X. IMPROVEMENT CONCEPTS

X.1 GUIDING PRINCIPLES IN CONCEPT DEVELOPMENT

Focusing upon the findings of the container flow model application for the future conditions, the study team developed a series of improvement concepts to serve the primary study area. A set of guiding principles was developed to focus and facilitate the concept development process. The principles included:

- Enhance multi-modal access and connectivity between marine ports, intermodal rail yards, warehouse/distribution dense trade clusters, and the regional transportation network.
- Utilize and enhance existing rail and roadway infrastructure to the maximum extent possible.
- Build upon infrastructure improvement plans currently being advanced by others.
- Create some "positive" system redundancy and multiple travel paths and mode options between marine ports, intermodal rail yards, warehouse/distribution dense trade clusters, and the regional transportation network.
- Minimize adverse environmental and community impacts that would result from the implementation of physical infrastructure improvements.
- Create "last mile" connections between roadway and rail spines and container places of first rest (warehouse / distribution centers).

X.2 IMPROVEMENT CONCEPT CATEGORIES

From the onset, it was the intent of this study to develop a wide range of improvements that do not rely solely on the ability of the roadway network to accommodate container movements by truck. It was recognized early on that a wide array of non-roadway improvements would likely provide significant benefit without requiring the construction of new or expanded roadway capacity. Accordingly, the team developed a series of improvement concepts for evaluation in this study. The categories were defined as:

- **Systems / Operational Improvements**
  - ITS System Architecture
  - Off-Peak Freight Operations
  - Container Management Strategies

- **Non-Roadway Infrastructure**
  - Elimination of height, weight, other capacity constraints

- Short Line/Short Haul Corridors
- Intermodal Yard Connectivity
- PIDN Rail/Barge

- **Roadway**
  - Truck Priority / Truck Only Facilities
  - NJTPK Interchange Enhancements
  - Last-Mile and Major Facility Connectors
  - Bridges (new or improved)

X.2.A SYSTEMS/OPERATIONS

Intelligent Transportation Systems (ITS) Architecture

ITS technologies and applications represent a set of powerful tools to ensure that existing infrastructure is utilized as efficiently as possible, and can help reduce or delay the need for new infrastructure development.

As a starting point in the definition of needed enhancements to the ITS architecture, the *Portway ITS Architecture Draft Report Chapters I-V, prepared by HNTB Corporation, May 2003* was reviewed. This document states that the goal of the Portway ITS Project is to improve *"connections between the Newark-Elizabeth Air/Seaport Complex and rail terminals and warehousing facilities to the north, as well as the surrounding transportation network"* (p. I-1). In order to develop an effective ITS system, a reliable communication system is essential.

Although there are several operational ITS systems in NJ, the Portway area lacks a strong communication network. As shown in Figure X.1, the current ITS systems are located on Route 80 (MAGIC), NJ Turnpike (I-95), and Route 21 (Main Line and Regional). NJ Department of Transportation (NJDOT) owns the MAGIC, Route 21 Main Line and Route 21 Regional ITS systems. It is recommended that the existing fiber optic backbone be extended sufficiently to facilitate implementation of the Portway ITS system.

After reviewing HNTB's table of ITS elements, user services and market packages were rearranged and prioritized. This re-prioritization is presented in Table X.1. The prioritization of services was based upon proven technologies, degree of difficulty to implement, and immediate user needs. Proven technologies have been successfully implemented around the country. They are not cutting-edge, but they are known to work

well and have proven to be more reliable than some of the newer technologies. It is recognized that some of the ITS components are more complex, and therefore more costly to implement. This factor was also taken into consideration when prioritizing the user services. The final factor that was considered when developing the list was immediate user needs. Obviously components that are needed immediately are a higher priority than those that will be required in the near to distant future.

Figure X.1
Existing and Proposed ITS System Coverage

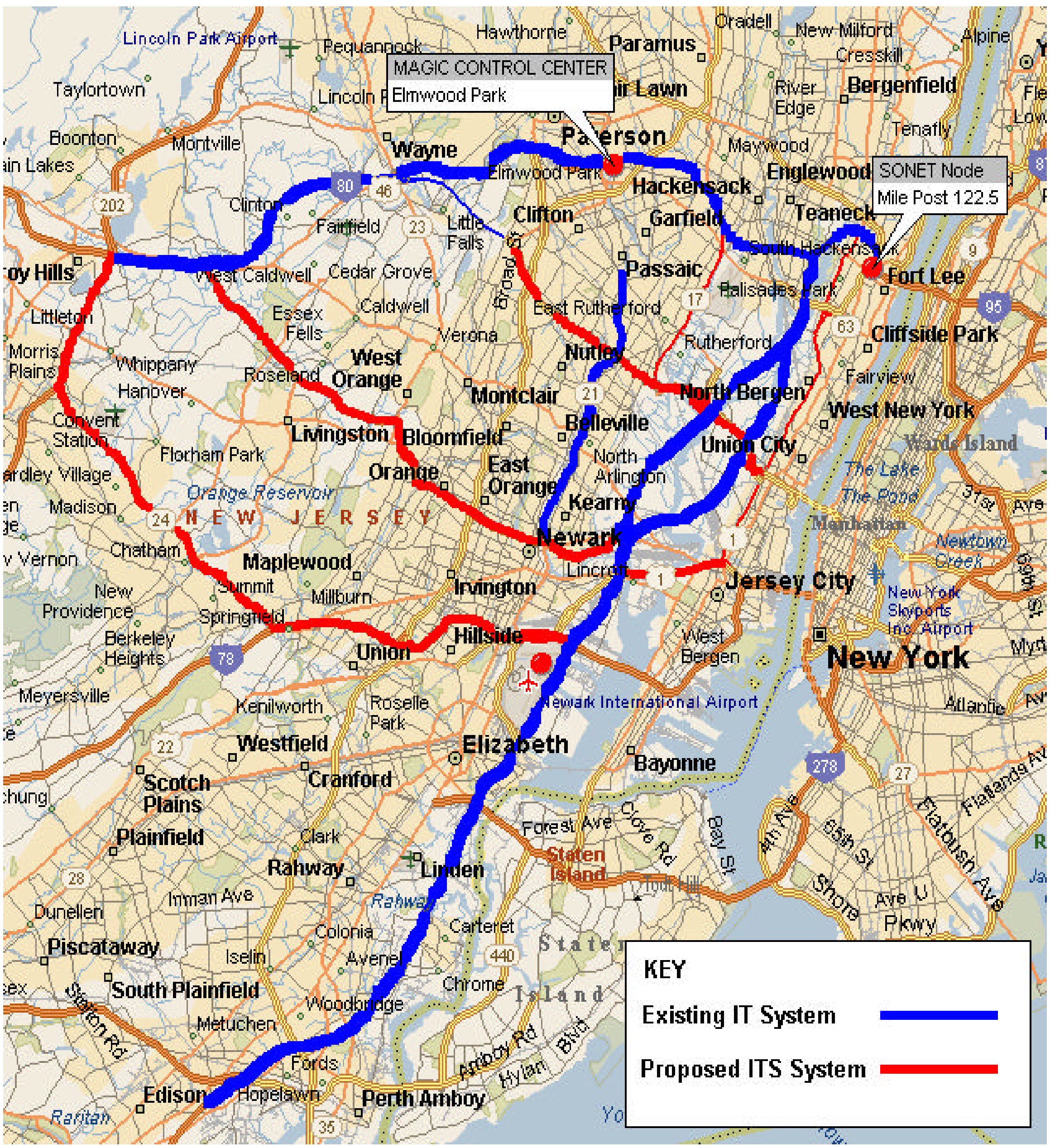

Table X.1
Prioritized ITS Market Packages

Market Packages		User Services																
		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17
		1.1 - Pre-Trip Travel Information	1.2 - En-Route Driver Information	1.3 - Route Guidance	1.6 - Traffic Control	1.7 - Incident Management	1.8 - Travel Demand	7.1 - Archived Data Management	4.6 - Commercial Fleet	4.4 - Commercial Vehicle	4.1 - Commercial Vehicle	3.1 - Electronic Payment	4.5 - Hazardous Material Incident Response	4.3 - On-Board Safety Monitoring	4.2 - Automated Roadside Safety Inspection	5.1 - Emergency Notification and Personal Security	5.2 - Emergency Vehicle Management	8.1 - Maintenance and Construction Operations
Advanced Traveler Monitoring System (ATMS)	**Network Surveillance**				√													
	Probe Surveillance				√													
	Surface Street Control				√	√												
	Freeway Control				√	√	√											
	HOV Lane Management				√		√											
	Traffic Information Dissemination				√													
	Regional Traffic Control				√													
	Incident Management System					√												
	Traffic Forecast and Demand Management				√		√											
	Electronic Toll Collection						√					√						
	Emissions Monitoring and Management																	
	Virtual TMC and Smart Probe Data		√		√	√												√
	Standard Railroad Grade Crossing																	
	Advanced Railroad Grade Crossing																	
	Railroad Operations Coordination																	
	Parking Facility Management						√					√						
	Regional Parking Management						√					√						
	Reversible Lane Management				√	√												
	Speed Monitoring				√													√
	Drawbridge Management				√	√												

Table X.1 (continued)
Prioritized ITS Market Packages

Market Packages		User Services																	
		#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15	#16	#17
		1.1 - Pre-Trip Travel Information	1.2 - En-Route Driver Information	1.3 - Route Guidance	1.6 - Traffic Control	1.7 - Incident Management	1.8 - Travel Demand Management	7.1 - Archived Data Management	4.6 - Commercial Fleet Management	4.4 - Commercial Vehicle Administrative Process	4.1 - Commercial Vehicle Electronic Clearance	3.1 - Electronic Payment Services	4.5 - Hazardous Material Incident Response	4.3 - On-Board Safety Monitoring	4.2 - Automated Roadside Safety Inspection	5.1 - Emergency Notification and Personal Security	5.2 - Emergency Vehicle Management	8.1 - Maintenance and Construction Operations
Advanced Traveler Information System (ATIS)	Broadcast Traveler Information	Ö	Ö															
	Interactive Traveler Information	Ö	Ö									Ö						
	Autonomous Route Guidance		Ö	Ö														
	Dynamic Route Guidance		Ö	Ö		Ö												
	ISP Based Route Guidance	Ö	Ö	Ö								Ö						
	Integrated Transportation Mgmt/Route Guidance		Ö	Ö								Ö						
	Yellow Pages and Reservation	Ö	Ö									Ö						
	Dynamic Ridesharing	Ö	Ö	Ö			Ö					Ö						
	In Vehicle Signing		Ö		Ö													

The following is a description of the various user services collectively identified as desirable by the goods movement industry.

- **Pre-Trip Travel Information** - Pre-Trip Travel Information provides travelers with details about various travel modes, so that informed decisions can be made about which is the best method of travel at specific time given the existing conditions. Prior to beginning a trip, travelers will be able to access real-time traffic data via the radio, television and the Internet.

- **En-Route Driver Information** - En-Route Driver Information provides travel information to drivers while they are already on the road. Variable Message Signs (VMS) and Highway Advisory Radio (HAR) advise drivers of alternate travel routes and methods.

- **Route Guidance** - Route Guidance provides travelers with route suggestions, directions and maps. This includes standard directions based on static map data, as well as directions that are based on real-time traffic and transit conditions. Route Guidance helps travelers make informed decisions about the best route for the current traffic and transit conditions.

- **Traffic Control** - Traffic Control uses real-time traffic data to minimize traffic congestion. Traffic Control consists Traffic Surveillance, which is used for Traffic Flow Optimization and Control Functions, as well as Providing Information. Real-time and historical traffic surveillance data is processed and used to control ITS equipment that is in the field.

- **Incident Management** - Incident Management includes identification of an incident, determination of an appropriate response, implementation of response and pre-planned responses. Once an incident and a response plan are identified, the response must be implemented. This involves providing information and coordination to all agencies that are involved. Incident management also involves pre-planned responses, such as emergency evacuation plans.

- **Travel Demand Management** - Travel Demand Management creates and disseminates plans that are designed to improve the travel conditions.

- **Archived Data Management** - Archived Data Management compiles and organizes ITS data. The data is stored and can be accessed when necessary.

- **Commercial Fleet Management** - Commercial Fleet Management provides drivers of commercial vehicles and dispatchers with real-time information. The

real-time data are used to direct the drivers to the best routing option for the current traffic conditions.

- **Commercial Vehicle Administrative Processes** - Commercial Vehicle Administrative Processes include the Electronic Purchase of Credentials, Automated Mileage and Fuel Reporting and Auditing, and International Border Electronic Clearance. Through the use of electric transponders, trucking companies can track vehicle mileage and fuel usage. The transponders can also be used to easily identify drivers and cargo at international border crossings.

- **Commercial Vehicle Electronic Clearance** - Commercial Vehicle Electronic Clearance provides vehicle information that can be electronically accessed at fixed facilities, such as inspection stations, weight stations, tollbooths, and ports of entry. This helps easily identify vehicles, vehicle credentials, drivers, driver credentials and vehicle safety information. Commercial Vehicle Electronic Clearance also enables vehicles to communicate with fixed facilities.

- **Electronic Payment Services** - Electronic Payment Services enables travelers to pay for tolls, fares, and parking services electronically. These electronic payment methods can be combined into one system.

- **Hazardous Material Incident Response** - Hazardous Material Incident Response provides communication between HAZMAT carriers and local agencies. HAZMAT incident notification informs enforcement agencies and HAZMAT agencies of details of incidents that occur with vehicles that are transporting hazardous material. An Operation Focal Point provides a main response center that receives and responds to calls from HAZMAT carriers.

- **On-Board Safety Monitoring** - On-Board Safety Monitoring detects problems with the vehicle and alerts the driver of the problem. The carrier and enforcement agencies are also notified of problems with the vehicle.

