routes to I-95 via local roads.
- Develop "Cold Ironing" (or AMP - Alternative Maritime Power) for vessels moored at the short sea terminal – Cold Ironing is the process of providing shore-side electrical power to a ship in port while its main and auxiliary engines are turned off. Cold ironing permits emergency equipment, refrigeration, cooling, heating, lighting, and other equipment to receive continuous electrical power while the ship loads or unloads its cargo. Cold Ironing provides a means to mitigate air pollution by significantly reducing, and in some cases, completely eliminating harmful emissions from ship's engines while in port.

Contents

Likely capital expenditure for a Providence short sea terminal would be in the $4-12 million range plus contingencies

Relative Merits of Optional Sites

- Lowest capital expenditure (capex) requirement would be at the ProvPort or Promet Marine locations that have adequate berths in place – capex likely in $4-6 million range
- Given the much lower capex necessary to build short sea terminal facilities at either the ProvPort or Promet sites, these two locations are the strongest candidates for short sea shipping operations

Summary of Estimated Capital Expenditures at Alternative Allens Avenue Sites[1]

Site	Estimated Capital Expenditure	Strengths	Weaknesses
ProvPort / Waterson Terminals	$4-5 million	Low capital cost Non-profit owner with access to government bonds through City of Providence Southbound truck traffic avoids Eddy St.	
Promet Marine Services	$5-6 million	Low capital cost Southbound truck traffic avoids Eddy St.	Requires replacement of existing marine business
Motiva Enterprises	$10-12 million	Southbound truck traffic avoids Eddy St. Possible use of existing berth Available unused space	Requires dredging Additional capital expenditure for Yard improvements
Cumberland Farms	$33-35 million		High capital cost

Source: Reeve & Associates and ConsultEcon, Inc.
[1] Total development costs would also include expenditures related to design fees, financing transaction costs, and an allowance for contingencies.

Capital expenditure for a Providence short sea terminal and support facilities would be in the $5-20 million range

Relative Merits of Optional Sites (continued)

- ProvPort's location also limits the potential impact of truck traffic on city streets and neighborhoods, and as a public entity provides potential to access public bond financing
- In view of Promet's current space constraints, it would be required to convert from its current ship repair business to marine terminal operations in order to function as a cargo terminal or acquire sufficient space (6-7 acres) from neighboring properties (e.g. Conley's Wharf)

Potential sources of capital

Background

- Short sea shipping infrastructure is part of the U.S. freight transportation system that is characterized by a high proportion of public highway expenditures. As shown in the table below describing transportation system expenditures by type, capital expenditures in 2004 for ports, harbors and inland waterways totaled $2.5 billion, accounting for only 3 percent of the total estimated capital expenditures on freight transportation.
- An estimated 68 percent of port, harbor and inland waterway capital expenditures were from state and local sources, 28 percent from federal sources, and 4 percent from private sources.
- Most large ports are publicly owned by state and local governments, which would account for the large share of expenditures by these public sources.

Capital Expenditures for U.S. Freight Transportation Infrastructure, 2004 ($billions)

Type of Infrastructure	Federal	State and Local	Total Public	Private	Total Public and Private	Percent To Total
Highways	30.2	36.5	66.7	NA	66.7	74%
Freight Railroads	0	0	0	6.4	6.4	7%
Aviation	5.6	6.8	12.4	2	14.4	16%
Ports, Harbors and Inland Waterways	0.7	1.7	2.4	0.1	2.5	3%
Total Expenditures	**36.5**	**45**	**81.5**	**8.5**	**90**	**100%**
Percent to Total	41%	50%	91%	9%	100%	
Ports, Harbors and Inland Waterways Percent to Total	***28%***	***68%***	***96%***	***4%***	***100%***	

Source: Congressional Budget Office, Transportation Research Board, and ConsultEcon, Inc.

Potential sources of capital

Background (continued)

- Established over 50 years ago, the U.S. Department of Transportation's Surface Transportation Program and other highway related programs have well-established program parameters. Highway project funding, project planning, development timelines and construction budgets are well understood. However, as more roads and highways are constructed, the cost of maintenance and upkeep of the entire system increases exponentially. According to recent reports by the Transportation Research Board, highway and rail systems are severely congested, with aging infrastructure that requires significant capital expenditures to maintain and expand capacity to meet future demand. Current levels of government funding are inadequate to maintain the highway system to support the projected growth in the freight transportation system.
- As congestion increases, roadway improvements remain underfunded, and the cost of fuel increases, waterborne freight transportation routes will become increasingly cost competitive with their overland counter parts. The projected future growth in demand for freight transportation will also support the development of water routes as alternatives to the roadway. Hence, domestic short sea shipping operations are an emerging alternative to overland trucking.
- Implementation of short sea shipping services requires collaboration of trucking companies, freight vessel operators, and ports to develop viable intermodal routes. Port's must ensure that there is adequate infrastructure, including landside improvements and equipment, to enable safe and efficient handling of containers for load-on, load-off (LoLo) operations and coordination of trucks for roll-on, roll-off (RoRo).

Potential sources of capital

Public Port Capital Expenditure Categories

- According to a U.S. Maritime Administration survey, 46 public ports spent an estimated $1.1 billion in FY 2006 in capital expenditures, as shown by data in the table below.
- An estimated $689 million or 64 percent of total port capital expenditures were for new construction while the remaining 36 percent of expenditures were for renovation and modernization.
- The largest share of capital expenditures was for investments in container cargo facilities at $341 million in FY 2006. The same year there was an estimated $20 million or 2 percent of total port capital expenditures for RoRo cargo and automobile facilities. This low level of investment is indicative of the relatively low requirement for capital expenditure in RoRo facilities in U.S. ports.

