Post-it® Fax Note 7671	Date 7/15	# of pages ▶ 15
To BRUCE FUKUJI	From TOM KLOSTER	
Co./Dept.	Co.	
Phone #	Phone #	
Fax # (510) 548-6848	Fax #	

METRO

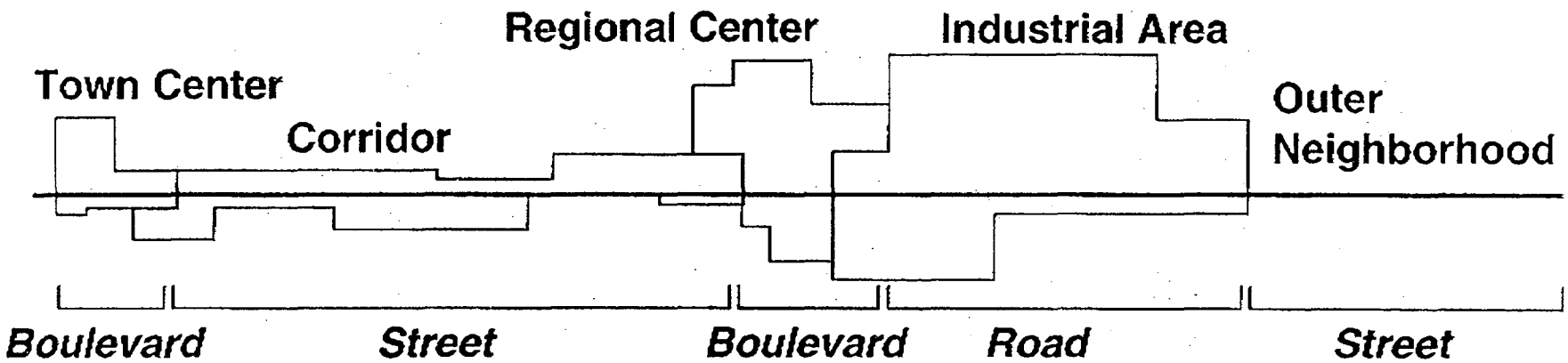
Regional Street Design Project

Design Concepts

COPY FOR CLERK

METRO

Creating the Street Design Map



- 2040 growth concept & urban form
- 2040 / Transp classification system

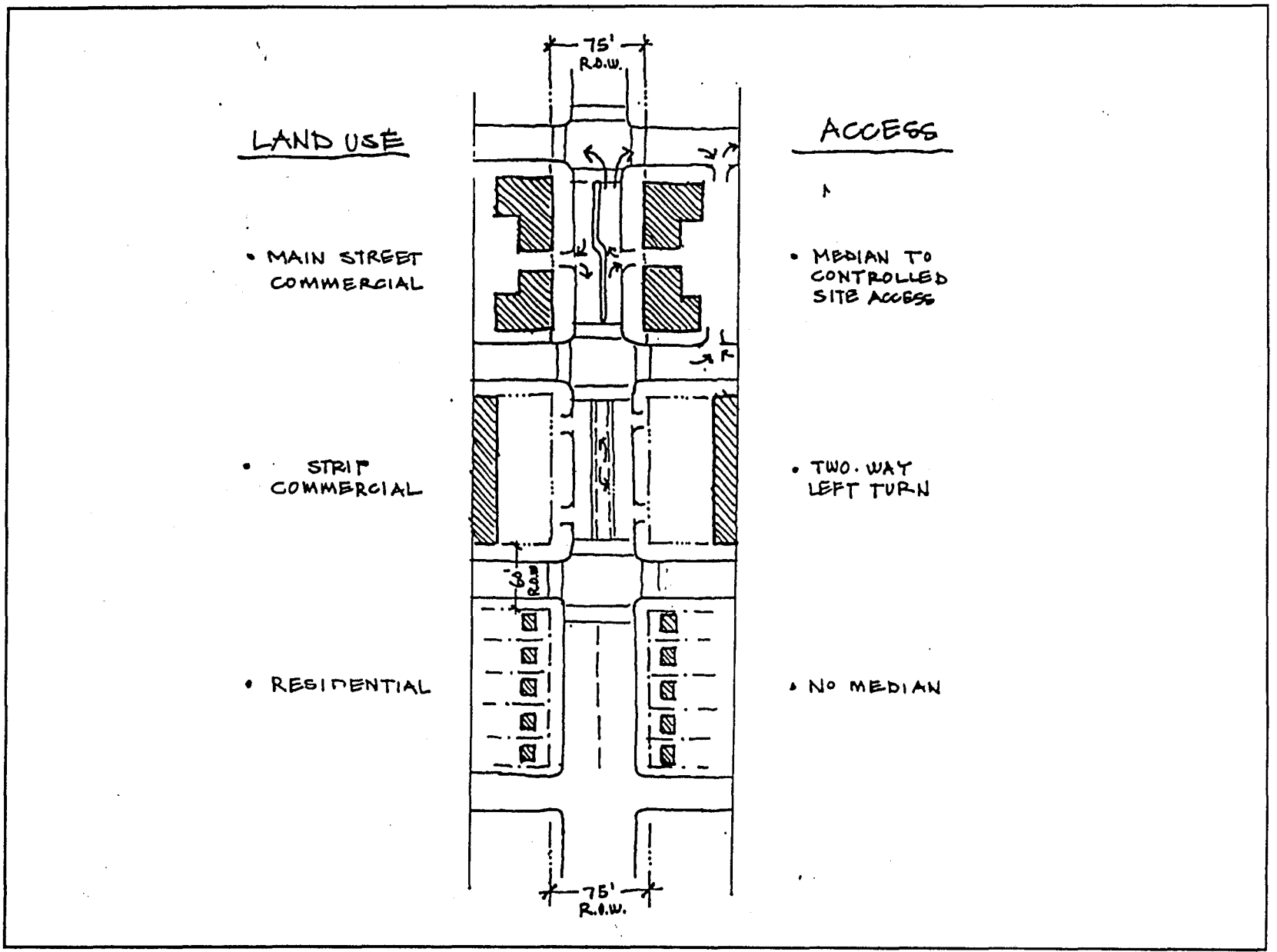


Figure 5. Regional Streets can have different median conditions, depending on the intensity of adjacent land use, cross-street and access needs, and available right of way.

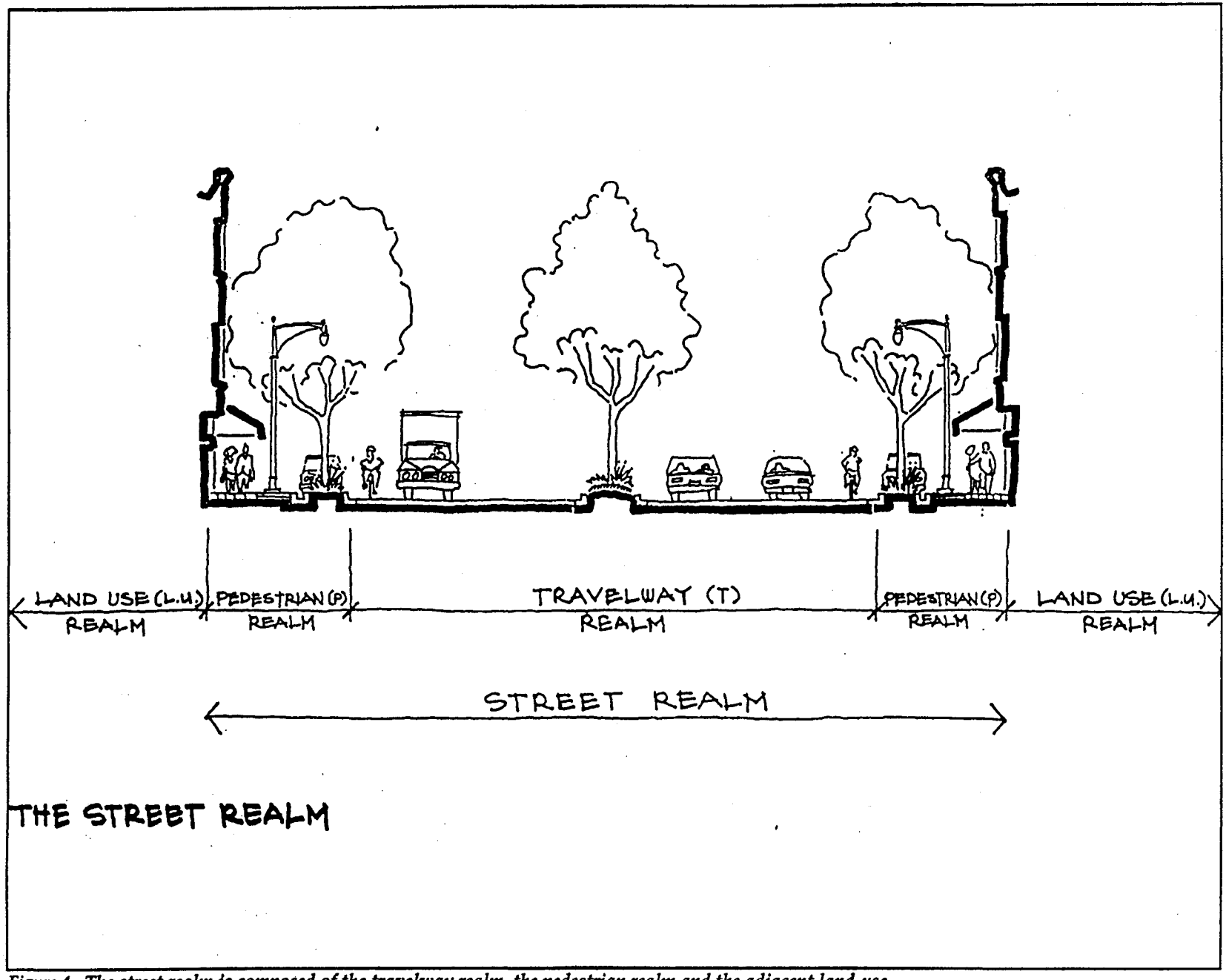
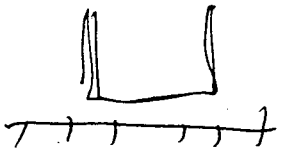


Figure 4. The street realm is composed of the travelway realm, the pedestrian realm and the adjacent land-use.

Contents:
- Intro
- principles
- Design guidelines - ELEMENTS COMPOSE R&G ST PUBLIC CONST R.O.W.



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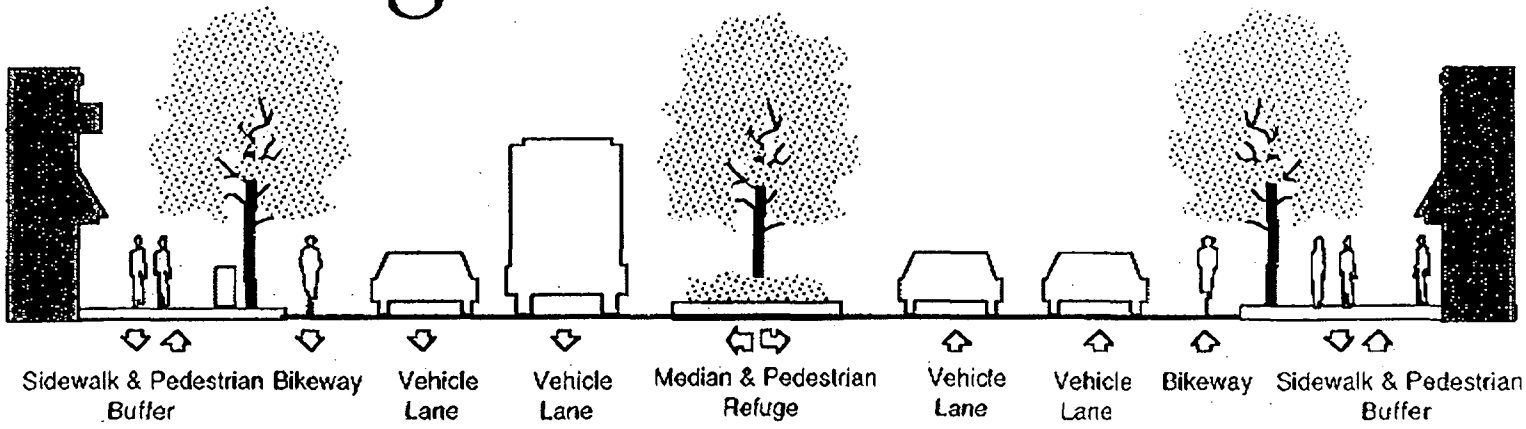
Regional Street Design Handbook

- **Provides design solutions that support regional street design policy** → RTP; 1STEA, TPR (which govern updating)
- **Integrates land use and transportation** → planning (such as P.W. traffic)
- **Serves as a tool for implementing 2040**
  - balances economic vitality and regional) community livability (multi modal street functions)
  - JIM's points caveats on AASHTO
  - GUIDELINES NOT STANDARDS
    - Broad in scope of types
    - review policy → Reg. st. Design Concepts
      - Focus BLVDS
      - Guidelines each type

see pg 2

SLIDE: YAMHILL DWNTWN PORTLAND
GOOD

Regional Boulevard



- **Transit and pedestrian-oriented design**
- **Frequent pedestrian crossings**
- **Some access control**
- **Many intersections**
- **Occur in centers and some main streets**

- Dense develop oriented to street
- Mixed traffic flow — MULTIMODAL
- Special Amenities.