- **Automated Roadside Safety Inspection** - Automated Roadside Safety Inspection provides a quick and efficient way to perform roadside inspections on commercial vehicles. Automated inspections can be performed at fixed facilities or by using a vehicle system. At fixed facilities, all data will be stored and available for access by the Federal Motor Carrier Safety Administration. The vehicle system can be used in conjunction with manual roadside inspection processes. The collected data can then be transmitted to a fixed facility so that inspection records can be updated.

- **Emergency Notification and Personal Security** - Emergency Notification and Personal Security provide emergency alert signals that are transmitted to emergency response agencies. Depending on the system, the signals can be initiated manually (Driver and Personal Security), automatically (Automated Collision Notification), or both (Remote Security and Emergency Monitoring).

- **Emergency Vehicle Management** - Emergency Vehicle Management monitors the emergency vehicle fleet, determines the best route and provides signal priority. The emergency vehicle fleet will be tracked and the most appropriate vehicle will be dispatched. Dispatched emergency vehicles will be provided with route guidance information as well and signal priority system.

- **Maintenance and Construction Operations** - Maintenance and Construction Operations, which includes Maintenance Fleet Management, Roadway Management, Work Zone Management and Safety, and Roadway Maintenance and Work Plan Dissemination, exchanges information about maintenance and construction activities with other agencies. Maintenance and Construction Operations also helps to track maintenance vehicles and to effectively schedule maintenance/construction activities.

- **Weigh in Motion Devices and Protocols** – These strategically located stations provide management support and regulatory compliance enforcement. These stations would best be deployed at marine and intermodal rail terminals and along strategic highway links.

The ITS components described above form a comprehensive program of non-infrastructure improvements that optimize the existing transportation system. Collectively, the system components comprise Market Packages that are consistent with the definitions put forth by the Federal Highway Administration. While not all of the individual user requirements have the same importance, implementation of a complete market package, in this case, *Advanced Traveler Monitoring System (ATMS)* and *Advanced Traveler Information System (ATIS),* yields maximum system flexibility and utility. Therefore, it is recommended that the complete packages be advanced in the near term.

Off-Peak Freight Operations

Container-related truck traffic tends to be spread more or less evenly throughout the daylight hours. But the negative impacts of container truck traffic are felt most during the AM and PM peak hours, when the highway system is most heavily used by other traffic.

At off-hours, when background traffic is light and highway capacity is available, container trucks have relatively little impact.

The opportunity here is to examine strategies that encourage container trucks to increase their utilization of the highway system when capacity is available. This is not a simple issue, because different types of trucks have different travel time requirements.

Through traffic (containers passing through the region) and long-haul traffic originating or terminating in the region has the most flexibility in scheduling their trips, because these trips are made over longer distances and involve more time. For example, a trucker may pick up a load in Baltimore at the end of the normal workday, travel north on I-95 during the evening, and deliver it to a customer in Boston at the beginning of the next workday. Truckers readily recognize that congestion costs them time and money, and long-distance truckers generally try to plan their trips so that they are passing through congested metropolitan areas during off-peak periods. However, their ability to do so is limited by a number of factors:

- Pickup and delivery hours. The trucker has to be at the pickup and delivery points when they are open. All truck scheduling is driven by this basic fact. Truck routing and peak congestion avoidance involve driver discretion as well as on time delivery requirements.

- Availability of truck rest areas. Nationally, over the past few years, we have seen growing numbers of large trucks parked overnight at public rest areas (on toll roads) and at private truck stops. We have also seen growing numbers of trucks parked on the shoulders of interstate highways; generally, these trucks have pre-positioned themselves near their destination by traveling in the off-peak hours, and are waiting for their pickup or delivery point to open. The availability of adequate, well-located truck rest areas is a critical element of the nation's – and the region's – goods movement system.

- Impact of work zones. During nighttime construction, when major highways can be reduced to one or two travel lanes, it is not uncommon for trucks to represent half of the traffic in queue. These trucks are trying to utilize off-peak capacity, but are seeing the same level of congestion they would experience in the peak hour.

Local and shorter-haul trucks tend to have less flexibility, because the trip involves less distance and less time. For these truckers, the key constraints to greater utilization of off-peak highway capacity include:

- Per trip payment or per hour shorthaul. Many of these truckers are paid by the trip, and the goal is to make as many trips as possible during the available work hours, regardless of highway conditions.

- Pickup and delivery hours. Many major container trip generators recognize that congestion costs them (and their customers) time and money. Maher Terminals and other container ports in the region, as well as the railyards in the region, operate their gates in the off-peak periods to allow trucker pickup and delivery. However, the off-peak gate volumes are generally reported as being quite low, for the reason that the pick-up or delivery point on the other end of the trip is not open. Large regional warehouse and distribution facilities may be open 24 hours per day, but smaller ones that receive less traffic are typically open for just a single work shift. In some cases, local regulations actually prohibit truck pickup and delivery in the off-peak hours because of neighborhood impact. While the freight world seems to be moving toward extended hours, this is currently the exception, not the rule.

There are a number of strategies that could encourage off-peak freight travel. This study has not evaluated them in detail, but it has performed an order-of-magnitude assessment of their potential impact at a system-wide level. These strategies include:

- Detailed planning for truck rest areas. These are obviously essential for driver and motorist safety, and rest/layover areas close-in to major pick-up and delivery points can encourage utilization of off-peak highway capacity, while moving clusters of parked trucks off of the shoulders of our highways.

- In the management of work zones, taking into account the need to provide sufficient capacity to ensure that off-peak truck travel is incentivized.

- Further encouraging and supporting the operation of extended hour gates and supporting on-terminal truck loading and unloading operations at the region's marine terminals and intermodal railyards.

- Identifying locations where time-of-day restrictions on truck activities prevent off-peak operations, and identifying appropriate mitigation measures that could allow such activities to occur in the off-peak.

- Creating a "critical mass" that begins to encourage medium and smaller business to utilize off-peak windows. Carriers, terminals, and shipper/receivers build operating efficiency around patterns of volume. When companies first begin to shift volume off-peak, there are two penalties: 1) it creates a new, inefficient operation, and 2) subtraction of volume makes the current operation less efficient

as well. The best opportunity for change is when volume is exceeding capacity, so that you pay the first penalty but not the second. One role of government may be to act as a coordinator and facilitator for multiple stakeholder groups.

While it is not part of this study or its recommendations, many parts of the world are experimenting with congestion pricing as a means of encouraging off-peak travel and discouraging peak-hour travel. Freight traffic is probably less amenable to congestion pricing than private auto traffic. Truckers will generally avoid toll roads where possible, and in cases where they do not it is usually because there is no alternative, and a small incremental time-of-day difference in toll price may not affect their driving behavior. However, if congestion pricing had the effect of reducing peak-hour auto travel (along with a more modest reduction in peak hour truck travel), it would clearly benefit the system. These types of approaches would need to be carefully studied by the appropriate implementing agencies.

Container Management Strategies

As described in Section VI, container logistics involves a substantial number of non-freight carrying moves. There are a variety of management strategies that could help reduce the number of these non-freight moves, thereby reducing the level of demand on the region's transportation system without reducing the positive economic benefits associated with the movement of containerized goods in the region.

- Internet-based and ITS systems for exchanging empties and equipment outside of major terminals. Many container terminals serve as intermediaries or depots for the exchange and/or temporary storage of container equipment. To the extent that these exchange activities can occur directly between two parties, without a move to and from the depot, truck trips and VMT could be reduced. For example, the Port of Long Beach is experimenting with a commercial third-party system (E-Modal Logistics) to provide this capability in the southern California region.

- Information systems for scheduling and coordinating truck pickup and delivery. A number of ports have implemented these systems, including the PANYNJ's FIRST system. With delivery appointments, a trucker may spend less time idling in the terminal, and may have a better chance of handling containers on both the headhaul and backhaul moves. This could also support off-peak delivery strategies.

- Alternatives for the handling of empty boxes. Movements between major intermodal terminals and regional empty depots could potentially be accomplished

by a program of coordinated off-peak trucking, or even by short-haul rail, potentially in conjunction with redevelopment opportunities presented by brownfields sites. (Site specific opportunities have not been identified as part of this study, pending the release of information from the NJIT Brownfields Study.) Multiple depots in different locations would reduce the VMT associated with pickup and dropoff.

- Alternatives for the handling of overweight containers. Similarly, overweight containers could travel on dedicated haul routes, or by rail, to a point of rest within or outside the region, before being opened and repacked. (The advantage of moving containers as overweights for as long as possible is that you have to move fewer boxes to transport the same amount of freight.)

- Development of chassis pools and chassis terminals. Chassis pools will help steamship lines get out of the chassis business, and offer important operating advantages – chiefly that you generally can use the closest unit that is compatible with the load. This lowers VMT and thus congestion. Roadability (e.g., safe over-the-road operation) is aided, because there are more alternative units available. Chassis terminals have advantages, if they are close to load centers: driver can inspect and refuse the unit, maintenance is on hand, and alternative units are available.

- Consolidation and development of container activity at "Container Freight Villages." A container freight village is an aggregation of warehouses and distribution centers offering excellent rail access in addition to good highway access. The idea is to consolidate and grow container-related businesses in locations where they can be served by rail. This generates a critical mass of rail demand -- which makes rail service economically feasible and attractive for the railroads to provide -- and reduces the demand for trucking. Freight villages have been identified as a major opportunity for brownfields redevelopment in North Jersey.

- "Inland Port" operations. In concept, an inland port is a marine container terminal, minus the water. That is, it offers the major functions of a marine container terminal – container storage, maintenance and repair, warehouses for "stuffing and stripping," and transfer to/from truck and rail – but it is located inland. It can also incorporate elements of a container freight village. Containers could be moved between the marine terminal and the satellite inland port by rail (using dedicated "set trains"), by barge, or by managed fleets of off-peak trucks. In concept, this offers two major advantages. First, it helps manage trucks in the immediate vicinity of the marine terminal – trucks would pick up and drop off containers at the

inland port, rather than the marine terminal. Second, it helps improve the operation and capacity of the marine terminal, by reducing the number of containers that need to be stored on site. This is similar to the PANYNJ's PIDN concept, except that the inland ports could be closer to the marine terminal serving them, and would offer a much higher level of operational integration. While no U.S. ports have developed fully-functioning inland ports fitting this description, the concept has been discussed for southern California, and there are several studies currently underway for a potential Oakland-to-Stockton inland port operation. This concept, we believe, has enormous potential as a means of increasing the region's port capacity while rationally managing the patterns of truck traffic generated by port activities.

X.2.B SHORT HAUL RAIL SPINE (Figure X.2)

The possibility of short-haul rail service for containers would serve several potential applications:

- Substitution for trips that would otherwise occur by truck, primarily to dense regional warehouse and distribution clusters that could generate sufficient levels of rail traffic to make the service economically viable. This is, in essence, a "local" version of the PIDN concept. [1]

- Support for the creation of freight villages, the management of empty containers, and the redevelopment of brownfield sites.

- Support for the development of inland port facilities.

There are many challenges involved in short-haul rail service for containers – overcoming the perceived cost and service advantage provided by trucking, developing suitable institutional and business relationships among the railroads, demonstrating how the concept can benefit truckers and customers (by potentially eliminating the most congested, most costly, and least profitable part of the trip), identifying the necessary rail infrastructure and improvements, and ensuring that short-haul rail operations are compatible with other uses of the regional rail system. The Portway Extensions study

[1] PIDN primarily aims to serve dense trade clusters between 75 and 400 miles from Port Newark / Elizabeth. Looking at "local clusters" less than 75 miles out, the initial concept focuses on rail service options. Barge service is also a potential option for serving certain local clusters. Although recent experience in the region suggests the potential need for significant subsidies, barge/ferry options should be considered as part of the subsequent feasibility assessments of short-haul distribution strategies.

does not represent a full feasibility assessment of this concept, but it does identify a highly promising strategy warranting more detailed analysis within a state-wide context.

Applying innovative rail technologies and operating practices will be the keys to making rail effective and competitive over shorter distances. The short haul spine would be one or more scheduled fixed consist set of container trains with a power unit on both ends. Imported containers would clear customs prior to being loaded on the train. The train would make scheduled stops along the spine, delivering full containers and picking up empty and export containers. Minimal yards and equipment would be required at each "container stop". The train would also reduce container dwell time at the Port, which currently extends to 5-days.

Potential locations for container stops include the Bayonne Peninsula, Port Newark/Elizabeth, Howland Hook Marine terminal, and the areas around NJ Turnpike Interchanges 12, 10, 8-A and 7-A. The initial stops may be more distant 8-A and 7-A locations. The rail spine may be continued down to the proposed South jersey PIDN site in Camden.

The Portway Extensions Shorthaul Rail Spine concept incorporates a series of existing rail lines extending from Little Ferry on the North to the vicinity of Hightstown, NJ on the south. It consists of nine key segments and several important additional feeder lines, most with rail yards, intermodal terminals or other major features. These features, as depicted on Figure X.2, include:

1. **River Line-West Shore/Susquehanna** (Little Ferry Yard to North Bergen Yard) - Little Ferry Yard, NJ Turnpike Interchange 18.

2. **Northern Branch Secondary** (North Bergen Yard to Croxton lead near County Road) - North Bergen, Croxton/NJIT, Resources International Yards, Meadowlands, South Kearny Terminal, NJ Turnpike Interchanges 17, 16 and 15 E/W.

3. **Bergen Tunnel** (Croxton lead to CP Nave) - Waldo Tunnel.

4. **National Docks Secondary/Greenville Branch (**CP Nave to Oak Island Yard) - NJ Turnpike Interchanges 14 A-C, Newark Bay Bridge, Greenville, and Oak Island Yard.