U.S. Public Port Capital Expenditures by Expenditure Category, FY 2006 ($thousands)

Expenditure Category	New Construction	Modernization / Rehabilitation	Total	Percent to Total
Type of Facility				
General Cargo	$72,488	$102,189	$174,677	16.1%
Specialized General Cargo: Container	261,349	79,288	340,637	31.4%
Specialized General Cargo: RO-RO / Auto	14,385	5,745	20,130	1.9%
Dry Bulk	23,352	10,030	33,382	3.1%
Liquid Bulk	374	7,154	7,528	0.7%
Passenger	51,417	5,208	56,625	5.2%
Other	125,120	61,933	187,053	17.2%
Infrastructure				
On-Terminal	21,779	21,087	42,866	4.0%
Off-Terminal	10,960	19,079	30,039	2.8%
Dredging: Improvement	34,999	27,279	62,278	5.7%
Dredging: Maintenance	34,996	46,791	81,787	7.5%
Security	38,039	9,401	47,440	4.4%
Total	**$689,258**	**$395,184**	**$1,084,442**	**100.0%**
Percent to Total	**64%**	**36%**		

Source: US Department of Transportation Maritime Administration and ConsultEcon, Inc.

Potential sources of capital

Funding Port Infrastructure

- Port infrastructure is typically funded through four different methods: port revenues, general obligation bonds, revenue bonds, and grants.
- Data in the table below presents FY 2006 port capital expenditures by type of financing method. For all U.S. ports 41 percent of port capital expenditures were financed using port revenues; however, this share was significantly lower among North Atlantic ports. The "other" category of financing accounted for the largest share (94%) of financing North Atlantic ports in FY 2006. Defined by the respondent, the other category included state and local appropriations, specific grant sources (i.e. U.S. Army Corps of Engineers), and tax levies, among others. In many ways, these methods are similar to the grant sources, only more specific as to the government entity.

U.S. Public Port Capital Expenditures by Type of Financing Method, FY 2006 ($thousands)

	North Atlantic Ports		All Ports	
Financing Method	Total Expenditures	Percent to Total	Total Expenditures	Percent to Total
Port Revenues	$481	0.5%	$434,664	40.7%
General Obligation Bonds	0	0.0%	133,637	12.5%
Revenue Bonds	0	0.0%	116,947	11.0%
Loans	3,400	3.3%	64,832	6.1%
Grants	1,796	1.8%	108,235	10.1%
Other [1/]	96,484	94.4%	209,382	19.6%
Total	**$102,161**	**100.0%**	**$1,067,697**	**100.0%**

1/ "Other" was defined as Transportation Trust Fund – Special Revenue, state capital funds, grant state bond bill, federal, local county grant, Army Corps of Engineers, state appropriations, insurance, state , CPF, priority transportation, FEMA, private partner, contract dredging, tax levy, cash. A few respondents did not define "other" at all.

Source: US Department of Transportation Maritime Administration and ConsultEcon, Inc.

Potential sources of capital

Port Revenues

- Port revenues are often used to fund capital improvements. In the case of Providence, port revenues used would ultimately depend on the location of the short sea shipping infrastructure and the project sponsor. Private port businesses may seek to invest in short sea shipping infrastructure directly if it supports a sufficient return on their investment. Potential sources of port revenue include retained earnings from port operations, lease revenue, and port fees.

General Obligation and Revenue Bonds

- A general obligation bond is a government bond in which the issuing governmental body pledges to use all revenues at its disposal to pay bondholders. These can be issued by municipal or state governments. A revenue bond is another type of government bond that is supported by the revenue of a specific project, such as a toll booth or dedicated tax stream. Revenue bonds differ from general obligation bonds in that general obligation bonds can be paid for through a variety of tax sources whereas revenue bonds can only be paid for by specific revenues. Many ports are governmental agencies or quasi-public authorities, and therefore, ports can issue bonds for most projects on a tax-exempt basis. In other words, investors who hold the bonds pay no federal income taxes on the interest they receive. As a result, ports are able to pay lower interest rates than are paid on taxable bonds, which provides for lower financing costs. The use of tax-exempt financing, however, subjects the port to federal regulations regarding the management and use of the bond proceeds.
- The passage of SAFETEA-LU[1] in 2004 amended the federal tax code to allow the issuance of tax-exempt private activity bonds for freight transfer facilities. Therefore, states and local governments are allowed to issue tax-exempt bonds to finance freight transfer facility projects sponsored by the private sector. The intention behind this change was to expand private sector participation in the financing of infrastructure improvements by enabling access to tax-exempt interest rates, which lower the cost of capital.

[1]SAFETEA-LU is the current surface transportation act that authorizes federal programs and public expenditures for transportation. The acronym stands for Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users. Passed initially in 2005 and authorized for FY 2005-2009, SAFETEA-LU was re-authorized through the end of 2010. Future programs and funding levels dependent upon future reauthorization or a new transportation act.

Potential sources of capital

General Obligation and Revenue Bonds (continued)

- In the current interest rate environment, bond rates are near historic lows. According to bond indices published by The Bond Buyer, the interest rate for a 20-year general obligation bond stood at 3.84 percent and for a 30-year revenue bond stood at 4.60 percent as of October 21, 2010.

Commercial Loans

- Loans from commercial banks and private investment companies account for a small share of overall port capital expenditures, as indicated in the prior table.
- Ports are unique real estate assets (as opposed to residential or office properties) that require specialized knowledge to operate and finance. The debt from a loan is paid off over a period and interest is charged. Loans are secured by collateral, which may include property and equipment, and some are supported by governmental guarantee programs. Moreover, loans typically do not cover the entire cost of a capital project and would need to be combined with other sources of financing.
- **Commercial loans typically have higher interest rates than governmental bonds – therefore the latter is the preferred alternative for port debt financing.**

Government Grants

- Government grants are an important aspect of funding for port infrastructure development. Grants may come through established programs, with defined project parameters and requirements, or through a direct allocation of funds by a legislative body. Grant programs can be very competitive, and therefore, the case for grant funds must be established thoroughly through demonstrable need, economic impacts and support from the public and private sectors.

Potential sources of capital

Public-Private Partnerships

- Some ports are increasingly looking to the private sector to develop and operate port assets. (ProvPort's long-term lease with Waterson Terminals though 2037 is an example of a public-private partnership. While ProvPort is technically a private corporation, its not-for-profit status means that it is virtually a quasi-public entity.)
- Delivery of new port infrastructure can be enhanced by the participation of private investors, which may be port operators or 3rd party investors. The private investment mechanisms may include equity and debt (loans) investments to support port infrastructure.
- According to a recent presentation at the 2010 Port Finance Seminar of the American Association of Port Authorities, institutional equity investors are looking for infrastructure investments between $20 million and $2 billion, with returns between 10 percent and 20 percent. For debt placements, loans range from $30 million to $600 million at roughly 200 basis points above LIBOR rate, with a loan to value ratio of 60 to 90 percent.

