Niagara Frontier Urban Area Freight Transportation Study

Technical Memorandum No. 5

Economic Impact Analysis

GBNRTC

GREATER BUFFALO-NIAGARA
REGIONAL TRANSPORTATION COUNCIL
Buffalo-Niagara Falls Metropolitan Planning Organization (MPO)

Project No. 06Freight
Updated June 2010

Prepared for:
Greater Buffalo-Niagara
Regional Transportation Council

ENGINEERS
PLANNERS
ECONOMISTS
WilburSmith
ASSOCIATES

TABLE OF CONTENTS

TABLE OF FIGURES

Introduction

1.1 Overview

As originally conceived within the Scope of Work for the project, the purpose of Technical Memorandum #5 was to provide a cost-benefit analysis of proposals previously presented in Technical Memorandum #4 and a sensitivity analysis of their impact on the future economy of the area. The purpose of this technical memorandum has been slightly altered from its original concept based upon comments received during a regional stakeholder forum held on April 29, 2010. As revised, the documents now includes both benefit cost analyses and economic impact, as well as steps for project implementation. The focus of this technical memorandum moves beyond the simple assessment of needs and listing of potential projects, and on to actions that can be taken to address needs and assess practical benefits. The project discussion also assesses barriers to successful implementation and likely parameters of the proposed projects. The outcome of this memorandum is a "vetting" of proposed projects to be included in the final report. The technical memorandum is organized as follows:

- Organizational and Marketing Plans
- Implementation of a permanent freight asset marketing/advisory organization
- Marketing plan for marketing region's freight assets
- Evaluation of maritime projects
- Analysis of rail projects
- Benefit cost analysis of projects aimed at relieving CP Draw congestion
- Prioritization and analysis of relative benefits from remaining rail projects that appear in the New York State Rail Plan
- Analysis of likely cost of International Bridge failure
- Discussion of potential logistics center in the Buffalo-Niagara region
- Potential weaknesses of the Buffalo-Niagara region
- Specific implementation proposals and likely costs
- Benefit/cost analysis of logistics center projects
- Economic impact analysis of logistics center projects

Freight Marketing/Advisory Organization

During the course of the study, several stakeholders expressed a need for a permanent freight marketing/advisory organization, with most recent affirmation of the need for such a group coming at the April stakeholder forum. During the forum discussion it was envisioned that a freight advisory organization could assist regional planning organizations with marketing the area's freight assets, particularly its ports, airports, and a potential logistics center. It would also provide guidance on research and assist in developing priorities for improving the area's logistics assets.

Freight Advisory Committees (FAC) have become an increasingly popular and effective way to integrate freight issues into the transportation planning process. Experience from other states and MPOs has identified several common attributes that appear to contribute toward successfully establishing and maintaining freight advisory groups:

- **Credible leadership** – Identify a champion who can take charge and lead the group – someone with the experience, authority and resources (e.g., transportation service/carrier executives, high-level leaders in a state or regional planning organization, business leaders, or former politicians).
- **Identify a vision** – To attract and retain members, the group should be formulated around a vision that communicates a strong sense of purpose.
- **Create a sense of urgency** – Identify one or more critical issues, that when resolved will show tangible results or benefits.
- **A forum for exchanging information** – Provide opportunities to exchange information in the process (i.e., avoid one-way information flow).
- **Seek feedback** – Develop methods for assessing stakeholder's perceived value of the forum early on – be flexible and willing to adapt to meet stakeholder preferences.

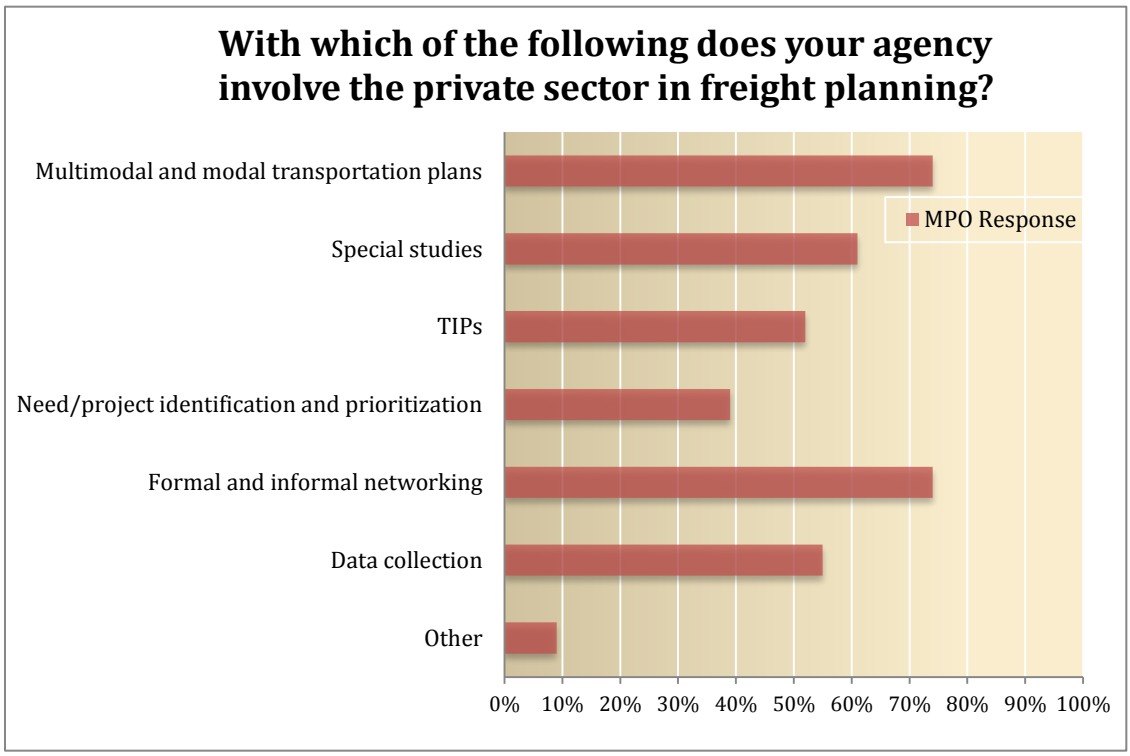
The following is a general framework that can be used to explore the concept for a Greater Buffalo-Niagara Regional Freight Advisory Committee (GBNR-FAC). The purpose of the GBNR-FAC is to facilitate communication and coordination between regional and local planning organizations, as well as between the public sector and private sector freight interests. Information presented in the framework reflects information gathered through a survey conducted in 2008 by the American Association of Metropolitan Planning Organizations (AMPO) about private sector freight outreach activities. AMPO received thirty-one responses from MPOs around the nation. Information is also presented from a peer-to-peer (P2P) exchange sponsored by FHWA and held in Phoenix, AZ on February 21, 2008. Attached as Appendix B to this document are a draft set of bylaws that could be used as a template for a charter to the GBNR-FAC.

2.1 Potential Purpose/Functions

Forty percent of the MPOs that responded to the AMPO survey reported having some form of freight advisory committee. In some cases, transportation agencies establish formal or ad hoc committees for specific initiatives, which are disbanded when the initiative is complete. **Figure 2- 1** presents reasons provided by MPO respondents for creating a FAC. In general, freight-related committee meetings represent opportunities for the private sector to:

- Provide input on freight issues and needs
- Exchange information and build relationships
- Learn about and participate in public sector processes for transportation planning, project identification, funding and implementation

Figure 2- 1: Reasons for Creating Freight Advisory Group



Source: FHWA Engaging the Private Sector survey

Experience suggests successful FAC's must also have a clearly stated value proposition. The following represent sample Vision or Mission Statements from several existing MPO-FACs:

Atlanta Regional Commission (ARC) Freight Advisory Task Force - Objectives[1]

- Provide input on policies and improvements for freight mobility
- Identify freight mobility characteristics and needs
- Highlight the significance of freight to the region
- Improve safety of the transportation system
- Prioritize freight transportation needs and investments

Baltimore Metropolitan Council (BMC) Freight Movement Task Force - Purpose[2]

- To provide the public and the freight movement community a voice in the regional transportation planning process. The FMTF is a forum for Baltimore region freight stakeholders to share information and discuss motor truck, rail, air, and waterway concerns.

[1] Source: http://www.atlantaregional.com/documents/tp_freightadvtf_0106.pdf
[2] Source: http://www.baltometro.org/content/view/351/277/

Delaware Valley Regional Planning Commission (DVRPC) Goods Movement Task Force - Purpose[3]

- Maximize the Delaware Valley's position in the global economy by promoting local freight operations and implementing a regional goods movement strategy

Objectives

- Insure the participation of the freight industry in the planning process
- Identify improvements to facilitate the safe and efficient movement of freight
- Implement regional congestion and intermodal management programs
- Improve communications and data and technology sharing

Des Moines Area MPO Freight Roundtable - Mission[4]

- To work with the public and the private sector to maximize the Des Moines metropolitan area's, central Iowa's, and Iowa's economic opportunity through development of and advocacy for an efficient transportation system to promote economic development and trade in the North American trade corridor centered on I-35/I-29 and connecting Canada, the United States, and Mexico.

Puget Sound Regional Council (PSRC) Freight Mobility Roundtable - Mission[5]

- To engage leaders in the central Puget Sound region in a public-private partnership for our economy and, as a critical part of this, for the mobility of freight and goods. To provide the freight movement community with a voice, and to advance the region's freight movement in a reliable, multimodal and intermodal, efficient, cost-effective, safe and environmentally responsible manner.

Puget Sound Regional Council Freight Mobility Roundtable Objectives

- Frame issues of concern to the freight community and serve as an advocate for policies and improvements to freight and goods mobility
- Participate in the transportation planning and investment decision processes recognizing the need for coordination between personal and freight mobility
- Review data and information used in freight analyses and planning
- Educate policy makers about the interdependence of freight and passenger systems and the significance of freight mobility to the continued growth of the regional economy
- Serve as the sounding board for the sponsors and all participant organizations on freight concerns and issues

The purpose for creating a GBNR-FAC could be to facilitate strategic information exchange and coordination toward potential solutions to improve the Buffalo regional economy, such as:

- Provide a forum to reach consensus among diverse stakeholders and facilitate successful solutions
- Serve as a source for developing freight champions, as well as points of contacts for local governments and economic development agencies
- Facilitate the probability of successful freight project implementations by raising the level of shared knowledge between public and private sector stakeholders on freight concerns
- Establish strong partnerships with key private sector economic leaders in the freight industry
- Provide GBNRTC with improved access to freight data and data sources
- Provide a forum for the discussion of relevant freight transportation security issues
- Help the GBNRTC target freight investments to where they are most needed

[3] Source: http://www.dvrpc.org/transportation/multimodal/freight/resume.htm
[4] Source: http://www.dmampo.org/Committees/freightroundtable.html
[5] Source: http://www.psrc.org/projects/freight/roundtable/mission070606.pdf

2.2 Participation/Roles

Peer exchange participants emphasized the need for FAC to be comprised primarily of private sector executives from companies that use freight services to ship or receive goods, as well as executives from the various modal services. In addition, the FAC should include key public sector representatives and others with specialty expertise. A suggested cross representation of membership might include:

- Agriculture
  - Producers
  - Elevators
  - Bio-fuel Producers
- Manufacturing
  - Finished Wood Products
  - Metal Refinery and Fabrication
  - Food Processing
  - Hi-tech Manufacturing
- Retail
- Utilities/Service Providers (e.g., hospitals)
- Construction
- Trucking
  - Less-than-Truckload (LTL)
  - Truckload
  - Express/Integrated Air Cargo
- Railroads
- Commercial Real Estate
- Third-party Logistics Providers

The list of stakeholders that was developed as part of this study could provide an initial pool from which FAC membership could be drawn. This list is provided as an appendix to this document. Stakeholder involvement with this study could provide an indication of likely participation in a FAC.

2.3 Meeting Formats and Sample Agenda

The survey of MPOs that utilize organized freight committees as an element of their planning process revealed a variety of meeting frequencies, ranging from monthly to once or twice per year depending on the purpose and goals of the group. A good starting point for GBNRTC would be to hold quarterly meetings. Meeting frequency can then be adjusted based on member input over time and the committee's strategic plan.

When developing a first agenda for a freight group, caution should be taken to not simply present information. To keep stakeholders engaged, the agenda should provide for two-way information exchange, offering ample opportunities for private sector representatives to make presentations and be involved in discussion. The following are suggestions for a first agenda:

- Discuss the initial purpose and need for the proposed committee activity, with a facilitated discussion to support the development of a strategic plan covering the first year or two of committee activities.
- Provide a "brief" overview of the MPO transportation planning process and TIP, or report on a current project, recent freight-related study, legislative initiative or funding program that is or will be affecting freight movements
- A presentation from a private sector interest such as a Class I railroad or large trucking company about corporate initiatives that might affect businesses in the region
- Invite a regional economist from a large company, bank or Federal Reserve district to present an economic outlook for the near future
- Plan time at the end of the meeting to conduct a brief feedback activity such as a meeting assessment survey.

At the conclusion of the first meeting, an effort should be made to assess how well the meeting met participant expectations and seek suggestions for improving future meetings. The meeting assessment can also be used to ask participants about future meeting days, times and locations. For example, is a regional business willing to host and possibly provide a tour of its shipping facilities?

Some publicly supported freight groups have also focused on regional education. Tucson, AZ offers an excellent example of an educational cooperation effort to benefit the development of freight and logistics businesses with the formation of the Southern Arizona Logistics and Education Organization (SALEO). The purpose is to raise awareness and highlight the importance of transportation and logistics to the region. "SALEO is the first of several projects developed to promote and grow the transportation and logistics industry in southern Arizona… especially the role that this industry plays within the region's supply chain as a catalyst for economic growth."[6] SALEO offers networking opportunities by hosting dinner meetings on different logistics topics once a month.

[6] SALEO dinner meeting announcement found at:
http://www.azcommerce.com/doclib/itrade/2008/saleo/saleo4-16-08.pdf

Marketing Plan

During the April Stakeholder Forum, participants also suggested that the final report for this study include a marketing plan. Marketing is potentially one of the most important freight activities that can be undertaken in the region. As was noted in Technical Memorandum #4, the region has a number of underutilized freight assets. Among these are:

- Eight inactive marine cargo terminals
- Niagara Falls International Airport is operating at only eighteen percent of capacity
- The former Bethlehem Steel site provides 1,100 acres, most of which are currently unused, which could provide a location for a logistics center

A key to reaching the goals of the marketing plan is to market these assets to clearly identified markets. In this technical memorandum, the outline and initial elements of the Greater Buffalo-Niagara (GBN) Regional Logistics Marketing Plan are established. This outline will be fleshed out and presented as an Appendix to the final report.

3.1 Marketing Plan Purpose and Goals

The purpose of the marketing plan is to provide a "road map" or implementation guide for marketing freight assets in the Buffalo-Niagara region. The marketing plan identifies strategies for reaching the marketing goals, the activities to be undertaken with the available resources, and the schedule and performance benchmarks that will define success. Creation of a marketing plan supports the need for the financial and staff resources required to implement a quality marketing program.

A marketing plan is also a communications tool with the following stakeholders:

- The community
- Government officials
- Board members
- External customer and potential customer groups
- Other client groups that contribute to the economic competitiveness of the region.

The marketing plan helps to distinguish the freight assets in the Greater Buffalo-Niagara region from competing regional economies primarily through product differentiation, price competitiveness, and market focus targeting particular industry sectors or geographic areas.

From an economic development perspective, understanding and marketing the region's freight assets is a critical component of branding the region as a competitive environment for investment and job creation. A successful marketing plan will:

- Define the competitive advantages of the local and regional freight assets, and the strengths and weaknesses
- Identify target customers or audiences, where they are located, what their freight needs are, and who are the competitors and how do these freight assets compare with the competitors

- Define an effective message to be communicated to the target audience about the advantages of the regions freight assets

A key decision that will need to be made by the GBNRTC is who will "own" the marketing plan. One strategy the GBNRTC might consider is creating a regional FAC and using the proposed marketing plan as the starting point for the committee's initial meeting activities. The marketing plan should include a statement of the outlining of the overarching purpose of the organization charged with implementing the plan so that the goals of the marketing plan align with owning organizations mission, customers and key stakeholders.

3.2 Greater Buffalo-Niagara Regional SWOT Analysis

Research conducted during the course of this study presented a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis based on the region's existing transportation assets. This SWOT analysis provides valuable direction for developing a marketing plan:

Greater Buffalo-Niagara Regional Transportation Strengths:

Highway / Truck Mode:
- Plenty of highway capacity, relatively uncongested
- Large urban areas within one-day truck drive, e.g., Rochester 1.1 million, Toronto 2.5 million, within a 12-hour drive of 60 percent of Canadian population and 40 percent of U.S. population
- Major East / West Corridors

Air Cargo (NFIA):
- NFIA has ample capacity. The airport is underutilized
- NFIA runways are long and can accommodate most aircraft types
- Inexpensive landing fees
- Plenty of available land for cargo operators adjacent to or near airport
- Location near to Toronto area, which includes potential outbound cargoes, such as perishable commodities
- Automotive and medical device manufacturers are located within the area, two industries that often use air cargo

Port:
- Plenty of unused port facilities
- Diversity of cargoes handles
- Relatively strong established market in grain handling

Rail/Intermodal:
- Four Class I carriers
- Good rail connections to Chicago and New York
- No reasonable rail alternative to serve PANYNJ to Toronto

Greater Buffalo-Niagara Regional Transportation Weaknesses:

Highway / Truck Mode:
- Lacking a significant north/south trade corridor

Air Cargo:
- Customs not on-site
- Would still need some infrastructure to handle international cargoes
- Not a major passenger gateway, so at a disadvantage for belly cargo
- Not as centrally located as Rickenbacker in Columbus, OH
- Two airports in a relatively small market sharing air cargo
- Low outbound cargo volumes from the region, although the Canadian markets could potentially provide outbound opportunities

Port:
- Overall, cargo growth has been flat on the Great Lakes/St. Lawrence Seaway System (GLSLS). Mostly serves markets within the system because all but the smallest ocean vessels cannot access beyond Montreal
- Organization of port means that it does not take part in a number of organizations and marketing groups that are attended by public port authorities
- Small portion of GLSLS traffic, only one percent

Intermodal/Logistics:
- While a decent market, still not as large as most logistics hubs such as Dallas or Chicago
- Not as centrally located as centers in Ohio, for example
- Imbalance of traffic with little outbound
- No container pool, so poor container availability
- Not located where east meets west, such as Memphis or St. Louis
- I-90 not a large freight corridor and is costly
- Train schedule from PANYNJ still is only several days per week

Greater Buffalo-Niagara Regional Transportation Opportunities:

Highway / Truck Mode:
- Proposed Continental 1 Corridor development

Air Cargo:
- Recruit anchor tenant for NFIA
- Market NFIA to "overhead" cargo airlines
- Continue economic development initiatives focused on medical device and automotive industries
- Develop NFIA as an industrial airport
    - Reuse of U.S. Army Reserve Base at NFIA – approximately 20 acres adjacent to the airport to be conveyed to the local municipality by 2011; local development plan calls for reuse of hangar and buildings for economic development targeting aviation-related uses.
    - Niagara Industrial Airpark application for New York State Shovel Ready Certification – approximately 217 acres adjacent to the airport undergoing pre-permitting to expedite development

Port:
- Growing markets – Alternative energy, this is driven by Ontario and New York State energy initiatives, as well as federal initiatives and European initiatives

    - Wind turbines
    - Biomass (still untested)
    - Ethanol, in particular the export of DDGS
- Growing markets – Agricultural exports

Intermodal/Logistics:

- Serve as auxiliary distribution area for the Toronto area market, particularly for Canadian imports that arrive at the PANYNJ
- Attempt to develop outbound container volumes to balance inbound, such as with agricultural exports
- Expansion of Lehigh Valley Rail Yard

Greater Buffalo-Niagara Regional Transportation Threats:

Highway / Truck Mode:

- Increased highway congestion resulting in increased delays, pollution and real/perceived safety issues

Air Cargo:

- The greatest threat is the status quo, where NFIA continues to be underutilized, and no one replaces Kitty Hawk

Port:

- Other ports aggressively market for many of the same cargoes to serve many of the same markets as Buffalo

Rail/Intermodal:

- Aging infrastructure
- Low redundancy in key Class I facilities
- Other rail corridors to the south are growing in importance

3.3 Greater Buffalo-Niagara Marketing Goals and Objectives

The marketing plan goals establish the desired outcome of the marketing effort and the objectives should be specific actions to be achieved. Some examples of goals or objectives might include:

- Grow the value of existing customer trade by x% per year through expanded transportation facilities and service offerings
- Grow the value of new customer trade by x% per year
- Seek to expand air cargo volumes by x%

The GBN Regional Marketing Plan should also identify target markets: Identify customers the GBN Region wants to reach effectively matching the freight assets with the needs of target industries and other community assets that match the needs of market targets. In this respect the marketing plan should be an evolving plan based on available data sources for identifying target markets.

3.4 Greater Buffalo-Niagara Marketing Action Strategies

Specific actions to achieve goals and objectives, the programs, operational actions, etc. are required to:

- Retain existing customers and develop new customers
- Diversify types of goods and industries served
- Expand partnerships with regional economic development organizations
- Develop marketing message and materials
- Identify marketing channels
- Communicate the marketing message

3.5 Marketing Implementation Plan and Performance Measures

Measureable performance benchmarks are required to evaluate the effectiveness of the marketing plan and to justify the investment of resources.

3.6 Greater Buffalo-Niagara Marketing Budget

The marketing plan budget should identify the operating costs associated with implementing the marketing plan on an annual basis for staff and promotional efforts.

Evaluation of Maritime Projects

Technical Memorandum #4 presented the idea of initiating short sea shipping between the Port of Buffalo and strategic markets on the Great Lakes. The determination of the parameters of the service would depend upon the likely value proposition that it could provide to the service's users. Service could be containerized or roll-on/roll-off (Ro/Ro) service. The benefit of roll- on/roll-off service is the flexibility of using typical over the road tractor-semitrailer truck equipment. A variety of truck equipment (e.g., dry van, reefer, flat bed) can be loaded onto or off of Ro/Ro cargo ships, whereas container ships are exclusive to shipping containers.

4.1 Roll On/Roll Off (Ro/Ro) Service

There are two types of Ro/Ro service, semitrailers and full tractor-semitrailer combination vehicles. The same cargo vessel can handle both types of service. The type of service is typically dependent on the length of the trip and shipper needs. For short trips, (a few hours or less) truck ferries that transport tractor-semitrailer combinations and driver are appropriate in order to keep the load/unload time to a small fraction of the total trip time. For the longest trips, the vessel would carry drop trailers. Medium size trips might keep the trucks but leave the drivers on shore for other drivers to pick up on the other end.

Figure 4- 1: Operating Expense per Day for Providing Short Sear Shipping on GLSLS System

Source	Operating Expense per Day
2002 U.S. Army Corps of Engineers U.S. Flag Containership, 600 TEU Domestic Trade	$29,557 at sea, $27,161 at port
FY 2008 Rand Logistics, Inc. (Operator of Bulk Lakes Vessels) Financial Results	$24,228
Paul F. Richardson Associates, Inc. Transportation Research Board "Cost and Regulatory Challenges to U.S. Short Sea Shipping," January 11, 2004, $40M container vessel of 400 – 600 TEU	$20,700
U.S. Army Corps of Engineers June 2002 *Reconnaissance Report*, synthetic rates for GLN/SLS bulk fleet	$21,418 (Class I) - $28,366 (Class X)

On short trips, the shipper or carrier would still pay many of the same costs associated with driving the truck to its destination (driver time, missed opportunity costs associated with the power unit). As a result, the full truck service is likely to only be feasible when the Ro/Ro service allows the carrier to capture significant time savings by avoiding bottlenecks or the ability to travel a more direct route.

It is possible to develop a sketch-level estimate of the operating costs associate with a Ro/Ro by making a number of assumptions about vessel capacity and benchmark operating costs:

- For illustrative purposes assume a Ro/Ro vessel capacity of approximately 200 semi-trailers or 150 full trucks
- Operating costs of $25,000 per day
- At a vessel cost of $25,000 per day, operating at capacity with 150 tractor semitrailer combinations. The cost per hour would be: $25,000/day ÷ 24 hours/day ÷ 150 trucks = $6.94 per hour.

- The typical speed for a Great Lakes ship on lake service is about 11.5 miles per hour.[7] Assuming 11.5 miles per hour, the cost per sea-mile would then be about $0.60 per mile.
- According to a recent study by the American Transportation Research Institute (ATRI), the typical marginal cost of trucking is $1.73 per mile (excludes fixed costs like administrative), of which $0.86 vary by highway mileage, including fuel and oil, repair and maintenance, fuel taxes, tires, permits, and tolls. Using a ferry service potentially saves $0.26 on these expenditures (i.e., $0.86 - $0.60).[8]
- The economics of ferry service begins to deteriorate when variable costs by hour are considered: Again using the ATRI study, the typical truck covers 48.4 miles per hour. Other expenses, such as driver wages, the cost of the truck/trailer lease payments, insurance vary by time, total about $0.87 per mile, assuming the truck is traveling at 48.4 miles per hour. However, if the truck is sitting on a ferry that travels only 11.5 miles per hour, the cost increases to $3.66 per mile (48.4 ÷ 11.5 x $0.87).

