COLUMBIA CORRIDOR TRANSPORTATION STUDY

CITY of PORTLAND
OFFICE of TRANSPORTATION

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Report and Recommendations

Winter 1999
CITY of PORTLAND
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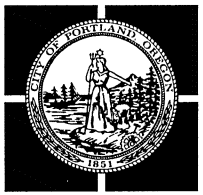

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Bill Bebeckos-East Marine Drive Safety Task Force; Frank Howatt-HiNoon Neighborhood Association;
Gary Kunz-East Columbia Neighborhood Association and Walter Valenta-Bridgeton Neighborhood Association.

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Chapter One: WHY STUDY THE COLUMBIA CORRIDOR

I. Study Objectives

The purpose of the Columbia Corridor Transportation Study is to ultimately provide a comprehensive vision for transportation policy and improvements that will serve the diverse uses within the Corridor well into the 21st century.

The Columbia Corridor reaches from the Rivergate Industrial District on the west to the City of Troutdale on the east and is generally bounded by N. Columbia Boulevard, NE Lombard Street and NE Sandy Boulevard on the south (Figure 1). The City of Portland's jurisdictional boundary reaches east only to NE 185th Avenue. Since this is such a large geographic area, the study was broken into two parts. The area analyzed in this report covers the eastern two-thirds of the Corridor from N Portland Road to NE 185th Avenue (Figure 2). The western third of the Corridor west of N Portland Road to the Willamette River is the focus of the upcoming North Portland Peninsula Truck Circulation Strategy.

The request for this study came as a result of the 1992 update of the City's *Transportation Element of the Comprehensive Plan*. Residents living adjacent to NE Marine Drive east of I-5, in addition to bicycle and pedestrian advocates asked the City to look at ways to reduce or remove the impact of truck and auto traffic on NE Marine Drive and NE 33rd Drive. The problem was identified as speeding, volume, vibration, cut-through traffic and conflict between modes.

The North Portland Peninsula Truck Circulation Strategy will complete the Corridor's transportation vision for that area within the City of Portland, beginning in 1999. Its focus is the reduction of through truck trips in predominately residential areas of the St. Johns peninsula and improvement of existing routes for both through and local truck trips at the edge of this district.

NE Marine Drive looking east.

NE Lombard Street looking west.

The Columbia Corridor Transportation Study has defined the following goals and objectives:

Goal:

Provide a transportation plan to develop and implement improvements to the existing transportation network that will efficiently and safely serve all travel modes and trips within the region, as determined by land use designations and related transportation needs.

Objectives:

- Develop an interconnected intermodal and multimodal transportation network, using existing arterials, to serve the Columbia Corridor employment centers, residential and recreation areas.
- Determine if the transportation network will be able to accommodate the planned levels of development, based on comprehensive plan designations. Given that analysis, determine whether land use designations should be modified to reflect the capacity of the network.
- Improve efficiency and access along and between NE Columbia Boulevard and NE Lombard Street (aka NE Portland Hwy., US30B) to primarily serve intermodal goods movement using these arterials.
- Determine environmental impacts and neighborhood mitigation/protection for residential areas close to NE Lombard Street, which may result from increased truck traffic.
- Develop a strategy to improve NE Marine Drive which will enhance regional recreational opportunities in the Columbia Corridor area.

Figure 1
The Columbia Corridor

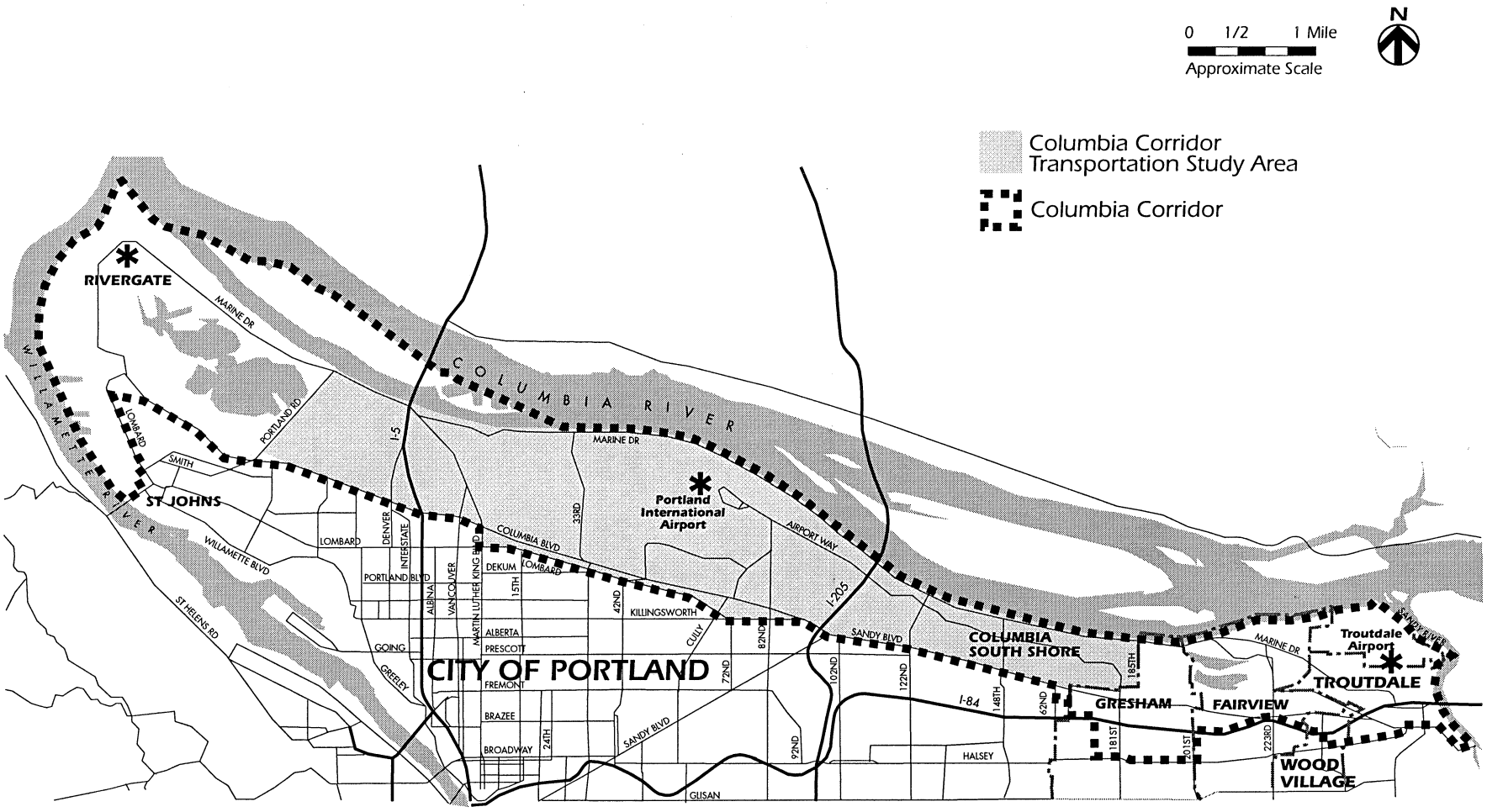
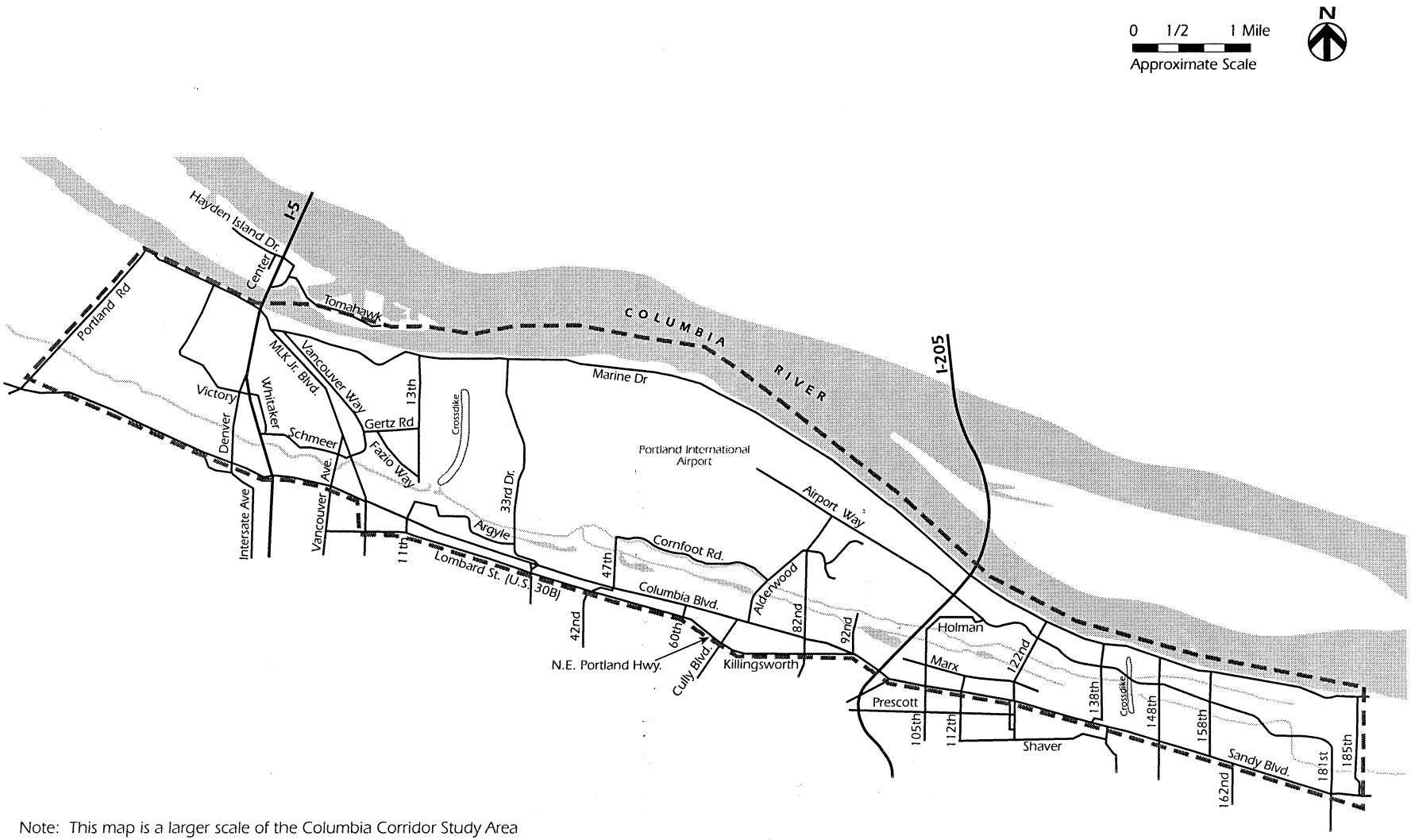


Figure 2

The Columbia Corridor Transportation Study Area



Note: This map is a larger scale of the Columbia Corridor Study Area

Chapter Two:
EXISTING CONDITIONS

I. The Geographic Setting and its History

The Columbia Corridor contains approximately 17,800 acres of land stretched along 18 miles of the Columbia River's southern shore. The Corridor is comprised of many different districts, each with their own character. The collection of natural and man-made features that make each "sub district" unique also provide the common theme of the entire Corridor.

The West End of the Corridor: (From N Portland Road to I-205)

The common picture that one has of the west end of the Corridor is one of low-lying, pastoral scenes interrupted by expansive one story industrial and commercial buildings as well as the airport. Similarly, the long narrow east-west character of the Corridor is reinforced by the natural water features that are its trademarks; the many arms of the Columbia and Oregon Sloughs, and, of course, the Columbia River. Additions to the natural and built environments like the Columbia Slough and N/NE Marine Drive trail systems and the east-west street network which include NE Columbia Boulevard, NE Lombard Street and NE Marine Drive mirror this image.

NE Columbia Boulevard at NE Martin Luther King Jr. Boulevard.

Historically, Native Americans lived along the banks of the Columbia River to capture the abundant wildlife, and used the river for their domestic needs and to provide mobility between encampments. Many of the old Native American foot trails are now significant arterials; NE Sandy Boulevard being the most notable.

The East End of the Corridor: (I-205 East to NE 185th Avenue)

In contemporary times, the rich alluvial soils provided lucrative truck farming for immigrant families who, until recently, had owned the majority of privately held land in the Corridor.

As urbanization encroached from both the east and west, the local farmers felt the economic impact of holding farmland in an increasingly commercial and industrial market.

NE Marine Drive looking east adjacent to the airport.

In the early 1980's, the majority of land owners began discussions with Multnomah County and the City of Portland about annexing the entire area east of NE 122nd and north of I-84 to the City. Urban services could then be extended, the land rezoned for commercial and industrial use and NE Airport Way could be extended east and south to provide access both to I-205 and I-84. The annexation and rezoning occurred with much public discussion. In addition to public controversy, the provision of sewer, drainage, water and transportation services was far more difficult than anticipated because of natural resource issues.

The most striking departure from the natural character of the area is the Portland International Airport (PDX). The sheer land needs of the airport require that it look different than the other features of the area. Yet even though the use is different, the long east-west design theme of the layout of the runways, the approach roads and general position of support buildings, is reminiscent of the Corridor's long, narrow shape.

II. Land Use

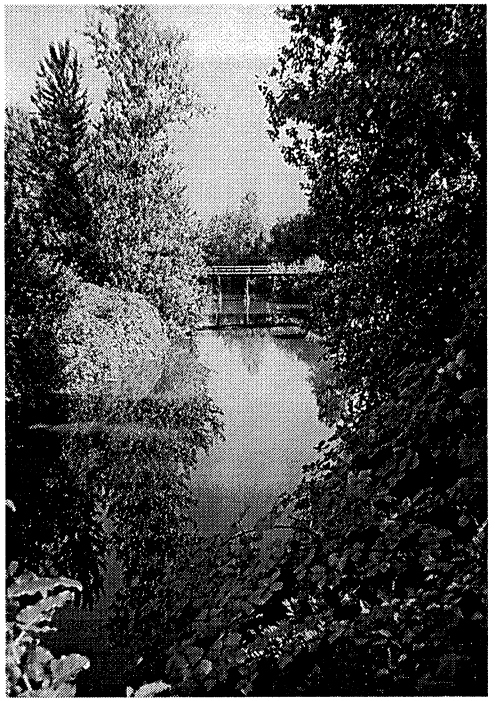
Apart from the natural character, the built environment is a diverse collection of uses. Single family homes along the edge of the Columbia River co-exist with adjacent industrial uses throughout the Bridgeton and East Columbia neighborhoods at the west end of the Corridor. The predominant land use and zoning in the Corridor however, is industrial, to take advantage of the area's proximity to a variety of transportation modes. Industrial businesses are generally either warehouse/commercial distribution, heavy machinery or airport related. The Corridor provides for two airports (Portland International and Troutdale), six marine terminals, three transcontinental railroads, three interstate freeways (I-5, I-205, and I-84), and a port to an extensive river barge system. Currently, the Corridor is home to approximately 2,100 firms which employ 41,000 employees, and house 7,500 residents. Zoning and Comprehensive Plan designations, especially the Industrial Sanctuary, are applied to protect the industrial character of the Corridor from commercial intrusion by restricting the types of uses which may develop.

Because the Corridor is primarily focused on industrial, warehousing and distribution type land uses, most businesses are heavily dependent on truck traffic, either through shipping and receiving or providing truck oriented services. Most of the existing truck activity tends to be concentrated in the area between I-5 and NE 33rd Drive and at the east end of the Corridor (see Figure 3).

A significant portion of the Corridor's total acreage is still developable, making it one of the largest developable industrial areas within a major urban center. Of the 8,095 developable acres in the Corridor, the majority (71%) is zoned for either heavy, light or mixed industrial uses.

By the year 2010, employment in the Corridor is projected to increase by 55% to approximately 64,000. Figure 3 shows that most of the large developable sites in the Corridor are east of NE 33rd Drive, indicating the likelihood that the concentration of trucking activity will progressively move eastward as the Corridor develops. Major future development centers include the Portland International Center (PIC) adjacent to Portland International Airport which is designed to accommodate relatively high density mixed use development; expansion at the Airtrans Center area for air freight and repair and the Portland International Airport.

In the northwest corner of the Corridor, between NE 33rd Drive and NE Martin Luther King Jr. Boulevard, there is a significant amount of existing and planned future residential development, throughout the Bridgeton and East Columbia Neighborhoods. Access to this area is gained primarily from NE Marine Drive.



The Columbia Slough.

Figure 3

The Columbia Corridor Transportation Study
Truck/Freight Activity Centers

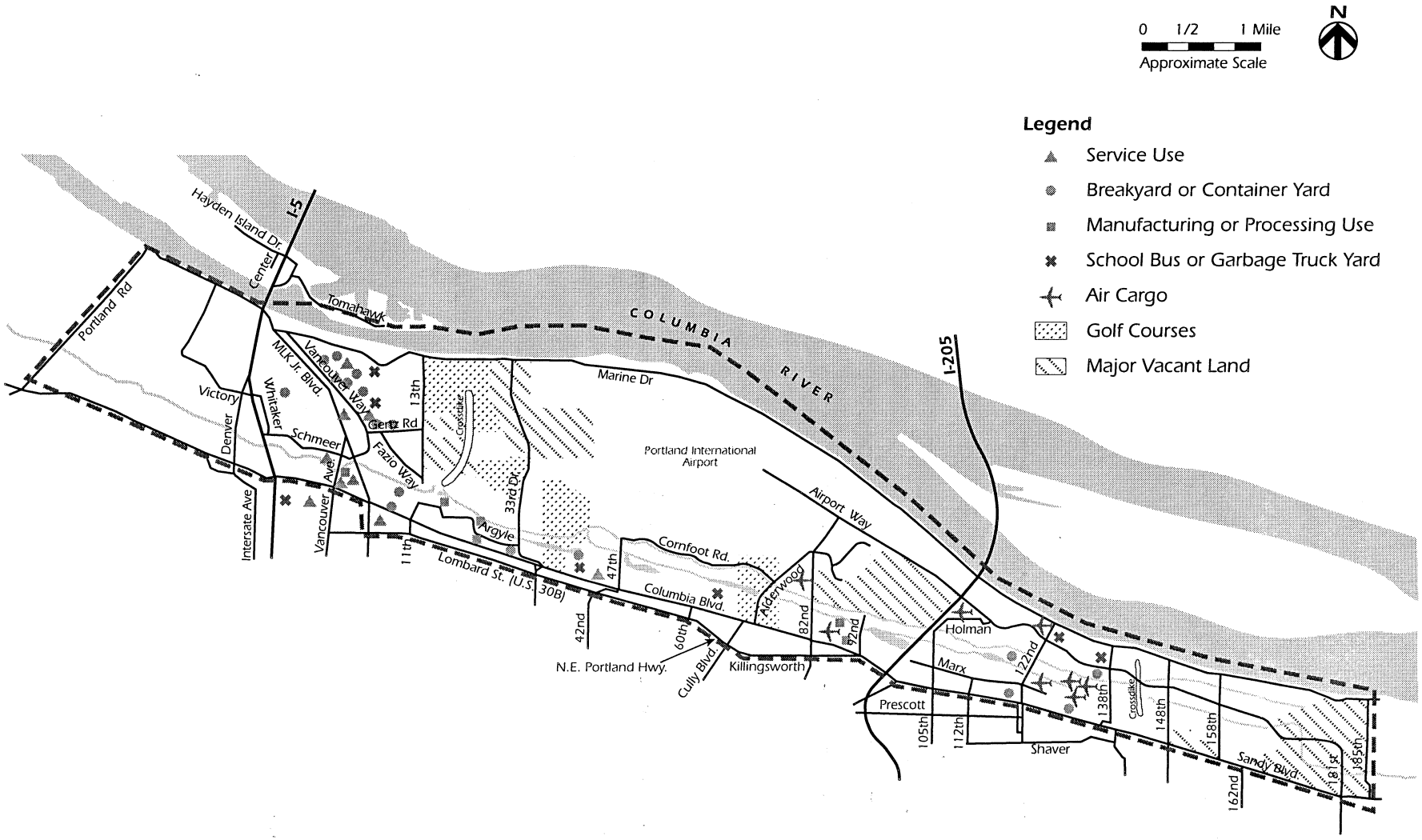


Table 1
Columbia Corridor Land Use and Employment

Business Type	% of CC	% of Employees
Manufacturing	35%	27%
Trade (retail and wholesale)	24%	27%
Transportation, Communications, & Utilities	11%	18%
Services	22%	14%
Government	<1%	9%
Finance, Insurance, & Real Estate	1%	3%
Construction	7%	3%

Source: Market Value Analysis of The Columbia Corridor, PSU School of Business Administraion, 1994.

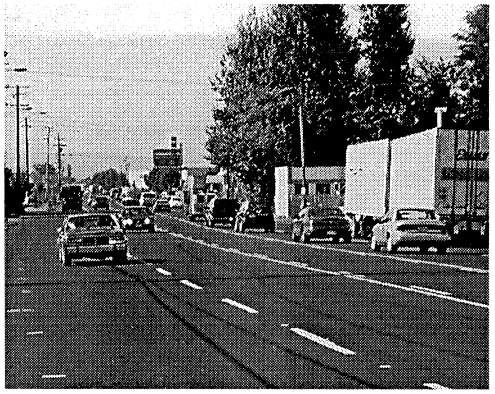
Table 2
Developable Land within the Columbia Corridor by Zoning

Zone	Acres	% of Total
Heavy Industrial	5,193	64%
Rural/Future Urban	1,090	13%
Mixed Use Industrial	371	5%
Parks & Open Space	334	4%
Agriculture/Forestry	321	4%
Light Industrial	222	3%
Single Family Residential/ R7-10	197	2%
General Commercial	181	2%
Office Commercial/ Neighborhood Commercial/ Multi-family/Single Family/Public Facilities	187	<1% each

Source: Market Value Analysis of The Columbia Corridor, PSU School of Business Administraion, 1994.