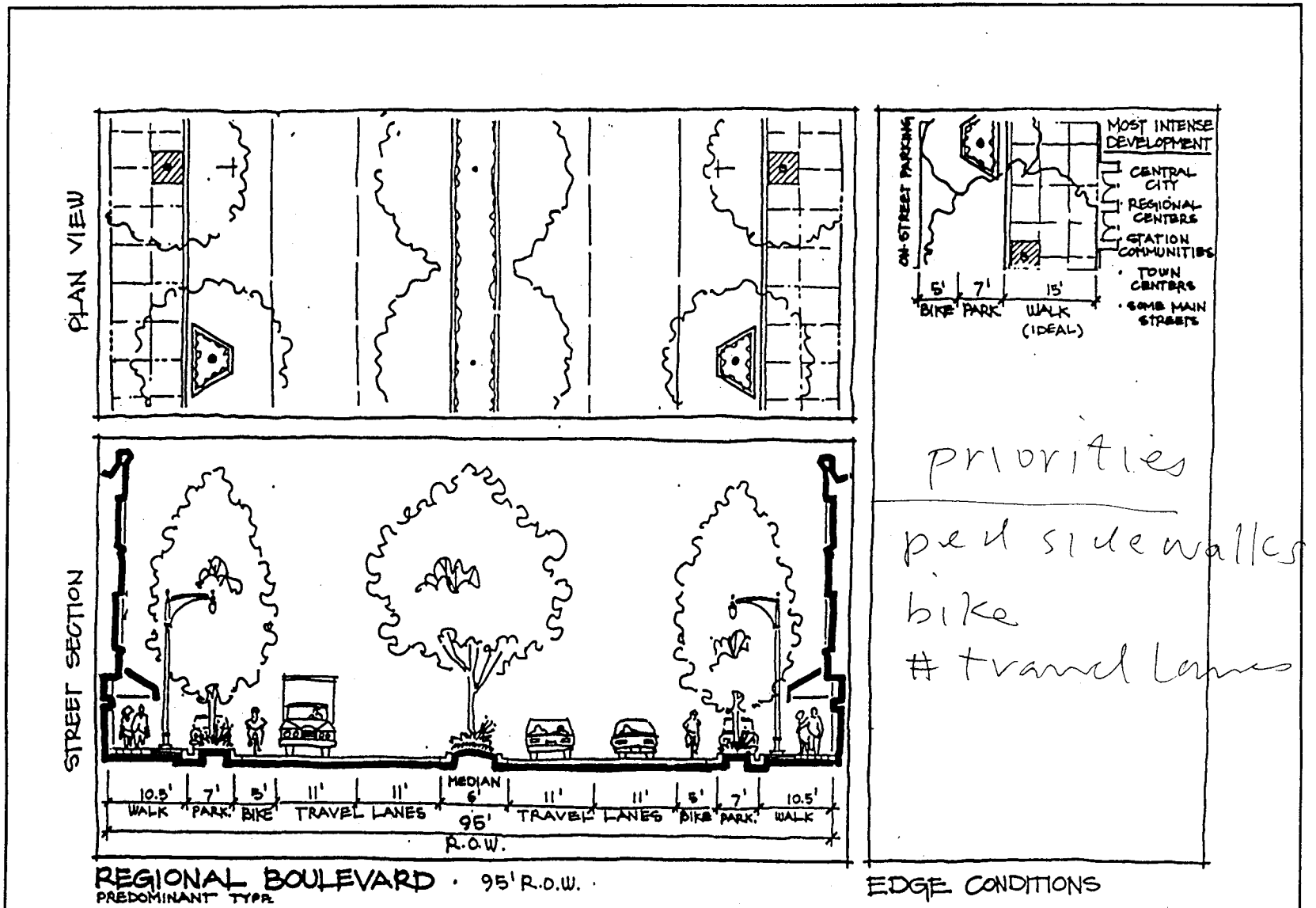
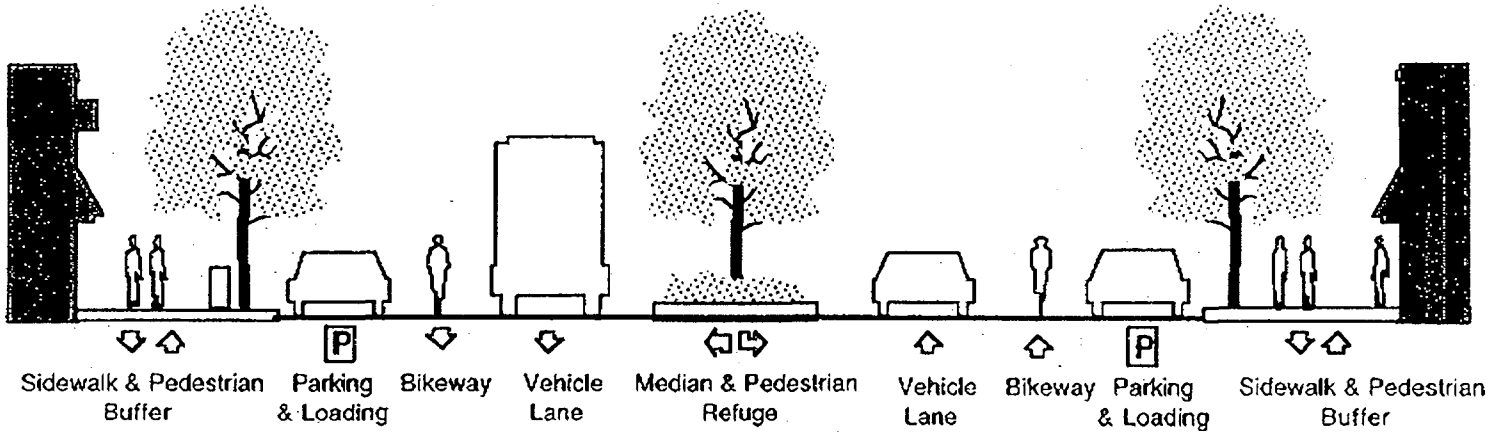


Figure 28. Typical regional boulevard design type. These facilities emphasize bicycle, pedestrian, and transit travel modes.

SLIDE: GRESHAM & UNTWN
GOOD

Community Boulevard



- **Transit and pedestrian-oriented design**
- **Frequent pedestrian crossings**
- **On-street parking when possible**
- **Many intersections**
- **Occur in centers and some main streets**

harmonize N.O.W.

4 or fewer lanes,
Intensely developed activity centers, village
to street

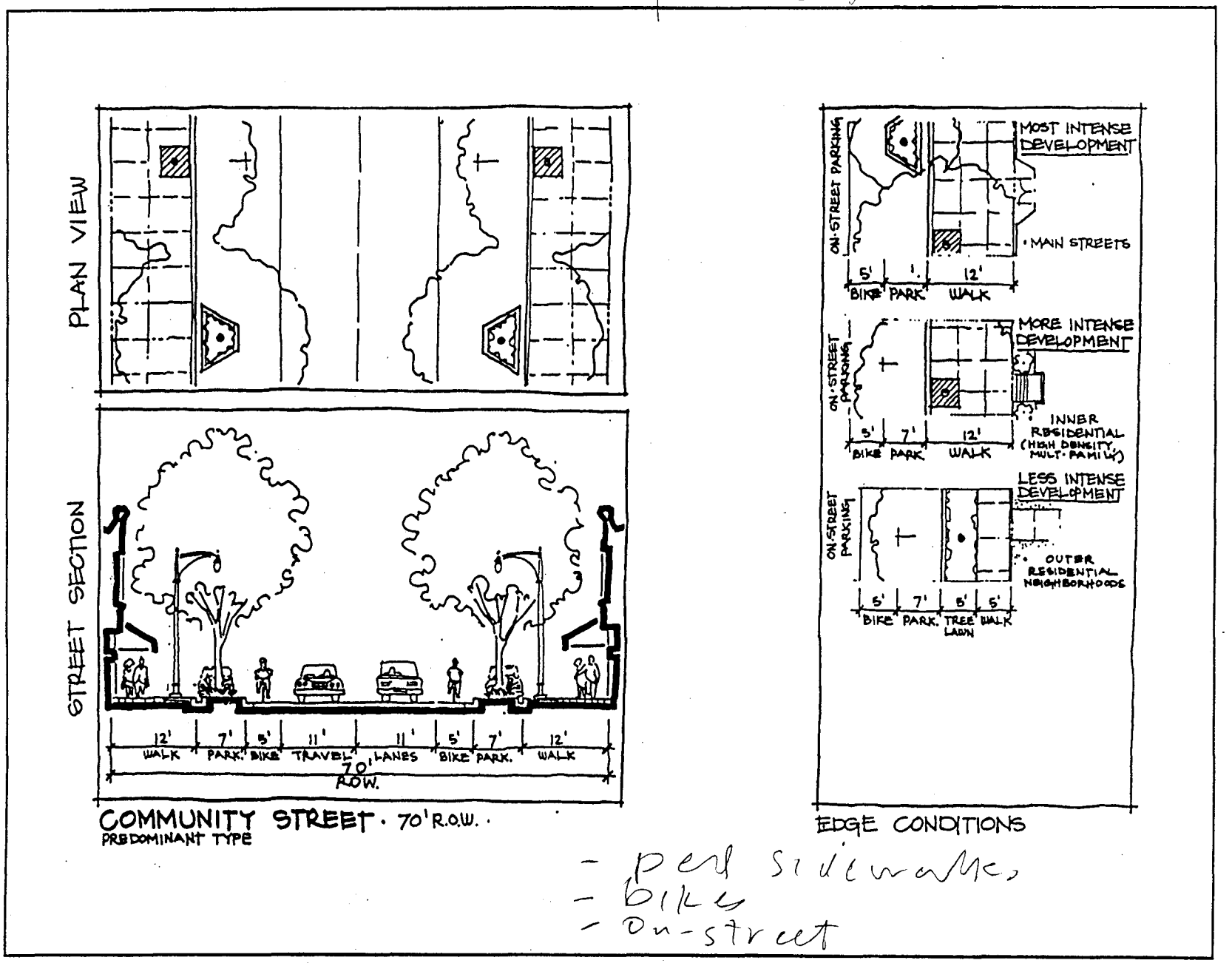


Figure 32. Typical community street design type. These facilities provide a balance of all modes of travel

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Regional Street Design Handbook

Design Guidelines

- The street realm
- Building orientation
- Street connectivity

Principles for livability

SLIDE: (1) EASTMAN PKWY GRESHAM

(2) 122nd Ave portland NEW @ REGIONAL STREET

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Regional Street Design Handbook

Design Guidelines

- Sidewalks and crossings
- Travel lanes
- Intersection trade-offs
- Transit considerations

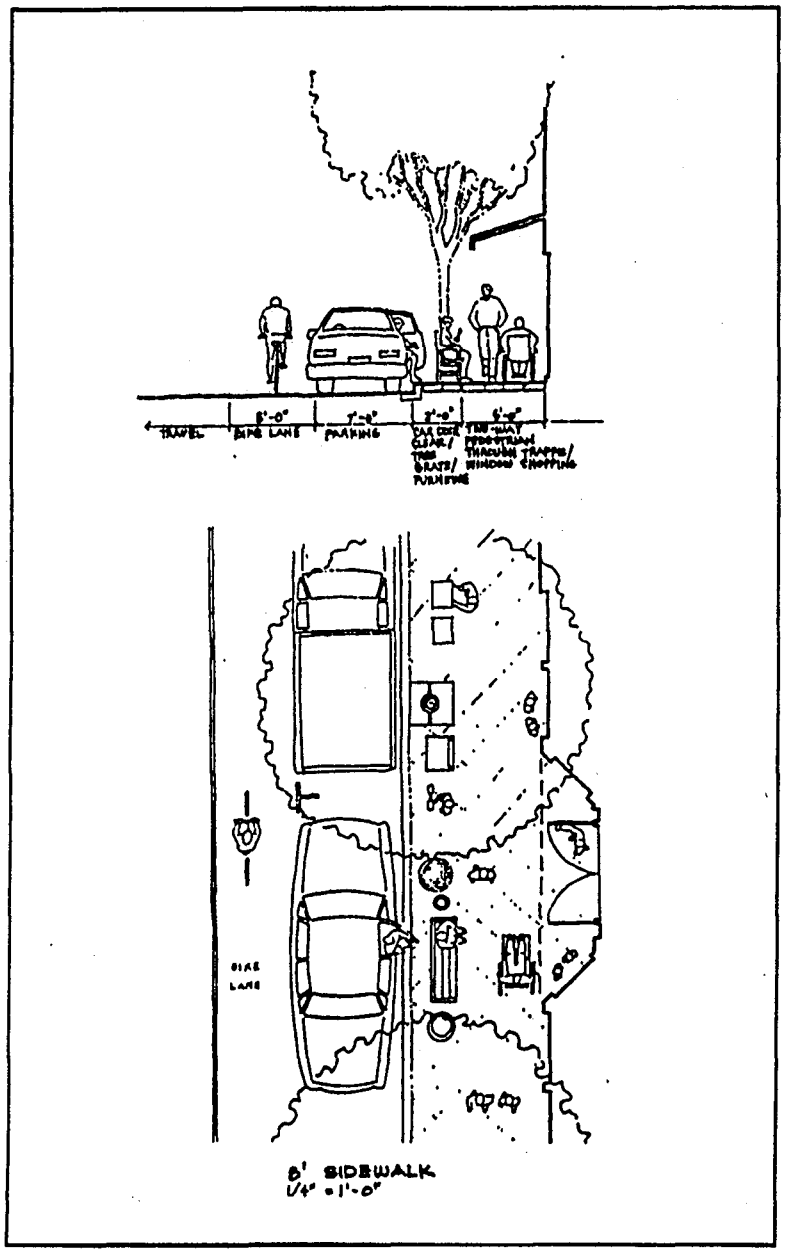


Figure 13. Eight feet combines two-way pedestrian traffic, window shopping, and a three foot street furniture zone along the curb. The street furniture buffers pedestrians from traffic.