This sketch-level example appears to emphasize the feasibility of short-haul Ro/Ro vessel service where users will realize significant time savings as compared to over-the-road truck service. The research and stakeholder outreach conducted for the GBNRTC Freight Study did not identify significant bottlenecks, or target markets that could be better served by short-haul Ro/Ro services.

Other short sea shipping services, such as those involving trailer-only Ro/Ro service or container services involve larger fixed cost components, similar to other intermodal services (e.g., container lift charges, yard demurrage, etc.). Under the typical intermodal container service model, a truck is dispatched to pick up or drop off the container or trailer at each end of the move (container drayage). Generally, short truck moves are much more expensive per mile than long truck moves. Loading/unloading operations add additional fixed costs. In the case of the Ro/Ro service, this would consist of the hostling to load or remove the trailers from the ship. In the case of containerized service a variety of equipment would be required. Based upon loading and unloading charges at various container terminals, it is reasonable to expect that the loading and unloading cost would be a minimum of $50 per container. Because of these fixed components of the costs, the service will be more economically feasible over longer distances.

The two most logical potential services would be: 1) Ro/Ro service on Lake Erie to Detroit, Toledo, or Cleveland; and, 2) a containerized service to a Canadian port such as Halifax, NS or Montreal, PQ. Of the potential markets for Option 1, the Detroit area may make the most sense. Detroit is farther, at slightly over 250 miles if driven to through Canada. Per **Figure 4- 2** below, Detroit also has the highest level of trade with the Buffalo-Niagara region. Cleveland is another possibility, but the level of traffic to and from Toledo, OH is low.

[7] This estimate is based upon vessel schedules from the Midwestern Energy Resource Center's (MERC) website, http://www.midwestenergy.com/
[8] American Transportation Research Institute, *An Analysis of the Operational Costs of Trucking,* December 2008.

Figure 4- 2: 2004 Truck Traffic to and from the Greater Buffalo-Niagara Region

Market	2004 Equivalent Trucks
Traffic to Buffalo-Niagara	
Cleveland (Cuyahoga County, OH)	96,008
Toledo (Lucas County, OH)	15,218
Detroit (Wayne, Oakland, Macomb Counties, MI)	77,778
Traffic from Buffalo-Niagara	
Cleveland (Cuyahoga County, OH)	72,547
Toledo (Lucas County, OH)	7,785
Detroit (Wayne, Oakland, Macomb Counties, MI)	102,223
Total Traffic to and From Buffalo-Niagara	
Cleveland (Cuyahoga County, OH)	168,554
Toledo (Lucas County, OH)	23,003
Detroit (Wayne, Oakland, Macomb Counties, MI)	180,001

Source: TRANSEARCH®

If a service were to be initiated, the success of the service would depend heavily on its usage. Maritime shipping is highly dependent upon the economies of scale. The more containers or trailers per ship, the lower the cost per unit. For example, one can make the following reasonable assumptions:

- Ro/Ro vessel carries on average of 200 trailers
- Operating cost is $25,000 per day
- Average speed is 11.5 miles per hour, about a 22-hour journey
- The vessel requires six hours to unload
- Distance between Buffalo and Detroit is about 250 miles by water
- Cost to pick-up/deliver trailers at each end of voyage is $100
- Marine terminal costs of $36 on each end voyage[9]

Under these assumptions, the cost of the service is $417. If the marginal cost of trucking is $1.73, and the distance between the Buffalo-Niagara region and Detroit is about 255 miles by road, the cost of an all truck move is approximately $441. The potential transportation savings would be $24.00 per load.

However, using the service would generate additional non-transportation costs. Instead of a five hour transit time, shipment transits, including loading, unloading, carriage to final destination, would probably be over 24 hours. Furthermore, if the service operated two round trips per week, the shipper would need to wait an average of 42 hours at any given time for the next sailing. Including time waiting for sailings, the lead time would be almost three days compared to a lead time of a little more than five hours by truck. The FHWA Freight Analysis Framework (FAF-3) estimated that the average value of shipments between the Buffalo-Niagara and the Detroit Metropolitan area is $2,356. Assuming an average in-transit inventory carrying cost of 13.33 percent per the FHWA ITIC-ST model and a trailer weight of 15 tons, the increase in inventory carrying cost would exceed the transportation cost savings. Under these assumptions, the Harbor Maintenance Tax (HMT) discussed below would also add another $44 in cost.

[9] Global Insight, Inc. for the U.S. Department of Transportation, Office of the Secretary/Maritime Administration, *Four Corridor Case Studies of Short-Sea Shipping Services,* August 15, 2006.

However, in the future if fuel prices rise or other factors increase over-the-road costs significantly, the cost advantages of Ro/Ro service could quickly change. The sketch-level scenarios presented here roughly describe Ro/Ro service economics under current conditions. A number of studies are currently underway to investigate potential technologies and practices that could reduce the costs associated with short sea shipping. As described above, speed is a significant barrier to more practical service. Research and technology development is investigating vessels that can operate at increased speeds. For example, Bollinger Incat USA makes high speed vessels for the U.S. Navy and Coast Guard. One particular catamaran design is capable of cruising speeds of 32 miles per hour and could potentially hold 100 trailers.[10]

There also exist maritime and trade regulatory barriers that increase costs, such as the HMT, which was established under the Water Resources Development Act of 1986. The HMT is a 0.125 percent ad valorem tax applied to goods carried in vessels which use federally maintained navigation projects. Advocates of short sea shipping favor a reduction in this tax. As an example, a study by the Short Sea Shipping Cooperative Program estimates that the typical cost per load of the HMT on a hypothetical coastal short sea shipping route is $120 for foreign trade traveling from initial point of entry to final destination and $75 for domestic moves.[11] If the HMT were reduced or modified, this could decrease the cost of short sea shipping. Other regulations impact the operating expenses associated with U.S. flagged vessels. The U.S. Coast Guard has established manning requirements for U.S. flag vessels. Generally, the manning requirements are more stringent for self-propelled vessels than for tug-barge combinations. If these requirements were altered, this could also change the economics of short sea shipping.

Not accounted for in this sketch-level analysis are the associated public and social costs of short sea shipping and trucking. The fuel efficiency gains from short sea shipping likely translate into lower public/social costs than for trucking. If these lower social costs can be reasonably estimated, the argument may be made for subsidizing Ro/Ro service. For example, another study by the National Ports and Waterways Institute estimated that a short sea shipping loop connecting New York and Boston would save about $0.56 per mile in public and social costs, including infrastructure savings, safety, environmental, and congestion costs.[12] Of course, these benefits will only materialize if shippers use the system.

4.2 Containerized Service

Another short sea shipping alternative from the Buffalo-Niagara region would be a containerized service between the region and Montreal or Halifax. This would be a feeder service in which international containers would arrive or depart at a deeper water Canadian seaport and be transferred to smaller vessels to and from the Buffalo-Niagara region. Unfortunately, some barriers would need to be overcome to make this service successful as well. The Cleveland-Cuyahoga County Port Authority recently commissioned a report to look at the feasibility of establishing a container terminal at the Port of Cleveland.[13] In particular, the study looked at the possibility of a marine container service between the Port of Cleveland and Halifax,

[10] National Ports and Waterways Institute for the Center for Commercial Deployment of Transportation Technologies, *High Speed Ferry and Coastwise Vessels, Assessment of New York/Boston Service*, May 2003
[11] National Ports and Waterways Institute for the Short Sea Shipping Cooperative Program, *Short Sea Shipping and Harbor Maintenance Tax*, October 2005
[12] National Port and Waterways Institute for the Short Sea Shipping Cooperative Program, *The Public Benefits of Short Sea Intermodal System*, 2004
[13] Martin Associates for the Cleveland-Cuyahoga County Port Authority, *Analysis of Cleveland Container Market*, March 12, 2008

Nova Scotia. The study identified several barriers to the successful implementation of the service, which would likely impact the Port of Buffalo were it to implement a similar service:

- The seasonal nature of the Great Lakes St. Lawrence Seaway system is a problem for shippers. It would be difficult for shippers to find transportation alternatives during the winter months when the system is closed. The winter closure would also create difficulties in terms of the efficient utilization of assets. This is less of a problem for traditional commodities that travel on the GLSLS, since many of these commodities can be easily stockpiled in anticipation of the winter closure.
- It would be difficult to find adequate volumes of container traffic to provide the desired frequency of service. This would particularly be problematic, since the service would likely provoke a competitive response from the Canadian rail carriers that would compete with the service.
- There is some uncertainty in regards to the growth of the Port of Halifax and its relative desirability compared to other ports.

Each of these issues would likely have impacts on intermodal feeder service in the Buffalo-Niagara region similar to those identified for the Port of Cleveland.

The best approach to short sea shipping may be to attempt to find an anchor user. This would be a company that ships a large volume of product over a specific origin/destination, which would lend itself to maritime transportation. One example could be a shipper of transportation products that constantly ships products between the Buffalo-Niagara region and Detroit. Perhaps, this shipper would not ship enough freight to justify a dedicated lake vessel but could provide a "seed" volume of freight to justify the service when combined with other shippers' cargo. If shipments are assembled at or adjacent to the port facility, they could be assembled into lot sizes that exceed the capacity of containers or trailers passing over public roadways. This higher volume per unit could also improve the economics of short sea shipping.

Status of Great Lakes/St. Lawrence Shipping in General

The Great Lakes/St. Lawrence Seaway (GLSLS) provides a vitally important transportation alternative to Buffalo area shippers. For example, lake vessels can carry the equivalent of three to four unit trains of bulk commodities. Not only do marine transportation options lower shipping costs, but the availability of service also provides a bargaining chip for shippers when negotiating with railroads. Lake service is particularly valuable for shippers of bulk commodities where the enormous capacity of lake vessels is an advantage. Lake service is also valuable to shippers of oversized "project" cargoes, which can be extremely complex and expensive to move via roadways, and difficult as well to ship by rail.

In total, the GLSLS system has lost market share over the past several decades.

Figure 4- 3 originally presented in Technical Memorandum #3, shows total U.S. freight as measured by ton-miles increased about one-third between 1980 and 2004 with increases particularly striking in trucking (doubled) and rail (increased by about 80 percent). In contrast, cargoes on the GLSLS declined by about 10 percent. Given the overall trends, individual ports in the GLSLS that have managed to maintain volumes, should be considered successful.

Figure 4- 3: U.S. Freight Demand (millions of ton-miles)

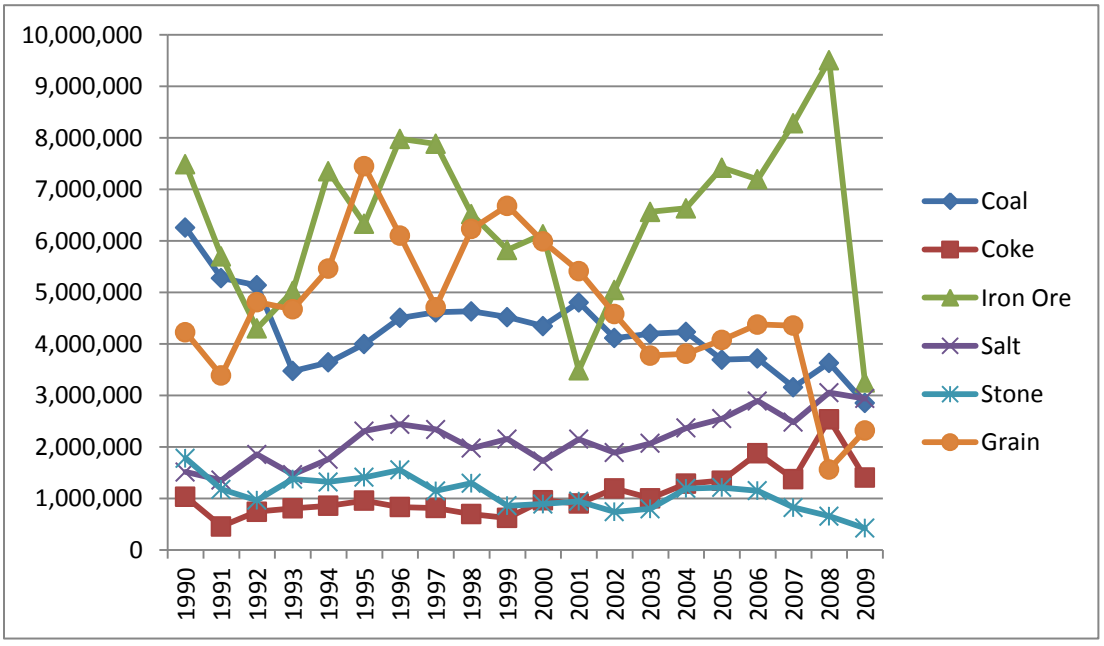
Mode	1980	1990	2000	2004	Percent Change 1980 - 2004
1. All modes	3,404,015	3,621,943	4,328,642	4,541,668	33.4%
2. Air	4,840	10,420	15,810	16,451	239.9%
3. Truck	629,675	848,779	1,192,825	1,281,573	103.5%
4. Railroad	932,000	1,064,408	1,546,319	1,684,461	80.7%
5. Domestic water transportation	921,835	833,544	645,799	621,170	-32.6%
a. Coastwise	631,149	479,134	283,872	279,857	-55.7%
b. Lakewise	61,747	60,930	57,879	55,733	-9.7%
c. Internal	227,343	292,393	302,558	284,096	25.0%
d. Intraport	1,596	1,087	1,490	1,484	-7.0%
6. Pipeline	915,666	864,792	927,889	938,013	2.4%
7. Oil and oil products	588,000	584,100	577,000	599,600	2.0%
8. Natural Gas	327,666	280,692	350,889	338,413	3.3%

Source: U.S. Bureau of Transportation Statistics

Figure 4- 4 displays the tonnage trends for some of the primary commodities that flow through the Welland Canal section of the GLSLS. As shown, coal shipments have declined from about 6.3 million tons in 1990 to about 2.9 million tons in 2009. The commodity group with the largest decline over the same time period has been grain; in 1990 grain movements on the GLSLS peaked at 6.7 million tons, but declined to 2.3 million tons by 2009. Much of the grain volume decline can be attributed to a collapse in grain exports on ocean-going vessels out of the GLSLS. In 1999, about 5.9 million tons of grains were shipped in ocean vessels through the Welland Canal. By 2009, this had decreased to 1.6 million tons.

Shipments of salt steadily increased between 1990 and 2009, consisting primarily of road salt. As metropolitan areas have grown, so has their need for road salt. Except for 2009, shipments of iron ore and coke have generally trended upward.

Figure 4- 4: Tonnage Trends of Marine Traffic in Welland Canal Section



While some Great Lakes cargoes have struggled in recent decades, there are some significant potential opportunities for growth. These will be explored more fully in a marketing plan that will appear in the final report. Some potential growth areas include:

- Wind turbines have been a growth area for Great Lakes shipping. Because wind turbines are often sourced from Europe and because the wind turbine sections would be difficult to transport by other modes such as road, they are often transported directly in small ocean vessels along the GLSLS. Both the governments of Ontario and New York have established aggressive alternative power goals. The government of Ontario's Supply Mix Directive of June 13, 2006 declared that the Ontario Power Authority should increase installed capacity of new renewable energy resources from 2,700 MW 2003 base to 10,402 MW for 2010, and 15,700 for 2025. In 2004, New York established the Renewable Portfolio Standard (RPS) to increase the percentage of electricity delivered to New York consumers that is generated by renewable resources to 35 percent by 2013. Subsequently, Governor Patterson proposed to increase the goal to 45 percent clean energy by 2015. The New York Power Authority (NYPA) has proposed a 120 MW to 500 MW wind project in the New York waters of Lake Erie and/or Lake Ontario.[14]
- Additional ethanol project or biodiesel projects will require corn and soybean inputs that will need to be brought into the region. These cargoes would be well-suited for transportation along the GLSLS.
- Growth in other agricultural activities in the area, such as dairy could spur the need for additional inputs like feed, which could further create demand for GLSLS shipping.
- Pipes and other heavy equipment for oil and gas exploration, as well as utility upgrades/retro-fitting.

4.3 AES Somerset

As mentioned in Technical Memorandum #4, AES Somerset has proposed to invest $25 million to construct a 3,200-foot long pier-conveyor that will allow the facility to obtain waterborne deliveries of coal, petroleum coke and limestone instead of having to rely on rail. The company has expressed willingness to allow other users access to the pier and encourages development at its 1,800 acre site. Given the proposed design of the pier, it will be most appropriate for transferring bulk commodities rather than intermodal or break bulk goods. The company is currently considering the economic environment and the status of energy markets before pursuing the project further.

[14] http://www.nypa.gov/NYPAwindpower/GreatLakesWind.htm

Figure 4- 5: AES Somerset Lake Unloading Project

Source: AES Somerset website

AES estimates that the project will create about 100 jobs over several years of construction and will help to retain the current 150 jobs of the employees currently employed at the power plant. Potentially, the greatest benefit to the company will be an enhanced ability to negotiate with rail carriers and access western coal. Potential public benefits will depend upon the likely usage of the facility and routing of maritime shipments. Traditionally, AES Somerset sourced its coal from mines in northern West Virginia and southwestern Pennsylvania. However, the company has recently been mixing coal from Montana into its burns. According to data from the Federal Energy Regulatory Commission (FERC), the plant received two million tons of coal in 2008, of which about 1,685,000 tons were sourced from mines in West Virginia, 248,000 were sourced from mines in Montana, and the remainder were sourced from mines in Kentucky and southwestern Pennsylvania. For Appalachian coal, the logical diversion point to vessel would be at Ashtabula Harbor in Ashtabula, OH. Coal would continue to travel by rail from the Appalachian coal fields but then be transferred to vessel at Ashtabula, OH. For the Montana coal, the logical vessel loading point would be at the Midwest Energy Resource Center (MERC) in Superior, WI. Coal would travel by rail on the BNSF rail line between Montana and the MERC facility, and then travel to Somerset by vessel over the Great Lakes system.

Maritime transport is the safest mode of freight. Data from a study sponsored by the USDOT Maritime Administration (Marad) and the National Waterways Foundation, suggests that the safety cost of inland maritime transport is only about 3.8 percent of the safety cost associated with rail transport.[15] Fatalities from inland towing only occur at a rate of about 0.028 per billion ton-miles compared to 0.649 for rail and

[15] WSA analysis, Texas Transportation Institute for the U.S. Maritime Administration and the National Waterways Foundation, *A Modal Comparison of Domestic Freight Transportation Effects on the General Public;* November 2007

4.351 for highway. The rate of injuries for inland towing is only 0.045 per billion ton-miles compared to 5.814 for rail and 99.044 for highway. It is assumed that these safety statistics are consistent between inland towing and Lake vessel operations. If the Lake Unloading Project (LUP) were to reduce the distance that coal travels from Montana by rail by 1,000 miles, the resulting savings in avoided risk of rail accidents, injuries, and property damage would be about $3.85 per ton. If lake service were to reduce the rail journey from Appalachian mines to Somerset by 180 miles, the resulting safety savings would be roughly $0.69 per ton.

Figure 4- 6: Estimated Safety Savings from AES Somerset

	Montana Coal	Appalachian Coal
Accident cost per ton-mile for rail 1/	$0.004	$0.004
Est. mileage different rail/vessel v. all rail	1,000	180
Safety cost of rail travel	$4.00	$0.72
Est. % reduction in safety cost switching to maritime	96.2%	96.2%
Estimated savings	$3.85	$0.69

1/WSA analysis using FRA safety statistics, USDOT guidance on fatality and injury costs

Maritime transportation is also more fuel efficient and generates lower emissions than other modes. As example, the same Marad study mentioned above also found that inland towing generates 0.47 grams of NOx per ton-mile compared to 0.65 for rail and 0.73 for truck. Inland towing can haul one ton of cargo 576 miles on a single gallon of fuel compared to 413 for rail and 155 for truck. Lake vessel operations would probably have more favorable comparisons because Lake vessels tend to be more fuel efficient than tug-barge combinations. However, because the commodity being transported is coal destined for a power plan, the net effect of the LUP on emissions is not clear and is beyond the scope of this study.

Analysis of Rail Projects

5.1 Benefit/Cost of Projects to Alleviate Delays at CP Draw

As first described in Technical Memorandum #3, perhaps the most significant bottleneck within the Buffalo-Niagara region is the bridge over the Buffalo River, referred to as the CP Draw. At the CP draw CSX, Norfolk Southern (NS) and other carriers' rail traffic funnels down to this single bridge. The CP Draw has been the subject of concern since the NS, CSX purchase of Conrail assets in the 1990's and before.

5.1.1 Estimated Trail Delays

The key parameter to estimating the need for, and benefits from, adding capacity at the CP Draw is the forecast for the extent of future train delays. As more trains transit through the draw each day, delays can be expected to increase in frequency and severity. The preferred methodology for measuring the relationship between rail traffic frequency, traffic diversity, track layout and features, and average delay is through simulation modeling. The most commonly used tool is Berkeley Simulation Software's Rail Traffic Control (RTC) model. Usage of the model requires detailed information for carrier track charts, train schedules, and train consist characteristics. While detailed RTC modeling is beyond the scope of the current analysis, it is suggested that RTC modeling be conducted in the future to develop a better assessment of benefits that would result from alleviating delays at the CP Draw. The analysis presented here is again a sketch-level series of estimates based upon information provided by carriers operating in the region.

The carriers that operate over the CP Draw are CSX, NS, Canadian National (CN), Genesee & Wyoming Railroad (GWRR), Buffalo Southern Railroad (BSOR), New York & Lake Erie Railroad (NYLE), and Amtrak. According to CSX, about 80 trains currently cross over the CP draw each day, of which 55 to 60 are CSX trains. For the purposes of this analysis:

- It is assumed that 57 CSX trains cross over the CP draw each day
- According to a representative from Genesee & Wyoming, Inc., two of the company's trains cross the CP Draw per day through its Buffalo & Pittsburgh Railroad (BPRR) subsidiary.
- Two Amtrak trains cross per day as part of the Amtrak *Lake Shore Limited* service.
- It is assumed that Canadian National (CN) and the other two independent short line carriers, the Buffalo Southern Railroad (BSOR), and the New York & Lake Erie Railroad (NYLE) account for another four trains.
- The remaining trains (15) crossing the CP Draw each day are operated by Norfolk Southern (NS).

The forecast for the total number of trains passing through the CP Draw is based on the overall forecast of rail tonnage moving for the Buffalo-Niagara region. This forecast was presented in Exhibit 4-14 of Technical Memorandum #3 to this study. The percentage of total trains represented by each carrier is assumed to remain constant. **Figure 5- 1** presents the forecasted traffic in number of trains and traffic breakdown by railroad. CSX has the highest share of traffic, around 70 percent. Annual growth rate for the total number of trains is around two percent over the period 2010 to 2035. According to a representative from CSX, the capacity of the CP Draw is about 120 trains per day. Under the forecast assumption, CP Draw will reach capacity in 2027. By 2035 the shortfall is projected to be 27 trains per day. (Note, the forecast of trains per day represents an average number of trains per day as opposed to the peak number of trains per day). Under the scenario, CP Draw is expected to reach capacity on the average day by 2027; however, the CP

Draw will likely reach capacity on peak days significantly before then. Furthermore, the forecast is sensitive to new developments. For example, the NS Southern Tier line currently carries about 14 to 16 trains per day. However, the Southern Tier Line is limited by the Portage Bridge that can only accommodate cars weight a maximum of 273,000 lbs compared to the industry standard of 286,000 lbs. Presumably, if the bridge were replaced, NS would place more traffic onto the corridor, some of which would pass over the CP Draw.

Figure 5- 1: Traffic Growth for CP Draw

Year	Trains per Day					
	CSX	CN, Amtrak, BSOR, NYLE	GWRR	NS	Total	Overcapacity
2010	57	6	2	15	80	-40
2015	64	7	2	17	90	-30
2020	72	8	3	19	101	-19
2025	81	9	3	21	114	-6
2030	92	10	3	24	129	9
2035	105	11	4	28	147	27

Source: Prepared by Wilbur Smith Associates

According to CSX, about 10 percent of trains currently passing through the CP Draw are delayed, with the average delay being about 20 minutes. As traffic grows, congestion at the CP Draw is expected to increase and more trains will experience delays. While in reality the average delay will likely be longer as the bridge reaches capacity, it is assumed that the average delays will be 20 minutes over the 2010 to 2035 period. This represents a minimum average duration of delay. The analysis also assumes that the percentage of trains that are delayed is proportionate to the percent of capacity that is used as the number of trains increase from 80 trains per day to 120. At 120 trains per day, 100 percent of all train crossings are delayed. One hundred trains per day would represent the midpoint where 55 percent of trains are delayed. **Figure 5- 2** presents annual delays in hours due to congestion at CP Draw. This indicates that if no improvements are made to relieve the congestion, delays will total 18,000 hours in 2035, 17 times the delays expected in 2010.

