



DIRECTION 2020

A Region on the Rise

INTERMODAL FREIGHT PLAN

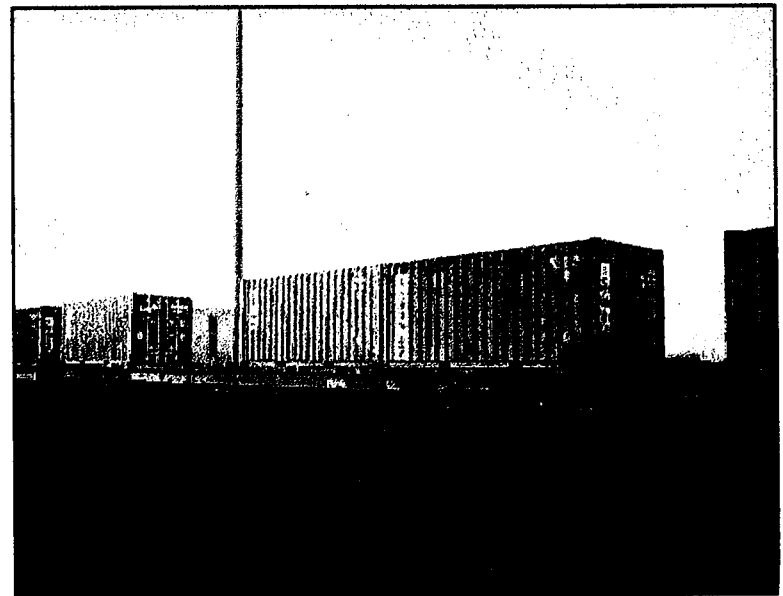
The Goods Movement Element
of the DVRPC Year 2020 Plan



Report 29



**DELAWARE VALLEY
REGIONAL PLANNING
COMMISSION**



INTERMODAL FREIGHT PLAN

Direction 2020 Report No. 29

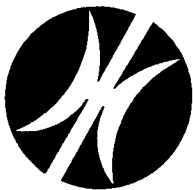


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Created in 1965, the Delaware Valley Regional Planning Commission (DVRPC) is an interstate, intercounty and intercity agency which provides continuing, comprehensive and coordinated planning for the orderly growth and development of the Delaware Valley region. The region includes Bucks, Chester, Delaware, and Montgomery counties as well as the City of Philadelphia in Pennsylvania and Burlington, Camden, Gloucester, and Mercer counties in New Jersey. The Commission is an advisory agency which divides its planning and service functions among the Office of the Executive Director, the Office of Public Affairs, and four line Divisions: Transportation Planning, Regional Information Services Center, Regional Planning, and Finance and Administration. DVRPC's mission for the 1990s is to emphasize technical assistance and services and to conduct high priority studies for member state and local governments, while determining and meeting the needs of the private sector.



The DVRPC logo is adapted from the official seal of the Commission and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River flowing through it. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey. The logo combines these elements to depict the areas served by DVRPC.

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

TITLE	Date Published: June 1995
INTERMODAL FREIGHT PLAN <i>Direction 2020 Report No. 29</i>	Publication No. 95013

Geographic Area Covered:

The nine counties in the DVRPC region including Burlington, Camden, Gloucester and Mercer in New Jersey and Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania.

Key Words:

freight, intermodal facilities, seamless transportation, ports, class one railroads, short line railroads, large truck network, airports, improvements

ABSTRACT

The focus of this plan is the twenty-three significant intermodal facilities in the Delaware Valley region where freight is exchanged between modes of transport en route to its final destination. A catalogue of these facilities and their supporting networks is provided, as is a listing of improvements and long-term goals to achieve seamless transfers of goods. This plan, *Report No. 29 of Direction 2020*, is an integral part of DVRPC's long range transportation and land use plan and reflects the integration of freight issues and concerns into the planning process.

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I INTRODUCTION

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) brought a reasoned sense of urgency to the topic of freight and intermodal planning. The transfer of goods between modes has become more commonplace, more complex, and more sensitive to time. The competitiveness of the nation, and of individual regions, in the global economy will rise or fall with their ability to stay abreast of changes and breakthroughs in logistical practices.

At the same time, ISTEA provided a strong impetus for states and metropolitan planning organizations (MPO) to examine and address freight operations and issues. Traditional public planning processes have been heavily slanted towards the movement of people. Goods movement has seldom been treated in a comprehensive, ongoing fashion, all the while looming collectively as an important yet neglected transportation consumer and provider.

This plan embodies a portion of the Delaware Valley Regional Planning Commission's (DVRPC) response to proactively examine freight matters and to make specific freight provisions in developing long range plans and transportation improvement programs. Like comparable plans developed by DVRPC for aviation and bicycle and pedestrian movements, this plan is intended to complement and augment the region's principal long-range transportation plan, *Moving People and Goods*.

The focus of this plan is intermodal freight systems and facilities in the region.

Intermodalism is broadly defined as the movement of goods via two or more modes. This plan is targeted at those commercial aviation airports, waterports, and truck-to-rail facilities where such exchanges of goods occur.

For those more familiar with passenger travel, intermodal freight facilities are analogous to transportation centers for passenger movements. Each one is unique in its size, services, and amenities. Like their people-movement counterpart, the success of intermodal freight facilities is dependent on factors such as access, capacity, and demand.

The identification of the facilities places them in a domain of concern shared by planners and operators. For planners, each of the facilities becomes a strong candidate for the Intermodal Management System (IMS) required by ISTEA. Highways connecting the facilities to freeways also become prime candidates for the National Highway System (NHS).

The plan has four primary components. They are:

- A catalogue of regionally significant intermodal facilities
- A detailed example of intermodalism
- A vision of the model intermodal freight network in the year 2020
- A set of projects, short and long-range in nature, to maximize the local system

Among the various objectives of this document is to illuminate fundamental operating aspects of the intermodal transportation process because of the unique convergence of private and public interests. It is also envisioned as establishing a foundation

for effecting and coordinating intermodal freight transportation infrastructure improvements in the Delaware Valley.

The plan is the first attempt in the region to add up all the money required for improvements to the intermodal freight network. These requirements may increase over time as studies are completed, needs get better defined, and the vision becomes enhanced. Many of the projects will also serve and benefit the movement of passengers. Costs of minor projects, operations, and maintenance expenditures are not included.

The contents of this document have resulted from various forms of research, analysis, and coordination. Of particular assistance in its production was the Delaware Valley Goods Movement Task Force (DVGMTF) and its

three subcommittees: Long Range Plan, Data, and Economics. (Note: The recurring symbol found in the header of all even numbered pages in this document is the symbol of the DVGMTF and one which very strongly implies intermodalism: a standard shipping container.) The DVGMTF is DVRPC's official freight committee and mechanism and it affords a wealth of freight transportation expertise from a wide spectrum of interests.

Finally, the plan is intended to raise the region's consciousness about its intermodal freight facilities and assets. In responding to the challenge of ISTEA to examine freight issues, the plan produces a challenge of its own: that of pursuing the best possible intermodal freight facilities and balancing their attainment with other transportation improvements. □

II ASSETS

The region's network of intermodal facilities is a valued asset that provides essential consumer services and substantial benefit for the local economy. The purpose of this chapter is to provide an overview of freight activity and to highlight the key facilities and the transportation systems which serve them. To this end, trend data, maps, and aerial photographs are employed.

Freight Activity

Gauges of intermodal freight activity can often be difficult to ascertain due to the incompatibility or sensitive, proprietary nature of data. Fortunately, however, some indices are available that provide insight into the performance of facilities and industries over time.

A great amount of the region's air freight activity is conducted at Philadelphia International Airport (PHL). Freight operations at the remainder of the commercial and general aviation airports in the regional airport system are thought to be minimal or incidental.

In recent years, PHL's growth rate in freight has exceeded that of all competing airports. Freight tonnage has increased by almost 50% in the past 5 years. The addition of new services to Europe by UPS and other carriers has resulted in a large increase in international freight (up more than 20,000 tons from 1993-4).

A 1994 study, *Philadelphia Cargo Capacity and Freight Movement Opportunities*, examined PHL's competitive position in

freight operations. The study revealed that JFK Airport dominates the Northeast region air cargo market. It also found that shippers in Pennsylvania rank 8th nationally in air cargo weight shipped, but that PHL captures only 15% of this market. Additionally, the study determined that most international cargo moves in passenger aircraft, and PHL has limited international flights.

Growth in trailer and container moves at AmeriPort, the region's newest intermodal rail facility, has been appreciable. From a total of 19,900 moves in all of 1993, the facility handled more than 54,000 moves in 1994. While providing a base for international waterborne commerce, it is realized that a high percentage of the facility's business is domestic in nature, not international. The facility's growth in container and trailer activity is a microcosm of global shifts to intermodal logistics and shipping. (Note: More information about AmeriPort and the ports of the region are contained in the chapter offering a case study of intermodalism.)

At the collective port facilities of the Delaware Valley (also referred to as the Port of Philadelphia and Camden), tonnage has slipped slightly in the past five years. Exports are off, particularly bulk commodities such as coal. However, at the same time, general cargoes (primarily imports) have increased. These cargoes are often labor intensive, require good landside transportation connections, and provide a return on the large local investments which have been made to handle specialized products such as paper, steel and scrap metals, and fruits and other perishables.

Phila. International Airport Cargo Traffic (tons)

Cargo/Year	1990	1991	1992	1993	1994	1990-94 Change	
						Absolute	Percent
Mail	75,826	69,900	83,371	86,070	81,690	5,864	7.7
Domestic Freight	275,601	302,464	301,880	337,289	419,260	143,659	52.1
International Freight	14,694	14,692	18,588	14,043	34,666	19,972	135.9
TOTAL	366,121	387,056	403,839	437,406	535,616	169,495	46.3

Source: Philadelphia Division of Aviation

AmeriPort Cargo Traffic Handled by Train, 1994 (containers and trailers)

Month/Direction	Inbound	Outbound	Total
January	1,825	1,117	2,942
February	2,021	1,095	3,116
March	3,056	1,322	4,378
April	3,000	1,605	4,605
May	3,643	1,359	5,002
June	3,218	1,902	5,120
July	2,848	1,960	4,808
August	2,599	1,957	4,556
September	3,042	1,940	4,982
October	3,127	1,779	4,906
November	2,822	2,151	4,973
December	2,705	1,948	4,653
ANNUAL TOTAL	33,906	20,135	54,041
Monthly Average	2,826	1,678	4,503

Source: Delaware River Port Authority

Ports of Philadelphia and Camden International Commerce (short tons)

Cargo/ Year	1990	1991	1992	1993	1994	1990-94 Change	
						Absolute	Percent
Import							
Bulk	54,431,511	51,825,557	51,727,807	56,701,560	55,476,098	1,044,587	1.9
General	4,142,712	3,721,268	3,995,603	4,288,093	5,256,119	1,113,407	26.9
Total	58,574,223	55,546,825	55,723,410	60,989,653	60,732,217	2,157,994	3.7
Export							
Bulk	5,198,617	2,335,222	1,541,468	1,458,295	1,175,486	(4,023,131)	(77.4)
General	830,344	797,449	768,838	737,169	653,128	(177,216)	(21.3)
Total	6,028,961	3,132,671	2,310,306	2,195,464	1,828,614	(4,200,347)	(69.7)
TOTAL							
Bulk	59,630,128	54,160,779	53,269,275	58,159,855	56,651,584	(2,978,544)	(5.0)
General	4,973,056	4,518,717	4,764,441	5,025,262	5,909,247	936,191	18.8
Total	64,603,184	58,679,496	58,033,716	63,185,117	62,560,831	(2,042,353)	(3.2)

Source: Delaware River Port Authority

Transportation Network

The region's freight transportation network is expansive. A series of maps (following p. 6) showcases the major attributes of each modal system: port, rail, large truck, and airport.

Freight-related facilities line both sides of the Delaware and Schuylkill Rivers. Much of the region's bulk and petroleum maritime activity occurs between Marcus Hook, Paulsboro, and the Schuylkill River. General cargo activities are clustered around and between the Walt Whitman and Benjamin Franklin bridges.

Active port sites stretch northward all the way to the Atlantic Marine Terminals at the USX Fairless facility in lower Bucks County.

Freight rail infrastructure is equally extensive. The region boasts three active Class I freight railroads (Conrail, CP Rail, and CSX), several short lines, and many terminals and yards.

The region's featured intermodal rail line is the Conrail line entering the Delaware Valley

from the west at Pottstown and then following the Schuylkill River in a southeasterly direction to the port area. This rail route was just upgraded at significant expense to the Commonwealth of Pennsylvania and the participating railroads (more than \$80 million) to allow for the conveyance of double-stacked containers via rail car to Canada and the western United States.

Smaller railroad operations, called short lines, augment the services afforded by the larger Class I railroads. As the holdings of some of the larger railroads are under examination for potential down-sizing (such as the "Camden Cluster"), short lines may ultimately play a more prominent role in moving freight in the region.

Equally comprehensive is the region's large truck network. These roads are designated by the states and the City of Philadelphia to accommodate the following trailers: 53' long, 102" wide, and twins. In Pennsylvania, some of the approved facilities contain minor restrictions whereby one or two of the trailer categories cited above may be limited to a slightly smaller size.

Lastly, airports of varying sizes and uses are spread equally over the region. While not all of these have any measure of significant freight activity, the totality of the regional system is important to take into account because even the smallest of the airports provides a measure of relief to freight and passenger activity at Philadelphia International Airport.