Relative merits of potential funding options

Grants

- Grants are the best alternative for financing the short sea shipping infrastructure because the grant recipient is not required to pay back the funds. A grant may be obtained for the entire project development cost or for part of it.
- The following table presents a list of potential grant sources that may apply to the development of short sea shipping infrastructure in Providence. There are few federal grant sources specifically for port development projects, and the Maritime Administration's Marine Highways Program has a very small amount of funds available. However, the project may have the potential to attract federal highway funds due to the intermodal nature of the project. The recent track record of the City of Providence may also make continued investment attractive – recently announced that the City of Providence was among the TIGER 2[1] grant recipients, receiving $10.5 million for two new electric cranes that will replace existing cranes that have outlived their useful life. The electric cranes will expand the port's capacity to handle container traffic, which would support a short sea shipping LoLo service.
- An alternative to applying for competitive grants would be to secure an allocation through the federal, state or local legislative body for funds for short sea shipping infrastructure. This would require lobbying the appropriate legislative body and is dependent upon competing political priorities.

[1] TIGER stands for Transportation Investment Generating Economic Recovery. This program was part of the American Recovery and Reinvestment Act, better known as the federal stimulus act, as passed in 2009 during the economic recession. For two completed rounds of competitive funding, TIGER has provided capital assistance to states, local governments and transit agencies, capital grants and transportation planning activities.

Relative merits of potential funding options

Grant and Other Funding Sources to Support Short Sea Shipping Infrastructure Development

Program Name	Coordinating Agency	Type of Funds	Eligible Uses Applicable to Short Sea Shipping Infrastructure	Remarks
Marine Highway Grants	USDOT Maritime Administration	Federal	♦ Port and terminal infrastructure ♦ Cargo, passenger and/or vessel handling equipment ♦ Efficiency or capacity improvements in ports, terminals, aboard vessels, intermodal connectors, etc. ♦ Investments that improve environmental sustainability ♦ New or used vessel purchase or vessel modifications ♦ Research, planning, or environmental analysis or review	Projects that have received designation as a Marine Highway Program project. Annual current available funds are $7 million. Providence would need to become a designated project in order to apply for funds.
Surface Transportation Program	Rhode Island DOT	Federal	Development of freight transfer yards.	Federal Highway Administration funds administered through state agency or MPO. Share of federal funds for project is 80 percent.
National Highway System (NHS)	Rhode Island DOT	Federal	Construction, reconstruction, resurfacing, and rehabilitation on a roadway connecting the NHS with a truck-rail facility, port, pipeline terminal, or an airport	Federal Highway Administration funds administered through state agency or MPO. Share of federal funds for project is 80 percent.
Congestion Mitigation and Air Quality Improvement Program	Rhode Island DOT	Federal	Projects and programs that improve air quality by reducing transportation-related emissions through removal of truck traffic from highways	Federal Highway Administration funds administered through state agency or MPO.
Harbor Maintenance Trust Fund	US Army Corps of Engineers	Federal	Operations and maintenance (i.e., dredging costs) of federally authorized channels for commercial navigation.	Recently a dredging project was completed in Providence.
Economic Development Administration Grants	US Economic Development Administration	Federal	Projects in economically distressed industrial sites that promote job creation and/or retention. Eligible projects must be located within an EDA-designated redevelopment area or economic development center.	City of Providence has current grant application for $3 million to support other port infrastructure improvements.

USDOT = United States Department of Transportation
Source: Program websites and ConsultEcon, Inc.

Relative merits of potential funding options

General Obligation Bonds

- General obligation bonds through the State of Rhode Island or the City of Providence are another potential funding source.

Revenue Bonds

- One approach to financing the short sea shipping infrastructure would be to use the revenue generated from the port's short sea shipping activities to fund bond payments. Such a funding mechanism might be combined with other funding sources, such as grants and existing capital or future port capital funds. In addition, such revenue bond financing could be enhanced through loan guarantees by government entities or the port itself.
- Future port revenue from short sea shipping can be determined using information from the demand analysis developed in Phase 1 of this project. The cost of short-haul and long-haul, LoLo and RoRo short sea shipping routes were compared to the cost of truck transportation over the same distances. Short-haul routes for LoLo and RoRo services were deemed uncompetitive with truck transportation and therefore, have a low likelihood of initiation. The long-haul RoRo service offers cost savings versus trucking and therefore has the greatest likelihood of implementation. The earliest this service could begin is 2014 due to lack of suitable vessels. The future revenue potential of a RoRo operation is evaluated subsequently.
- Data in the following tables present revenue assumptions to inform estimates of port revenues, as well as financing assumptions as an input into the subsequent discussion of alternative funding mechanisms. The short sea shipping operation has the potential to generate revenue from port fees and from rent associated with the cargo handling operation. Average port handling revenue would cover expenses associated with labor, maintenance and operating costs, overhead and operator profit. Rent paid by the operator would flow to the port, and is assumed at 10 percent of total handling revenue. Port fees are assumed at $9.00 per truck length. In this model, both rent and fees are determined by volume.
- In the near-term, the port has the potential to generate revenue of $420,000 in current dollars annually, which includes an estimated $252,000 from port fees and $168,000 from rent revenue. In the long-term, total revenue has the potential to grow to $1.2 million in current dollars annually.

Relative merits of potential funding options

Revenue and Financing Assumptions

Short Sea Shipping Volume (Demand)		
Near-term	28,000	TLs
Medium-term	45,000	TLs
Long-term	80,000	TLs
Revenue		
Average Port Handling Revenue per TL	$60.00	per TL
Average Port Revenue per TL	$9.00	per TL
Annual Revenue Inflation	2%	
Rent as Percent of Handling Revenue	10%	
Development Costs		
Low Range Construction Costs	$4,000,000	
High Range Construction Costs	$6,000,000	
Transaction Fees	$500,000	
Design & Engineering Fees as Percent of Construction Costs	15%	
Project Contingency as Percent of Construction Costs	5%	
Revenue Bond Financing		
Revenue Bond Interest Rate	4.5%	
Ammortization Period	20	years

TL = Truck Load
Source: Reeve & Associates and ConsultEcon, Inc.