III. Transportation Network Characteristics

NE Columbia Boulevard at NE Martin Luther King Jr. Boulevard.



NE Columbia Boulevard west of NE 60th Avenue.

The east-west roadway system in the Corridor is primarily defined by NE Columbia Boulevard and NE Lombard Street, Major City Traffic and Neighborhood Collector Streets respectively, along the southern edge of the Corridor. Along the northern edge of the Corridor runs NE Marine Drive, a Neighborhood Collector Street, which provides a direct connection between I-84 and I-5.

Internal access within the Corridor is provided by a series of collector streets, principally N Vancouver Way, NE 33rd Drive, NE Marine Drive, NE 47th Avenue, NE Cornfoot Road, NE Alderwood Road, NE 82nd Avenue and NE Airport Way. The internal collector street network is incomplete due the expanse of the airport, environmental considerations related to the Columbia Slough (which precludes roadway connections) and undeveloped land.

EAST-WEST TRANSPORTATION FACILITIES: OPERATIONAL CHARACTERISTICS/ POLICY DESIGNATIONS

NE Columbia Boulevard

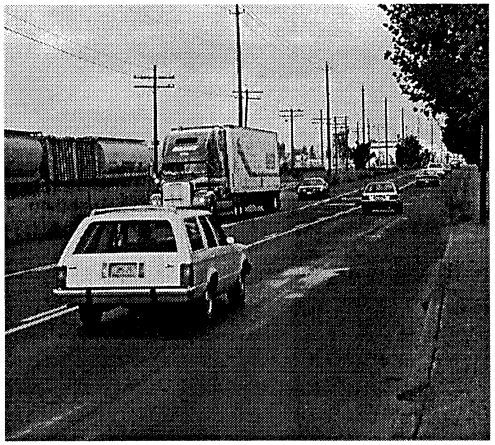
Operational Character: NE Columbia Boulevard runs between the Union Pacific Railroad overpass at NE 92nd Avenue and the Rivergate Industrial area. NE Columbia Boulevard carries the most traffic, both in terms of total and truck traffic, of the two main east-west arterials that run through the study area. Between Rivergate and NE 60th Avenue, NE Columbia Boulevard is four lanes wide with a center turn lane. East of NE 60th Avenue, the roadway tapers down to two lanes with a center turn lane,then to two lanes east of NE 80th Avenue to its intersection with NE Killingsworth Street. NE Columbia Boulevard has traffic control signals at seven intersections through the study area: I-5 ramps, N Vancouver Way, NE Martin Luther King Jr. Boulevard, NE 21st Avenue, NE 47th Avenue, NE 60th Avenue and NE 80th Avenue. In addition, there are yellow flashing warning signals located at the intersections of NE Cully Boulevard and NE Alderwood Road.

Average daily total traffic volumes on NE Columbia Boulevard vary between approximately 28,000 vehicles at the west end of the study area, with a PM peak hour volume of 1,700, to 20,000 vehicles at the east end, with a PM peak hour volume of 1,250. Right-of-way width varies between 70 and 80 feet along most of the Corridor. There are a few short sections at the east end of the Corridor where the right-of-way widths narrows to as little as 56 feet.

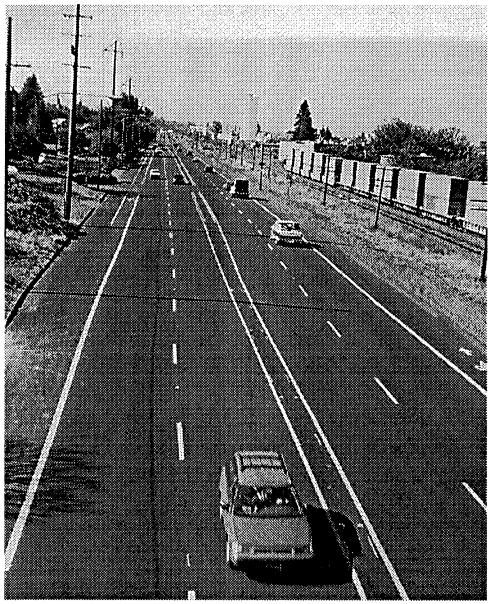
East of NE 60th Avenue to NE Lombard Street, where NE Columbia Boulevard is two lanes, the roadway experiences significant congestion problems during the peak periods. The lack of connections to NE Lombard Street for relief, primarily due to the parallel east-west railroad tracks, tends to concentrate traffic along this segment. Turn movements to and from adjacent land uses compounds the congestion problem.

A large percentage of truck oriented land uses are located directly adjacent to NE Columbia Boulevard. Friction between through traffic and local truck circulation results. Close spacing of access points creates safety problems for all modes and reduces available capacity. Output from the Truck Routing Model indicates that during the truck peak hour (1:30 PM - 2:30 PM) the percentage of trucks to the total vehicle volume on NE Columbia Boulevard ranges from 16 to 22% in the westbound direction (60 to 140 trucks) and 14% eastbound (40 to 120 trucks). Average truck percentage elsewhere in the City can range from 8-10% of total traffic volume.

Policy Designations: Between I-5 and NE 60th Avenue, NE Columbia Boulevard is designated a Major City Traffic Street. East of NE 60th Avenue, it is designated as a Neighborhood Collector. West of I-5, NE Columbia Boulevard is designated as a Major City Transit Street. West of NE Martin Luther King Jr. Boulevard, NE Columbia Boulevard is designated as a City Bikeway. The entire length of NE Columbia Boulevard is designated as a City Walkway and is within a Truck District. The intent of these policy designations is to reinforce NE Columbia Boulevard as the primary arterial for east-west local truck trips and access roadway for major employers.



NE Columbia Boulevard west of NE 92nd Avenue.



NE Lombard Street west of NE 60th Avenue.

NE Lombard Street

Operational Character: What is commonly called NE Lombard Street throughout the study area is actually a series of connected roadway segments with different street names. From east to west, the segment from Troutdale to I-205 is known as NE Sandy Boulevard, from I-205 to NE Cully Boulevard it is known as NE Killingsworth Street, from NE Cully Boulevard to NE 60th Avenue it is known as N Portland Highway, and from NE 60th Avenue west to the St. Johns Bridge it is known as NE and N Lombard Street. The entire length, approximately 10 miles, is owned and maintained by the Oregon Department of Transportation, serving as US30 Bypass.

Through the study area, most of NE Lombard Street is four travel lanes wide. A center turn lane is provided between NE 60th Avenue and I-205. The right-of-way width varies from 80 feet at the west end of the study area to 100 feet along the eastern portion. The Union Pacific rail line parallels most of its length, creating a barrier on the northern edge of the street to property access.

NE Lombard Street has traffic signals at eleven intersections throughout the study area: N Albina Avenue, N Vancouver Way, NE Martin Luther King Jr. Boulevard, NE 11th Avenue, NE 27th Avenue, NE 60th Avenue, NE Cully Boulevard, NE 72nd Avenue, NE 82nd Avenue, NE Columbia Boulevard and I-205. Left turn lanes are provided at most of these intersections, as well as five other unsignalized intersections.

NE Lombard Street currently operates with generally good levels of service during the peak periods. There is sufficient roadway capacity to handle the travel volumes and limited local access activity. Traffic volumes on NE Lombard Street vary from 22,000 total vehicles per day at the west end of the Corridor (west of NE Martin Luther King Jr. Boulevard) with a PM peak hour volume of approximately 1,500 vehicles, to 24,500 total vehicles per day at the east end (east of I-205), with a PM peak hour volume of approximately 2,500 vehicles. Output from the Truck Routing Model indicates that during the truck peak hour (1:30 PM - 2:30 PM) the percentage of trucks to the total vehicle volume on NE Lombard Street ranges from approximately 14% at the west end (west of NE Martin Luther King Jr. Boulevard) to 7% east of NE Cully Boulevard.

Policy Designations: The City has designated the portion of NE Lombard Street east of NE 60th Avenue as a Major City Traffic Street. West of NE 60th Avenue to NE Martin Luther King Jr. Boulevard the street is classified as a Neighborhood Collector. West of NE Martin Luther King Jr. Boulevard Lombard is classified as a District Collector. The entire length of NE Lombard Street is designated as a Major City Transit Street, City Bikeway and City Walkway. West of NE Martin Luther King Jr. Boulevard NE Lombard Street is designated as a Minor Truck Street, and east of NE 60th Avenue it is designated as a Major Truck Street.

The intent of these designations is to provide for the through movement of trucks from I-205 along NE Lombard Street to NE 60th Avenue and continuing west along NE Columbia Boulevard. This study is recommending that NE Lombard Street's designation be changed to a Major City Traffic Street between NE 60th Avenue and NE Martin Luther King Jr. Boulevard to attain the goal of using the underused capacity of NE Lombard Street for some part of the through traffic movement in the Corridor (see Chapter Six– Comprehensive Plan Policy Analysis for further explanation).

NE Marine Drive

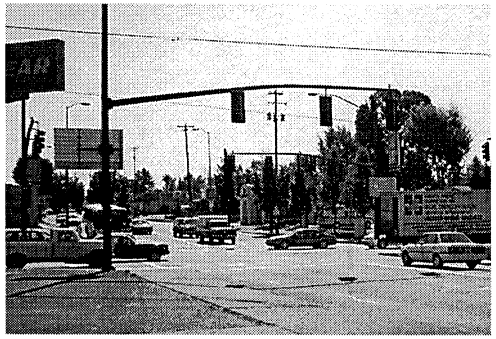
Operational Character: Between I-5 and Troutdale, NE Marine Drive generally consists of a single travel lane in each direction with a right-of-way width of 60 feet. East of NE Bridgeton Road to Troutdale the street is built for the most part on a dike. The exception is a segment adjacent to the Portland International Airport which is built parallel to the dike. No intersections are signalized on NE Marine Drive east of I-5. The average daily traffic volume on NE Marine Drive is approximately 10,000 vehicles over its entire length. The PM peak hour volume varies between 700 and 1,200 vehicles east of I-205, with a PM peak hour volume of approximately 2,500 vehicles.

NE Marine Drive at NE 122nd Avenue.

Most of the land uses adjacent to NE Marine Drive are concentrated at the western end of the study area near I-5. In addition to a large amount of residential development, there are a significant number of truck oriented land uses located just off N Vancouver Way which, in part, use NE Marine Drive for access. West of NE 33rd Drive, during the truck peak hour (1:30 PM - 2:30 PM) the percentage of trucks of the total vehicle volume on NE Marine Drive ranges from approximately 8 to 21% in the westbound direction and 15 to 21% in the eastbound direction.

The multiple users of NE Marine Drive compete for limited space. The high percentage of trucks on NE Marine Drive have raised noise, vibration and speed complaints from single family residents along its edge. Recreational users of NE Marine Drive would also like to see improvements to the bicycle and pedestrian pathway links to provide better access to the Columbia River beaches and the scenic opportunities along its length.

Policy Designations: NE Marine Drive is classified a Neighborhood Collector, City Bikeway and Off Street Path for bicycles, and Off Street Path for pedestrians for its entire length. West of NE 6th Drive, N Marine Drive is designated as a Minor Transit Street and east of NE 33rd Drive it is within a Truck District. The intent of these policies is to generally allow NE Marine Drive to be the conduct for trips from local streets destined for the I-5 freeway or NE Martin Luther King Jr. Boulevard.



NE Martin Luther King Jr. Boulevard at NE Lombard Street.

NORTH-SOUTH AND OTHER COLLECTOR FACILITIES: OPERATIONAL CHARACTERISTICS/POLICY DESIGNATIONS

NE Martin Luther King Jr. Boulevard

Operational Character: Only a small portion of the overall boulevard passes through the study area between the I-5 interchange and its intersection with NE Lombard Street. It is, however, a crucial link in the overall improvement program because the traffic capacity is underused in this segment during the off-peak which can serve as the anchor and access for truck trips at the west end of the Columbia Corridor.

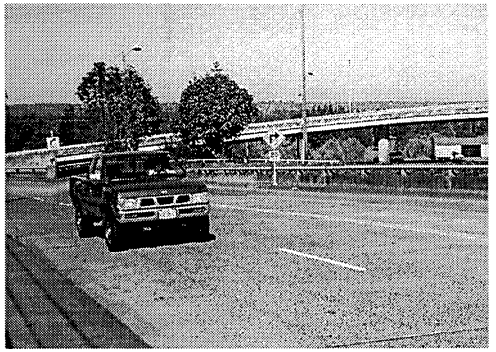
The character of the roadway changes from at-grade at its intersection with NE Lombard Street to grade-separated over the Union Pacific rail trackage; back to at grade at its intersection with NE Columbia Boulevard; to grade-separated over the Columbia Slough, and finally built on a 30 - 40 foot dike at its intersection with the I-5 interchange.

Due to the dike's elevation, there are few intersecting streets or access driveways. Generally, there are four travel lanes along its length, except at major signalized intersections where turn pockets are provided or side streets have left turn provisions. A striped bikeway and some lengths of sidewalk also appear in this segment.

Policy Designations: NE Martin Luther King Jr. Boulevard is classified as a Major City Traffic Street, Major City Transit Street, City Walkway and City Bikeway. The intent of these designations is to provide for a major north-south arterial to serve trips in the Northeast District.

NE 33rd Drive

Operational Characteristics: NE 33rd Drive extends between NE Columbia Boulevard and NE Marine Drive (NE 33rd Avenue is connected to NE 33rd Drive by grade-separated ramps which extend up and over NE Lombard Street and NE Columbia Boulevard). In this segment of NE 33rd Drive, the roadway is four lanes with turn pockets at one east-west street. Much of the northern end of the street serves the Port of Portland, Oregon National Guard or Multnomah County Corrections. These uses are secured properties with few access points. The balance of the street abuts a major golf course, vacant land and industrial properties with access off of local streets.

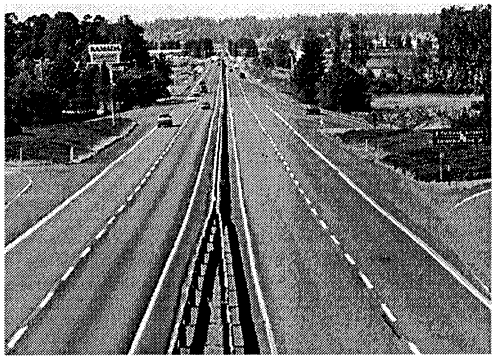


NE 33rd Drive looking north.

Policy Designations: NE 33rd Drive north of NE Columbia Boulevard is designated a Neighborhood Collector, City Walkway and City Bikeway. The intent of these designations is to provided necessary connections between east-west arterials and local streets.

NE 82nd Avenue

Operational Characteristics: NE 82nd Avenue, like NE Martin Luther King Jr. Boulevard, is an underused vestige of the old primary state highway system built before the advent of I-205 and I-5 respectively. This segment of NE 82nd Avenue between NE Killingsworth Street (aka NE Lombard Street/NE Portland Highway) and NE Airport Way was the primary access route to Portland International Airport before the I-205 freeway's construction.



NE 82nd Avenue looking north at NE Columbia Boulevard.

Policy Designation: NE 82nd Avenue is designated a Neighborhood Collector, Minor Transit Street in this segment and the Columbia Slough is designated a Pedestrian and Bicycle Pathway. The intent of these designations is to provide access between the Portland International Airport and the air freight related businesses linked to NE 82nd Avenue. Additionally, the mixed use Portland International Center, just east of the airport, receives its primary access from NE 82nd Avenue.

Other Collectors in the Study Area

The following Table 3 shows the operational characteristics of the balance of the collector streets serving the study area. Each of these streets provides an integral piece of the connecting links of the transportation network.

TABLE 3
Study Area Collector Streets

	Travel Lanes	Average Daily Traffic	PM Peak Volume
N Vancouver Way	2	~7,500	n/a
NE 33rd Drive	4	7,800	n/a
NE 47th Avenue	2	4,600	500
NE Cornfoot Road	2	7,300	760
NE Alderwood Road	2	~3,000	980
NE 82nd Avenue	4	7,300	630

Other Modes of Transportation

Transit Service-Bus: Transit Service in the Corridor is both limited and intermittent (see Figure 4). Eight different bus routes provide service to the Corridor. Each serves only a small portion of the overall Corridor. Most of the transit travel demand is on NE Columbia Boulevard where employment is the most concentrated, but currently there is no scheduled bus service. NE Columbia Boulevard is classified as a Minor Transit Street.

The entire length of NE Lombard Street through the Corridor is also classified as a Major City Transit Street. Although four bus routes provide transit service on NE Lombard Street, service is limited to only short segments near I-5 and I-205. At the western end of the Corridor, the #8 NE 15th Avenue and # 75 SE 39th Avenue routes provide 30 minute and 12 minute radial and crosstown service between N Vancouver Way and NE Martin Luther King Jr. Boulevard. At the east end of the Corridor, the #12 NE Sandy Boulevard

and #72 NE Killingsworth Street/NE 82nd Avenue routes provide approximately 12 minute PM peak hour radial and crosstown service between I-205 and NE 72nd Avenue. Only a small portion of NE Marine Drive is served by transit (near I-5).

Transit Service-Light Rail: An 5.5 mile extension of light rail from the Gateway Transit Station to the Portland International Center and Portland International Airport has been endorsed by the City of Portland, the Portland Development Commission, METRO, Tri-Met and the Port of Portland. A financial partnership between local and federal agencies and the developer of a portion of the Portland International Center, DEVCO (a Bechtel/ Trammel Crow partnership), will enable this project to move rapidly to implementation.

It is anticipated that DEVCO's new development at Portland International Center (PIC) will provide a mixed use, high density, transit oriented environment which would include hotel(s), office, general retail space and a theater complex. The Port of Portland will continue to develop the balance of the PIC area with industrial-related and some office uses. Projections for employment in the PIC are approximately 6,250-10,000 by the year 2015. Light rail is anticipated to serve 330-380 trips each peak hour just for the PIC area alone, not considering the addition of airport employees or patrons.

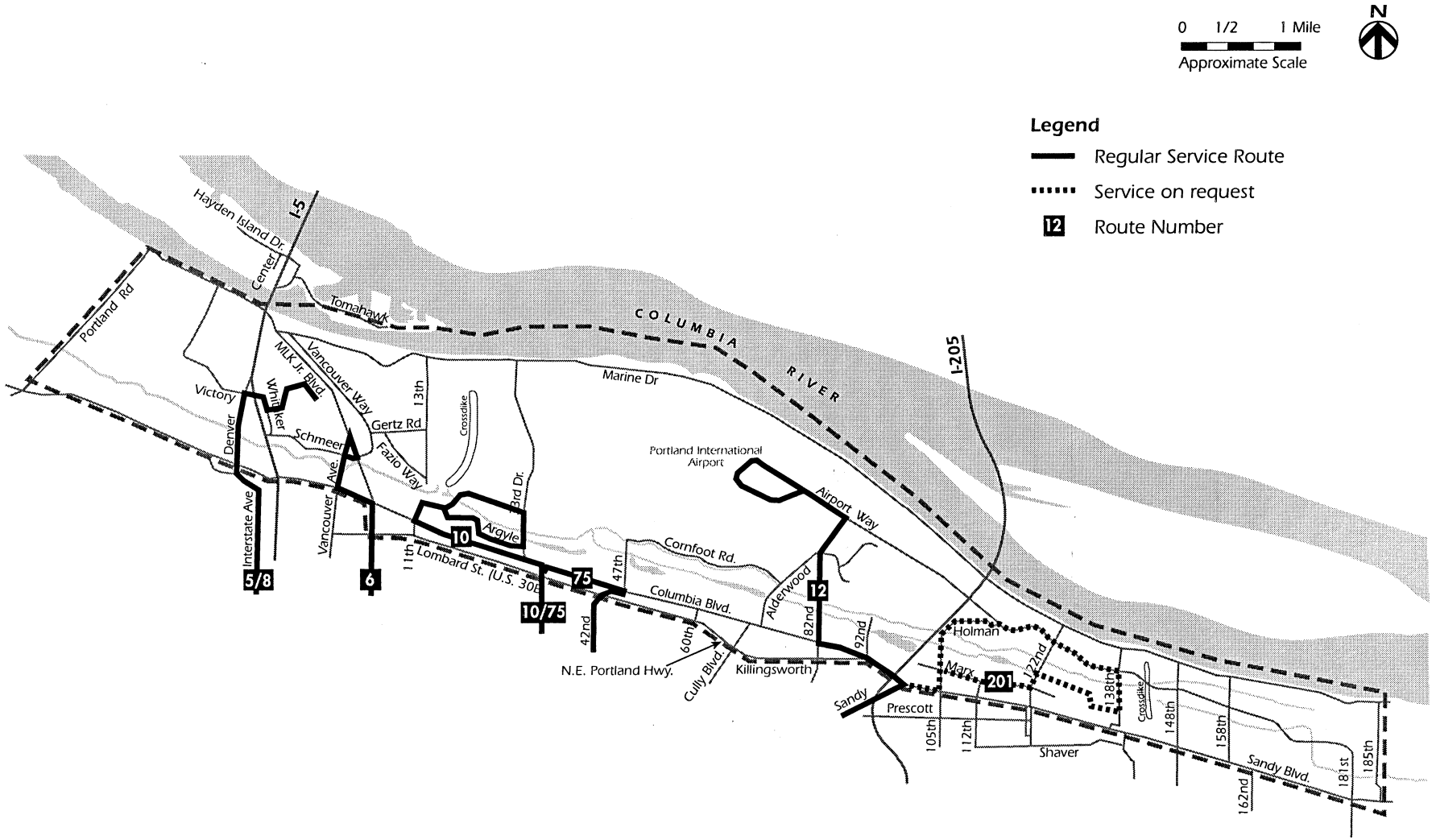
Light rail will provide improved access to PDX. The fastest growing airport in the United States, its annual passenger numbers are projected to be 30 million in 2020 compared to today's 12 million passengers. Without light rail, freight access will potentially be impaired and surrounding industries will find longer transportation delays.