Regionally Significant Intermodal Facilities

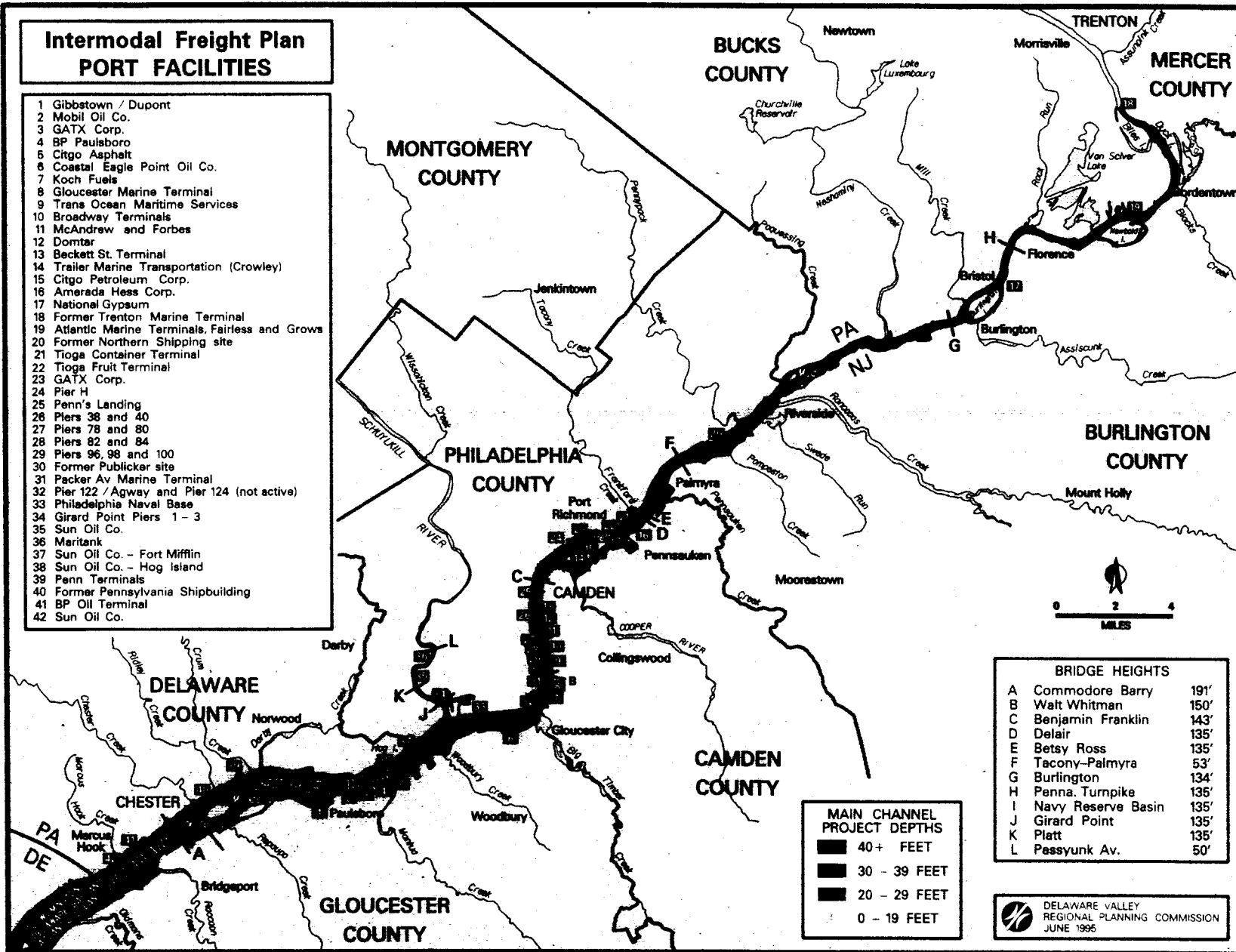
The most dynamic points of convergence of the separate freight modes may be referred to as the region's significant intermodal facilities. Identification of these facilities was based on qualitative and quantitative assessments and factors such as recent and projected levels of activity, the facility's relationship to other intermodal facilities, the intensity of the intermodal transportation connection (e.g., ship-to-pipeline facilities were precluded from consideration), and linkages to the transportation network.

Beginning on page 7 of this document, each of twenty-three regionally significant intermodal facilities is catalogued. An aerial photograph, dating from the spring of 1995, captures the facility (Refer to the identification number on the photograph.) and reveals the surrounding and supporting transportation infrastructure. The facility's owner and principal cargoes are noted to afford a basic level of understanding of its operations. Activity indicators for each facility, which will be updated in conjunction with the development of an Intermodal Management System for the region, are also provided.

Of particular importance, each entry contains information on the following: the roads that logically and unobtrusively connect the facility to a nearby freeway(s), the closest freeway(s), and the railroad(s) which serve the facility. Rigorous consideration of these connections is the true springboard to improving intermodal interfaces. □

Intermodal Freight Plan PORT FACILITIES

- 1 Gibbstown / Dupont
- 2 Mobil Oil Co.
- 3 GATX Corp.
- 4 BP Paulsboro
- 5 Citgo Asphalt
- 6 Coastal Eagle Point Oil Co.
- 7 Koch Fuels
- 8 Gloucester Marine Terminal
- 9 Trans Ocean Maritime Services
- 10 Broadway Terminals
- 11 McAndrew and Forbes
- 12 Domtar
- 13 Beckett St. Terminal
- 14 Trailer Marine Transportation (Crowley)
- 15 Citgo Petroleum Corp.
- 16 Amerada Hess Corp.
- 17 National Gypsum
- 18 Former Trenton Marine Terminal
- 19 Atlantic Marine Terminals, Fairless and Grow
- 20 Former Northern Shipping site
- 21 Tioga Container Terminal
- 22 Tioga Fruit Terminal
- 23 GATX Corp.
- 24 Pier H
- 25 Penn's Landing
- 26 Piers 38 and 40
- 27 Piers 78 and 80
- 28 Piers 82 and 84
- 29 Piers 96, 98 and 100
- 30 Former Publicker site
- 31 Packer Av Marine Terminal
- 32 Pier 122 / Agway and Pier 124 (not active)
- 33 Philadelphia Naval Base
- 34 Girard Point Piers 1 - 3
- 35 Sun Oil Co.
- 36 Meritank
- 37 Sun Oil Co. - Fort Mifflin
- 38 Sun Oil Co. - Hog Island
- 39 Penn Terminals
- 40 Former Pennsylvania Shipbuilding
- 41 BP Oil Terminal
- 42 Sun Oil Co.



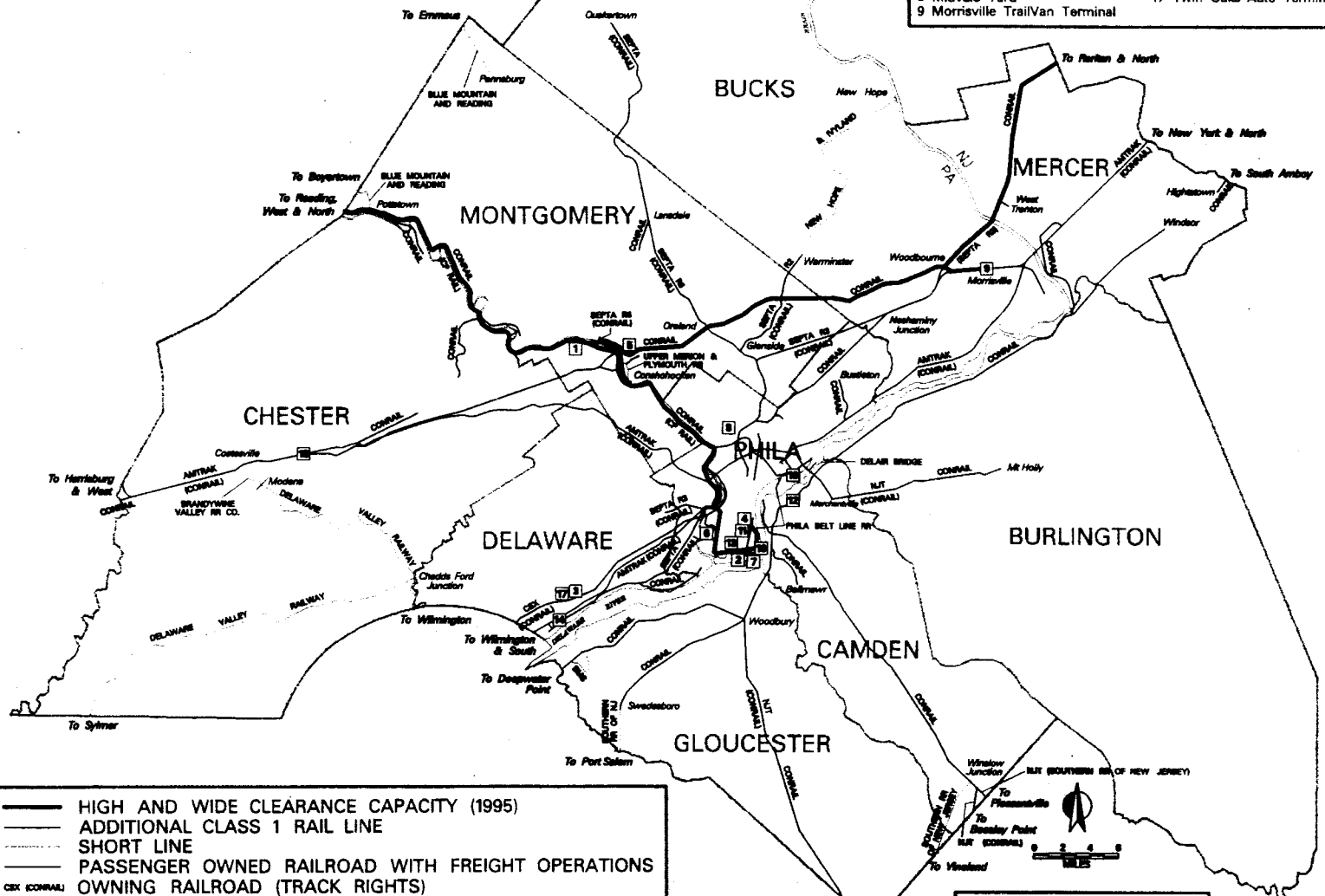
BRIDGE HEIGHTS	
A	Commodore Barry 191'
B	Walt Whitman 150'
C	Benjamin Franklin 143'
D	Delair 135'
E	Betsy Ross 135'
F	Tacony-Palmyra 53'
G	Burlington 134'
H	Penna. Turnpike 136'
I	Navy Reserve Basin 135'
J	Girard Point 135'
K	Platt 135'
L	Pessyunk Av. 50'

MAIN CHANNEL PROJECT DEPTHS	
■	40+ FEET
■	30 - 39 FEET
■	20 - 29 FEET
■	0 - 19 FEET

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Intermodal Freight Plan RAIL FREIGHT NETWORK

- | TERMINALS AND YARDS | |
|----------------------------------|-------------------------------|
| 1 Abrams Yard | 10 Packer Av. Marine Terminal |
| 2 Ameriport Terminal | 11 Pasha Auto Terminal |
| 3 Bulk Intermodal Dist. Services | 12 Pavonia Yard |
| 4 CSX Intermodal Terminal | 13 Phila. Flexi Flo Terminal |
| 5 Earnest Auto Terminal | 14 Stony Creek Yard |
| 6 Eastside Yard | 15 Thorndale Yard |
| 7 Greenwich Yard | 16 Tioga Marine Terminal |
| 8 Midvale Trail | 17 Twin Oaks Auto Terminal |
| 9 Morrisville TrailVan Terminal | |



— HIGH AND WIDE CLEARANCE CAPACITY (1995)
 — ADDITIONAL CLASS 1 RAIL LINE
 - - - SHORT LINE
 — PASSENGER OWNED RAILROAD WITH FREIGHT OPERATIONS
 CSX (CONRAIL) OWNING RAILROAD (TRACK RIGHTS)

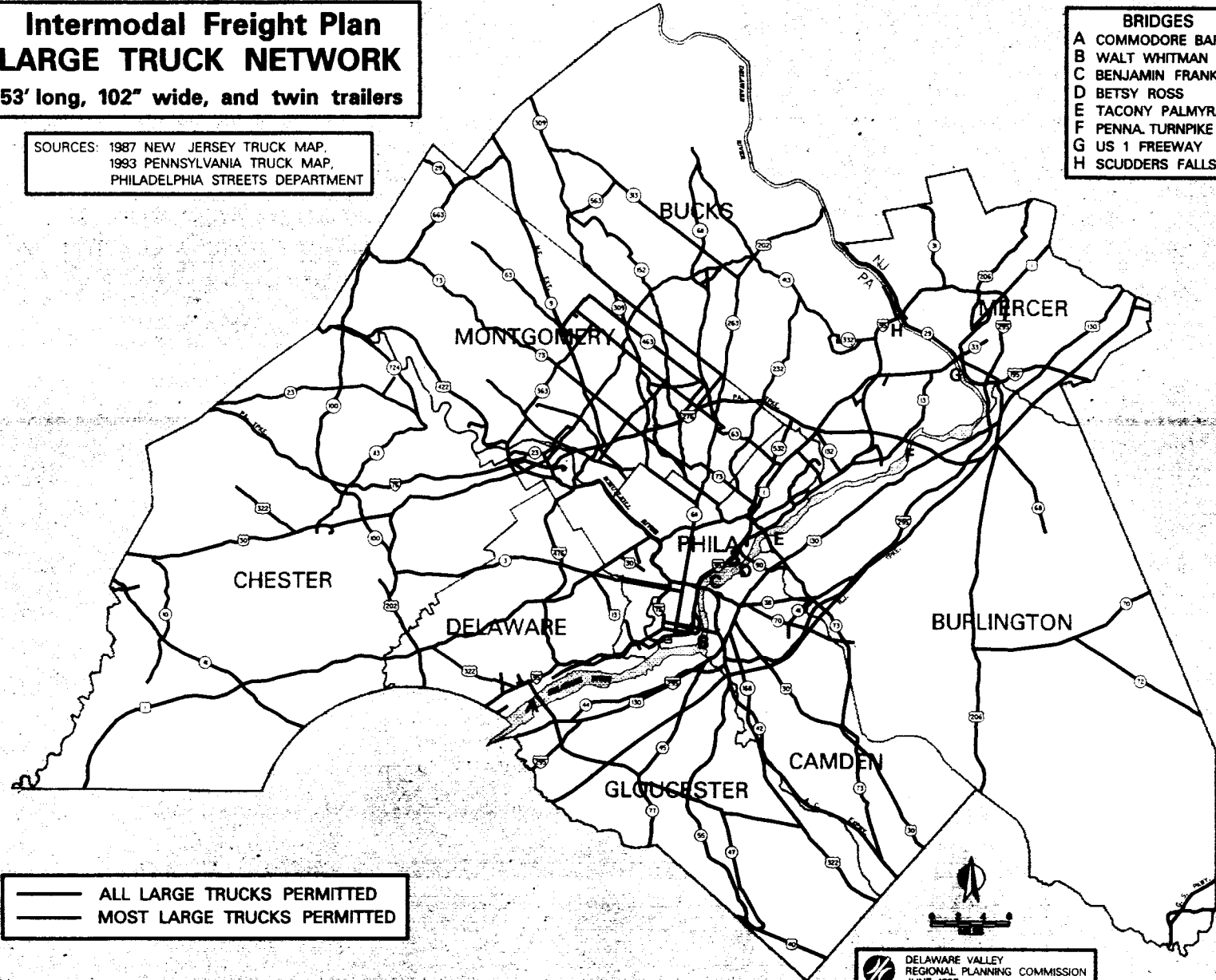

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Intermodal Freight Plan LARGE TRUCK NETWORK