Figure 5- 2: Annual Delays in Hours on the CP Draw

Year	Trains per Day	Percent of Trains Delayed	Minutes per Delay	Total Delays per day (hours)	Delays per Year (hour)
2010	80	10%	20	2.7	973.3
2015	90	32%	20	9.6	3,508.7
2020	101	57%	20	19.1	6,977.2
2025	114	86%	20	32.5	11,865.6
2030	129	100%	20	43.0	15,707.7
2035	147	100%	20	48.9	17,851.3

5.2 Improvements

Eight potential rail improvements were presented and discussed in Technical Memorandum #4; four of these improvements would impact the CP Draw. The proposed improvements include:

1a Build a new bridge parallel to the CP Draw at the location of an inactive bridge in order to reduce congestion and resulting delays at the CP Draw

1b Establish a new connection between the Buffalo Line and NS Line that will allow Norfolk Southern Railway (NS) and Genesee & Wyoming Railroad (GWRR) trains to bypass the CP Draw, thus reducing NS and GWRR delays at the CP Draw

2a Create a "wye," so that the Canadian National Railways (CN) can use the CSX Niagara Branch to access Buffalo, thus avoiding delays at the Frontier Yard and the CP Draw

2b Create a new connection that will allow CN trains to access the CSX Compromise Branch from the Niagara Branch, thus providing CN with additional access to businesses in the area

Scenario 1a is expected to impact the largest number of trains and therefore have the greatest impact on reducing delays. All trains would be impacted by the improvement. Assuming the new bridge has the same capacity as the CP Draw, (a maximum of 120 trains per day) congestion will be moderate even in 2035 when each bridge receives 70 trains per day. **Figure 5- 3** displays time savings accruing to the 1a scenario. Assuming the new bridge is open to use in 2012, 0.18 million hours will be saved over the 20-year analysis period (2012 to 2031).

Figure 5- 3: Time Savings for 1a Scenario

Year	Time Savings (hours)
2012	1,890
2013	2,395
2014	2,934
.	.
.	.
2029	15,425
2030	15,824
2031	16,234
Total=	**177,225**

Source: Prepared by Wilbur Smith Associates

For scenario 1b, NS and GWRR trains bypass the CP Draw, which will reduce the traffic by 21 percent. **Figure 5-** 4 below presents the estimated time savings associated with the 1b scenario. This scenario not only benefits the trains that are bypassing the CP Draw, but it also benefits the trains that continue to use the CP Draw as congestion is reduced. Assuming scenario 1b is also open to use in 2012, the estimated time savings over the 20-year analysis period is around 121,000 hours.

Figure 5- 4: Time Savings for 1b Scenario

Year	Time Savings (hours)
2012	1,087
2013	1,573
2014	2,093
.	.
.	.
2029	8,788
2030	8,291
2031	7,742
Total=	**121,312**

Source: Prepared by Wilbur Smith Associates

For scenarios 2a and 2b, only the CN trains will be reduced at CP Draw, which account for 2.5 percent of the total traffic at the bridge. **Figure 5- 5** presents the time savings associated with the 2a and 2b scenarios.

Figure 5- 5: Time Savings for 2a and 2b Scenarios

Year	Time Savings (hours)
2012	516
2013	551
2014	587
.	.
.	.
2029	386
2030	396
2031	406
Total=	**15,285**

Source: Prepared by Wilbur Smith Associates

5.3 Economic Impacts

To measure the benefits resulting from reducing train delays, the study team quantified the cost of delayed, idle trains. There are four costs associated with delayed trains:

- Train operating cost: the costs of train crews, fuel, equipment ownership, and locomotive maintenance. Many of these costs are time-related.
- Shipper freight car costs: many of the railcars used in freight rail service are owned or leased by rail customers. Delayed trains reduce the utilization of these railcars, forcing shippers to own or lease more railcars than required with a more efficient operation.
- Shipper inventory cost: inventory in transit has a cost, as it is very often financed or represents postponed profits. Train delays extend the time in transit.
- Locomotive emissions costs: idling locomotives still emit pollutants with the concurrent environmental cost.

5.4 Train Operating Costs

The operating costs for NS, CSX or CN idling trains was developed using several information sources.[16] The estimated costs include only the direct costs of rail operations and do not include overhead or spillover costs that a bottleneck may have on other parts of the rail system. Wage data was derived from statistics filed by the carriers with the U.S. Surface Transportation Board (STB). Other statistics, such as the distribution of freight car type, fuel costs and salary fringe rates, are taken from each railroad's 2007 Class 1 Annual Report (R-1) filed by the STB.

Figure 5- 6 summarizes the data used in the calculations. **Figure 5- 7** summarizes the train operating costs per hour that are incurred by delayed trains.

[16] NS, CSX and CN are each Class I rail carriers and are therefore required to submit detailed statistics to the U.S. Surface Transportation Board (STB). Similar information is not available for the Genesee & Wyoming Railroad, since it is not a Class I rail carrier.

Figure 5- 6: Data Sources for Train Operating Costs per Idling Hour

Statistic	Source
Train & Engine Crew Wages per Hour	Assume two person crew, Cost per hour from Wage Forms A & B
Train & Engine Crew Fringes per Hour	Fringe rate from R-1 Annual Reports
Locomotive Fuel per Hour	Cost per gallon and average locomotives per train from R-1 Annual Reports, per EPA statistics, fuel consumption assumed to be 4 gallons per hour
Locomotive Ownership per Hour	Based on lease rates of two most common locomotive types for each carrier, lease rates from June 2008 article in *Railway Age*
Locomotive Maintenance per Hour	Assumed $1 per locomotive hour
Railcar Ownership per Hour (Railroad-Owned Cars)	Distribution of railcar type and average railroad-owned cars per train from R-1 Annual Reports. Railcar lease rates from June 2008 article in *Railway Age*. Intermodal (TTX) cars are categorized as railroad-owned.

Source: Prepared by Wilbur Smith Associates

Figure 5- 7: Operating Costs per Hour of Idling Trains (2007$)

Cost Element	CSXT	NS	CN
Train & Engine Wages with Fringes	$65.26	$69.13	$91.82
Fuel	$19.18	$19.03	$19.00
Locomotive Ownership per Hour	$42.26	$34.05	$37.67
Locomotive Maintenance per Hour	$2.25	$2.27	$2.17
Railroad owned/leased cars per hour	$20.73	$24.54	$24.82
Cost of Idling per Hour	$149.68	$149.02	$175.48

Source: Prepared by Wilbur Smith Associates

5.5 Shipper Freight Car Costs

The typical Class I railroad operating in the region owns or leases about half of the railcars on the train with the other half being owned or leased by rail customers. This practice, which differs by type of car, reflects several factors:

- For some equipment such as tank cars, railroads have encouraged shippers to acquire cars because the cars are frequently used for storage as well as transportation.
- Rail customers may elect to acquire their own rail cars to avoid not having access to cars during periods of high demand.
- Intermodal well cars are an example of a third equipment supply alternative. The cars are leased to railroads by a third party company (TTX), owned by the railroads.

Based upon the average number of privately owned/leased cars per train, the distribution of car types, and typical lease rates per car type, the average hourly cost to shippers of train delays associated with railcar ownership/leasing is presented in

Figure 5- 8. These estimated costs are likely conservative.

Figure 5- 8: Average Private Car Cost per Train Hour (2007$)

	CSX Trains	NS Trains	CN Trains
Average Private Cars per Train (2007 R-1 Annual Report)[17]			
Box	1	0	1
Plain Gondola	3	1	2
Equipped Gondola	0	0	0
Covered Hopper	7	7	17
Open Hopper	7	5	3
Reefer	0	0	0
COFC/TOFC Flat			
Multi Level Flat	5	4	4
General Flat	1	1	1
Tank	7	7	16
Other	0	0	1
Total	**32**	**26**	**46**
Lease Rates per Hour (*Railway Age* Article)[18]			
Box	$0.68	$0.68	$0.68
Plain Gondola	$0.62	$0.62	$0.62
Equipped Gondola	$0.62	$0.62	$0.62
Covered Hopper	$0.48	$0.48	$0.48
Open Hopper	$0.62	$0.62	$0.62
Reefer	$1.10	$1.10	$1.10
COFC/TOFC Flat	$1.51	$1.51	$1.51
Multi Level Flat	$1.10	$1.10	$1.10
General Flat	$0.68	$0.68	$0.68
Tank	$1.10	$1.10	$1.10
Other	$0.68	$0.68	$0.68
Private Car Costs			
Box	$0.50	$0.32	$0.36
Plain Gondola	$2.08	$0.84	$1.47
Equipped Gondola	$0.26	$0.22	$0.22
Covered Hopper	$3.28	$3.33	$7.95
Open Hopper	$4.26	$3.16	$1.93
Reefer	$0.45	$0.06	$0.02
COFC/TOFC Flat	$0.00	$0.00	$0.00
Multi Level Flat	$5.00	$4.53	$4.81
General Flat	$0.88	$0.54	$0.82
Tank	$7.47	$7.14	$17.41
Other	$0.15	$0.02	$0.81

[17] From Schedule 755, divided loaded and empty private car-miles by train-miles
[18] *Railway Age,* "Railcar Market: What's Equipment Worth Today?" June 2008

Total	**$24.34**	**$20.16**	**$35.81**

Fleet size decisions are driven by both the expected transit time and service reliability. If train delays extend transit times, and increase the variability in the average transit time, shippers mitigate these uncertainties by expanding their equipment fleet to protect against cars not being available at locations where they are to be loaded next. (Data specific to reliability metrics was not readily available, so these costs were not included in the analysis).

5.6 Shipper Inventory Carrying Cost

Shippers must pay to finance inventory while goods are in-transit on rail. Train delays increase this cost by adding to the amount of time that inventory must remain in-transit and therefore be financed. The U.S. Federal Highway Administration (FHWA) Intermodal Transportation and Inventory Cost Model State Tools (ITIC-ST) estimates the cost of in-transit inventory to be 13.33 percent, per year of the value of the inventory. Data from the FHWA Freight Analysis Framework–2, 2007 Update, suggest that the average value per ton of freight shipped by rail into or out of the Buffalo-Niagara region is about $258/ton. Applying these statistics to the average net tons per train and dividing by 8,760 hours per year, yields the estimated inventory carrying cost per train hour as shown in **Figure 5- 9**.

Figure 5- 9: Calculation of Shipper Inventory Cost per Train Hour

Line	Item	Source	CSX Trains	NS Trains	CN Trains
1	Average Tons per Train	Ton-Miles ÷ Train-Miles	2,642	2,394	3,416
2	Inventory Value per Ton	FAF – 2 Buffalo Rail	$258	$258	$258
3	Inventory Value per Train	Ln 1 x Ln 2	$681,608	$617,630	$881,359
4	Inventory Cost Factor	ITIC - ST	13.33%	13.33%	13.33%
5	Inventory Cost per Year	Ln 3 x Ln 4	$90,881	$82,351	$117,515
6	Hours per Year	24 hrs/day x 365 days/yr	8,760	8,760	8,760
7	Inventory Cost per Train Hour	Ln 5 ÷ Ln 6	$10.37	$9.40	$13.41

5.7 Emissions Cost Savings

A railroad infrastructure project that reduces unnecessary locomotive idling is also a benefit to the environment. Fuel consumed by idling locomotives is influence by temperature, throttle settings, type of engine and other factors. Based upon the range of fuel consumption, statistics for idling locomotives produced by the U.S. Environmental Protection Agency (EPA), four gallons of fuel consumed per hour for an idling locomotive appears to be a reasonable estimate. **Figure 5- 10** shows the EPA's emissions factors for locomotives in grams of pollutants per gallon of fuel consumed for line haul locomotives.[19]

Figure 5- 10: EPA Estimated Controlled Emissions Rates for Locomotives

Locomotive Tier	CO	NOx	PM
Tier 0 – Locomotives manufactured 1973 - 2001	26.6	178	6.7

[19] U.S. Environmental Protection Agency, *Technical Highlights: Emission Factors for Locomotives*, December 1997.

Locomotive Tier	CO	NOx	PM
Tier 1 – Locomotives manufactured 2002 - 2004	26.6	139	6.7
Tier 2 – Locomotive manufactured since 2004	26.6	103	3.6

Source: EPA

Based on a distribution of locomotive age as provided in the Association of American Railroads *Railroad Facts*, the following is an estimate of locomotive emissions rates in grams per gallon:

- Carbon Monoxide: 26.6
- Nitrogen Oxides: 115.5
- Particulate Matter: 4.3

Regarding the costs associated with air emissions, the *CAFE standard (Corporate Average Fuel Economy, 2009)* presents damage costs for evaluating the emission costs in the U.S. (**Figure 5- 11**). This analysis will use the emission costs in **Figure 5- 10** to estimate the emission cost savings associated with reducing train delays at CP Draw.

Figure 5- 11: Damage Costs for Transportation Emissions (2007$ per ton)

CO	NOX	PM10	SOX	VOC	CO2
-	$4,000	$168,000	$16,000	$1,700	$33

Note: Annual increase in CO2 damage cost is 2.4 percent.
Source: USDOT, Corporate Average Fuel Economy for MY 2011 Passenger Cars and Light Trucks, March 2009, page V-III 60

Figure 5- 12 develops the costs per train hour of pollution. Because NS, CSX and CN operating parameters are similar, a single measure is presented for all carriers' trains.

Figure 5- 12: Calculation of Emissions Cost per Train Hour

Line	Item	Source	Amount
1	Locomotives per Train	Locomotive Unit Miles ÷ Train Miles	2.25
2	Gallons per Idling Loco Hour	EPA Publications	4
3	Gallons per Train Hour	Ln 1 x Ln 2	9.0
4	Emissions Factors		
4a	CO grams per gallon	EPA Emissions Factors for Locomotives	26.6
4b	NOx grams per gallon	EPA Emissions Factors for Locomotives	115.5
4c	PM grams per gallon	EPA Emissions Factors for Locomotives	4.3
5	Emissions per Train Hour		
5a	CO Tons per Train Hour	Ln 3 x Ln 4a x tons per gram	0.00026
5b	N0x Tons per Train Hour	Ln 3 x Ln 4b x tons per gram	0.00115
5c	PM Tons per Train Hour	Ln 3 x Ln 4c x tons per gram	0.00004
6	Damage per Ton (in 2007$)		
6a	CO Damage per Ton	*CAFE standard*	$0
6b	NOx Damage per Ton	*CAFE standard*	$4,000
6c	PM Damage per Ton	*CAFE standard*	$16,800
7	Damage per Train Hour (in 2007$)		
7a	CO Damage per Train Hour	Ln 5a x Ln 6a	$0
7b	NOx Damage per Train Hour	Ln 5b x Ln 6b	$4.6
7c	PM Damage per Train Hour	Ln 6c x Ln 6c	$0.627

Line	Item	Source	Amount
8	Total Damage per Train Hour	Sum Ln 7a: Ln 7c	$5.227

5.8 Summary of Benefits & Sensitivity Analysis

Figure 5- 13 summarizes the economic impacts associated with reducing train delays at CP Draw. The table suggests that for every hour saved, around $200 worth of benefits accrue to rail operators, shippers and the society. Train operators are expected to receive the highest benefits compared to other affected parties. In order to quantify the economic benefits over time, this analysis assumes the dollar values for these cost savings over the 2012 to 2031 period will remain the same as they are in 2007.

Figure 5- 13: Summary of Economic Impacts of Reducing Train Delays

Category	Time Savings (2007 $ per train-hour)			Average Savings	
	CSX	NS	CN	2007$ per train-hour	Share
Train Operation Cost Savings	$149.68	$149.02	$175.48	$158.06	79%
Shipping Freight Car Cost Savings	$24.34	$20.16	$35.81	$26.77	13%
Shipping Inventory Carrying Cost Savings	$10.37	$9.40	$13.41	$11.06	5%
Emission Cost Savings	$5.23	$5.23	$5.23	$5.23	3%
Total=	$189.62	$183.81	$229.93	$201.12	100%

Source: Prepared by Wilbur Smith Associates

The four improvement scenarios previously outlined have different impacts on the traffic delays, with different impacts on the cost-benefit results. To reach a decision-making point, it is valuable to estimate the net present value (NPV) of the benefits for each scenario over the 20-year analysis period, and use the results to compare with the NPV of total costs for a scenario to determine if a project is economically feasible.

According to USDOT funding criteria, it is recommended that transportation projects use a seven percent discount rate, which approximates the marginal pretax rate of return on an average investment in the private sector.[20] However, the funding criterion states that a three percent discount rate is also an alternative, when funds dedicated to the project would be other public expenditures, rather than private investment.

Figure 5- 14 presents the estimated NPV of benefits for scenario 1a. Compared with the base scenario, scenario 1a will affect all the trains traveling through CP Draw, and save 177,000 train-hours. The resulting present value of accumulated benefits over a 20-year period (2012 to 2031), totals $22 million (in 2007$) under a three percent discount rate, or $13 million (in 2007$) under a seven percent discount rate. The results suggest that using the higher discount rate results in lowering benefits by 40 percent, with a variance of $8.9 million in total.

[20] Office of Management and Budget, Circular No. A-94 Revised, available online at http://www.whitehouse.gov/omb/rewrite/circulars/a094/a094.html#8

Figure 5- 14: Present Value of Benefits Associated with Scenario 1a (2007$)

Item	NPV of Benefits (Savings)				
	Train Operation	Shipper Freight Car Allowance	Shipper Inventory Carrying Cost	Emission Cost	Total
3% discount rate (I)	$17,681,210	$2,785,996	$1,203,167	$614,584	$22,284,957
7% discount rate (II)	$10,635,218	$1,675,772	$723,703	$369,671	$13,404,364
Difference (I-II)	$7,045,992	$1,110,224	$479,464	$244,913	$8,880,594

Source: Prepared by Wilbur Smith Associates

Based on this sketch-level analysis the benefits of adding an additional span to the CP Draw do not yield a positive cost/benefit ratio: The estimated cost of the additional span is $40 million, versus savings estimates of $22.2 million or $13.4 million depending on the discount rate. However, the analysis is sensitive to assumed train delays and the estimated point in time the span will reach capacity. These estimates can be refined using simulation modeling to define future train delays and improve the delay-volume relationship.

Figure 5- 15 presents the estimated NPV of benefits for scenario 1b. Compared with the base scenario, Scenario 1b will divert NS and GWRR trains, which help to reduce the delays at CP Draw, resulting in $15.6 million (in 2007$) benefits under a three percent discount rate, or $9.6 million (in 2007$) benefits under a seven percent discount rate. Given that this project is estimated to cost $2 million, it is clearly justified from a benefit/cost ratio. It may be somewhat unrealistic to expect that under this set of improvements, all NS trains and all GWRR trains will bypass the CP Draw. However, it does show the alternatives which help to divert traffic away from and bypass the CP Draw can be compelling from a benefit-cost standpoint.

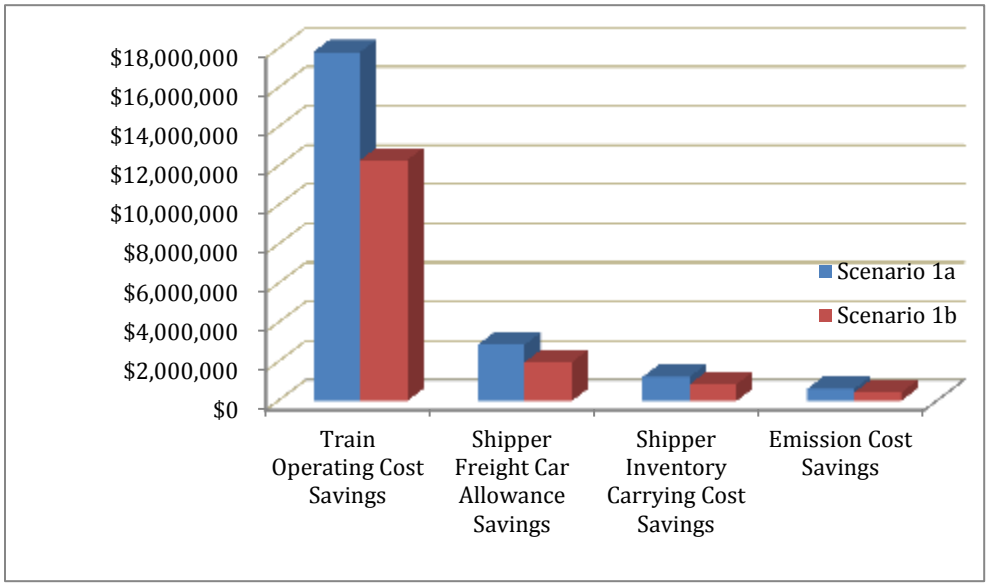
Figure 5- 15: Present Value of Benefits Associated with Scenario 1b

Item	NPV of Benefits (Savings)				
	Train Operation	Shipper Freight Car Allowance	Shipper Inventory Carrying Cost	Emission Cost	Total
3% discount rate (I)	$12,314,087	$1,986,905	$846,914	$424,294	$15,572,200
7% discount rate (II)	$7,574,794	$1,222,210	$520,964	$260,997	$9,578,965
Difference (I-II)	$4,739,293	$764,695	$325,950	$163,297	$5,993,235

Source: Prepared by Wilbur Smith Associates

Figure 5- 16 shows a comparison of the discounted benefits for the four scenarios, under a three percent discount rate. Scenario 1a is anticipated to generate the largest benefits with most of the gains in train operation. Benefits associated with scenario 1b are around 25 percent of that for scenario 1a. Scenario 2a and 2b have minor impacts on reducing the train delays, resulting in much fewer benefits compared with scenario 1a and 1b.

Figure 5- 16: Comparison of Discounted Benefits for 1a, 1b Scenarios (3% Discount Rate)



Source: Prepared by Wilbur Smith Associates

The analysis presented above is based on the conservative assumption that average train delays remain at 20 minutes over the analysis period. However, with the number of trains growing by 2.3 to 2.5 percent per year at the bridge, not only more trains will be affected, but the average delay is also likely to increase. Delays from 30 minutes (low estimate) to one hour (high estimate) are reasonable assumptions based on experience.

Figure 5- 17 and **Figure 5- 18** show a comparison of benefits under 20, 30 and 60 minute delay assumptions for the CP Draw Bridge Replacement. The annual benefits for 30 minute delays is expected to exceed $4 million in 2030, and the annual benefits for 60 minute delays will reach $9 million in 2030.

Figure 5- 17: Comparison of Benefits for 20, 30 and 60 Minute Delays

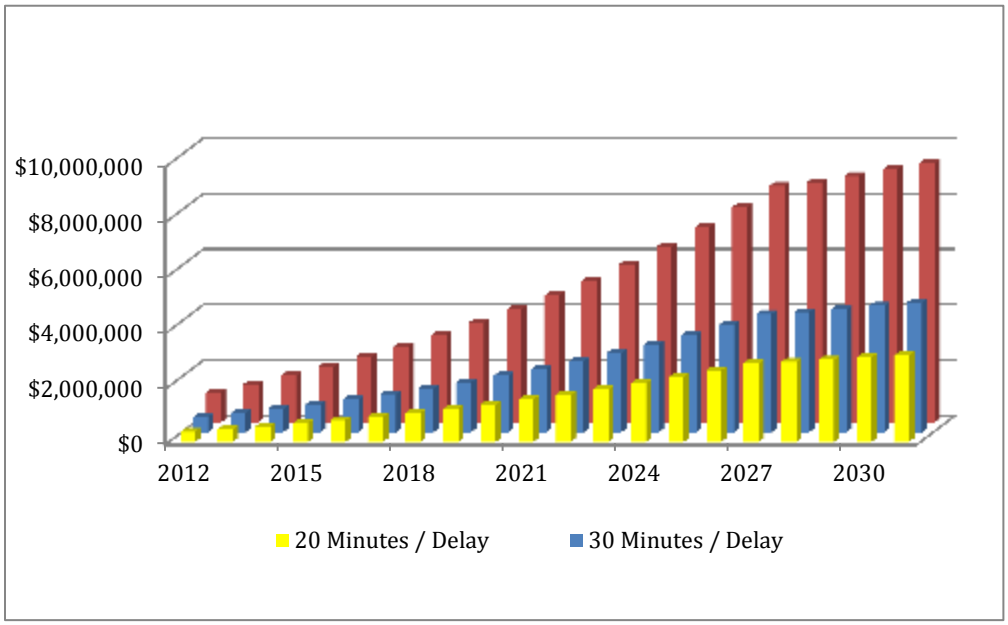


Figure 5- 18: Tabular Comparison of Benefits for 20, 30 and 60 Minute Delays

Assumptions	NPV of Benefits with 3 Percent Discount Rate	NPV of Benefits with 7 Percent Discount Rate
20-Minutes Delay	22 million	13 million
30-Minutes Delay	33 million	20 million
60-Minutes Delay	67 million	40 million

Under the 60 minute delay scenario, the benefits of the CP Draw replacement exceed the costs.

Benefits from Improvement 2a, 2b – CN Northern and CN Southern Connections

The CN Northern Connection and CN Southern Connection would allow CN trains to avoid delays associated with the CP Draw. **Figure 5- 19** displays the estimated benefits of improvements 2a and 2b in terms of the resulting reduction of delays at the CP Draw. This table would suggest that in terms of benefits associated with relieving delays at the CP Draw, the alternatives 2a and 2b do not cover the associated costs, $3 million and $5 million, respectively. However, **Error! Reference source not found.** only displays one of several benefits that would accrue from a CN Northern or Southern connection. A secondary benefit from this improvement would be the CN's ability to provide alternative rail services to Buffalo shippers. Given the

current availability of information and the difficulty of quantifying competitive benefits, the benefits from this service could not reliably be estimated. Therefore, it is currently impossible to determine whether alternatives 2a and 2b would yield a benefit/cost ratio greater or less than one.