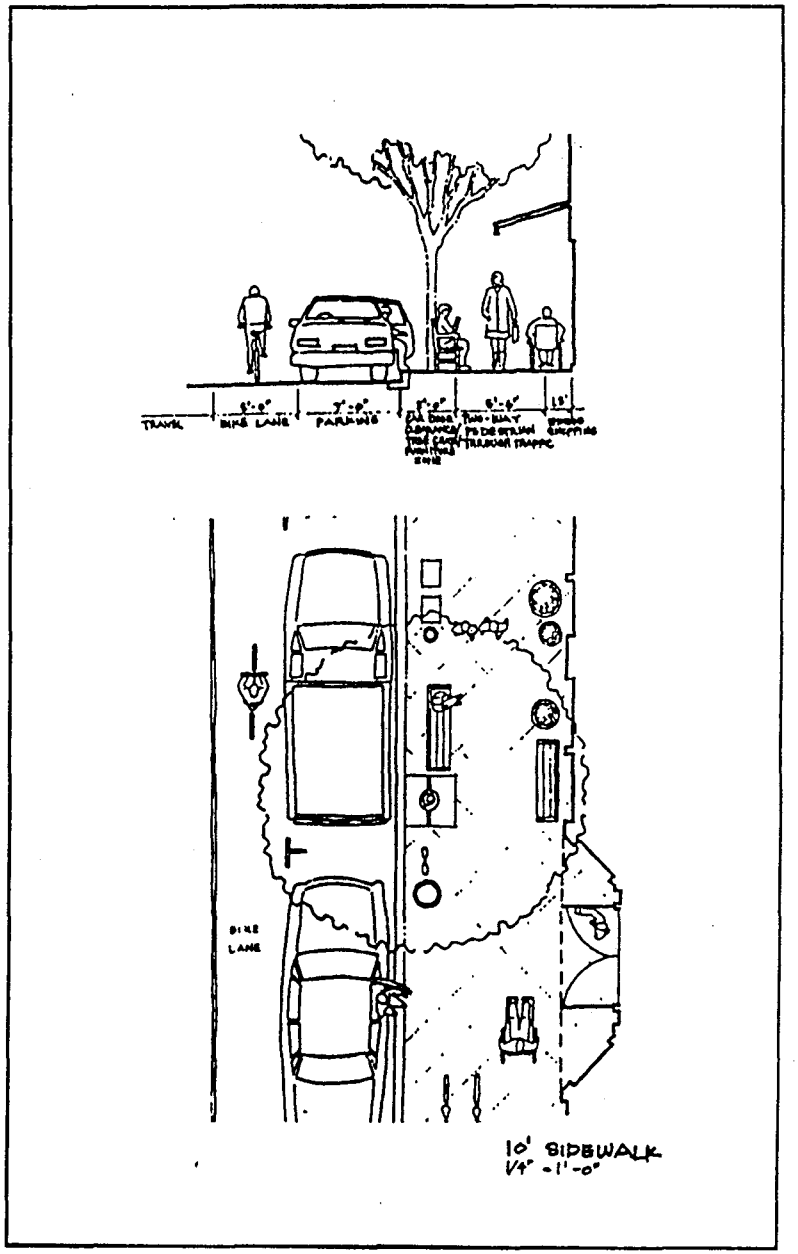


Figure 14. Ten feet provides an opportunity for street furniture to be located along the curb or along the storefronts.

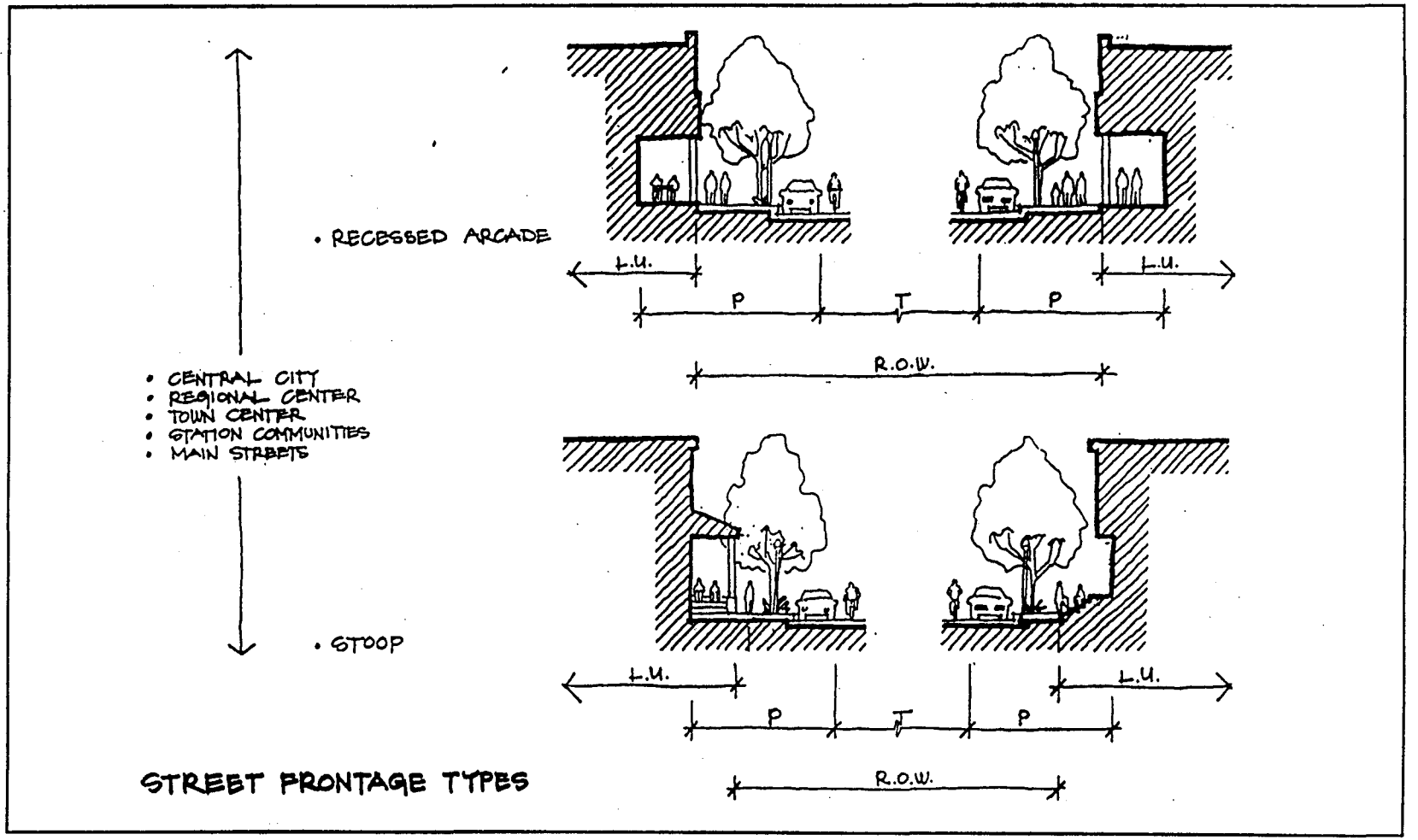


Figure 21.
Recessed arcade - This applies to mixed-use residential or commercial buildings. The buildings are aligned directly on the property line with the building entrance at grade setback from property line creating a deep pedestrian sidewalk. This treatment provides direct activity to the street and increases public outdoor space for private uses to spill out on the sidewalk.

Stoop - This applies to residential or commercial areas, where buildings are aligned directly on the property line. Building entrances and the first floor are slightly raised above street level. The front door is a semi-private, semi-public area, which provides a vantage point to view and make social contact with the activity on the street. This treatment provides spatial definition to the street and some privacy for first floor windows and living or working areas.

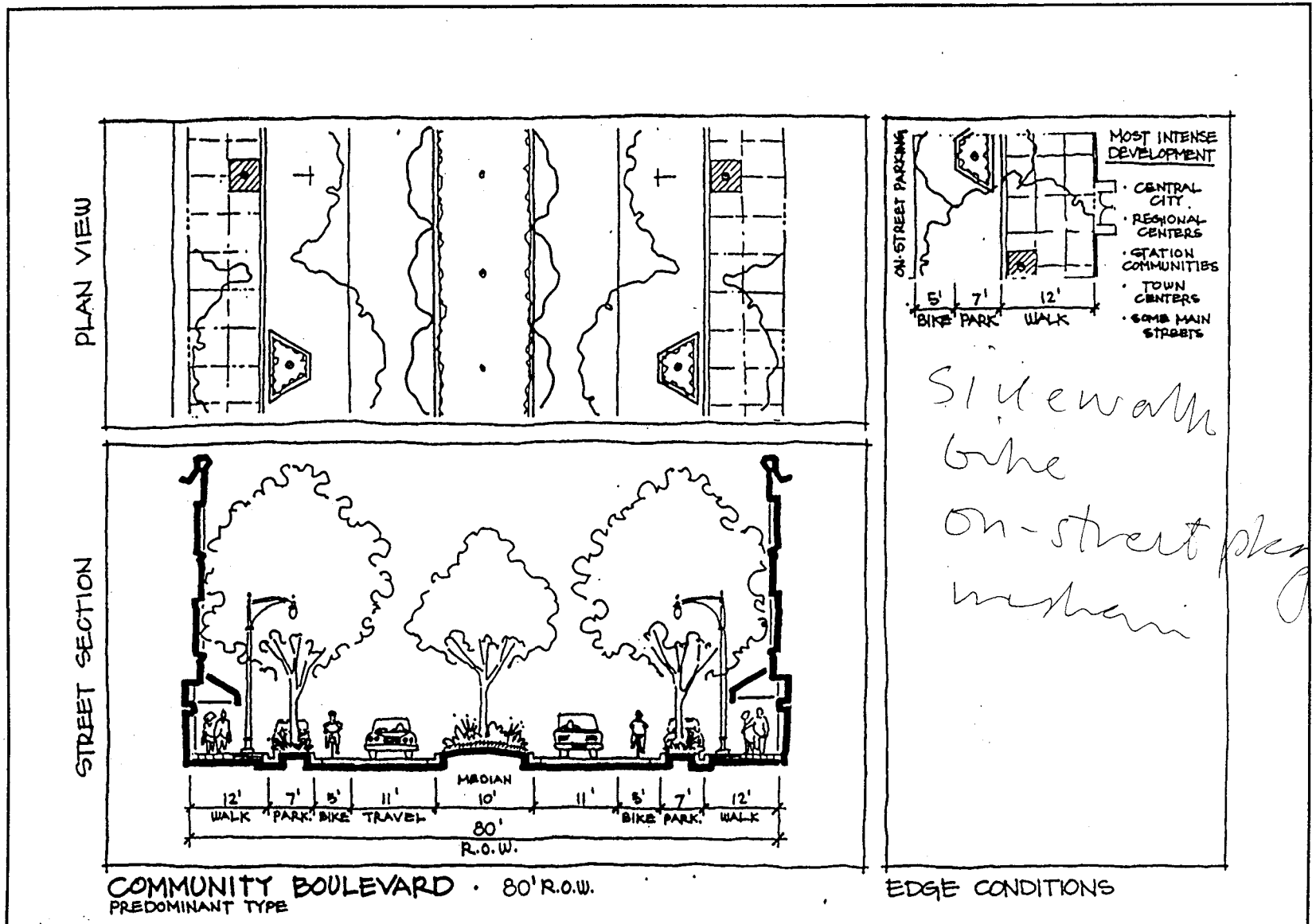
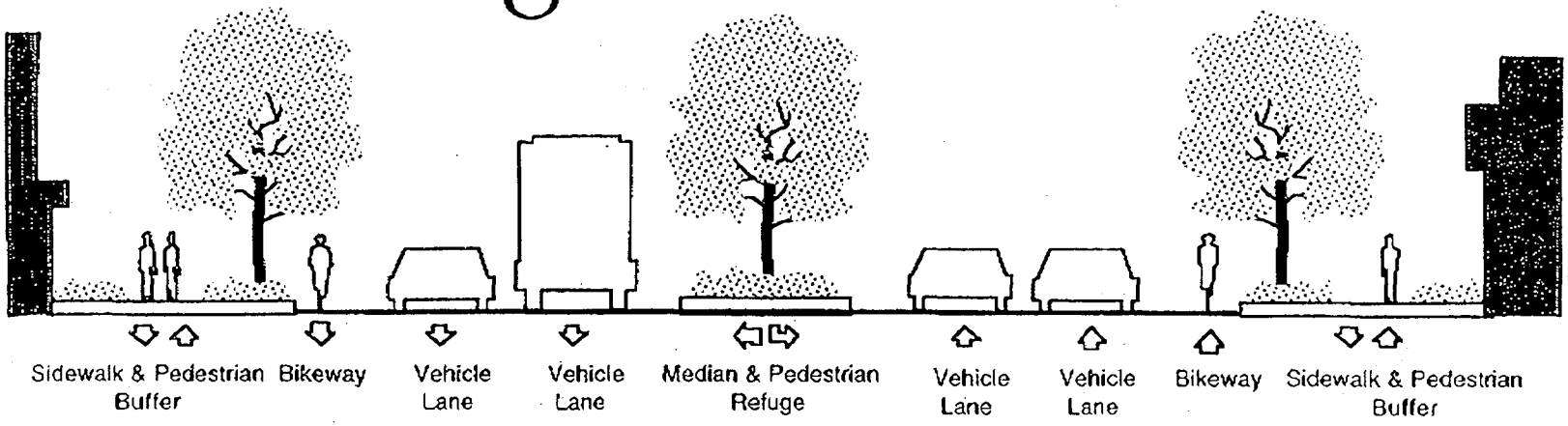


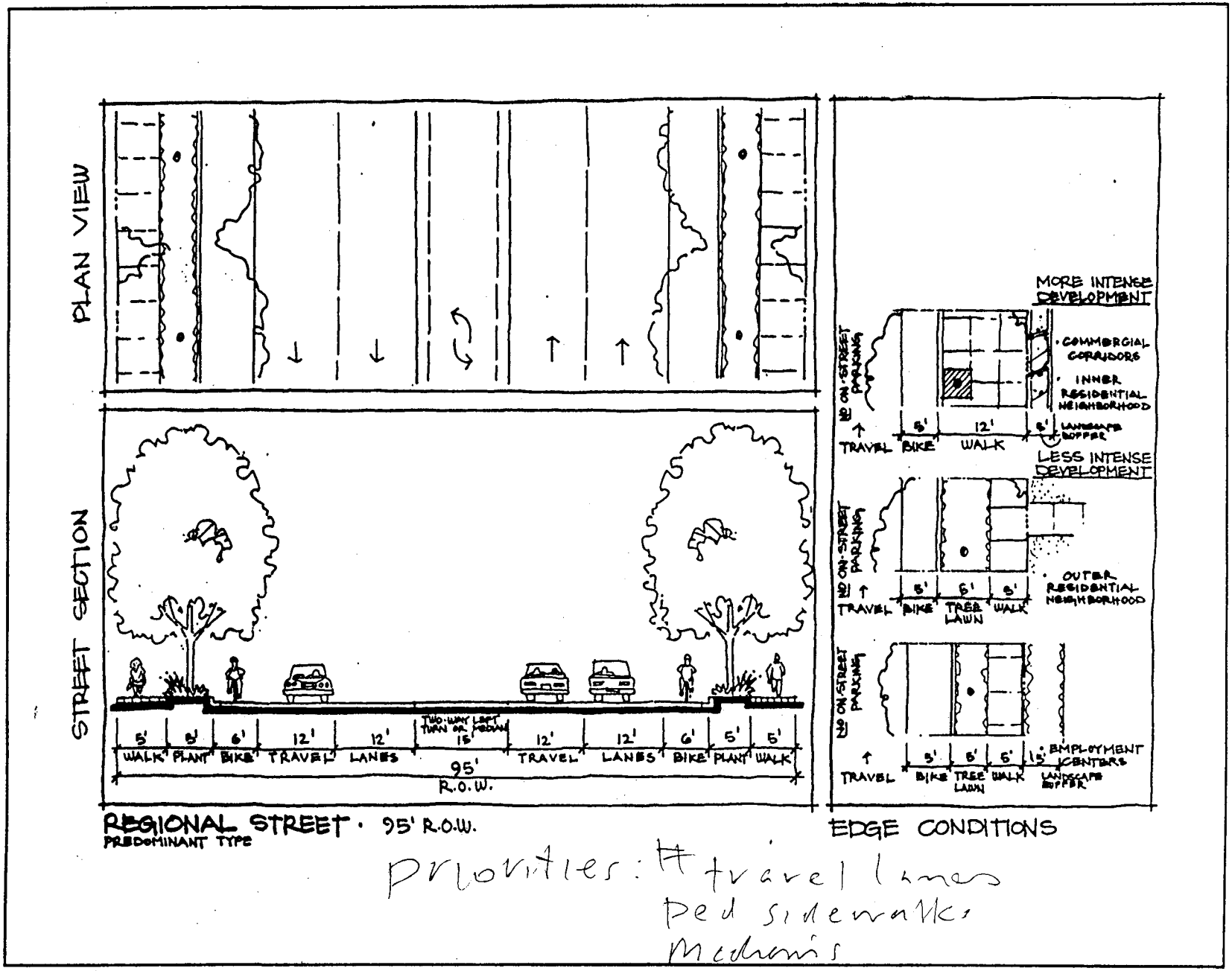
Figure 30. Typical community boulevard design type. These facilities emphasize bicycle, pedestrian, and transit travel modes.