5. **Newark Elizabeth Running Track** (Oak Island Yard to Elizabethport) - NJ Turnpike Interchange14, Port Newark/Elizabeth, Portside Yard, ExpressRail.

6. **Chemical Coast** (Elizabethport to CP Wood) - E-Rail, Elizabethport Yard/Terminal, NJ Turnpike Interchange 13, 13-A, 12, Tremley Point, Port Reading Yard.

7. **North Jersey Coast Line** (CP Wood/Woodbridge to Essay) Raritan River Bridge, NJ Turnpike Interchanges 10 and 11, Raritan Center Industrial Park.

8. **Amboy Secondary** (Essay/S. Amboy to Jamesburg) - Browns Yard, NJ Turnpike Interchanges 8-A, 9.

9. **Jamesburg Secondary** (Jamesburg to Monmouth Jct.) - NJ Turnpike Interchange #8, #8A

In addition to the primary segments that comprise the rail spine, a number of mainline rail segments and feeders are envisioned to supplement the corridor including:

1. CSX West Shore, and Susquehanna Corridors
2. NS Southern Tier and Passaic & Harrimus
3. NS Southern Tier
4. Bayonne Branch, NS Lehigh Line
5. none
6. Staten Island Railroad, Port Reading Secondary, Reformatory Spur, Sound Shore /Chrome Branch, Third Branch/Tremley Yard, Cartaret Industrial Track
7. Perth Amboy Running Track. Raritan Industrial Track
8. Sayreville Secondary
9. Hightstown Industrial Track, Freehold Running Track

Following is a description of the key components of the spine, and operational issues associated with each segment.

1. ***River Line -*** This segment is considered a capacity pinch point on the CSX West Shore/River Line. Additional tracks have been installed north of Little Ferry to handle train queues waiting to enter into the North Jersey terminal area. The Susquehanna freight capacity has been compromised south of Little Ferry Yard by converting one of the two track beds to the main truck access road from the south into Little Ferry Yard. The alignment of the HBLRT alongside North Bergen Yard and the use of the Northern Branch above Bridge 4 may absorb additional space but not railroad track capacity.

The planned West Shore commuter service restoration could further impact the Portway Rail Spine[2], by adding additional tracks and train movements in an area surrounded by wetlands south of Little Ferry Yard. As originally proposed, the Susquehanna Light Rail/Cross County Rail service had been planned to connect with HBLRT at Vince Lombardi Park Ride. This would have competed for alignment with the Portway spine proposal between the vicinity of Bridge 4 (near 84th St.) and Little Ferry Yard. As now proposed, the alignment of the Cross County is more likely to use the former Susquehanna Edgewater Branch between Little Ferry Yard and Fairview where that line crosses the Northern Branch. This change reduces somewhat the competition for alignment space south of Little Ferry Yard for a Portway spine.

2. ***Northern Branch -*** Formerly a 4-track railroad south of Bridge 4 or former Granton Jct. (where the Susquehanna and Northern Branch converged) the Northern Branch was used by the former Erie Northern Branch and Susquehanna trains. This alignment is, over time, being reclaimed for various transportation purposes. The Northern Branch is being converted back to double track by the Conrail Shared Asset (CSAO) including the elevated track through Marion Connection.

   One of the two track beds on the Susquehanna is used by that railroad to access the growing International Resources intermodal terminal at Secaucus Road. A portion of the Susquehanna former east/southbound track bed was encroached upon for an access ramp to the North Bergen Park-n-Ride Lot. Both the Paterson Plank Road and Secaucus Road grade crossings of the Northern Branch/ Susquehanna alignments have been eliminated. The HBLRT turns east through the Weehawken Tunnel thereby surrendering that track bed through this segment south of North Bergen Yard.

   Effectively, there is only one vacant track space north of Secaucus Road vicinity, and two vacant track bed spaces south of Secaucus Road to the vicinity to Croxton Yard. Expansion of International Resources Terminal operations created a long trail track extending slightly south of Secaucus Rd. Diminishing traffic on NS Southern Tier feeds through Croxton Yard to this segment of the

[2] The preferred alignment of the HBLRT north of the portal of the Weehawken Tunnel has shifted several times in the course of study. Since the selection of the Northern Branch as the preferred northern terminus of the HBLRT, this has opened some opportunities that would have otherwise been problematical had NJT selected the NYS&W alignment near Little Ferry Yard.

Portway Rail Spine. Except for Susquehanna trains, NS service on the Southern Tier east of Binghamton has diminished to the extent that through train movements now feed this corridor at Campbell Hall from the east.

3. ***Bergen Tunnel*** **-** The Bergen Tunnel and Waldo Tunnel routing option represents a current operating constraint because of physical clearances. Bergen Tunnel was formerly a double track tunnel converted to a single, centered track to handle double stack trains. The recently completed Bergen Arches (paralleling the Bergen Tunnel) analysis did not include rail freight among its final three alternative reuses of the Arches. The north portion of this segment includes a major routing option for trains headed south. Trains for South Kearny Yards, the P&H (Passaic and Harsimus) presently continue straight via Marion Junction.

   Those trains bound for the Bayonne peninsula, Oak Island Yard, the Port Terminal complex and Chemical Coast turn southeast to enter the Bergen Tunnel. A proposed Waverly Loop, if built, would alter the routing choices of railroad dispatchers by shifting Oak Island and possibly Chemical Coast and Port Terminal trains to Marion Jct./South Kearny rather than the height-restricted Bergen Tunnel, Waldo Tunnel route. Waverly Loop would likely create more capacity for a Portway Spine route using the Bergen Tunnel and National Docks Branch.

4. ***National Docks*** - The Waldo Tunnel is a constraint on capacity and operational flexibility. It is a single-track tunnel with vertical clearance constraints at its southern portal. Limited track capacity is another issue at the approaches to the Newark Bay Bridge. A realignment of track at the vicinity of CP Green (Greenville) would provide a new alignment to MOTBY via the Port Jersey Railroad. The effect of this additional complexity to the track configurations at Green is unknown at this time. Basically, tracks will diverge from the bridge approach to the Bayonne Branch, to the Port Jersey Railroad, to the National Docks, to the Autoport (a portion to be relocated), to the NY Cross Harbor car float yard and to the Tropicana Orange Juice facility. As described earlier, a Waverly Loop could provide relief to this area and make a Portway Rail spine more operationally feasible.

5. ***Newark-Elizabeth Running Track*** - The cluster of four major intermodal terminals along this segment at the Ports of Newark and Elizabeth and the presence of busy Oak Island Yard combine to ensure that this will be a continuing capacity challenge. It is assumed that the adding of an additional track to the Chemical Coast will be extended north into this segment. Train sorting for the terminals and for the conventional Oak Island Yard at the north end of this

segment is problematical. Presently, the track configuration off Corbin St. favors movements out of Express Rail to and from the north. This is expected to be the busiest segment of the Portway spine.

6. ***Chemical Coast -*** The affect of adding a programmed track connection by the Port Authority in the northeast quadrant of the intersection between the Staten Island Railroad and the Chemical Coast is unclear at this time, until the amount of container interchange between Howland Hook and Ports Elizabeth and Newark is realized. The presence of a movable span bridge across the Elizabeth River at this point further complicates the converging and diverging of train movements on this segment. A track connection to the south for the Staten Island RR has also been proposed, but not programmed at this time.

   An additional track is programmed to be added to the Chemical Coast that will alleviate the capacity constraints of this segment, and allow it to absorb additional through train movements. As this is the major rail gateway to the port district from the south, the additional track capacity may be absorbed by anticipated growth in rail traffic. Surplus track capacity with an additional track to the Chemical Coast is assumed to be sufficient to overlay Portway rail spine operations.

   Portions of the Chemical Coast are used for drilling cars into the refinery and chemical complexes that line this segment. Ways of reducing tank car dwell time on the Chemical Coast should be explored between the CSAO (Morristown & Erie) of the Bayway Refinery/Conoco-Phillips (formerly Tosco) complex. Adding a new intermodal burden to this track would suggest that the strings of tanks cars observed along the Chemical Coast from Bayway south will be a deterrent to additional train movements, unless otherwise handled. A track connection in the northwest quadrant of the Chemical Coast/Port Reading Secondary intersection added by Conrail enables direct through movements. Further improvements programmed by the Port Authority and NJDOT to the Port Reading Secondary permits increased train movement capacity and double stack capability on this feeder route.

   The former Sound Shore Branch of the CNJ feeds the Chemical Coast at three locations. Formerly, this branch was a continuous link between Elizabeth/Bayway and Port Reading, following the shoreline of Arthur Kill. This routing involved crossing the Raritan River on a movable span bridge. After discontinuance of commuter passenger service in 1959-60, the bridge was taken out of service thereby severing the line. The connection to Port Reading yard from Chrome was subsequently also severed. Spurs connecting with the

Chemical Coast exist at Cartaret (Cartaret Branch), Tremley Point and the original connection at Bayway. If restored to its former continuity, the Sound Shore line could serve as a local rail bypass, load shedder or short term car storage for the Chemical Coast

7. ***North Jersey Coast Line (NJCL) -*** This is the one segment place along the entire alignment of the Portway rail spine where a potential conflict with existing commuter rail operations exists. NJ Transit operates nearly 80 weekday trains over this segment. Most of the trains are electrically propelled from overhead catenary. At current dimensions, the overhead catenary is a deterrent to double stack use. Extending between the Wood interlocking in Woodbridge to the Essay interlocking at South Amboy, the NJCL segment also presents another challenge to a Portway rail spine.

   A movable span NJCL railroad bridge crosses the Raritan River at its mouth. This bridge has been the site of several vessel collisions with the bridge fendering system, center span and most recently, the high voltage overhead feeders. The bridge is a low-level structure with long approaches to the movable center span. Any vessel with an on-deck superstructure requires opening of the span.

   Though peripheral to the Portway Spine route on NJCL, the former Lehigh Valley Perth Amboy Branch once was the main line of the Lehigh Valley before it entered the Port District at the Jersey City/Bayonne peninsula. The branch provided access to the former Raritan Arsenal, now Raritan Center Commercial Park. It did so by connecting the NJCL. Business on this eastern portion of the branch has reduced over time. A second rail access route is now provided from the west to Raritan Center off the Northeast Corridor near Metuchen. More significantly, the former Perth Amboy Branch once provided direct rail access from the NS (former Lehigh Valley) at South Plainfield Yard to the NJCL/ Chemical Coast at Perth Amboy.

   This route was considered as a back up route for the Port Reading Secondary as the two lines parallel one another. Port Reading Secondary is preferred as it connects with both CSX and NS near Bound Brook. The Perth Amboy branch has an inactive center portion between Metuchen and Fords section of Woodbridge. This inactive portion has been the subject of dispute between the railroads and competing local interests who want to reclaim the alignment for trail purposes. The railroads would likely prefer the option of reactivating the line as an additional back-door feeder from the west into the Chemical Coast and the port district.

8. ***Amboy Secondary[3] -*** Diverging off the NJCL at "Essay" tower near the south approach to the Raritan River bridge, this line was once a highly strategic link in the former Pennsylvania Railroad (PRR) system. This segment currently ends at Jamesburg. Because of its strategic location and the high volume of trains formerly operated on this branch, it was double track and electrified. Electrified commuter rail service was discontinued in 1957. A yard, largely for coal trains, occupied the northern portion of the branch at South Amboy. The high voltage feeders were used to distribute AC traction power to the electrified New York and Long Branch Railroad (now NJCL) at South Amboy. The tracks and the overhead feeders are separately owned, the latter by NJ Transit. Remnants of this infrastructure remain on the Amboy Secondary alignment.

   Near Spotswood, approximately half the distance to Jamesburg, is Browns Yard. This yard has grown in significance as warehousing and industry have moved outward from the core. Local freight trains from this yard now feed the Freehold, Hightstown, Jamesburg and Sayreville (former Raritan River Railroad) freight branches. No major obstacles to a Portway spine service are detected, especially since restoration of a second track is possible on the Amboy secondary.

9. ***Jamesburg Secondary [4] -*** Jamesburg is the location where the Jamesburg, Amboy, Hightstown and Freehold branches meet. All of these branches once were part of through-passenger and freight services, the former having been curtailed over time. The last passenger train was discontinued in 1962 between Trenton and Red Bank via Monmouth Jct., Jamesburg, and Sea Girt. The Freehold line is currently out of service, while the Hightstown line has been severed. The latter no longer connects with the rest of the system at Bordentown. The Jamesburg Secondary extends to Monmouth Jct. on the Northeast Corridor (NEC). A wye track configuration once existed there to

[3] There exist potential conflicts between NJCL commuter rail and short haul rail freight between "Wood" and "Essay" and the potential vertical clearance and congestion problems associated with this route.

[4] Potential conflicts exist with the CSAO local freight operations from Browns Yard. The concept recognizes the status and condition of the rail lines radiating from Jamesburg including the severed line at Heightstown. None of these limitations preclude consideration of using this corridor for short haul rail from the port district to the warehouse districts located in Union, Middlesex and Mercer Counties.

enable trains to enter the branch from the north and from the south. Only the southern segment of the wye remains.

The Jamesburg Secondary represents a critical link of the MOM (Monmouth-Ocean-Middlesex) Corridor proposal by NJ Transit. MOM trains would enter the branch from the north on the restored tracks of the northeast quadrant of the wye at Monmouth Jct. A grade-separated junction is proposed for the MOM junction with the NEC, where passenger train speeds reach in excess of 125 miles per hour.