Summary of Annual Revenue Potential in Current Dollars

	Near Term	Medium Term	Long Term
Annual Ro/Ro Traffic (TL)	28,000	45,000	80,000
Average Port Revenue Fees per TL	$9	$9	$9
Average Port Handling Revenue per TL	$60	$60	$60
Total Annual Port Handling Revenue	$1,680,000	$2,700,000	$4,800,000
Annual Port Revenue			
Port Fees	$252,000	$405,000	$720,000
Rent	$168,000	$270,000	$480,000
Total Annual Port Revenue	**$420,000**	**$675,000**	**$1,200,000**

Source: Reeve & Associates and ConsultEcon, Inc.

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Management and Economic Counsel

Relative merits of potential funding options

Revenue Bonds (continued)

- Data in the table opposite show a 20-year schedule of potential port revenue for a RoRo service in Providence. The near-term demand would be achieved in Year 1. Medium-term and long-term volume estimates would be achieved in Year 9 and Year 19, respectively, in this analysis. Over the 20-year period, total revenue from RoRo short sea shipping is estimated at $19.8 million, including $11.9 million in fee revenue and $7.9 million in rent revenue.

20-Year Revenue Potential Analysis in Future Dollars

Year	Truck Loads	Annual Port Fee Revenue	Annual Rent Revenue	Annual Revenue Potential
1	28,000	$252,000	$168,000	$420,000
2	30,125	$276,548	$184,365	$460,913
3	32,250	$301,976	$174,787	$476,763
4	34,375	$328,311	$218,874	$547,185
5	36,500	$355,579	$237,053	$592,632
6	38,625	$383,806	$255,871	$639,677
7	40,750	$413,020	$275,347	$688,367
8	42,875	$443,249	$295,499	$738,748
9	45,000	$474,522	$316,348	$790,870
10	48,500	$521,658	$347,772	$869,430
11	52,000	$570,489	$380,326	$950,816
12	55,500	$621,065	$414,044	$1,035,109
13	59,000	$673,436	$448,958	$1,122,394
14	62,500	$727,654	$485,102	$1,212,756
15	66,000	$783,770	$522,514	$1,306,284
16	69,500	$841,841	$561,227	$1,403,068
17	73,000	$901,920	$601,280	$1,503,200
18	76,500	$964,066	$642,711	$1,606,777
19	80,000	$1,028,337	$685,558	$1,713,895
20	80,000	$1,048,904	$699,269	$1,748,173
Total		**$11,912,153**	**$7,914,905**	**$19,827,058**

Source: Reeve & Associates and ConsultEcon, Inc.

Relative merits of potential funding options

Evaluation of Revenue Bond Financing

- Data in the tables on the following page present an illustrative revenue bond payment schedule for a 20-year bond at both low range development costs and at a high range.
- The low-range development cost of $5.3 million includes construction, design, project contingency and transaction costs. At an assumed interest rate of 4.5 percent, the annual revenue bond payment is $407,000, which totals $8.1 million over 20 years.
- The high-range development cost is an estimated $7.7 million, requiring an annual payment of $592,000 and total 20-year payment of $11.8 million.

Relative merits of potential funding options

Evaluation of Revenue Bond Financing

20-Year Revenue Bond Payment Schedule, Based on Low-Range Construction Costs

Term	20
Interest Rate	4.50%
Bond Proceeds [1/]	$5,300,000

Year	Annual Bond Payments	Principal Payments	Remaining Principal	Interest Payments
1	$407,444	$168,944	$5,131,056	$238,500
2	$407,444	$176,546	$4,954,510	$230,898
3	$407,444	$184,491	$4,770,020	$222,953
4	$407,444	$192,793	$4,577,227	$214,651
5	$407,444	$201,468	$4,375,759	$205,975
6	$407,444	$210,534	$4,165,224	$196,909
7	$407,444	$220,008	$3,945,216	$187,435
8	$407,444	$229,909	$3,715,307	$177,535
9	$407,444	$240,255	$3,475,052	$167,189
10	$407,444	$251,066	$3,223,986	$156,377
11	$407,444	$262,364	$2,961,622	$145,079
12	$407,444	$274,171	$2,687,451	$133,273
13	$407,444	$286,508	$2,400,943	$120,935
14	$407,444	$299,401	$2,101,542	$108,042
15	$407,444	$312,874	$1,788,668	$94,569
16	$407,444	$326,954	$1,461,714	$80,490
17	$407,444	$341,666	$1,120,048	$65,777
18	$407,444	$357,041	$763,006	$50,402
19	$407,444	$373,108	$389,898	$34,335
20	$407,444	$389,898	($0)	$17,545
Total	**$8,148,871**	**$5,300,000**		**$2,848,871**
	Average Annual Interest Payment			$142,444
	Average Annual Yield			2.69%

1/ Includes design fees, allowance for project contingency and transaction costs.
Source: Reeve & Associates and ConsultEcon, Inc.

20-Year Revenue Bond Payment Schedule, Based on High-Range Construction Costs

Term	20
Interest Rate	4.50%
Bond Proceeds [1/]	$7,700,000

Year	Annual Bond Payments	Principal Payments	Remaining Principal	Interest Payments
1	$591,946	$245,446	$7,454,554	$346,500
2	$591,946	$256,491	$7,198,062	$335,455
3	$591,946	$268,034	$6,930,029	$323,913
4	$591,946	$280,095	$6,649,934	$311,851
5	$591,946	$292,699	$6,357,234	$299,247
6	$591,946	$305,871	$6,051,364	$286,076
7	$591,946	$319,635	$5,731,729	$272,311
8	$591,946	$334,019	$5,397,710	$257,928
9	$591,946	$349,049	$5,048,661	$242,897
10	$591,946	$364,757	$4,683,904	$227,190
11	$591,946	$381,171	$4,302,734	$210,776
12	$591,946	$398,323	$3,904,410	$193,623
13	$591,946	$416,248	$3,488,163	$175,698
14	$591,946	$434,979	$3,053,184	$156,967
15	$591,946	$454,553	$2,598,631	$137,393
16	$591,946	$475,008	$2,123,623	$116,938
17	$591,946	$496,383	$1,627,239	$95,563
18	$591,946	$518,721	$1,108,519	$73,226
19	$591,946	$542,063	$566,456	$49,883
20	$591,946	$566,456	($0)	$25,491
Total	**$11,838,926**	**$7,700,000**		**$4,138,926**
	Average Annual Interest Payment			$206,946
	Average Annual Yield			2.69%

1/ Includes design fees, allowance for project contingency and transaction costs.
Source: Reeve & Associates and ConsultEcon, Inc.