Pedestrian Facilities: Most of the Corridor's street network lacks sidewalk facilities for pedestrian travel. NE Columbia Boulevard is designated as a Pedestrian Path though pedestrian facilities are intermittent. Sidewalks are in place on both sides of the street from the I-5 ramps to NE 33rd Drive. Between NE 33rd Drive and NE 52nd Avenue there are sidewalks only on the south side of NE Columbia Boulevard. Between NE 52nd Avenue and NE 82nd Avenue there are generally sidewalks on both sides of the street again, though with certain sections missing. Protected pedestrian crosswalks are provided at the signalized intersections noted above.

NE Killingsworth west of I-205.

Figure 4

The Columbia Corridor Transportation Study
Bus Routes



NE Lombard Street between I-5 and NE 10th Avenue is designated a Pedestrian Path with Crossings, east of NE 11th Avenue it is designated a Pedestrian Path. Sidewalks are present along both sides of the street between I-5 and NE 11th Avenue. East of NE 11th Avenue to NE 60th Avenue there are no sidewalks on either side of the street. From NE 60th Avenue to NE 82nd Avenue there are sidewalks again on both sides of the street. East of NE 82nd Avenue there are sidewalks only on the south side of the street. There are signalized crosswalks at N Albina Avenue, N Vancouver Way, NE Martin Luther King Jr. Boulevard, NE 11th Avenue, NE 60th Avenue, NE Cully Boulevard, NE 72nd Avenue, NE 82nd Avenue and I-205.

NE Marine Drive west of NE 13th Avenue is not improved with sidewalks. East of NE 13th Avenue pedestrians share use of the recreational path with bicyclists along the north side of NE Marine Drive. Between NE 33rd Avenue and NE 122nd Avenue a south side pathway is under construction.

None of the north-south collector streets are continuously improved with sidewalks in the study area.

Bicycle Facilities: The current street network in the Corridor is only partially improved to accommodate bicyclists. NE Columbia Boulevard has no special policy designation nor facilities to accommodate bicycles. While NE Lombard Street is classified as a Bicycle Route through the Corridor, there is limited infrastructure for bicycles. East of NE 60th Avenue, Lombard is stripped with bike lanes. Bike lanes are planned for the portion between NE 60th Avenue to NE 6th Drive. NE Marine Drive is designated a City Bikeway and Off-Street Path for bicyclists. East of approximately NE 47th Avenue there is an existing bike path. Bike lanes are planned for the portion between NE 33rd Drive and I-5, which will provide a connection to an existing off-street path on the Interstate Bridge and an off-street path which continues west on NE Marine Drive west of the Interstate Bridge.

North-south bicycle travel is accommodated by bike lanes on NE 33rd Drive and NE Martin Luther King Jr. Boulevard between NE Columbia Boulevard and NE Marine Drive.

NE Marine Drive bikepath.

IV. Truck Origin and Destination Surveys

Purpose of Surveys

Origin and destination surveys were conducted on NE Marine Drive and NE Columbia Boulevard to help develop a comprehensive picture of how truck traffic is currently utilizing these two study area arterials. The survey data specifically allows for a more refined understanding of how each street is used for through truck traffic vs. use for local truck access and circulation. In addition, the data is useful in the evaluation of how certain alternatives may affect truck traffic within the study area. A more detailed explanation of the study methodology and results can be found in the Appendix.

Survey Conclusions

The origin and destination survey data indicates that both NE Columbia Boulevard and NE Marine Drive are used primarily by Columbia Corridor truck traffic as local access and circulation facilities and only secondarily as through traffic routes (see Figure 5). Even though there are notable differences in the characteristics of each facility, in terms of design, capacity, and adjacent land use patterns, they are utilized by truck traffic in a similar manner.

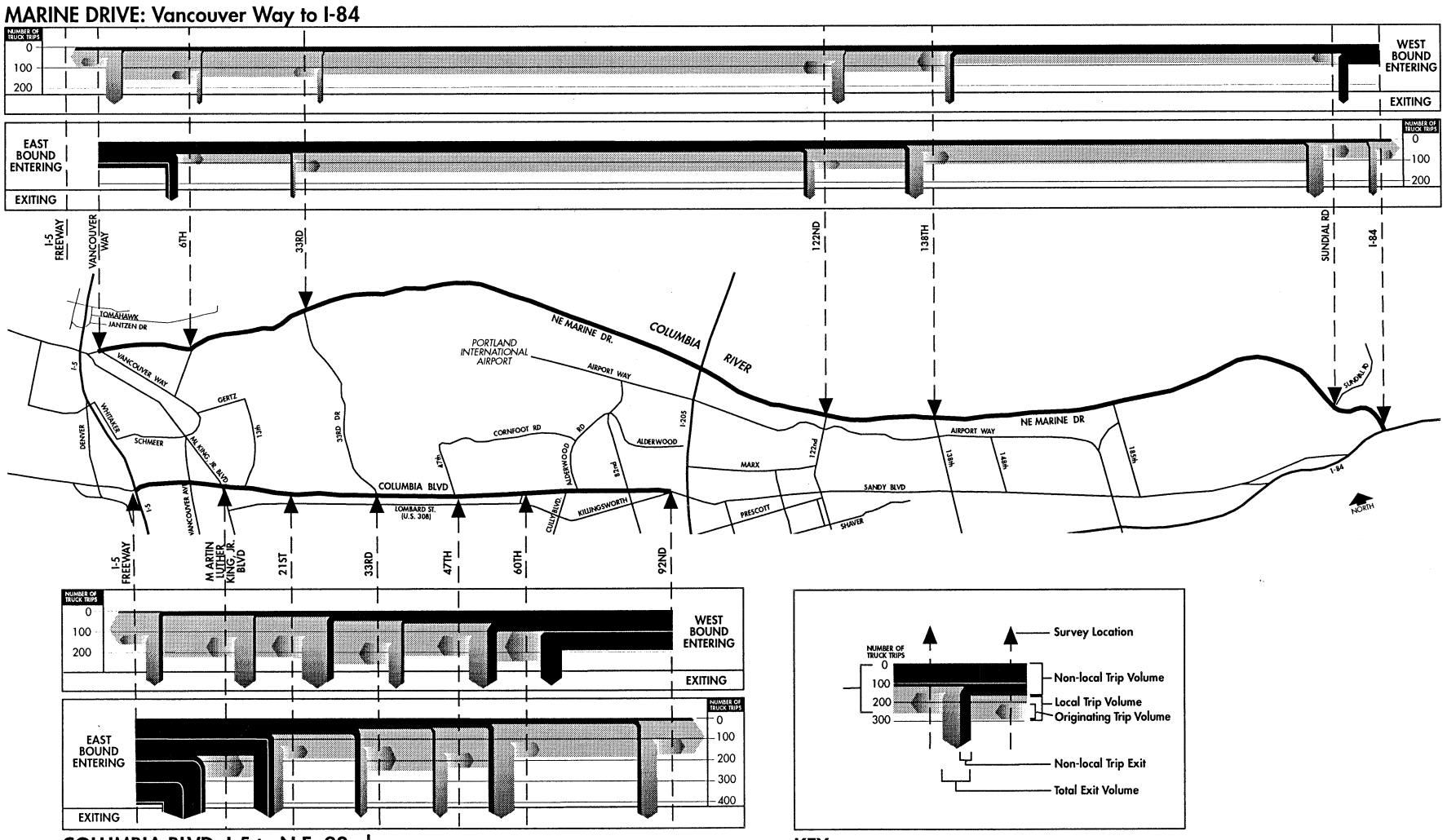
The data shows that during the 1 PM to 4 PM truck count period only approximately 3% of the truck traffic entering the study area at either end of NE Columbia Boulevard and 10-15% of the truck traffic starting at either end of NE Marine Drive reach the opposite end of the study area. These trips which traverse the Corridor without stopping are defined as a 'through' truck trip (see Figure 5). This means that most of the truck traffic using each facility is probably originating within the Corridor or is destined for a location within the Corridor. We can only say "probably" because the study did not track the true origins and ultimate destinations of each truck trip, only that portion of the trip which used either facility.

The study results also indicate that truck volumes tend to be heaviest along the western portion of both NE Columbia Boulevard and NE Marine Drive. This is consistent with the identified truck activity centers within the Corridor which also tend to be concentrated near I-5.

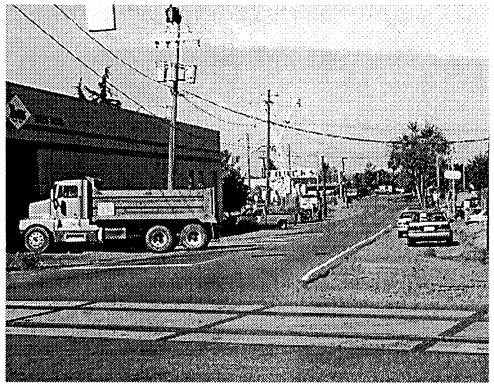
Figure 5

Local and Non-Local Truck Trips

3 Hour (1-4 P.M.) Truck Traffic Volume



V. Existing Conditions Summary



Unpretected rail crossing.

- Poor connections between NE Columbia Boulevard and NE Lombard Street have led to inefficient use of the available roadway capacity and congestion.
- The Corridor is dominated by industrial and warehousing types of land uses which are heavily dependent on truck transportation.
- Considerable growth potential remains within the Corridor for industrial development. Employment in the Corridor is expected to increase from 41,000 to over 59,000 by 2010.
- There are also a growing number of residential units concentrated mainly in the northwest corner of the Corridor west of NE 33rd Drive. These neighborhoods are in proximity to industrial land uses and are potentially impacted by truck traffic.
- Numerous driveways on NE Columbia Boulevard create safety conflicts and reduce street operation efficiency.
- Truck traffic on NE Marine Drive creates conflicts with adjacent residential neighborhoods, primarily due to their noise and vibration.
- Lack of a completed sidewalk system along NE Columbia Boulevard, NE Marine Drive, NE Lombard Street and the internal street network does not encourage pedestrian travel.
- There is insufficient transit service throughout the Corridor.
- Lack of bicycle facilities creates discontinuous and inconvenient bicycle access.
- Both NE Columbia Boulevard and NE Marine Drive are primarily used by truck traffic for local access and circulation purposes.
- Only approximately 3% of truck traffic on NE Columbia Boulevard and 10-15% of the truck traffic on NE Marine Drive was found to have neither an origin nor a destination in the study area.
- Truck volumes tend to be heaviest along the western portion of both NE Columbia Boulevard and NE Marine Drive, consistent with the number of freight terminals and truck activity near I-5.

Chapter 3: UNIVERSE OF TRANSPORTATION ALTERNATIVES

I. Future "Base Case" Conditions

This section identifies 20-year employment growth and programmed transportation improvements in the Columbia Corridor. Future "base case" transportation conditions which include the existing transportation system plus known or programmed improvements are forecasted using output from a) the Truck Routing Model, which models truck movements during the truck peak period in the early afternoon, b) the EMME/2 transportation demand model which models both cars and trucks during the typical evening peak period, and c) other transportation planning tools.

Employment Growth

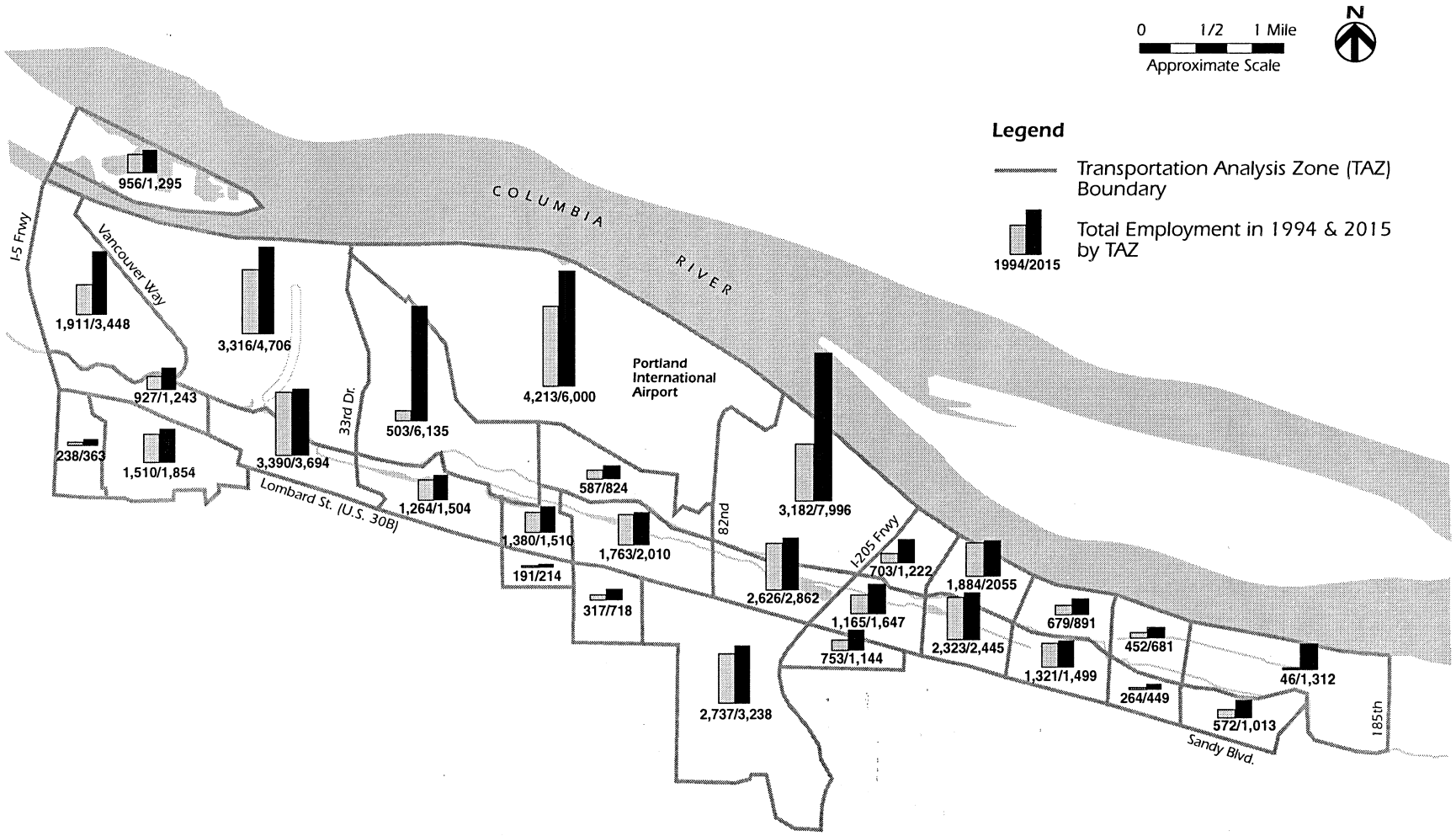
The Columbia Corridor between the Willamette River and the City's eastern boundary, currently employs 41,100 people in industries ranging from high technology services to freight handling.

According to employment projections provided by Metro, over 18,000 new jobs are expected within the Corridor's study area within the next 20 years. Almost 13,000 of these new jobs will likely be located east of NE 33rd Drive, primarily serving an expanded AirTrans Center (industrial and freight handling), the developing Portland International Center (office, light industrial, airport related and hotel uses), and the growing Portland International Airport. About 5,000 new jobs are projected to be created west of NE 33rd Drive, serving industrial and intermodal uses.

Figure 6 depicts projected employment growth, by zone, in the Corridor's study area.

Figure 6

The Columbia Corridor Transportation Study
Projected Employment Growth



Programmed Transportation Improvements

Every year the City of Portland prepares a two-year balanced budget. The Office of Transportation approves projects within its capital improvement program (CIP) budget for the two-year period and plans, but does not fund, projects for the following three years. The following table shows study area projects listed in the Office of Transportation's Capital Improvement Program for fiscal years 1997/1998 through 2002/2003. Overall, 250 projects are listed and ranked in the CIP. Projects are included in the CIP as a result of Council mandate, neighborhood requests or implementation of City policy. Hundreds of proposed projects are evaluated by a team of technicians and rated for their ability to attain the greatest number of City policy objectives. Each project receives a rank number and projects are proposed for funding in the two year budget according to available funds.

The projects listed below show those projects in the 1997 through 2003 budget cycle which are proposed for funding. As each budget year proceeds each of these projects will require preliminary engineering to determine if they are worthy of construction.

Table 4
Columbia Corridor Projects in PDOT Capital Improvement Program
(in $1,000)

Project Title	Priority Rank	Funded Projects 97-98	Funded Projects 98-99	Unfunded Projects 99-2003
NE Airport Way	22	$54	$34	$60
NE 158th Ave: Sandy-Marine Dr	27		$200	$900
Seismic Retrofit 33rd Ave	38			$213
Seismic Retrofit Columbia Blvd	40		$50	$389
NE Alderwood Rd. Extension	84	$351		
NE Alderwood Rd/Cornfoot Rd	104			$120
NE MLK Jr. Blvd at Columbia Blvd	111			$681
NE Alderwood at Columbia Blvd	122			$295
NE 82nd/Webster-Holman	140		$50	$1650
NE 138th Ave: Sandy-Marine Dr	156	$21	$853	
NE 138th Over Columbia Slough	156		$21	$853
NE Marine Dr/33rd Dr	234			$750
NE Marine Dr/122nd Ave	237			$1,500
NE 11th Ave -13th Ave Connection	268			$901

Besides the above projects, the Oregon Department of Transportation has funded a lane striping and traffic signal modification project on NE Columbia Boulevard between NE Lombard Street and the I-205 northbound ramps.

Transportation Forecasts

Using the 20-year employment growth forecasts (assuming no land use zoning changes) and considering most of the programmed transportation improvements, the Truck Routing Model and the EMME/2 model were used to predict which roadway facilities would operate acceptably and which would operate at congested conditions by the year 2015. The forecasts also considered increases in passenger traffic, via automobiles, to and from Portland International Airport.

Figure 8 highlights the numerous Columbia Corridor roadway segments which would likely operate at congested or overcapacity conditions during the 2015 evening peak hour. The figure shows the ratio of traffic volume to roadway capacity for roadway segments which are expected to operate poorly. While several of the depicted roadway segments would operate slightly better during the earlier truck peak period than during the later commuter peak period, many roadway segments would likely be congested during the later part of the truck peak period as well due to an extended future commuter peak hour (i.e. spreading into the truck peak periods).