SLIDE McGOUGLIN
ODOT ~~ROAD~~ STATE HWY
BAD

Regional Street



- **Balances motor vehicles with alternative modes**
- **Pedestrian crossings at all intersections**
- **Access managed to protect mobility**
- **Some to many intersections**
- **Occur in corridors and neighborhoods**



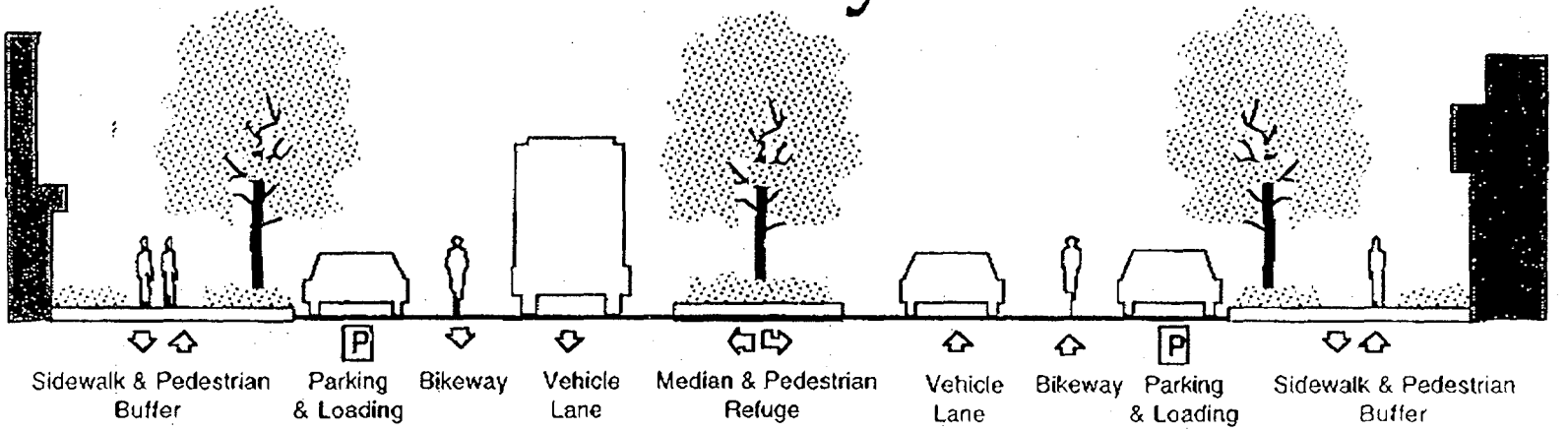
priorities: # travel lanes
Ped sidewalks
Mechanics

Figure 31. Typical regional street design type. These facilities provide a balance of all modes of travel.

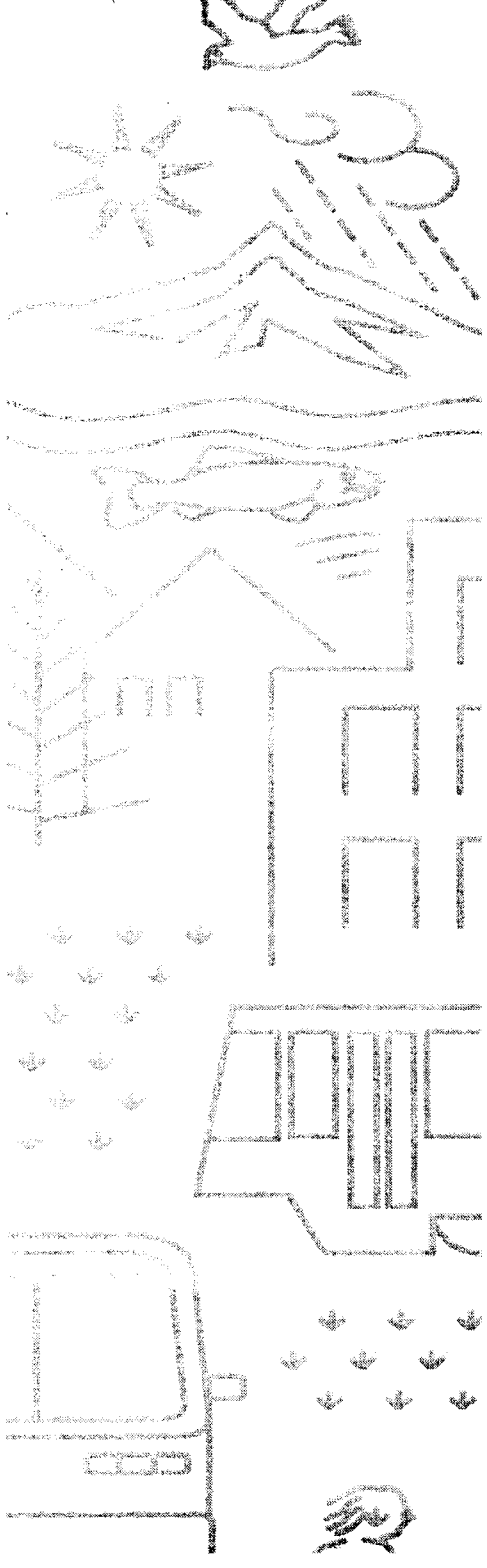
Likes

SLIDE : INNER NEIGHBORHOOD

Community Street



- **Balances motor vehicles with alternative modes**
- **Pedestrian crossings at all intersections**
- **On-street parking when possible**
- **Some to many intersections**
- **Occur in corridors and neighborhoods**



July 16, 1997

Draft Alternatives Analysis Findings

Briefing Materials for JPACT, MPAC and the Metro Transportation Planning Committee

Regional Transportation Plan Update

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Table of Contents

1 Introductory Materials

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RTP Alternatives Analysis

Purpose

The alternatives analysis study is intended to provide the decision makers with tools to evaluate the region's level of service policy for motor vehicles and public transportation. For motor vehicles, level of service describes the amount of congestion that exists on the street system at a given time. For transit, level of service describes the frequency, speed and coverage of transit service available at a given time. The alternatives analysis study is also intended to be a starting point for developing a "preferred" system of transportation improvements and programs that will be included in the updated Regional Transportation Plan.

Scope

This study examines a series of five conceptual motor vehicle and transit systems for their ability to serve forecast 2015 population and employment growth. Each of the five scenarios is based on a different level of service and mix of transit service and motor vehicle system improvements, and *all scenarios have significantly more service and system improvements than the "committed" system.* This briefing packet includes a detailed analysis of how each alternative performed according to a number of key performance measures.

Though the alternatives are intended to provide differing levels of service, each is framed by the 2040 Growth Concept, with the primary emphasis being on access to the central city, regional centers, intermodal facilities and industrial areas. There is also a strong, but secondary emphasis on access to town centers, station communities, main streets and corridors.

Process and Products

The alternatives were developed during the past several months in consultation with the RTP Citizens Advisory Committee and the Transportation Policy Alternatives Committee (TPAC). The findings from the study will be discussed at a joint JPACT, MPAC and Metro Transportation Planning Committee workshop on July 16, 1997. Policy conclusions reached at this joint meeting will direct staff in developing the preferred system.

The policy conclusions from the alternatives analysis will also be discussed in an RTP alternatives analysis handbook. The handbook will serve as a tool in RTP public involvement activities beginning in Fall 1997. The first major public outreach will be a series of community workshops. These workshops will be designed to gather input on the projects and priorities of the preferred system. The alternatives analysis handbook will serve as an important background document for these workshops.

Finally, the alternatives analysis handbook will be widely available to the general public during the formal comment period. Comment on the draft Regional Transportation Plan is tentatively scheduled to begin in early 1998. The updated RTP is scheduled for adoption in early Spring 1998.

RTP Alternatives Analysis

Modeling Principles

METRO

1 Motor Vehicle Level of Service Alternatives

IMPROVEMENT SCENARIO	MOTOR VEHICLE SERVICE LEVEL		
	PM Peak - First Hour	PM Peak - Second Hour	Off-Peak 1 Hour
A (baseline)	Level of Service F	Level of Service E	Level of Service D
B (moderate)	Level of Service E	Level of Service D	Level of Service C
C (high)	Level of Service D	Level of Service C	Level of Service C

Motor Vehicle Level of Service (LOS) Summary

LOS	V/C	Freeways	Streets
A	*.5 to .59*	*More than 60 mph*	*More than 35 mph*
B	*.6 to .69*	*57-60 mph*	*28-35 mph*
C	*.7 to .79*	*54-57 mph*	*22-28 mph*
D	*.8 to .89*	*46-54 mph*	*17-22 mph*
E	*.9 to .99*	*30 to 46 mph*	*13-17 mph*
F	*1.0*	*Less than 30 mph*	*Less than 13 mph*

2 Public Transportation Alternatives

IMPROVEMENT SCENARIO	TRANSIT SERVICE LEVEL	
	TRAVEL TIME - PTN	COVERAGE - STN
A (baseline)	1.5x off-peak auto to MAJOR centers/corridors	high density areas
B (moderate)	1.5x off-peak auto to MANY centers/corridors	moderate and high density areas
C (high)	1.5x off-peak auto to ALL centers/corridors	all areas

July '97

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RTP ALTERNATIVES ANALYSIS

Modeling Assumptions

Motor Vehicle Alternatives

The 2015 RTP Base Highway Network includes projects in the 2015 Committed Network with three additional projects; Tualatin-Sherwood Expressway, Multnomah Parkway, and the full Sunrise Corridor. The roadway projects included in the 2015 Committed Network have reasonably anticipated Federal, State, Local, and/or Private funding within the next 20 years and includes those projects identified in the Transportation Improvement Program. The three Level of Service Networks (Low-LOS F, Moderate-LOS E, and High-LOS D) were created based on the following assumptions:

- We "met" the Transportation Planning Rule requirement of 10% reduction in VMT/Capita by the year 2015 so that the networks were not "over built". This was done by applying mode split targets by 2040 land use design type and length of trip, resulting in reduced drive-alone auto trips and an associated 10 percent reduction in VMT/capita.

- Additional lanes were added to a maximum of 10 lanes for highways and freeways. There was no limit for arterials. The added capacity was assumed to be 2000 vehicles per hour/lane for highways and 900 vehicles/hour/lane for arterials.

- For the low alternative, any link operating at LOS F (no higher than a volume to capacity ratio of 1.0) were assumed to be widened.

- For the moderate alternative, any link operating at LOS E (no higher than a volume to capacity ratio of 0.9) were assumed to be widened.

- For the high alternative, any link operating at LOS D (no higher than a volume to capacity ratio of 0.8) were assumed to be widened.

- Although there is an assumed 10 percent reduction in VMT/capita, each of the alternatives experiences an increase in overall VMT of more than 50 percent because of population growth.

Public Transportation Alternatives

The three transit scenarios were based on the Primary Transit Network created by a consultant working for Tri-Met. The Levels of Service were defined by 2040 land use design type served, with the "low" scenario providing primary service the major centers, the "moderate" scenario expanding primary service to all centers and some corridors, and the "high" scenario providing primary service to all centers and corridors. Secondary service ranged from covering limited areas in the "low" scenario to covering all urban areas in the "high" scenario.

These scenarios were further refined, as follows:

- The moderate network was created first and "equilibrated" so that capacity was adjusted to meet demand. Rail assumptions for the moderate included the proposed South/North LRT full length "generic" alignment (from Clackamas Town Center to Vancouver) and LRT to the Portland Airport.

- From this moderate network the low and high were created by subtracting or adding service, respectively.

- The high scenario includes additional light rail on I-205 and along I-5 to Tualatin, as well as the NW trolley in downtown Portland.

- The low scenario was "scaled" so that the extra demand (that exceeded available transit capacity) was moved back into other modes. The low scenario includes the South/North light rail line, but not the airport extension.

2 Policy Implications

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RTP ALTERNATIVES ANALYSIS

Policy Implications

Motor Vehicle Travel

The 2040 Growth Concept assumes that the automobile will continue to be the dominant mode of travel. The development of the central city and regional centers, in particular, depends on maintaining or improving motor vehicle access, as well as providing new transit, bicycle and pedestrian improvements. However, in this mix of modes, automobile access must be managed in a way that complements compact urban form, and encourages the use of alternative modes. The following findings from the alternatives analysis generally support these 2040 policies:

- Though adding road capacity reduces congestion, it also attracts "latent demand" in many areas such that more capacity is needed to absorb new demand.
- Reduced congestion encourages longer trips, thus increasing development pressures along the urban fringe and in neighbor cities.
- Reduced congestion encourages more driving on a per-capita basis through both longer and more frequent trips.
- Use of alternative modes is not significantly affected by changes in congestion unless corresponding pedestrian, bicycle and transit improvements are made.
- Congestion on the motor vehicle system does not significantly limit access to the central city or regional centers.
- Relieving congestion through adding capacity is very expensive.