Another complicating issue with alternative 2a is clearance on the Niagara Branch. A tunnel on the line near Exchange Street Station has a clearance of only 16' 10". This level would not only limit the passage of double stack intermodal cars and multilevel flat auto cars, but it would also limit the usage of other types of equipment, such as high cube boxcars. Estimates are not currently available regarding the cost of improving clearance on the line. However, the cost would likely depend upon whether the overhead portion of the tunnel would simply be removed or whether the tunnel would be expanded. The former would be the less expensive option, but would involve closing the street that passes overhead. One option could be to assist CSX with improving the clearance on the Niagara Branch in return for CSX granting trackage rights to CN. As with other rail projects presented within this study, the project would be contingent upon agreement by the rail carriers.

Figure 5- 19: Benefits of Alternatives 2a and 2b Associated with CP Draw

Item	NPV of Benefits (Savings)				
	Train Operation	Shipper Freight Car Allowance	Shipper Inventory Carrying Cost	Emission Cost	Total
3% discount rate (I)	$1,661,943	$268,158	$114,302	$57,264	$2,101,667
7% discount rate (II)	$1,117,917	$180,378	$76,886	$38,519	$1,413,700
Difference (I-II)	$544,026	$87,780	$37,416	$18,745	$687,966

Benefits from Improvement 3a – Rehabilitate Portage Bridge

Technical Memorandum #4, describes an alternative to rehabilitating the Portage Bridge that involves rerouting trains on the Meadville Line through Hornell and Olean, NY. The Meadville Line route is more circuitous and time-consuming and does not support as many industries as the Southern Tier between Binghamton and Buffalo. The route would also require upgrades in order to carry Southern Tier Line trains. For the purpose of this study, the benefits derived from rehabilitating the Portage Bridge equal the costs that would otherwise be borne by rerouting trains along the more circuitous Meadville Line route. Admittedly, there are additional benefits, such as continued service to Southern Tier Line industries, as well as money that would not be needed to upgrade the Meadville Line. However, the direct benefits of avoiding the more circuitous route are the most immediate and obvious benefits to quantify.

Figure 5- 20 estimates the avoided costs of rerouting from the more circuitous Meadville Line, a savings of 40 route miles. Operating costs are estimated based upon NS system average operating expense per train mile, excluding terminal operating expenses and administrative operating expenses. The source data for calculating locomotive emissions benefits, shipper railcar lease benefits, and inventory carrying cost benefits is the same or similar to that used to estimate benefits for improvements 1a through 2a. According to the Portageville Bridge Project Scoping Document about 14 to 16 trains pass over the bridge per day, or about 4,380 to 5,110 trains per year.[21]

[21] New York State Department of Transportation, Norfolk Southern Corporation, *Portageville Bridge Project Scoping Document*, August 2008

Figure 5- 20: Direct Costs of Rerouting Trains over Circuitous Route

Items	Low Traffic	High Traffic
Costs per Train		
Railroad Operating Cost	$2,400	$2,400
Shipper Railcar Leasing Cost	$35	$35
Shipper Inventory Carrying Cost	$16	$16
Locomotive Emissions Costs	$131	$131
Trains per Year	4,380	5,110
Costs per Year		
Railroad Operating Cost	$10,512,000	$12,264,000
Shipper Railcar Leasing Cost	$153,300	$178,850
Shipper Inventory Carrying Cost	$70,080	$81,760
Locomotive Emissions Costs	$573,780	$669,410
Total Rerouting Costs	$11,309,160	$13,194,020

When viewed as a stream of discounted benefits over a 20-year period with a terminal value at year 21, the benefits of replacing this bridge are substantial (**Figure 5- 21**). Given that the cost of the project is estimated to be $25 million, this project clearly has a favorable benefit cost ratio.

Figure 5- 21: Benefits of Portage Bridge Replacement

Benefit	Amount
Operating expense savings to rail carriers	$135,316,676
Private shipper inventory and railcar lease savings	$6,389,570
Emissions savings to general public	$42,027,309
Total	$183,733,554

5.9 Lehigh Valley Yard and Whirlpool Bridge

The rail project that was listed as Alternative #4 in Technical Memorandum #4 was the development of the Lehigh Valley Yard in Niagara Falls as an intermodal terminal. The site has good rail and highway access near a border crossing. Concomitant with this project would be improvements to nearby Whirlpool Bridge to improve the bridge's capacity to carry cross-border rail freight. Alternative #4 is not considered to be a high priority for the region for the reasons described below.

Although the Whirlpool Bridge provides valuable redundancy to the area's cross-border rail infrastructure, the study team does not believe that the current reliance on the International Bridge crossing for U.S./Canadian freight poses an undue risk. CN is maintaining the International Bridge at a good state of repair. The carrier is undoubtedly aware that this is a critical piece of infrastructure.

There are several containerized intermodal options for the Lehigh Valley Yard:

Another CSX Intermodal Ramp

This option would not be desirable. Intermodal terminals are sensitive to economies of scale. Generally, larger intermodal ramps are better able to defray fixed capital and operating costs than small intermodal ramps. CSX already operates an intermodal ramp at the Seneca Yard. It would be inefficient to divide traffic between the Seneca Yard and Lehigh Valley Yard, rather than consolidate traffic onto one yard. The Lehigh Valley Yard is also more distant from the CSX mainline, which would further create inefficiencies.

CN Intermodal Shuttle Service to Brampton, ON

This service would be dependent upon agreement between CSX and CN. The service would face several additional obstacles. Carriers generally prefer to limit the number of intermodal terminals within a geographic area. Given that the Brampton, ON terminal is only about 78 miles away, it may be difficult for CN to justify another terminal within the Greater Toronto Area/Buffalo-Niagara region. Based upon discussions with CN, the carrier has indicated that it would require about 250 containers per day for a shuttle service between Canada and the U.S. to be a desirable addition to its intermodal network. This level of traffic would be difficult to capture, particularly since it exceeds the current traffic at the existing intermodal facilities within the Buffalo-Niagara region. Most international traffic is overhead to the Buffalo-Niagara region.

The Lehigh Valley Yard could provide important services as a transload area for carload freight, but establishing a successful intermodal container service at this location could face headwinds.

5.10 Prioritization & Analysis of Projects in the NY State Rail Plan

The rail projects presented in Technical Memorandum #4 were a subset of rail projects put forth for Erie and Niagara Counties in the 2009 New York State Rail Plan. These projects were also included later in a TIGER Discretionary Grant Application by the GBNRTC dated September 15, 2009, entitled "Western New York Short Line Freight Rail Initiative." **Appendix A** lists those projects in the GBNRTC TIGER Grant application, not discussed elsewhere in freight study documents. These projects were ranked by high, medium, and low priority.

The qualitative priority assessment considers the gap between a project, and a non-project scenario (i.e., what is the difference in likely outcome if the project is built compared to if it is not built). This relationship tends to be the most dramatic in cases where continued rail operations depend upon the project. If the infrastructure were not upgraded, it would soon be rendered of limited or no use at all. The Falls Road Bridge over the Erie Canal is such a case. The criteria used to assess projects were as follows:

- Upgrades of rail lines that are in poor condition were considered to be of higher priority than upgrades of rail lines in good condition.
- Projects that enable lines to handle 286,000 lb. rail cars were given high priority. Without these improvements, these lines will become increasingly obsolete, as they will not be able to accommodate industry standard equipment. Furthermore, the 286,000 lb. standard is consistent with NYSDOT goals as outlined in the State Rail Plan.
- Projects are also considered to be high priority if they appear to have a high economic development potential or activity. In these cases, the study team was able to identify specific growing rail markets that would depend upon the projects.
- Projects were given higher priority if alternate funding mechanisms are not available.
- General maintenance projects were considered to be of lower priority, since operating maintenance should be covered through carriers' operating revenues.
- Projects were given lower priority if there is some question over the project's necessity or whether the project is the most cost-effective solution to achieve a given benefit.
- A number of projects for bridge structures over roads were proposed. Further information will be required to assess the priority of these projects, since it is uncertain who has responsibility for the

structure. This could either fall to the railroad or to the roadway's owner (federal, state, or local). Responsibility for the structure depends upon who built over whom.

Several high potential projects are discussed in more detail below:

Falls Road Bridge over Erie Canal

The Falls Road Bridge over the Erie Canal was described as Alternative #3b. in Technical Memorandum #4. Genesee Valley Transportation currently operates the Falls Road Railroad (FRR) in Lockport which utilizes this bridge. The bridge is used by the FRR to service an ethanol plant; the plant produces 50 million gallons annually. The ethanol plant receives carloads of grain and ships out tank cars of ethanol and hopper cars loaded with dry distiller grain (DDG). The bridge was lightly utilized until the construction of the ethanol plant. A 50 million gallon ethanol plant has the potential of shipping over 1,700 tank cars of ethanol per year plus 1,500 hopper car loads of DDGs. Because of the impact on a large potential volume of traffic, this project could yield sizeable benefits. The project should be able to justify the $1 million estimate to rehabilitate the bridge. Genesee Valley Transportation has applied for funding with the NYSDOT for this project. Due to the direct impact on a customer, this project would be given high priority.

Burrows Lot Yard

The Burrows Lot Yard is an underutilized yard in a distressed area of Buffalo. The track structure needs to be upgraded to current safety standards in order to service the proposed Buffalo Lakeport (grain operation) and RiverWright (ethanol plant) operations. While the RiverWright project is currently on hold, in June 2008 Whitebox commodities purchased the grain elevator on the 23-acre site. Whitebox, an investment group which specializes in grain futures trading, recently moved into "hands on" grain handling and storage through the acquisition of grain silos in the Midwest and in Buffalo. Rehabilitation of the elevator included installation of new electrical and conveyor systems, plus general clean-up of the neglected complex. Whitebox has continued to modernize the silos, including installation of a mechanized hopper which allows it to receive grain shipments from "self-unloading" freighters. The restoration of the grain silo to service could provide a compelling case for the restoration upgrade of track at the Buffalo Burrows Lot Yard.

Highway Projects that Impact the Buffalo-Niagara Region

As noted in Technical Memorandum #4, the Buffalo-Niagara region has lower congestion than other United States urban areas of similar size. However, the area is not without congestion problems. Furthermore, this study notes a sizeable forecasted increase in truck traffic for the area. The routing of traffic to/from the Buffalo-Niagara region can also be somewhat inefficient. The area lacks direct connections with markets to the south. Generally, one must travel east or west along the New York State Thruway in order to travel south on a limited access highway. Stakeholders have also mentioned cross border issues. Although many of these cross border problems have been improved since the beginning of this study through better usage of technology, maintaining fluidity at the region's border crossing remains a priority. Perhaps, the most important initiative to impact cross-border trucking is the Peace Bridge Expansion Project.

6.1 Peace Bridge Expansion Project

The Buffalo and Fort Erie Public Bridge Authority (BFEPBA) and the Federal Highway Administration (FHWA), in cooperation with the New York State Department of Transportation (NYSDOT), have prepared a draft Final Environmental Impact Statement (FEIS) to study the effects of a proposed Federal Inspection Station plaza and bridge expansion at the Peace Bridge. The project is intended to improve security and operations at the bridge and accommodate future increases in traffic volumes of people and goods crossing the border. The FEIS looked at three alternatives: 1) a No Build scenario; 2) Alternative 1: Maximization of the Existing U.S. Plaza, so that the plaza is expanded eastward and northward to accommodate additional auto and truck booths, enlarged vehicle secondary inspection areas, additional employee parking areas, a relocated Duty Free Shop and required circulation roadways; and, 3) Alternative 3: a relocation and consolidation of U.S. inspection facilities and operations to an expanded Canadian plaza.

Analysis included within the draft FEIS found that Alternative 1 would yield a benefit/cost ratio of 8.4 while Alternative 3 would yield a benefit/cost ratio of 8.9.

Figure 6- 1: Benefits and Costs of Peace Bridge Expansion Project[22]

Cumulative Present Value (2006-2040) ($ millions)	Alternative 1	Alternative 3
Costs		
Capital Costs	$264.5	$244.9
Annual Lifecycle Costs	$10.43	$10.43
Total Costs	$274.9	$255.3
Benefits		
Travel Time Savings	$2.124.1	$2.123.9
Vehicle Operating and Ownership Cost Savings (VOC)		
VOC: Fuel	$7.2	$2.4
VOC: Inventory Carrying Cost Savings	$178.7	$151.4
Total Benefits	$2,310	$2,277.6
Benefit Cost Ratio	8.4	8.9

[22] Ecology and Environment, Inc. for the Buffalo and Fort Erie Public Bridge Authority, Peace *Bridge Expansion Project Final Environment Impact Statement, Appendix G: Socio-Economic Analysis*, February 2008

6.2 U.S. Route 219

Several other proposed projects would not take place within the Buffalo-Niagara region, but would nevertheless impact the region's motor carrier freight. One of these is the expansion of the Southern Expressway/US 219 from Springville, NY to Salamanca, NY to connect with I-86 in Cattaraugus County, NY. Currently, the four lane expressway ends near Springville and does not connect to any other highways. South of Springville, US 219 is a two lane road.

The U.S. Route 219 would help to improve the Buffalo-Niagara region's connectivity to markets to the south. A recent study commissioned by Southern Tier West Regional Planning & Development Board[23] estimated that the project would cost $667 million to complete. It would generate a safety benefit of $135 million over 50 years. Travel time between Springville and Salamanca would be reduced by 11 minutes. The study estimated that 7,000 direct jobs and 2,450 induced jobs would be created as a result of the project. The study estimated that traffic would grow by 1.9 percent per year on the corridor, in part as a result of the project.

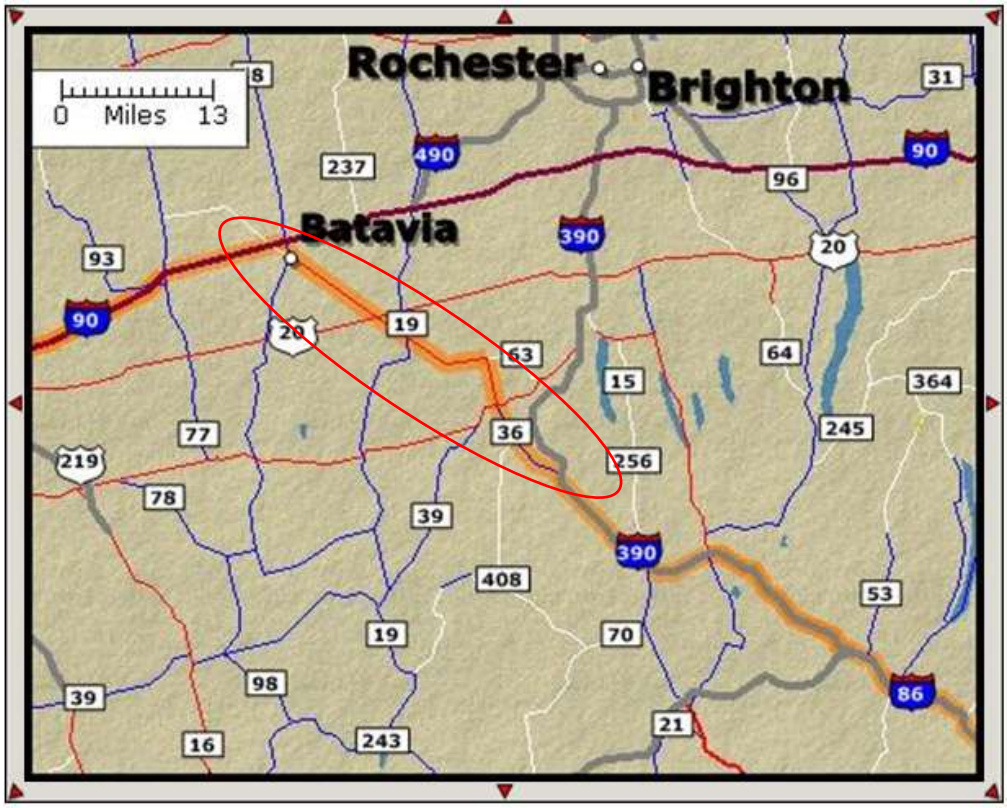
An earlier analysis completed for the New York State Department of Transportation (NYSDOT) environmental impact process estimated that the annual user benefits of the project as of 2025 would be $26.8 million.[24] Placed into context, the net present value of $26.8 million in annual benefits occurring into perpetuity would be $893 million at a three percent discount rate and $383 million at a seven percent discount rate. Obviously, a proper net present value calculation would account for the timing of the construction period, forecasted growth rates, etc. However, the project would likely need to generate more than $26.8 million in annual benefits to be clearly justified by user benefits alone. On the other hand, consideration of appropriate economic development impacts could help to justify the project on a benefit/cost basis.[25]

6.3 New York Route 63 Corridor

Another project that impacts shippers in the Buffalo-Niagara region is the New York Route 63 corridor. In many cases, the best route between the Greater Toronto Area or the Buffalo-Niagara region and markets in the Mid-Atlantic uses I-390 toward Elmira, NY. Unfortunately, the connection between I-390 and I-90 is somewhat circuitous for Buffalo-Niagara shippers, since the two roads intersect relatively far eastward. The most direct route to access I-390 would be to use N.Y. Route 63 from where it intersects with I-90 at Batavia, NY, and then access I-390 near Mt. Morris. This shortcut represents the hypotenuse of what would otherwise be two sides of a triangle.

[23] Hatch Mott MacDonald for the Southern Tier West Regional Planning & Development Board, *U.S. 219 Planning Study: Springville to Salamanca, NY,* August 2009.
[24] FHWA, NYSDOT, U.S. Route 219 Springville to Salamanca, Preferred Freeway Alternative – Partial Build Assessment, December 2004.
[25] Considerable attention has recently been devoted to the relationship between economic impact analysis and benefit cost analysis. Generally, economic development impacts can be considered a "benefit" only to the extent that they do not just represent the shifting of economic activity from one sector or location to another. Discussion of this issue appears in the Notice of Funding Availability for the TIGER II Discretionary Grant Program http://www.dot.gov/docs/TIGER_II_Discretionary_Grant_Program_Final_Notice_1_June_2010.pdf.

Figure 6- 2: Screenshot of ProMiles Route from Niagara Falls to New York City[26]



Unfortunately, N.Y. Route 63 is a local road. In 2001 through 2004 NYSDOT commissioned a study of the corridor.[27] The study found that numerous trucks were using N.Y. Route 63 as a shortcut to travel between I-90 and I-390. Most trips were overhead to the corridor, and most trips had origins or destinations in Western New York or Canada. The study found that N.Y. Route 63 is 30 miles shorter than the I-390/I-90 route. Drivers save about $36 by taking N.Y. Route 63. Some proposed the elimination of tolls between exit 48 and exit 46 on the Thruway in order to induce trucks to stay on I-90 to I-390. The study concluded that this solution would have minimal effect. The study found that larger trucking companies typically direct their drivers to use the I-90/I-390 route because it is safer; drivers are reimbursed for tolls anyway; and, the routing is simpler and avoids driver confusion. Many of these larger companies maintain policies that restrict their drivers to interstates and other major highways where possible. Smaller and independent trucking companies are more likely to use the N.Y. Route 63 shortcut. They do so because drivers are paid by the mile and therefore directed to use the shortest route and because these companies' policies are often do not restrict drivers to major roadways. Furthermore, independent owner/operator drivers must cover the costs of expenses themselves.

The study considered six alternative solutions to improve the corridor. Alternatives #1 and #2 were to build new limited access highways. Alternative #1 would lead from N.Y. Route 77 near Pembroke to I-390 near Mt. Morris. Alternative #2 would lead from I-90 somewhere between the I-490 interchange and Batavia to I-390 south of Gleneseo. Alternative #3 included a range of legislative solutions aimed at discouraging trucks from the corridor, while Alternative #4 represented better enforcement of existing

[26] ProMiles is a routing software for owner-operator trucking companies.
[27] NYSDOT, Route 63 Corridor Study, https://www.nysdot.gov/portal/page/portal/regional-offices/region4/projects/route63-corridor-study/rte63-documentation.

policies, also aimed at discouraging trucks from the corridor. Alternative #5 consisted of bypasses around the villages of Corfu, Pavillion, and Griegsville. Alternative #6 was a series of solutions aimed at addressing specific traffic problems within specific areas. The study ultimately recommended Alternatives #4 and #6. Alternative #1 was estimated to cost at least $400 million, while Alternative #2 was estimated to cost at least $250 million. Alternatives #1 and #2 were estimated to provide the greatest benefits but were eliminated because of its high cost, environmental impacts, and time required to deliver the project.

Although outside of the Buffalo-Niagara region, the N.Y. Route 63 corridor could have a sizeable impact on the region's shippers. The Route 63 Corridor Study estimated that Alternative #1 would save $43.43 in truck costs compared to using the I-90/I-390 route. Although routing will likely vary by carrier, the I-390 route could potentially be used for a significant portion of trade between the Buffalo-Niagara region and key markets in Southern New York and parts of the Mid-Atlantic. The potential extent of the impact is apparent when one considers a hypothetical example. Based upon data from the TRANSEARCH® database, this study estimates that the truck equivalents traveling between Buffalo and the fourteen counties that comprise the New York State portion of the New York Business Economic Area (BEA)[28] totaled about 1.4 million in 2004. This traffic is expected to almost double to 2.7 million in 2035. If half of this traffic were to save $43.43 in vehicle operating costs as a result of the construction of Alternative #1 of the Route 63 Corridor Study, the net present value of savings in 2004 dollars over the period 2004 to 2035 would be about $870 million at a three percent discount rate and $526 million at a seven percent discount rate. This analysis does not consider trade between the region and other important trading partners in parts of Connecticut, New Jersey, Pennsylvania, and other points south. Depending upon the frequency by which carriers route their traffic onto I-390, this project could have a large impact on Buffalo-Niagara shippers and carriers. GBNRTC may want to request additional study.

[28] Bronx, Dutchess, Kings, Nassau, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster, Westchester.

Logistics Center Potential in the Buffalo-Niagara Region

In Technical Memorandum #4 the idea of establishing a logistics center in the Buffalo-Niagara region was presented. Various options were presented in terms of potential locations, functions that could be performed and business model formats. A study by the World Trade Center of Buffalo-Niagara also identified potential markets and the potential market size was estimated. This technical memorandum continues the examination of the logistics center concept by further examining strengths and weaknesses of the region as a potential logistics hub. The discussion presented also seeks to define what would be the most appropriate parameters for a logistics center project, as well as to present an economic impact and cost-benefit analysis of a logistics initiative in the Greater Buffalo-Niagara region.

7.1 Potential Weaknesses of the Greater Buffalo-Niagara Region as a Logistics Center

Technical Memorandum #4, including the report by the World Trade Center of Buffalo-Niagara, presented a series of reasons why the GBN region could be a promising location to establish a logistics center. Among these were the following:

- Four Class I railroads serve the region. The region has good east-west connectivity, particularly to the Port of NY/NJ, Ohio, Indiana, Chicago and markets beyond. The region is served by two Class I railroad mainlines, the CSX Chicago Line and the NS Southern Tier
- The region has good highway corridors for serving end customers both in the U.S. and Canada
- The region, both the U.S. and Canadian sides of the border, has significant trade infrastructure including customs brokers, freight forwarders, logistics firms and government agencies
- Buffalo-Niagara intermodal facilities can serve large metropolitan areas, including the Buffalo-Niagara region with over one million inhabitants, the Rochester metropolitan area with over one million inhabitants, and the Greater Toronto Area with over 5.5 million inhabitants
- The Toronto metropolitan area does not have any direct connections to the Port of NY/NJ

When considering a potential logistics center it is important to consider not only the region's location advantages, but also any potential disadvantages. Such considerations can help temper expectations, correctly size the effort, and identify strategies for overcoming potential disadvantages. Initially, the basic disadvantages facing the GBN Region appear to be:

- No container pool, imbalance of inbound and outbound freight
- Competing corridors
- Competing logistic hubs
- The I-90 corridor through Buffalo is not as important a truck corridor as other corridors to the south

Lack of Container Pool/Unbalanced Traffic Flows

Container availability is a vital issue to intermodal shippers. When containers are not available within a given area, containers must be relocated from areas where they are available, adding cost and time. The study completed by the World Trade Center of Buffalo-Niagara, found container availability an impediment to using intermodal rail service within the region, based on stakeholder survey responses. Container

ownership typically resides with the container steamship lines, and they generally decide where containers will be stored and made available. Containers are generally made available in the largest intermodal markets. For example, plenty of containers are available in Chicago, or at major seaports, such as the Port of NY/NJ (NY/NJ).

A related issue is the lack of traffic or lane balance in the Greater Buffalo-Niagara region. Generally, more intermodal freight flows into the region than flows out.

Together, container availability and lane balance tend to raise the cost of truck drayage to and from the region. As will be demonstrated, these hurdles impact the region's ability to serve as a distribution hub for the Toronto market. Because a container pool is located within the Toronto area, shippers effectively pay for a one way trip to truck containers from the Port of NY/NJ. By contrast, shippers delivering containers from the Port of NY/NJ to the GBN Region by truck or shipping containers between Toronto and Buffalo pay for a round trip. Drayage pricing reflects the presumption that the container will return empty.