53' long, 102" wide, and twin trailers

SOURCES: 1987 NEW JERSEY TRUCK MAP,
1993 PENNSYLVANIA TRUCK MAP,
PHILADELPHIA STREETS DEPARTMENT

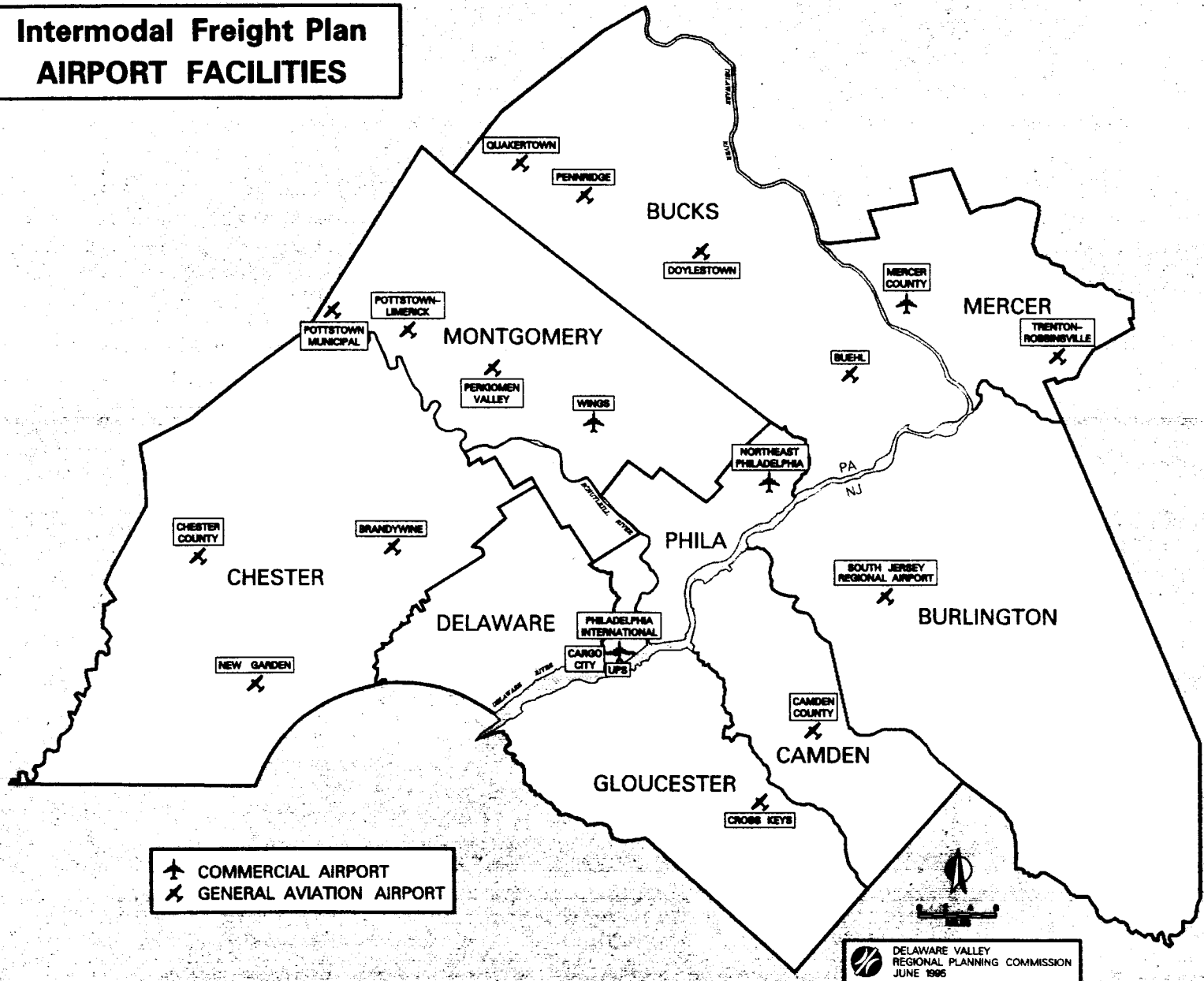
- BRIDGES**
- A COMMODORE BARRY
 - B WALT WHITMAN
 - C BENJAMIN FRANKLIN
 - D BETSY ROSS
 - E TACONY PALMYRA
 - F PENNA. TURNPIKE
 - G US 1 FREEWAY
 - H SCUDDERS FALLS



— ALL LARGE TRUCKS PERMITTED
— MOST LARGE TRUCKS PERMITTED

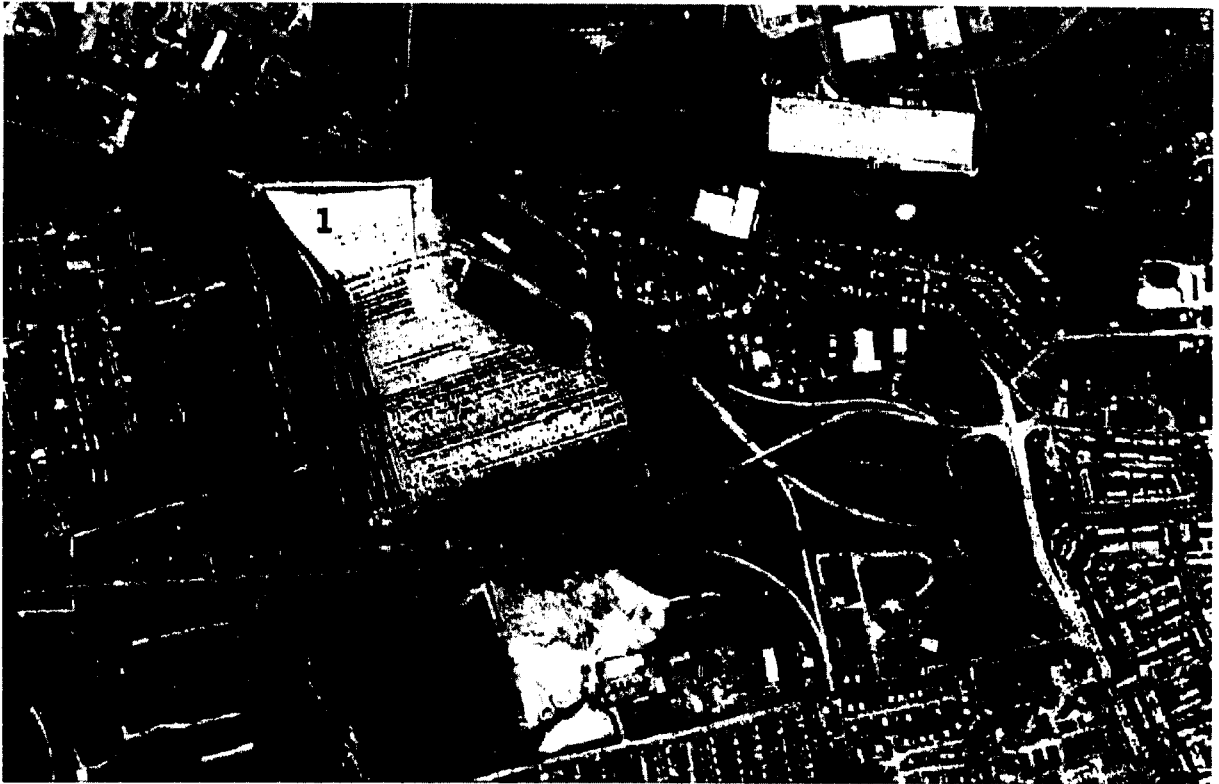
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Intermodal Freight Plan AIRPORT FACILITIES

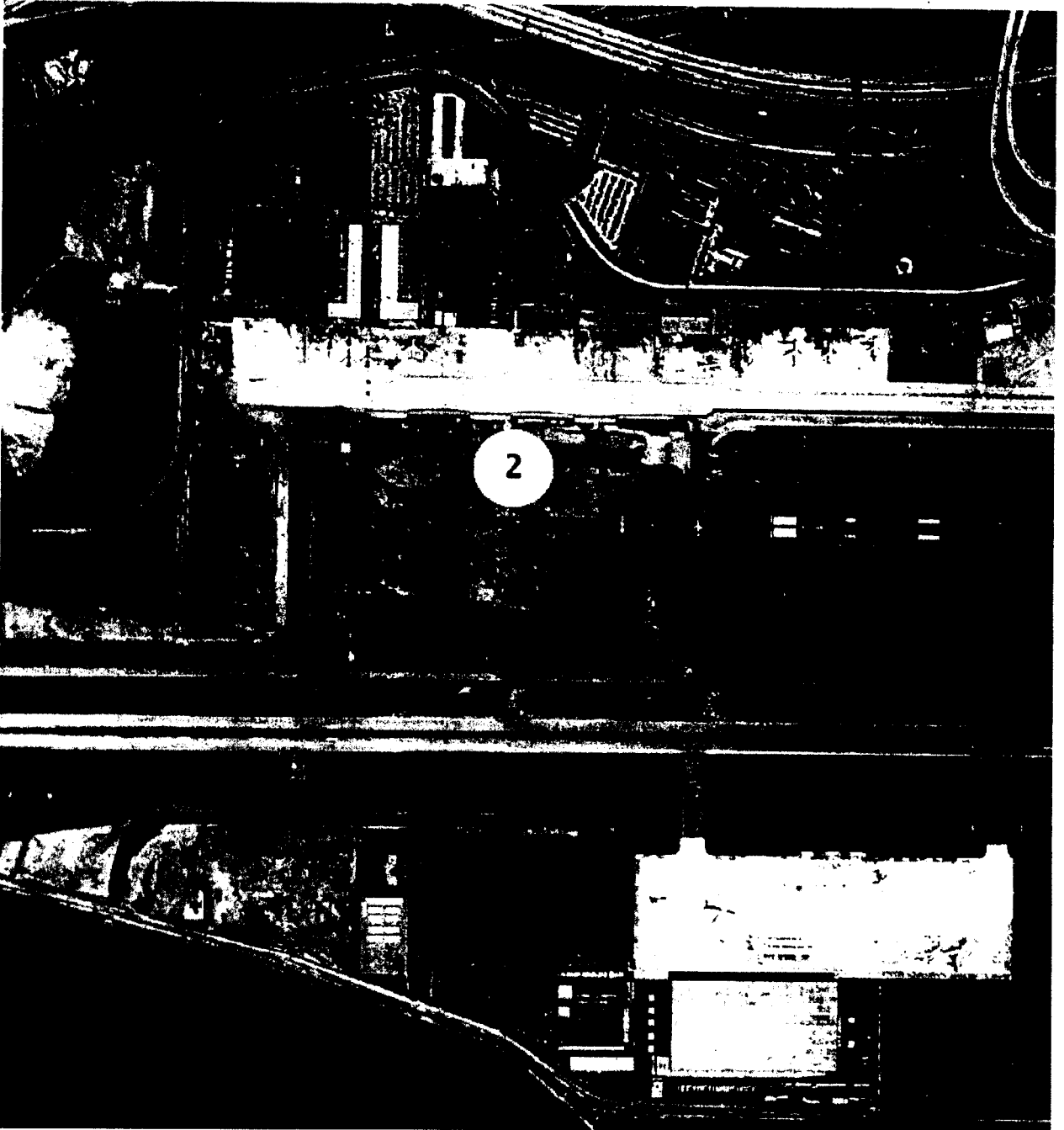


✈️ COMMERCIAL AIRPORT
✈️ X GENERAL AVIATION AIRPORT

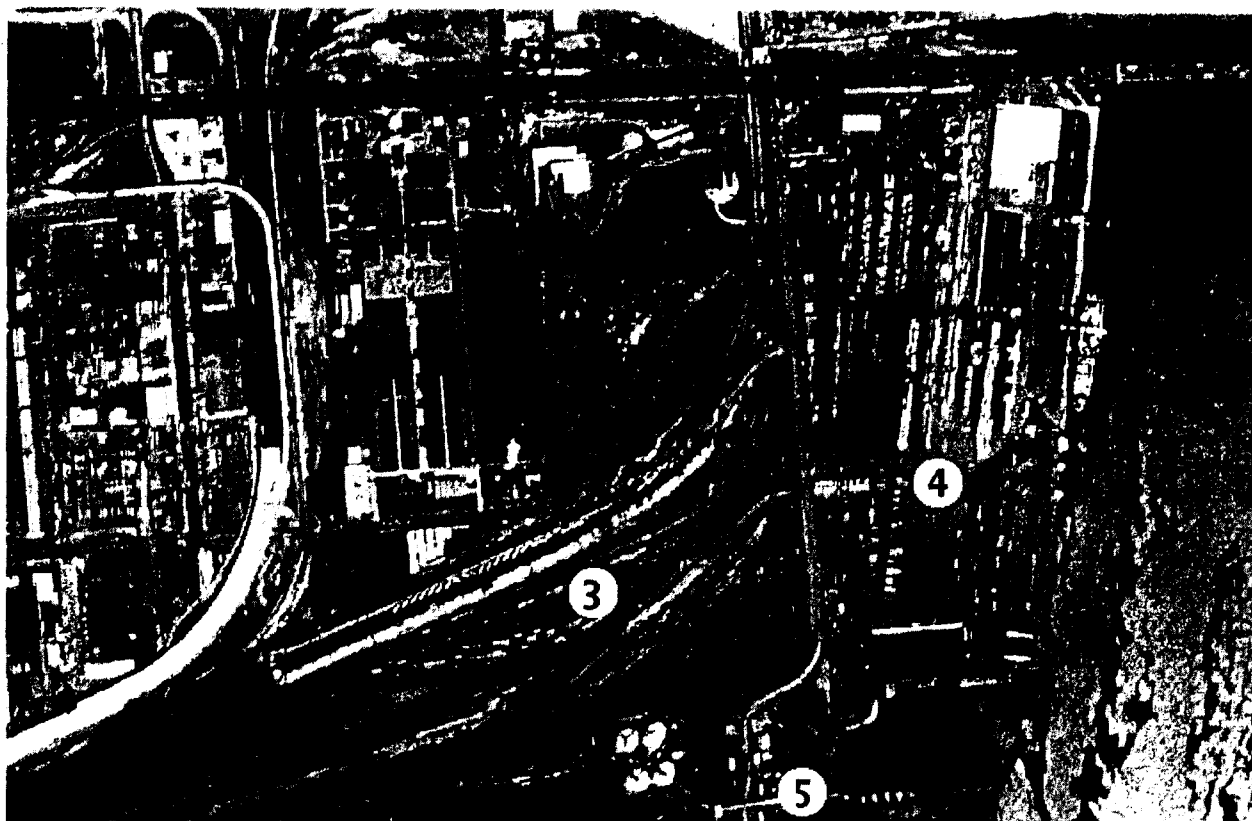
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Facility 1	Twin Oaks Automobile Terminal
Owner	CSX
Primary Cargoes	automobiles and trucks
Location	Bethel Road and US 322 Upper Chichester, PA
Connections to Freeways	Bethel Road and US 322
Proximate Freeways	I-95
Rail Service	CSX
Activity Indicator	33,250 units in 1994



Facility 2	Philadelphia International Airport
Owner	City of Philadelphia
Primary Cargoes	textiles, rubber, mail, small packages, and plastic materials
Location	PA 291 and I-95 Philadelphia, PA
Connections to Freeways	Penrose, Island, Bartram, and Enterprise Avenues Scott Way, Cargo City Road,, PA 291 Tinicum Island and Hog Island Roads
Proximate Freeways	I-95 and I-76
Rail Service	Conrail
Activity Indicator	535,616 tons in 1994



Facility 3	AmeriPort
Owner	Delaware River Port Authority (ownership to be transferred to the Port of Phila. and Camden)
Primary Cargoes	containers and trailers
Location	Old Delaware Avenue Philadelphia, PA
Connections to Freeways	Old Delaware, Pattison, Packer, and Oregon Avenues Columbus Boulevard and Front and Broad Streets
Proximate Freeways	I-76 and I-95
Rail Service	Conrail, CP Rail, and CSX
Activity Indicator	54,041 units in 1994