Figure 7

The Columbia Corridor Transportation Study
Ratio of Traffic Volume to Street Capacity
1993 PM Peak Hour

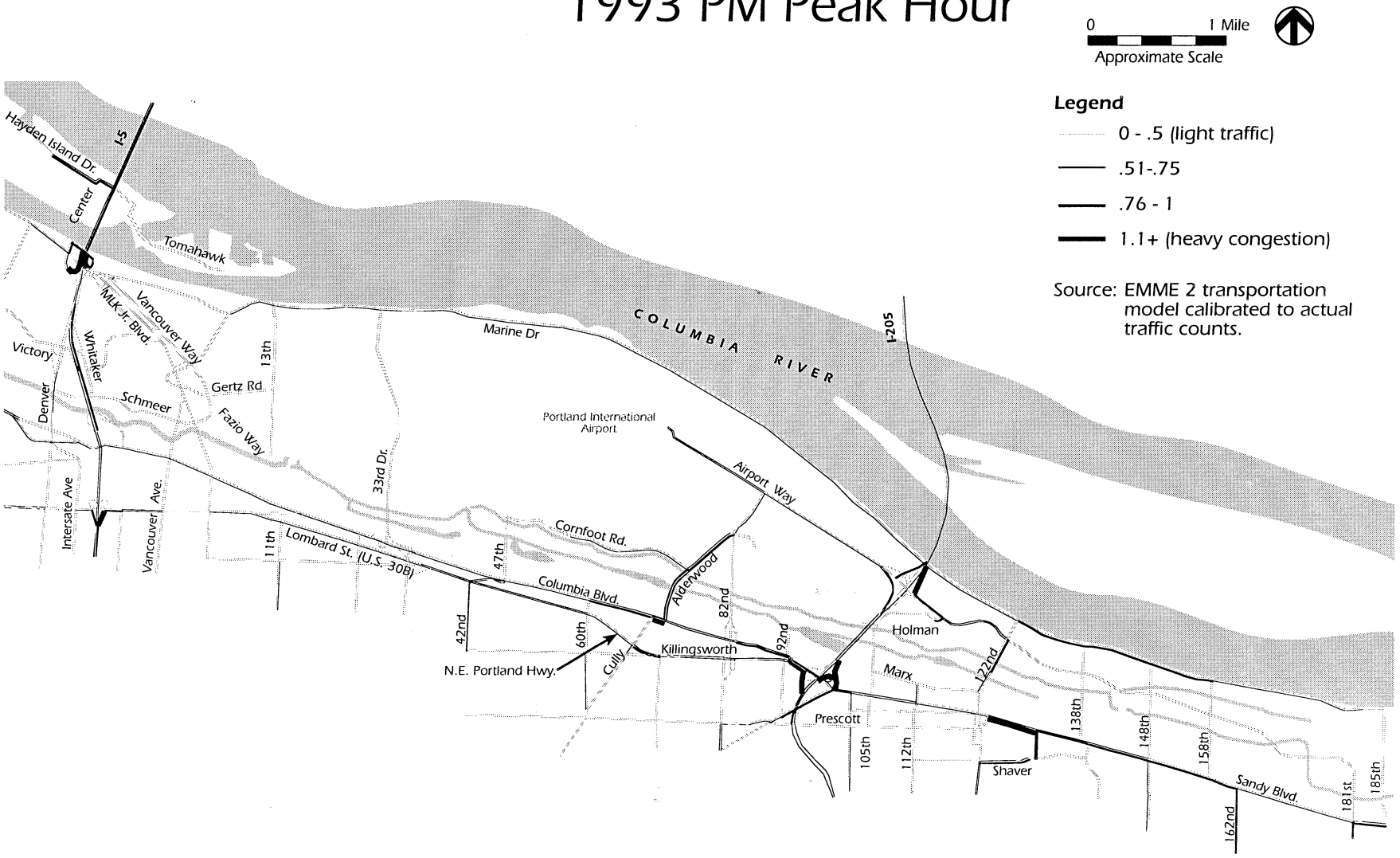
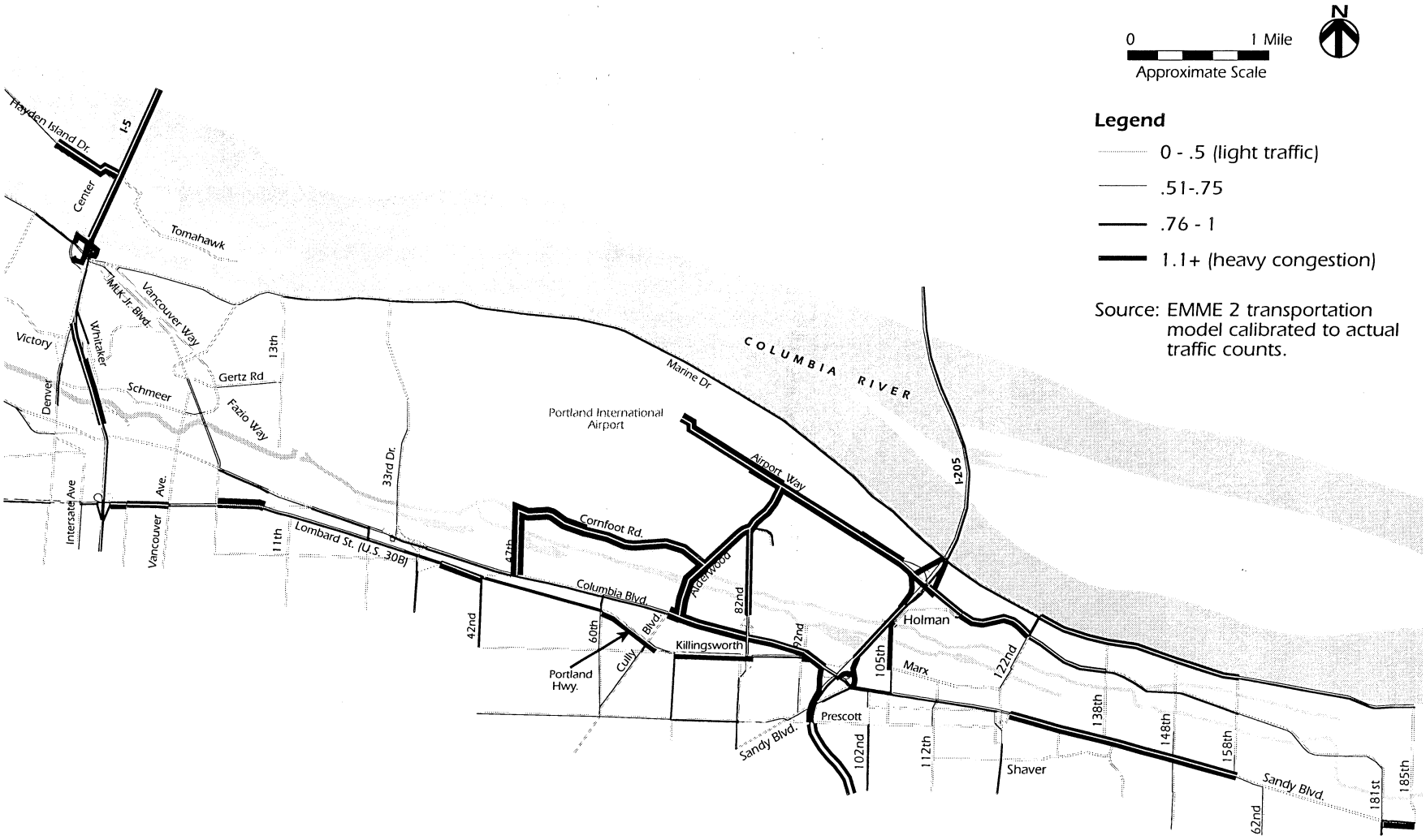
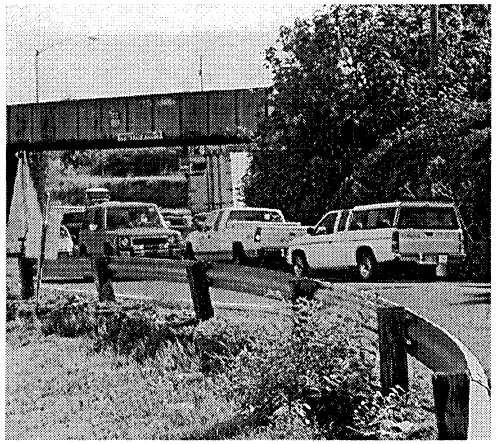


Figure 8

The Columbia Corridor Transportation Study
Ratio of Traffic Volume to Street Capacity
2015 PM Peak Hour



II. Summary of Future 'Base Case' Conditions

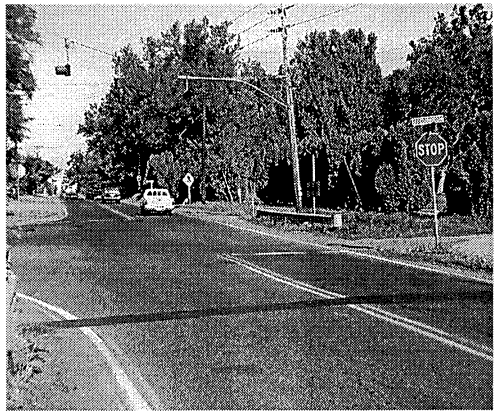


NE 92nd Avenue at Union Pacific rail over-crossing.

The following conclusions were made about year 2015 "base case" transportation conditions in the Columbia Corridor study area:

- NE Columbia Boulevard, east of NE 60th Avenue, would degrade from its current congested condition to an over capacity condition. Peak hour traffic demands would exceed available capacities by an average of 20 percent. At most signalized intersections, motorists would experience delays of over two minutes.
- Due to the significant increase in east-west travel demand and the over capacity conditions expected along NE Columbia Boulevard, many drivers would shift to NE Lombard Street to access I-205 and other points to the east. This would cause the currently under-utilized roadway to approach over capacity conditions. Its existing excess capacity would be immediately absorbed. Motorists would experience significant delays of up to two minutes at most signalized intersections.
- The existing NE Lombard Street/NE Columbia Boulevard/NE Killingsworth Street three-legged intersection would operate at over capacity conditions for several hours each weekday, with eastbound vehicle queues along NE Lombard Street and NE Columbia Boulevard exceeding 1,000-feet per lane during the evening peak hour. The NE Columbia Boulevard/I-205 ramp intersections and ramps would experience severe congestion and back-ups through each of the three signals near the interchange.
- Both NE Columbia Boulevard and NE Lombard Street, between NE Martin Luther King Jr. Boulevard and NE 60th Avenue, would be approaching capacity conditions during peak periods. However, traffic flows would be well balanced between the two roadways. Noise levels on NE Lombard Street could rise by 2 decibels (which would be unnoticeable due to background train-related noise levels).
- NE Airport Way, from the airport through the I-205 interchange, would be over capacity, primarily due to airport growth and the expanded Portland International Center. Severe congestion would occur on the northern I-205 ramps, with traffic demand increases of 50% to 100%, causing back-ups onto the freeway and along NE Airport Way.

- NE Alderwood Road, especially between NE 82nd Avenue and NE Columbia Boulevard, would experience substantial congestion due to commuting traffic from the expanded AirTrans Center and Portland International Center. Traffic demands would exceed capacities by about 40%, logically shifting some traffic to NE 82nd Avenue.
- Traffic demand along segments of NE Cornfoot Road and NE 47th Avenue would be 65% to 75% higher than the capacities offered by these two-lane roadways, causing severe congestion and difficulty in accessing or egressing the unsignalized north-south roadway connections.
- Traffic levels would continue to increase on NE Marine Drive, but unacceptable congestion would not occur by the year 2015.



NE Alderwood Road at NE Cornfoot Road.

In summary, the expected employment increase in the Columbia Corridor, coupled with the increasing amount of freight-related trips made into and from the Corridor, would consume the available capacity on several critical roadway segments and cause congested or over capacity conditions at key Corridor gateways if no transportation improvements over those programmed or demand reduction measures were made in the future.

III. Evaluation of Transportation Alternatives

NE Columbia Boulevard and NE Lombard Street are long parallel major arterial roadways, separated at some points by only a few hundred feet, serving different types of vehicle trips. NE Columbia Boulevard serves many short, localized trips since the arterial provides connections with north-south roadways directly serving the NE Columbia Boulevard Industrial Area. According to the NE Columbia Boulevard license plate (origin and destination) survey completed as a part of this study, the average distance a vehicle travels along NE Columbia Boulevard (between I-5 and I-205) is about two miles.

On the other hand, NE Lombard Street serves longer trips due to many factors: its continuous five-lane cross-section, its low number of traffic signals, its higher speed limits, and its limited number of north-south roadway connections. Thus, it is not surprising that NE Lombard Street carries fewer vehicles than NE Columbia Boulevard. Nevertheless, only about five to 10% of the traffic on NE Lombard Street actually travels

along the roadway all the way between I-5 and I-205 (through trips), and vice-versa, indicating that most of the vehicle trips along this arterial also originate or are destined for the Columbia Corridor.

One objective of this study is to develop an interconnected transportation network, using existing arterials. Another objective is to improve efficiency and access along and between NE Columbia Boulevard and NE Lombard Street. By interconnecting NE Columbia Boulevard and NE Lombard Street at one or more key locations, both of these objectives could be realized. But more importantly, the underutilized NE Lombard Street could act as a "reliever" route for NE Columbia Boulevard, possibly alleviating the need for future widening of NE Columbia Boulevard to accommodate six through lanes, a project which could entail substantial impacts.

In addition, with improved east-west circulation along NE Columbia Boulevard and NE Lombard Street and better connections between the two arterials, truck drivers should find this route more attractive than NE Marine Drive to access the Columbia Corridor.

The following section identifies a number of proposed connections between NE Columbia Boulevard/NE Lombard Street (cross-over options) which were identified by the joint Citizens and Technical Advisory Committee. Options were dropped from consideration after analysis based on how well they met the evaluation criteria, and goals and objectives. Finally, the cross-over options that best met the study evaluation criteria were further validated considering other network-wide project proposals.

Conceptual Cross-Over Options

Cross-overs at the following locations between NE Columbia Boulevard and NE Lombard Street were evaluated in this study: NE Martin Luther King Jr. Boulevard, NE 11th Avenue, NE 33rd Avenue/NE 33rd Drive, NE 60th Avenue (with two options), NE 82nd Avenue and NE 92nd Avenue.

NE Martin Luther King Jr. Boulevard

As shown in Figure 9, this improvement would entail widening NE Martin Luther King Jr. Boulevard between NE Columbia Boulevard and NE Lombard Street to accommodate additional left-turn lanes. Curb returns would be pushed back to better facilitate right-turn truck movements. In addition, the railroad bridge would be rebuilt and NE Lombard Street between NE Martin Luther King Jr. Boulevard and NE 11th Avenue, would be widened to accommodate a continuous left-turn lane. This improvement is estimated to cost about $12,616,000 (all costs in 1995 dollars).

NE 11th Avenue

Under this option, NE 11th Avenue would be widened from two lanes to five lanes (Figure 10). Channelization would be provided at the NE 11th Avenue/NE Lombard Street/NE Lombard Place intersection to provide improved delineation, maintain the existing railroad grade crossing length, and restrict movements to/from NE Lombard Place to right-turns only. A new traffic signal would be installed at NE 11th Avenue/NE Columbia Boulevard. Of all the cross-over alternatives, this is the only one which would not have the railroad grade-separated from the cross-over roadway. Currently, 15 to 22 slow-moving freight trains cross NE 11th Avenue each day. Union Pacific projects that an additional 7 to 14 trains will cross NE 11th Avenue in the near future. This improvement is estimated to cost about $1,600,000.

NE 33rd Avenue/NE 33rd Drive

A new overcrossing would replace the existing bridge and would connect NE 33rd Avenue on the south with NE 33rd Drive to the north, while maintaining all of the existing ramp connections to NE Columbia Boulevard (Figure 11). Elevated ramps to and from NE Columbia Boulevard and NE Lombard Street would converge at a new single-point intersection located above NE Lombard Street. Under this configuration, new westbound and eastbound connections between the two arterials could be conveniently made through just one signalized intersection. The NE 33rd Drive "loop" ramp to/from NE Columbia Boulevard would be removed, its intersection with NE 33rd Drive would be signalized, and the number of its approaches would be reduced from four to three. This improvement is estimated to cost about $42,000,000.