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Relative merits of potential funding options

Impact of Increased Shipping Costs to Accommodate Revenue Bond Payments

- The port will generate revenue from port fees and increased rent associated with the short sea shipping service. This revenue may, in whole or in part, be used to support revenue bond payments associated with any bonds issued to cover the development costs. In addition to these potential revenue sources used for bond payments, rent or port fees may need to be increased to cover an amount up to the entire revenue bond payment.
- Based on the demand analysis conducted in Phase 1, the total estimated shipping cost is $1,182 per truckload. The cost due to port rent and fees is an estimated $15, or 1.3 percent of the total shipping cost. If the entire development cost is funded through a bond issue and the entire debt service payment were to be passed through to the shipper, the maximum additional cost passed through to the shipper would be roughly $18 per truckload (at near-term volumes), which is a 1.5 percent increase over the estimated shipping cost per truckload. Since the long-haul cost overland exceeds $1,400 per truckload, the cost increase up to the full amount of debt service payment per truckload would not significantly impact the cost competitiveness of the short sea shipping service.

Loans and Private Equity

- Based on the relatively small scale of the project, loans and private equity are not likely to be viable options for funding the short sea shipping infrastructure. Moreover, given the alternative to use tax-exempt revenue bonds, the cost of debt for commercial loans is high.

Relative merits of potential funding options

Summary Findings

- The optimum approach to funding the RoRo short sea shipping infrastructure is through grants, direct allocation of government funds, or general obligation bonds. It is recommended that these be pursued as the lowest cost options to the port. Government grants and direct allocations, however, can be difficult to obtain due to the competition for funds.
- Alternatively, the port may chose to internally fund some or all of the capital expenditures for short sea infrastructure with current or future retained earnings. The use of retained earnings would depend on their availability currently and commitment to other activities, such as existing debt payments or capital projects.
- In addition, the port may issue revenue bonds based on the anticipated port revenues. Based on the capital funding evaluation, a RoRo short sea shipping service has the potential to generate sufficient port revenues to support repayment of revenue bonds used for infrastructure development. Moreover, future port revenues at assumed levels and at levels up to the entire cost of bond payments would not have a significant impact on the overall cost of shipping.
- Finally, a mix of capital funding may be required. Attracting government grants, a direct allocation of government funds, and/or general obligation bonds, or using the port's retained earnings to cover a portion of the overall development costs would lower any future revenue bond payments and mitigate the risk involved in start-up operations and cost variances elsewhere in the supply chain (e.g. cost of short-haul truck movement to destination).

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Potential economic impact of short sea shipping on Providence area calculated at $180 million and 670 jobs

Key Elements of Economic Impact Analysis

- Economic impact analysis for a business activity such as short sea shipping in the Port of Providence measures the effect of that activity in terms of changes in economic output and associated changes in jobs or employment
- There are three key elements of economic impact:
  - **Direct impact** is the primary spending on goods and services for the transportation services provided that goes to the business's employees, suppliers, and owners – freight revenue for the door to door movement of goods by short sea shipping is a good measure of direct impact
  - **Indirect impact** occurs through the secondary spending by the recipients of the primary spending – this secondary spending generates additional economic activity that increases the overall economic impact of the business activity[1]
  - **Payment of taxes**: Finally, the business activity through the combined impact of direct and indirect output contributes to the payment of taxes to federal, state, and local governments (e.g. income tax, sales tax, as well as tax on corporate profits) in addition to personal and corporate contributions to the Social Security System
- Both primary and secondary spending create jobs within the U.S. economy – jobs directly created are in areas such as shipboard manning, port terminal services, and local drayage or trucking; secondary spending creates jobs in retail, housing, and marine support services

[1] The U.S. Bureau of Economic Analysis (BEA) publishes economic multipliers that reflect the level of this secondary spending or indirect economic impact for a variety of industries including U.S. domestic cargo shipping – this multiplier is 1.839. Source: *Economic Impact of the Jones Act*, report for the U.S. Maritime Administration by Reeve & Associates, 2006

The potential economic impact of short sea shipping for Providence is estimated to be around $180 million

Direct Impact

- Projected annual long term freight revenue for the Long-Haul service (by 2028) is $88 million[1]

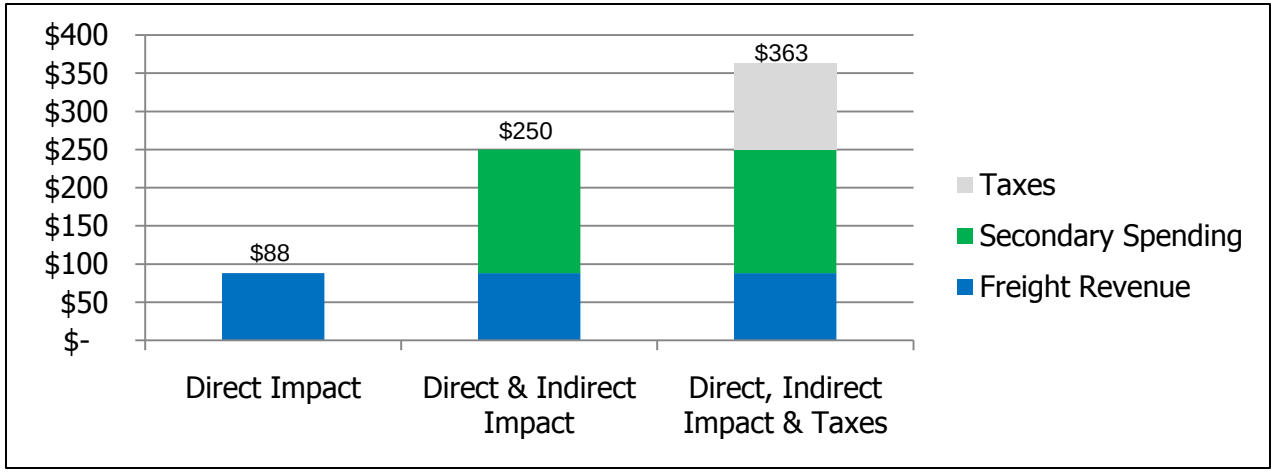
Indirect Impact

- Secondary spending is estimated at $162 million based on the BEA multiplier of 1.839