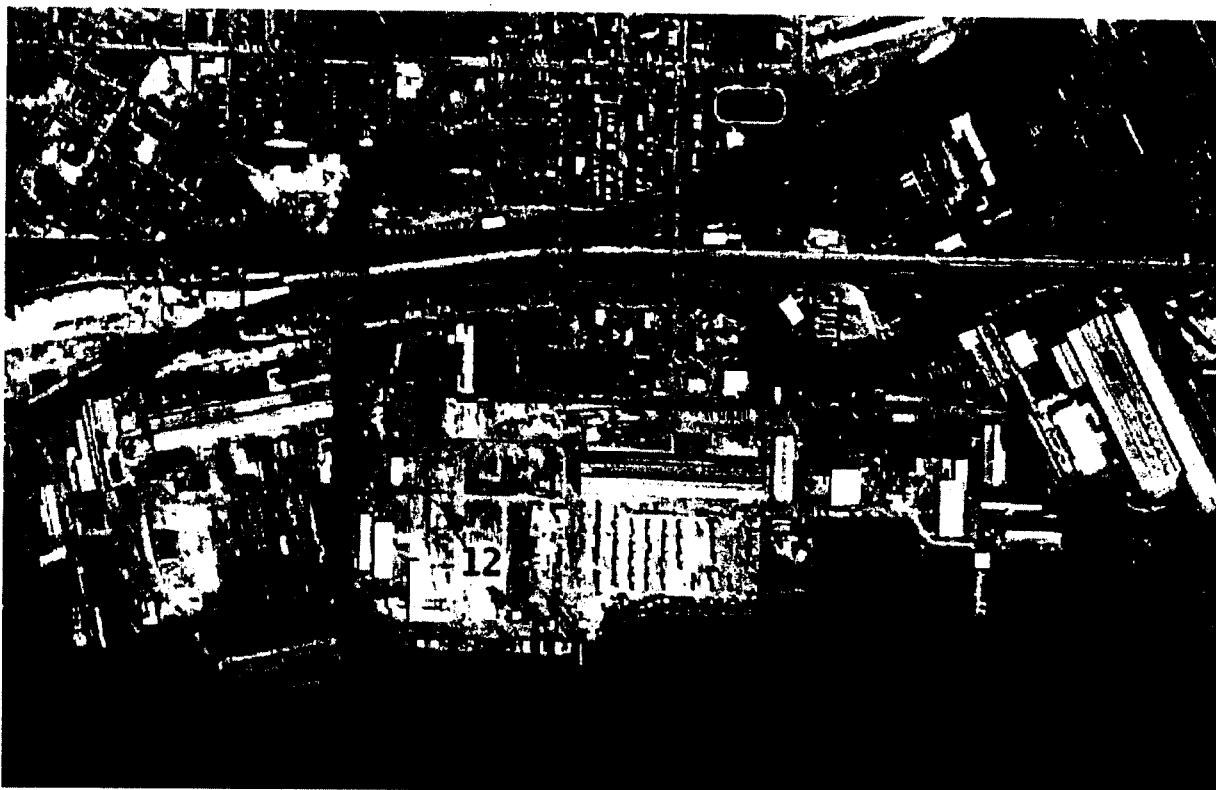
Facility 4	Packer Avenue Marine Terminal
Owner	Philadelphia Regional Port Authority
Primary Cargoes	containers, steel products, meat, fruit, and heavy lift
Location	3301 S. Columbus Boulevard Philadelphia, PA
Connections to Principal Freeways	Old Delaware, Packer, Pattison, and Oregon Avenues Columbus Boulevard and Front and Broad Streets
Proximate Freeways	I-76 and I-95
Rail Service	Conrail, CP Rail, and CSX
Activity Indicator	184 ships in 1994

Facility 5	Pier 122
Owner	Conrail
Primary Cargoes	ore and coal
Location	Greenwich Point Philadelphia, PA
Connections to Freeways	Old Delaware, Pattison, Packer, and Oregon Avenues Columbus Boulevard and Front and Broad Streets
Proximate Freeways	I-76 and I-95
Rail Service	Conrail
Activity Indicator	54 ships in 1994

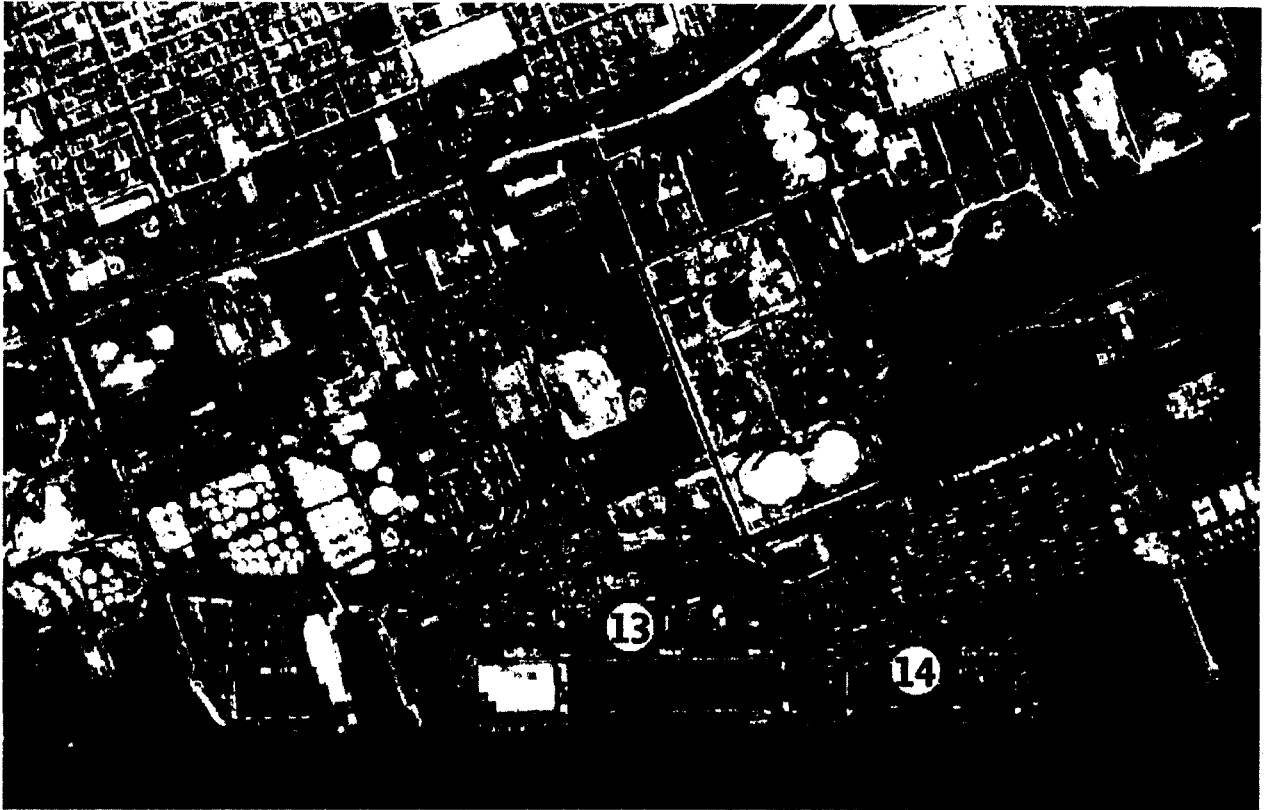


Facility 6	Pier 98 Annex
Owner	Philadelphia Regional Port Authority
Primary Cargoes	automobiles and trucks
Location	Oregon Avenue and Columbus Boulevard Philadelphia, PA
Connections to Freeways	Packer and Oregon Avenues Columbus Boulevard and Front Street
Proximate Freeways	I-76 and I-95
Rail Service	Conrail, CP Rail, and CSX
Activity Indicator	limited activity in 1994
Facility 7	Pier 96
Owner	Philadelphia Regional Port Authority
Primary Cargoes	automobiles and trucks
Location	140 East Oregon Avenue Philadelphia, PA
Connections to Freeways	Packer and Oregon Avenues Columbus Boulevard and Front Street
Proximate Freeways	I-76 and I-95
Rail Service	Conrail, CP Rail, and CSX
Activity Indicator	0 ships in 1994

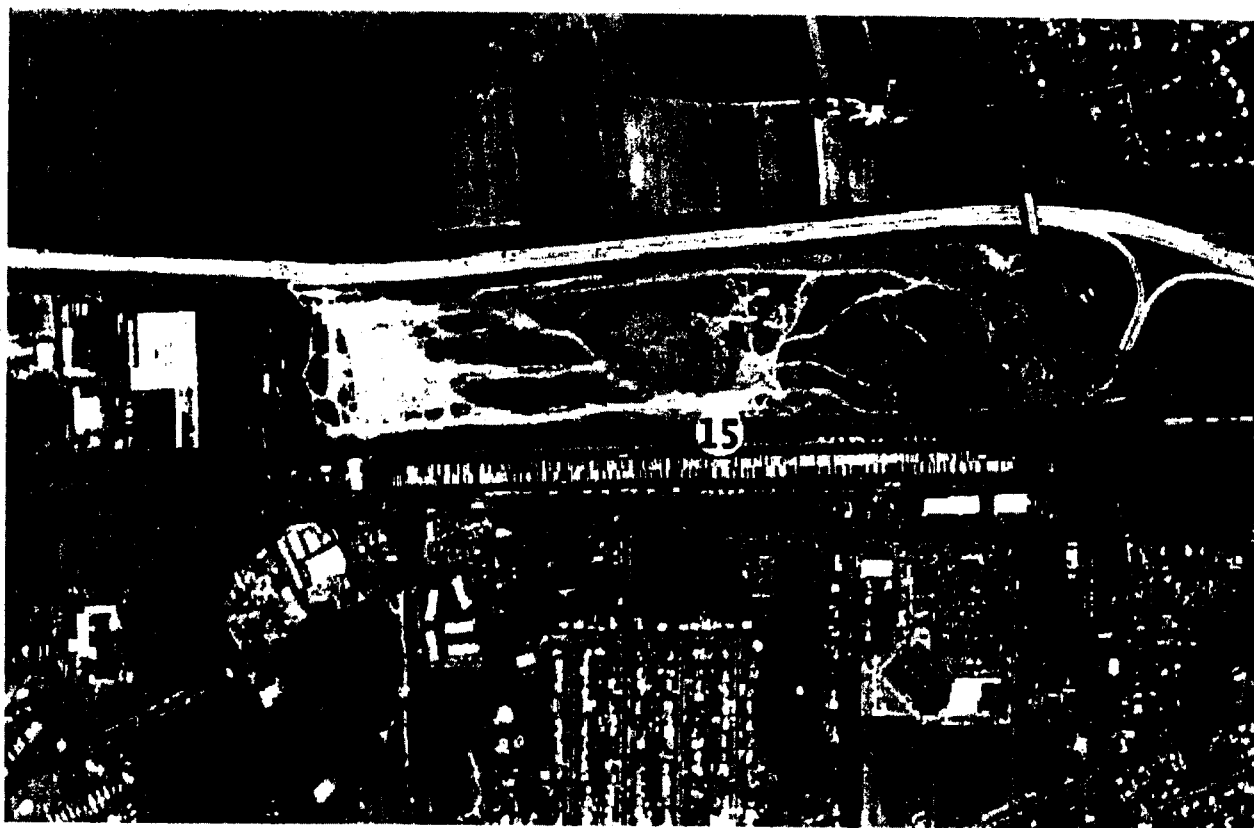
Facility 8	Piers 82-84
Owner	Philadelphia Regional Port Authority
Primary Cargoes	cocoa beans and products and other perishables
Location	Columbus Boulevard Philadelphia, PA
Connections to Freeways	Packer, Old Delaware, and Oregon Avenues Columbus Boulevard and Front Street
Proximate Freeways	I-76, I-676, and I-95
Rail Service	Conrail, CP Rail, and CSX
Activity Indicator	1 ship in 1994
Facility 9	CSX Intermodal
Owner	CSX
Primary Cargoes	containers and trailers
Location	Snyder Avenue and Columbus Boulevard Philadelphia, PA
Connections to Freeways	Packer, Snyder, Old Delaware, and Oregon Avenues Columbus Boulevard and Front Street
Proximate Freeways	I-76, I-676, and I-95
Rail Service	CSX
Activity Indicator	157,000 units in 1994
Facility 10	Piers 78-80
Owner	Philadelphia Regional Port Authority
Primary Cargoes	newsprint, coated paper, and wood pulp
Location	2147 Columbus Boulevard Philadelphia, PA
Connections to Freeways	Packer, Snyder, Old Delaware, and Oregon Avenues Columbus Boulevard and Front Street
Proximate Freeways	I-76, I-676, and I-95
Rail Service	Conrail, CP Rail, and CSX
Activity Indicator	103 ships in 1994
Facility 11 (not pictured)	Piers 38-40
Owner	Philadelphia Regional Port Authority
Primary Cargoes	newsprint, coated paper, wood pulp, and other forest products
Location	Columbus Boulevard and Christian Street Philadelphia, PA
Connections to Freeways	Oregon Avenue Columbus Boulevard and Front Street
Proximate Freeways	I-76, I-676, and I-95
Rail Service	Conrail, CP Rail, and CSX
Activity Indicator	0 ships in 1994



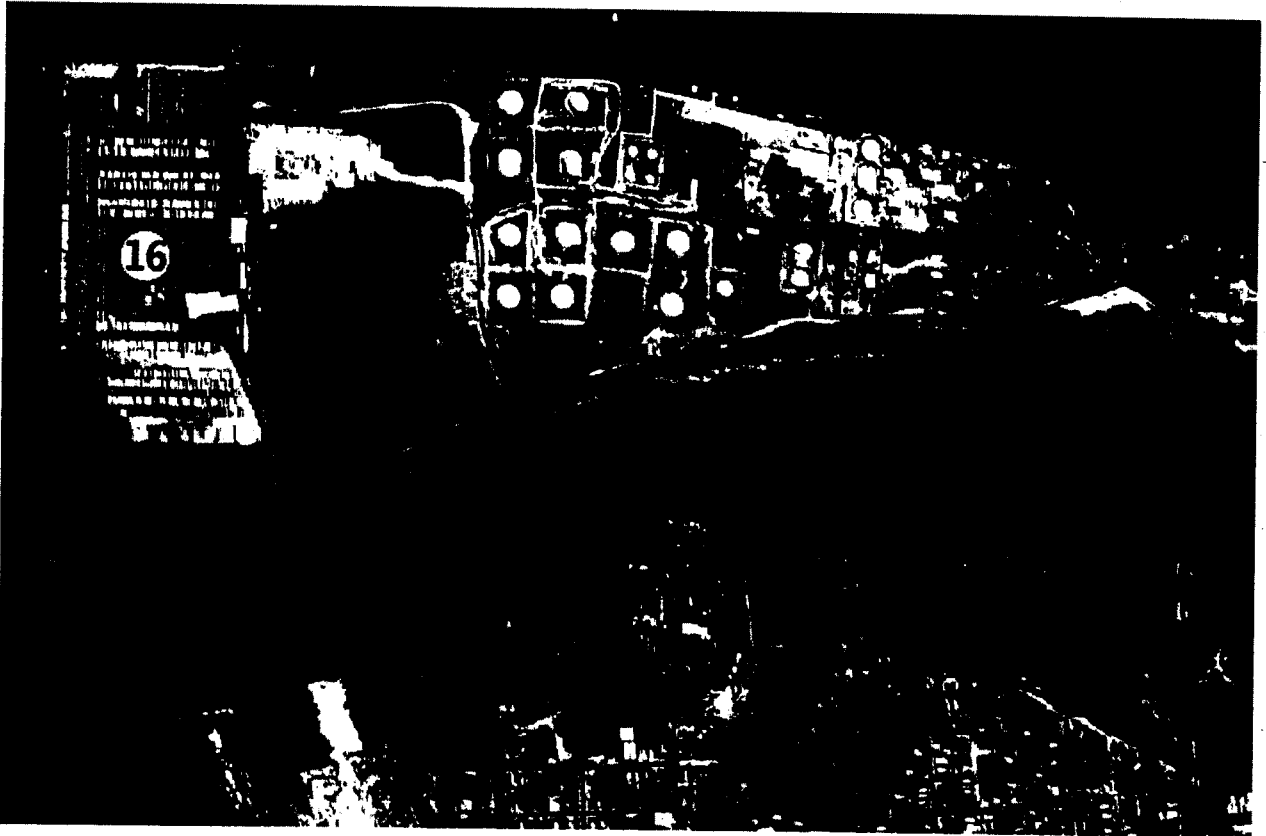
Facility 12	Penn Terminals
Owner	Penn Terminals, Inc.
Primary Cargoes	containers, steel, metals, lumber, and fruit
Location	1 Saville Avenue Eddystone, PA
Connections to Freeways	Stewart and Saville Avenues and PA 291
Proximate Freeways	I-95 and I-476
Rail Service	Conrail
Activity Indicator	274 ships in 1994