Figure 9

Martin Luther King Jr. Boulevard Cross-Over

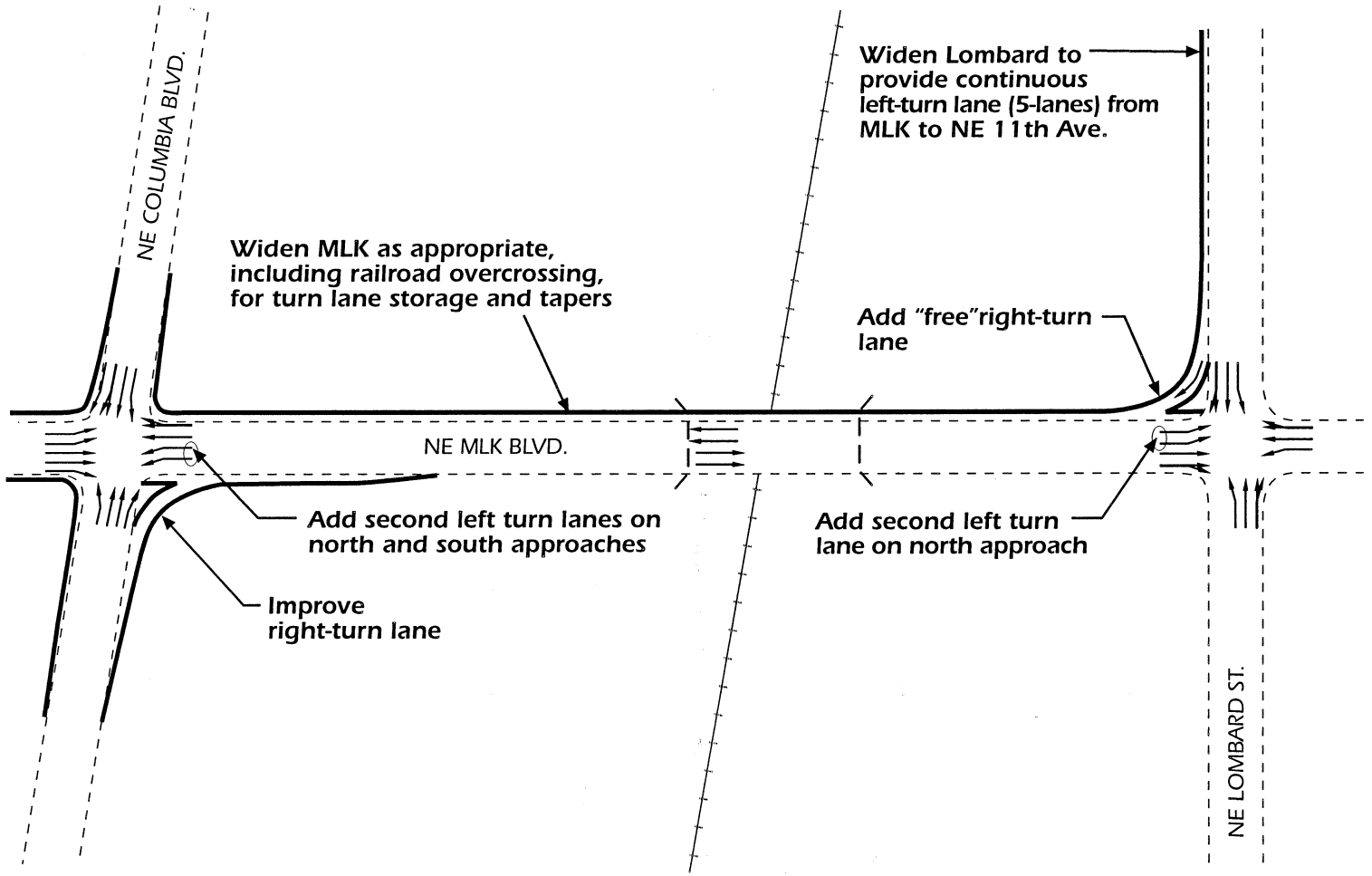


Figure 10

11th Avenue Cross-Over

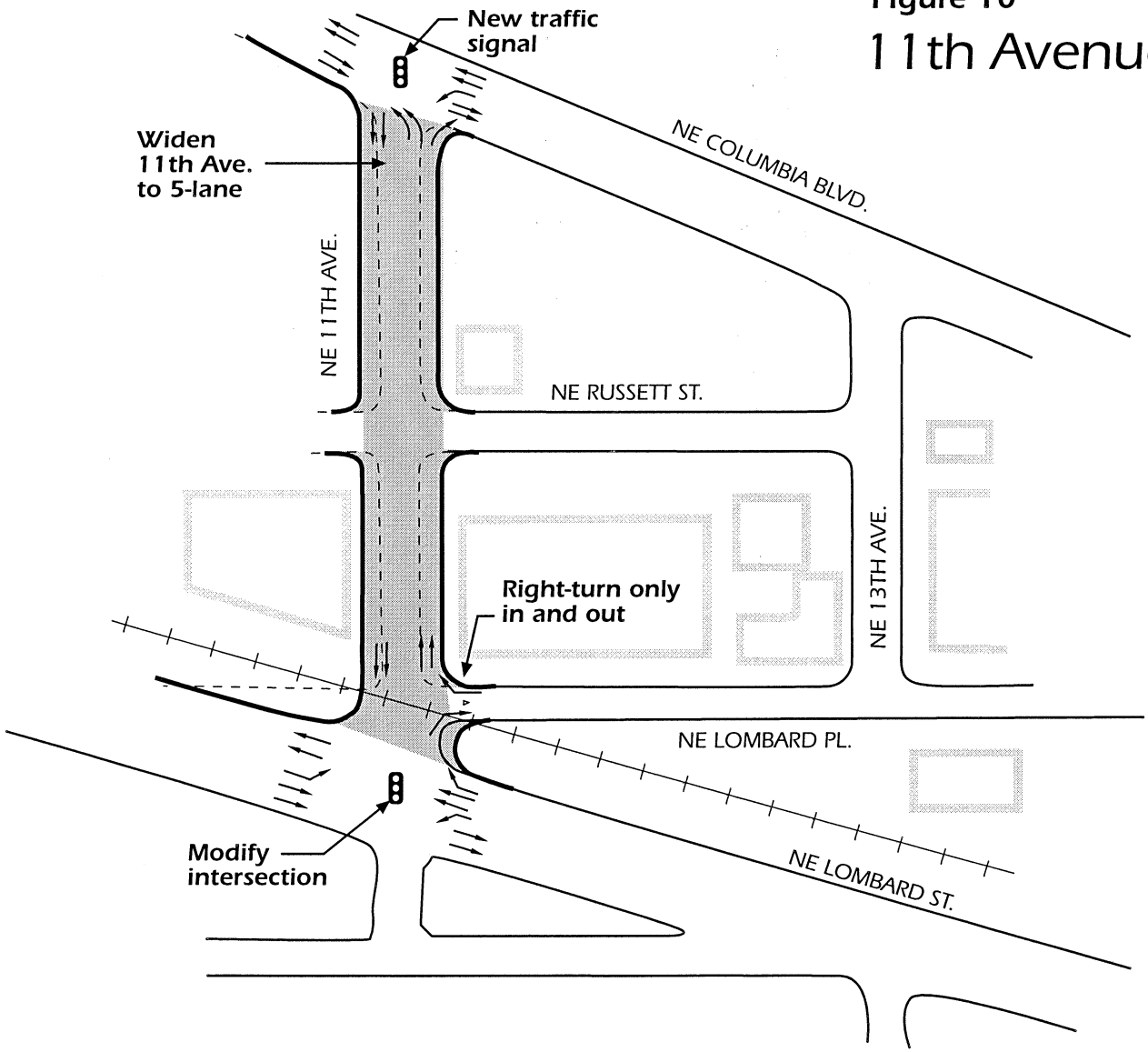


Figure 11

33rd Avenue Cross-Over

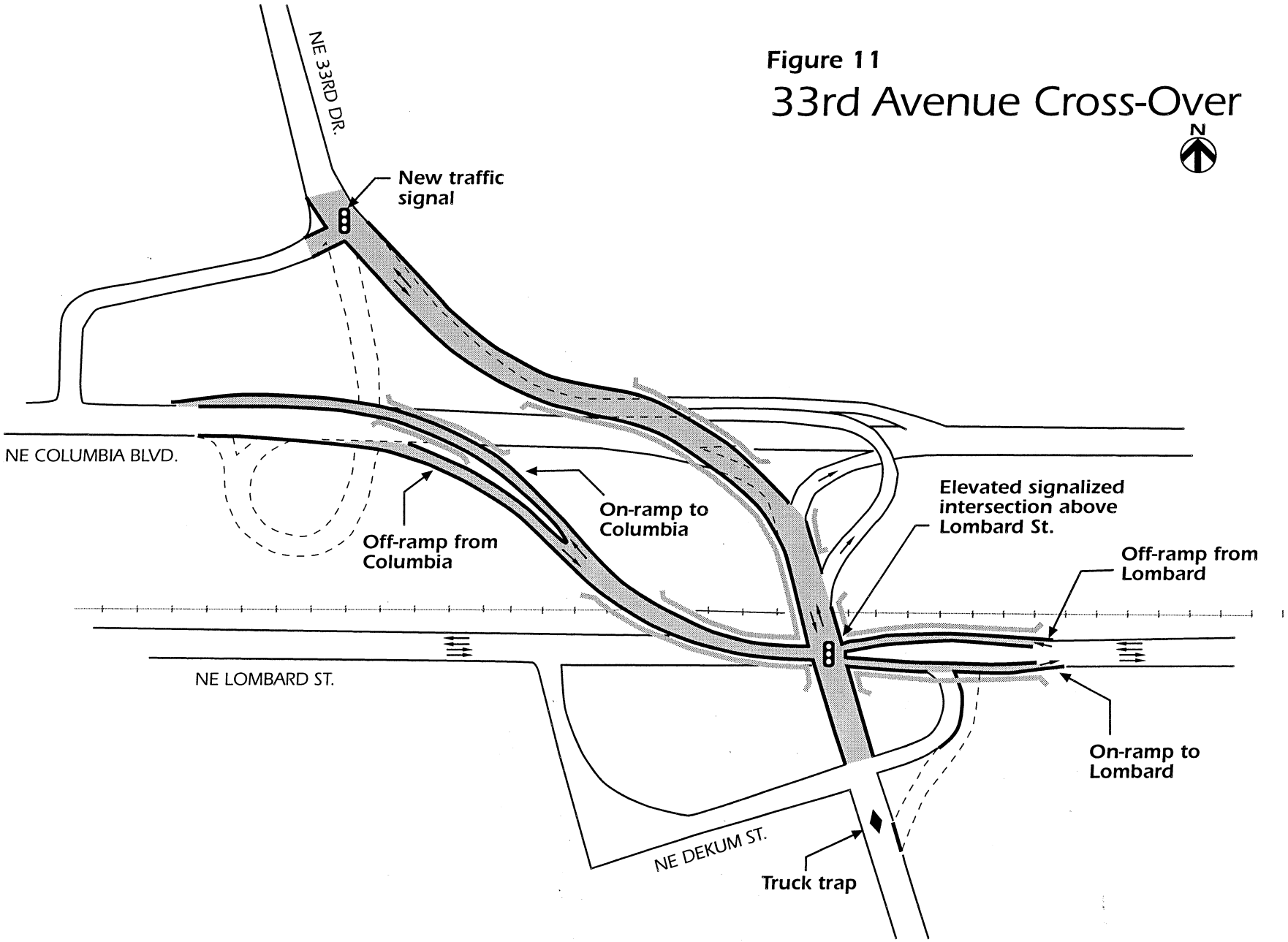
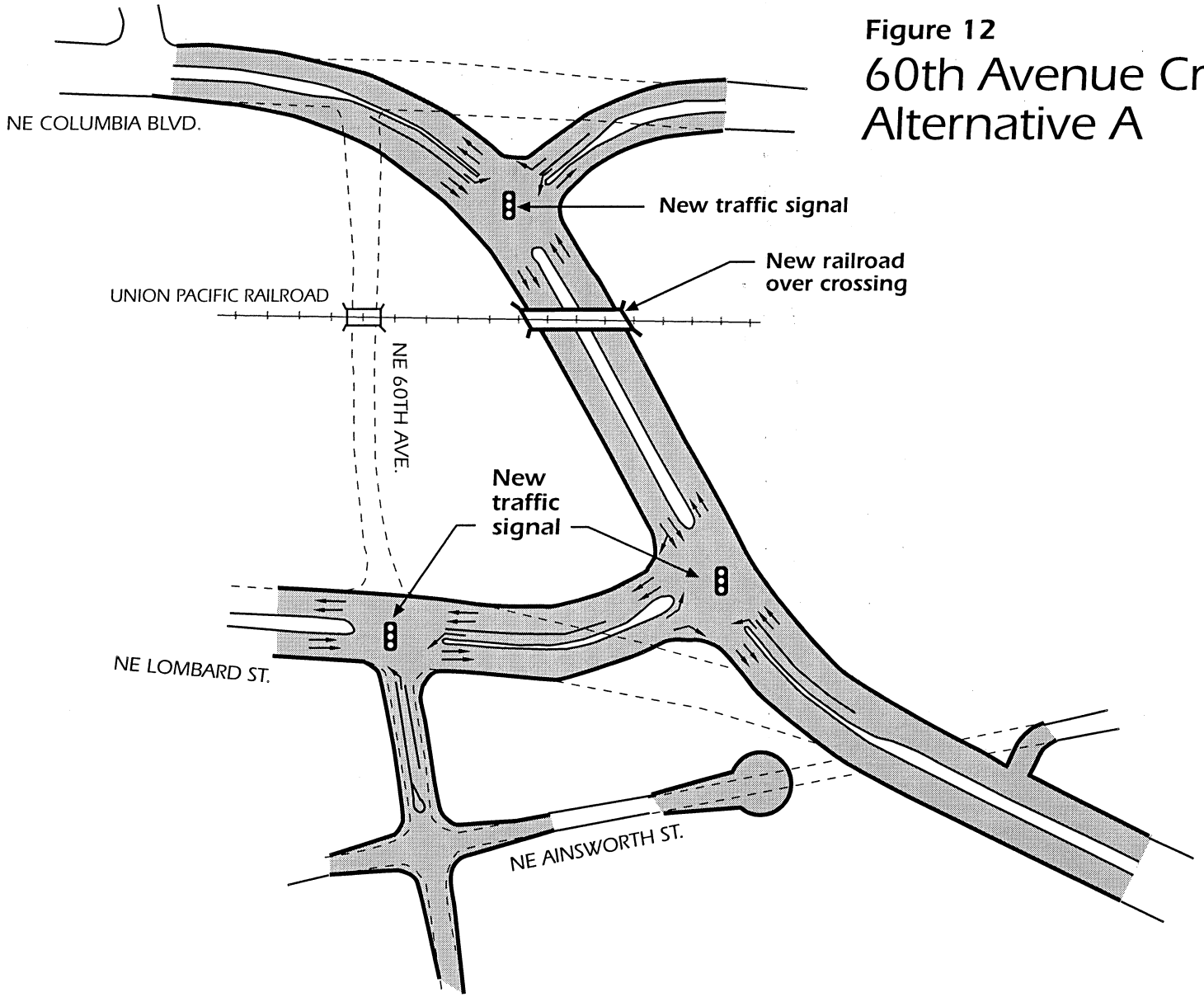


Figure 12

60th Avenue Cross-Over Alternative A



NE 60th Avenue, Alternative A

The concept shown in Figure 12 was developed by ODOT and the City. The design would connect the two arterials such that the emphasized through route consists of NE Columbia Boulevard to the west of NE 60th Avenue and NE Lombard Street to the east, with a reverse curve transition in between. Under this alternative, motorists crossing over would travel through two signalized intersections, but no turning movements would be necessary. On the other hand, motorists continuing through the complex on NE Columbia Boulevard would travel through one intersection and need to make turning movements. Those continuing through on NE Lombard Street would need to travel through two intersections and make turning movements. A new, wider grade-separated crossing of the railroad would be constructed to the east of the existing crossing. This improvement is estimated to cost about $14,000,000.

NE 60th Avenue, Alternative B

As an alternative to the previous option, the NE 60th Avenue cross-over shown in Figure 13 would emphasize straight-through movements on NE Lombard Street, but de-emphasize NE Columbia Boulevard's function to the east of NE 60th Avenue. The design of this concept would also discourage through trips along NE Columbia Boulevard to the west of NE 60th Avenue. This improvement is estimated to also cost about $14,000,000.

NE 82nd Avenue

The NE 82nd Avenue cross-over, shown in Figure 14, would require lowering NE Columbia Boulevard and NE Lombard Street to meet NE 82nd Avenue at-grade. The railroad would still be grade-separated and above NE 82nd Avenue. Non-standard and underused loop ramps would be removed and two high-capacity signalized intersections would be created. The existing traffic signal at NE 82nd Avenue/NE Lombard Street would be removed. Under this option, NE Columbia Boulevard to the east would be de-emphasized. This improvement is estimated to cost about $16,851,000.

NE 92nd Avenue

This alternative would emphasize a transition from NE Lombard Street (to the east) to NE Columbia Boulevard (to the west) near NE 92nd Avenue (Figure 15). The existing signalized intersection at NE Lombard Street would be expanded to accommodate at least two lanes in both directions to/from NE Columbia Boulevard. Either a new railroad overcrossing would be constructed just to the west of the existing structure, or a longer structure would be built to replace the existing one. Since NE Columbia Boulevard would obtain better access at this point and because of ever-increasing traffic demand along the arterial, it would be widened to five lanes (two through lanes in each direction and a continuous center left-turn lane) from about NE 60th Avenue to NE 92nd Avenue. This improvement is estimated to cost about $14,000,000.

Narrowing the Alternatives: Cross-Over Options Dropped from Study

Based on an analysis of existing and future traffic volumes and travel patterns, as well as cost considerations and attainment of study goals and objectives, five of the seven cross-over alternatives discussed above were not considered for further study. The NE 11th Avenue, NE 33rd Avenue /33rd Drive, both NE 60th Avenue, and NE 92nd Avenue 'cross-overs' were dropped, as discussed below. The remaining two "cross-overs" were further tested, as discussed in the next section.

NE 11th Avenue

This option was eliminated primarily for two reasons: 1) it would require motorists to travel along a circuitous route, and 2) it would not be grade-separated from the railroad tracks. Motorists from southbound NE Martin Luther King Jr. Boulevard destined to eastbound NE Lombard Street would be encouraged to turn left from NE Martin Luther King Jr. Boulevard onto NE Columbia Boulevard, then right onto NE 11th Avenue, then left onto NE Lombard Street. The opposite movements would be encouraged for motorists traveling in the opposite directions. However, the direct and more expeditious route for these movements is via NE Martin Luther King Jr. Boulevard between NE Columbia Boulevard and NE Lombard Street. In addition, with an increase in the number of slow-moving train crossings expected, high volume traffic movements at this location could ill-afford the associated delays and queuing.

NE 33rd Avenue/NE 33rd Drive

Using existing traffic volume data, it became apparent that a NE 33rd Avenue/33rd Drive cross-over would not attract truck or auto trips. This was later verified using 20-year transportation demand modeling results. Future employment growth in the Corridor is expected to the east of 33rd Drive and most of the future vehicle-trips will be generated from the I-205 Corridor. In addition, the $42 million price tag for this cross-over would diminish the benefit-to-cost ratio.

NE 60th Avenue, Alternatives A and B

Based on 20-year traffic forecasts, it was determined that Alternative B would be preferable to Alternative A based on traffic operations and minimization of the number of high turning movements. However, neither cross-over alternative would capture enough future traffic to/from the developing northern area (AirTrans Center, Portland International Center, etc.) from/to the I-205 Corridor to justify carrying the alternative forward. Traffic from these significant generators would be required to backtrack to use one of the proposed NE 60th Avenue cross-overs. It was determined that a 'cross-over' further to the east, i.e. NE 82nd Avenue or NE 92nd Avenue, would serve the potential future traffic substantially better due to these north-south roadway's continuations north of NE Columbia Boulevard. NE 60th Avenue does not connect to other north-south roadways to the north. In addition, either cross-over alternative would require upgrading NE Alderwood Road to four through travel lanes. Lastly, to serve all of the future traffic demand, NE Lombard Street would need to be widened to six lanes from the cross-over to I-205.

NE 92nd Avenue

This cross-over was dropped from further study due to two factors: 1) its high cost, and 2) the poor traffic operations that would result. The cost of this improvement would not only include the cost of replacing the railroad bridge with a longer bridge, but also widening NE Columbia Boulevard to five lanes from its intersection with NE Lombard Street all the way west to NE 60th Avenue. The NE Columbia Boulevard widening would require substantial right-of-way acquisition. In addition, the resulting NE Columbia Boulevard/NE Lombard Street intersection would serve a high amount of turning movements in very

Figure 13

60th Avenue Cross-Over Alternative B

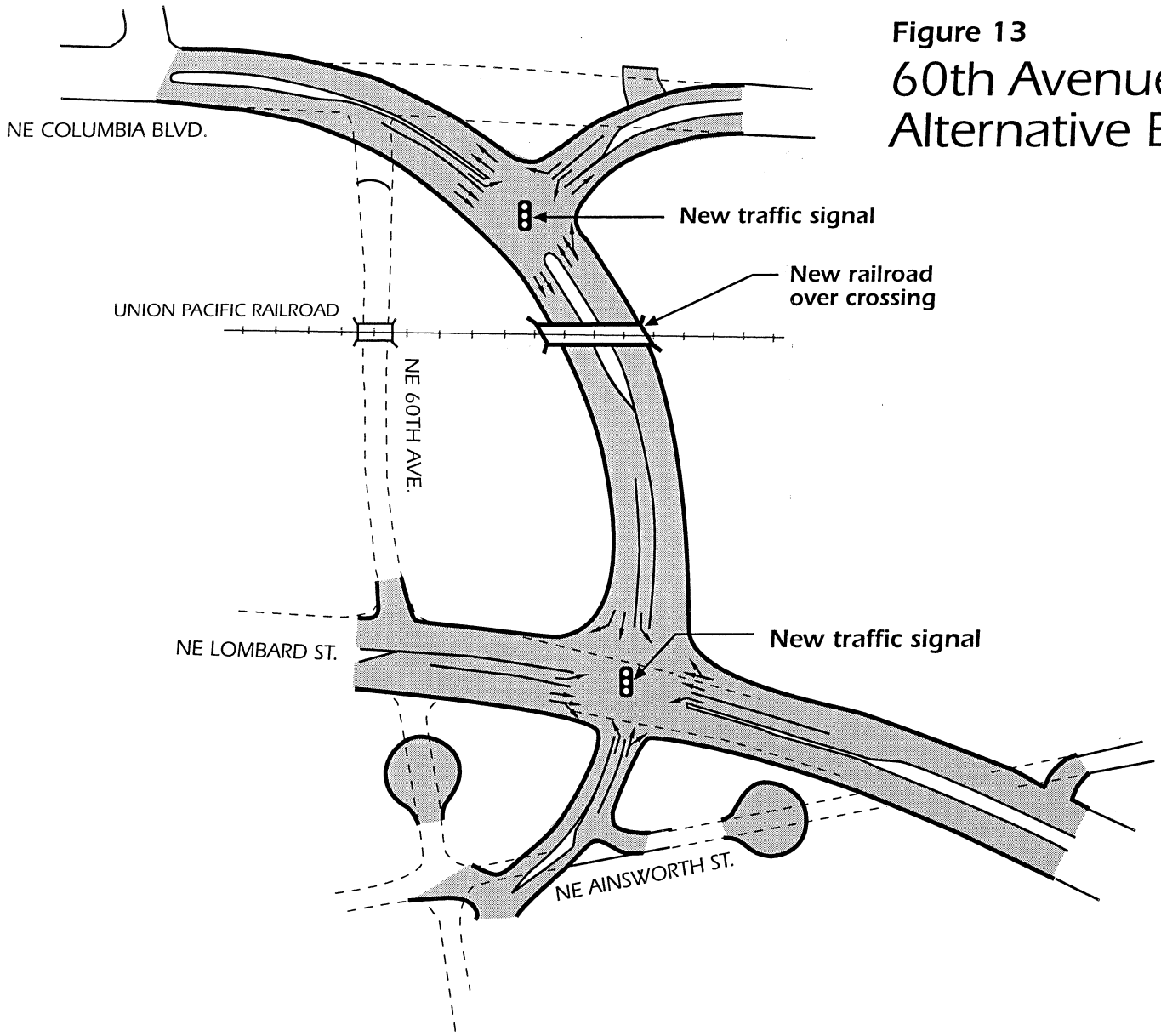


Figure 14

82nd Avenue Cross-Over

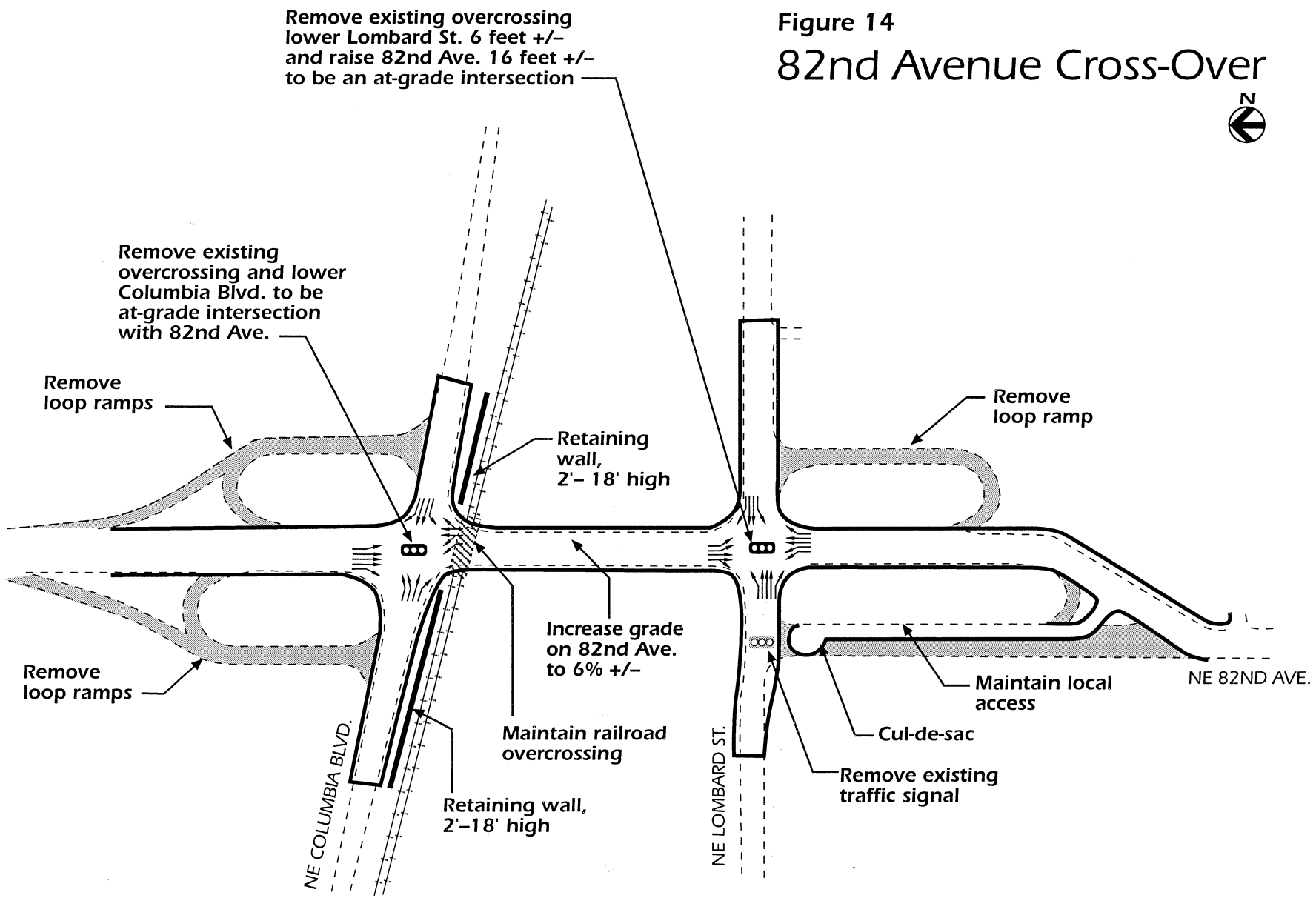
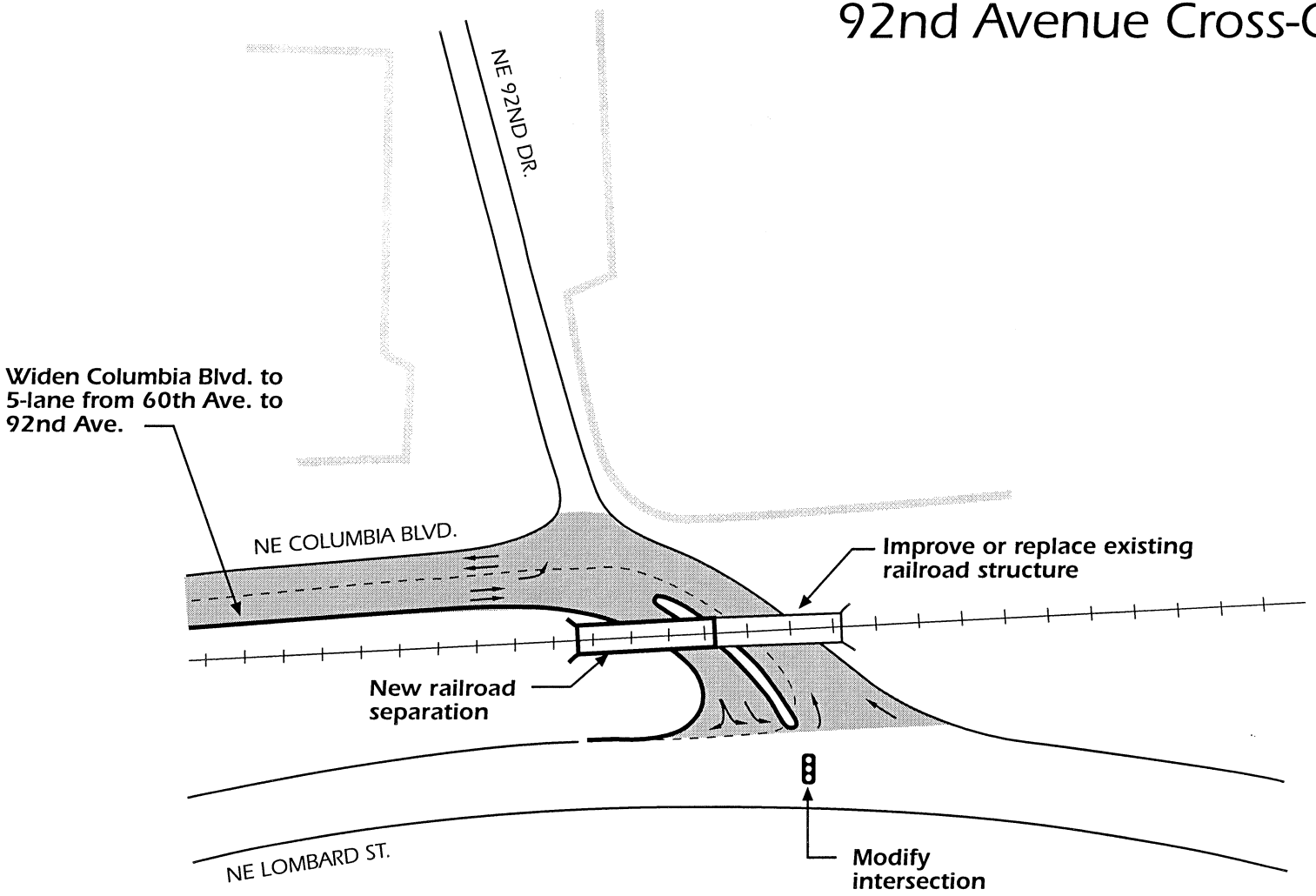


Figure 15

92nd Avenue Cross-Over



close proximity to two I-205 ramp intersections. It would be difficult to progress the various traffic streams through the interchange/intersection complex without resulting large-scale queuing and congestion.