Freight Movement

Freight movement on the motor vehicle system is the backbone of the region's economy, and is a prominent element of the 2040 Growth Concept. Freight access to the central city, regional centers, industrial areas and intermodal facilities is key to achieving planned job growth in these areas. The alternatives analysis demonstrated that:

- Truck travel times experience a modest decrease when congestion is reduced.
- Congestion on the motor vehicle system does not significantly limit access to the central city or regional centers.

Public Transportation

Public transportation is a key element of the 2040 Growth Concept, and is the key to achieving compact development in centers, corridors and main streets. Conversely, these development patterns are assumed to be more efficiently served with high quality transit as the region grows. Both the RTP alternatives analysis and current transit ridership data generally confirm these strategies, with the following key findings:

- Portland's transit system has experienced an increase in the number of transit rides per capita compared to other transit districts serving a similar population, due to its compact form and emphasis on density along transit streets.

- Under the 2040 Growth Concept, focused growth in centers and transit corridors allows transit ridership to increase at a faster rate than population, resulting in a lower cost per rider in 2015 compared to today. Focusing growth in centers and corridors allows new transit service to be delivered in a very cost-effective manner.

- Increased transit service results in a modest decrease in vehicle miles traveled (VMT) per capita.

- Point-to-point travel times improve with improved transit service where separated right-of-way provides a speed advantage.

- When the street system becomes congested, transit service hours must be increased simply to maintain the same level of transit service.

Financial Impacts

Motor Vehicle Alternatives

Each of the motor vehicle alternatives represent major infrastructure improvements over today's transportation system. The 1995 Federal RTP identified $3 billion in road improvements over the 20-year plan, though only $900 million in revenues were projected in that period. In comparison:

- The low motor vehicle alternative would require $4.7 billion over 20 years in road improvements alone;

- The moderate motor vehicle alternative would require $9 billion in road improvements; and

- The high motor vehicle alternative, which meets current RTP congestion standards, would require $13.5 billion in road improvements.

Though estimated capital costs vary dramatically among the three motor vehicle alternatives, there is less difference in how they perform. This suggests that motor vehicle system improvements should be tailored to best implement the 2040 land use components, with an emphasis on optimizing the use of the existing transportation system.

Public Transportation Alternatives

Each of the public transportation alternatives represent a significant increase in transit service over today's level. Total costs for each of the alternatives include expanded light rail, new rapid bus service and expanded local bus coverage in suburban areas. Of the $4.5 billion in transportation improvements included in the 1995 Federal RTP , about $1 billion was identified for transit expansion. In comparison:

- The low transit alternative includes $1.4 billion in new transit service, with an emphasis on expanded light rail and local bus;

- The moderate transit alternative includes $2.2 billion in expanded transit service, with a focus on light rail and rapid bus service connecting centers and corridors; and

- The high transit alternative includes $3.6 billion in new transit service, and include expanded light rail, rapid bus and local bus that provide high quality service to all areas in the region.

In all three scenarios, transit ridership increased significantly over today, both in terms of total ridership and on a per capita basis. These results confirm the 2040 strategy of connecting land use and transportation planning, with the combination of expanded transit and 2040 land use policies resulting in an increasingly efficient system.

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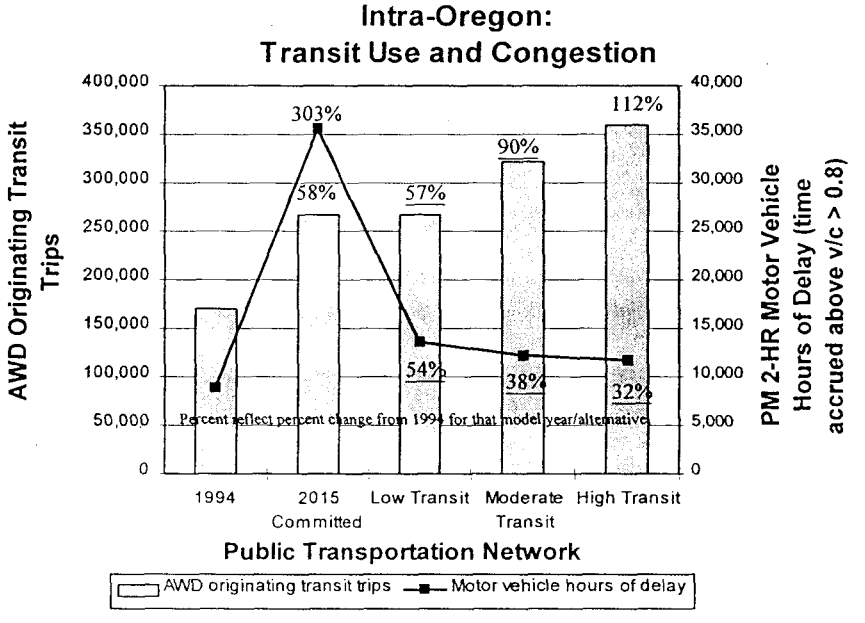
Draft Alternatives Analysis Findings

Briefing Materials Errata Sheet

1. Revise the three bullets in the Public Transportation Alternatives section on page 10 to reflect total cost of transit operations and maintenance (currently they show only capital costs of expansion): the low transit network should read "$3.6 billion in new transit," the moderate network should read "$4.8 billion" and the high network should read "$6.5 billion."

2. Revise graph on page 77 to reflect new percentages as indicated with an underline below:



The most efficient transit lines were those serving mixed use centers and corridors. Most notable were regional centers, which showed a substantial increase in ridership per capita. These findings suggest that these areas should continue to be the focus of transit expansion in the RTP.

Land Use Impacts

Staff will continue to study general land use impacts of both the motor vehicle and public transportation alternatives. Major impacts include (1) the land consumption cost of expanding public right-of-way, and (2) the effects of changes in accessibility on regional growth management policies.

Land Consumption

Land consumption costs that result from expanding public right-of-way include the following:

- Much of the planned density in the 2040 Growth Concept is located along regional facilities, both in centers and along corridors. Expanding one mile of a typical two-lane road to five lanes would require about 5 acres of land to be converted to public right-of-way. The cumulative effect of this conversion translates into a need to provide new development capacity for displaced housing and jobs elsewhere.

- Some regional facilities border sensitive environmental, cultural or institutional land, and expansion in these areas may consume land that is irreplaceable.

- Few transit improvements consume new right-of-way, with light rail or other dedicated right-of-way transit projects as the exception.

- Staff will continue to examine the amount of right-of-way consumed in the various alternatives, and will add this information to the summary handbook.

Accessibility

Changes in accessibility can affect regional growth management policies in the following ways:

- Increases in motor vehicle accessibility within the urban area would be accompanied by a relatively large increase in accessibility for areas outside the urban area. In other words, while urban road expansion may modestly improve accessibility within the region, areas outside the region become much more accessible as places to live or work.

- Conversely, increases in transit accessibility within the region have less effect on accessibility outside the urban area. Exceptions include express service to neighbor cities and local bus service along the urban fringe.

3 Motor Vehicle Alternatives

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Motor Vehicle Alternatives Analysis Results

Building the Motor Vehicle Alternatives

- Uses 2015 pop/emp forecast
- Motor vehicle networks sized assuming a 10% VMT per capita reduction
- Total intra-UGB VMT increased by 50% from 1994 to the 2015 LOS F motor vehicle network alternative (56% increase in region-wide VMT)
- Adds travel lanes to 2015 committed network (plus Access Oregon Highways) to build alternatives based on level of service (LOS F, LOS E and LOS D)

LOS	Volume/Capacity Ratio	Average Freeway Speeds	Average Street Speeds
A	0.5 to 0.59	Greater than 60 mph	Greater than 35 mph
B	0.6 to 0.69	57-60 mph	28-35 mph
C	0.7 to 0.79	54-57 mph	22-28 mph
D	0.8 to 0.89	46-54 mph	17-22 mph
E	0.9 to 0.99	30-46 mph	13-17 mph
F	1.0	Less than 30 mph	Less than 13 mph

Source: *Highway Capacity Manual* , 1985.

- Freeways capped at 10 lanes, arterials capped at 7 lanes
- Transit static across all three motor vehicle alternatives, representing 44% more transit service hours than today (includes E/W LRT, S/N LRT to Oregon City and Clackamas Town Center and PIA LRT)

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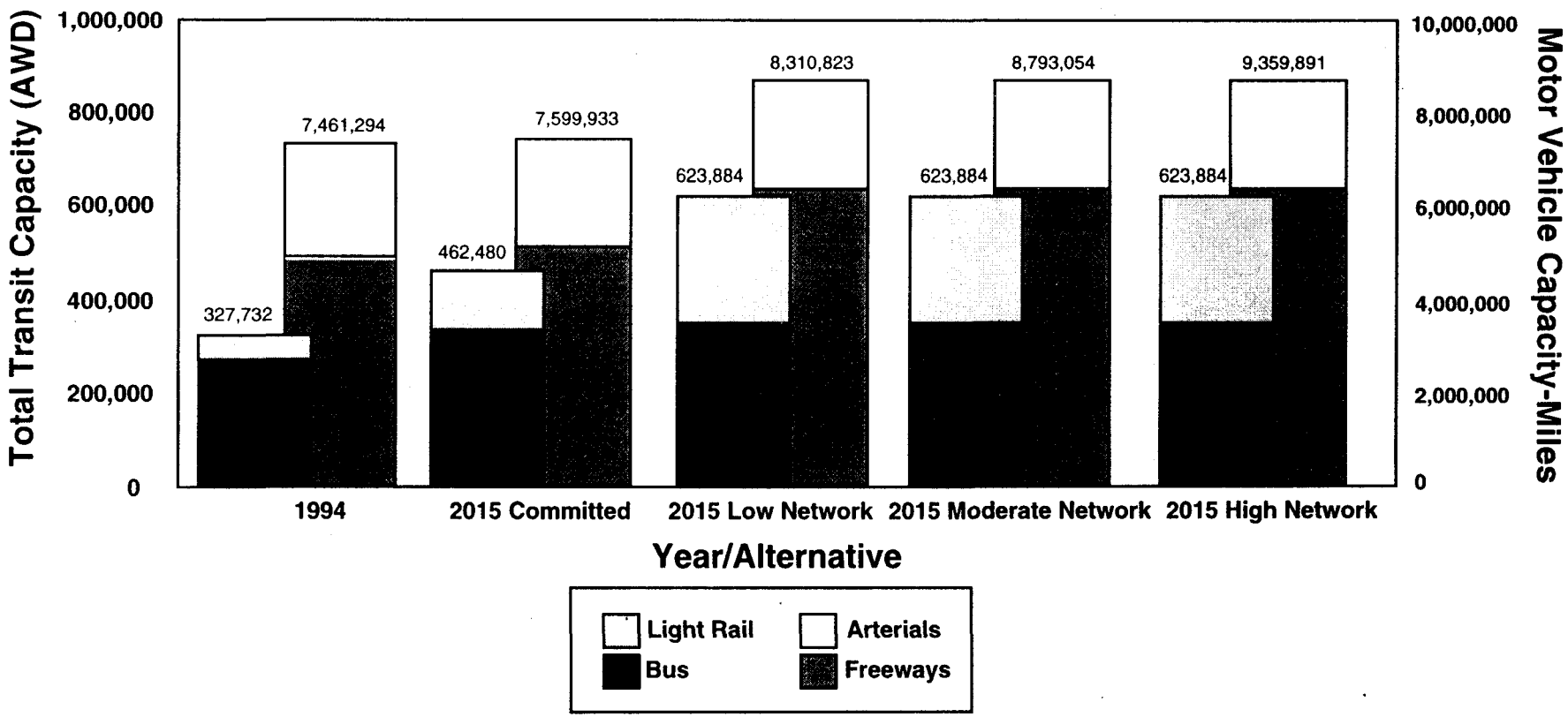
Motor Vehicle Alternatives Analysis

Building the Motor Vehicle Alternatives



Source: Metro 1997

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Motor Vehicle Alternatives Analysis Results

Issue 1: Congestion and Auto Capacity

Expected Result:

- Adding auto capacity reduces congestion

Actual Result:

Yes

- However, adding auto capacity attracts more traffic in areas with latent demand such that added capacity must also absorb new demand

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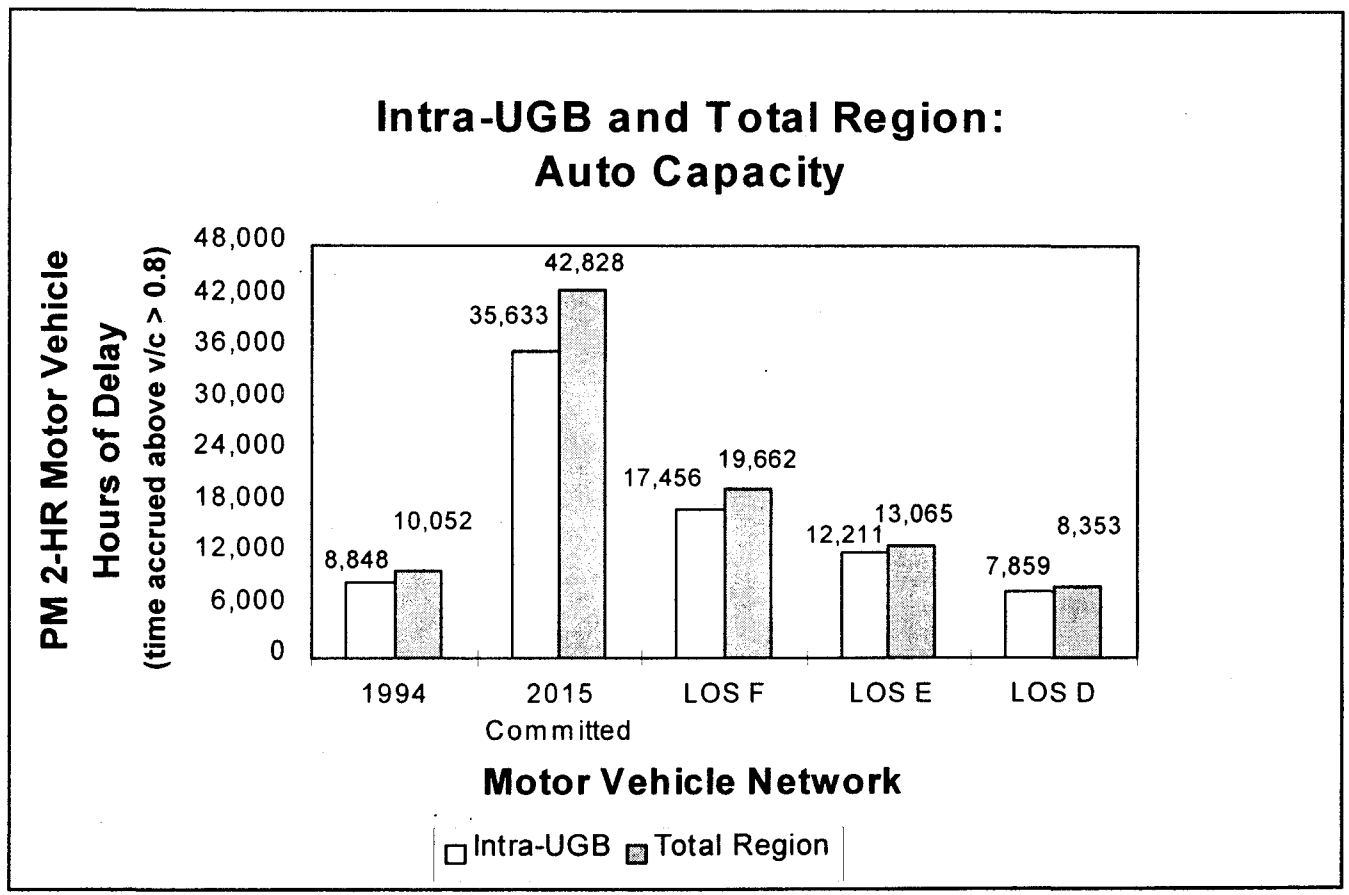
Motor Vehicle Alternatives Analysis Results