Facility 13	Tioga Fruit Terminal
Owner	Philadelphia Regional Port Authority
Primary Cargoes	fresh and refrigerated fruit, autos, and passengers
Location	3460 North Delaware Avenue Philadelphia, PA
Connections to Freeways	Richmond and Lewis Streets Allegheny, Castor, and Delaware Avenues
Proximate Freeways	I-95 and NJ 90
Rail Service	Conrail
Activity Indicator	part of 173 ships at Tioga terminals in 1994
Facility 14	Tioga Container Terminal
Owner	Philadelphia Regional Port Authority
Primary Cargoes	containers, project, and autos
Location	North Delaware Avenue Philadelphia, PA
Connections to Freeways	Richmond and Lewis Streets Allegheny, Castor, and Delaware Avenues
Proximate Freeways	I-95 and NJ 90
Rail Service	Conrail
Activity Indicator	part of 173 ships at Tioga terminals in 1994



Facility 15	Morrisville TrailVan Terminal
Owner	Conrail
Primary Cargoes	containers and trailers
Location	East Cabot Boulevard Morrisville, PA
Connections to Freeways	East Cabot Boulevard and Oxford Valley Road
Proximate Freeways	US 1 and I-95
Rail Service	Conrail
Activity Indicator	100,000 units in 1994



Facility 16	Petty's Island
Owner	Citgo Petroleum (leased by Crowley Maritime Corporation)
Primary Cargoes	containers and trailers
Location	Petty's Island Pennsauken, NJ
Connections to Freeways	36th Street and River Road Westfield Avenue and Cove Road
Proximate Freeways	NJ 73, US 130, and I-676
Rail Service	none
Activity Indicator	12 ships and numerous barges in 1994



Facility 17	Gloucester City Marine Terminal
Owner	Holt Hauling and Warehouse Company
Primary Cargoes	plywood, steel, project, fruit, and containers
Location	King and Essex Streets Gloucester City, NJ
Connections to Freeways	King Street, Broadway, and Morgan Boulevard
Proximate Freeways	I-676, I-76, and I-295
Rail Service	Conrail
Activity Indicator	27 ships in 1994

Facility 18	Trans Ocean Maritime Services
Owner	Holt Hauling and Warehouse Company
Primary Cargoes	steel products and forest products
Location	701 North Broadway Gloucester City, NJ
Connections to Freeways	King Street, Broadway, and Morgan Boulevard
Proximate Freeways	I-676, I-76, and I-295
Rail Service	Conrail
Activity Indicator	36 ships in 1994

Facility 19	Broadway Terminal
Owner	South Jersey Port Corporation
Primary Cargoes	steel, ores, plywood, bananas, and pineapples
Location	Broadway and Morgan Boulevard Camden, NJ
Connections to Freeways	Broadway and Morgan Boulevard
Proximate Freeways	I-676, I-76, and I-295
Rail Service	Conrail
Activity Indicator	80 ships in 1994



Facility 20	Beckett Street Terminal
Owner	South Jersey Port Corporation
Primary Cargoes	containers, scrap metal, steel, cocoa beans, and others
Location	Second and Beckett Streets Camden, New Jersey
Connections to Freeways	Second and Beckett Streets Ferry and Atlantic Avenues
Proximate Freeways	I-676 and I-76
Rail Service	Conrail
Activity Indicator	143 ships in 1994

Facility 21 (not pictured)	Conrail Flexi-Flo
Owner	Conrail
Primary Cargoes	bulk commodities
Location	52 East Oregon Avenue Philadelphia, PA
Connections to Freeways	Columbus Boulevard and Front Street
Proximate Freeways	I-76, I-676, and I-95
Rail Service	Conrail
Activity Indicator	6,000 trucks in 1994
Facility 22 (not pictured)	CSX BIDS
Owner	CSX
Primary Cargoes	bulk commodities
Location	36th and Moore Streets Philadelphia, PA
Connections to Freeways	Wharton, Warfield, and Moore Streets
Proximate Freeways	I-76
Rail Service	CSX
Activity Indicator	NA
Facility 23 (not pictured)	Atlantic Marine Terminals
Owner	USX
Primary Cargoes	steel, non-ferrous metals, and forest products
Location	USS Fairless Works Morrisville, PA
Connections to Freeways	Tyburn Road and New Ford Mill Road Bordentown Road
Proximate Freeways	US 1, US 13, and I-95
Rail Service	Conrail
Activity Indicator	NA

III INTERMODAL PRIMER: THE CASE OF CMCU 2011400

Freight intermodalism, where, broadly speaking, commodities are shifted between modes en route to their final destination, pervades the Delaware Valley in many forms. There are domestic and international intermodal moves, as well as moves which are distinguished by their particular combination of modes (ship and rail, plane and truck, etc.). The following narrative profiles a single, actual freight shipment in the region involving multiple modes: a containerized shipment of coffee beans, originating in Sao Paulo, Brazil, passing through the Philadelphia region, and ultimately travelling to Montreal, Canada. This profile is intended to explain freight intermodalism at a rudimentary level and also to advance discussion on how the local intermodal system can be enhanced.

The particular freight shipment that was tracked was pre-selected with the assistance of the Philadelphia Regional Port Authority (PRPA). PRPA is a state agency which provides oversight and advocacy for the public port facilities in the Pennsylvania portion of the region. Ultimately, staff from the PRPA, the South Jersey Port Corporation (SJPC), and the World Trade Division of the Delaware River Port Authority (DRPA) are to be merged into the Port of Philadelphia and Camden (PPC), which will unify all public port management functions. In selecting a shipment to monitor, one important parameter was that it involve three modes of transport to make the case study as enlightening as possible.

The subject of this profile is CMCU 2011400, a twenty-foot long container, and its contents, three hundred (300) bags of unroasted coffee beans, each weighing 60 kilos (yielding a total commodity weight of 39,600 lbs). The container traversed the Delaware Valley between the dates of Friday, December 16, 1994 and Monday, December 19, 1994 (See Figures 1 and 2.). Within the region, the container was transported by ship along the Delaware River to the Tioga Container Terminal, was then taken by truck via I-95 to the AmeriPort facility in South Philadelphia, and finally was shipped out of the region on the freight rail line that runs parallel to the Schuylkill River.

The journey of the container and its cargo are indicative of current local transport methods for international waterborne commerce. Philadelphia, although neither the origin or final destination of the subject cargo, played an important role in its transport. While generating economic benefits, the cargo's brief appearance in the region also carries profound transportation implications.

The shipper of the coffee under study was a Brazilian firm and the consignee was a Canadian importer in Montreal. Crowley American Transport, which provides transportation services between North, Central, and South America and the Caribbean, was the commodity carrier. Crowley did not actually provide all of the transportation services involved in transporting the container, contracting out for some portions of its transport, yet it had the ultimate responsibility for the container and making arrangements for its method of

Figure 1. Container Progression to Destination

(From December 3 to December 22, 1994.)

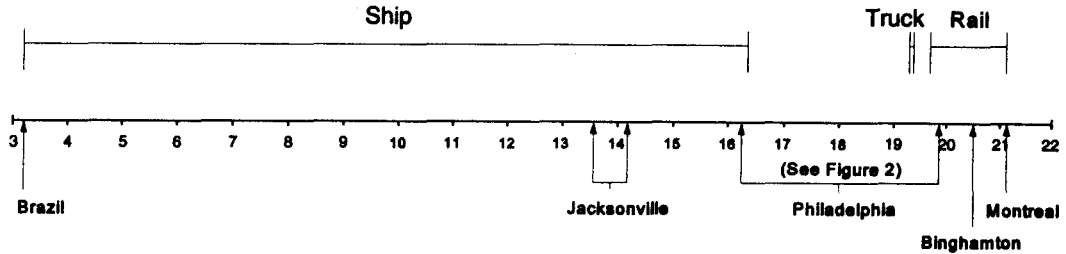
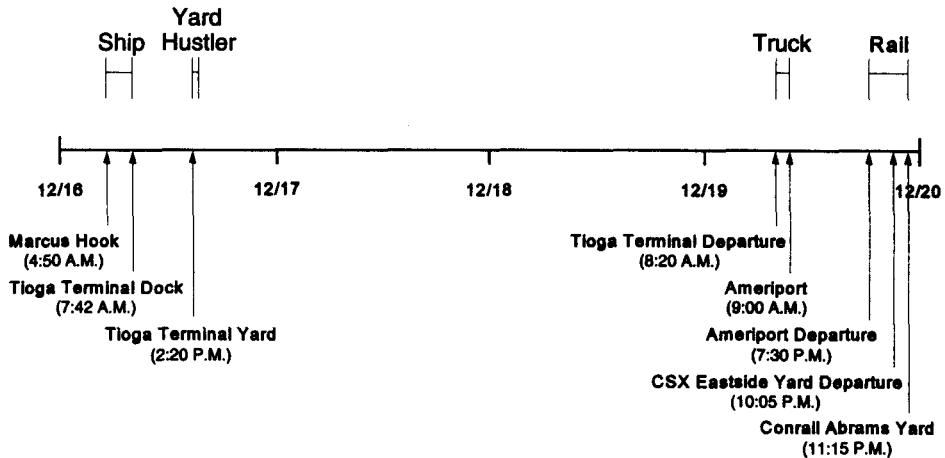


Figure 2. Container Progression in the Delaware Valley

(All times are arrivals unless otherwise noted.)



transport and routing. The subject container was one of a shipment of 24 containers, all containing coffee, weighing the same, attributed to the same consignee, and all destined for Montreal (except for 2 being shipped to Toronto).

Due to their ready adaptability to most modes, containers represent the quintessence of freight intermodalism. Their use in transporting a wide range of general cargoes has been steadily increasing. Furthermore, containerized cargo is no longer just an international phenomenon; now, many domestic cargoes are also transported by container. To address growth in the industry, and shortages of equipment, companies such as Crowley have committed to large intermodal capital expenditures.

Containers are subject to the guidelines of the International Standards Organization as to their physical specifications. A U.S. registry maintains data about containers and other intermodal equipment such as trailers and chassis. Each container has a unique seven digit identification number (e.g., 2011400), the first number of the series indicating if it is a 20' container ("2") or a 40 footer ("4"). The equipment pre-fix (e.g., CMCU) indicates the owner (in this case, Crowley Maritime Corporation) and whether it is a container ("U") or a railroad eligible trailer ("Z"). Containers are generally 20 or 40 feet in length; between 8 feet, 6 inches and 9 feet, 6 inches in height; and 8 feet in width. They have small notches called corner castings at all corners, top and bottom, to permit stacking and hoisting by crane. Many have corrugated surfaces to provide structural strength. Steel "skins" are very prevalent, except for temperature-controlled containers, called

"reefers," that are made of aluminum. Reefers do not necessarily convey frozen goods. They are used to control cargo temperatures and to neutralize the potentially harmful effects of ambient air temperatures, cold or hot. Reefers pose greater challenges in transport in that they require electric power at all times and their performance must be monitored. Most containers open from the rear, via two doors that swing open, although some have open-tops to permit top-loading. Seals are used to provide a measure of security and assure the integrity of the cargo.

The subject container was 19', 11" long and was manufactured by the JINDO Corporation of Korea in March of 1992. Crowley, in addition to being the freight carrier in this instance, was also the owner of the container. The container's empty (i.e., tare) weight is 5,070 lbs., its maximum gross weight with contents 52,910 lbs., and its allowable stack weight (i.e., the amount of weight that can be stacked on it) 423,280 lbs. This particular container was not equipped with a transponder, a device which can be used to relay information about the container's status and location.

In this instance, container CMCU 2011400 and its contents originated in the Brazilian port city of Santos. The coffee was loaded into the container at Santos and was probably placed on the ship on December 2. With the coffee stored inside in individual burlap bags, the container was nearly full to the top.

The container was transported by the *M.S.* (motor ship) *Sea Wolf*, a Wolf class ship owned by Crowley. The *Sea Wolf* makes continuous voyages and provides scheduled service between Philadelphia and the east

coast of South America. Its sister ships, the *Sea Lion* and *Sea Fox*, make similar voyages at staggered and coordinated intervals. The vessel is an American flag ship which identifies Philadelphia as its port of registry. One cycle, Philadelphia to South America and back, takes about 42 days; each voyage is slightly different and entails different ports of call in Argentina, Brazil, Venezuela, and the United States.

On this particular voyage (number 67), the vessel had journeyed as far south as Buenos Aires, Argentina. It then turned northward, stopping in Imbituba, Brazil before arriving in Santos, a port city in the state of Sao Paulo. The *Sea Wolf* sailed for the United States on December 3 and, after a stop in Jacksonville, Florida, proceeded towards Philadelphia. Among the ship's contents were shoes, seafood, chemicals, dog chewies, and even some empty containers. Brazil's top 5 exports to the United States are footwear, coffee, tires, tobacco, and auto products and parts.

Trade ties between Latin America and this region are well established. South American fruit, for example, is very prominent. Some have suggested that the North American Free Trade Agreement (NAFTA) is actually a precursor to a full hemispheric trade agreement. If this is true, and trade barriers are, in fact, lowered, Philadelphia, with a natural "north-south" trade lane, may be very well positioned for future trading growth with Latin America.

The *Sea Wolf* was built in Denmark in 1984. It is a medium size ship, 199 meters in length. The ship is principally designed to accommodate containers: it can hold up to

1,936 20-foot containers and has 27 slots for 40-foot containers (The ship, therefore, has a capacity of 1,990 twenty-foot equivalent units, or TEUs.). Special facilities are on board to accommodate 200 temperature-controlled containers, or reefers (These are included in the 1,990 TEUs.).