Midway Tower and high-speed crossovers are located at Monmouth Jct. As the Jamesburg and Amboy Secondarys formed an end-to-end back-door access into the port district, both were electrified at 11,500 volts AC, 25 Hz. The catenary wire was dismantled, but the towers remain to carry the active feeders to South Amboy from the NEC. The double track has been removed, but the right-of-way can accommodate restoration of the second track.

X.2.C ROADWAY INFRASTRUCTURE IMPROVEMENTS

While the systems and operational improvements will reduce the overall magnitude of container trips being made by truck during the peak periods, a significant volume of container truck trips will remain on the roadway network. These movements will be competing for available capacity with a tremendous volume of background traffic and non-goods movement related trips. Accordingly, physical improvements to the roadway infrastructure will still be required. The following is a description of the physical improvement concepts developed as part of this study.

New Road Extension to Little Ferry (Figure X.3)

One key component of the Portway Phase I improvements is the creation of a new roadway linking St. Paul's Avenue to County Road in Secaucus in the vicinity of the Croxton Intermodal Railyard. Under Portway Phase I, this roadway is being investigated for extension further north to terminate at Secaucus Road. While this would provide enhanced local connectivity, the roadway would not facilitate container truck movements to and from the Little Ferry Railyard or to and from points north.

Little Ferry railyard is an active intermodal railyard and is therefore represents an origin and destination for container truck trips. Extending the New Road alignment from Secaucus Road to the southern end of West Side Avenue would allow direct access to

and from Little Ferry Yard and the Resources Terminal without traversing Route 1&9 Tonnelle Avenue or other congested area corridors.

Extending this roadway further to the north and creating direct connections to the NJ Turnpike in the vicinity of the Vince Lombardi Park-n-Ride would effectively create a third north-south spine for travel between the Port District and points north. This improvement would alleviate congestion along the Tonnelle Avenue corridor as well as along the Route 3 corridor east of Route 17.

This concept includes northbound and southbound on and off ramps, utilizing both the New Jersey Turnpike and the Turnpike's western spur. The existing Vince Lombardi Park-and-Ride, which is a major truck stop and is located to the west of the rail yard, already connects to the Turnpike. The existing ramps can be expanded to serve the truck population and facilitate access to the rail yard.

Paterson Plank Road / Route 3 Corridors (Figure X.3)

Two conceptual improvements were determined to have merit with respect to relieving congestion and facilitating the movement of containers. Reconstruction of the former Paterson Plank Road bridge over the Hackensack River would create a new corridor for travel between Route 17 north of Route 3 and the Tonnelle Avenue/Paterson Plank Road interchange area.

Two potential alignments have been identified. The first would utilize the existing Paterson Plank Road alignment with new connections created with the extension of New Road (see above). While this alignment would represent the most direct route, it would require traversing an existing residential neighborhood north of Route 3 just east of the Hackensack River.

An alternative alignment would utilize the existing interchange of Tonnelle Avenue with Route 3, and completion of the northern leg of Meadowlands Parkway. Meadowlands Parkway currently terminates immediately north of Route 3. Completion of this roadway along the Hackensack River would provide a connection to the reconstructed Paterson Plank Road bridge over the Hackensack River. While this route would not require traversing an existing residential community, plans are underway for construction of a new residential development along the Hackensack River north of Route 3. Final alignments would need to be coordinated with the residential development plans and the NJ Meadowlands Commission.

NJ Turnpike Interchange 15-W Connectivity (Figure X.4)

This improvement concept, dubbed "the wishbone" due to its design appearance, would utilize right-of-way currently occupied by the under-utilized Newark Industrial track and the east end of the Boonton Line. Utilizing a portion of Harrison Avenue, direct connections would be created between the NJ Turnpike Interchange 15-W and the two major intermodal rail yards. Creation of these truck haul roads would alleviate congestion along portions of Route 7 and other small commuter roadways. Additionally, through creation of a new roadway segment and intersection with Harrison Avenue, this concept would facilitate provision of access to existing brownfield sites.

Potential uses are proposed by NJ Transit as part of the Access to the Regions Core (ARC) program for the general area of the Greenwood Lake/Boonton Line east of "DB." There also exist plans for extension of the pocket track to the former Boonton Line and a loop track between the Boonton Line and the Main/Bergen to link NYP with the Meadowlands directly. Further, a future improvement may include an additional "West Shore" connecting track to the Boonton Line east of DB.

These proposals do not necessarily preclude a freightway and rail improvements sharing the area. The study also recognized other planned roadway improvements such as the replacement for the Wittpen Bridge in the area. We believe that these improvements enhance rather than detract for the viability of the Portway Extensions preliminary findings.

Hackensack River Bridge – Central Ave to Route 440 (Figure X.5)

Portway Phase I includes the construction of a new bridge across the Passaic River. The bridge would supplement the existing Route 1&9 Truck crossing, and provide a connection between Doremus Avenue and Central Avenue. A logical extension to this improvement is the construction of a bridge across the Hackensack River connecting Central Avenue with Route 440 in the vicinity of Culver Avenue. This new bridge, coupled with the Portway Phase I improvements would create an alternative pathway between Jersey City and the Bayonne Peninsula and the Port Newark/Elizabeth area and NJ Turnpike Interchange 15-E. This would create a redundant, alternative routing that would alleviate congestion on the Newark Bay Bridge as well as the NJ Turnpike Interchange 14 area.

NJ Turnpike Interchange 14-A Improvements (Figures X.6 and X.7)

The Military Ocean Terminal in Bayonne (MOTBY) was recently vacated and turned over the City of Bayonne. The Bayonne Local Redevelopment Authority (BLRA) is investigating the redevelopment potential for this property, inclusive of the creation of a container port along the northern shore of the MOTBY peninsula. Additional development will likely consist of a mix of residential and commercial land uses, all of which are expected to generate extensive additional traffic volumes, both automobile and truck. As part of the MOTBY redevelopment studies, significant effort is being invested in identifying necessary operational improvement to the local transportation infrastructure.

While numerous roadway and rail improvement concepts were developed, two concepts have emerged as having significant merit in terms of feasibility and mobility enhancement. These options both center around major reconfiguration of the NJ Turnpike Interchange 14-A and connections to the local roadway network.

Scheme 1 (Figure X.6):

This scheme would expand the existing toll plaza in its current location, create a series of new flyovers, and provide direct access to Route 440, Port Jersey Boulevard and the MOTBY peninsula. The new flyovers would separate automobile and truck traffic, with automobiles utilizing designated access points to the MOTBY peninsula farther south along Route 440. Trucks exiting the Turnpike will access MOTBY using an elevated fly-over crossing above Route 440. The existing Port Jersey Boulevard would be improved creating a full-interchange between the Turnpike and Route 440. This scheme would also realign the existing rail line to eliminate the grade crossing with Route 440.

This scheme would likely require the taking of several residential properties adjacent to the existing toll plaza, as well as an industrial property east of Route 440 and south of Port Jersey Boulevard.

Scheme 2 (Figure X.7):

This scheme would reconstruct the toll plaza east of its existing location. A fully grade separated directional interchange between the Turnpike and Route 440 would be provided, with direct access afforded to a reconstructed Pulaski Street. As with Scheme 1, the new flyovers would separate automobile and truck traffic, via a diamond interchange with a reconstructed Pulaski Streets. This scheme would also realign the existing rail line to eliminate the grade crossing with Route 440.

While this scheme would not require the taking of residential properties adjacent to the existing toll plaza, it would likely require taking of part or all of the existing tank farm, as well as several industrial properties east of Route 440 both north and south of Port Jersey Boulevard.

NJ Turnpike Interchange 14 Improvements (Figure X.8)

Interchange 14 connects the NJ Turnpike with Interstate 78 and Routes 1&9. Adjacent to the interchange is the beginning of the Portway Phase I improvements, which link Port Newark/Port Elizabeth to the Kearny, Croxton and Little Ferry Rail Yards. The proposed improvements to Interchange 14 facilitate movements from Interstate 78 eastbound and the NJ Turnpike exit plaza to Brewster Road, Port Street and the Newark/Elizabeth Seaport Complex. In addition, a direct connection would provide truck only access from Port Street to the NJ Turnpike toll plaza, thereby reducing the volume of trucks within the interchange itself. This set of ramp widenings and new connections would reduce conflicts within the interchange weave areas and facilitate for efficient movement of vehicles through the interchange.

NJ Turnpike Newark Bay Bridge (Figure X.9)

At one time, the Newark Bay Bridge operated with three travel lanes in each direction. The lack of shoulders in this operating configuration contributed to a series of accidents that prompted the NJ Turnpike Authority to re-stripe the bridge. The current operating configuration consists of two travel lanes per direction with ten-foot shoulders. Suggestions that the bridge be returned to its original operating configuration have met with some resistance.

As an interim measure, replacing the existing fixed median barrier with a movable median barrier would allow the creation of a reversible center lane. Three travel lanes would be maintained eastbound during the a.m. period, with three travel lanes being maintained in the westbound direction during the p.m. period. Two travel lanes would be maintained in the non-peak flow directions. Operations would be similar to that which is currently in place on the Tappan Zee Bridge.

Bayonne Bridge Elevation (Figure X.10)

The Bayonne Bridge spans the Kill Van Kull connecting Bayonne, New Jersey to Staten Island, New York, and links the MOTBY port area to the Port Richmond/Howland Hook area. Oceangoing vessels currently use the waterway beneath the bridge to access Port Newark/Port Elizabeth, as well as the Howland Hook marine terminal. The bridge

currently operates with two travel lanes per direction, with shoulders. The Bayonne Bridge is currently one of the least utilized in terms of daily traffic volumes.

While operational improvements were not found to be necessary in terms of roadway capacity, it is recognized that the channel clearance of the bridge at mid-section is only one hundred fifty feet. Plans are underway to increase the depth of the channel by dredging at this location, allowing larger vessels to access Port Newark/Port Elizabeth. Some of these larger vessels will require increased clearance under the bridge.

The proposed improvements for the Bayonne Bridge include replacing the bridge at a higher elevation to increase the vertical clearance. This would involve reclamation of area at the base of each side of the bridge, including several residential properties, to obtain the required grade modifications.

Routes 1&9 NB with Delancy Street (Figure X.11)

Northbound Routes 1&9 north of Interstate 78 experiences recurring congestion. This condition is expected to worsen as traffic volumes, particularly truck volumes, increase over time. A key cause of this condition is spillback from the intersection of the Route 1&9 northbound ramp with Delancy Street. This partial diamond interchange provides minimal storage between the ramps, with large vehicles often grid-locking the interchange area for short periods of time.

The improvement concept for this location consists of widening of the northbound off ramp, and provision of greater separation between the signalized intersections of the ramps with Delancy Street. A dedicated flyover would be constructed allow vehicles exiting Route 1&9 northbound to access South Street without affecting the two signalized intersections.

NJ Turnpike Interchange 13-A Improvements – Kapkowski Road (Figure X.12)

In addition to the expanding port related activity, the local region served by NJ Turnpike Interchange 13-A includes major retail and commercial components including the highest grossing IKEA store in the US, the Jersey Gardens Mall and several new hotels. The anticipated non-port development includes additional hotels, office space, restaurants and retail operations. The area includes North Avenue, which is one of the two major access routes to Port Newark/Elizabeth. The Maher and Maersk Terminals, the two largest container facilities in the port are located in the study area. The Port

Newark Container Terminal is located just above the northern border of the Kapkowski Road area.

An analysis of the transportation needs of this area identified a series of both transportation capital and systems management projects for the area and has advanced select priority projects into preliminary engineering.

The set of proposed improvements most pertinent to the Portway Extension project are located in the North Avenue corridor. The Kapkowski Road study has developed a series of improvements that substantially improve the vehicular flows on the North Avenue corridor and separate port from non-port traffic. The improvements include:

- Improvements to the Dowd/Division/North Avenue intersection. The Kapkowski Road study envisions a redesigned intersection where North Avenue will be elevated and the remainder of the intersection reconfigured to alleviate congestion.
- Improvements in the vicinity of New Jersey Turnpike Interchange 13A whereby port and non-port traffic will be directed to separate roadways, improving safety and traffic flow and reducing lane weaving in the area.
- A new flyover across the New Jersey Turnpike and over North Avenue into the IKEA property that provides more direct access to the IKEA site, as well as separates non-port vehicular movements in the study area from port traffic. With this flyover, the intersection of Kapkowski and North Avenues, the site of major delays in container movement, is eliminated.

While being addressed and advanced as part of other related initiatives, these improvements are considered key to the continued mobility and growth of this area.

NJ Turnpike Interchange 13 Improvements (Figure X-13)

The Goethals Bridge is an important element in the Port Authority's complex of vehicular crossings connecting Staten Island with New Jersey. The strategic location of the bridge in the heart of the surface transportation network allows it to serve more than 28.6 million automobiles, 2.8 million trucks and 300,000 buses in both directions on an annual basis. Plans are being advanced to initiate an Environmental Impact Statement to explore options to modernize this crossing to address the functional obsolescence of the current bridge and the growing maintenance burden of the 75-year old bridge structure.

A new connection at the interchange of Route 1&9 North and I-278 will be dependent upon the recommendations presented in the PANYNJ-initiated Environmental Impact

Statement (EIS) for the Goethals Bridge. Any alteration recommended by the EIS for this Interchange will require the preparation of an Interchange Modification Report, which would be submitted to FHWA for approval.

Phase II of the Union County Transportation Development District study, completed in 2001, recognized the need to create enhanced connections between the Goethals Bridge and Routes 1&9 and NJ Turnpike Interchange 13. Enhanced connectivity would create a better balance in capacities between the bridge and its approach/departure roadways, while providing direct access to the Bayway area, a currently underdeveloped property east of the NJ Turnpike. These direct connections would eliminate the need for Bayway related traffic to utilize local roadways for access.