Issue 1: Congestion and Auto Capacity



METRO

Motor Vehicle Alternatives Analysis Results

Issue 2: Congestion and Trip Length

Expected Result:

- Less congestion encourages longer trips

Actual Result:

Yes

- Modest increase in trip length

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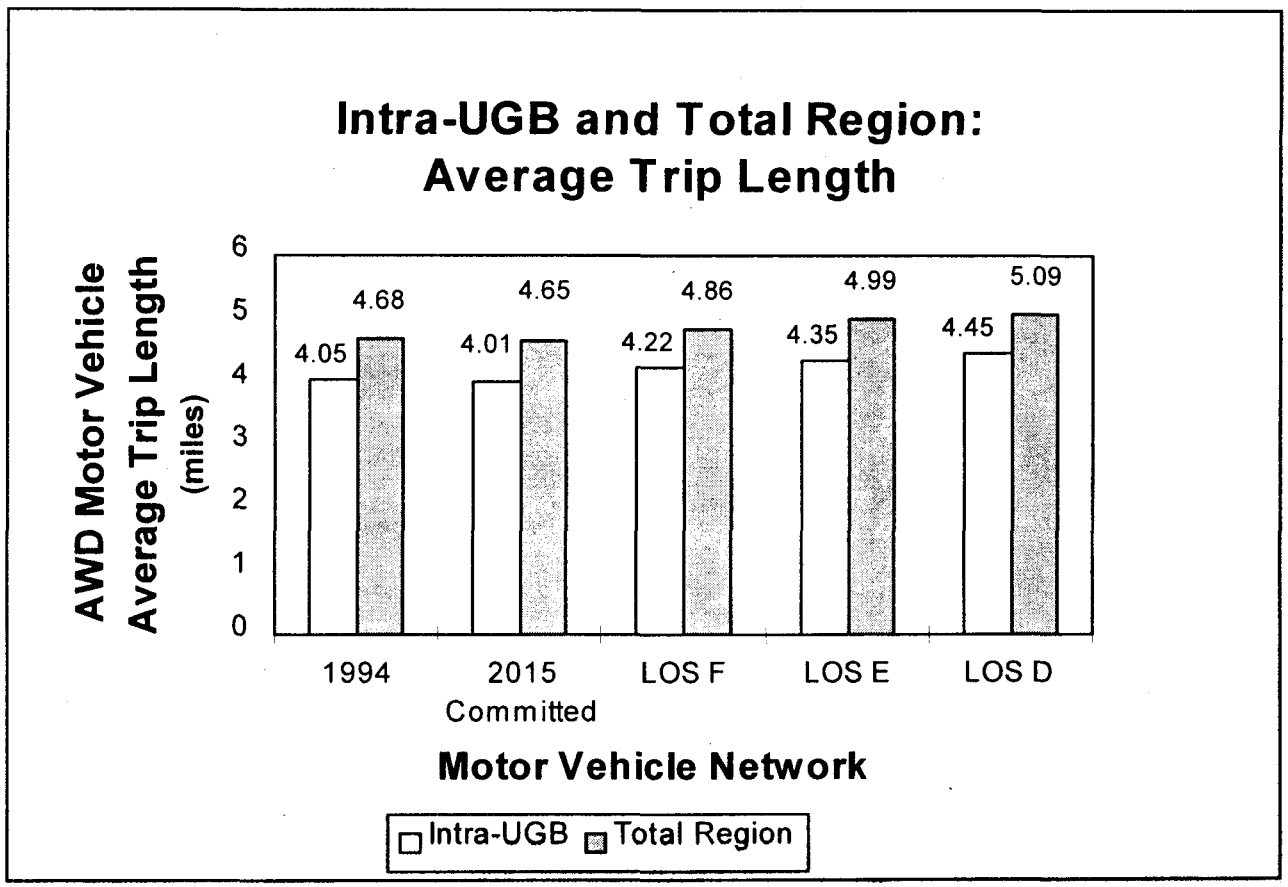
Motor Vehicle Alternatives Analysis Results

Issue 2: Congestion and Trip Length



METRO

Motor Vehicle Alternatives Analysis Results

Issue 3: Congestion and VMT per capita

Expected Result:

- VMT per capita increases with less congestion

Actual Result:

Yes

- Modest increase in VMT/capita, resulting in the need for more aggressive non-SOV targets to meet TPR 10% VMT/capita reduction requirement

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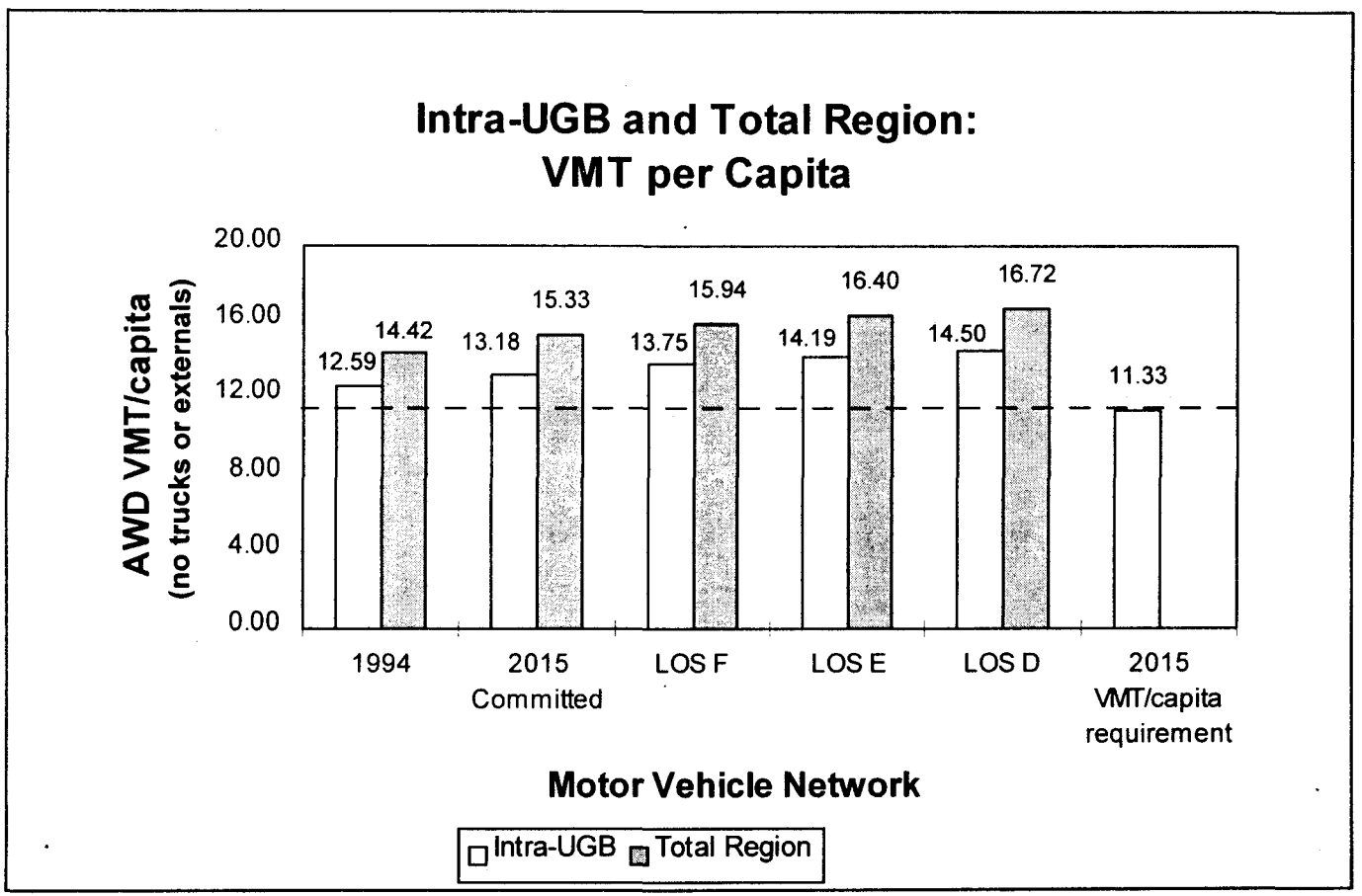
Motor Vehicle Alternatives Analysis Results

Issue 3: Congestion and VMT



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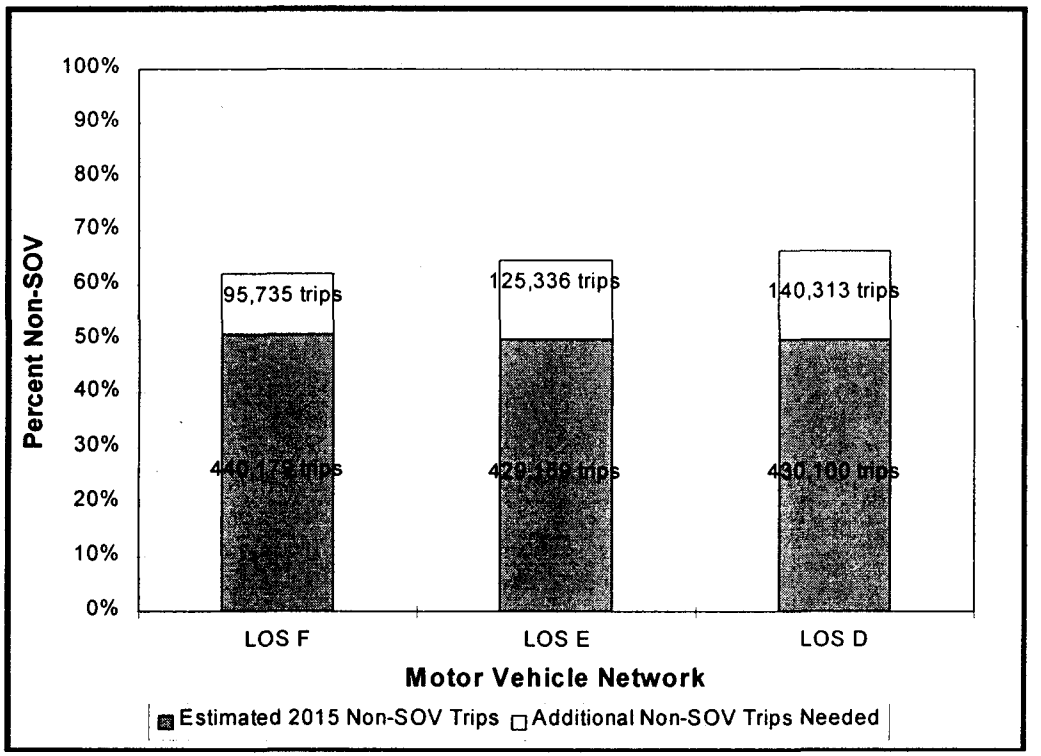
Mode Share Target Results
(to achieve 10% reduction in VMT per capita)

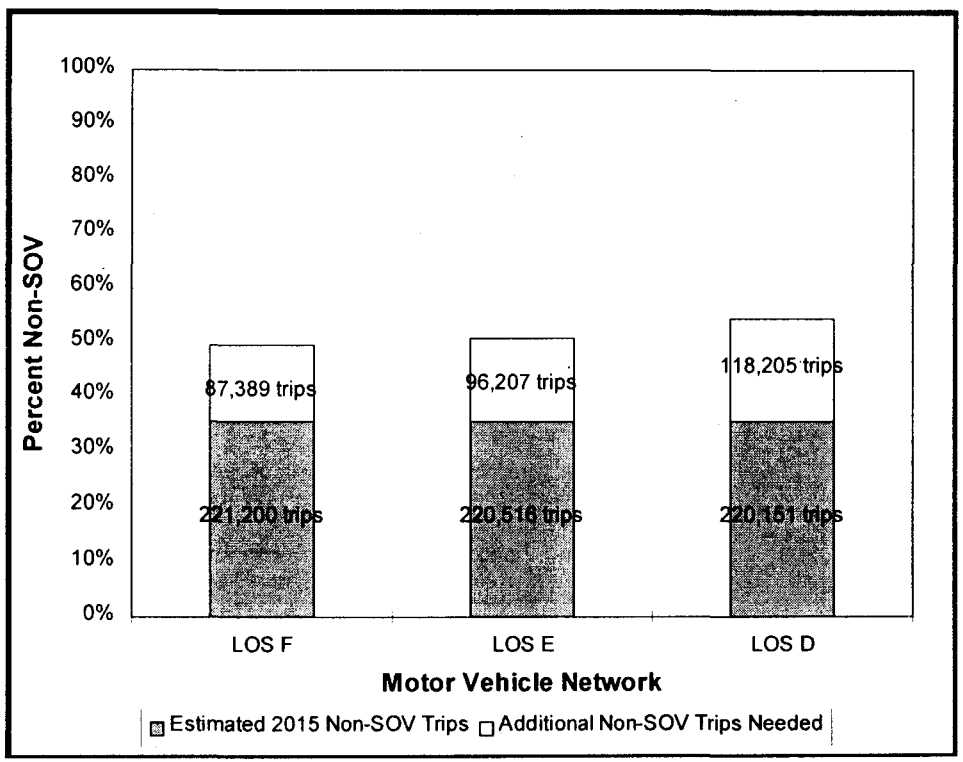
Central City



This graph shows the additional non-SOV (i.e., bike, walk, transit, shared ride) trips needed to meet the Transportation Planning Rule requirement for a 10 percent reduction in vehicle miles traveled by 2015. These targets were assumed when building the three 2015 motor vehicle network alternatives.