The ship has 9 holds for containers towards the front of the vessel (i.e., the bow) and accommodations for direct truck access via a ramp (i.e., roll-on, roll-off, or ro-ro) towards the rear of the vessel (i.e., the stern). At the stern, containers may also be stacked, just behind the bridge and superstructure. The vessel also has two cranes on board which can be used to manipulate containers at ports where cranes are not available. Containers are stacked seven deep in the holds, secured by hatches, and topped off by additional containers fastened together on deck (up to 4 high). On this particular voyage, 22 crew members were aboard. The captain was a relief captain, one who performed rotations aboard the *Sea Wolf* and her sister ships. The ship is comfortable and is equipped with some special amenities such as a small basketball court.

Thursday, December 15

The *Sea Wolf* arrived at Cape Henlopen off the coast of Delaware at 11:00 PM on Thursday, December 15. At a specially designated location about 20 minutes offshore (i.e., the "Pilot Area"), a locally based pilot from The Pilots' Association for the Bay and River Delaware was taken alongside the vessel by a small launch where he then boarded the vessel by scaling a ladder extended from the *Sea Wolf*. The Pilots' Association is housed in a former Coast

Guard station adjacent to the Delaware-side terminal of the Cape May-Lewes Ferry. Like other ports throughout the country, the pilots board all large international vessels to assist the ship's captain with guiding the vessel through the primary channels of the Delaware and Schuylkill Rivers which have a maximum project dredging depth of 40 feet (These pilots are also used for the Chesapeake and Delaware Canal.)

For the trip, the vessel's reported deepest draft was 27' 10". The pilot was the son of a former pilot - other instances of related family members can be observed from the Pilots' roster of 77 active pilots. The Delaware River channel is considered somewhat narrow and local familiarity with the waters, therefore, is desirable. Pilots accompany vessels both up and down the Delaware River. On December 15, the Pilots' Association provided assistance to 10 ships sailing from Philadelphia and 18 which were inbound.

Trips along the Delaware River between the Delaware Bay entrance and Philadelphia require about 8 hours for large vessels; the Tioga Marine Terminal is just under 90 nautical miles from the Delaware Bay entrance. Pilots keep a vigilant watch for other craft and unexplained lights. From the bridge, the vessel was guided by the captain, pilot, chief mate, and helmsman. At nighttime, range lights are used by the pilots to line the vessel with the center of the channel.

The following anecdotal information demonstrates that river traffic and conditions are not unlike the transport of commodities on land. At one point of the vessel's trip, the *Sea Wolf* began to overtake a bulk liquids tanker

and its tug. The tanker was piloted by a federal pilot (who may navigate vessels between all American ports, while all international vessels require a local pilot) who was uncomfortable with shifting his vessel closer to the shore to permit the *Sea Wolf* unobstructed passage. At the same time, a car carrier converged on the same location from the opposite direction. Constant radio communications and expertise averted any mishaps, but the incident did serve to illustrate that traffic congestion can occur on the region's waterways. Vertical clearances in the Delaware River, too, can be a problem and ships may have to lower their masts. Through the center of Philadelphia, the Benjamin Franklin Bridge has the lowest vertical clearance along the vessel's route to the Tioga terminal: 129 feet.

Friday, December 16

Most large ships like the *Sea Wolf* average 10-13 knots, or 12-15 mph, when moving through constricted waterways, such as the Delaware River. Due to the need to keep to a narrow channel, large vessels essentially have the right-of-way over smaller craft. Journeying northward, one of the first notable sights was the Port of Wilmington, a competitor to Philadelphia for shipping activity.

Entering the Delaware Valley region via the Delaware River, one immediately encounters an oil refinery in Marcus Hook. It is one of many reminders on both sides of the river that the Philadelphia region has one of the largest oil refinery complexes in the nation, and that most of the freight tonnage handled on the river is oil and petroleum products. Also observable are several anchorage points, pre-determined locations outside of the main

channel where vessels can temporarily remain at rest.

The local ports draw a variety of products from all over the world. Some of the more prominent commodities handled at the various facilities in the region and their origins are paper products from Scandinavia, cocoa beans from West Africa, steel from Japan, and meat from Australia.

Having reached the north side of the Benjamin Franklin Bridge, a tugboat pulled alongside the *Sea Wolf* and a special docking master boarded to relieve the local pilot and to dock the vessel at the Tioga Container Terminal. When a vessel departs from the port, a docking master and pilot are similarly found on board to fulfill these respective rolls. A local agent, Inchcape Shipping Services of Philadelphia, had made the arrangements for these services for this voyage of the *Sea Wolf*.

The ship docked at the container terminal (just south of the Delair railroad bridge) at 7:45 AM. Petty's Island in New Jersey, which is served by Crowley container and ro-ro barges to and from Puerto Rico and other Caribbean destinations, was visible to the southeast. The Tioga Fruit Terminal, adjacent and south of the Tioga Container terminal, did not have any vessels to service. Solely within the Delaware Valley region, the total transit time of the vessel was about three hours.

The Tioga Container Terminal is owned by the Philadelphia Regional Port Authority. Crowley leases a portion of it for its operations there. Stevedoring is performed by the Delaware River Stevedores (DRS). Recently, in an effort to help the port's

competitiveness, labor and management representatives have agreed to some changes in the work rules. For example, gang sizes have been reduced, workers are permitted to do more than one function, and some extended work hours are paid at the regular wage rate. The facility is open from 7:00 AM to 5:00 PM on weekdays, but ship servicing can be handled at virtually any time.

The chief mate of the ship is charged with oversight of the cargo. He prepares a stow plan and closely monitors the placement of cargo on board to assure equilibrium and the seaworthiness of the vessel. CMCU 2011400 was located in the fifth hold, on the forward side (i.e., towards the front of the vessel. Most holds have a forward side, and an aft (rear) side to accommodate two 20 foot containers end to end.).

Each hold of the *Sea Wolf* is sub-divided into three separate sections; looking from the bridge towards the front of the vessel, the left and right sections have 3 container slots, while the center section has 4 container slots divided by cell guides. The subject container was located in the center section, and the third row from the left (looking from the bridge to the bow). As the stow plan indicated, the container was stored underneath the hatch, and was the second from the bottom.

Shortly after the vessel's arrival, Crowley representatives from the Tioga site and longshoremen from the DRS joined the *Sea Wolf's* crew in unloading the cargo. Crowley and others maintain trailer-offices at the Tioga facility. Two gangs of 18 stevedores and two crane operators assisted with the operation. The Crowley employees oversaw moving the

cargo from ship to land; the longshoremen un-lashed the above-hatch containers and drove the containers into the terminal yard. The operation demonstrated that handling containerized cargo is more labor intensive than other commodities such as wet and dry bulk.

In unloading the ship, the first major task was undoing the metal lashing and "pineapples" that bind together the containers perched atop the hatches. As these were undone, the laborers often dropped the securing hardware onto the ledges at hatch level. A technician also examined two reefer containers whose meters on the outside of the "box" indicated that they were not maintaining proper temperatures.

A profile of freight intermodalism would not be complete without some reference to the numerous men and women who provide and support transportation services. These individuals utilize intricate technologies and processes. Working conditions are often adverse, yet their collective dedication and competence generally assures the safe achievement of the desired end results.

Two large gantry cranes (dating from 1969 and 1974) positioned on land were used to unload the ship's containers. Crane operators, perched high up in cabs, move laterally on a set of tracks to align themselves correctly with the hold, before swooping down on the cargo. The cranes have spreader units that are guided onto the tops of the container by flippers; special pins then twist inside the corner castings and this permits the crane to lift and move the container.

Containers are picked off the ship and then generally set down on a waiting chassis connected to a yard-hustler (tractors which are for terminal use only). A container "pick" from the ship lasts anywhere from 1-3 minutes, depending upon the location of the container, the presence of an awaiting chassis and driver, and the skill of the crane operator. Some cranes exist that can manipulate two containers simultaneously. Marked cars with checkers sit near the crane and tick off each container as it is removed, and instruct the crews where to place the containers. The cranes and their operators must also remove the hold hatches and place them temporarily on shore in order to access the below-hatch containers (i.e., those in the hold). In many cases, containers are taken off the ship, in order to access other containers, and are then re-loaded onto the vessel.

As mentioned previously, the ship's cargo must be positioned properly to assure the vessel's equilibrium in transit. The cargoes are the responsibility of the ship's crew while on board and then, once they touch the dock, are the responsibility (in this case) of Crowley's intermodal division, who also make the land-side transportation arrangements (i.e., truck and rail connections).

Following an hour break for lunch from 1-2 PM, container CMCU 2011400 was pulled off the vessel by the crane operator at 2:20 PM, about an hour earlier than was estimated in the morning. Like many containers before it, the crane placed it on a chassis and the driver then took it to spot #MM-52 in the adjacent storage area. There, the driver backed the container in place, and then detached his yard hustler from it and the chassis. Later, a checker would come by and note the location of the

container. The container would remain parked in the storage area for the ensuing weekend.

U.S. Customs paperwork for many commodities is often done by the carrier in advance. The process works much like it does for individual overseas travellers in that a declaration of items must be submitted. The coffee required a transportation entry form ("T. and E.") because the commodity was not destined for the United States and was merely passing through.

The longshoremen worked until 6:00 PM unloading the *Sea Wolf*. A total of 239 loaded containers, 141 empty containers, and 30 reefers were unloaded from the ship. The *Sea Wolf* then immediately sailed for Norfolk, Virginia. After dispensing of the ship's remaining cargo in Norfolk, it was scheduled to go into "drydock" for routine maintenance and a thorough check-up in Norfolk (painting, propeller inspection, etc.). This procedure is required of all vessels every two and a half years after they reach a certain age. As a result of the scheduled drydocking, the vessel took no cargo aboard in Philadelphia, thereby accelerating its turn-around time. Following its drydocking (about 10 days), the *Sea Wolf* would resume its normal cycling between South and North America.

Monday, December 19

The Philadelphia-based Intermodal Division of Crowley Transport had made arrangements with a trucking company located in Palmyra, New Jersey (Northstar) to transport (or "dray") the shipment of coffee to a local intermodal rail facility. Most arriving containers at Tioga are at least initially

transported by truck. There are railroad tracks that lead right to the Tioga piers, but they are not heavily utilized.

Reporting to work at about 7:00 AM this day, Northstar's driver received the day's first instructions from his dispatcher: retrieve container CMCU 2011400 from the Tioga Container Terminal and take it to AmeriPort (the Delaware River Port Authority's intermodal railroad terminal) in South Philadelphia. The driver, a veteran, was very familiar with this task, having performed it innumerable times before. Like all truck drivers, he was bound to maintain a log book of his day's activities and cannot drive more than ten hours in one 24-hour period.

The driver departed from the truck terminal in Palmyra at about 7:30 AM and drove his tractor without a chassis (i.e., "bobtailed") to the Tioga Marine Terminal via the Betsy Ross Bridge, Richmond Street, Lewis Street, and Delaware Avenue. The tractor was a Mack with 9 speeds and contained a regular size bed in the rear of the cab. En route, many truck terminals and generators could be observed in the Bridesburg and Port Richmond sections of Philadelphia. The concentration of these trucking locations reminded one that conflicts between truck activity and residential neighborhoods have arisen in this area.

During the short trip to Tioga, Lewis Street, in particular, was in poor condition: dirty, bumpy, and traversed by many railroad tracks. The driver commented that compared to the rest of the nation, East Coast auto drivers were the least considerate of trucks and that better public education regarding trucks was needed.

At the Tioga Marine Terminal, truckers discharging or picking up cargo have various procedural steps to contend with at or near the terminal gate (separate from actually retrieving or dropping off their freight in the yard). Generally, there are at least three aspects to both entering and exiting the facility: picking up or turning in a gate pass at the guard house, clearing an equipment interchange receipt (i.e., a T.I.R) with the carrier and terminal operator that specifies the condition of the equipment picked up or discharged (e.g., the container and chassis), and passing the inspection of the equipment by terminal inspectors. If queues of drivers form at any of these points, the drivers are delayed, and they are sometimes forced to wait outside unprotected from the elements. The hours of the Tioga trucking operations are 7:00 AM to 5:00 PM, with a reduction in staffing at lunch time.

On this occasion, many trucks were clustered around the container terminal gate and Delaware Avenue in both directions. Not having a container or chassis, the driver was able to bypass the inspection bay and head directly into the terminal yard. The T.I.R. indicated that the container had routine dents and scratches (condition code #25). However, the driver was unsure if the container was on a chassis. If it were not, a lengthy delay of up to two hours might be incurred to secure a chassis and have the container placed on it.

Having located container CMCU 2011400, the driver backed his tractor up to the chassis. The tractor contains a "fifth-wheel" with a locking device that, as the tractor is backed up to the chassis, envelops the pin of the chassis. Having successfully made this coupling, the driver then got out of the cab, attached the

light and brake cables (service and emergency) of the tractor to the chassis, and then cranked the dolly legs up off the ground. The driver completes a visual inspection to assure that the T.I.R. and its assessment of the equipment are accurate.

Throughout the Tioga container yard, one can observe containers on chassis and some stacked on top of each other. Tioga also includes a "reefer-bank" with special outlets to accommodate reefer containers.

Large, 5-axle tractor-trailer (or tractor, container, and chassis) combinations are restricted to a total weight of 80,000 pounds. Trucks exceeding this weight limit require a special permit from the state and/or the city of Philadelphia. In Pennsylvania, weight restrictions are enforced by the Department of Transportation (PennDOT). PennDOT personnel use portable scales; they can often be found near port facilities checking truck weights and other items related to safety and regulations.

Recently, in Pennsylvania, legislation was passed which will establish a permitting process for companies to allow them to haul international containers at an increased weight, but not exceeding 90,000 lbs. (with trailer and chassis). The legislation was initiated to enhance the competitiveness of the state's ports, particularly Philadelphia, because many states along the East Coast already provide for a similar weight allowance.

After receiving the necessary clearances, the driver, cargo in tow, pulled out of the Tioga terminal at 8:20 AM, the retrieval of the container requiring about 40 minutes. He then

drove to Allegheny Avenue, entered southbound I-95, exited I-95 just below Center City to Columbus Boulevard, drove along Columbus Boulevard until the left-hand turn into the Packer Avenue Marine Terminal entrance, and then proceeded south on Old Delaware Avenue. Within a short distance, the driver made a right towards the AmeriPort facility. This service road, and the roads within AmeriPort, are constructed of ground-up millings from old highways.

AmeriPort, which is operated by the Port of Philadelphia and Camden, is the newest intermodal facility in the region. Like the Tioga terminals, one finds terminal managers (the AmeriPort staff) and frequent users (e.g., CP Rail) with their own office/trailers. Work in the yard is performed by Teamsters.

AmeriPort consists of three parallel tracks, all of which run east-west for 2,000 feet; from north to south, the tracks are referred to as: the runner, north, and south tracks. Overflow from the terminal can be seen on tracks at the southern end of Columbus Boulevard. Train sets are assembled (or disassembled) by using all three sets of track. The yard also contains storage locations for trailers, containers, and chassis (one section runs parallel to the train tracks. A newer storage lot is located north of the tracks.). AmeriPort, by virtue of its proximity to the Packer Avenue Marine Terminals, affords port access to the region's three Class I freight railroads: Conrail, CP Rail, and CSX. CP has trackage rights only and must obtain clearance from the other two railroads each time they access the terminal.