NJ Turnpike Interchange 12 Area Improvements (Figure X.14)

Tremendous industrial development is anticipated in the near future within Tremley Point and the existing industrial complexes of Carteret and Port Reading. In recognition of this growth potential, major reconstruction of the NJ Turnpike Interchange 12 is currently under design. While these improvements will facilitate access to and from the Turnpike, the local connector roadways between the interchange area and the local industrial complex require significant enhancement.

In addition to the short haul rail spine discussed previously, expansion and extension of Roosevelt Avenue and Industrial Avenue are necessary to provide access for trucks to Carteret and Port Reading. With the advent of enhanced rail activity, Roosevelt Avenue would be widened to allow trucks greater access to the turnpike to and from the local rail yard.

NJ Turnpike Interchange 10 Improvements (Figure X.15)

Raritan Center in Woodbridge is one of the largest single industrial park complexes in the United States, with tremendous potential for continued growth. The complex is reasonably well served by a number of major regional roadways, as well as currently active shortline rail service. Under the future growth scenarios, the volume of traffic, including container trucks, accessing the complex is expected to increase significantly. The NJ Turnpike Interchange 10 is expected to receive significant volumes of additional traffic flows.

The conceptual improvements to the Interchange 10 area would enhance connections for trucks between the interchange toll plaza and Industrial Avenue. This enhanced

connectivity would serve not only container trucks destined to and from the facility, but also the tremendous volume of local trucks that characterize the local environment.

NJ Turnpike Interchange 8A Improvements (Figure X.16)

The area in the immediate vicinity of New Jersey Turnpike Exit 8A is characterized by light industrial development. This is particularly evident to the west of the New Jersey Turnpike where many of these industrial properties are used as distribution centers for products entering the region through the ports of New Jersey. Products collected at the ports are transported by truck to the distribution centers in the Exit 8A area. Once assembled and packaged, the final products are shipped by truck and/or rail to retail outlets throughout the region and beyond. The more notable distribution centers at the interchange include Barnes & Noble, Hyundai, Tommy Hilfiger, Liz Claiborne, Crate & Barrel, Russ, and Cooper Tires.

The light industrial uses around the interchange are within three municipalities: Monroe Township, Cranbury Township, and South Brunswick Township. A study area within a 1-½ mile radius of Exit 8A of the Turnpike was established to determine the acreage of existing industrially zoned land. A summary of these results is provided in the following table.

NEW JERSEY TURNPIKE - EXIT 8A AREA
INDUSTRIAL ZONED LAND

Township	Vacant		Developed		Total	
	Acreage	Percent	Acreage	Percent	Acreage	Percent
Cranbury	477	46.4%	552	53.6%	1029	100.0%
South Brunswick	967	43.8%	1243	56.2%	2210	100.0%
Monroe	433	34.4%	827	65.6%	1260	100.0%
Total	1878	41.7%	2621	58.3%	4499	100.0%

Within the Exit 8A study area, a total of approximately 4,500 acres of land is zoned as industrial. A considerable number of light industrial uses have been developed within the industrially zoned land in the Exit 8A study area. Based upon the data, a significant number of new light industrial uses can be developed within the three townships based upon current zoning designations. This new development could constitute approximately 41% of the total industrial zoning in the Exit 8A study area. Presumably, many of these future developments will be distribution centers. These new

developments collectively would generate a sizable number of truck trips to the area. The construction of Route 92, which will connect the Turnpike at Exit 8A to Route 1, will help to increase the attractiveness of this area for distribution centers.

The New Jersey Turnpike Authority is planning to add one travel lane in each direction to the northbound and southbound outer roadways between Exits 9 and 8A. This improvement will match the existing configuration north of Exit 9 and provide an increase in roadway capacity along this link of the Turnpike. In conjunction with this measure, the southbound merge area south of Exit 8A will be improved to reduce congestion and delays and to minimize weaving and vehicular conflicts. Additional improvements cover portions of Route 32, Cranbury South River Road, Thatcher Road and the ramps from the toll plaza to Thatcher Hill Road. Construction is scheduled to start in the 4th quarter of 2003. An alignment plan from the Route 92 – Section 1 Advanced Contract – CR535 / SR32 Intersection Proposed Improvements is included in Appendix C of this report.

No improvements are currently planned for the Exit 8A toll plaza or ramps. Additional local connector improvements will be developed as more detailed plans for the development of the region and a location for a potential short haul rail yard is identified.

NJ Turnpike Interchange 7A Improvements (Figure X.17)

The area surrounding NJ Turnpike Interchange 7A is experiencing similar development of warehousing and distribution centers as the area surrounding Interchange 8A. No improvements are currently planned for the Exit 8A toll plaza or ramps. Additional local connector improvements will be developed as more detailed plans for the development of the region and a location for a potential short haul rail yard is identified.