METRO

Mode Share Target Results
(to achieve 10% reduction in VMT per capita)
Regional Centers

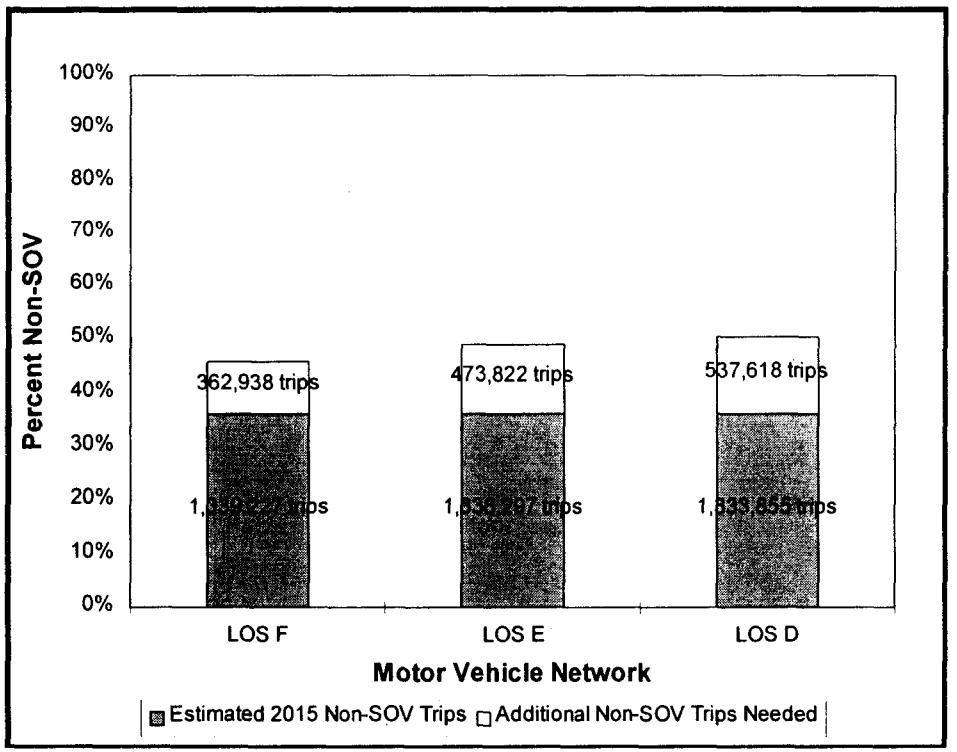


This graph shows the additional non-SOV (i.e., bike, walk, transit, shared ride) trips needed to meet the Transportation Planning Rule requirement for a 10 percent reduction in vehicle miles traveled by 2015. These targets were assumed when building the three 2015 motor vehicle network alternatives.

METRO

Mode Share Target Results
(to achieve 10% reduction in VMT per capita)

Town Centers, Main Streets and Corridors



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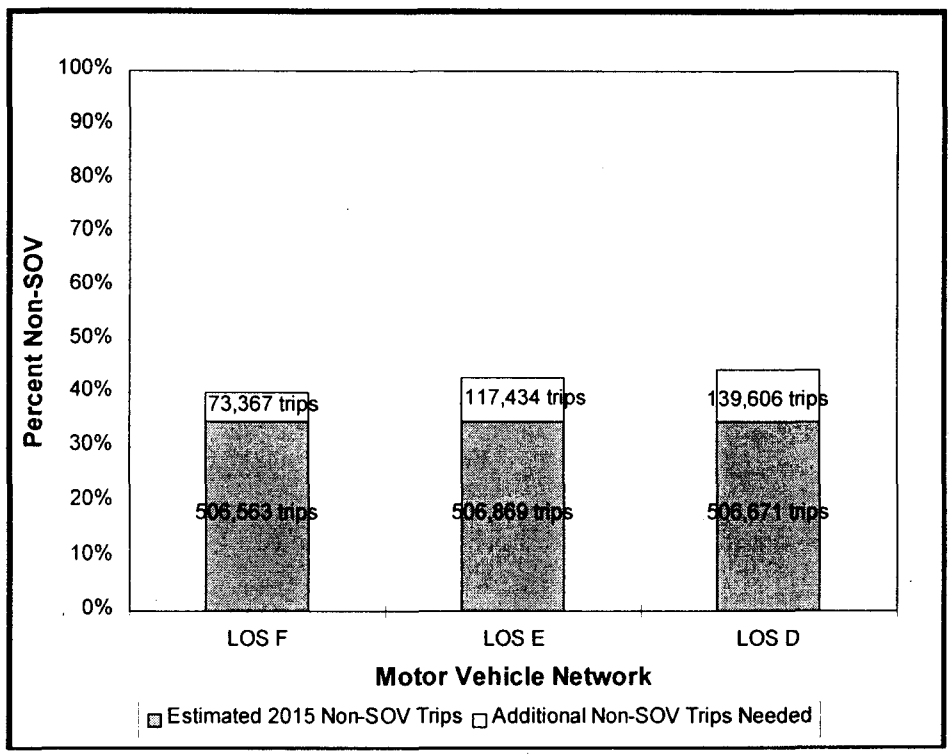
METRO

Mode Share Target Results
(to achieve 10% reduction in VMT per capita)

Industrial Areas and Employment Areas



This graph shows the additional non-SOV (i.e., bike, walk, transit, shared ride) trips needed to meet the Transportation Planning Rule requirement for a 10 percent reduction in vehicle miles traveled by 2015. These targets were assumed when building the three 2015 motor vehicle network alternatives.

METRO

Motor Vehicle Alternatives Analysis Results

Issue 4: Congestion and Travel Time

Expected Result:

- Auto travel times decrease with less congestion

Actual Result:

Yes

- Significant decrease in specific point-to-point travel times (e.g., downtown Portland to downtown Beaverton)
- Modest decrease in the average regional travel time

METRO

Motor Vehicle Alternatives Analysis Results

Issue 4: Congestion and Auto Travel Time

Point-to-Point Travel Time Summary For Selected Routes in the Region

Model Year and Motor Vehicle Alternatives

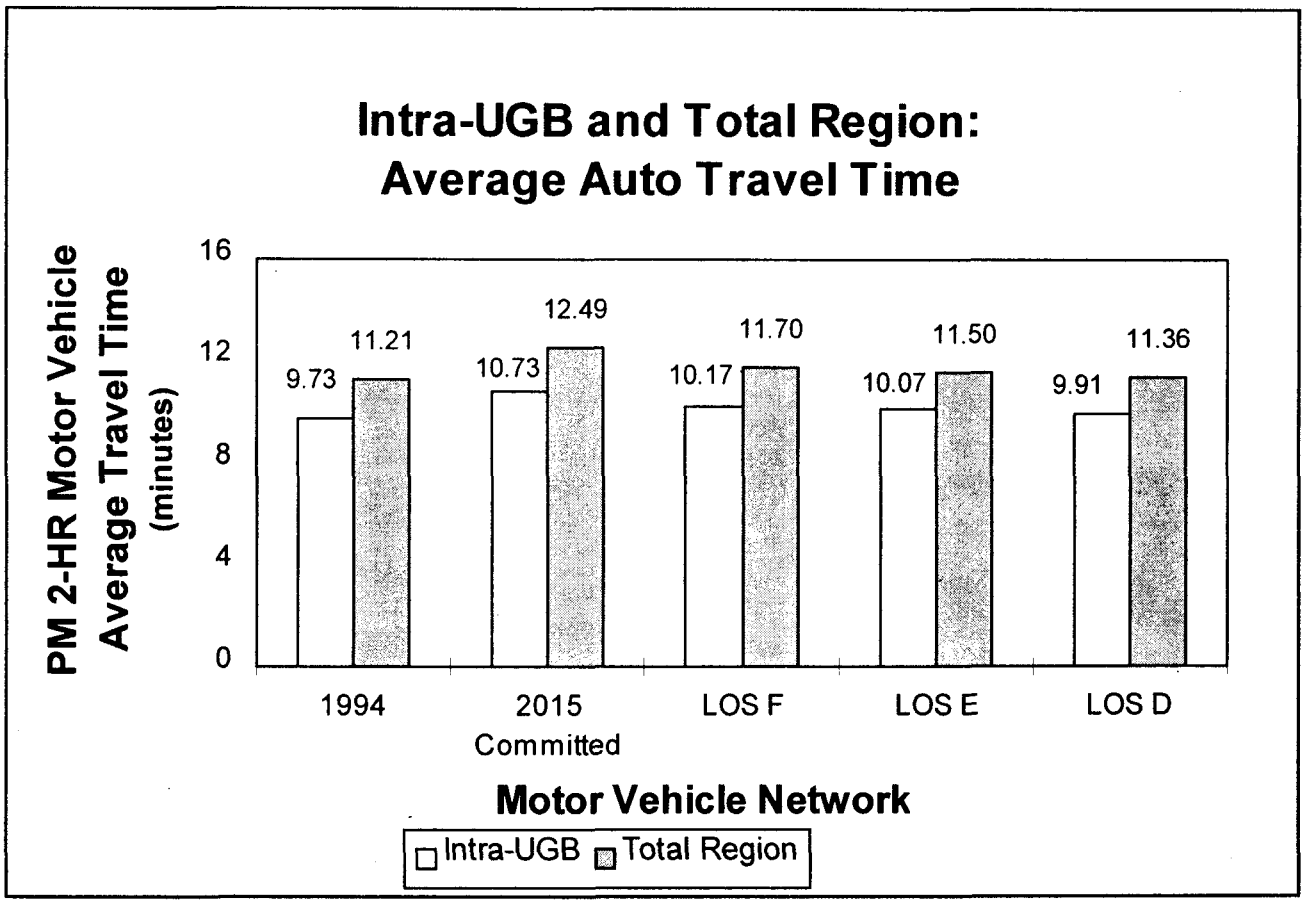
Selected Origins and Destinations	1994	2015 RTP Committed	2015 RTP Low	2015 RTP Moderate (% change from low)	2015 RTP High (% change from moderate)
Portland CBD to Hillsboro (via US 26 and Cornell)	34.1	40.9	38.3	36.7 (-4.2%)	34.1 (-7.1%)
Portland CBD to Beaverton (via US 26 and Hwy 217)	18.7	21.0	20.8	19.5 (-6.3%)	18.1 (-7.1%)
Washington Square to CTC (via Hwy 217, I-5 and I-205)	30.1	37.0	36.1	34.0 (-5.8%)	31.6 (-7.1%)
Portland CBD to Wilsonville (via I-5)	27.2	33.2	33.1	30.6 (-7.6%)	27.9 (-9.5%)
Portland CBD to Lake Oswego (via Highway 43)	20.9	23.9	21.9	21.1 (-3.7%)	20.1 (-4.7%)
Portland CBD to Oregon City (via 99E)	36.7	44.1	38.4	36.3 (-5.5%)	34.3 (-5.5%)
Gateway to Oregon City (via I-205)	23.6	29.3	27.6	26.1 (-5.4%)	24.0 (-8.0%)
Portland CBD to Gresham (via I-84, 181st and Burnside)	32.5	38.2	33.6	33.1 (-1.5%)	31.7 (-4.2%)
Portland CBD to Vancouver CBD (via I-5)	23.1	37.5	24.3	23.0 (-5.3%)	22.4 (-2.6%)
Rivergate to Columbia South Shore (via Lombard, Columbia, Hwy 30 bypass, Sandy and 181st)	33.2	39.4	34.5	34.1 (-1.2%)	33.1 (-2.9%)
Hillsboro mfg. area to Air Cargo at PIA (via Hwy 26)	35.1	43.4	40.0	38.2 (-4.5%)	36.2 (-5.2%)
Tualatin industrial area to Terminal 6 at Rivergate (via I-5)	36.7	44.2	42.1	39.3 (-6.7%)	37.5 (-4.6%)
Clackamas County distribution center area (east of I-205 along Hwy 212/224) to Albina Intermodal Rail Yard (via I-205 and I-84)	23.2	26.4	24.3	23.9 (-1.6%)	22.8 (-4.6%)

Note: Travel times are in minutes. Motor vehicle alternatives are defined by level of service, and all three scenarios were modeled against the "moderate" transit alternative which reflects a 44 percent increase over 1994 service hour levels.