Taxes

- Total federal, state, and local government taxes plus contributions to Social Security estimated at 45 percent[2] of combined Direct and Indirect economic output

Total Annual Economic Impact of Long-Haul Providence Short Sea Shipping Service by 2028 ($ Millions)



Providence economic impact would be around $180 million – based on 50% of the total impact

1 Annual freight revenue based on 40,000 northbound loaded trailers at $1,200 each and 20,000 southbound loads at $1,200 each plus 20,000 southbound empty trailers at $800 each

2 Source: *Economic Impact of the Jones Act*, report for the U.S. Maritime Administration by Reeve & Associates, 2006

Total of 1,340 jobs projected to be created – likely that at least 670 (50%) of these would be in the Providence area

Jobs

- Short sea shipping will directly contribute to employment in the marine and shore sectors shown in the table below
- Ship's crew and ship operator shore staff may be located at either port area served by the short sea service
- Other categories (terminal, drayage, marine support) would be divided between ports at either end of the service
- Indirect jobs also likely to be distributed relatively evenly between ports at either end of the service

Projected Total Jobs Created by Long-Haul Providence Short Sea Shipping Service by 2028

Direct Jobs in Full Time Equivalents (FTE)	FTE
Ship's Crew	120
Ship Operator Shore Staff	30
Terminal Labor & Administration	80
Drayage Operators	300
Marine Support Services (Tugs, etc.)	20
Total Direct	550
Total Indirect	790[1]
Total Jobs Created	1,340

1 Source: *Economic Impact of the Jones Act*, report for the U.S. Maritime Administration by Reeve & Associates, 2006 – based on ratio of 1.435 indirect jobs to 1.0 direct jobs

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There are a number of action steps necessary to make Short Sea Shipping actually happen in Providence

Several key players must be involved to make short sea shipping a success

- Ocean carriers – must order and then operate the Jones Act vessels required
- Truckers – control the highway traffic to be diverted to short sea
- Cargo owners – need to buy into the short sea concept and support truckers' diversion of coastal highway traffic to short sea
- Ports and marine terminal operators – need to develop the required facilities in conjunction with ocean carriers
- Government organizations at federal, state, and city level – need to create a positive regulatory environment for short sea shipping as well as construction of necessary port and road infrastructure
- U.S. Department of Defense – needs to replace aging RoRo vessels in Reserve Fleet. This provides opportunity for DOD to team with U.S. commercial shipping industry to create large order book for RoRo vessels that may meet both commercial and national security requirements and help drive down the production costs of new vessels through scale economies
- U.S. shipbuilders – need to work with ship owners and suppliers to develop capability to build short sea vessels on efficient and economical basis
- U.S. Coast Guard – needs to align manning levels for monohull vessels operating in coastal service with those for tug-barge combinations of similar tonnage
- Marine labor – need to work with ocean carriers and Coast Guard to develop efficient and economical manning levels for short sea vessels
- Longshore labor – need to work with ocean carriers and terminal operators to develop efficient and economical manning levels for marine terminal operations

There are a number of action steps necessary to make Short Sea Shipping actually happen in Providence

The primary challenge to short sea shipping

- Given the long lead time of 2-3 years for designing and then building the necessary vessels for a long-haul short sea service, it is imperative that the dialogue between ocean carriers, shipyards and suppliers, and DOD be pursued on a high priority basis
- U.S. shipyard costs to construct appropriate RoRo vessels (of around 200 trailer capacity and higher) need to be substantially reduced (bringing them roughly in line with European shipyard prices) to make U.S. short sea shipping competitive with trucking costs and to eliminate the capital cost risk currently faced by a U.S. ship owner in owning vessels that would be noncompetitive in any shipping market other than Jones Act deployment

The City of Providence can take a number of steps to move this process forward

- Align with Rhode Island state and U.S. congressional government representatives to help facilitate the needed dialogue between ocean carriers, DOD, DOT (Maritime Administration) and shipyards to commence building appropriately priced vessels as well as with U.S. Coast Guard and labor to put in place efficient and economical shipboard manning and marine terminal labor agreements
- Develop a dialogue with potential short sea shipping operators, port partners (e.g. ports in the South Atlantic such as Jacksonville or Fernandina Beach) and inter-regional truckload operators to further develop the business case for Providence as a short sea shipping hub and to identify needed infrastructure improvements
- Become involved in regional activities of the Short Sea Shipping Cooperative Program (SCOOP) that includes representatives of the transportation industry and government organizations including U.S. DOT

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Calculations of Long and Short Haul Short Sea Shipping Economics