The facility, which opened in 1992, is already nearing capacity in track and storage space

and is looking to expand its operations. At this point, the facility has reached 5,000 lifts per month (trailers or containers placed on or taken off trains). Most of these moves are domestic in nature, not international. Utilization of a portion of the Philadelphia Naval Ship Yard (PNSY), adjacent to Conrail's Greenwich Yard, is under consideration as a potential site for intermodal expansion in South Philadelphia.

At present, CSX uses the facility the most intensively of the three Class I railroads. CP's usage is highest from January until June; then, because of Canadian annual meat quotas, the volume of northbound CP trains decreases. At the same time, CSX train volumes tend to increase between July and December (in large part due to the year-end holidays). Conrail currently does little activity at AmeriPort; the majority of its intermodal activity occurs at its Morrisville facility in Bucks County.

A recent improvement has greatly helped operations at AmeriPort. Spaces between sections of the three tracks were filled in. This permits vehicles passage over the tracks and much greater flexibility in performing tasks in the terminal.

The preceding weekend had been a busy one at AmeriPort (The facility is open virtually around the clock, seven days a week.). On a normal weekday, the facility will service two arriving CSX trains and one departing CSX train to Atlanta (between, roughly, 7:00 PM and 7:00 AM), and one arriving and one departing CP train (between, roughly, 7:00 AM and 7:00 PM). Train arrival and departure times are not always strictly adhered

to and outbound trains rarely occur on weekends.

At AmeriPort, the truck driver transporting CMCU 2011400 presented his paperwork to the terminal operator. There is currently no facility control directly at the entrance, although the terminal is policed. The container was marked on its side with an "M" in chalk to indicate that it would be destined for Montreal. This assists in identifying the destination of the container as the train is being prepared for departure that evening. The truck driver is then told where to proceed in the yard with the container.

At 8:45 AM, the driver pulled up parallel to the rail car the container would be placed on. Due to their length, most rail cars can accommodate more than one container (placed end to end) at a time (often, up to 2 trailers, 4 empty 20 footers, or 3 loaded and 1 empty 20 footers). The yard's mobile crane, a "piggy-packer," plucked the container off the chassis and then placed it on the rail car. Unlike containers, trailers are picked up from their underside. Terminal personnel were on hand to assure that the containers and trailers were secured in place on the cars. In addition to trucks, yard jockeys were in evidence ferrying containers and trailers between parked locations and the rail cars.

Containers on flat cars (COFC) and trailers on flat cars (TOFC) are now very common on trains. Boxcars are still used for some commodities, such as tires, canned goods, paper, and some produce. Covered "gondolas" for products such as steel and "high-cubes" (9' 6") for coal are also found. Some trains also include generator cars that supply power to reefer units. Automotive tri-

level cars are the state-of-the-art for the transport of cars and trucks.

Following removal of container CMCU 2011400, the truck driver, with tractor and chassis, returned to the AmeriPort trailer area to phone his dispatcher and receive instructions for his next task. At this time, the driver was instructed to pick up another 20-foot container at AmeriPort and transport it to the Tioga terminal. The new container contained a "hazardous" load of para-dichlorobenzene being transported to Brazil.

Upon returning to the Tioga facility, the truck driver dropped off the new container, and then picked up another full 20 footer (also from the *Sea Wolf*) to take back to AmeriPort. Leaving this third container at AmeriPort, he returned to Tioga with only a chassis. Upon each visit to Tioga and AmeriPort, the driver went through the required procedural and security steps. Due to the proximity of I-95 and Columbus Boulevard and many different ramps, there are several different ways to get to and from I-95 from the South Philadelphia port area.

Following the dray movements back and forth between Tioga and AmeriPort, the driver went home to rest before setting out for Saratoga Springs, New York with an empty 40-foot container to pick up a shipment of cans. All of the morning's activities (starting and ending at the truck terminal in Palmyra) took the driver about 6 hours.

At about 6:30 PM, the CP Rail train crew began to undertake the final assembly of the evening's train. The yard engineer guided the yard engine backwards and forwards according to the instructions of his conductor,

who coupled cars and threw track switches. As the yard engine advanced forward, the conductor radioed, "Two boxcars. One boxcar." as the cars neared their coupling. The cars are joined together when the two knuckles lock and the pin drops. A stretch test is done to assure a sound coupling. At one point, the compression of the brake lines that run from car to car was lost. The yard engine was operated from the rear of what would eventually become the train. The yard engine moved back and forth and juggled cars from track to track. Empty cars were shifted onto the south track. These cars later obstructed passage onto the north track and had to be shifted further west on the south track so that the train could get by.

CP's train, #557, runs northbound nightly from AmeriPort (at least Monday through Friday). It runs intact until Binghamton, New York, where Montreal and Toronto (and west) cargoes are split apart. The train had three engines, all of which were operating. The train crew included an engineer and a conductor (At one time, crews numbered 5. On occasion, a third individual, a train man, will accompany the crew and assist the conductor with his duties.). The engineer and conductor had brought the arriving CP train into Philadelphia that morning. After resting at a center city hotel during the day, they returned to AmeriPort for the return trip to Allentown.

The load list indicated that the train consisted of 26 cars. The subject container was on rail car #SOO 55216, the 15th car in the train set. The cars, in order, behind the engines were broken down as follows: 5 cars destined for Chicago, 4 for Toronto, 8 for Montreal, and 9

with steel (labelled hot because the cars are dedicated to a particular service). The train included 13 trailers, 43 containers (five 40-footers and thirty-eight 20-footers), and 9 gondolas of steel that had been taken off a ship that day at the adjacent Packer Marine Terminal. The engines were positioned at the front of the train. Due to the weight of the steel and the terrain north of Allentown, the engines would be re-positioned to the end of the train at Allentown. Freight trains no longer have cabooses; they have been replaced with a bright, flashing red light that is attached to the last car of the train.

Following a brake test, at 7:30 PM, the conductor radioed Conrail's South Philadelphia Yard Master to gain permission to proceed. The various tracks leading from AmeriPort belong to Conrail and CSX. CP Rail, because it has trackage rights only, must seek radio and signal clearances from the owning railroad to proceed. Within Philadelphia, this requires 3 separate clearances. Since there was a Conrail train ahead, #557 proceeded slowly, and sometimes came to a complete stop.

Cargo security on trains (and elsewhere) is always a concern. Cargo is most vulnerable when trains are stopped due to heavy train traffic and/or are awaiting track clearances. Trains can be more than a mile long, and there are often only two crew members in the engine. In South Philadelphia, for example, some incidents have occurred where local residents have broken into containers and trailers on delayed trains and removed their contents.

The train's initial route through Philadelphia paralleled I-95. The train then ran north along 26th Street, crossed Passyunk Avenue, and then entered the CSX Eastside Yard. Many oil facilities were observed. At CSX's Eastside Yard (or, "R.G."), the train was to pick up 39 more cars to add to the train. This number of cars was relatively high because no northbound trains had operated over the weekend. At Eastside, CSX's main line peels off in a southerly direction. The area represents a logistical choke-point in that trains must be backed up to negotiate the adjacent river crossing.

As required, the CP conductor entered the CSX R.G. Building at 8:45 PM to report to the yard master. Once there, the conductor requested additional F.R.A. paperwork to identify containers with hazardous materials. The yard master, unfamiliar with this request, instructed the conductor to go to a room on a lower floor to wait at a printer for the papers to be produced. Once he obtained the papers, the conductor helped attach the 39 cars immediately behind the engines. Despite the relatively short distance from AmeriPort to the Eastside Yard, a total of two hours and thirty minutes was required to get fully under way, only slightly less than the amount of time it would take the train to get from Philadelphia all the way to Allentown.

Leaving the Eastside Yard at 10:05 PM, the train wound northward on tracks just east of the Schuylkill River. The train entered a large tunnel that goes under the Philadelphia Museum of Art, continued along the Schuylkill River, and then crossed onto its west side via the Columbia Bridge at Belmont near Montgomery Drive. There, the train linked up with the soon-to-be completed

double-stack container route linking the port of Philadelphia with Conrail service areas to the west and CP Rail service areas in Canada. (A CSX doublestack route to the south has yet to be undertaken.) Along the way, the number of tracks varied, from one or more. In one case, several rails cars were temporarily stored on a track.

The train went through the Flat Rock Tunnel, one of 130 doublestack rail clearance sites in Pennsylvania. Just west of this point, material extracted from the tunnel was piled up. Near Conshohocken, several industrial uses could be seen from the train. Also observed were a dead deer and a decayed tree collapsed onto the tracks. Many interlockings were also observed including Park, River, Falls, and Norris.

Speed limits for the train varied from 20 to 50 miles per hour. Limits tend to be lower in and near Philadelphia and higher outside of the city. For example, near the Philadelphia Zoo, the speed limit is 20 mph; west of Norristown, the speed limit is 50 mph.

In Bridgeport Borough in Montgomery County, the train traversed several at-grade intersections: at Depot Street, Mill Street, Green Street, DeKalb Pike, and Ross Road. A railroad devotee could be seen in his apartment complex swinging a lantern as the train passed. Just ahead, ran a nightly Conrail mail train. Just west of Bridgeport, in Upper Merion Township and Norristown, a railroad bridge crosses over the Schuylkill River. This crossing leads east towards the Conrail Morrisville facility in Bucks County.

The train continued along the west bank of the Schuylkill River, passing the Abrams Yard

and Valley Forge area. This section of track has been proposed for joint freight/passenger uses between Norristown and Reading. Then, just prior to exiting the region near Pottstown, the train passed through the Black Rock Tunnel and over the Schuylkill River.

Epilogue

Train #557 continued west to Reading and then north to Binghamton, New York. Arriving at Binghamton at noon on December 20, the train set was separated into westbound and northbound traffic. The subject container and rail car were switched to the northbound Montreal train, #553. Train #553 departed Binghamton around 3:00 PM, passed through Canadian Customs at Rouses Point, and then arrived at the Lachine Intermodal Yard, just outside of Montreal, at 1:30 AM on December 21. The total train trip, a distance of 483 miles, required about 30 hours. The container was then to be stored at the yard and ultimately retrieved by the importer following its release.

This particular journey of container CMCU 2011400 was nearly completed. It had lasted 18 days and covered 6,000 miles, at a shipping cost of about \$2,000. This trip profile provides a useful example of freight intermodalism and also highlights the pivotal role played by the Delaware Valley as a freight distribution center. It is particularly interesting to note the number of actors involved with a container move, how these disparate actors come together, and also how each mode must face similar problems. □

IV VISION STATEMENT

The following statement offers a stimulating vision of the goods movement network of the Delaware Valley in the year 2020. The statement provides a foundation for the region's long-range multi-modal freight planning efforts. Although a departure from a more conventional recitation of goals and objectives, the statement fulfills a similar purpose in articulating desired ends and a flexible framework for their achievement.

An exemplary freight network in 2020

The next millennium has arrived; in fact, the year is 2020. In the Delaware Valley, the region boasts the nation's finest goods movement system without qualification. Freight speeds efficiently and safely to ultimate destinations by plane, railroad, ship, and truck. Facilities form a cohesive whole and connections between different modes of transportation are seamless. Freight and passenger transportation needs are skillfully meshed together. Philadelphia is synonymous with intermodalism and is the recurring subject of international scrutiny and inquiry.

The region's status as a freight mecca is not accidental. Public and private sector cooperation is unparalleled. Investment in physical and procedural improvements, while judicious, is sufficient and expedient. The available labor pool is talented, highly skilled, and dedicated.

The seeds of success

The initial spark for Philadelphia's assumption of leadership in freight systems harkens back to passage of the Intermodal Surface Transportation Efficiency Act (ISTEA) in

1991. Since reauthorized several times by the U.S. Congress, ISTEA provided the impetus to consider the needs of freight service providers and customers within the context of metropolitan transportation planning. Now, the use of federal transportation funds is much more flexible and innovative private-public funding arrangements are widespread.

Unbridled intermodalism

Freight intermodal facilities in the region are exemplary. A term once reserved for rail terminals only, "intermodal facility" refers to a broader range and a diverse set of facilities. These facilities are clean, attractive, and well marked with directional signs. Transfer times are minimized and operators sustain ongoing dialogues to assure the best possible connections. In addition, increases in the capacity of facilities to accommodate growth in intermodal traffic have been effected where needed.

While there are many important freight facilities across the region, the epicenter of freight movement is South Philadelphia. There, the disparate modes of transportation converge in an orchestrated and efficient amalgamation. Through careful planning, this complex permits the rapid and safe transfer of goods between all modes. The Packer Avenue Marine Terminal bustles with containers and project cargoes; double-stack trains bound for Canada, the Midwest, and the Deep South churn out of the AmeriPort Intermodal Facility without cessation; enormous quantities of dry bulk commodities exit from Piers 122 and 124; and commercial vehicles zip from interstate routes 76 and 95 and the Walt Whitman Bridge into terminals and pleasing rest areas. Many value-added processes are located at what was once a

portion of the Philadelphia Naval Base; and high-value, time-sensitive cargo, mail, and packages flow in and out of the Philadelphia International Airport. Although the level of activity is intense, freight concerns are a good neighbor to river-view residents and to the sports complex at Broad Street and Pattison Avenue.

In the New Jersey portion of the region, intense and well-integrated freight activity can also be observed. For example, the Broadway Terminal is a thriving water-borne industrial park. Just north of it is a hub of commercial shipping and cargo handling: the Beckett Street Terminal. Highway access to these facilities is unimpeded and trains pull right up to pier and berthing locations.

A national and international gateway

On a market-share basis, the ports of Philadelphia and Camden are among the leaders in the North Atlantic. Its signature imported cargoes include meat, fruit, steel, autos, and forest products. Export traffic has exploded, buoyed by the removal of toll barriers and bridge restrictions to trucks conveying the products of Pennsylvania and New Jersey manufacturers to the world and by state-of-the-art glass, metal, and pulp recycling facilities. The ports' lifeline, the Delaware River, has been dredged to a depth of 45 feet and the world's largest and fastest vessels ply its waters. The petroleum industry which hugs the shores of the Delaware River is vibrant.

Inexorable links to the global economy are exemplified by DRPA's gleaming headquarters, One Port Center, found in the Camden skyline. Eastern Asia favors the

region as the American port of entry for a diverse array of manufactured goods. The many countries of Latin America, from Chile to Mexico, also maintain strong trade partnerships. Philadelphia, *the City of Brotherly Love*, welcomes all countries and all commodities. The city's strategic location in the resurgent Northeast is perfectly suited to quickly distributing goods to large markets.

The region's diverse manufacturing base is robust, and transportation costs in conveying goods to markets are minimal. Area shippers, important stakeholders in the freight network, are also staunch participants in infrastructure decisions. The thriving memberships of traffic clubs and logistics organizations assure the best practices for shipping the region's hallmark finished goods, such as pharmaceuticals and medical equipment.

Pro-active marketing initiatives tout the region's comprehensive package of freight facilities and services. Old friends and allegiances are strengthened, while new opportunities are aggressively courted by the region's representatives. Fast-paced videos, glossy publications, and fiber-optic communications provide a potent arsenal of promotional materials and paint a compelling and flattering picture of the region. Overseers of the freight network rally to a simple credo: there is only one language that matters, and it is that of the customer.