Competing Corridors

An ideal situation for a logistics hub is to be situated on both a heavy rail corridor and a heavy trucking corridor. This is consistent with the motor carrier mantra "freight moves freight." Carriers are more likely to find backhauls and charge lower rates on well-balanced, dense freight corridors. These motor carrier rates and the density of their facilities and services will in turn influence the desirability of a location from the standpoint of shippers. In terms of motor carrier traffic, the I-90 corridor within New York State competes with the I-80 corridor within Pennsylvania.

Figure 7- 1 below compares average truck traffic per mile on I-90 within New York State to I-80 within Pennsylvania. The source of data is the U.S. Federal Highway Administration's (FHWA) Freight Analysis Framework – 2.2 (FAF). The Average Annual Daily Truck Traffic (AADTT) for 2002 is from the FHWA's Highway Performance Management System (HPMS) with HPMS average truck percentage. The AADTT is based upon the 2002 statistic with trend growth to 2035. The FAF 2002 and 2035 counts are based upon the freight demand model and the FAF 2.2 origin-destination database. As can be seen, the I-80 corridor carries higher truck volumes than the I-90 corridor, and I-80 truck volumes are expected to increase at a faster rate than I-90 truck volumes.

Figure 7- 1: Comparison of I-90 and I-80 Truck Traffic

Truck Counts	I-90 New York	I-80 Pennsylvania
AADTT - 2002	4,122	7,094
AADTT - 2035	7,359	27,041
FAF - 2002	3,324	6,941
FAF - 2035	5,832	14,219

While the lower freight volumes on the I-90 corridor are weaknesses in one sense, they could also be strengths in another. If the infrastructure of I-80 does not keep pace with the tremendous forecasted freight increases, more carriers and shippers will want to use the I-90 corridor. The recently failed attempt to toll I-80 in Pennsylvania was a response to a looming crisis in maintenance funding for this highway.

Competing Logistics Centers

A Greater Buffalo-Niagara International Logistics Center (ILC) would compete with Ohio-based logistics centers that have some advantages over the Greater Buffalo-Niagara region. Areas such as Cleveland are at a comparative advantage by being situated on a denser freight corridor. Ohio locations can also effectively serve the Toronto area market. A driver based in Cleveland, OH can drive to Toronto and return to Cleveland before his hours of service are exhausted.

Impact of Costs on Truck Routing to Ontario

From a number of key gateways and ports within the Northeast, the Greater Buffalo-Niagara crossings are the shortest route to the Toronto area. However, a number cost factors prohibit the Greater Buffalo-Niagara region from necessarily being the most cost-effective solution. When accessing Canada from Baltimore, Boston, or NY/NJ, the Greater Buffalo-Niagara crossings are more direct than the second most direct alternative to the Toronto area, the Thousand Islands Bridge in the Alexander Bay (**Figure 7- 2**).

Figure 7- 2: Vehicle Miles Traveled, Shortest Route

	Toronto ON		
Port of	Via GBN	Via Thousand Islands	Buffalo NY
Baltimore	582	622	482
Boston	552	614	457
NY/Newark	496	535	395

Assuming an average cost per mile of $1.73[29], these variances translate to a cost advantage for the Greater Buffalo-Niagara crossings from $69.20 to $107.26 per one-way trip. This cost advantage can be diluted by two initial costs not found with the alternative crossing at Thousand Island Bridge:

- Tolling fees to access the Buffalo-Niagara crossing
- Cross-border fee variance

Using the Greater Buffalo-Niagara crossings requires motor carriers to use the New York State Thruway. Otherwise identified as I-90, this roadway is tolled which presents a disadvantage for those carriers following the route over Buffalo-Niagara. Parallel routes are available to the NY Thruway, State Route 5, though these present longer travel times and pose specific efficiency and safety concerns.

Trucks traveling from the Ports of Baltimore and Newark would enter the NY Thruway in the vicinity of Syracuse NY and exit in Buffalo. This segment charges a fee[30] of $32.85 (cash) or $31.21 (e-tolling/EZ-Pass). The route taken from the Port of Boston could include all miles tolled. To Buffalo, this route would subject the truck to a toll of $45.00 on the Massachusetts Turnpike and $77.05 (cash) or $73.20 (e-tolling/EZ-Pass), for a total of $122.05 or $118.20, respectively. These charges are substantial and are typically not reimbursable to the carrier, thus these are costs which may influence the route, as they significantly impact the cost savings provided by the shorter route over Buffalo.

[29] Determined by the 2009 annualized cost average by the American Transportation Research Institute (ATRI) for U.S. based motor carriers
[30] Calculated for a 5-axle tractor with trailer, the standard envelope vehicle

The Buffalo-Niagara bridges are more expensive than the Thousand Islands Bridge. Utilizing the 5-axle, tractor trailer combination, one way fees are 53 percent higher via the Niagara Bridges, **Figure 7- 3,** resulting in an increase cost of $8.75 per crossing.

Figure 7- 3: Cross Border Fees, Buffalo-Niagara Compared to Thousand Islands Bridge

		THOUSAND ISLANDS BRIDGE (ALEXANDRIA BAY) [Eff April 2010]		NIAGARA FALLS BRIDGE COMMISSION [Eff May 2010]	
Description	No. Axles	US Fare	CA Fare	US Fare	CA Fare
Auto, Pickup Trucks, Motorcycles	2	$2.50	$2.50	$3.25	$3.25
Auto, Pickup Trucks, w/single axle trailer	3	$3.75	$3.75	$9.75*	$9.75*
Recreational Vehicles, Tractor without trailer, Tow Trucks, School Buses, Island Delivery	2	$2.50	$2.50	$6.50*	$6.50*
Trucks and Buses	2	$6.00	$6.00	Bus $10.25 Truck $3.25	Bus $10.75 Truck $3.25
Tractor Trailer Trucks and Buses	3	$7.25	$7.25	Bus $13.50 Truck $6.50	Bus $14.00 Truck $6.50
Tractor Trailer Trucks	4	$8.50	$8.50	$12.50	$13.00
Tractor Trailer Trucks	5	$9.75	$9.75	$18.50	$19.25
Tractor Trailer Trucks	6	$11.00	$11.00	$24.50	$25.50
Tractor Trailer Trucks	7	$12.25	$12.25	$30.50	$31.75
Tractor Trailer Trucks	8	$13.50	$13.50	$36.50	$38.00
Additional axle any one vehicle class	1	$1.25	$1.25	$6.00	$6.00
				*$3.25 per axle	

Border crossing costs could discourage using GBN bridges and present a cost hurdle for the region if it seeks to develop a logistics hub. By overcoming these issues, Buffalo may still hold the key as an alternative to areas that have historically served as primary distribution hubs, including Cleveland and Harrisburg.

7.2 Specific Implementation Proposals and Likely Costs

Technical Memorandum #4 presented a series of potential functions that could be performed in association with a Greater Buffalo Niagara ILC, including:

- Truck/rail intermodal container terminal
- Marketing/Business Development/Planning
- Technology
  - Shipment tracking
  - Alerts
  - Trade document processing
  - Empty container management
- Container depot and chassis pool

The 1,100-acre former Bethlehem Steel site was identified as the most promising location for a logistics complex within the area.

Truck/Rail Intermodal Container Terminal

Any intermodal ramp would need to be associated with at least one intermodal network. Currently, the CSX and NS intermodal networks are accessed through the CSX Seneca Yard and the NS terminal adjacent to the Bison Yard. The study team has not received any indication that these existing facilities have encountered capacity issues or will be at capacity in the near future. Therefore, it probably would not make sense to fund the construction of a new intermodal container terminal at this time. However, it may be logical to

encourage carriers to operate at a single intermodal terminal associated with a logistics hub in the future, as the existing intermodal ramps reach capacity. For example, CSX estimates provided a forecast at a meeting of the Buffalo-Niagara Logistics Council in August 2007 that the Seneca Yard facility would reach capacity of 60,000 containers around 2015. While forecasts are always subject to uncertainty, and this forecast may not have accounted for the economic downturn since 2007, it is likely that Seneca Yard could reach capacity sometime within the next decade. The likely cost of a new terminal serving would probably be about $25 million.

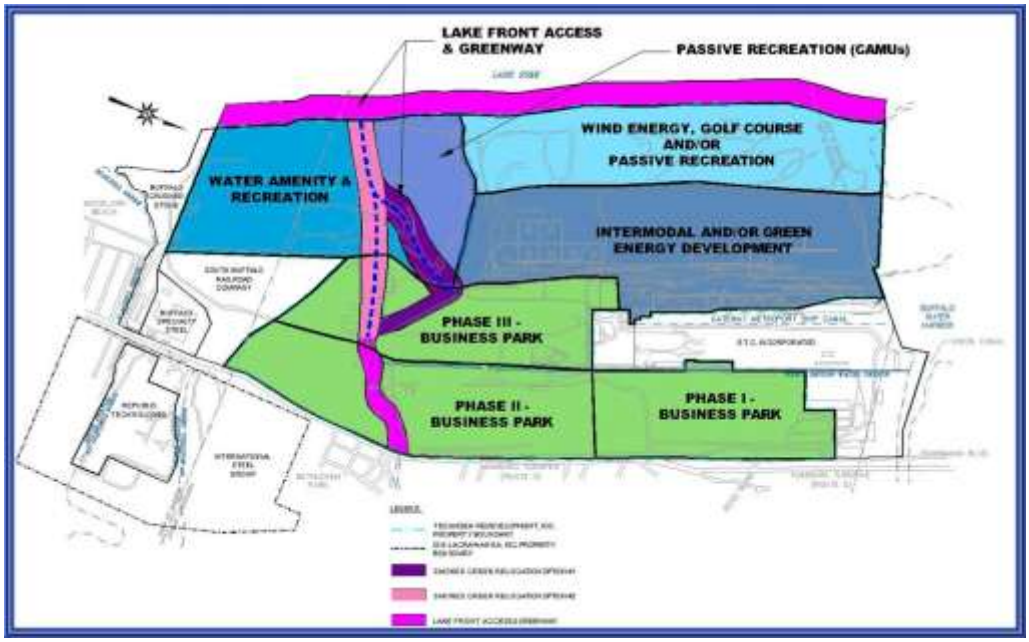
The Memphis region provides an example of an area that has tried and partially succeeded in concentrating logistics activities within a specific area. Currently, CSX and CN operate at a combined intermodal terminal in Memphis called "Gateway Memphis." Area planners had originally hoped that all rail carriers in the area would concentrate their intermodal operations within this "super terminal," but several carriers declined to participate.

In the meantime, activities at the Bethlehem Steel site could support the existing intermodal terminals. Economic development activities could focus on bringing warehousing and distribution facilities into the site. These in turn would benefit from the close proximity of the Bethlehem Steel site to the Seneca Yard (less than a mile) and the Bison Yard (about five miles).

Status of Bethlehem Steel Site

A subsidiary of Arcelor Mittal called Tecumseh Redevelopment, Inc. has responsibility for redeveloping the site under a memorandum of understanding with Erie County, and the City of Lackawanna. The site is planned to provide mixed-use land parcels. Several wind turbines have been constructed along the shore of Lake Erie. If an intermodal terminal were to be built on the site in the future, a strip of land would need to be available that is between 3,000 and 7,000 feet in length, with a total required footprint between 100 and 200 acres.

Figure 7- 4: Planned Uses of Bethlehem Steel Site



Source: Tecumseh Redevelopment website

According to the Erie County economic development office, most of the site is relatively clear of contamination, likely requiring just a foot of clean cover or a cap, such as pavement. Environmental considerations would not be expected to add significant, if any cost to the development of an intermodal terminal or distribution/logistics assets on the site.

Work has already begun to improve the transportation connections to the site. Under a $4.4 million grant from the New York Department of Transportation Multi-Modal Program, railroad tracks within the site are being reconfigured. Currently a rail line runs parallel to Route 5 along much of the length of the property. This line blocks highway access into the property and is also not to modern standards. The focus of the project is to move the rail line away from Route 5 along the center of the property where future industrial or distribution tenants of the site may want to use this line. The rail infrastructure within the site is also being upgraded. Curves are being straightened, which will allow longer modern cars and six-axle locomotives to access the Bethlehem Steel site, which had not been possible before. The project will also improve rail operations around the port. About 90 percent of the design work has been completed. Construction is expected to begin by the end of 2010, and it is hoped that construction will be completed in 2011.

Potential Interim Activities at Bethlehem Steel Site

In addition to attracting potential users of existing freight facilities within the GBN Region, the Bethlehem Steel site could also support establishing the region as a logistics center in several other ways. For instance, transload services could be provided at the site. The term “transload” in a rail context generally refers to the transfer of bulk or break-bulk commodities between truck and rail.

Figure 7- 5 displays facilities from the U.S. Department of Transportation's National Transportation Atlas Database (NTAD) which provide transload capabilities between truck and rail within the Greater Buffalo-Niagara region. However, most transload facilities are designed to handle specific commodities and to serve specific customers. It may be valuable to establish "team tracks" at the Bethlehem Steel site. These are "self help" transload facilities, where customers can load a range of commodities. While team tracks have become rare in some freight markets they provide a valuable solution to shippers who do not have more permanent arrangements elsewhere. They can also establish a location as a transload area, so that as shippers become accustomed to the service they build facilities near the site and foster permanent facilities.

Figure 7- 5: Facilities with Truck/Rail Transload Capabilities

Name	Modes	City	Primary Commodities
CN South Buffalo Distribution Center-Lackawana-NY	Rail & Truck	Lackawana	Forest products
Frontier Elevator-Buffalo-NY	Rail & Truck	Buffalo	Cereal grains
ADM Milling Co.-Buffalo-NY	Rail & Truck	Buffalo	Cereal grains
SONWIL Distribution Center Inc.-Buffalo-NY	Rail & Truck	Buffalo	Food products, pharmaceutical products, pulp, paper and paperboard, stone, ceramic or glass, iron or steel
C. S. W. Warehouse	Rail & Truck	Blasdell	Wood products, iron or steel products
Buffalo Distribution Incorporated	Rail & Truck	Depew	Wood products, pulp, paper, or paper-board, stone, ceramic or glass, iron and steel products
Integrated Terminals	Rail & Truck	Lackawanna	Iron and steel products
Laub Warehouse	Rail & Truck	Buffalo	Food products, pulp, paper or paperboard
Bestway Distribution Services	Rail & Truck	Cheektowaga	Forest products, pulp, paper or paper-board, metal, metal products, motor vehicle parts
TRANSFLO-Buffalo-NY	Rail & Truck	Buffalo	Basic chemicals
NS Independent Bulk Transfer Terminal-Buffalo-NY	Rail & Truck	Buffalo	Basic chemicals, plastic or rubber
NS Thoroughbred Bulk Transfer Terminal-Buffalo-NY	Rail & Truck	Buffalo	Food products, plastic and rubber
Port of Buffalo	Truck - Port - Rail	Buffalo	Cereal grains, natural sands, non-metallic minerals, coal, petroleum products, basic chemicals, stone, ceramic or glass, waste or scrap
Yellow-Buffalo-NY Terminal	Truck - Port - Rail	Tonawanda	Various
Team Freight, Inc./Team Distribution, Inc.-Buffalo	Rail & Truck	Buffalo	Various

Source: Prepared by Wilbur Smith Associates

Another potential activity at the Bethlehem Steel site, which could help to bolster the area's status as a logistics center is container stuffing. Container imbalance is an issue with the region's intermodal network, receiving more containers in to the area than are shipped out. Container stuffing facilities could help to rectify the imbalance by promoting exports from the region. One export that has grown in significance across the country is distillers dried grains with soluble (DDGS). These are the byproducts from ethanol plants and are primarily exported for animal feed. DDGS are generally exported by container because of their handling characteristics. Depending upon how they are dried, they tend to clump. These handling characteristics render export by bulk vessel problematic as the DDGS are difficult to extract from bulk vessels.

The study team spoke with Western New York Energy, LLC in Shelby, NY. According to the individual interviewed, the company does not currently export DDGS because the cost of trucking containers to the Port of NY/NJ is prohibitively expensive. However, if DDGS could be railed or trucked into Buffalo and then loaded into containers for a rail move to the Port of NY/NJ the economics of exporting DDGS could be more

compelling. The Shelby, NY plant ships about 160,000 tons of DDGS per year. If the RiverWright plant is built, this could also create demand for the exporting of DDGS. More research will need to be performed than is possible within this study to investigate the likely demand for a container stuffing facility. Equipment to transfer large volumes of grain between truck or rail hopper to containers would probably cost between $2 million and $3 million.

Marketing/Business Development/Planning

Another feature of a potential logistics complex that was presented in Technical Memorandum #4 is an organization for performing marketing, business development and planning. The KC SmartPort in Kansas City was provided as a case study that marketing efforts for a GBN-ILC could be modeled after. The KC Smart Port organization has the following mission:

- To grow the Kansas City area's transportation industry by attracting businesses with significant transportation and logistics elements
- To make it cheaper, faster, more efficient, and secure for companies to move goods into, from, and through the Kansas City area

KC SmartPort has two permanent staff, a Board of Directors consisting of 22 individuals from both public and private sectors organizations, and an executive committee of four. Given the number of people involved compared to staff members, KC SmartPort almost operates as an association. KC SmartPort shares offices and branding material with the Kansas City Area Development Council (KCADC), the economic development agency responsible for promoting economic development in the 18-county Kansas City area.

In terms of the organization's marketing efforts on behalf of the Kansas City area, the organization works with companies that are considering placing logistics assets within the Kansas City area to identify locations and develop solutions that meet these organizations' needs. The KC SmartPort also promotes logistics in the area by direct mail campaigns, trade shows, and conferences. It is a public-private organization, which is partially funded by private backers.

If the Greater Buffalo-Niagara region were to create an analogous marketing organization, it would probably work closely with Buffalo-Niagara Enterprise or similar organization. A Greater Buffalo-Niagara regional logistics organization could share offices and marketing materials with the Buffalo-Niagara Enterprise or similar organization. It would be a specialist economic development organization, focusing on attracting and promoting one industry sector within the region, transportation and logistics. It would probably have a permanent staff of two, but would extensively involve area stakeholders in its ongoing activities. The cost of the organization's marketing function would roughly correspond to the cost of employing two professionals with their associated overhead. In addition, there would likely be significant travel cost, membership dues, cost of attending conferences, promotional materials and advertising. These costs for the Greater Buffalo-Niagara will be examined more closely in a marketing plan presented in the final report.

Information Technology

The United States Department of Transportation (USDOT) has launched the Electronic Freight Management (EFM) initiative and has funded test projects in Kansas City and Columbus, OH. KC SmartPort, which was mentioned in Technical Memorandum #4 for its own supply chain visibility initiative, the Trade Data

Exchange (TDE), uses EFM technology. It is likely that an information technology initiative within the GBN Region would also be based upon EFM technology. This would include efforts to improve shipment tracking, provide alerts, manage empty containers, and improve the electronic handling of trade documents. In this case, the public sector would act as a facilitator. The users of the EFM would represent a voluntary association of companies within the region that have agreed to share data in order to benefit from improved supply chain visibility. The EFM initiative seeks to promote electronic data exchanges along the supply chain in an "end-to-end" manner in contrast to a "point-to-point" manner. Currently, freight movements are supported by paper or electronic communications between specific trading partners that have agreed to such communication. Under an EFM system, any authorized and authenticated user would have access to information electronically and in real time. While partners communicate with each other electronically today, these communications are over proprietary systems. EFM seeks to migrate communications to open systems, but under strict data security requirements. Information would be entered once and then used many times. The benefits anticipated are as follows:

- Improved efficiency
- Reduced paperwork
- Better cycle times
- Reduced complexity of access to information
- A view across the supply chain

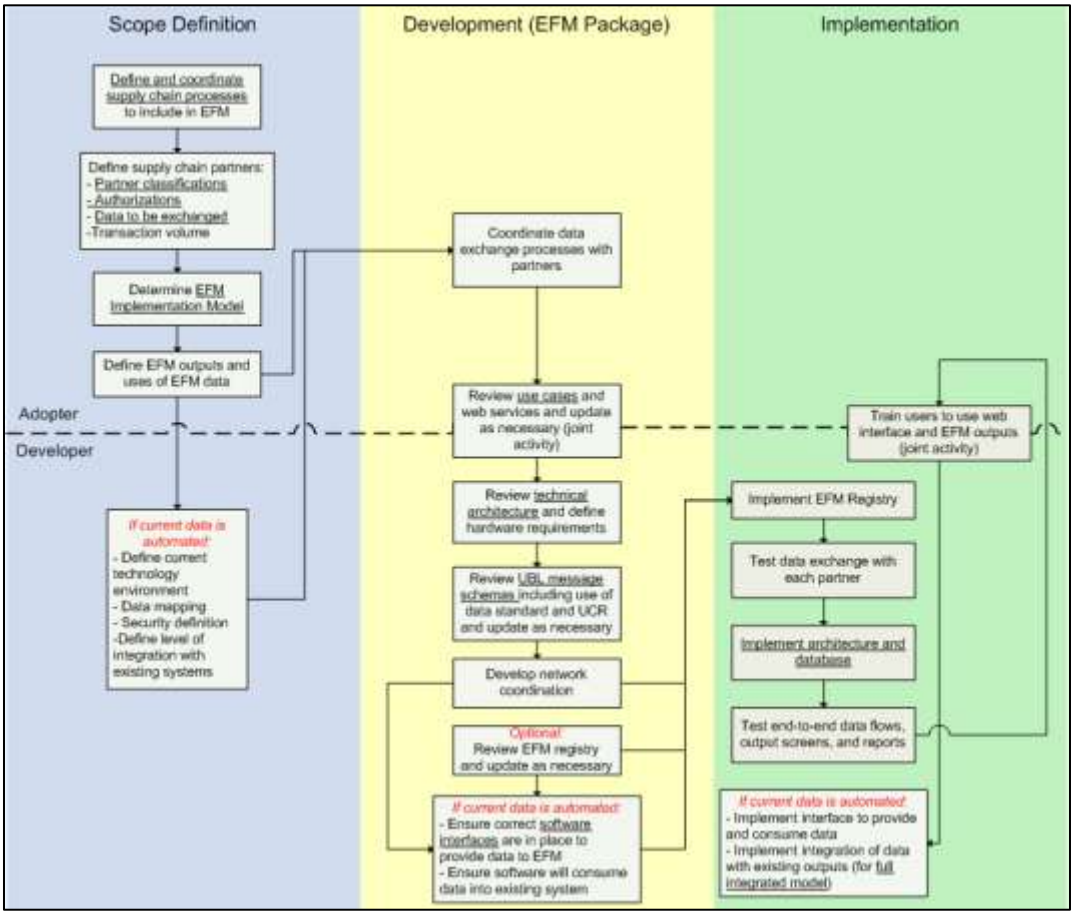
According to information from the USDOT, 40 percent of supply chain time is spent waiting for information exchanges to take place. The adoption of EFM could automate and speed these information exchanges. The technology to support the initiative is an important component. EFM is based on an open architecture and is intended for use by all industries. The technology uses Service Oriented Architecture (SOA) and Web Services. Web Services is a reusable computer application that transfers data via standard data and communications formats over the Internet. SOA is a software architecture approach where applications communicate with each other through Web Services.

The USDOT recently concluded a test program in Columbus, OH, which involved thirteen partners, including four manufacturers, and two freight forwarders. The test focused primarily on air cargo transport from China to Columbus, OH. The test documented total savings of $5.94 per shipment.[31] The EFM website suggests an implementation process that is presented in

Figure 7- 6.

[31] *Electronic Freight Management* by Battelle at IFTWG meeting in Ft. Lauderdale, FL on November 16, 2008.

Figure 7- 6: EFM Implementation Process



Source:www.efm.us.com

A project to facilitate supply chain visibility in the Greater Buffalo-Niagara region could begin by facilitating a meeting between stakeholders and knowledgeable EFM individuals who could provide an explanation of the program, its benefits, and how it could be best implemented. A critical success factor will be the involvement of private stakeholders and guidance of private stakeholders. According to a representative from KC SmartPort, their own Trade Data Exchange initiative has cost a total of about $6 million to $8 million, including studies and software development. A significant portion of this effort has been funded by the private sector.

7.3 Potential Benefits of a Logistics Center

Relative Costs of Truck/Rail and all Truck Service through Buffalo

A first and logical step to assessing the economic benefits of a logistics center is to examine the benefits to shippers from having access to intermodal services in the Greater Buffalo-Niagara region. Truck/rail intermodal service to important gateways is a key aspect of the area's potential success as a logistics center. Currently, CSX provides intermodal service between Buffalo and the Port of NY/NJ and to Chicago, IL. At Chicago, connecting services link the GBN Region with a range of other markets, but the focus of the service is foreign trade flowing through West Coast ports. NS also provides service to Chicago, IL with connections to points beyond.