US Coastal Shipping Service Economic Model	Jacksonville/Providence				Jacksonville/Providence				Bayonne, NJ/Providence Full Service				Bayonne, NJ/Providence Ocean Service Only			
Origin:	Jacksonville, FL				Jacksonville, FL				Bayonne, NJ				Bayonne, NJ			
Destination:	Bristol County, MA				Bristol County, MA				Providence RI				Providence RI			
Ocean Transit (Nautical Miles):	993.00				993.00				178.00				178.00			
Vessel type:	RoRo				Container				RoRo				RoRo			
Vessel speed: (Knots)	25				25				21				21			
One Way Steaming Time (Hours)	40.0				40.0				8.5				8.5			
Frequency in R/T voyages per week:	3.00				3.00				7.00				7.00			
No. R/T voyages per year:	144				144				350				350			
R/T Ocean Transit Days:	3.50				3.50				0.70				0.70			
TTL Terminal Days:	1.50				1.50				0.30				0.30			
Total Ship Days	5.00				5.00				1.00				1.00			
TTL Drayage Days	2.00				2.00				2.00				2.00			
Total Container Days	7.00				7.00				3.00				3.00			
Total Volume of Lane Traffic (Truckloads):	**Truckloads**				**Truckloads**				**Truckloads**				**Truckloads**			
Northbound:	277,000				277,000				597,000				597,000			
Southbound:	141,000				141,000				190,000				190,000			
Share of Total Lane Traffic:	**Base**	**Freq. Adj**	**Net Share**		**Base**	**Freq. Adj**	**Net Share**		**Base**	**Freq. Adj**	**Net Share**		**Base**	**Freq. Adj**	**Net Share**	
Northbound:	7%	100%	7%		10.0%	100%	10.0%		7.0%	100%	7.0%		7.0%	100%	7.0%	
Southbound:	8%	100%	8%		11%	100%	11%		7.0%	100%	7.0%		7.0%	100%	7.0%	
Vessel Capacity (truckloads):	140				200				140				140			
NB capacity payload utilization:	96.2%				96.2%				85.3%				85.3%			
SB capacity payload utilization:	56.0%				53.9%				27.1%				27.1%			
	Per Unit	**Per Voyage**	**Per Year**	**Percent**	**Per Unit**	**Per Voyage**	**Per Year**	**Percent**	**Per Unit**	**Per Voyage**	**Per Year**	**Percent**	**Per Unit**	**Per Voyage**	**Per Year**	**Percent**
Freight Volumes (truckloads)																
Northbound Loads		135	19,390	50%		192	27,700	50%		119	41,790	50%		119	41,790	50%
Northbound Empties		-	-	0%		-	-	0%		-	-	0%		-	-	0%
Southbound Loads		78	11,280	29%		108	15,510	28%		38	13,300	16%		38	13,300	16%
Southbound Empties		56	8,110	21%		85	12,190	22%		81	28,490	34%		81	28,490	34%
Total Volumes		**269**	**38,780**	**100%**		**385**	**55,400**	**100%**		**239**	**83,580**	**100%**		**239**	**83,580**	**100%**
Service Economics																
Variable Costs																
Marine Terminal Cargo-Handling																
RoRo cost per unit (load & discharge): $60	$ 120	$ 32,317	$ 4,653,600		$ -	$ -	$ -		$ 91	$ 14,328	$ 5,014,800		$ 91	$ 14,328	$ 5,014,800	
LoLo cost per unit (load & discharge): $200	$ -	$ -			$ 200	$ 76,944	$ 11,080,000		$ -	$ -	$ -		$ -	$ -	$ -	
Mean terminal cargo handling cost per load	$ 152				$ 256				$ 91				$ 91			
Land Transportation																
Origin Dray	$ 193	$ 41,141	$ 5,924,290		$ 193	$ 57,962	$ 8,346,547		$ 225	$ 35,471	$ 12,414,869			$ -	$ -	
Destination Dray	$ 228	$ 48,455	$ 6,977,549		$ 228	$ 68,267	$ 9,830,450		$ 293	$ 46,124	$ 16,143,312			$ -	$ -	
Long haul drays	$ 70	$ 3,739	$ 538,374		$ 70	$ 5,267	$ 758,498		$ 238	$ 9,374	$ 3,281,072			$ -	$ -	
Mean Truck Dray Expense	$ 438	$ 93,335	$ 13,440,213		$ 438	$ 131,496	$ 18,935,495		$ 578	$ 90,969	$ 31,839,253		$ -	$ -	$ -	
Equipment Costs																
Container/Trailer	$51	$ 10,862	$ 1,564,170		$ 53	$ 15,904	$ 2,290,130		$ -	$ -	$ -		$ -	$ -	$ -	
Chassis	$ -	$ -	$ -		$ 18	$ 5,386	$ 775,600		$ -	$ -	$ -		$ -	$ -	$ -	
Mean Equipment Costs	$ 51	$ 10,862	$ 1,564,170		$ 71	$ 21,290	$ 3,065,730		$ -	$ -	$ -		$ -	$ -	$ -	
Total Variable Costs	**$ 641**	**$ 136,514**	**$ 19,657,983**		**$ 766**	**$ 229,731**	**$ 33,081,225**		**$ 669**	**$ 105,297**	**$ 36,854,053**		**$ 91**	**$ 14,328**	**$ 5,014,800**	
Fixed Costs																
Vessel	$ 315	$ 67,110	$ 9,663,840	27%	$ 213	$ 63,895	$ 9,200,880	19%	$ 52	$ 8,138	$ 2,848,300	6%	$ 52	$ 8,138	$ 2,848,300	20%
Vessel fuel (MDO at $2.38 per gal/4,300 GPD)	$ 165	$ 35,175	$ 5,065,200	14%	$ 117	$ 35,175	$ 5,065,200	10%	$ 65	$ 10,234	$ 3,581,900	8%	$ 65	$ 10,234	$ 3,581,900	26%
Port Charges	$ 19	$ 4,000	$ 576,000	2%	$ 13	$ 4,000	$ 576,000	1%	$ 6	$ 1,000	$ 350,000	1%	$ 6	$ 1,000	$ 350,000	3%
Sales & Administration	$ 38	$ 8,000	$ 1,152,000	3%	$ 27	$ 8,000	$ 1,152,000	2%	$ 38	$ 6,000	$ 2,100,000	5%	$ 38	$ 6,000	$ 2,100,000	15%
Non-Vessel Depreciation	$ 5	$ 1,000	$ 144,000	0%	$ 3	$ 1,000	$ 144,000	0%	$ 2	$ 300	$ 105,000	0%	$ 2	$ 300	$ 105,000	1%
Total Fixed Costs	**$ 541**	**$ 115,285**	**$ 16,601,040**	**46%**	**$ 373**	**$ 112,070**	**$ 16,138,080**	**33%**	**$ 163**	**$ 25,672**	**$ 8,985,200**	**20%**	**$ 163**	**$ 25,672**	**$ 8,985,200**	**64%**
Total Operating Expenses	**$ 1,182**	**$ 251,799**	**$ 36,259,023**	**100%**	**$ 1,139**	**$ 341,801**	**$ 49,219,305**	**100%**	**$ 832**	**$ 130,969**	**$ 45,839,253**	**100%**	**$ 254**	**$ 40,000**	**$ 14,000,000**	**100%**
Operating Expense per Revenue Load:		**$ 1,182**				**$ 1,139**				**$ 832**				**$ 254**		
Operating Statistics	**Pilot Lane #2**				**Pilot Lane #2**				**Pilot Lane #3**				**Pilot Lane #3**			
Number of Ships		2.00				2.00				1.00				1.00		
Door-to-Door Transit (days)		6.00				6.00				2.00				2.00		
Vessel Turns per Week		1.40				1.40				7.00				7.00		