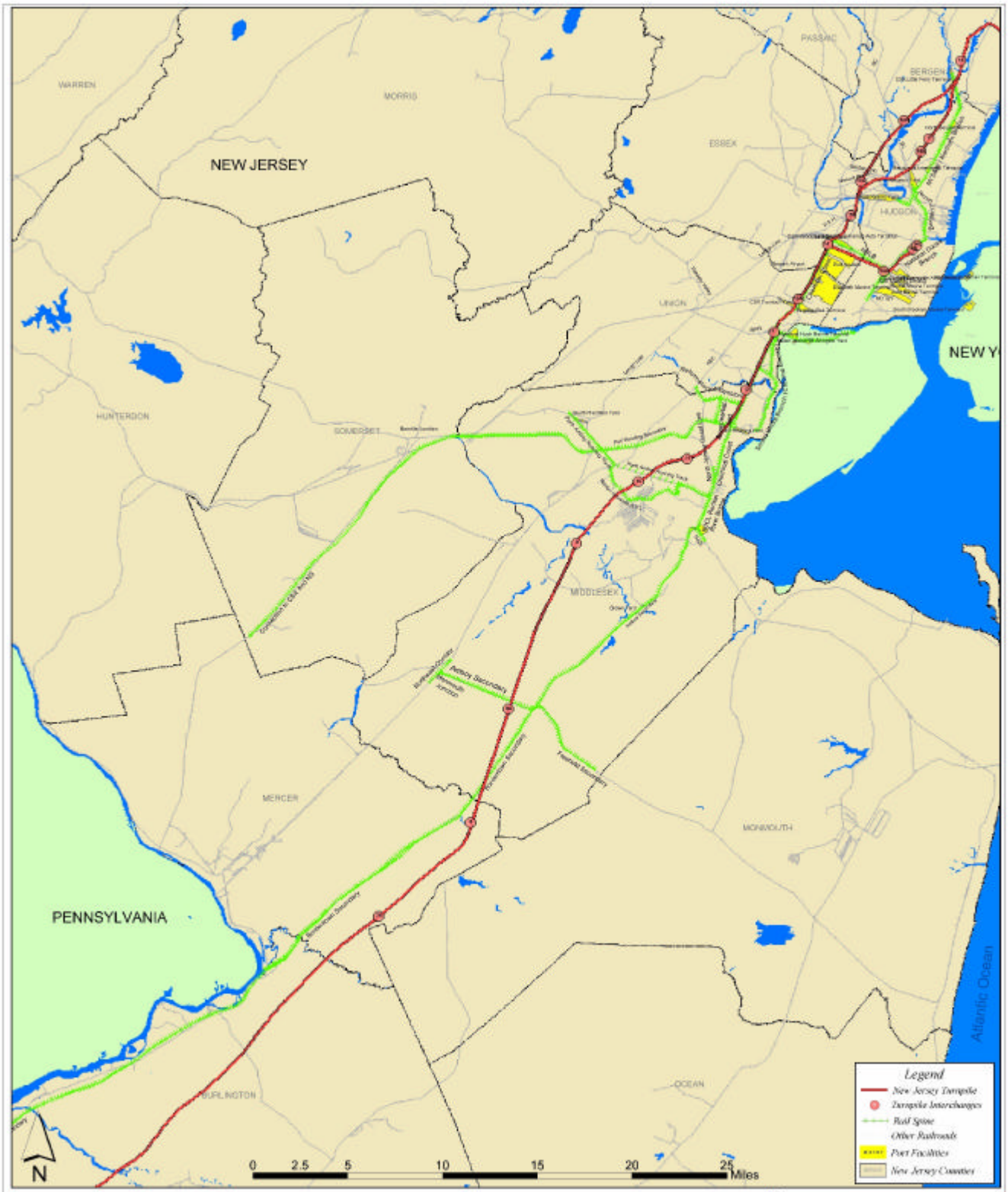

Figure X.2: Shorthaul Rail Corridor

Portway Extensions Concept Development Study

Edwards AND Kelcey

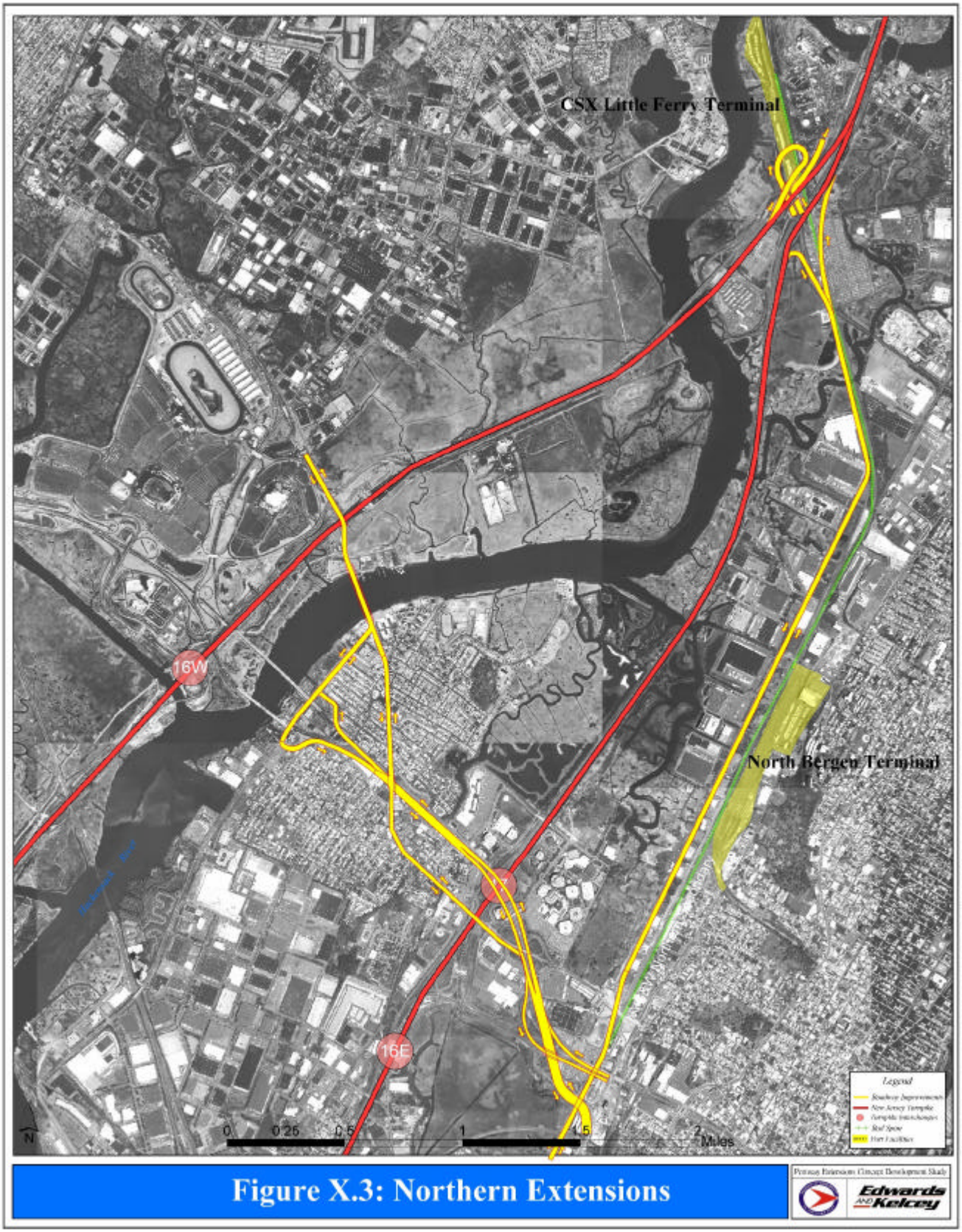

Figure X.3: Northern Extensions

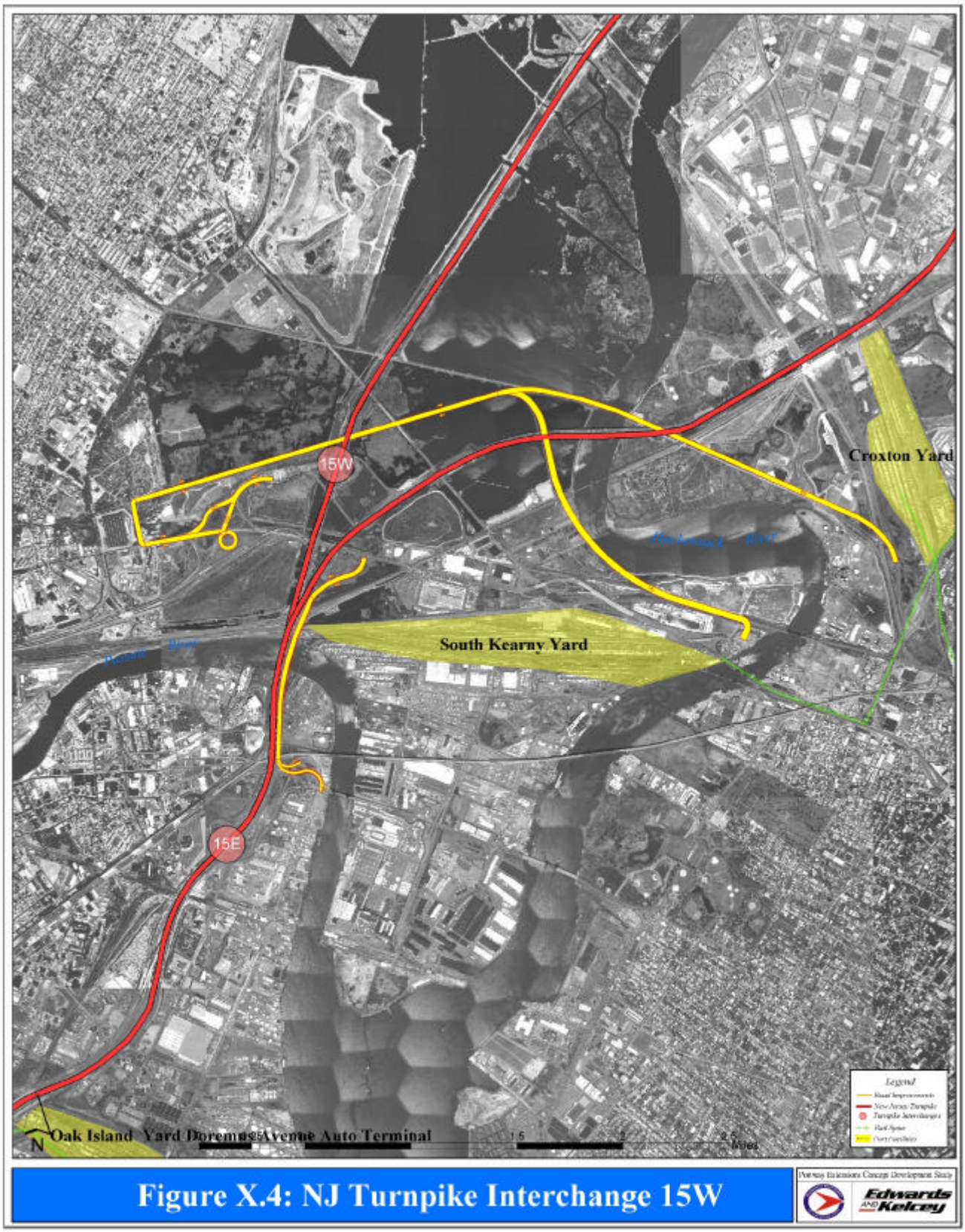

Figure X.4: NJ Turnpike Interchange 15W

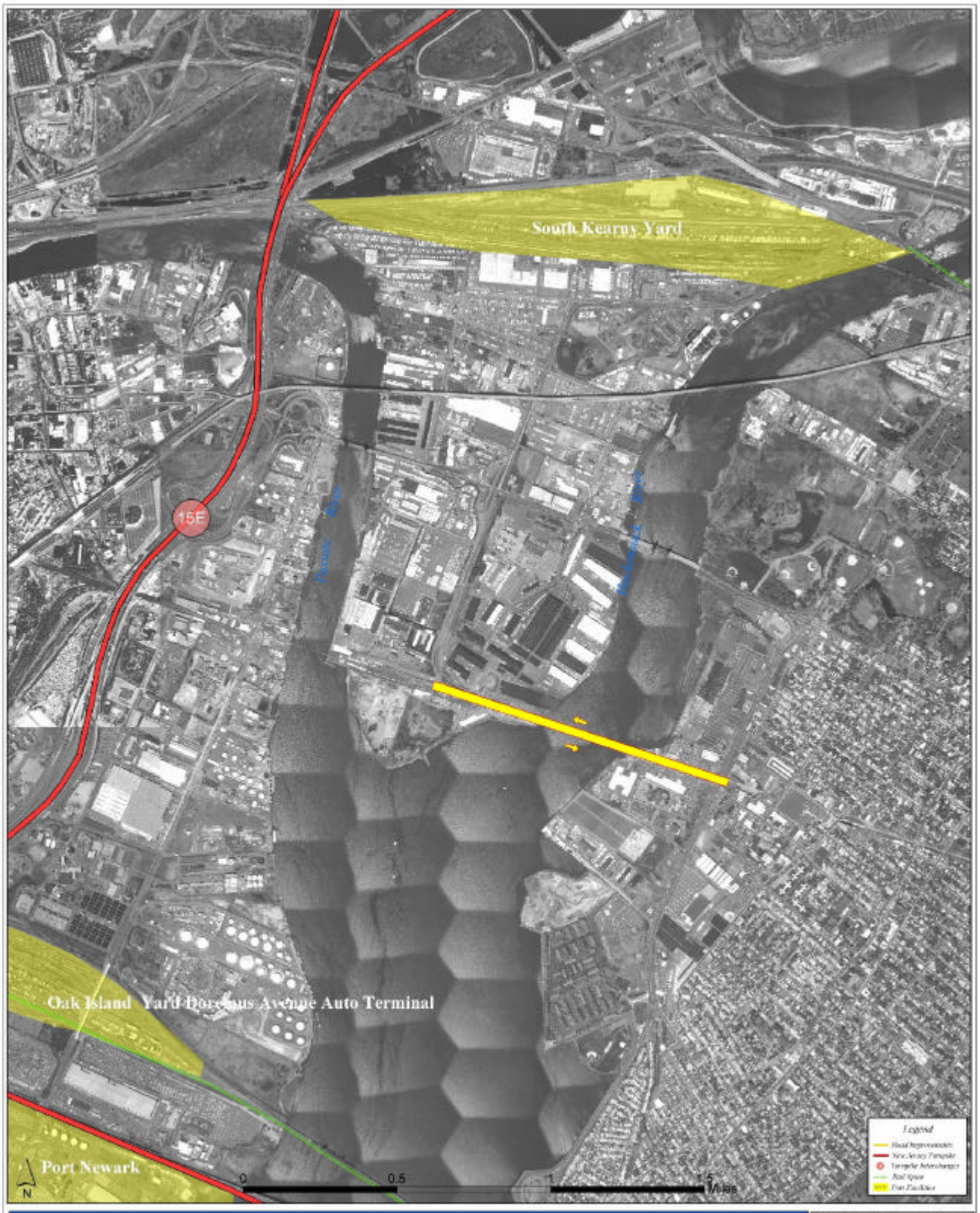

Figure X.5: Hackensack River Bridge

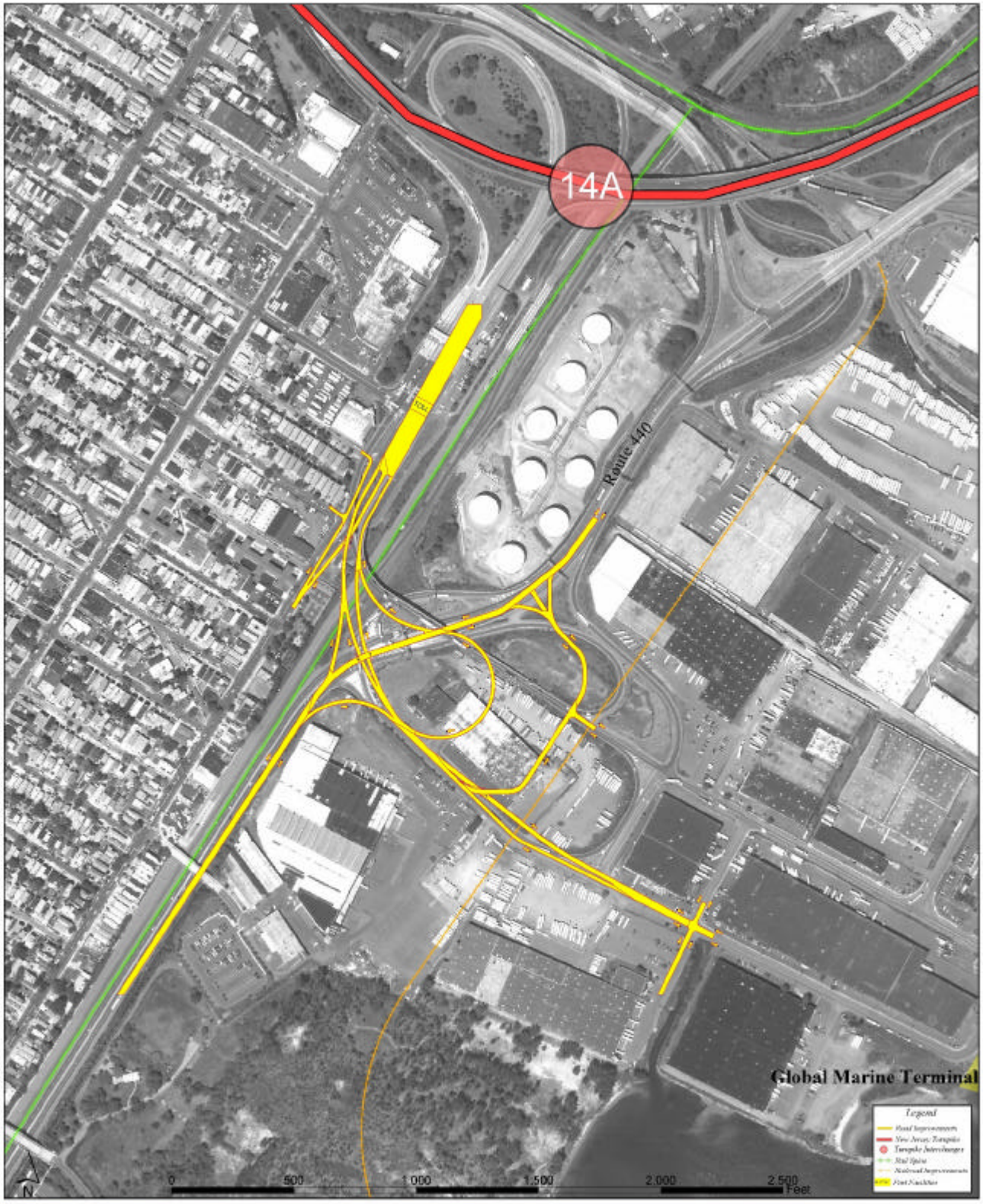