The benefits obtained from intermodal service would depend upon the cost savings relative to alternatives that would compete with the service. An often used rule of thumb for utilizing intermodal railroad services suggest that intermodal rail shipment must move a significant distance (e.g., 500 miles or more) to allow the line-haul efficiencies of rail service to outweigh higher terminal and transaction costs. As a result, rail intermodal services are ordinarily provided only in high volume corridors between major population centers. If trucking a container is less expensive than shipping it by rail, the rail intermodal service will have little value. Furthermore, benefits of rail intermodal service depend not just on the cost of the line haul rail move, but local drayage expenditures incurred on either end of the intermodal service. In this section, relative benefits of using rail intermodal are discussed for each of the primary intermodal routes into and out of Buffalo.

Port of New York/New Jersey – Buffalo Service

The Port of NY/NJ is the largest single potential market for container traffic to or from the Greater Buffalo-Niagara region. The *Intermodal Freight Terminal Volume Feasibility Study* prepared by the World Trade Center identified 16,506 TEUs (twenty foot equivalent units) of traffic between the Port of NY/NJ and the Buffalo area. The majority, 77 percent, of these loaded containers are inbound to Buffalo, compared to only 23 percent outbound. Assuming that empty TEUs are 90 percent of loaded containers, the empty containers traveling between Buffalo and the Port of NY/NJ would be 14,856 TEUs.

Intermodal rail service on CSX currently competes with truck drayage between Buffalo and the Port of NY/NJ. Because there currently is no container pool in the Buffalo area, one-way truck drayage rates for loaded containers shipped to Buffalo are similar to round trip drayage rates, in which the carrier hauls a loaded container to Buffalo, and then an empty container back to the Port of NY/NJ. Rate quotes provided by trucking companies from the Port of NY/NJ to Buffalo were found to be in the neighborhood of $1,300 to $1,550 per container. Rates for outbound shipments from Buffalo to the Port of NY/NJ were somewhat less, at around $900 to $950 per container. Round trip between the Port of NY/NJ and Buffalo was quoted at around $1,400 per container.

Rail between the Port of NY/NJ and Buffalo has become more competitive recently. Previously, intermodal rail service was provided through the South Kearney Yard, approximately eight miles from the marine terminals. The drayage rate was $275 per container to transfer between the CSX intermodal yard and the marine terminals. As part of its ExpressRail project, the Port Authority of NY/NJ has moved much of the intermodal train loading in the area to on-dock rail service. Cuts of intermodal cars are loaded on-dock with unit intermodal trains then assembled at a near dock rail yard, the Corbin Street Support Yard. Buffalo

shippers will no longer need to pay the $275 to dray containers between the South Kearney Yard and the marine terminals.

The recent CSXT financial statements suggest that the average CSXT revenue per thousand ton-miles of intermodal freight is $77.57.[32] Given that Buffalo is about 445 miles from the Port of NY/NJ by rail and assuming an average container weight of between 15 and 20 tons, the expected cost of intermodal rail service between Buffalo and the Port of NY/NJ is likely in the range of $500 to $700 per container. **Figure 7- 7** suggests that shippers would expect to save between $350 and $800 on transportation costs by using rail intermodal instead of all truck transport for containers between the Port of NY/NJ and Buffalo. The table in **Figure 7- 7** also assumes a $250 truck dray within the Buffalo region. If a logistics center were established in close proximity to the intermodal yard such as proposed in Technical Memorandum #4, logistics center tenants could minimize drayage costs, and benefits would increase. Coordinating inbound and outbound shipments to increase lane balance on drayage moves (i.e. move loaded containers from the Greater Buffalo-Niagara region to the Port of NY/NJ and return with loaded containers on the back-haul), can significantly increase the competitiveness of the all truck option: The one-way rate for draying containers from Buffalo to NY/NJ is around $900 to $950, not very different from the truck/rail intermodal costs listed below.

Figure 7- 7: Transportation Savings Using Rail Intermodal from the Port of NY/NJ to Buffalo

	Low	High
All Truck Alternative		
NY/NJ to Buffalo Dray	$1,300	$1,550
Truck/Rail Intermodal		
Rail Cost – NY/NJ to Buffalo	$700	$500
Assumed Local Dray at Buffalo	$250	$250
Total	$950	$750
Truck/Rail Intermodal Savings	**$350**	**$800**

Port of New York/New Jersey to Toronto/Golden Horseshoe Area via Buffalo Service

The Port of NY/NJ is also a large container market for traffic into and out of the Toronto/Golden Horseshoe (GTA) area. The *Intermodal Freight Terminal Volume Feasibility Study* identified 33,519 TEUs of freight traveling between the Port of NY/NJ and the Golden Horseshoe. Assuming that the number of empty containers is about 40 percent of loaded containers, the volume of empty containers is assumed to be about 13,408 TEUs. Much of this traffic currently travels by truck across Buffalo, and it is hoped that these containers could move by rail instead. Containers could be loaded either onto or off of trains at Buffalo, or CN could provide a shuttle container service from Brampton, ON to Buffalo as described under Improvement 2b, Section 4.5 in Technical Memorandum #4.

Rail intermodal service from Toronto to the Port of NY/NJ via Buffalo would compete with truck drayage. Quotes from drayage companies suggest that one-way truck drayage rates between the Port of NY/NJ and Toronto are similar or slightly less than the rates between the Port of NY/NJ and Buffalo, between $1,200 and $1,500. However, because a container pool is located in Toronto, one-way and round-trip drayage rates for Toronto differ significantly. A drayage quote for round-trip service between the Port of NY/NJ and Toronto suggests that the cost is around $2,000 per container. Drayage rates between Toronto and Buffalo

[32] Because they are on a revenue ton-mile basis, these rates are assumed to include railroad repositioning of empty containers.

are fairly expensive and quoted solely on a round-trip basis. Rates quoted were around $450 to $550 per container.[33] Rates from Toronto to Buffalo using Toronto-area drayage companies are more expensive than the reverse direction. Toronto area drayage companies quote rates to Buffalo between $650 and $800 per container.

The relative costs suggest that draying containers between Buffalo and Toronto and then shipping these containers between Buffalo and the Port of NY/NJ by rail may not always be the more favorable alternative. As shown in **Figure 7- 8**, Toronto shippers could save as much as $550 by using rail service out of Buffalo; however, rail intermodal service also could be more costly under certain circumstances.

Figure 7- 8: Transportation Savings Using Rail Intermodal from the Port of NY/NJ to Toronto (via Buffalo)

	Low	High
All Truck Alternative		
NY/NJ to Toronto Dray	$1,200	$1,500
Truck/Rail Intermodal		
Rail Cost – NY/NJ to Buffalo	$700	$500
Dray from Buffalo to Toronto	$550	$450
Total	$1,250	$950
Truck/Rail Intermodal Savings	-$50	$550

On the other hand, Toronto shippers that must otherwise ship containers empty may benefit more from intermodal rail service through Buffalo. Round trip drayage rates are less competitive (**Figure 7- 9**).

Figure 7- 9: Transportation Savings Using Rail Intermodal from the Port of NY/NJ to Toronto (via Buffalo – Round Trip Dray)

	Low	High
All Truck Alternative		
NY/NJ to Toronto Round Trip Dray	$2,000	$2,000
Truck/Rail Intermodal		
Rail Cost – NY/NJ to Buffalo	$700	$500
Dray from Buffalo to Toronto	$550	$450
Total	$1,250	$950
Truck/Rail Intermodal Savings	$750	$1,050

Chicago – Buffalo Service

Ports on the West Coast offer another significant source of potential intermodal traffic for the Greater Buffalo-Niagara region. Most likely, this traffic would be interchanged with western rail carriers in Chicago. A significant portion of existing intermodal traffic coming into the Greater Buffalo-Niagara region from Chicago does not come by rail. Instead, containers are transported from West Coast ports to Chicago by rail and drayed by truck to the Buffalo area. A lesser number of containers are shipped from West Coast ports to Chicago where they are interchanged to an eastern rail carrier, brought to a terminal such as Columbus and then trucked to the Buffalo area. Analysis suggests that shippers that currently truck containers from Chicago could enjoy significant transportation cost savings with improved rail intermodal service from

[33] Drayage between Buffalo and closer areas, such as Hamilton, ON would be less expensive. Toronto was chosen as a benchmark, since the Greater Toronto Area was identified as the largest source of freight crossing the border at Buffalo in Technical Memorandum # 3.

Chicago to Buffalo. A quote from a drayage company suggests that the round-trip drayage from Chicago to Buffalo and back is around $1,600 to $1,800 per container. Based upon CSXT's average revenue per ton-mile, a distance by rail of about 522 miles, the rail cost of this move would be around $600 to $800 per container. Total transportation cost savings would be around $750 to $1,050.

Figure 7- 10: Transportation Savings Using Rail Intermodal from Chicago to Buffalo

	Low	High
All Truck Alternative		
NY/NJ to Toronto Round Trip Dray	$1,600	$1,800
Truck/Rail Intermodal		
Rail Cost	$800	$600
Dray from Buffalo to Toronto	$250	$250
Total	$1,050	$750
Truck/Rail Intermodal Savings	$550	$1,050

Benefit/Cost Assessment of Buffalo Logistics Center

Below is a benefit cost analysis of the Buffalo Logistics Center. This analysis does not address the economic development impacts of a logistics center in terms of jobs, payroll, or potential increases in Gross Region Product. These issues will be handled later in this Technical Memorandum. Rather, the analysis focuses on user benefits, and specifically the user benefits from one activity: truck/rail intermodal. If the Buffalo Logistics Center generates greater usage of truck/rail intermodal, what are the benefits? The analysis compares a non-project scenario to two project scenarios. These scenarios are as follows:

- Non-Project Scenario: Under the non-project scenario, no intermodal capacity is added, and the CSX Seneca Yard reaches capacity in 2015 at 60,000 containers, per a CSX forecast that was presented to the Buffalo-Niagara Logistics Council in August of 2007. Under this scenario, traffic that would otherwise use travel truck/rail intermodal is instead trucked. NS intermodal operations are not capacity-constrained.
- Project Scenario – Low: Under this scenario, a new intermodal facility is funded. Intermodal traffic handled through Buffalo grows to 60,000 units in 2015, identical to the non-project scenario, but then continues to grow at a rate consistent within inbound, outbound container traffic shown in Technical Memorandum #3, Exhibit 4-14. Shipper savings from rail intermodal are relatively low
- Project Scenario – High: Under this scenario, not only is a new facility built, but the savings of using intermodal service through Buffalo is high. The area is successful in marketing the area as a logistics center to Toronto shippers. Specifically, it is assumed that the region will handle an additional 27,285 containers in 2015. These correspond to the traffic that was identified traveling through the region between the Port of NY/NJ in the World Trade Center of Buffalo-Niagara *Intermodal Freight Terminal Volume Intermodal Feasibility Study*

For the project scenarios, the analysis periods include a 2-year construction period (2013 to 2014), and 20-year (2015 to 2034) operational period.

Figure 7- 11 presents the estimated difference in container traffic between the non-project scenario and the low and high – project scenarios, which account 0.4 million and 1 million containers over the 20-year operational period, respectively.

Figure 7- 11: Estimated Difference in Container Traffic
Between Non-Project and High and Low Project Scenarios

Year	Low Project Scenario	High Project Scenario	Year	Low Project Scenario	High Project Scenario
2015	0	0	2025	19,237	55,270
2016	1,677	29,724	2026	21,531	58,607
2017	3,401	32,232	2027	23,892	62,041
2018	5,173	34,810	2028	26,321	65,574
2019	6,995	37,461	2029	28,820	69,210
2020	8,868	40,185	2030	31,391	72,951
2021	10,827	43,035	2031	34,084	76,868
2022	12,842	45,966	2032	36,856	80,900
2023	14,914	48,981	2033	39,709	85,051
2024	17,046	52,081	2034	42,647	89,325
Total=	-	-	-	386,232	1,080,274

Under the low-project scenario, this analysis assumes 28 percent of the traffic is between the Port of NY/NJ and Buffalo (i.e., NY – Buffalo), and 72 percent of the traffic is between Buffalo and Chicago (i.e., Chicago – Buffalo). This is roughly based upon CSX estimates. Under this scenario, no traffic is shipped to Toronto. Per the low scenario displayed in **Figure 7- 11** above, service between Toronto and the Port of NY/NJ is uneconomical. Under the high-project scenario, 19 percent of the container traffic is on the route of NY – Buffalo, and 49 percent of the traffic is on the route of Chicago – Buffalo, and the remaining traffic is shipped to between the Port of NY/NJ and Toronto.

To estimate the user benefits associated with a new intermodal center serving the Buffalo area, the study team compared the intermodal service with truck shipping in terms of shipping rates, transit time, fuel consumption, emissions and safety. There are five types of costs associated with shipping by truck compared to rail:

- Shipping Cost: the difference in costs that shippers pay between truck/rail service and all truck service
- Inventory Cost: inventory in transit has a cost, as it is very often financed or represents postponed profits. Train delays extend the time in transit
- Emission Cost: fuel efficiency rates associated with truck and rail would result in different amounts of emissions affecting the environment
- Safety Cost: Railroad transportation is generally safer than truck transportation. The proposed intermodal project helps to promote safety by removing the trucks off the road
- Highway Maintenance Cost: heavy-loaded trucks is one of the major sources for highway damage, and the intermodal service will help to reduce the cost by diverting trucks from the highway

Shipping Cost Savings

Rail facilities provide shippers with additional transportation options that allow them to lower their transportation costs. The difference between the cost of truck and the cost of rail service is the transportation efficiency benefit. Rail carriers can provide the likely distribution of traffic by rail origin and destination to and from the intermodal terminal. In the case of intermodal container facilities, origins and destinations are dictated by the terminal's intended train schedules. Equivalent truck mileage is calculated for each origin/destination.

Based on information collected from trucking companies and the railroads, this analysis estimates shipping cost savings by using rail verses using truck shipping (**Figure 7- 12**), which suggests that the shipping cost savings per container is higher for high-project scenario than the low-project scenario.

Figure 7- 12: Shipping Cost Savings ($2008 per Container)

Low Project Scenario			High Project Scenario		
NY-Buffalo	NY-Toronto	Chicago-Buffalo	NY-Buffalo	NY-Toronto	Chicago-Buffalo
$350	$0	$550	$800	$550	$850

Source: Prepared by Wilbur Smith Associates based on average rates, discussions with motor carriers

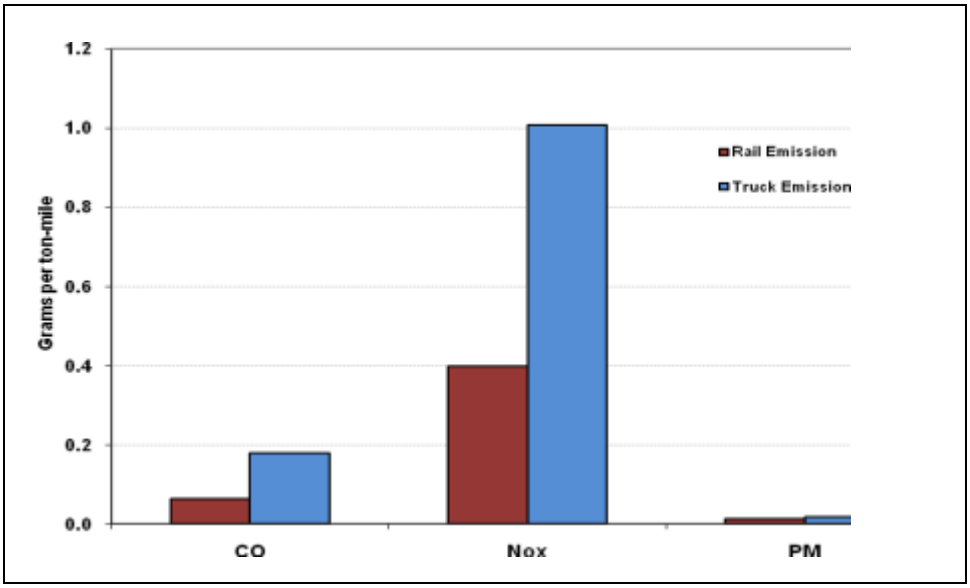
Inventory Cost Savings

Shippers must pay to finance inventory while it is in-transit on rail or truck. Longer transit times increase this cost by adding to the amount of time that inventory must remain in-transit and therefore be financed. The U.S. Federal Highway Administration (FHWA) Intermodal Transportation and Inventory Cost Model State Tools (ITIC-ST) estimates the cost of in-transit inventory to be 13.33 percent per year of the value of the inventory. Data collected from FHWA Freight Analysis Framework–2 (FAF-2) suggests that the inventory value per ton is about $925 for intermodal rail traffic, so inventory carrying cost is around $0.014 (in 2008$) per ton-hour.

Emission Cost Savings

Figure 7- 13 compares the emissions of truck and rail. As can be seen, rail has a clear advantage over truck operations. Rail emits fewer emissions, especially for Carbon Monoxide (CO), Nitrogen Oxide (NOx) and Particulate Matter (PM), compared with truck for moving the same amount of ton-miles. Therefore, emission cost savings can be generated by diverting truck traffic to rail.

Figure 7- 13: Emissions Comparisons across Modes



Source: (1) FHWA, Estimation of Future Truck Emission Factor, available online at: http://www.fhwa.dot.gov/environment/freightaq/appendixb.htm
(2) EPA, Emission Factor for Locomotive, available online at: http://www.epa.gov/nonroad/locomotv/frm/42097051.pdf

Estimates within the CAFE standard (Corporate Average Fuel Economy, 2009) can provide estimated damage costs of emissions (**Figure 7- 14**).

Figure 7- 14: Damage Costs for Transportation Emissions (2007$ per ton)

CO	NOX	PM10	SOX	VOC	CO2
-	$4,000	$168,000	$16,000	$1,700	$33

Note: Annual increases in CO2 damage cost is 2.4 percent
Source: USDOT, Corporate Average Fuel Economy for MY 2011 Passenger Cars and Light Trucks, March 2009, page V-III 60

Safety Cost Savings

Safety costs refer to the economic value of damages caused by transportation-related accidents. Based on statistics published by the Federal Railroad Administration (FRA) and the Federal Highway Administration (FHWA), nationwide rail freight tends to have lower accident rates and safety costs compared to truck operations for moving the same amount of goods. To compare the safety costs between truck and rail, this analysis investigates the number of fatalities and injuries for Class I railroads over the period 1998 to 2007. The estimated safety cost for rail shipping is $0.004 (in 2009$) per ton-mile. Fatality and injury rates for combination trucks are developed based on FHWA, *Highway Statistics 2006* and EPA, *Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel.*

Highway Maintenance Cost

The analysis of highway maintenance implications rests on the assumption that truck transportation and rail transportation are substitutes for one another. The built scenarios will reduce truck trips on the highways, and not building an intermodal center will increase truck trips. **Figure 7- 15** presents the truck distance for three indentified potential markets.

Figure 7- 15: Truck Distance (miles)

NY-Buffalo	NY-Toronto	Chicago-Buffalo	Buffalo-Toronto
395	490	534	99

Source: Mapquest.com

The assumed highway damage associated with trucking is $0.056 per ton-mile. This is based upon the FHWA's *Highway Cost Allocation Study, 2000 Update*, indexed to 2008.

Figure 7- 16 presents the total estimated economic impacts by comparing project scenarios with non-project scenario. If assuming the container traffic will growth slowly between Buffalo and potential markets, the present values of economic impacts associated with the low-project scenario account for $145 million and $75 million under three percent discount rate and seven percent discount rate, respectively; while under a high container growth assumption, the present values of benefits account for $557 million and $310 million under three percent discount rate and seven percent discount rate, respectively. The total traffic for high-project scenario is two times larger than the low-project scenario, while the discounted benefits are three times larger than the low-project scenario.

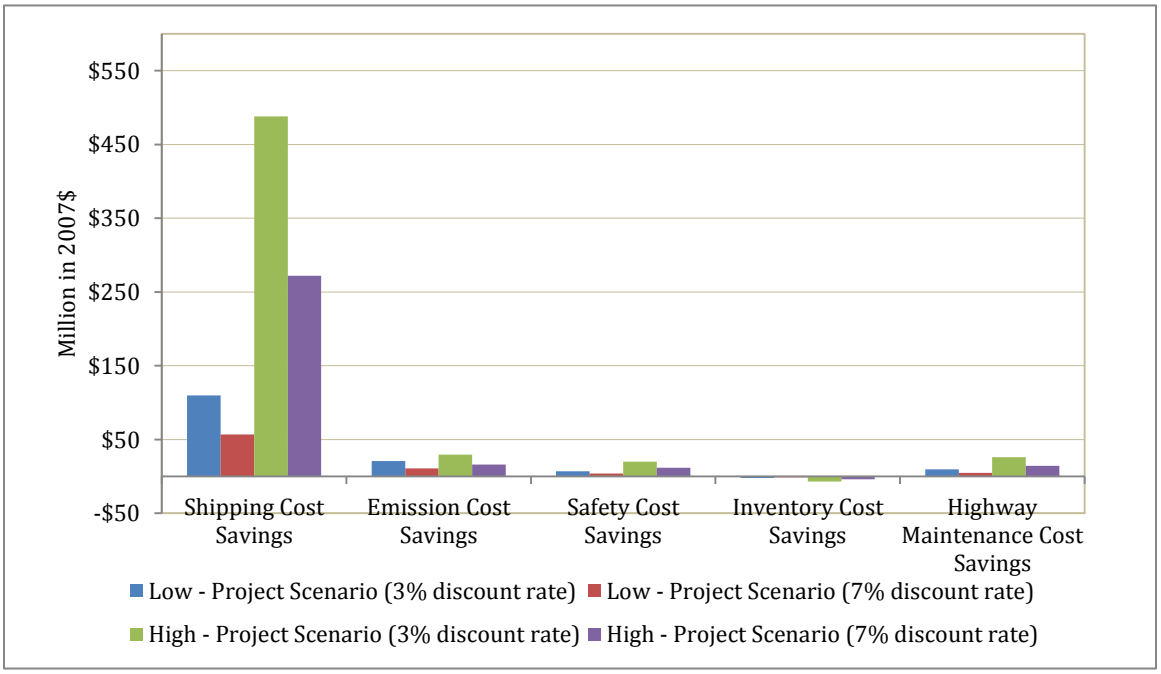
Figure 7- 16: Present Values of Benefits (millions)

Scenario	3% Discount Rate	7% Discount Rate
Low - Project Scenario	$145	$75
High - Project Scenario	$557	$310

Source: Prepared by Wilbur Smith Associates

Figure 7- 17 displays the benefits by sources. Close to 90 percent of the benefits is shipping cost savings, and a conservative estimate of the shipping cost savings is $50 million over a 20-year analysis period, while an aggressive estimate is $480 million. Emission cost savings, safety cost savings and highway maintenance cost savings account for 12 to 15 percent of the total benefits. Although truck shipping has advantages in saving inventory cost, the impact is minor compared with other saving categories.

Figure 7- 17: Benefits by Source



Source: Prepared by Wilbur Smith Associates

Under the low-project scenario, it is assumed that $25 million is spent on the new intermodal terminal. Under the high-project scenario, the same money is spent on the new intermodal terminal, but $300,000 is also spent marketing the Buffalo logistics center for every year. All benefit and cost figures are discounted to 2010. The worst benefit/cost ratio of all four scenarios is about three.

Figure 7- 18: Benefit Cost Ratio of Projects to Expand Intermodal Service

Scenario	3% Discount Rate	7% Discount Rate
NPV Benefits (Millions)		
Low - Project Scenario	$145	$75
High - Project Scenario	$557	$310
NPV Costs (Millions)		
Low - Project Scenario	$25	$25
High - Project Scenario	$30	$29
Benefit/Cost Ratio		
Low - Project Scenario	5.9	3.1
High - Project Scenario	18.6	11.0

Source: Prepared by Wilbur Smith Associates

7.4 Economic Impacts of Buffalo Logistics Center

In Technical Memorandum #4, a concept was proposed for Buffalo as a logistics complex. The largest benefit from a logistics center in Buffalo would be economic development. The key components of the proposed logistics complex are:

- Rail Intermodal Terminal(s)
- Warehousing and Distribution Facilities offering comprehensive functions that not only include the pure logistics services, such as transportation and storage, but also specialize in value-added services that can enhance the goods prior to reshipping to consumer markets

A growth in container traffic could cause carriers or their contractors to employ an additional 10 to 15 employees at the rail intermodal terminal(s) to handle the additional traffic. However, warehousing, distribution services and other value-added activities offered by the new logistics complex would generate more employment and economic activity than those generated by the terminal(s). For instance, a recent study for the Southern California Association of Governments (SCAG) estimates that logistics/distribution facilities employ on average, nine people per acre compared to people per acre employed on average, by rail intermodal terminals.[34]

The potential economic development impact of the Buffalo Logistics Center will depend upon a number of factors, including the size of the logistics center, the scope and scale of activities that take place there, and the amount of traffic that travels through the logistics center.

[34] Tioga Group, Inc. for the Southern California Association of Governments, *Inland Port Feasibility Study, Tasks 3 – 5 Draft Report*, March 2008

Figure 7- 19 relates the number of jobs created and amount of private investment at various logistics centers to the container traffic at associated rail intermodal facilities. The private investment figures include investment that is unrelated specifically to the intermodal terminal itself. These consist of warehousing and distribution facilities, as well as some manufacturing facilities that have been constructed near the intermodal terminals. The employment statistics include employment in the logistics centers and do not include secondary employment impacts. The statistics for the Joliet Arsenal Development Authority and the Frank C. Pidgeon Industrial Area represent impacts that have occurred (historical), while the statistics for the UP Global III Intermodal Center and the KC Logistics Park are forecasts. To be conservative, the analysis focuses on centers that are focused solely on logistics. Other sites such as the Alliance Logistics Park in Texas have generated far more private investment and created more direct employment. However, Alliance also includes a number of non-logistics commercial activities that might not be available within a Buffalo logistics complex.