Alternatives Further Tested

As discussed below, it was determined that using the excess roadway capacity obtainable on existing "cross-overs" between NE Columbia Boulevard and NE Lombard Street would best meet one or more objectives of the study. The most effective cross-overs were determined to be at the west end (NE Martin Luther King Jr. Boulevard) and east end (NE 82nd Avenue) of the study area. To compliment these improvements and efficiently serve traffic movements throughout the Columbia Corridor, a number of other roadway connectivity and transportation system improvements were tested.

NE Martin Luther King Jr. Boulevard

The intent of improving NE Martin Luther King Jr. Boulevard between NE Columbia Boulevard and NE Lombard Street is to use an existing regional north-south, four-lane roadway which is already grade-separated from the Union Pacific railroad tracks. In addition, a western cross-over at this location minimizes the number of turning movements needed to access the cross-over, particularly for vehicles coming from or going to NE Martin Luther King Jr. Boulevard either to the north or south of the cross-over.

It was determined that to maintain level of service (LOS) D conditions at both the NE Martin Luther King Jr. Boulevard/NE Columbia Boulevard and NE Martin Luther King Jr Boulevard/NE Lombard Street intersections extra capacity would need to be added with new turning lanes, larger right-turn curb returns, and extra lane(s) on the bridge over the railroad tracks.

NE 82nd Avenue

The intent of the improved cross-over is at least four-fold: 1) to use an existing under-utilized road before constructing new roads, 2) to remove the bottleneck at the NE Columbia Boulevard/NE Lombard Street (Killingsworth) three-legged intersection near I-205, 3) to facilitate through movements between the two arterials and from the arterials to I-205 and vice-versa, and 4) to effectively serve future traffic generated from

Table 5
Columbia Corridor Transportation Study and Alternatives Analysis
Comparison of Alternatives with Current Traffic Volumes

Decription of Alternative	Traffic Impacts	Alternative Mode & Noise Impacts	Conclusions
Base Case: Existing Roadway Infrastructure This Alternative is the "do-nothing" option. However, it does include programed regional transportation improvements.	• About 50% of truck trips along NE Columbia remain within about one mile of I-5 or I-205; The majority of truck trips along NE Columbia are short, local trips. • No significant peak hour congestion presently occurs except near NE Columbia/NE Killingsworth/I-205. • Travel speeds are lower on NE Columbia than NE Lombard due to traffic signals and more extensive roadside development.	• Existing noise levels on NE Lombard are 72, 77, and 75 dBA at NE 27th, NE 36th, and NE 51st, respectively. FHWa noise abatement criterion for residential areas is 67 dBA.	• Very low percentage of through truck travel (between NE MLK and I-205) in Corridor. Majority of trips originate or are destined for areas near freeways. • Lack of efficient cross-overs between NE Columbia and NE Lombard generally provides truckers and motorists just one route–no choice of feasible alternative routing.
Alternative 1: NE Columbia Blvd Truck Access Route with NE 11th Cross-Over This Alternative would generally emphasize NE Columbia for short trips and NE Lombard for longer trips. Average travel speeds would drop by 5mph on NE Columbia. The following improvements would occur: • Construct a 5-lane, at grade NE 11th Ave. cross-over with signals. • Widen NE Columbia from 2-lanes to 3-lanes between NE 60th Ave. & NE 92nd Ave. • Extend NE 92nd Ave. to serve PIC. In lieu of an improved cross-over at NE 11th Ave., this improvement could consist of significant improvements at or near the NE Lombard/NE Martin Luther King intersection area.	• NE 11th Avenue: >300%. • NE Columbia Blvd.: <50% e/o NE 11th, effect drops off gradually to the east with <30% w/o NE 92nd. • NE Lombard Street: >40% e/o NE 11th, with only >10% w/o NE 92nd. • NE Marine Drive: >5%. • Effectiveness controlled by efficiency of NE 11th Avenue at-grade crossing.	• No significant improvements for pedestrians or bicyclists. • Noise levels on NE Lombard to the east of NE 11th Avenue would rise about 1.5 dBA.	• Improves freight access on NE Columbia especially at west end of Corridor. • Slight volume increase on NE Marine Drive due to slower speeds on NE Columbia. • Potential problem with NE 11th Avenue at-grade cross-over due to increasing rail activity. • Noise levels on NE Lombard would increase by 1.5 dBA. • Recommendation: Evaluate further using 20-year forecasts. Determine if alternative west end improvements more appropriate. • Things to watch out for: Noise levels along NE Lombard and increased traffic along NE Marine Drive.
Alternative 1A: NE Columbia Blvd Truck Access Route with NE 11th and 'Modified' NE 60th Cross-Over This alternative would be the same as Alternative 1, with the addition of the following improvements: • Construct a 5-lane, grade-separated "modified" NE 60th Ave. cross-over with signals. The cross-over would emphasize straight-through movements on NE Lombard through NE 60th and de-emphasize NE Columbia to the east of NE 60th.	• NE 11th Avenue: >310%. • NE Columbia Blvd.: <110% e/o NE 11th to NE 60th, effect gradually drops off to the east with <50% w/o NE 92nd. • NE Lombard Street: >50% e/o NE 11th to NE 60th, effect gradually drops east of 60th with >20% w/o NE 92nd. • NE Marine Drive: >5%. • Effectiveness controlled by efficiency of NE 11th Avenue at-grade crossing. • Decreases traffic demand in NE Columbia/NE Lombard Corridor by 200 vph due to provision of only one continuous thoroughfare in lieu of two.	• No significant improvements for pedestrians or bicyclists. • Noise levels on NE Lombard would rise about 1.5 dBA to the east of NE 11th Avenue; and 0.5 dBA west of NE 60th Avenue.	• Improves freight access on NE Columbia more than Alternative 1, especially at west end of Corridor. • Slight volume increase on NE Marine Drive due to slower speeds on NE Columbia. • Potential problem with NE 11th Avenue at-grade cross-over due to increasing rail activity. • Noise levels on NE Lombard would increase by 0.5 to 1.5 dBA. • Recommendation: Evaluate further using 20-year forecasts. Determine if alternative west end improvements more appropriate. • Things to watch out for: Noise levels along NE Lombard and increased traffic along NE Marine Drive and in neighborhoods south.

Note: Increases (>) or Decreases (<) over 1994 Base Conditions.

Table 5 (continued)
Columbia Corridor Transportation Study and Alternatives Analysis
Comparison of Alternatives with Current Traffic Volumes

Decription of Alternative	Traffic Impacts	Alternative Mode & Noise Impacts	Conclusions
Alternative 1B: NE Columbia Blvd Truck Access Route with NE 11th and NE 33rd Cross-Overs This alternative would be the same as Alternative 1, with the addition of the following improvement: • Construct a grade-separated NE 33rd Avenue cross-over which requires only traveling through one signal when crossing from NE Columbia to NE Lombard westbound and vice-versa.	• No significant differences in comparison to Alternative 1, even with NE 33rd Drive cross-over. • Negligible increase in volumes using NE 33rd Drive cross-over–not effective in combination with NE 11th Ave. cross-over (using 1993 volumes). • Effectiveness controlled by efficiency of NE 11th Ave. at-grade crossing.	• Significant improvements for pedestrians and bicyclists crossing at NE 33rd Drive. • Noise levels on NE Lombard would rise about 1.5 dBA east of NE 11th Ave. and 0.5 dBA west of NE 60th Ave.	• See Alternative 1 conclusions. • NE 33rd Drive cross-over in combination with NE 11th Ave cross-over is ineffective–spacing between cross-overs is too close. • Recommendation: Do not study further, except as stand-alone project (Alternative 4).
Alternative 2: NE Columbia Blvd Truck Access with NE 60th Cross-Over This alternative would emphasize travel along NE Columbia west of ODOT's proposed NE 60th Ave. cross-over and travel along NE Lombard to the east. West of NE 60th, NE Columbia would serve circulatory needs at a 5mph reduction in average speed. The following improvements would occur: • Construct a 5-lane, graded-separated NE 60th Ave. cross-over with signals. The cross-over would emphasize movements eastbound NE Columbia to NE Lombard movements and vice-versa. • Extend NE 92nd Ave. to serve PIC.	• NE Columbia Blvd.: Negligible change e/o NE 11th and w/o NE 60th, > 30% w/o NE 92nd. • NE Lombard Street: Negligible change e/oNE 11th, <10%, w/o NE 60th, >10% w/o NE 92nd. • NE Marine Drive: No significant changes. • Decreases traffic demand in NE Columbia/NE Lombard Corridor by 200 vph due to provision of only one continuous thoroughfare in lieu of two.	• No significant improvements for pedestrians or bicyclists. • Noise levels on NE Lombard would decrease by about 0.5 dBA west of NE 60th Ave.	• Improves freight access on NE Columbia to the east of NE 60th Ave. • Only slight changes on NE Columbia and NE Lombard west of NE 60th Ave. • No significant traffic volume change on NE Marine Drive. • Noise levels on NE Lombard would decrease by 0.5 dBa west of NE 60th. • Recommendation: Evaluate further using 20-year forecasts. Determine if alternative west end improvements more appropriate. • Things to watch out for: Would NE 60th cross-over intersections really work? Need to perform detailed traffic operatons analysis.
Alternative 2A: NE Columbia Blvd Truck Access NE 60th Cross-Over and NE Columbia/ I-5 Interchange This alternative would be the same as Alternative 2, with the addition of the improvements: • Construct a full-interchange serving all traffic movements at NE Columbia and I-5.	• No significant differences in comparison to Alternative 1, except on NE MLK and roadways to the west of NE MLK. • NE Columbia Blvd.: <10% w/o NE MLK and >20% w/o N Vancouver Way. • NE Lombard Street: No significant traffic volume changes west of NE MLK.	• Same impacts as Alternative 2.	• Same conclusions as under Alternative 2 for areas east of NE MLK. • Only slightly improves goods movement and efficiency west of NE MLK by providing relief to NE Marine Drive and Delta Park interchanges. • **Recommendation:** Do not study further as addition of interchange would only re-route minor volumes of traffic to the west of NE MLK with no benefits along the Corridor east of NE MLK.

Table 5 (continued)
Columbia Corridor Transportation Study and Alternatives Analysis
Comparison of Alternatives with Current Traffic Volumes

Decription of Alternative	Traffic Impacts	Alternative Mode & Noise Impacts	Conclusions
Alternative 3: NE Columbia Blvd Through Route with NE Columbia Widened between NE 60th and NE 92nd This alternative would emphasize NE Columbia as the through route for many trucking movements. Widening and access management on NE Columbia east of NE 60th Ave. would raise travel speeds by 5mph. The following improvements would occur: • Widen NE Columbia from 2-lanes to 5-lanes between NE 60th Ave. and NE 92nd Ave. • Extend NE 92nd Ave. to serve PIC.	• NE Columbia Blvd.: >10% e/o NE 11th, >20% w/o NE 60th, and >80% w/o NE 92nd. • NE Lombard Street: <10% e/o NE 11th, <10% w/o NE 60th, <30% w/o NE 92nd. • NE Marine Drive: <5%.	• Significant improvements for pedestrians and bicyclists along NE Columbia with sidewalks and bike lanes. • Noise levels on NE Lombard would decrease by about 0.5 dBA east of NE 11th Ave. and west of NE 60th Ave.	• Provides efficient movement along east end of NE Columbia at cost of substantial right-of-way take. • Moderately increases volumes on NE Columbia west of NE 60th Ave., possibly causing future congestion in future. • Volume decrease on NE Marine Drive due to attractiveness of continuous 5-lane NE Columbia. • Noise levels on NE Lombard decrease by 0.5 dBA. • Recommendation: Evaluate further using 20-year forecasts. • Things to watch out for: Congested conditions on NE Columbia west of NE 60th Ave. and a congested NE Columbia/NE 92nd Ave. intersection area limiting access to PIC.
Alternative 3A: NE Columbia Blvd Through Route with NE Columbia Widened between NE 60th and NE 92nd and NE Columbia/I-5 Interchange This alternative would be the same as Alternative 3, with the addition of the following improvements: • Construct a new full-interchange serving all traffic movements at NE Columbia and I-5.	• Negligible increase in volumes using NE 33rd Drive cross-over–not effective in combination with NE 11th Ave. cross-over (using 1993 volumes). • NE Columbia Blvd.: >10% e/o 11th, >20% w/o NE 60th, and >80% w/o NE 92nd. • NE Lombard Street: No significant traffic volume changes west of NE MLK.	• Same impacts as Alternative 3.	• Same conclusions as under Alternative 3 for areas east of NE MLK. • Only slightly improves goods movement and efficiency west of NE MLK by providing relief to NE Marine Drive and Delta Park interchanges. • Recommendation: Do not study further as addition of interchange would only re-route minor volumes of traffic to the west of NE MLK with no benefits along the Corridor east of NE MLK.
Alternative 4: NE Columbia Blvd Truck Access Route with NE 33rd Cross-Over This Alternative would emphasizse travel along NE Columbia west of a NE 33rd Drive cross-over and travel along NE Lombard to the east. West of NE 33rd, NE Columbia would serve circulatory needs at a 5mph reduction in average speed. The following improvements would occur: • Construct a grade-separated NE 33rd Drive cross-over which requires only traveling through one signal when crossing from NE Columbia to NE Lombard westbound and vice-versa. • Widen NE Columbia from 2-lanes to 3-lanes between NE 60th Ave. and NE 92nd Ave. • Extend NE 92nd Ave. to serve PIC.	• NE 33rd Drive: >80% • NE Columbia Blvd.: Negligible change e/o NE 11th, <30% e/o NE 33rd and w/o NE 92nd. • NE Lombard Street: Negligible change e/o NE 11th, >20% e/o NE 33rd, and >10% w/o NE 92nd • NE Marine Drive: No significant changes.	• Significant improvements for pedestrians and bicyclists crossing at NE 33rd Drive. • Noise levels on NE Lombard would rise about 0.5 dBA east of NE 33rd Drive	• Effectively shifts traffic from NE Columbia to NE Lombard east of NE 33rd Drive with no change to the west of NE 33rd. • Improves freight access on NE Columbia east of NE 33rd. • No significant traffic volume change along NE Marine Drive. • Noise levels on NE Lombard increase by 0.5 dBA • Recommendation: Evaluate further using 20-year forecasts. • Things towatch for: Noise levels along NE Lombard, future development along NE 33rd Drive Corridor, and neighborhood impacts south of NE 33rd.

Table 5 (continued)
Columbia Corridor Transportation Study and Alternatives Analysis
Comparison of Alternatives with Current Traffic Volumes

Decription of Alternative	Traffic Impacts	Alternative Mode & Noise Impacts	Conclusions
Alternative 5: Prohibit Trucks on NE Marine Drive Between NE 6th and NE 33rd This alternative would prohibit trucks on N Marine Drive between NE 6th Drive and NE 33rd Drive through the use of effective traffic control devices. Trucks would be diverted to use alternative routes such as NE MLK, NE 33rd Dr., NE Columbia, NE Lombard, and SR 14 (Washington)	• About 30% of the trucks that currently use this segment of NE Marine Drive would re-route via I-205 to SR 14 and vice-versa. • About 30% would re-route via NE Columbia, with some diversion to NE MLK and I-84. • About 40% of the trucks would divert via NE Lombard, with some diversion to NE MLK and I-84.	• Significant improvements for pedestrians and bicyclists along NE Marine Drive. • Existing noise level is about 71 dBA on this segment of NE Marine Drive. This would drop by 2 to 5 dBA.	• Re-routes trucks via NE Columbia, NE Lombard and SR 14 (Washington). Encourages trucks to/ from east to use I-84. • As shown in Origin-Destination Survey, about 75% of trucks using this segment have origins or destinations east fo I-205. • Noise levels decrease on NE Marine Drive by 2 to 5 dBA. • Recommendation: Evaluate further using 20-year forecasts. • Things to watch out for: Effective signing and traffic control devices would be required.
Transportation System Management (TSM) Improvements TSM improvements would be provided to further complement any of the above alternatives. These could include improvements to: • NE Marine Drive/I-5 interchange. • NE Columbia/NE MLK intersection (see Alternatives 1, 1A and 1B). • NE Killingsworth between NE 92nd Ave. and I-205. • I-205 northbound between I-84 and NE Columbia Blvd. (adding an auxiliary lane). • Various intersections through turn lane. additions, channelization, new signals, etc. • Traffic signal timing. • Specific alternative mode improvements. It is recommended that directional and route signing be updated throughout the Columbia Corridor.	• TSM improvements would alleviate congestion at specific locations, e.g. intersections. • Traffic impacts for the listed TSM measures were not evaluated using results from the City's transportation demand model. • The benefits of each of the TSM measures will be determined using 20-year forecasts and performing traffic operations analyses.	• Several low cost TSM measures could benefit alternative modes, e.g. signals for pedestrian crossings, installation of sidewalks and bike lanes, bus queue jump lanes, etc.	• See comments under "Traffic Impacts" and "Alternative Mode and Noise Impacts". • Recommendation: Evaluate further using 20-year forecasts and performing traffic operations analyses. • Things to watch out for: Shifting of bottleneck locations to other areas, performance of highway weaving area (I-205), benefit to cost ratio.

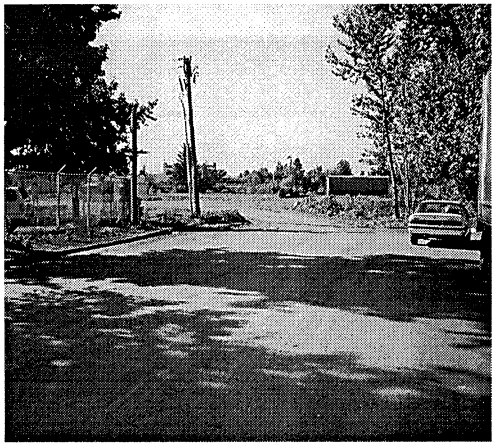
developments to the north (e.g. AirTrans Center and Portland International Center). A detailed traffic operations analysis was performed using 2015 PM peak hour traffic volumes, which assume an increase in through trips in the Columbia Corridor and development of intense land uses north of the proposed at-grade intersections (see Appendix). The analysis determined that given these improvements the NE 82nd Avenue/NE Columbia Boulevard intersection and the NE 82nd Avenue/NE Lombard Street intersection would operate at LOS D (with about 31 seconds of average delay). Improved operations would result by interconnecting and coordinating the traffic signals at these two intersections to allow progression of two major movements: 1) eastbound NE Columbia Boulevard to eastbound NE Lombard Street and 2) southbound NE 82nd Avenue to eastbound NE Lombard Street.