Figure X.6: NJ Turnpike Interchange 14A - Scheme 1

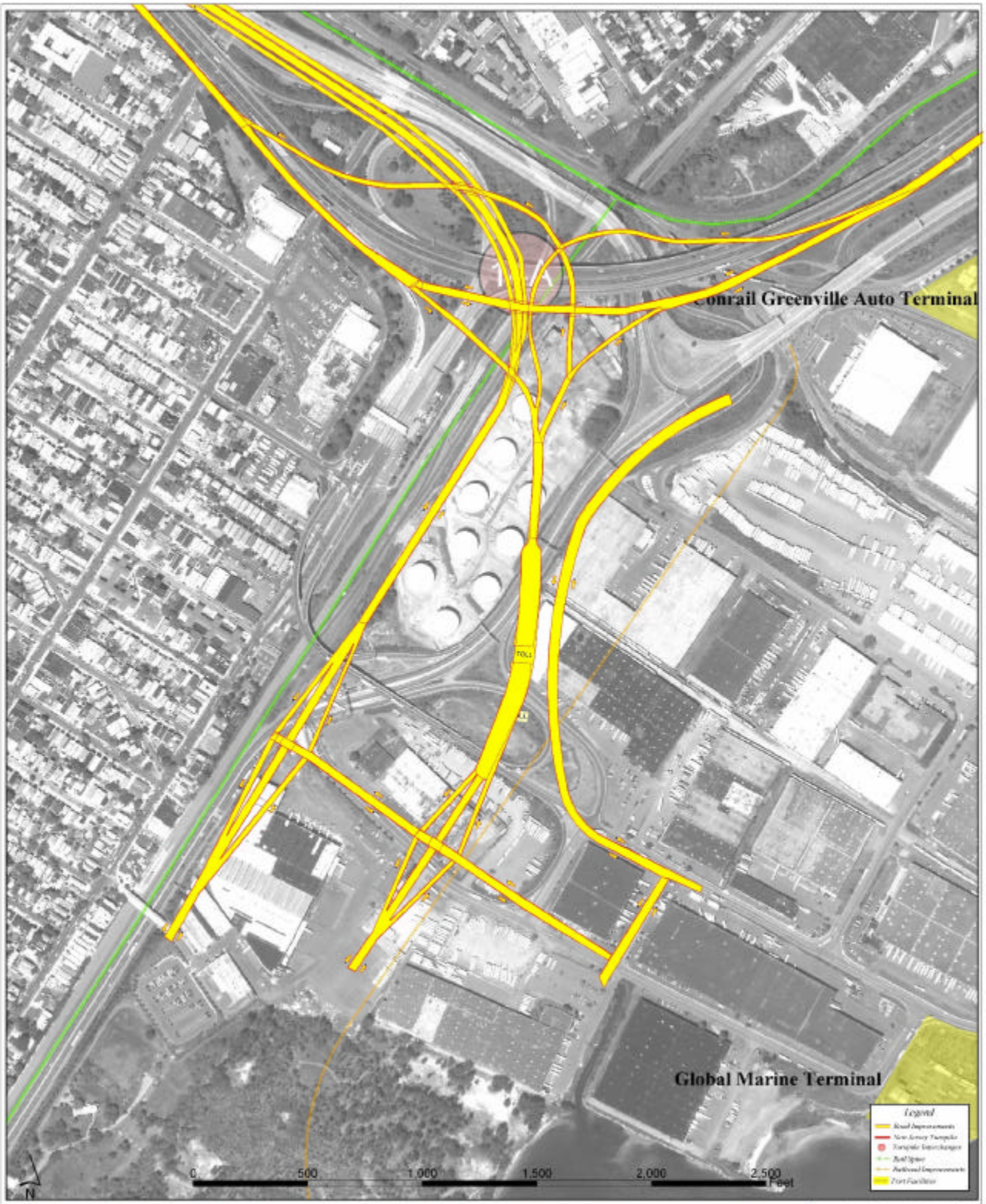

Figure X.7: NJ Turnpike Interchange 14A - Scheme 2

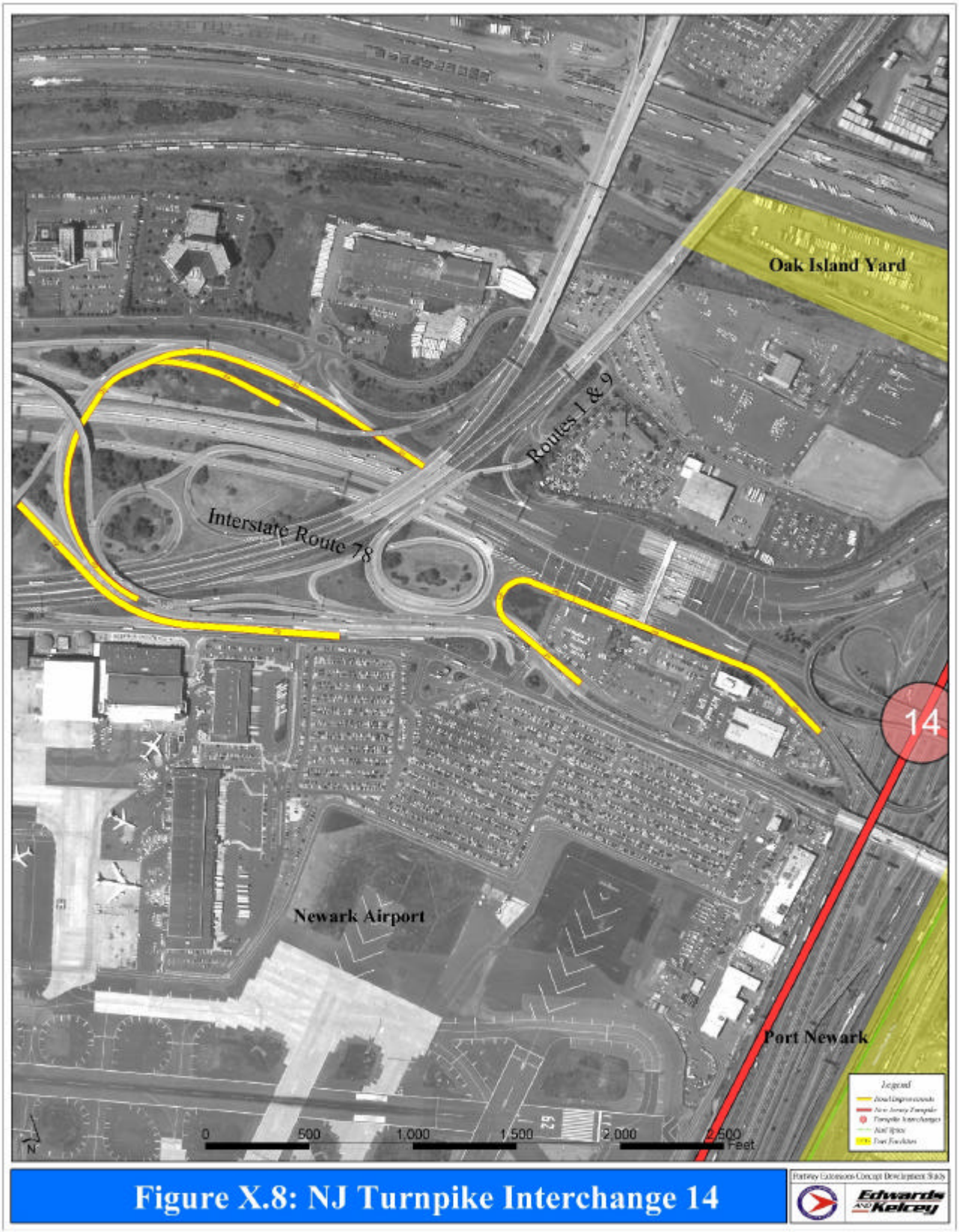

Figure X.8: NJ Turnpike Interchange 14

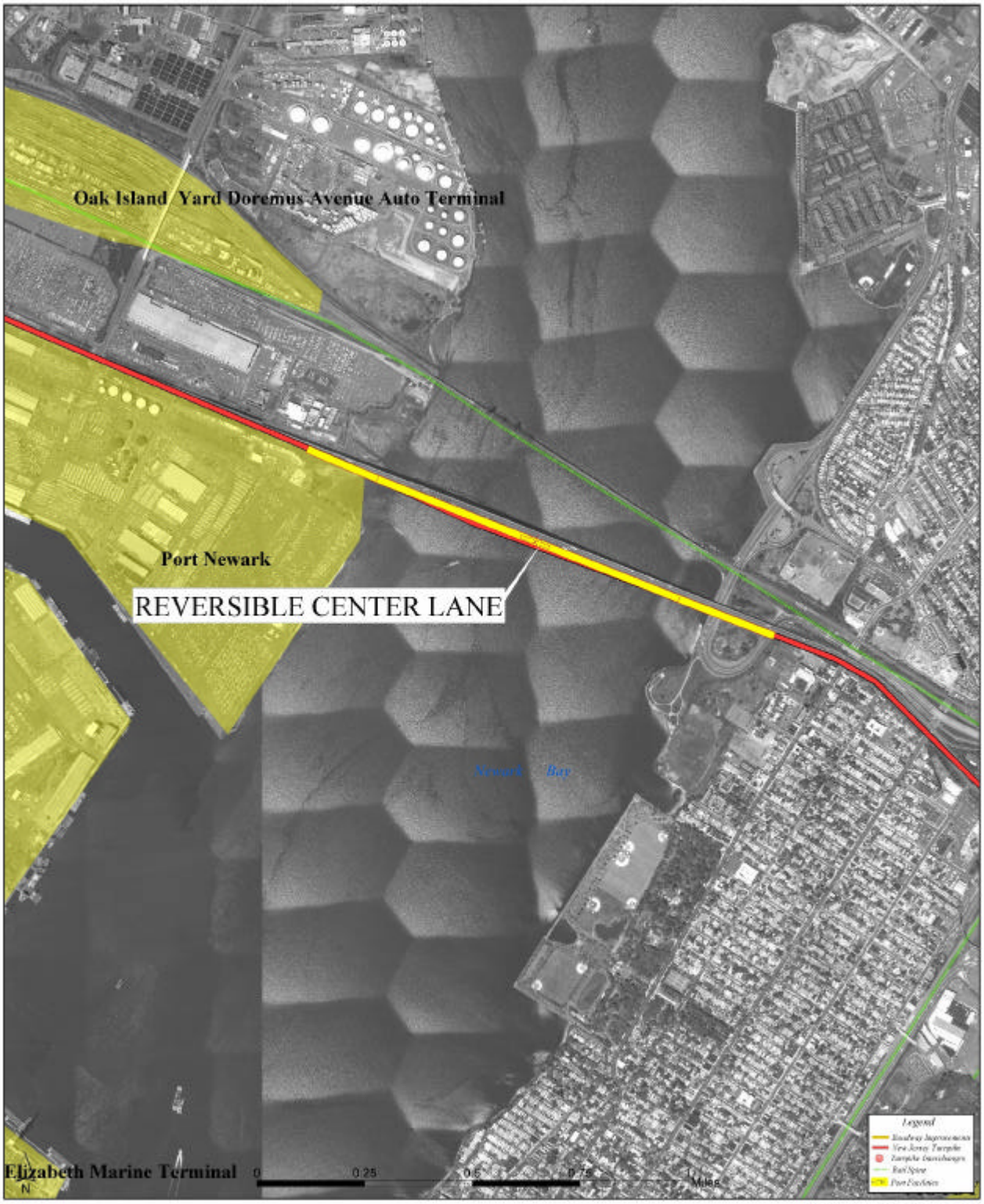

Figure X.9: Interim Newark Bay Bridge Improvement

Figure X.10: Bayonne Bridge

Figure X.11: Routes 1/9 & Delancy Street

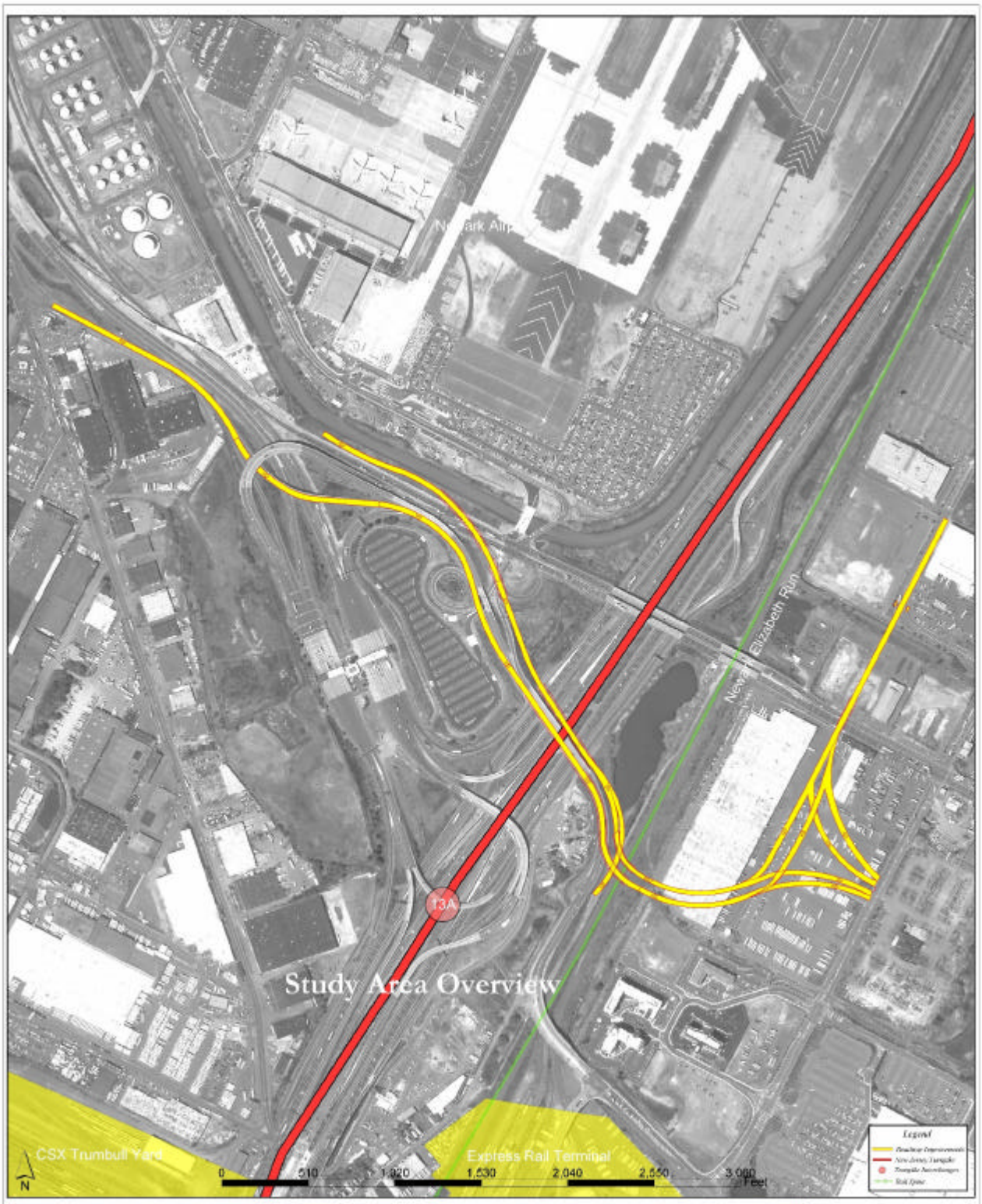

Figure X.12: NJ TPK Int 13A - Kapkowski Road Area