Figure 7- 19: Economic Development Impacts of Selected Logistics Centers

Inland Port	Private Investment	Jobs	Containers	Acres	Jobs per 1,000 Containers	Private Investment. per Container
Historical						
Joliet Arsenal Development Authority, IL [1]	$345 million	1,000	223,000	1,870	4.48	$1,548
Frank C. Pidgeon Industrial Area, Gateway Memphis[2]	$230 million	225	160,000	2,500	1.41	$1,438
Projected						
UP Global III Intermodal (Rochelle, IL) [1]	$440 million	1,500	720,000	1,592	2.08	$611
KC Logistics Park - Year 1 (Kansas City)[3]		340	483,000	1,000	0.70	Not Avail.
KC Logistics Park - Year 16 (Kansas City)[3]		4,900	1,062,000	1,000	4.61	Not Avail.

[1] Illinois Department of Transportation
[2] Memphis Business Journal
[3] HDR, *Traffic Study for the Proposed Logistics Park in Johnston County, KS*, March 14, 2006

Unsurprisingly, logistics centers generate higher rates of employment and investment the longer time they have to attract tenants. The KC Logistics Park is anticipated to generate less than one job per container handled its first year, but nearly five jobs per container by its sixteenth year of operation. The Frank C. Pidgeon/Gateway Memphis Terminal has been slow in attracting tenants. DeSoto County, MS has drawn development away from the Memphis area, since taxes in this jurisdiction are lower and permitting is less rigorous. The Frank C. Pidgeon Area also has attracted one tenant, Nucor Steel. It is expected that Nucor's suppliers and customers will also relocate to the area. This could increase employment above the modest 1.41 jobs per 1,000 containers shown above.

It is reasonable to expect that for every 1,000 containers approximately 2 to 4.5 jobs at the logistics center would be created and about $600 to $1,600 (in 2007$) in private investment would be stimulated. This in turn would have a positive impact on economic development. Based upon the incremental container counts that appear in

Figure 7- 19 above, the impacts on jobs and private investment of the low and high project scenarios are shown in

Figure 7- 20. This does not include the economic impact of the transportation efficiency benefits described above in the benefit/cost analysis. In reality, improved transportation rates and options would provide area shippers with more money to invest and pay their employees. This in turn would have a positive impact on economic development within the region.

Figure 7- 20 focuses solely on the incremental impact of companies moving into and investing in the logistics center.

Figure 7- 20: Jobs and Incremental Investment Created by Logistics Center

Year	Low Scenario			High Scenario		
	Incr. Containers	Jobs	Private Investment (2007$)	Incr. Containers	Jobs	Private Investment (2007S)
2016	1,677	3	$1,006,278	29,724	134	$47,558,925
2017	3,401	7	$1,034,405	32,232	145	$4,012,783
2018	5,173	10	$1,063,320	34,810	157	$4,124,948
2019	6,995	14	$1,093,041	37,461	169	$4,240,250
2020	8,868	18	$1,123,595	40,185	181	$4,358,774
2021	10,827	22	$1,175,546	43,035	194	$4,560,314
2022	12,842	26	$1,208,991	45,966	207	$4,690,051
2023	14,914	30	$1,243,385	48,981	220	$4,823,481
2024	17,046	34	$1,278,759	52,081	234	$4,960,705
2025	19,237	38	$1,315,139	55,270	249	$5,101,835
2026	21,531	43	$1,376,430	58,607	264	$5,339,604
2027	23,892	48	$1,416,280	62,041	279	$5,494,194
2028	26,321	53	$1,457,284	65,574	295	$5,653,259
2029	28,820	58	$1,499,475	69,210	311	$5,816,931
2030	31,391	63	$1,542,886	72,951	328	$5,985,340
2031	34,084	68	$1,615,533	76,868	346	$6,267,157
2032	36,856	74	$1,663,130	80,900	364	$6,451,799
2033	39,709	79	$1,712,128	85,051	383	$6,641,881
2034	42,647	85	$1,762,570	89,325	402	$6,837,563

Note: 'Low Scenario' assumes that for every 1,000 containers, about two jobs at the logistics center would be created and about $600 in private investment would be stimulated. 'High Scenario' assumes that for every 1,000 containers, about 4.5 jobs at the logistics center would be created and about $1,600 in private investments would be stimulated.

The potential secondary economic impacts of a logistics center in Buffalo were analyzed using the Minnesota IMPLAN Group's IMPLAN model. The model was originally created by the University of Minnesota for the U.S. Forest Service to use in land and resource management planning. Since that time, the model has gained wide acceptance. The economic theory underlying the IMPLAN model contends that money injected into a local economy will generate additional output through a multiplier, or "ripple effect". Expenditures by one industry impact other industries in the area. Economic impacts are comprised of three parts:

- Direct Impacts: impacts directly associated with a change in economic activity
- Indirect Impacts: investments/expenditures that are caused by direct expenditures in other parts of the economy. For example, if a builder is hired to construct a building, that builder will then purchase materials and services to be able to construct the building, thus impacting the economic activity of these suppliers
- Induced Impacts: impacts that result from wages and other income paid to employees, which in turn purchase goods and services, thus increasing consumer spending

The development of a logistics complex in Buffalo would affect the economy in two phases: construction and operations. Considering only the Bethlehem Steel site and not other sites that would expand or be developed, construction of a logistics center would cost about $25 million (in 2007$). In addition, the development of the logistics center would help spur further private direct investment in the logistics complex. This would amount to about $26 million under the low-project scenario and about $143 million under the high-project scenario by 2034.

As abovementioned, the potential economic development impact of the new logistics complex in the GBN Region will depend upon a number of factors, including the size of the logistics center, the scope and scale of activities that take place there, and the amount of traffic that travels through the logistics center. This study quantifies three types of economic benefits:

- Economic impacts arising from expenditures on labor and material used in constructing the new rail terminal(s)
- Economic impacts arising from private expenditures (i.e., construction, operations and maintenances expenditures) on warehousing, distribution and manufacturing facilities to be located near the new intermodal terminal
- Economic impacts resulting from expenditures made by employees of the logistics complex in the region

The construction time frame of the new rail terminal is estimated to be two years, starting in 2013 and ending in 2014. For both low and high scenarios, the construction investment will represent a total of $25 million (in 2007$).

Error! Reference source not found. presents the annual economic impacts accruing to the GBN Region as a result of construction expenditures on the new Buffalo Logistics Center. During the construction period, the proposed facility will generate $18.7 million (in 2007$) per year of economic output. This level of economic activity will generate 153 new temporary jobs and $7.4 million (in 2007$) per year of labor income.

Figure 7- 21: Annual Economic Impacts Accruing to the Buffalo-Niagara Region from the Allocation of Construction Expenditures of the Rail Terminal

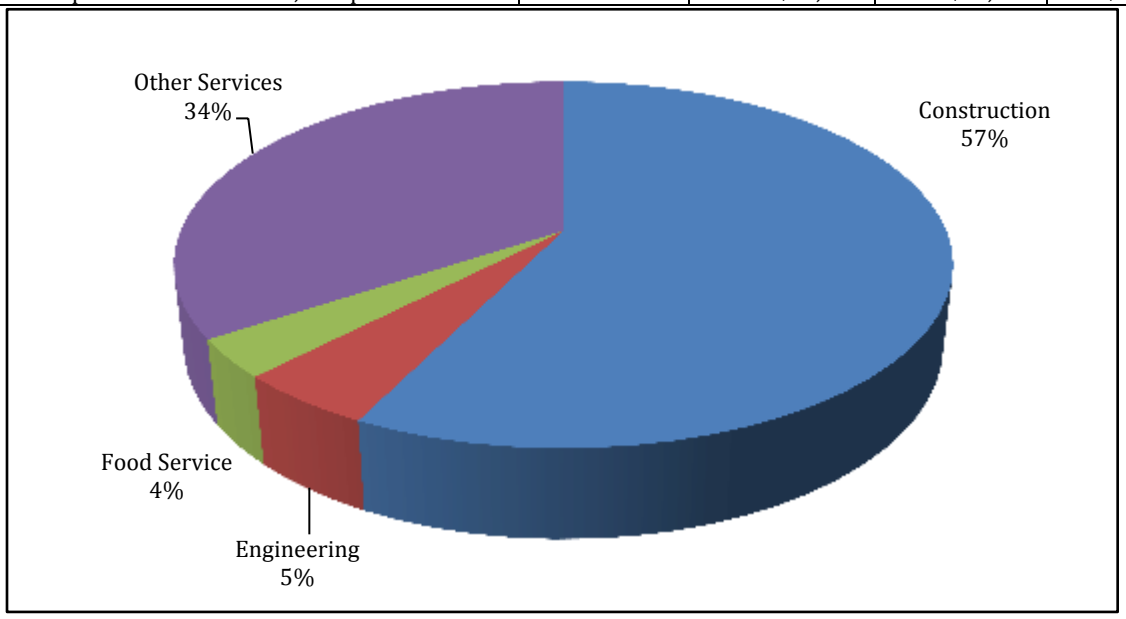
Impact Type	Employment		Labor Income (in 2007$)	Value Added (in 2007$)	Output (in 2007$)
	Number	Percent			
Direct Effect	88	57%	$4,397,876	$4,735,788	$10,482,807
Indirect Effect	30	20%	$1,651,832	$2,362,886	$4,301,356
Induced Effect	35	23%	$1,302,312	$2,274,316	$3,915,783
Total Effect	153	100%	$7,352,020	$9,372,989	$18,699,945

Source: Prepared by Wilbur Smith Associates

Figure 7- 22 presents the top ten industrial sectors that would realize the highest economic benefits. As expected, most of the jobs will be generated within the construction sector, accounting for 57 percent of total new jobs, followed, by far, by jobs generated in the architectural, engineering and related services.

Figure 7- 22: Employment Impact by Industry Sector Resulting from the Construction of the Rail Terminal(s)

Sector	Employment	Labor Income (in 2007$)	Value Added (in 2007$)	Output (in 2007$)
Construction of other new nonresidential structures	88	$4,397,876	$4,735,788	$10,482,807
Architectural, engineering, and related services	8	$523,210	$527,165	$839,952
Food services and drinking places	5	$87,243	$123,345	$267,209
Wholesale trade businesses	3	$206,981	$351,121	$546,330
Employment services	2	$71,311	$71,432	$87,850
Offices of physicians, dentists, and other health practitioners	2	$134,576	$151,076	$225,977
Retail Stores - Food and beverage	2	$42,756	$62,413	$94,569
Private hospitals	2	$93,438	$99,226	$201,442
Legal services	2	$94,810	$125,747	$179,904
Automotive repair and maintenance, except car washes	2	$49,840	$68,700	$133,741



Source: Prepared by Wilbur Smith Associates

The second type of economic benefits accruing to the Greater Buffalo-Niagara region will arise from private construction expenditures on warehousing, distribution and manufacturing facilities at the Bethlehem Steel site over a 20-year period, from 2015 to 2034.

Figure 7- 23 presents the annual investments for the low-project scenario. As shown in this figure, annual expenditures on constructing warehousing and distribution facilities are between $1.0 million and $1.7 million (in 2007$), growing due to increased container traffic, and the total investment will account for $25.6 million (in 2007$) over the 20-year analysis period.

Figure 7- 23: Private Construction Expenditures on Warehousing, Distribution and Manufacturing Facilities – Low Scenario

Year	Annual Private Investment (in 2007$)	Year	Annual Investment (in 2007$)
2015	0	2025	$1,315,139
2016	$1,006,278	2026	$1,376,430
2017	$1,034,406	2027	$1,416,280
2018	$1,063,319	2028	$1,457,284
2019	$1,093,041	2029	$1,499,474
2020	$1,123,594	2030	$1,542,887
2021	$1,175,547	2031	$1,615,533
2022	$1,208,990	2032	$1,663,129
2023	$1,243,385	2033	$1,712,128
2024	$1,278,759	2034	$1,762,571
Total=			**$25,588,175**

Source: Prepared by Wilbur Smith Associates

Figure 7- 24 presents the total economic impacts accruing to the Greater Buffalo-Niagara region as a result of private investments for the low scenario. During the construction period, the new facilities will generate, annually, 11 new temporary jobs, $542,000 (in 2007$) of labor income, and $1.4 million (in 2007$) of economic output.

In the long-term, the private investment ($25 million in 2007$) on the new warehousing, distribution and manufacturing facilities at the Bethlehem Steel site can generate over $10 million (in 2007$) of personal income and over $26 million (in 2007$) of economic output in the Greater Buffalo-Niagara region.

Figure 7- 24: Total Economic Impacts Accruing to the Buffalo-Niagara Region as a result of Private Investments on the Logistics Center – Low Scenario

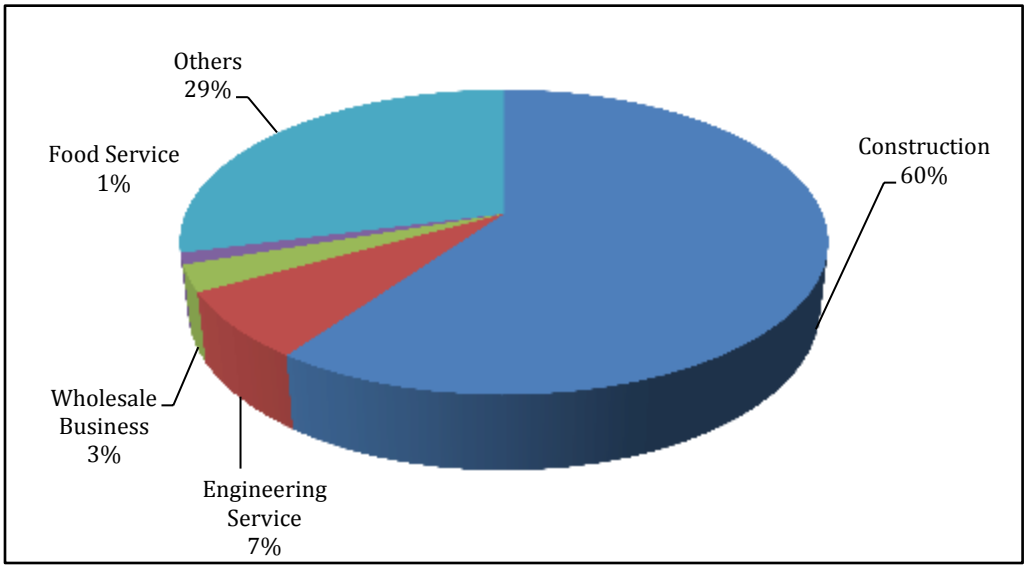
Construction Period (Average Annual Impact)				
Impact Type	**Employment**	**Labor Income (in 2007$)**	**Value Added (in 2007$)**	**Output (in 2007$)**
Direct Impact	6	$324,510	$349,443	$773,503
Indirect Impact	2	$121,885	$174,352	$317,387
Induced Impact	3	$96,095	$167,817	$288,937
Total Impact=	11	$542,489	$691,612	$1,379,827
Long Term Impact (20 - Year Period)				
Impact Type	**Employment (Job – Years)**	**Labor Income (in 2007$)**	**Value Added (in 2007$)**	**Output (in 2007$)**
Direct Impact	123	$6,165,681	$6,639,422	$14,696,560
Indirect Impact	43	$2,315,814	$3,312,692	$6,030,360
Induced Impact	49	$1,825,799	$3,188,517	$5,489,800
Total Impact=	215	$10,307,294	$13,140,631	$26,216,720

Source: Prepared by Wilbur Smith Associates

Figure 7- 25 presents the major labor income impacts by industrial sectors due to private expenditures on constructing the new warehousing, distribution and manufacturing facilities at the Bethlehem Steel site for

the low scenario. As expected, most jobs and personal income will be generated within the construction industry. However, other service sectors, such as engineering, wholesale business and food business, will also benefit from these private expenditures in the region.

Figure 7- 25: Personal Income Impact by Industry Sector Resulting from Private Construction Expenditures on Warehousing, Distribution and Manufacturing Facilities – Low Scenario



Source: Prepared by Wilbur Smith Associates

Figure 7- 26 presents the annual investments for the high scenario. As shown in this figure, the second year capital investment accounts for over $47 million (in 2007$) due to a sharp increase in container traffic. For the following years, annual expenditures spent on constructing the new warehousing and distribution facilities goes from approximately $4 million to $7 million (in 2007$) due to increased container traffic at the logistics center, and the total investment will account for $143 million (in 2007$) over the 20-year analysis period.

Figure 7- 26: Private Construction Expenditures on Warehousing, Distribution and Manufacturing Facilities – High Scenario

Year	Annual Private Investment (in 2007$)	Year	Annual Investment (in 2007$)
2015	0	2015	$5,101,835
2016	$47,558,925	2016	$5,339,604
2017	$4,012,783	2017	$5,494,194
2018	$4,124,949	2018	$5,653,260
2019	$4,240,250	2019	$5,816,930
2020	$4,358,774	2020	$5,985,340
2021	$4,560,313	2021	$6,267,157
2022	$4,690,052	2022	$6,451,799
2023	$4,823,481	2023	$6,641,881
2024	$4,960,706	2024	$6,837,563
Total=	NA	NA	$142,919,794

Source: Prepared by Wilbur Smith Associates

Figure 7- 27 presents the total economic impacts accruing to the Greater Buffalo-Niagara region as a result of private investments for the high scenario. During the construction period, the new facilities will generate, annually, 66 new permanent jobs, $3.1 million (in 2007$) of labor income, and $4.0 million (in 2007$) of economic output.

In the long-term, the private investment ($143 million in 2007$) on the new warehousing, distribution and manufacturing facilities at the Bethlehem Steel site could generate over 1,200 temporary jobs, $60 million (in 2007$) of personal income and over $152 million (in 2007$) of economic output in the Greater Buffalo-Niagara region.

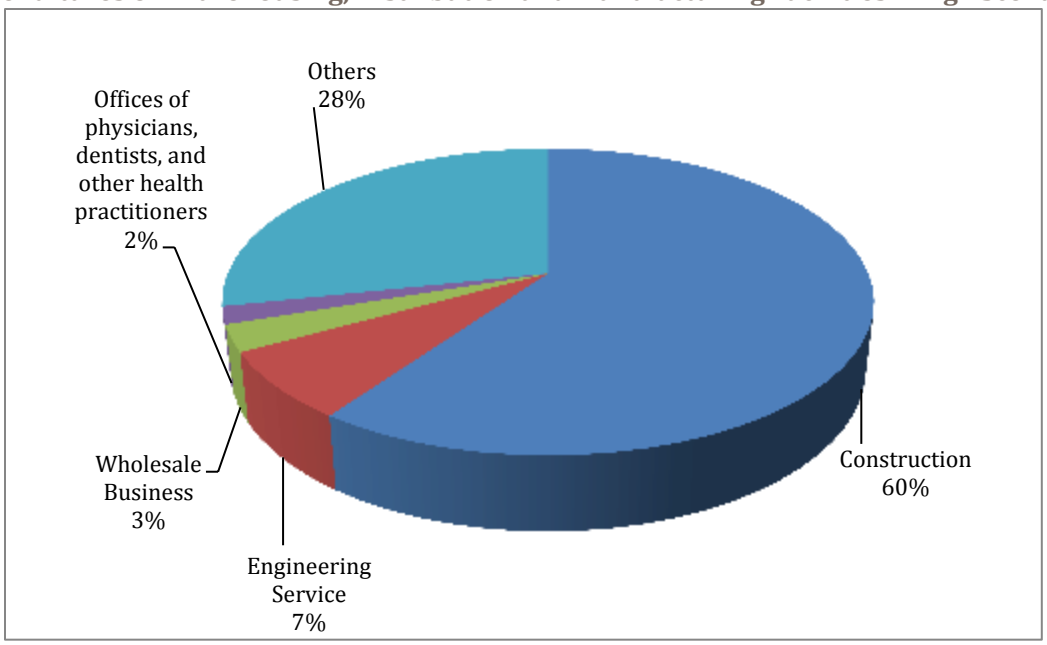
Figure 7- 27: Total Economic Impacts Accruing to the Buffalo-Niagara Region as a Result of Private Investments on the Logistics Center – High Scenario

Construction Period (Average Annual Impact)				
Impact Type	**Employment**	**Labor Income (in 2007$)**	**Value Added (in 2007$)**	**Output (in 2007$)**
Direct Impact	38	$1,881,924	$2,026,522	$4,485,766
Indirect Impact	13	$706,846	$1,011,118	$1,840,621
Induced Impact	15	$557,281	$973,217	$1,675,629
Total Impact=	66	$3,146,050	$4,010,857	$8,002,015
Long Term Impact (20 - Year analysis Period)				
Impact Type	**Employment (Job- Years)**	**Labor Income (in 2007$)**	**Value Added (in 2007$)**	**Output (in 2007$)**
Direct Impact	715	$35,756,550	$38,503,913	$85,229,555
Indirect Impact	246	$13,430,071	$19,211,238	$34,971,796
Induced Impact	285	$10,588,335	$18,491,127	$31,836,943
Total Impact=	1,245	$59,774,956	$76,206,278	$152,038,294

Source: Prepared by Wilbur Smith Associates

Figure 7- 28 shows the major labor income impacts by industrial sectors due to private expenditures on constructing the new warehousing, distribution and manufacturing facilities at the Bethlehem Steel site for the high scenario. As expected, most jobs and personal income will be generated within the construction industry. However, other service sectors will also benefit from these private expenditures in the region.

Figure 7- 28: Personal Income Impact by Industry Sector Resulting from Private Construction Expenditures on Warehousing, Distribution and Manufacturing Facilities – High Scenario



Source: Prepared by Wilbur Smith Associates

The third type of economic impact results from expenditures on services and other related activities (e.g., health care, food, etc.) made by employees of the logistics complex, including all associated warehouses, distribution centers and other assets in the Greater Buffalo-Niagara region. In order to support those employees' activities, additional services are required (e.g., food services) and additional jobs are generated in other industrial sectors.

Figure 7- 29 shows the total (direct, indirect and induced) economic impact for the low scenario. As shown in **Figure 7- 29**, in order to support the 773 jobs at the warehousing and distribution centers, another 348 jobs are created. This level of economic activity will generate $14 million (in 2007$) of personal income and $40 million (in 2007$) of output over the 20-year analysis period.

Figure 7- 29: Economic Impacts Resulting from Employee's Activities – Low Scenario

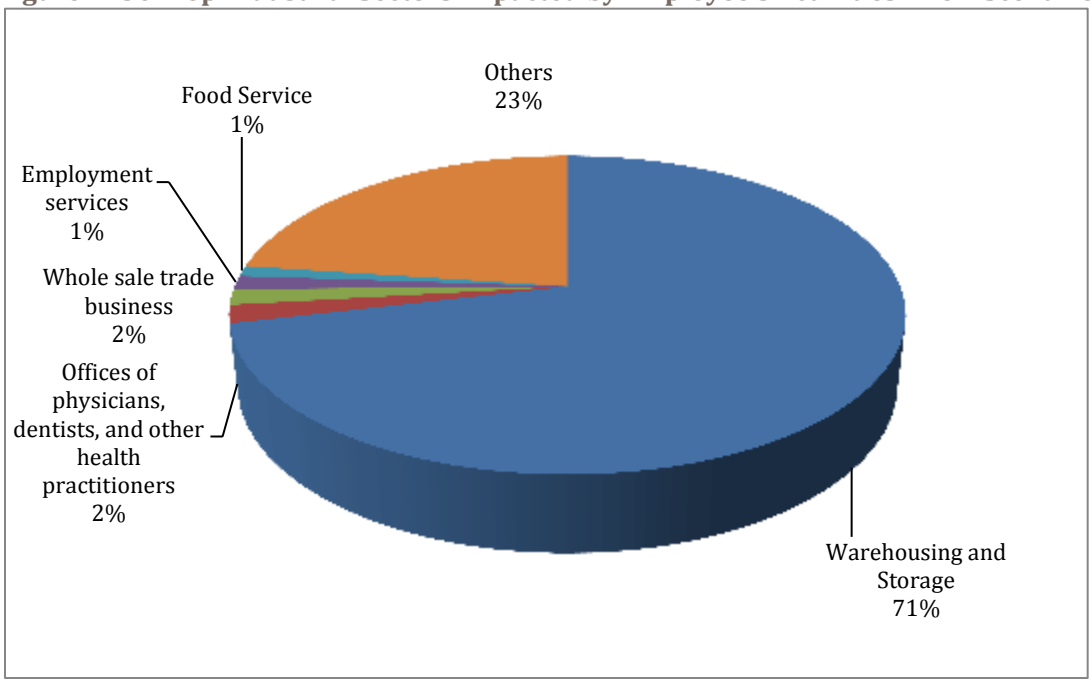
Long Term Impact (20 - Year analysis Period)				
Impact Type	**Employment (Job - Years)**	**Labor Income (in 2007$)**	**Value Added (in 2007$)**	**Output (in 2007$)**
Direct Impact	773	$33,055,335	$41,122,980	$60,835,893
Indirect Impact	124	$5,916,979	$9,591,293	$15,385,880
Induced Impact	224	$8,316,668	$14,523,771	$25,006,348
Total (indirect and induced)=	348	$14,233,647	$24,115,064	$40,392,228
Total (direct, indirect and induced)=	1,121	$47,288,982	$65,238,044	$101,228,121

Source: Prepared by Wilbur Smith Associates

Figure 7- 30 shows the top industrial sectors which are expected to benefit the most in terms of personal income under the low scenario. Most of the personal income will be created within the health care and

wholesale businesses (e.g., two percent of the total personal income). Other industrial sectors, such as the employment service and food service, will account for one percent of the total additional personal income, respectively.