As a part of this study, a TRAF-NETSM computer simulation model was developed. The model showed that the proposed NE 82nd Avenue at-grade improvement would significantly enhance future traffic movements. The proposed improvement would eliminate the traffic signal at the NE Columbia Boulevard/NE Lombard Street (Killingsworth) three-legged intersection and funnel all eastbound traffic (headed to the I-205 interchange) along NE Lombard Street instead of along both NE Lombard Street and NE Columbia Boulevard. Therefore, queuing space west of the I-205 southbound ramps would be significantly increased and grid-locked conditions at the three-legged intersection would be eliminated. In addition, only one 'surge' of eastbound traffic would need to be accommodated through the interchange instead of two surges, thereby improving progression.

It was determined that provision of west end and east end cross-overs and improved intra-connectivity along both NE Columbia Boulevard and NE Lombard Street would provide some NE Marine Drive truck drivers a feasible alternative route and therefore lower truck volumes on NE Marine Drive by 5% to 10%.

Connectivity and System Improvements

The previous chapter discussed future 'base case' transportation conditions, that is, which roadway segments and intersections are predicted to operate at congested or overcapacity conditions during the 2015 evening peak hour. Using the Truck Routing Model and the



NE Marx Street looking west.

EMME/2 model, and assuming that by the year 2015 both the NE Martin Luther King Jr. Boulevard and NE 82nd Avenue cross-overs are operational, the system-wide roadway segments and intersections were tested for future performance.

It was determined that the cross-over improvements would primarily enhance commuter and truck movements along NE Columbia Boulevard and NE Lombard Street, with NE Columbia Boulevard serving as a local access route compared to NE Lombard Street serving as a longer intra-Corridor route. However, many of the Corridor's other connectivity problems previously discussed would still persist. For example, the available capacity on NE Airport Way would be exceeded, as well as the capacities at most of the I-5 and I-205 on-ramps and off-ramps. Most of NE Alderwood Road would experience substantial congestion. In addition, traffic along NE Cornfoot Road and NE 47th Avenue would be congested for several hours each day.

With an improved route for trucks on NE Columbia Boulevard and NE Lombard Street the City can take steps to improve NE Marine Drive for recreational trips that are oriented to river activities, residents and local commercial businesses. These improvements include signalization of NE Marine Drive at NE 122nd Avenue, bike paths along its length from I-5 to the City boundary, pedestrian crossings at activity points, and traffic management devices or design treatments which may include truck traps, traffic diverters at NE 33rd Drive and/or NE 185th Avenue, median islands, signing and striping improvements among others.

The next section provides a detailed discussion of recommended transportation connectivity and system projects aimed at meeting the objectives of this study.

Noise Assessment

Provision of cross-overs between NE Columbia Boulevard and NE Lombard Street would likely increase traffic volumes along segments of the currently under-used NE Lombard Street. Increased traffic levels, particularly an increase in the volume of trucks, could contribute to an increase in sound levels along the Corridor.

As a part of this study, existing sound levels were monitored at three locations along the south side of NE Lombard Street where any potential impacts to residences could occur. The locations were near NE 27th Avenue, 36th Avenue and 51st Avenue. Each monitored location was located 50-feet south of NE Lombard Street. Table 6 shows the existing noise levels at these locations.

As shown in Table 6, existing noise levels are from 72 to 77 dBA (decibels on the A-weighted scale). Traffic is the dominant noise source at each location. Other noise sources are normal neighborhood sounds such as dogs and birds, industrial sounds such as saws whining and truck loading, and other transportation sources such as aircraft and trains.

Table 6
Existing Sound Levels

NE 27th Avenue	72 dBA
NE 36th Avenue	77 dBA
NE 51st Avenue	75 dBA

The current sound levels already exceed the Federal Highway Administration's (FHWA) noise abatement criterion of 67 dBA for residential areas.

Table 7
Year 2015 Sound Levels

Site 2015	'Base Case' Sound Level	2015 'Cross-Over' Sound Level Difference
NE 27th Avenue	75 dBA	76 dBA+1 dBA
NE 36th Avenue	78 dBA	78 dBA no change
NE 51st Avenue	76 dBA	77 dBA+1 dBA

A screening-level noise assessment was made for year 2015 conditions. Sound level increases were predicted under the base case scenario and under a scenario with the two cross-overs (inducing increased traffic levels along NE Lombard Street). Figure 7 shows the future predicted sound levels.

In comparing Figures 6 and 7, "base case" sound levels increase by 1 to 3 dBA over the next 20 years. It should be noted that the human ear is typically insensitive to noise level increases under 3 dBA. The highest noise level increase is predicted near the NE 27th Avenue area.

With provision of the NE Columbia Boulevard/NE Lombard Street cross-overs, noise levels would increase only 1 dBA over year 2015 "base case" conditions. This low increase would occur primarily due to the minor increase in the number of automobiles and trucks traveling via NE Lombard Street.

The screening level noise assessment is included in the Appendix. Prior to implementation of any major transportation improvement, a detailed noise assessment would need to be conducted as part of the environmental assessment.

Chapter Four: RECOMMENDED TRANSPORTATION IMPROVEMENT PROGRAM

This section presents a recommended transportation improvement program and strategy for the Columbia Corridor study area.

I. Recommended Improvement Projects

The list on pages 56–58 describes the transportation improvement projects which were determined to best meet the goal and objectives of the Columbia Corridor Transportation Study. The projects are not depicted in a priority order. All five study objectives would be met under the recommended improvement program. Its aim is to efficiently direct excess traffic to existing under-utilized facilities before considering construction of new, extended, or widened roadways.

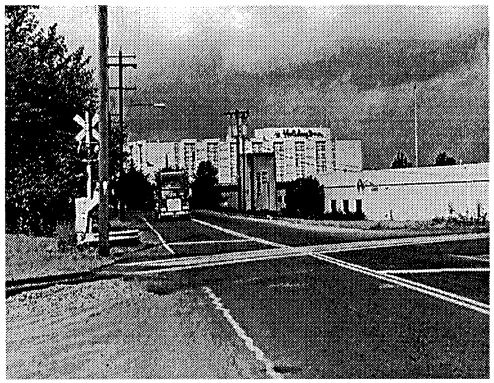
As shown on pages 56–58 and Figure 16, proposed projects are categorized within four areas: Corridor-wide expanded transit service, safety and traffic management projects, connectivity improvements, and system improvements.

Corridor-Wide Expanded Transit Service

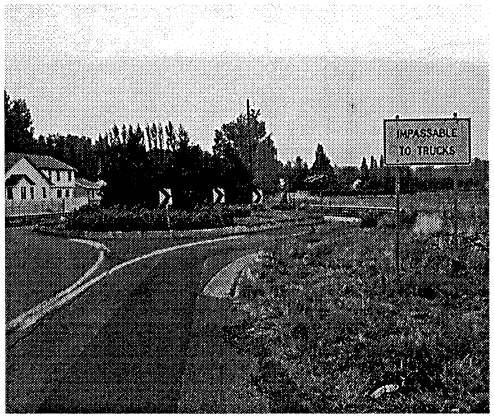
As dictated by the rapid pace of employment growth in the Columbia Corridor and the prediction of overcapacity roadways there is an immediate need for the expansion of transit service throughout the Corridor. A side benefit of transit service expansion is reserving roadway lane capacity to efficiently serve freight movements.

Transit service expansion would include, but not be limited to, light rail transit to the airport, fixed route bus service (including connections to southern neighborhoods), and paratransit services. In addition, transportation demand measures, such as flexible work hours, telecommuting, vanpooling and carpooling should be implemented throughout the Corridor. Transit service expansion is consistent with the City's "transit first" policy. The Columbia Corridor Association is developing a program to obtain these objectives.

NE Lombard Street at NE Martin Luther King Jr. Boulevard.



NE Columbia Boulevard at 92nd Avenue looking west.



NE 13th and Gertz Road.

Safety, Traffic Management and Operational Improvements

Safety measures include traffic signalization at NE 122nd Avenue and NE Marine Drive, pedestrian crossings at the NE 42nd Avenue boat ramp and NE Marine Drive, and bike path improvements along the length of NE Marine Drive. In addition, traffic calming measures such as truck traps or semi-diverters would be considered at NE 33rd Drive and/or NE 185th Avenue and NE Marine Drive, but cannot be installed until an improved east-west truck corridor is in place. Pedestrian refuges would be placed on NE Marine Drive at locations agreed upon by Metro and the City as part of the Green Spaces Program. As appropriate, speed limits should be adjusted on particular Corridor roadways and other traffic calming devices provided along NE Marine Drive west of NE 33rd Drive as necessary. Detailed studies and engineering solutions would be required for each project.

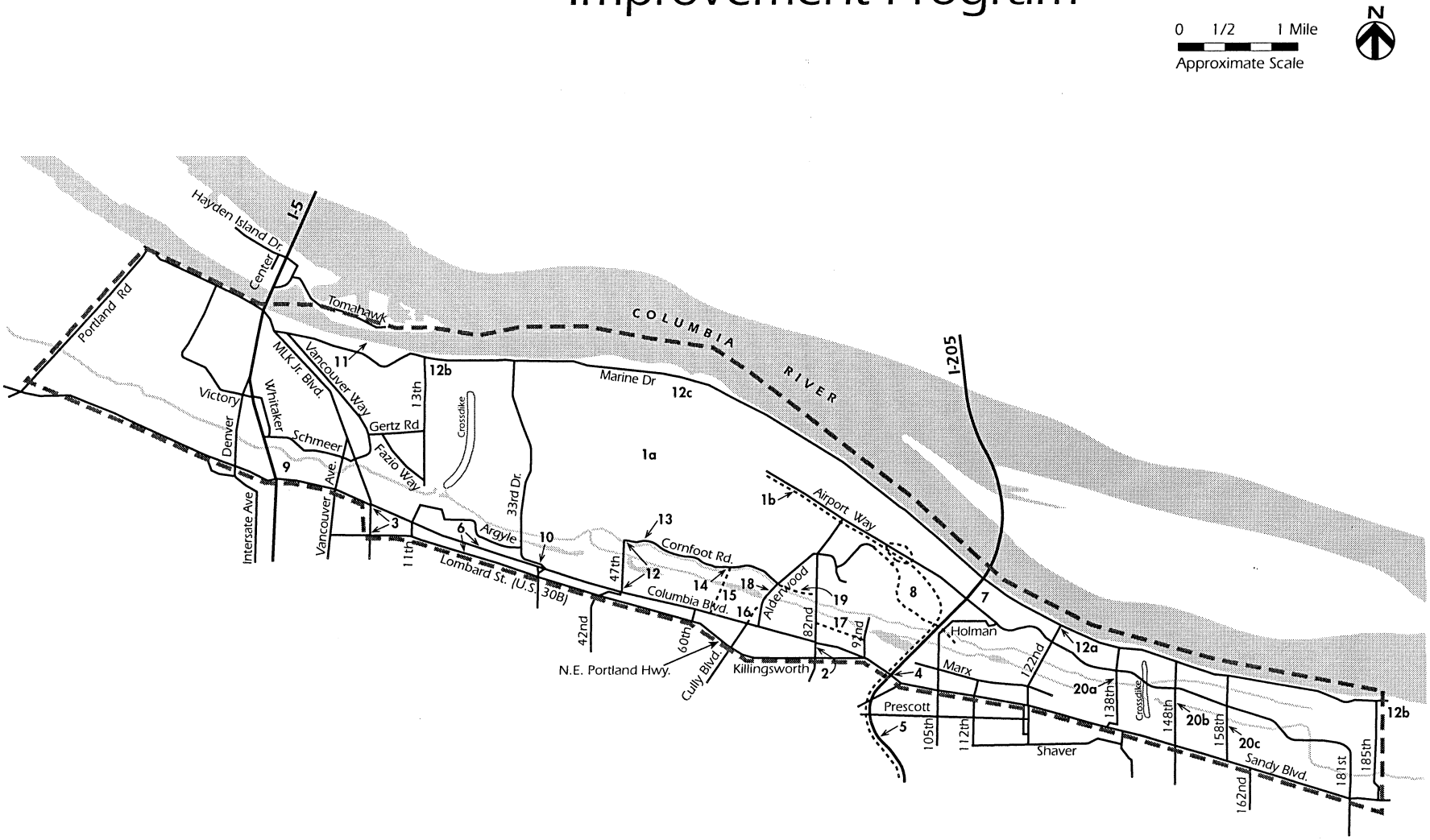
Traffic management measures include area-wide traffic signal improvements (e.g. interconnection and coordination of traffic signals) and access management strategies along the entire lengths of NE Columbia Boulevard and NE Lombard Street.

Re-Connecting the Transportation Network Improvements

Connectivity improvements are geared to improving local circulation within the Columbia Corridor and include projects such as installing left-turn lanes along NE Cornfoot Road; improving NE 47th Avenue's intersections to facilitate truck turning movements; providing a new north-south roadway connection between NE Cornfoot Road and NE Columbia Boulevard; improving non-standard intersections in the Bridgeton area, extending NE Marx Drive westerly to connect to NE 82nd Avenue; providing local access improvements associated with the PIC expansion; and several other local circulation improvement projects. Connectivity improvements are generally larger in scale and more expensive than safety and traffic management projects, as many require the acquisition of land for right-of-way.

Figure 16

The Columbia Corridor Transportation Study Improvement Program



Columbia Corridor Transportation Study Improvement Program

REGIONAL AND MAJOR CITY TRAFFIC STREET IMPROVEMENTS (not in priority order)

1. **Corridor-Wide Expanded Transit Service**

   1a. Work with Tri-Met to provide comprehensive transit service throughout the Columbia Corridor. This would include fixed route bus route improvements and paratransit. Increased capacity for all vehicles will be provided primarily through transit service improvements and transportation demand management techniques such as flexible work hours, telecommuting, carpooling and vanpooling.

   1b. Light Rail from Gateway to Portland International Center and Portland International Airport.

2. **NE 82nd Avenue Intersections with NE Columbia Blvd. & NE Lombard St.– Reconstruction**
   Remove the existing NE Columbia Blvd. and NE Lombard St. bridges over NE 82nd Ave. and lower both NE Columbia Blvd. and NE Lombard St. to intersect with NE 82nd Ave. at grade.
   Remove existing loop ramps and provide high capacity intersections for truck movements.
   Maintain existing railroad overpass.

3. **NE Martin Luther King Jr. Blvd. (MLK) between NE Lombard St. & NE Columbia Blvd.– Reconstruction**
   At NE MLK Jr. Blvd./NE Columbia Blvd. add second left turn lane at the north approach and sweeping right turns at the east and west approaches. At NE MLK Jr. Blvd./NE Lombard St.add second left turn lanes at the north and south approaches and a sweeping right turn at the east approach. Widen NE MLK Jr. Blvd. between NE Columbia Blvd. and NE Lombard St. as needed. Widen NE Lombard St. from four to five lanes to allow for installation of a center two-way left turn lane between NE MLK Jr. Blvd. and NE 11th Ave.

4. **NE Columbia Blvd./I-205 Interchange– Improvements (by ODOT)**
   Provide capacity improvements to ramp intersections, i.e., add second right turn lanes at the north and west approaches to the southbound ramp intersection and increase capacity of the northbound on-ramp.

5. **I-205 Auxiliary Lane (by ODOT)**
   Install a northbound auxiliary lane along I-205 from the westbound I-84 on-ramp to the NE Columbia Blvd. off-ramp.

6. **NE Columbia Blvd. and NE Lombard St.– Signal System Improvements**
   Interconnect and coordinate the traffic signals along NE Columbia Blvd. and NE Lombard St. for efficiency of freight movement.

7. **NE Airport Way/I-205 Interchange– Improvements (by ODOT)**
   Add ramp capacity by providing two lane on-ramps and two lane off-ramps at the interchange.

8. **Port of Portland International Center (PIC)– Improvements (by the Port of Portland)**
   Widen NE Airport Way adjacent to PIC to six lanes; construct a full interchange at NE Lombard Street/NE Airport Way; provide partial interchange at NE 82nd Ave./NE Airport Way and realign frontage roads.

9. **I-5 Freight Mobility– Improvement (by ODOT)**
   Determination if a full interchange at I-5 and NE Columbia Blvd. (addition of a northbound on-ramp) or improvement to the location of existing ramps is feasible given the constraints of the interchange area.

10. **NE 33rd Dr./NE Columbia Blvd. Interchange– Reconstruction (by Port of Portland)**
    Reconfigure interchange to better accommodate truck turning movements.

NEIGHBORHOOD COLLECTOR AND LOCAL STREET IMPROVEMENTS (not in priority order)

11. **Bridgeton Neighborhood– Improvements**
    Realignment of the NE Bridgeton/NE Marine Dr., NE Gantenbein/NE Marine Dr. and NE Faloma/NE Marine Dr. intersections to provide better sight distance and reduce cut through traffic.

12. **NE Marine Dr. Phased– Improvements**
    12a. Install a full signal at NE 122nd Ave./NE Marine Dr. and petition Oregon State Speed Control Board to reduce speeds on NE Marine Dr. (reduction dependent on existing posted speed and driver speeds). Monitor NE Marine Dr. to determine its performance (by City) after installation of signal. Determine, with neighborhoods, if 12B is necessary.
    12b. Semi-diverters, truck traps or other devices to slow or divert traffic are required to reduce speed and volume of traffic.
    12c. Install bicycle lanes and pedestrian crossing improvements on NE Marine Dr. as part of other City projects and as capital improvement strategy to enhance recreational opportunities at and along the Columbia River.

13. **NE 47th Avenue Intersection– Improvements**
    Widen and channelize NE 47th Avenue's intersections with NE Cornfoot and NE Columbia Blvd. to facilitate truck turning movements.

14. **NE Cornfoot Road Intersection– Improvements**
    Add left turn lanes at major intersections along NE Cornfoot Road.

15. NE Columbia Blvd./NE Cornfoot Road Connection
Construct a two-lane north-south slough crossing connecting NE Columbia Blvd. and NE Cornfoot Road between NE 57th and 62nd Avenues.

16. NE Alderwood Road/Cully Blvd.– Realignment
Realign NE Alderwood Road or NE Cully Road or both, to "line up" at NE Columbia Blvd.

17. NE Marx Drive Extension
Extend NE Marx Drive west to connect with NE Holman St. and provide a signalized intersection at NE 82nd Avenue.

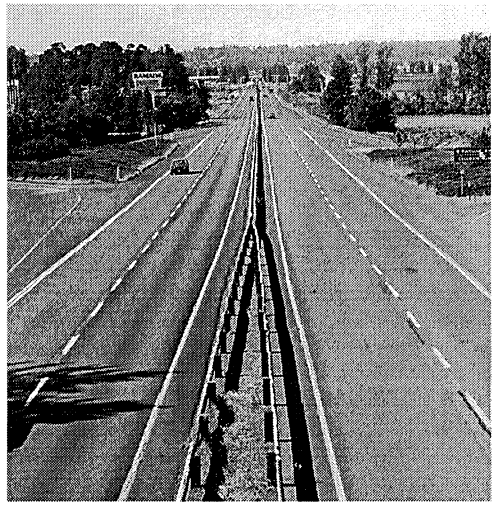
18. NE Alderwood Road– Widening
Widen NE Alderwood Road from two to four lanes between NE 82nd Avenue and NE Cornfoot Road. This improvement may not be necessary if improvements numbers 14 and 18 are implemented.

19. NE Cornfoot Road Extension to NE 82nd Avenue
Extend NE Cornfoot Road east to a signalized intersection with NE 82nd Avenue if proven to be environmentally feasible.

20 a,b,c. NE 138th, NE 148th and NE 158th Avenues Improvements
Improve all three streets from NE Sandy Boulevard to NE Marine Drive to City standard which will/may include a three lane cross section, sidewalks, bike lanes and new bridges where required.

System Improvements

System improvements are aimed at improving regional access to and through the Corridor. Recommended system improvements include the NE Columbia Boulevard/NE Lombard Street cross-overs at MLK Jr. Boulevard and at NE 82nd Avenue; improvements at I-205's interchanges with NE Airport Way and NE Columbia Boulevard; addition of a northbound auxiliary lane on I-205; further study of possible I-5 interchange improvements (between Hayden Island and NE Columbia Boulevard); and slough bridge and/or three lane street improvements to NE 138th, 148th and NE 158th Avenues. The system improvement category are the largest and most expensive projects recommended.



NE 82nd Avenue at NE Columbia Boulevard looking north.

Implementation Strategy

The proposed transportation improvement projects should be implemented in a flexible manner, depending on extent of need (based on safety, Corridor growth patterns and traffic congestion), logical phasing of projects, agency responsibility, and funding availability, at the local, state and federal level. Figure 17 shows one way in which project categories could move forward.