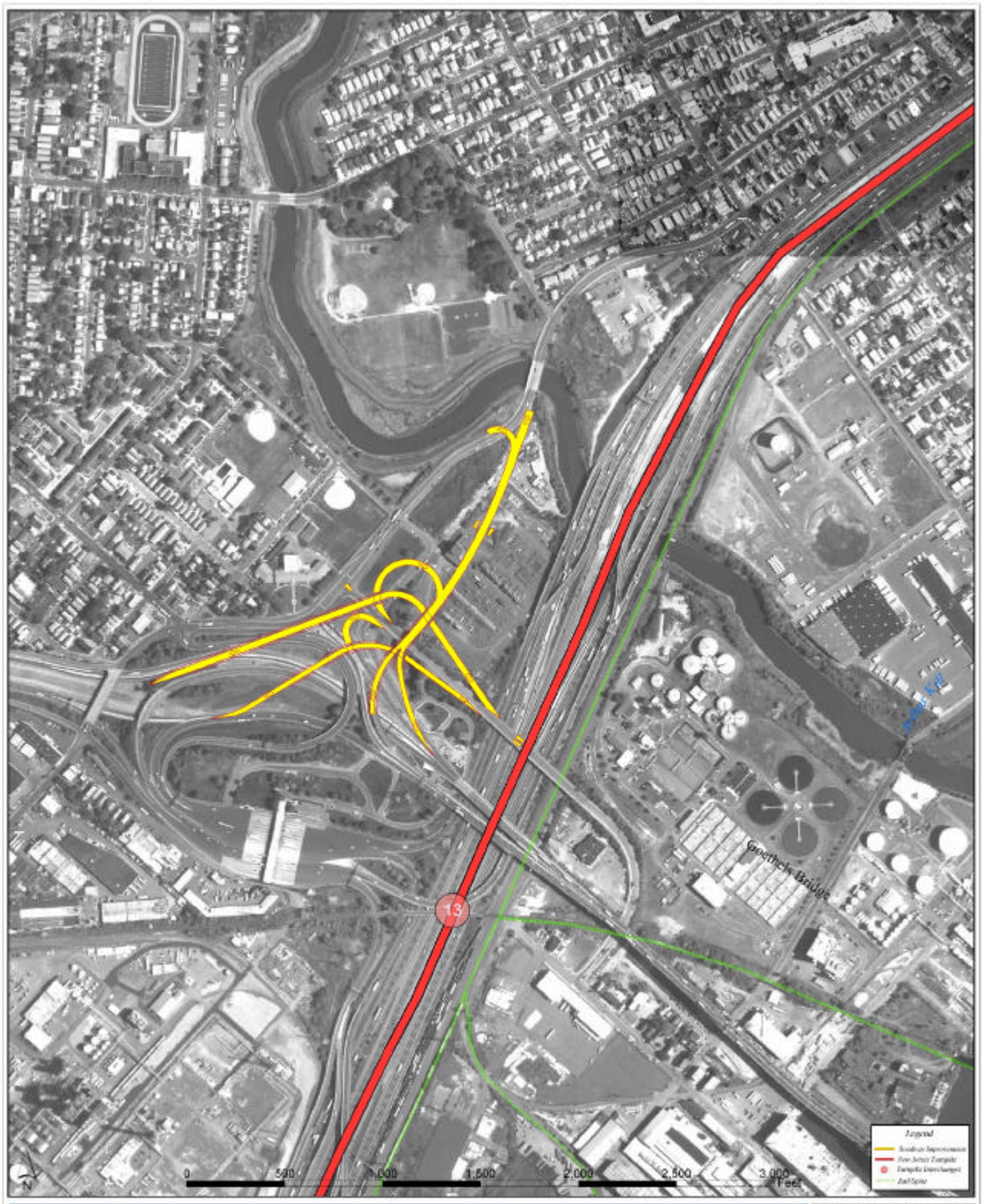

Figure X.13: New Jersey Turnpike Interchange 13

Figure X.14: NJ Turnpike Interchange 12 Area

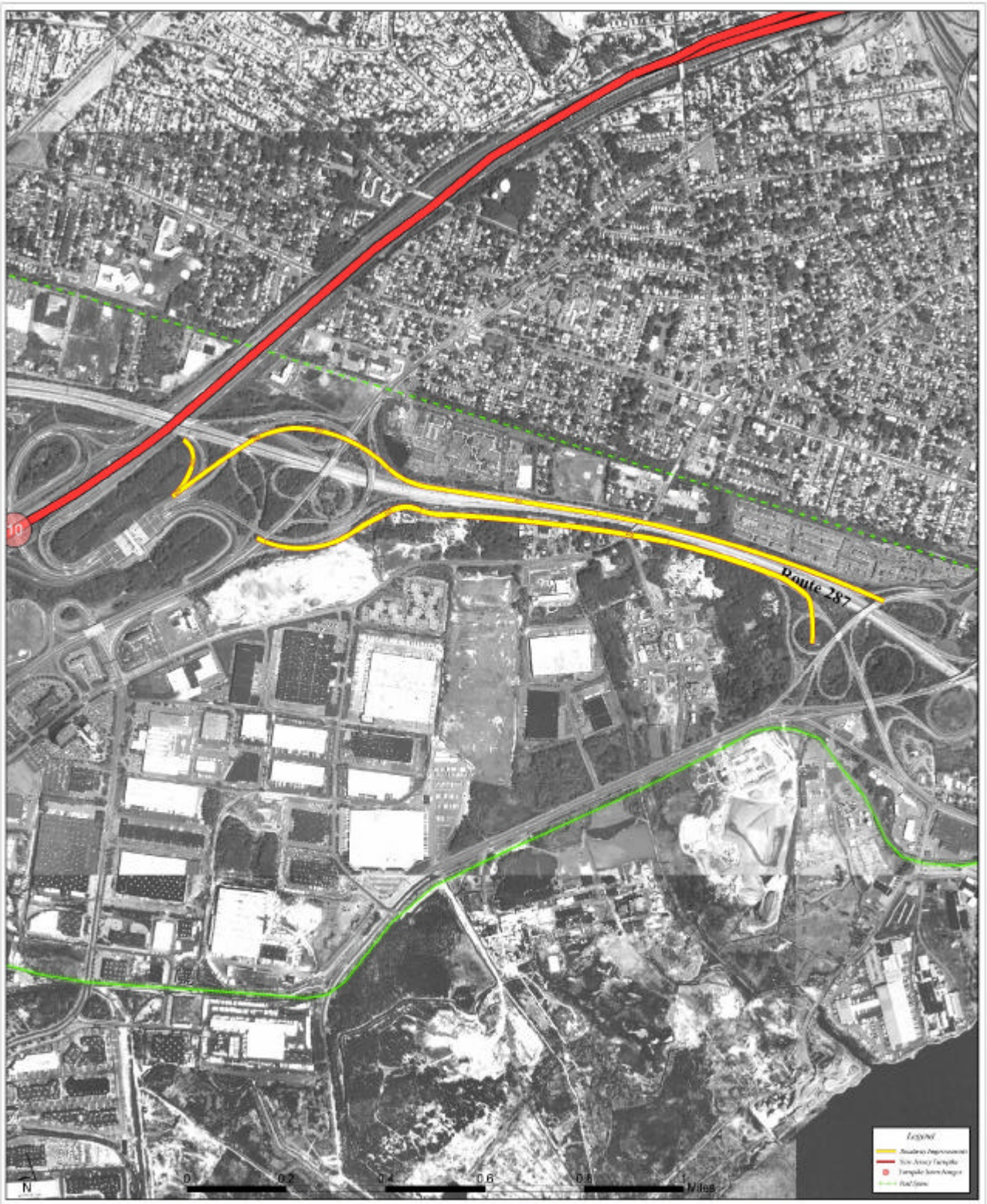

Figure X.15: New Jersey Turnpike Interchange 10 Area

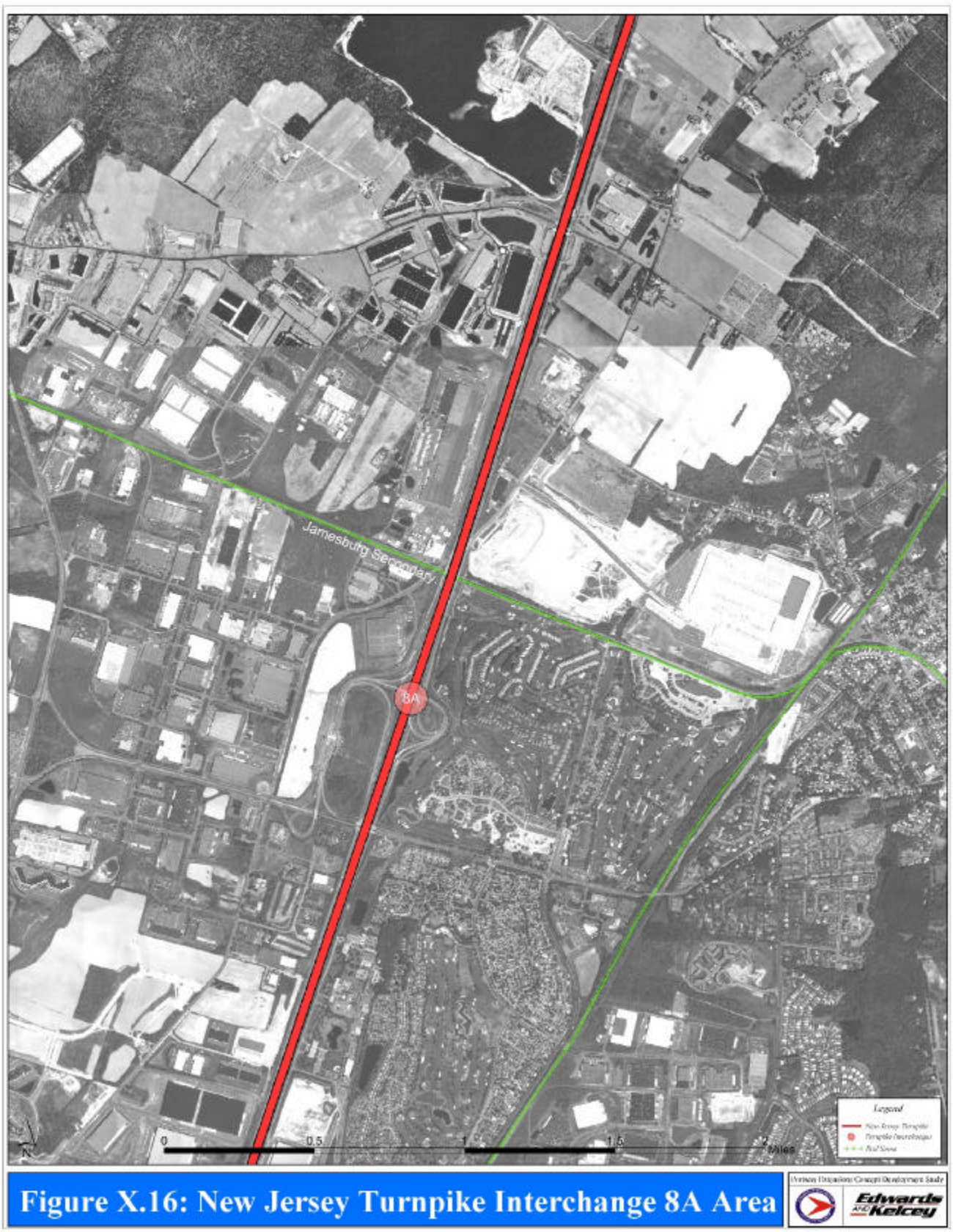

Figure X.16: New Jersey Turnpike Interchange 8A Area

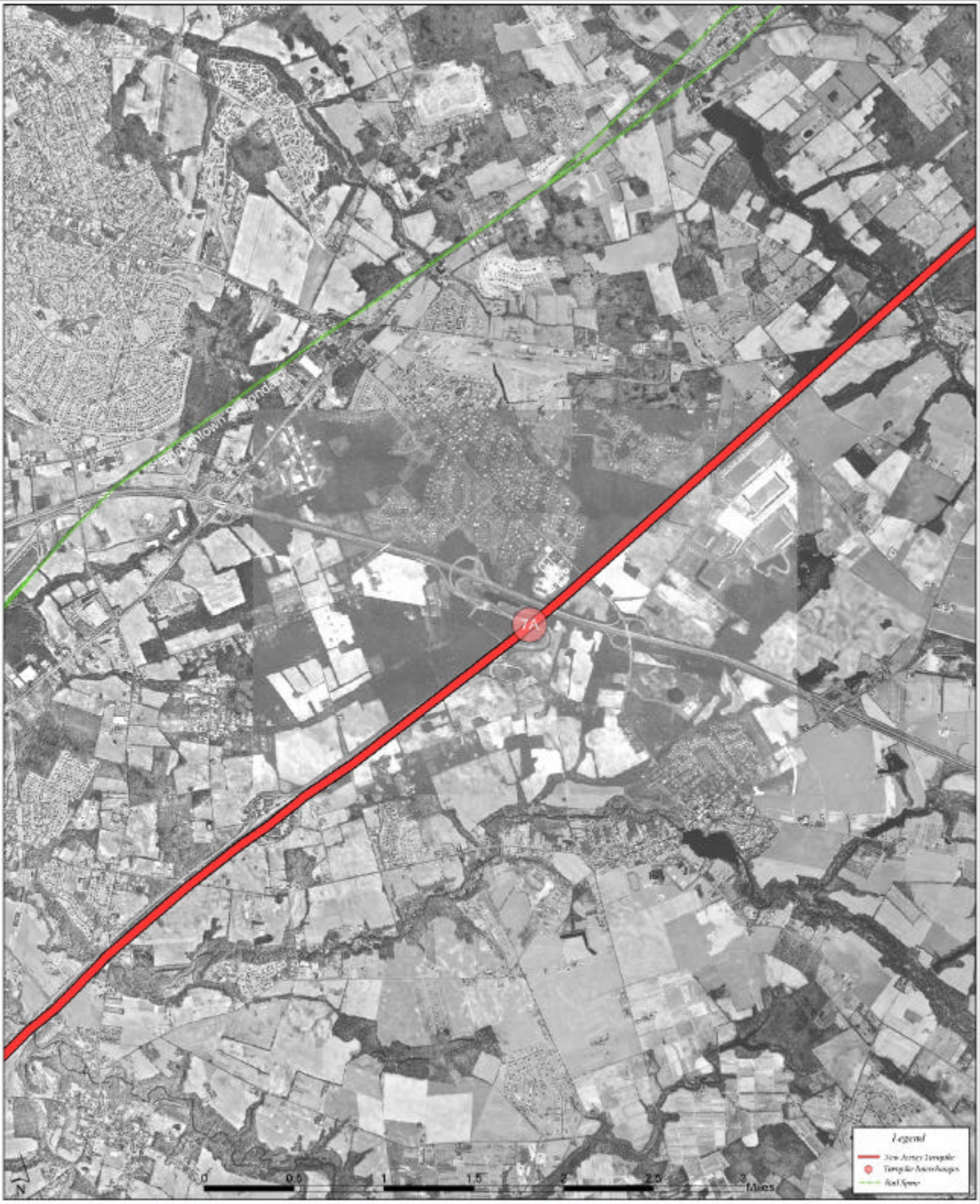

Figure X.17: New Jersey Turnpike Interchange 7A Area