Figure 7- 30: Top Industrial Sectors Impacted by Employee's Activities – Low Scenario



Source: Prepared by Wilbur Smith Associates

For the high scenario, approximately 5,000 temporary jobs at the warehousing and distribution centers (**Figure 7- 31**) will generate another 780 indirect jobs and 1,400 induced jobs in the Greater Buffalo-Niagara region. Over the 20-year analysis period, the additional personal income will account for $90 million (in 2007$) and the total output will account for $254 million (in 2007$).

Figure 7- 31: Economic Impacts from Employee's Activities – High Scenario

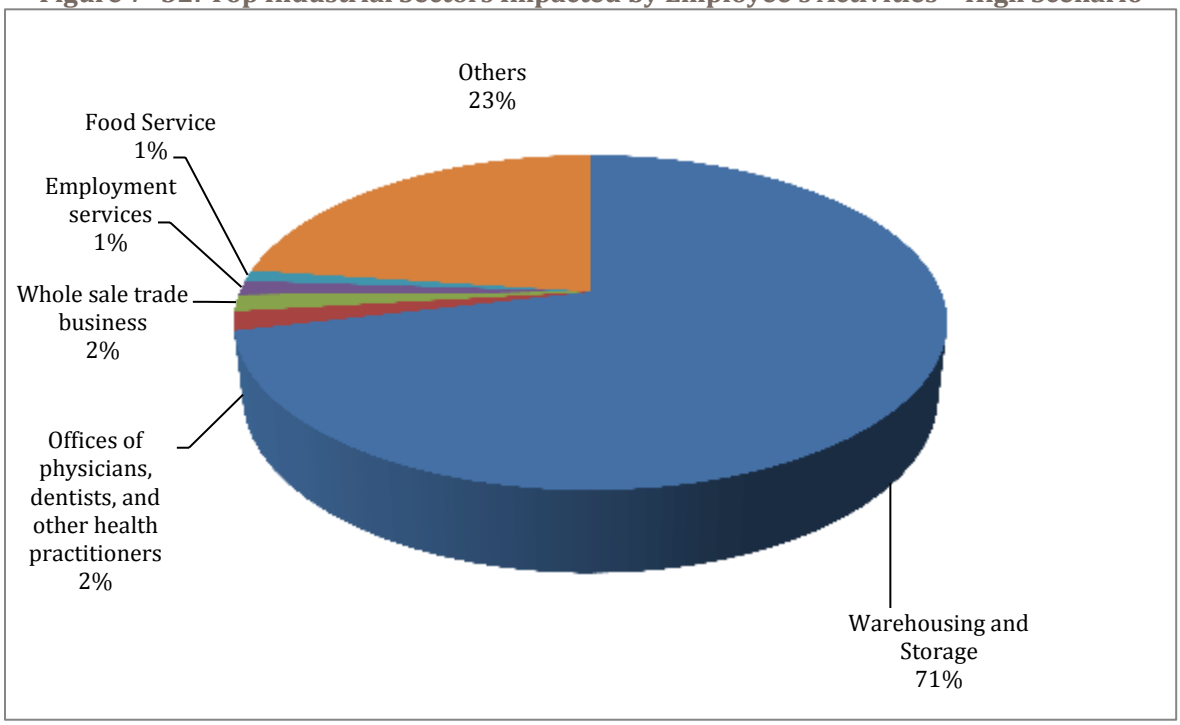
Long Term Impact (20 - Year analysis Period)				
Impact Type	**Employment (Job - Years)**	**Labor Income (in 2007$)**	**Value Added (in 2007$)**	**Output (in 2007$)**
Direct Impact	4,862	$207,910,797	$258,654,488	$382,644,380
Indirect Impact	780	$37,216,494	$60,327,133	$96,773,811
Induced Impact	1,408	$52,310,016	$91,351,355	$157,284,428
Total Impact (indirect and induced)=	2,188	$89,526,510	$151,678,488	$254,058,239
Total Impact (direct, indirect and induced)=	7,050	$297,437,307	$410,332,976	$636,702,619

Source: Prepared by Wilbur Smith Associates

Figure 7- 32 shows the top industrial sectors which are expected to benefit the most in terms of personal income under the high scenario. Similar to the low scenario, the wholesale trade business and health care

services will benefit the most (two percent of the total additional personal income) and other industries such as the employment service and food service will account for one percent of the total personal income.

Figure 7- 32: Top Industrial Sectors Impacted by Employee's Activities – High Scenario



Source: Prepared by Wilbur Smith Associates

Appendix A: TIGER Grant Application Projects

Figure A- 1: TIGER Grant Application Projects Not Elsewhere Discussed in this Technical Memorandum

ID	Type	Railroad	Project Location	Description	Est. Cost (millions)	Priority	Comments
2	Track/Yard	BPRR	Erie County	Rehabilitate Buffalo Creek Yard, to include ties, rail surfacing, turnouts	$1.80	Low	Although this project would benefit customers, could still serve customers without project.
3	Track Rehab or Upgrade	BPRR	Erie and Catt County	Upgrade Buffalo Line - Upgrade a 50-mile section of track from 10 mph to 25 mph (replacement to ties and ballast)	$3.50	Med/High	The BPRR previously filed to the STB to abandon this line and was denied on September 17, 1998. The line is in poor condition and needs work.
4	Equipment	BPRR	Erie and Catt County	Acquire four low emission locomotives	$6.00	Med	Project would help to reduce emissions in region. Need to ensure that cost is minimized. Project is inconsistent as to cost of low emission locomotives.
5	Track Rehab or Upgrade	BPRR	Erie and Catt County	Rail rehab - 75 miles and numerous structures	$2.00	Med	This rail line is in poor condition and needs upgrading.
6	Track Rehab or Upgrade	BPRR	Erie and Catt County	Upgrade 2 miles of track to and structure to accommodate 286,000 pound car capacity.	$1.00	Med/High	Upgrading rail line to accommodate 286K cars helps to keep rail line from becoming obsolete.
7	Rail Crossings or Signal	BPRR	Erie and Catt County	Upgrade crossings	$1.00	Low	Although project would improve safety, other programs fund crossing improvements.
8	Rail Crossings or Signal	BPRR	Erie and Catt County	Upgrade signals and dispatch	$2.00	Low	Although this would improve efficiency there is no evidence that track warrant control is insufficient for traffic on the line.
9, 10, 11	Track Rehab or Upgrade	BPRR	Erie County -	Bridge repair of highways over railroad	$5.00	Low	Although these projects would maintain state of good repair, it is uncertain who owns these bridges and whether they are the carrier's responsibility.
12	Track Rehab or Upgrade	BSOR	MP 28.12 and 28.18	Bridge rehab and repair	$0.19	Low	Although this project would help maintain good repair, the $190,000 cost of this project suggest that it is not major work, but ongoing maintenance.

ID	Type	Railroad	Project Location	Description	Est. Cost (millions)	Priority	Comments
13	Track Rehab or Upgrade	BSOR	MP 32.9	Bridge rehab and repair - Bridge needs a new deck. The Bridge is jointly maintained by Erie County	$0.70	Med/High	This bridge is half maintained by county and half maintained by carrier. County rehabbed half of deck but left other half to carrier to complete. It is inefficient to have half complete bridge rehab.
14	Track Rehab or Upgrade	BSOR	MP7-14 MP18.77-19.73 MP 22.76 - 23.21	Track rehab project - these sections of track desperately needs ties - rail is 112 pound CWR. BSOR has MP 7-14 listed as a top priority.	$0.82	High	Line is in poor condition and needs upgrading.
16	Track Rehab or Upgrade	BSOR	Buffalo Burrows Lot Industrial Yard	Upgrade Track and facility for grain elevator and proposed ethanol plant - Track needs to be upgraded from the current 80 to 100 pound rail to 115 pound rail.	$5.20	High	Because of grain elevator and potential ethanol plant, this project has high economic potential.
17	Equipment	DLWR		Standby power supplies for four locomotives	$0.10	Med/High	Efficient way to reduce emissions.
18	Rail Crossings or Signal	DLWR		Upgrade crossings - gates and lights	$0.25	Low	Although project would improve safety, other programs fund crossing improvements.
19	Track Rehab or Upgrade	DLWR		Nine miles of track and six bridges - Upgrade	$0.33	Low	Although would help to ensure continued rail service, already did major rehab 10 years ago. In 1999 was 40 mph line. All rails are 115 - 132 lbs and can accommodate 286 to 315K cars.
20	Rail Crossings or Signal	DLWR		Upgrade several surface crossings	$0.25	Low	Although would improve safety, fits more into the category of ongoing maintenance.
21	Track Rehab or Upgrade	DLWR	Tonawanda Creek	Double track bridge timber and upgrade to accommodate 315,000 pounds	$0.38	Low	Although would improve efficiency, 315K is not a minimum standard.
22	Track Rehab or Upgrade	DLWR	Erie County	Ties and ballast for track	$0.43	Low	Although would facilitate safe operations, appears to be ongoing maintenance.
23	Track Expansion	DLWR	Lancaster	Extend track into industrial park - add three switches	$0.33	Med	Promotes economic development.
24	Track Rehab or Upgrade	FRR	Lockport	Rail yard to handle ethanol and DDGS	$0.73	Med/High	Promotes economic development.
25	Rail Crossings or Signal	FRR	Niagara and Orleans	Upgrade signals and dispatch	$1.00	Low	Although project would improve safety, other programs fund crossing improvements.

ID	Type	Railroad	Project Location	Description	Est. Cost (millions)	Priority	Comments
26	Structure	FRR	Niagara	Engine house for 3rd locomotive	$0.14	Low	Although would have environmental benefits, does not appear to be required for ongoing operations.
27	Track Rehab or Upgrade	FRR		Bridge and track rehab	$0.55	Low	Although the project would help to preserve rail service, appears to be ongoing maintenance.
28	Bridge Rehab	GVT	Lockport	Rehab Falls River Road Bridge over Erie Canal	$1.00	High	High economic development potential
37	Track Rehab or Upgrade	SB	Erie County	Upgrade track and structure to accommodate 286,000 pounds.	$4.00	High	Upgrading rail line to accommodate 286K cars helps to keep rail line from becoming obsolete.
32	Track Rehab or Upgrade	SB	Erie County	Rehab rail yard and main track	$2.80	High	Line is in poor condition and needs upgrading.
34	Equipment	SB	Erie County	Acquire four low emission locomotives	$4.00	Med	Project would help to reduce emissions in region. Need to ensure that cost is minimized. Project is inconsistent as to cost of low emission locomotives.
35, 36	Track Rehab or Upgrade	SB	Erie County	Rehab track and bridges	$5.00	High	Line is in poor condition and needs upgrading.
37	Track Rehab or Upgrade	SB	Erie County	Upgrade 25 Miles of Track to carry 286K rail cars	$4.00	High	Upgrading rail line to accommodate 286K cars helps to keep rail line from becoming obsolete.
38	Rail Crossings or Signal	SB	Erie County	Upgrade crossings	$0.30	Low	Although project would improve safety, other programs fund crossing improvements.
39	Upgrade Signal System	SB	Erie County	Upgrade Signal System	$0.10	Low	Although this would improve efficiency there is no evidence that track warrant control is insufficient for traffic on the line.
40, 42	Track Rehab or Upgrade	SOM	Niagara	Track rehab	$2.90	Low	Although improvements would increase efficiency, line already has heavy rail at 119 - 136 lbs. CSX runs 6-axle power over the line.
41	Rail Crossings or Signal	SOM	Niagara	rehab crossings	$0.30	Low	Although project would improve safety, other programs fund crossing improvements.
43	Upgrade Signal System	SB	Erie County	Upgrade signals and dispatch	$1.25	Low	Although this would improve efficiency there is no evidence that track warrant control is insufficient for traffic on the line.

Appendix B: Freight Advisory Committee Bylaws

Mission

Insert Mission Statement

Article 1: Purpose, Values, Roles and Responsibilities

Section 1: Purpose

a. The Buffalo-Niagara Freight Advisory Committee (BNFAC or COMMITTEE) is defined in by (Insert statute or other mechanism).
b. Bylaws of BNFAC are created, deleted or amended consistent with (Insert statute of other mechanism), and upon deliberation and approval of quorum.
c. The purpose of BNFAC is to advise the Planning Committee of the Greater Buffalo-Niagara Regional Transportation Council (GBNRTC) on matters relating to the priorities, issues, freight mobility projects and funding requirements that impact multimodal freight mobility in Erie and Niagara Counties.
d. Upon requires, report to the (insert legislative body) on BNFAC business and issues affecting freight mobility.

Section 2: BNFAC Values

a. BNFAC values inclusiveness in deliberations, respect for a variety of interests in transportation decisions, and informed decision making.

BNFAC shall:

1) Serve as a forum for discussion, an opportunity for joint action, and a source of knowledge and advice for Niagara Frontier transportation decisions affecting freight mobility.
2) Promote the cross-sharing of information between private and public sectors on freight issues.
3) Advocate the importance of freight mobility to the economic well-being of the Buffalo-Niagara region.
4) Champion a sound multimodal freight goods delivery network.
5) Communicate and coordinate regional priorities with other organizations, including NYSDOT regions, area Commissions on Transportation, Metropolitan Planning Organizations (MPOs), regional partnerships, regional investment boards, NYSDOT Advisory Committees, etc.
6) Make an annual report to the GBNRTC Planning Committee on BNFAC business and freight transportation policy recommendations.
7) Upon request, report to the (insert legislative body) on the BNFAC business and freight transportation policy recommendations.

Section 3: The Roles and Responsibilities of BNFAC shall include but are not limited to:

a. Policy Development
   1) Advise in the development and update of the Transportation Improvement Plan and Long Range Plan for the Buffalo-Niagara region.
   2) Review and make recommendations on policy and planning initiatives that affect the region's multimodal freight infrastructure.

3) Monitor policy developmental activities of jurisdictions as they affect the movement of freight and the multimodal freight network.

b. Freight Mobility Project Selection Recommendations
   1) Focus on identifying separate modal lists of high priority freight projects in the Buffalo-Niagara region.
   2) Review and make recommendations regarding project funding priorities for the region's multimodal freight network.

Article 2: Membership

Section 1: Composition of Committee

a. The general membership of the COMMITTEE shall consist of not more than (X) members with full standing.
b. General membership in the COMMITTEE shall be open to any adult representative of a freight service provider, shipper, trade association, or business directly related to freight activities, and citizens experienced in fright mobility issues. Members should be interested in advocating and advising on the cost effective and efficient movement of goods and services and able to contribute to the development and implementation of investments, policies, and practices that benefit regional freight mobility. Members must be willing to attend meetings and actively participate in the work of designated sub-committees.
c. Associate membership may be extended to (insert membership requirements)
d. In addition to the general membership requirements, the COMMITTEE should strive to enhance diversity of freight interests by ensuring its membership draws upon all of the freight modal areas including trucking, rail, maritime, air, and pipeline. General membership should represent different geographic areas of the state and represent a cross-section of the major industrial sectors within the region.

Section 2: Appointment

a. Applications for general or associate membership shall be available through the (insert location).
b. The DIRECTOR shall appoint general members and associate members.

Section 3: Sub-committees

a. The COMMITTEE shall have standing sub-committees on "membership and nominations," "policy," and "projects." Other ad hoc sub-committees may be formed from time to time to conduct COMMITTEE business.
b. Sub-committee membership will be approved by simple majority of general members at a regularly scheduled meeting.
c. Sub-committee membership may include any general member or associate member in good standing.

Section 4: Voting

a. General members shall have one vote each to cast during attendance at any general or special meeting.
b. Associate members shall abstain from voting.

Section 5: Terms of Membership; Transitions to Staggered Terms

a. General members shall be appointed by the DIRECTOR and shall serve a four year term. Terms begin July 1st and terminate June 30th. Members will be identified as Category A, B, C, or D with eight general members in each category. Category A members will initially serve a four year membership, Category B members a three year membership, Category C members a two year membership, and Category D members a one year membership. Category membership has no connotation other than identification for membership terms.
b. Thereafter, general membership status will be reviewed annually by the membership sub-committee with one quarter of the general members being replaced annually. Neither general nor associate members are subject to term limits.
c. If any general is absent without good cause from three consecutive regularly scheduled meetings, the CHAIR may declare this position vacant. The DIRECTOR will appoint an individual to fill the vacant position for the remainder of the vacant position's term.
d. Associate members will be appointed by the DIRECTOR for a four year term.
e. If any associate member is absent without good cause from three consecutive regularly scheduled meetings, the CHAIR may declare this position vacant. The DIRECTOR, at his discretion, may elect to appoint a new associate member. If appointed to fill a vacant associate member position, this newly appointed associate member would begin a two year term upon appointment.

Article 3: Officers

Section 1: Officers

a. Officers of the BNFAC will include the CHAIR, Vice-chair, and standing sub-committee chairs.
b. Ad hoc sub-committee chairs are not offices of BNFAC.

Section 2: Committee Chairs

a. There shall be a Chair (CHAIR) and Vice-chair for the COMMITTEE, and chairs for each of the designated standing sub-committees, as well as any ad hoc sub-committees approved by the COMMITTEE.
b. Only general members are eligible for the positions of CHAIR, Vice-chair or standing sub-committee chair.
c. General and associate members may serve as chair of ad hoc sub-committees and are appointed by the CHAIR.
d. The CHAIR shall be elected by a simple majority vote of general members present.
e. The Vice-chair shall be elected by a simple majority of the general members present.
f. Standing and ad hoc sub-committee chairs shall be appointed by the CHAIR.
g. The CHAIR is ineligible to chair any sub-committee.

Section 3: Responsibilities of the CHAIR and Vice-Chair

a. The CHAIR shall:
    1) Appoint standing and ad hoc sub-committee chairs;
    2) Appoint members of standing and ad hoc committees;
    3) Develop agendas and conduct meetings;
    4) In January of each year provide a schedule of meetings for that year;
    5) Select the location of regularly scheduled meetings; and,

6) Call for elections of the CHAIR and Vice-chair prior to the expiration of their respective terms consistent with Sections 4 and 5 of this Article.

b. The Vice CHAIR shall:
   1) Perform all functions of and serve as the CHAIR in the absence of the CHAIR.

Section 4: Terms of Officers

a. Each CHAIR, Vice-chair, and standing sub-committee chairs shall each serve a planned two-year term. Terms begin in January of even-numbered years and end in December of odd-numbered years.
b. The CHAIR and Vice-chair and standing sub-committee chairs may serve multiple and or consecutive terms but shall stand for re-appointment every two years in December.
c. In the event the CHAIR has been in office for at least a six-month period and then vacates office for any reason, the Vice-chair will accede to the CHAIR for the remainder of the vacating CHAIR's planned two-year term. If the CHAIR has been in office for less than a six-month period and then vacates office for any reason, an election is required to select a CHAIR for the remainder of the vacating CHAIR's term.
d. If the Vice-chair accedes to the CHAIR due to Article III, Section 4, (c), then an election is required to select a Vice-chair for the remainder of said term.

Section 5: Nominations

a. The CHAIR shall receive nominations from the Membership and Nominations Sub-committee for the CHAIR and Vice-chair positions during a regularly scheduled meeting. Consideration for the CHAIR and Vice-chair position will be from the general membership of the COMMITTEE only.

Article 4: Meetings

Section 1: Meetings

a. Regularly scheduled COMMITTEE meetings will be held a minimum of four times per calendar year.
b. Special COMMITTEE meetings may be called upon consensus of the need to do so by the officers of the COMMITTEE. Sufficient advance notice will be given to comply with the requirements of the (Any applicable laws regarding meetings).
c. Two regularly scheduled COMMITTEE meetings will be scheduled in Salem.
d. A calendar for regularly scheduled COMMITTEE meetings will be submitted to the COMMITTEE by the CHAIR not later than January 31st of each calendar year for that calendar year. The calendar for regularly scheduled COMMITTEE meetings will specify date, time, and city in which the meeting will be held.

Section 2: Conduct of Meetings

a. A simple majority of general members present with full standing shall constitute a quorum for convening a meeting.
b. COMMITTEE business will be conducted by Roberts Rule of Order.
c. (Insert organization) staff shall be responsible for meeting minutes, distributing the meeting agendas, and other associated administrative duties required to support the business of the COMMITTEE.
d. Any general or associate member may request the CHAIR to place business on the agenda.

Section 3: Public Involvement and Citizen Input

a. BNFAC will comply with the requirements of the (Any applicable laws regarding meetings). Any general or sub-committee meeting is open to any person and to all that may wish to be heard regarding any agenda item.
b. Only general members of BNFAC are eligible to vote.

Article 5: Amendments to Bylaws

a. The COMMITTEE may propose amendment to the bylaws at any regularly scheduled meeting by vote of general members under the following conditions:
    1) The COMMITTEE shall agree to consider one or more amendments to the bylaws during a regularly scheduled meeting;
    2) Meeting notes reflect the discussion;
    3) Written notice of the proposed amendment(s) is sent to general members and posted for public notice not later than 60 days prior to the regularly scheduled meeting at which subject amendment is to be considered.
    4) Committee recommendations to the (organization if applicable) for proposed amendments to the bylaws shall require a two-thirds (2/3) vote of approval by the general membership.
    5) Proposed amendments that receive two-thirds (2/3) approval of the general membership will be submitted to the (organization if applicable) for consideration. The (organization if applicable) has full and sole discretion to take proposed amendments under consideration.

Appendix C: Potential Organization Members for the Buffalo-Niagara Freight Advisory Committee

Figure C- 1: Potential Organization Members for the Buffalo-Niagara Freight Advisory Committee

Potential Organization Members for the Buffalo-Niagara Freight Advisory Committee	
Institutional	Empire State Development Corporation
	Buffalo Niagara Partnership
	Buffalo Niagara Enterprise
	Buffalo Urban Development Corporation
	Niagara Frontier Transportation Authority
	Erie County Industrial Development Agency
	Erie County Economic Development Corporation
	Niagara County Industrial Development Agency
	Niagara County Economic Development
Surface Freight – Rail	CSX Transportation
	Norfolk Southern
	Canadian National
	Canadian Pacific
	Genesee & Wyoming
	Genesee Valley Transportation
	Buffalo Southern Railroad
Surface Freight – Transfer	Bison Yard
	Bulkmatic
	Laub
	Transflo
	Speed Transportation
Surface Freight – Motor Carriers	ABF Freight Systems, Inc.
	AIM Dedicated Logistics, Inc.
	American Freight Transport
	Bestway Distribution
	Capacity Transport
	Con Way
	Develan Industries
	Estes Express Lines
	Landstar Transportation Services, Inc.
	New Penn Motor Express, Inc.
	Old Dominion Freight Lines, Inc.
	Swift Transportation
	Saia Motor Freight Line, Inc.
	YRC, Inc.
Surface Freight – Marine	Great Lakes Towing Company
	Gateway Metro Port
	Port of Buffalo Users Group
	Buffalo Crushed Stone
Surface Freight – Air	Buffalo Niagara International Airport
	Niagara Falls International Airport
	Tech Aviation Services
	Superior Cargo Services
	Forward Air, Inc.
	Eagle Global Logistics
	FedEx
	UPS
	DHL

Potential Organization Members for the Buffalo-Niagara Freight Advisory Committee	
Logistics	Cargo International
	CEVA Logistics
	Circle International Group, Inc.
	Extra Mile Transportation
	G&C Logistics
	G&W International Forwarders, Inc.
	GBL Freight Forwarders
	K C Forwarding
	M&M Forwarding, Inc.
	Professional Distribution Ltd.
	Sam-Son Distribution Ltd.
	Sonwil Distribution
	WBE Forwarding
Shippers	AES Eastern Energy
	Cello-Pack
	Colorite WaterWorks
	DuPont De Nemours El & Co.
	Flexovit
	FMC Corporation
	Ford Motor Corporation
	General Mills
	General Motors Power Train Group
	Goodyear Dulop Tire North America
	Goya Foods
	Great Lakes Plastic, Inc.
	Jamestown Container Company
	Kraft Foods
	Metform
	Multisorb Technologies, Inc.
	New Penn
	NOCO Energy
	Northeast Great Dane
	Occidental Chemical Corp.
	Olin Chlor Alkali Products
	Prince Rubber & Plastic Company
	Protective Closures Co., Inc.
	Republic Engineered Products
	Rich Products
	Saint Gobain Advanced Ceramics
	Shuman Plastics
	Silicone Products & Technology, Inc.
	Tonawanda Coke Corporation
	Western New York Energy, LLC
	WSF Industries