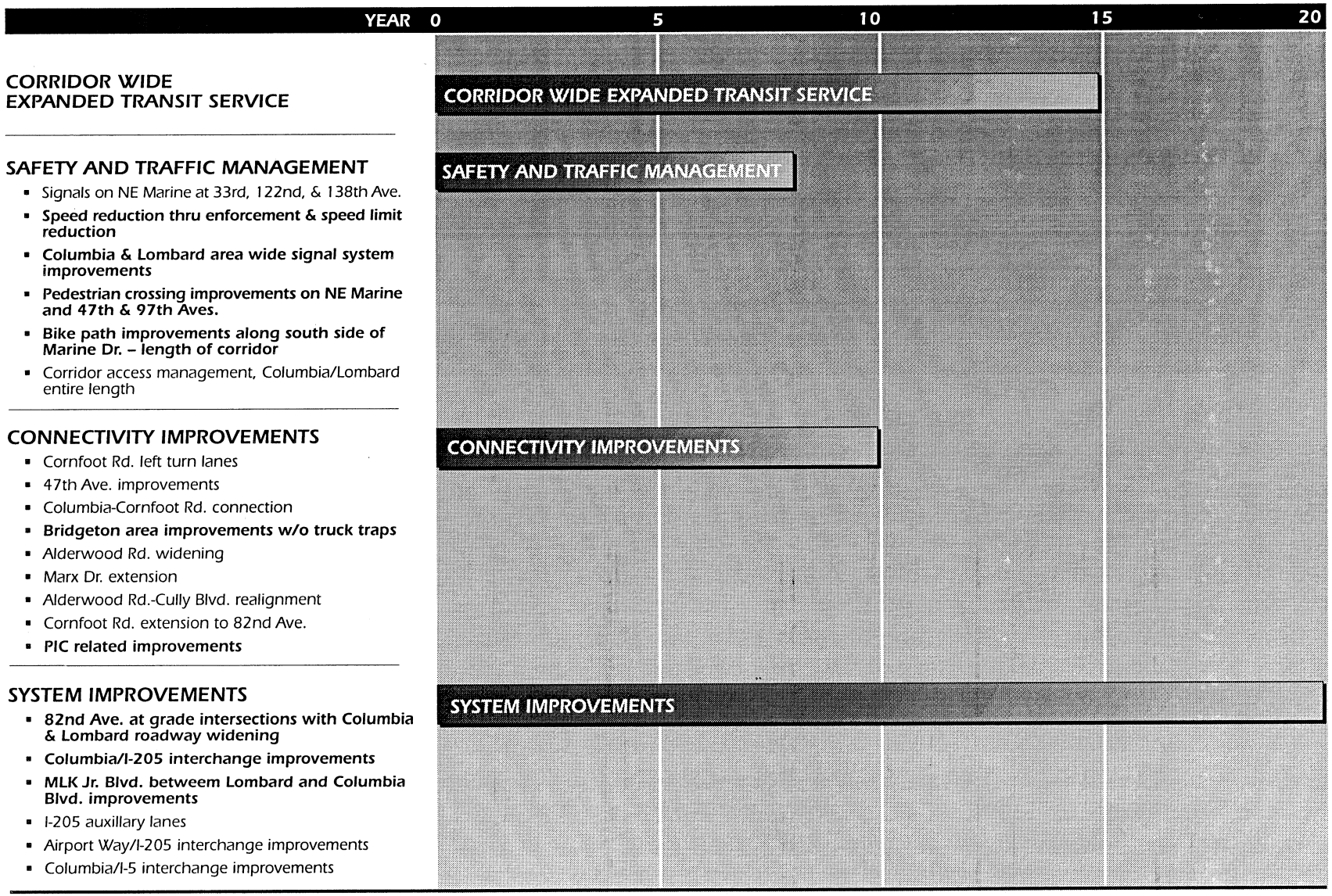
As shown in Figure 17, **implementation of all four project categories should begin upon adoption of this study**. Due to the extent of transit service potentially needed to serve the Columbia Corridor and the likely timeline for light rail transit expansion, Corridor-wide transit service should be implemented incrementally over the next 15 years. Safety and traffic management projects should be constructed within the next five to seven years, with NE Marine Drive improvements implemented in the next three to five years.

NE 92nd Avenue and NE Columbia Boulevard.

Most of the connectivity improvements will require environmental studies, detailed designs, and moderate budgets. These improvements would likely require seven to ten years to implement.

Finally, system improvements will require substantial costs, planning and design, and would probably be implemented within the next 10 to 20 years. Since the intiation of this study, the City has a new financing mechanism available for transportation projects. Many of the projects listed in this study may or are programmed to be financed in part by "system development charges" levied on development.

Figure 17
Project Implementation Schedule



CORRIDOR WIDE EXPANDED TRANSIT SERVICE

SAFETY AND TRAFFIC MANAGEMENT

- Signals on NE Marine at 33rd, 122nd, & 138th Ave.
- **Speed reduction thru enforcement & speed limit reduction**
- **Columbia & Lombard area wide signal system improvements**
- **Pedestrian crossing improvements on NE Marine and 47th & 97th Aves.**
- **Bike path improvements along south side of Marine Dr. – length of corridor**
- Corridor access management, Columbia/Lombard entire length

CONNECTIVITY IMPROVEMENTS

- Cornfoot Rd. left turn lanes
- 47th Ave. improvements
- Columbia-Cornfoot Rd. connection
- **Bridgeton area improvements w/o truck traps**
- Alderwood Rd. widening
- Marx Dr. extension
- Alderwood Rd.-Cully Blvd. realignment
- Cornfoot Rd. extension to 82nd Ave.
- **PIC related improvements**

SYSTEM IMPROVEMENTS

- **82nd Ave. at grade intersections with Columbia & Lombard roadway widening**
- **Columbia/I-205 interchange improvements**
- **MLK Jr. Blvd. betweem Lombard and Columbia Blvd. improvements**
- I-205 auxillary lanes
- Airport Way/I-205 interchange improvements
- Columbia/I-5 interchange improvements

Note: Year 0 = the adoption of the Columbia Corridor Transportation Study by the city council. Subsequent years indicate approximate time anticipated for project(s) implementation. Bold indicates top priority project within the improvement type.

Chapter Five:
PUBLIC INVOLVEMENT PROCESS

The Columbia Corridor Transportation Study public process was initiated with the invitation and selection of neighborhood leaders, freight haulers, public agency, technical staff and other business representatives assembled into a joint Technical and Citizen's Advisory Committee. The intent of having a joint group rather than separate committees for technicians and community leaders was to allow each to speak to the other about the issues each see as critical to the health of the transportation system in this Corridor. Representatives from the following groups participated in the Advisory Committee:

Neighborhood/Community Groups:

Bridgeton Neighborhood Association
East Columbia Neighborhood Association
Parkrose Community Group
Wilkes Community Group
Troutdale Community Group
Cully Neighborhood Association
HiNoon
East Portland District Coalition
East Marine Drive Safety Task Force
NE Coalition of Neighborhoods

City of Portland Bureaus/Advisory Committees:

Bicycle Advisory Committee
Police - East Precinct
Pedestrian Program
Planning
Transportation Engineering and Development
Water

Environmental Services
Traffic Management
Parks

Other Agencies:

Port of Portland
Metro
Multnomah Drainage District
ODOT
Regional Transportation Commission (Vancouver)
Multnomah County Environmental Services
Multnomah County Bicycle Program
City of Troutdale
City of Fairview
Tri-Met
Columbia River Correctional Institute

Community Leaders:

OTAK
The Halton Co.
Independent Dispatch
Jubitz
Oregon Trucking Association
Gresham Transfer Inc.
Columbia Corridor Association

Process:

At the outset of the Plan process, as mentioned, a joint Citizens and Technical Advisory Committee (CAC/TAC) was formed by the City with the guidance of neighborhood, industry and special transportation interest groups.

Early in the study, presentations to neighborhoods within and adjacent to the study area were made to familiarize each group with the goals and objectives of the study, their concerns to be addressed in the analyses and schedule of events.

The CAC/TAC was responsible for formulating and endorsing the Plan goals and objectives and evaluation criteria to be used to make choices between alternatives to be developed and recommended. The larger CAC/TAC was broken into smaller subcommittees so that members with particular interests could meet among others to determine specific issues that require particular attention by the staff and/or consultant team. Sub-committees included transit, freight, and alternate modes. As the transportation alternatives were developed, the issues from these subcommittees were folded in. As an example, the issue of moving trucks off of NE Marine Dr. to another improved route was analyzed as part of the modeling process and compared with other alternatives to provide a basis of comparison.

Meetings of the CAC/TAC were held monthly during the determination of issues and alternatives phase of the study. As the study moved into the analysis phase and most of the work fell to city staff and the consultants, the CAC/TAC met quarterly. Technical Advisory Committee members were assigned to provide such information as cost estimates, additional civil engineering or modeling analysis and report back to the joint group.

As elements of the transportation alternatives analyses were completed, the results were reported to the CAC/TAC over several meetings. The progression of the narrowing of alternatives led to a draft map and list of transportation improvements in the Corridor that satisfy the study's goals, objectives, evaluation criteria and set a program for capital financing.

The draft recommendations have been presented to the Columbia Corridor Association, the adjacent neighborhoods and technical groups. The draft recommendations were accompanied by the Plan document and have been reviewed and endorsed by the CAC/TAC as well.

Chapter Six: COMPREHENSIVE PLAN POLICY ANALYSIS

The preferred alternative of the Columbia Corridor Transportation Study was reviewed for compliance with adopted State, Regional and City policies as detailed in the following documents:

- Comprehensive Plan Goals and Policies, 1980
  Transportation Element of the Comprehensive Plan, 1996
  Arterial Streets Classifications and Policies (ASCP), 1996
- Interim Federal Regional Transportation Plan (RTP), 1995
- Albina Community Plan, 1993
- Transportation Planning Rule (ORS 660-12-000), 1991

I. Arterial Streets Classifications and Policies

Contained within Goal 6 Transportation of the Comprehensive Plan are the Arterial Streets Classifications and Policies, a document that classifies the optimal function of individual City streets in relation to each mode of travel. The classification also generally dictates the appropriate type of improvements needed to accommodate the modes. Policy 11.10 of the Comprehensive Plan directs that all improvements within the public right-of-way shall be consistent with the classifications found within the Arterial Streets Classifications and Policies.

NE Columbia Boulevard is classified as a Major City Traffic Street between I-5 and NE 60th Avenue. East of NE 60th Avenue, the Major City Traffic Street designation moves to NE Lombard Street and continues on to the east along NE Sandy Boulevard. NE Martin Luther King Jr. Boulevard is also classified as a Major City Traffic Street. NE Lombard Street from I-5 to NE 60th Avenue is classified as a Neighborhood Collector. The

Neighborhood Collector designation switches to NE Columbia Boulevard east of NE 60th Avenue. The entire length of NE Marine Drive through the study area is classified as a Neighborhood Collector.

NE Lombard Street is designated a Major City Transit Street, while NE Columbia Boulevard is designated a Minor Transit Street. NE Lombard Street and NE Marine Drive are designated Bicycle Routes. NE Columbia Boulevard and NE Lombard Street are both designated as City Walkways for pedestrians. NE Marine Drive is classified as an Off-Street Path for pedestrians, except through the Bridgeton neighborhood, where it is designated a City Walkway.

The entire study area from NE Columbia Boulevard north to the Columbia River is classified as a Truck District. NE Lombard Street east of 60th is classified as a Major Truck Street.

The other arterials have the following modal classifications:

NE Martin Luther King Jr. Blvd.	Major City Traffic Street, Major City Transit Street, City Bikeway, City Walkway
N Vancouver Way	Neighborhood Collector, Major City Transit Street, City Walkway
NE 33rd Dr.	Neighborhood Collector, Minor Transit Street, City Bikeway, City Walkway
NE Cornfoot Rd.	Neighborhood Collector, Minor Transit Street, Bikeway
NE Alderwood Rd.	Neighborhood Collector, Minor Transit Street, Bikeway
NE 47th Ave. (to NE Cornfoot Rd.)	Neighborhood Collector, Minor Transit Street, City Bikeway, City Walkway.
NE Airport Way	Major City Traffic Street, Regional Transitway, City Bikeway
NE 82nd Ave.	Major City Traffic Street, Major City Transit Street, City Bikeway

The recommended improvements from the study do not conflict with the intended functional operation of these streets, with the exception of NE Lombard Street west of NE 60th Avenue. NE Lombard Street west of NE 60th Avenue is not identified as part of the NE District's truck route network by policy. This study is proposing that NE Lombard Street between NE Martin Luther King Jr. Boulevard and NE 60th Avenue be redesignated as a Major City Traffic Street. While currently there is a significant amount of truck traffic which uses NE Lombard Street, existing transportation policy dictates that future improvements should not encourage or specifically accommodate use by truck traffic. The recommended 'cross over' improvements are designed to shift both auto and truck traffic congestion from NE Columbia Boulevard to the currently under-utilized NE Lombard Street (at NE Martin Luther King Jr. Boulevard). This trade-off is considered necessary in order to achieve other study policy objectives, such as the development of a multimodal transportation network which uses existing arterial capacity so long as it is not to the detriment of neighborhood livability. The impacts associated with increasing truck traffic on NE Lombard Street have been addressed. The efficiency and feasibility of achieving the study objectives is enhanced by minimizing the need for widening along NE Columbia Boulevard or the creation of new roadways.

The only identified impact of changing the policy directive is the increase in traffic volume which translates into minimal increases in noise exposure to the westerly segment of residents on NE Lombard Street. Noise analysis shows that over the 20 year timeframe NE Lombard Street is projected to have a 1–3 db increase in the 24 hour noise exposure, which is not a generally perceptible increase over existing noise levels.

Goal 6: Transportation

The project generally supports the objectives of Goal 6 through proposing a cost effective improvement program which improves the efficiency of an existing street network for all modes. The improvements are designed to provide enhanced accessibility and efficiency to an important employment center within the City that is expected to experience significant growth in the future. The improvements are also designed to improve the transportation system's safety and efficiency while at the same time specifically addressing impacts to neighborhood livability.

Policy 6.1 Intergovernmental Coordination

The project development process used supports the intent of this policy through close coordination with Metro and the Regional Transportation Plan, as well other regional agencies, such as Tri-Met, the Port of Portland, and property owners in the study area. Each of the groups served on the combined Technical and Citizen Advisory Committees and has reviewed and supported the staff recommendation. The proposed improvements have been coordinated with Metro's regional transportation funding program.

Policy 6.2 Regional and City Travel Patterns and Policy 6.5 Neighborhood Collector and Local Service Street Traffic Management

The improvements proposed by the study are designed to increase the efficiency of the existing roadway network in a manner supportive of both the above policies. The intent of Policy 6.2 is to insure that streets not designated for regional travel are not used as alternative routes for regional traffic. Similarly, the intent of Policy 6.5 is to manage traffic such that Local Service Streets do not carry traffic that should be using a Neighborhood Collector or higher designated street. Of specific concern and directive to the study was the issue of regional truck traffic using NE Marine Drive as a bypass route between I-84 and I-5. Origin and destination data collected by the study did not confirm significant use of NE Marine Drive for such purposes. The proposed improvements which act to balance traffic flow between NE Columbia Boulevard and NE Lombard Street improve the ability of both facilities to accommodate traffic generated within the Corridor and needing access to the freeway system, without causing diversion onto alternative routes.

Policy 6.6 Urban Form

Policy 6.6 Urban Form calls for a inter-connected multi-modal transportation system. A key objective of the study has been to improve the connectivity between NE Columbia Boulevard and NE Lombard Street. The recommended improvements are designed specifically to improve the inter-connectivity of these streets for all modes. Elements of the recommended improvement program which specifically improve connectivity within the Corridor's roadway network include: signal coordination on NE Columbia Boulevard and NE Lombard Street; intersection redesign at NE 82nd Avenue and NE Columbia Boulevard and NE Lombard Street; intersection redesign at NE Martin Luther King Jr.

Boulevard and Columbia Boulevard; improvements to the NE ColumbiaBoulevard/I-205 and I-5 interchanges; I-205 auxiliary lanes; improved connections between NE Airport Way and I-205; and access improvements to the Portland International Center development.

Policy 6.7 Public Transit

A top priority of the improvement program is to expand transit service Corridor wide, consistent with Policy 6.7 Public Transit. Improving transit service in the Corridor will come through not only expanded bus routing on NE Columbia Boulevard and extension of north-south bus routes to MAX stations, but through employer based programs which encourage transit travel, including van pools, carpools and subsidized transit fares. Improving system connectivity between NE Columbia Boulevard and NE Lombard Street will reduce congestion and as a result improve transit travel times on NE Columbia Boulevard, a designated Major City Transit Street, when service is expanded.

Policy 6.10 Barrier-Free Design

The improvement program is consistent with the above policy because all improvements will be constructed in conformance with the Americans with Disabilities Act.

Policy 6.11 Pedestrian Network

The project supports the above policy through providing pedestrian facilities as part of all proposed construction in the right-of-way, in the form of sidewalks. Pedestrian crossing areas will be enhanced at all intersection improvement areas, as well as at specific activity areas along NE Marine Drive. Measures to discourage truck traffic on NE Marine Drive will enhance pedestrian safety and comfort.

Policy 6.12 Bicycle Transportation

Access management measures on both NE Columbia Boulevard and NE Lombard Street will improve bicycle safety through reducing the number of bicycle and auto conflict points. Provision of a continuous pathway along most of the length of one side of NE Marine Drive will provide improved connections between the regional bike paths at I-5 and I-205.

Policy 6.21 Freight Intermodal Facilities and Freight Activity Areas

The study and improvement recommendations strongly support the above policy through addressing issues specifically related to freight movement in the Columbia Corridor. Because land use in the Corridor is heavily oriented toward freight movement, Corridor wide improvements which improve the street network's efficiency minimizes the impact of congestion on the goods movement travel times and employee access. These improvements preserve and enhance considerable existing public and private investment in the Corridor's freight network. These improvements have also been designed specifically to address the impacts of freight movement on residential areas both inside and adjacent to the Corridor so that growth in freight related businesses can continue without conflict with these neighborhoods. All project development has been coordinated with the Port of Portland and major freight related businesses in the Corridor.

Policy 6.25 Access Management

The proposed improvement program supports the above policy because it includes an access management strategy for NE Columbia Boulevard and NE Lombard Street Street, a State highway. The plan guidelines have been reviewed by the State and are consistent with State adopted access management policy for NE Lombard Street Street. The plan will promote traffic safety, improve efficiency, and improve pedestrian and bicycle safety and mobility.

Policy 6.27 Public Involvement

A joint Citizens and Technical Advisory Committee developed the goals and objectives , evaluation criteria and recommendations along with staff. The CAC/TAC was composed of citizen stakeholders in the community, as well as regional technicians. Open houses were held to provide and solicit information about the project to the public.

NE District Policy 7: Columbia Corridor Transportation Study

This is the policy which directed the Office of Transportation to prepare the Columbia Corridor Transportation Plan. The study process and recommendations are consistent with the conditions stipulated by the above policy. The study did not consider

reclassification of NE 33rd Drive. Potential land use changes were considered. The process utilized a Citizen's Advisory Committee representing a comprehensive cross-section of area stakeholders which met regularly during the study. The needs of all modes of travel were addressed by the study and its recommendations.

The following Transportation Element policies were reviewed in relation to the recommended improvement program and found to be not relevant: 6.3 No New Regional Trafficways, 6.4 Coordinate Land Use and Transportation Planning, 6.8 Regional Rail Corridors, 6.9 Transit Oriented Development, 6.13 Transportation Demand Management, 6.14 Parking Management, On-Street Parking Management, Off-Street Parking, 6.17 Institutional Parking, 6.18 Clean Air and Energy Efficiency, 6.19 Multimodal, 6.20 Northwest Corridor Passenger Rail Service, 6.22 Right-of-Way Opportunities, 6.23 South Portland River Crossing, 6.24 Market Based Congestion Management, 6.26 Adequacy of Transportation Facilities, 6.28 Transportation Education, and 6.29 Street Vacations.

III. Interim Federal Regional Transportation Plan

NE Columbia Boulevard is classified in the Regional Transportation Plan (RTP) as a Regional Through Route and Road Connector for freight movement. Regional Through Routes are intended to serve as the primary backbone of the regional road system, allowing efficient movement of auto traffic with destinations throughout the region. NE Columbia Boulevard serves this purpose as a major link between I-205 and I-5. Columbia Boulevard's freight classification acknowledges its importance as a major link between the freeway system and the Columbia Corridor.

The recommended improvements of the Columbia Corridor Plan are consistent with the above two classifications because the improvements are designed to enhance the capacity of NE Columbia Boulevard to carry internally generated auto and truck trips that need connections to the freeway system. The 'cross over' projects at each end of the study area, in addition to interchange upgrades at I-205 and internal roadway connectivity improvements, allow NE Columbia Boulevard to continue to operate at acceptable levels

of service with anticipated future growth in both the Corridor and region. The improvements maintain efficient, cost effective freight movement in a growing industrial area of regional importance, supportive of Goals 1 and 3 of the Regional Freight System. Plan improvements also address existing safety issues related to freight movement in the study area consistent with Goal 2 of the RTP freight system.

IV. Albina Community Plan

Policy II: Transportation of the Albina Community Plan directs project development to improve freeway access in support of industrial and employment centers, while at the same time protecting residential neighborhoods from truck traffic these centers generate. The recommended improvements in general are supportive of this policy through providing transportation system enhancements that support the continued growth of the Columbia Corridor's freight related industry and as an accessible employment center to the Albina community's residential areas. Impacts to adjacent neighborhoods, in particular those adjacent to NE Lombard Street, have also been studied. Noise levels were found to increase slightly, though not louder than existing background noise. Transit system improvements which are a first priority within the implementation strategy support policy objectives aimed at reducing reliance on single occupant vehicle travel.

V. Transportation Planning Rule

The purpose of the Transportation Planning Rule is to ensure implementation of Goal 12 Transportation, which is aimed at reducing reliance on automobile travel. Section 660-12-050 Transportation Project Development allows for project development proceed without findings of compliance with the Transportation Planning Rule if the project does not involve land use decision making or amendments to the Comprehensive Plan. Project development for the plan has shown compliance with Comprehensive Plan policies and street classifications without the need for Comprehensive Plan amendments, improvements outside of existing right-of-way, or land use decision making.