State-of-the-art facilities

The region is a pacesetter in embracing emerging technologies. *FastShip Atlantic*, the shipping concept designed and constructed in the late 20th Century, has revolutionized trans-Atlantic freight movement. These

vessels, smaller than traditional ships, gain their increased speeds through the utilization of marinized jet engines and a modified hull design. The overall *FastShip* concept, a door-to-door logistics system that facilitates improved inventory and management control for shippers, has been very successful throughout the world. The re-use of the Philadelphia Naval Ship Yard for the *FastShip Atlantic* terminal operation has brought direct and indirect benefits to the regional economy, as has the adjacent intermodal facility. The state-of-the-art *FastShip* facility is at capacity and expansion plans are underway.

Nowhere is America's *Second Golden Age of Railroads* more evident than in Philadelphia. Conrail, CP Rail, and CSX continue to distinguish Philadelphia as one of few U.S. ports served by three Class One railroads. Pennsylvania's high and wide clearance initiative, completed in 1995, has greatly exceeded expectations in generating increased rail business and creating new jobs. Numerous shortline rail operations provide door-to-door service for their customers. Sophisticated technologies and unprecedented agreements have allowed passenger and freight rail services to flourish side by side on the same trackage. The *Operation Lifesaver* program has resulted in the elimination or upgrading of all at-grade highway crossings. Finally, rail line rights-of-way, once abandoned and discarded, have found a number of new lives as recreational trails and even high occupancy vehicle (HOV) lanes.

Interstate 95 is the region's showcase highway. Totally reconstructed and upgraded between 1997 and 2005, I-95 exhibits a full range of intelligent vehicle highway system (IVHS) and truck-friendly technologies,

including weigh-in-motion stations, variable message signs, and a traffic control center. Linkages to port facilities, such as the Tioga Marine Terminals, have been improved and the interchange with the Pennsylvania Turnpike, completed only in the year 2000, is now an integral part of the transportation network.

Removing impediments to the flow of goods

Conditions for trucks and truck drivers have been vastly transformed since the 1990's. Height and weight restricted bridges have been eliminated. Accident-prone locations are equipped with special warning mechanisms. Roving tow trucks respond quickly to incidents. Most trucks are equipped with monitors to receive information about congestion delays, construction advisories, and routing alternatives. Strong public transit and ride-share systems and telecommuting help keep vehicular traffic to a minimum. Electronic Toll and Traffic Management (ETTM) technologies on Delaware River bridge crossings, and throughout the region, have been very successful. The DRPA, along with the other members of the *EZ Pass* Consortium, the group of eastern state authorities, jointly implemented ETTM technologies in the late 1990's. The use of ETTM has improved traffic operations and provided for safe and seamless travel opportunities for the freight community. Model truck ordinances guide municipalities in preserving the sanctity of neighborhoods while not needlessly restricting commercial traffic. Pennsylvania and New Jersey lead the nation in programs governing hazardous materials, and their roadway conditions are consistently rated the nation's best. Driver education and professionalism are heightened, and driver shortages are a thing of the past.

Finally, computer networks have dramatically transformed and streamlined permitting for over-size trucks.

A kinder, gentler freight presence

The freight network has a decidedly human element, too. Safety and healthy working conditions are of the utmost importance. Cyclists traverse the region's extensive bicycle network to make quick deliveries of small items and provide a stark contrast to the latest generations of trucks and ships. Labor unions and terminal and freight operators have achieved a harmonious relationship that promotes premier services and wages and flexible working rules. Women and minorities are represented in all facets of goods movement services and activities.

The area citizenry, benefactors of ongoing public education efforts that begin in elementary school, appreciates the role of freight in the regional fabric. Trucks are not scorned, but rather respected and given friendly *thumbs-up* and honks from passing motorists. The economic impact and contributions of the freight sector in terms of jobs (primary and secondary) and taxes are widely heralded. Several local colleges and universities offer advanced degrees in highly regarded logistics and transportation planning programs.

In addition to bolstering the region's economic vitality, improved freight activities have also contributed significantly to the achievement of ambient air quality standards. Levels of oxides of nitrogen and non-methane hydrocarbons in truck fuels, which are precursors to the formation of ozone, have been reduced and many local fleets employ

alternative fuel technologies. With these advances, the region has remained an ozone attainment area since 2005.

Effective leadership and coordination

Over time, institutional arrangements have become more complementary and less complex. Modal representatives and operators have shelved self-serving interests in favor of creating an atmosphere of cooperation and healthy competition. State government and departments of transportation based in Harrisburg and Trenton continue to provide effective leadership. The Port of Philadelphia and Camden, Inc., a marriage of what was the World Trade Division of the Delaware River Port Authority, the Philadelphia Regional Port Authority, and the South Jersey Port Corporation, is characterized by decisiveness, a spirit of regionalism, and unity of action. Cooperation in port-related activities even extends to the State of Delaware. Ongoing personnel exchanges promote an appreciation and understanding of operational and organizational differences.

The catalyst for development and pursuit of a comprehensive regional freight strategy is the Delaware Valley Goods Movement Task Force. Meeting regularly since 1992, the Task Force brings together representatives from all freight modes and interests in a productive and dynamic forum to address both short and long-term planning issues. The Task Force also uses focused subcommittees to tackle ever-changing needs and priorities.

At the Delaware Valley Regional Planning Commission, freight concerns are woven into all planning activities, including the FY 2020-

2024 Transportation Improvement Program (TIP), the Year 2040 Long Range Transportation and Land Use Plan, the Intermodal Management System, and the National Transportation System. Candidate improvement projects which facilitate goods movement are granted preferred status; the Plan and TIP, in fact, contain target funding levels for freight projects. The Regional Transportation Committee, the Regional Citizens Committee, and the DVRPC Board receive regular updates from DVRPC's Office of Freight Planning.

Sophisticated data is one of the pillars of the region's freight planning. At one time the exclusive domain of passenger travel, data is used to monitor freight movements and to examine future scenarios and alternatives. Individual cargoes can be accurately tracked as they pass through the system and real-time information can be provided to awaiting recipients. The regional electronic clearinghouse established for the sharing of international trade and transportation information provides accessible and standardized data to aid decision-makers in confronting transportation and economic issues.

A dynamic, ongoing process

Finally, perhaps the most noteworthy feature of the region's freight network and related planning work is that they are not static. Continuing with a tradition begun in the early 1990's, new ways of doing business are always thoroughly investigated and long-range plans and strategies are regularly updated. Thus, the region's premier freight network is assured well beyond 2020. □

V PROJECT AND STUDY ACTION PLAN

This chapter sets out an action plan, comprised of projects and technical studies, to achieve the ambitious intermodal transportation network described in the preceding chapter. While regulatory, institutional, and other initiatives are of extreme importance, the action plan presented here is focused on capital improvements.

Proposed improvements are grouped into the following categories: airport, highway, port, and railroad. Useful technical studies are also identified, as are a set of proposed passenger transportation improvements that should be monitored by the freight community because of their potential impact on intermodal operations.

This plan brings together all known projects to facilitate the movement of goods at regionally significant intermodal sites. There is no attempt to limit the projects to those which would be eligible for a particular set of private or public funds. In fact, various (and possibly new) funding arrangements will be required if the plan is to be realized in its totality.

For each of the major transportation modes, the known total costs of the recommended projects are shown. More detailed cost and funding information will be developed as projects become better defined and technical studies are completed. Many of these projects will compete for scarce funds. Traditionally, federal funding of freight improvements has been limited. However, with the advent of ISTEA, freight and intermodalism have

received elevated emphasis and status, and funding opportunities have increased.

Many of the following projects can be found in other capital plans, such as the DVRPC long range transportation plan. Their identification here serves to reinforce their applicability to intermodal facilities and to highlight the opportunity to use them to improve facility access and other characteristics and attributes. Most of the improvements are designed to upgrade and improve existing facilities, with a few special projects more properly regarded as increases in capacity or new construction.

Within the highway category of improvements, some projects are followed by the letters, "MIS." MIS signifies a major investment study and indicates that the precise nature of the improvements has yet to be defined and must be subjected to a thorough technical analysis to demonstrate cost-effectiveness.

Airport Improvements — Known total costs: \$575 million

1. Philadelphia International Airport, Philadelphia and Delaware Counties.
Construct new commuter aircraft runway (8-26), expand terminal and install new hangar spaces.
2. Philadelphia International Airport, Philadelphia.
Realign Hog Island Road to intersect with Enterprise Avenue and construct a tunnel under the Runway Protection Zone.

3. Philadelphia International Airport, Philadelphia.
Realign rail line adjacent to the north side of realigned Hog Island Road.
 4. Northeast Philadelphia Airport, Philadelphia.
Install hangar spaces and 16 T-hangars.
 5. Trenton/Mercer County Airport, Mercer County.
Install 30 ramp spaces.
- Highway Improvements — Known total costs: \$3,000 million**
- Pennsylvania**
6. I-95, Philadelphia and Bucks and Delaware Counties.
Reconstruct highway and improve access to significant freight facilities in the corridor. (MIS)
 7. I-95/I-276, Bucks County.
Construct interchange between I-95 and the Pennsylvania Turnpike.
 8. Oxford Valley Road, Bucks County.
Install closed loop signal system from Business Route 1 to Big Oak Road.
 9. I-95 and Betsy Ross Bridge, Philadelphia.

Improve connections of I-95 to Aramingo and Torresdale Avenues.
 10. PA 132, Bucks County.
Improve traffic flows and intersections from I-95 to PA 611.
 11. PA 291 (Industrial Highway), Delaware County.
Widen to five lanes with a center turn lane from Ridley Creek to Trainer Borough.
 12. PA 291, Delaware County.
Improve signal and channelization at PA 420.
 13. Christopher Columbus Boulevard, Philadelphia.
Reconstruct to 6 lanes from Reed to Richmond Streets.
 14. Columbus Boulevard/Old Delaware Avenue, Philadelphia.
Reconstruct and upgrade service road from Packer Avenue Marine Terminal to McKean Street.
 15. US 322, Delaware County.
Effect corridor, access, and intersection improvements between I-95 and US 202.
 16. Allegheny Avenue, Philadelphia.
Improve signals from PA 611 to I-95.
 17. Broad Street (PA 611), Philadelphia.
Realign interchange at I-76.
 18. Walt Whitman Bridge, Philadelphia and Camden counties.
Replace bridge deck and improve approaches.
 19. Commodore Barry Bridge, Delaware and Gloucester counties.
Rehabilitate bridge deck.

20. Traffic and Incident Management System, Delaware, Montgomery, and Philadelphia counties.
Install TIMS system to manage traffic operations of the interstate highway system.
21. Benjamin Franklin Bridge, Philadelphia and Camden counties.
Complete implementation of one-way tolls.
22. Betsy Ross Bridge, Philadelphia and Camden counties.
Repave bridge, ramps, roadway, and plaza area.
- New Jersey**
23. NJ 42, Camden and Gloucester counties.
Add a fourth lane in each direction from NJ 41 to I-295.
24. Computerized Traffic Signal System, South Jersey.
Install computer-controlled traffic signal system along various corridors.
25. I-295, Gloucester County.
Improve interchanges from exits 14-20.
26. Traffic Operation Center, Burlington, Camden and Gloucester counties.
Implement traffic operation center and other advanced traffic management techniques.
27. US 30 and 130, Camden County.
Eliminate traffic circle.
28. US 130 and New Jersey Turnpike, Burlington County.
Construct full interchange.
29. Camden, Gloucester, Delaware, and Philadelphia counties.
Develop and implement electronic technology for toll facilities.
- Port Improvements — Known total costs: \$585 million**
30. Delaware River, Delaware County and Philadelphia.
Dredge main channel to 45 feet as far north as the Beckett Street Terminal.
31. South Philadelphia.
Construct FastShip terminal and improve highway and rail access and internal circulation as required.
32. South Philadelphia.
Provide additional capacity for truck, rail, and ship intermodal activities.
33. Beckett Street Terminal, Camden County.
Widen terminal entrance, relocate security gate and power lines along Beckett Street, and pave Front Street from Clinton Street to Beckett Street.
34. Beckett Street Terminal area, Camden County.
Improve conditions for left turn movements from I-676 northbound ramps onto Atlantic Avenue westbound, and improve directional signs to and from the terminal.
-

35. Beckett Street Terminal, Camden County.

Repair main rail leading into terminal, install rail into J building, and install turn-off from rail for Berth 4 going east/west.

36. Beckett Street Terminal, Camden County.

Construct barges for the transport of scrap materials.

37. Broadway Terminal, Camden County.

Repair rail at main ingress at south end, and construct a loop rail track at the Bulson St. rail yard.

38. Broadway Terminal, Camden County.

Improve road direction signs to/from I-676 and the terminal.

39. Pier 98 Annex, Philadelphia.

Provide rail spur and siding to car staging facility.

40. Tioga Marine Terminals, Philadelphia.

Improve highway access to and from I-95 and the Betsy Ross Bridge, and truck staging area along Delaware Avenue.

41. Columbus and Oregon Avenues, Philadelphia.

Improve landside connections between Pier 96 and 98 Annex.

42. Petty's Island, Camden County.

Improve truck access, with possible use of 37th Street as primary access route.

Railroad Improvements — Known total costs: \$6 million

43. CSX Rail Line, Philadelphia.

Effect clearance and capacity improvements from the Eastside Yard west to Belmont.

44. CSX Rail Line, vicinity of Schuylkill Expressway and Grays Ferry Avenue, Philadelphia.

Improve connections for north-south rail movements, particularly those to and from the South Philadelphia port complex.

45. Oxford Valley Road, Bucks County.

Improve traffic and truck flows along East Cabot Boulevard and Oxford Valley Road.

46. Regionwide.

Improve railroad/highway grade crossings (particularly along major freight routes) and bridges.

Technical Studies

47. Regionwide.

Investigate needs and opportunities to increase rail activity in the region, rail competitiveness in South Jersey, and rail access to port facilities.

48. Philadelphia International Airport, Philadelphia.

Examine alternatives to improve highway access from the south (I-95, Route 291, and Tinicum Island Road) to the east and Hog Island Road.

49. Delaware River.
Identify measures to improve drayage operations such as the institution of ferry service.
50. Regionwide.
Explore means to maximize truck traffic on toll roads.
51. South Jersey.
Study shipper needs and transportation issues.
52. CSX rail line, Delaware County and Philadelphia.
Identify measures to establish a double-stack clearance route from South Philadelphia to Delaware, Maryland, and the South.
53. Regionwide.
Examine the adequacy of truck rest facilities.
- Harrisburg to Philadelphia.
Lease two train sets and provide additional improvements to support inter-city rail passenger service.
 - Penn's Landing, Philadelphia.
Construct an enclosed ferry terminal for passengers.
 - Trenton and Morrisville.
Construct a new rail yard for New Jersey Transit operations.
 - Burlington, Camden, and Gloucester counties, New Jersey.
Upgrade transit, with possible PATCO extensions. □

Proposed Passenger Transportation Initiatives Which May Impact Intermodal Freight Operations

- Chester, Montgomery, and Bucks Counties.
Institute cross county rail service between Downingtown and Trenton.
 - Schuylkill Valley Metro, Montgomery County.
Restore commuter rail service between Norristown, and Pottstown.
 - Delaware Avenue and Front Street, Philadelphia.
Initiate waterfront trolley service to Snyder Avenue.
-