Source: Reeve & Associates

Estimated Capital Expenditures to Develop Required Short Sea Shipping Terminals at Alternative Sites

Motiva				
Item	Quantity	Unit Cost	Item Cost	Remarks
Civil site work-grading, paving, fencing, etc.	8 acres	$ 140,000	$ 1,120,000	
Dredging	200,000 Sq. Ft	$ 20	$ 2,000,000	Construction alongside existing pier
Wharf construction	650 linear Ft.	$ 25,000	$ 1,500,000	Upgrading of existing finger pier
Site electrical	8 acres	$ 35,000	$ 280,000	Electrical sub-stations, etc.
Site water, sewage, etc.	8 acres	$ 30,000	$ 240,000	Depends on existing infrastructure
Yard lighting	6	$ 25,000	$ 150,000	Standard 60' light poles
Gates	1	$ 500,000	$ 500,000	Gatehouses, scales, utilities
Administration Buillding	3,000 Sq. Ft	$ 110	$ 150,000	Depends on existing infrastructure
Maintenance & Repair Building	10,000 Sq. Ft	$ 85	$ 500,000	M&R for yard equipment, cranes, etc.
Cranes, ramps, etc.	1	$ 7,500,000	$ -	Mobile harbor crane
Yard equipment	20	$ 85,000	$ 1,700,000	Yard hustlers, Top-lifters, etc.
Sub-Total			$ 8,140,000	
Contingency (20%)			$ 1,628,000	
Total			$ 9,768,000	

ProvPort				
Item	Quantity	Unit Cost	Item Cost	Remarks
Civil site work-grading, paving, fencing, etc.	8 acres	$ 500,000	$ 1,120,000	Much already in place
Dredging	200,000 Sq. Ft	$ 20	$ -	Wharf in place with 40' depth
Wharf construction	650 linear Ft.	$ 25,000	$ -	Wharf in place with 40' depth
Site electrical	8 acres	$ 35,000	$ 100,000	Much already in place
Site water, sewage, etc.	8 acres	$ 30,000	$ 100,000	Much already in place
Yard lighting	6	$ 25,000	$ 50,000	Minor improvements
Gates	1	$ 500,000	$ 200,000	New scale, some improvements
Administration Buillding	3,000 Sq. Ft	$ 110	$ 50,000	Upgrade existing infrastructure
Maintenance & Repair Building	10,000 Sq. Ft	$ 85	$ 100,000	Upgrade existing infrastructure
Cranes, ramps, etc.	1	$ 7,500,000	$ -	Assume RoRo operation
Yard equipment	20	$ 85,000	$ 1,700,000	Yard hustlers, Top-lifters, etc.
Sub-Total			$ 3,420,000	
Contingency (20%)			$ 684,000	
Total			$ 4,104,000	

Promet				
Item	Quantity	Unit Cost	Item Cost	Remarks
Civil site work-grading, paving, fencing, etc.	8 acres	$ 140,000	$ 1,120,000	
Demolition		$ 500,000	$ 500,000	Estimate
Dredging	200,000 Sq. Ft	$ 20	$ -	Depends on specific location
Wharf construction	650 linear Ft.	$ 25,000	$ -	May be less for finger pier
Site electrical	8 acres	$ 35,000	$ 100,000	Much already in place
Site water, sewage, etc.	8 acres	$ 30,000	$ 100,000	Much already in place
Yard lighting	6	$ 25,000	$ 150,000	Standard 60' light poles
Gates	1	$ 500,000	$ 500,000	Gatehouses, scales, utilities
Administration Buillding	3,000 Sq. Ft	$ 110	$ 50,000	Upgrade existing infrastructure
Maintenance & Repair Building	10,000 Sq. Ft	$ 85	$ 100,000	Upgrade existing infrastructure
Cranes, ramps, etc.	1	$ 7,500,000	$ -	Mobile harbor crane
Yard equipment	20	$ 85,000	$ 1,700,000	Yard hustlers, Top-lifters, etc.
Sub-Total			$ 4,320,000	
Contingency (20%)			$ 864,000	
Total			$ 5,184,000	

Cumberland Farms				
Item	Quantity	Unit Cost	Item Cost	Remarks
Civil site work-grading, paving, fencing, etc.	8 acres	$ 140,000	$ 1,120,000	
Demolition		$ 2,000,000	$ 2,000,000	Estimate
Dredging	200,000 Sq. Ft	$ 20	$ 4,000,000	Depends on specific location
Wharf construction	650 linear Ft.	$ 25,000	$ 16,250,000	May be less for finger pier
Site electrical	8 acres	$ 35,000	$ 280,000	Electrical sub-stations, etc.
Site water, sewage, etc.	8 acres	$ 30,000	$ 240,000	Depends on existing infrastructure
Yard lighting	6	$ 25,000	$ 150,000	Standard 60' light poles
Gates	1	$ 500,000	$ 500,000	Gatehouses, scales, utilities
Administration Buillding	3,000 Sq. Ft	$ 110	$ 330,000	Depends on existing infrastructure
Maintenance & Repair Building	10,000 Sq. Ft	$ 85	$ 850,000	M&R for yard equipment, cranes, etc.
Cranes, ramps, etc.	1	$ 7,500,000	$ -	Mobile harbor crane
Yard equipment	20	$ 85,000	$ 1,700,000	Yard hustlers, Top-lifters, etc.
Sub-Total			$ 27,420,000	
Contingency (20%)			$ 5,484,000	
Total			$ 32,904,000	

Source: Reeve & Associates