METRO

Motor Vehicle Alternatives Analysis Results

Issue 4: Congestion and Auto Travel Time



METRO

Motor Vehicle Alternatives Analysis Results

Issue 5: Congestion and Alternative Modes

Expected Result:

- Use of alternative modes decreases with less congestion

Actual Result:

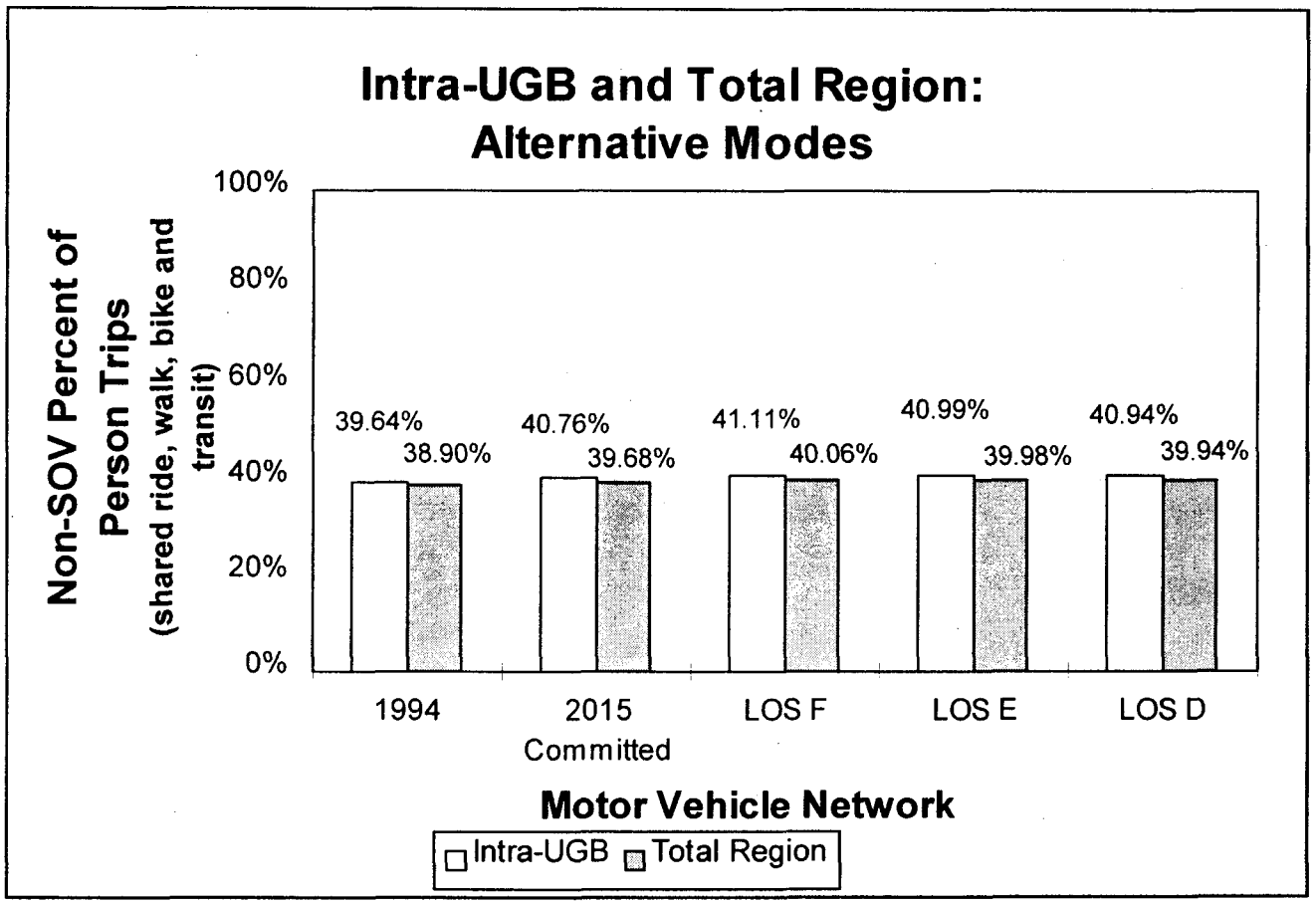
Not significantly

- Slight decrease in use of alternative modes, reflecting modest auto speed changes and a static transit network

METRO

Motor Vehicle Alternatives Analysis Results

Issue 5: Congestion and Alternative Modes



METRO

Motor Vehicle Alternatives Analysis Results

Issue 6: Congestion and Truck Travel Time

Expected Result:

- Truck travel times decrease with less congestion

Actual Result:

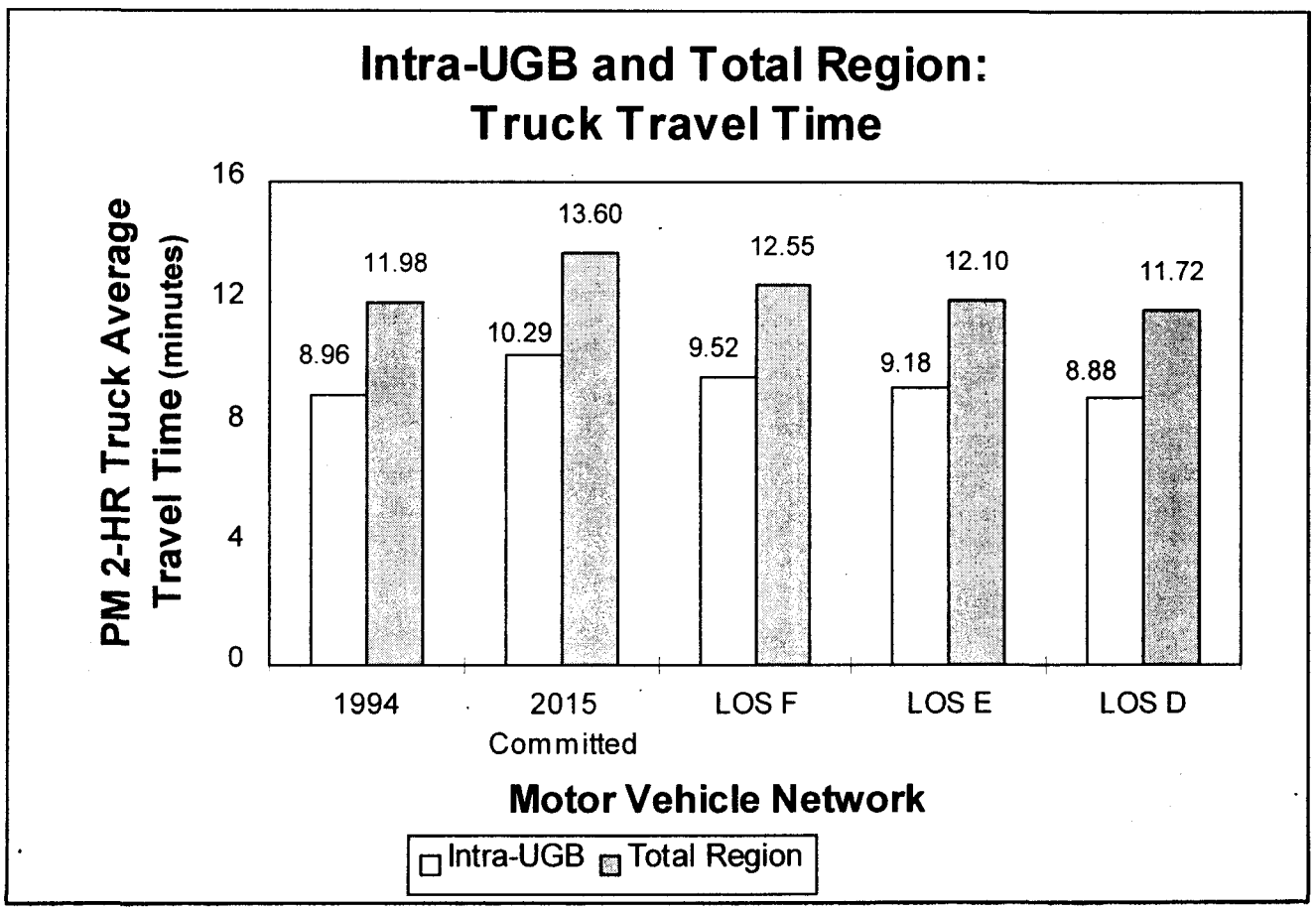
Yes

- Modest decrease in truck travel times

METRO

Motor Vehicle Alternatives Analysis Results

Issue 6: Congestion and Truck Travel Time



METRO

Motor Vehicle Alternatives Analysis Results

Issue 7: Congestion and Cost

Expected Result:

- Reducing congestion carries a very high cost

Actual Result:

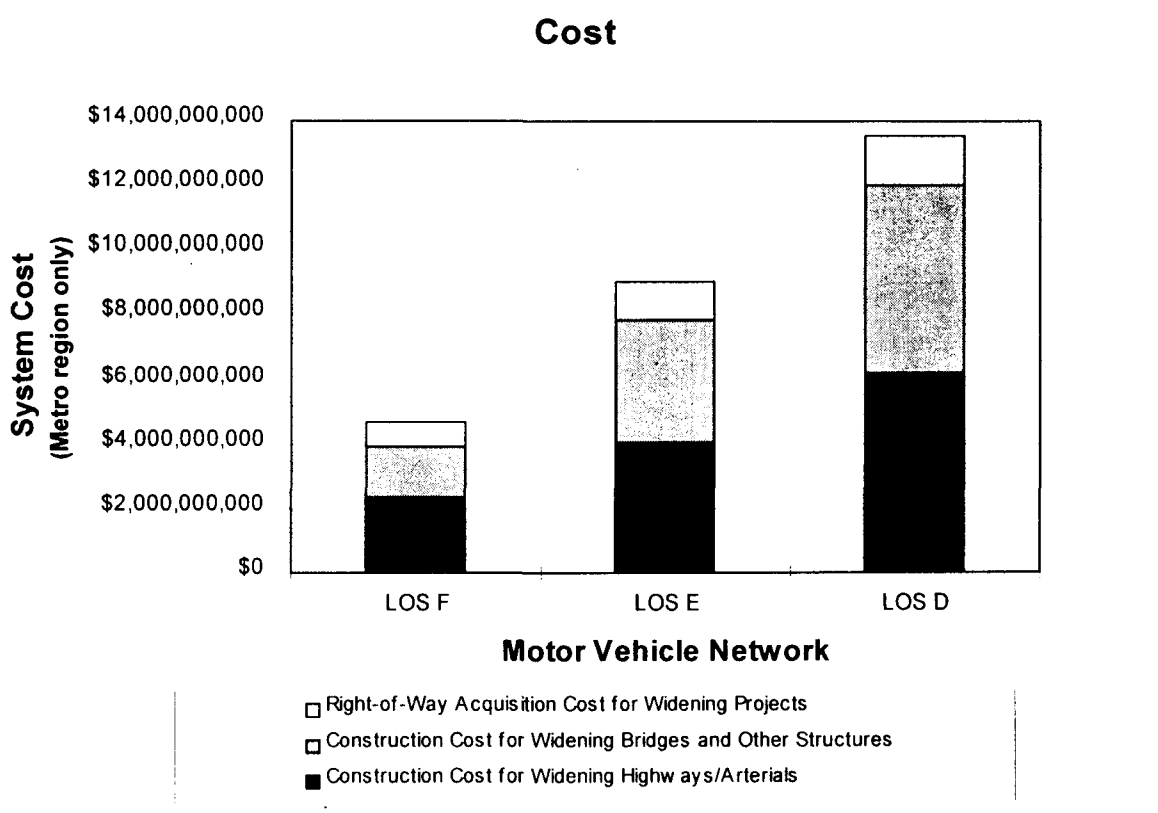
Yes

- Dramatic increase in capital costs (two to three times)

METRO

Motor Vehicle Alternatives Analysis Results

Issue 7: Congestion and Cost



Costs are for projects beyond 2015 committed network. All costs are estimates and include contingency amounts.

METRO

Motor Vehicle Alternatives Analysis Results

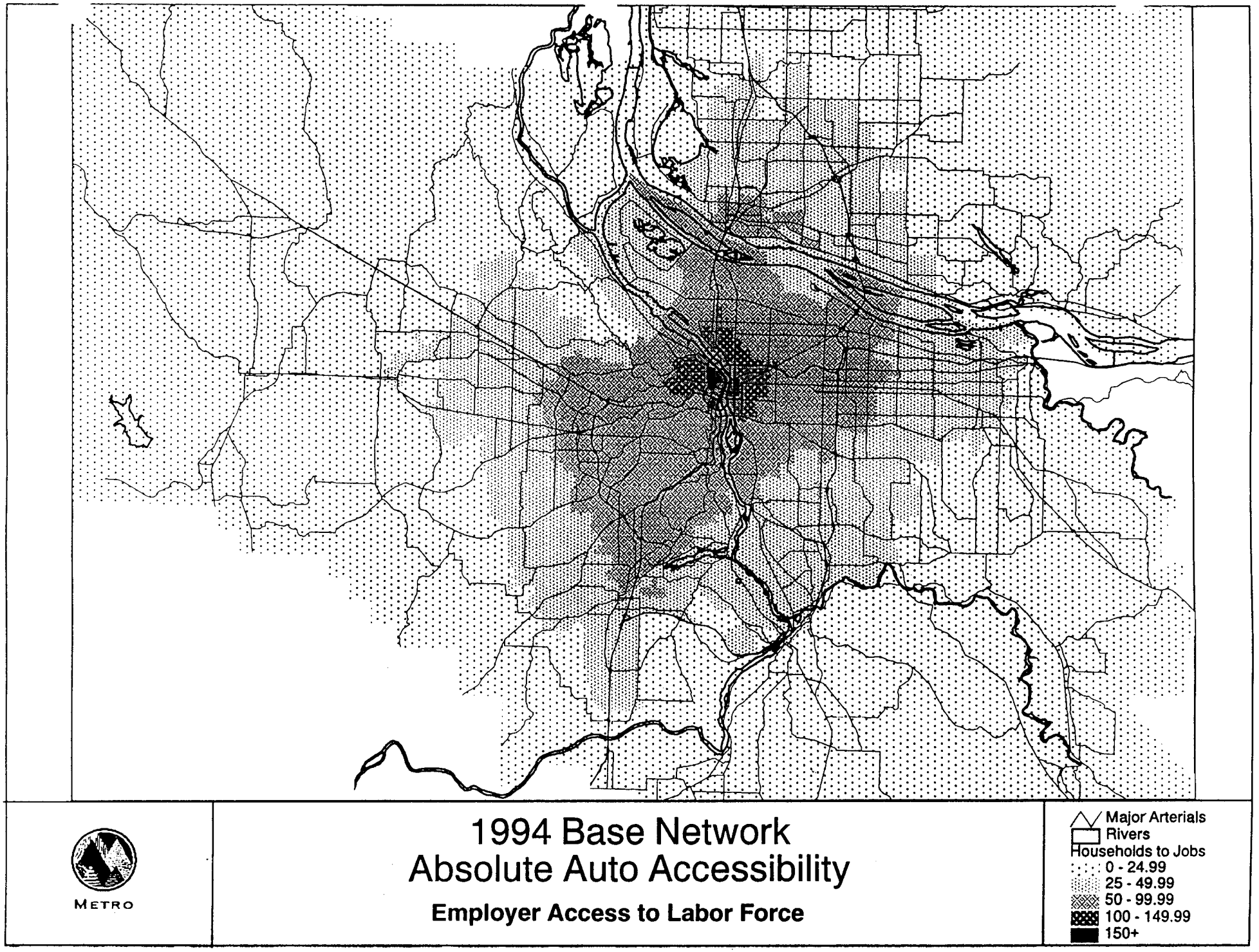
Issue 8: Congestion and Accessibility

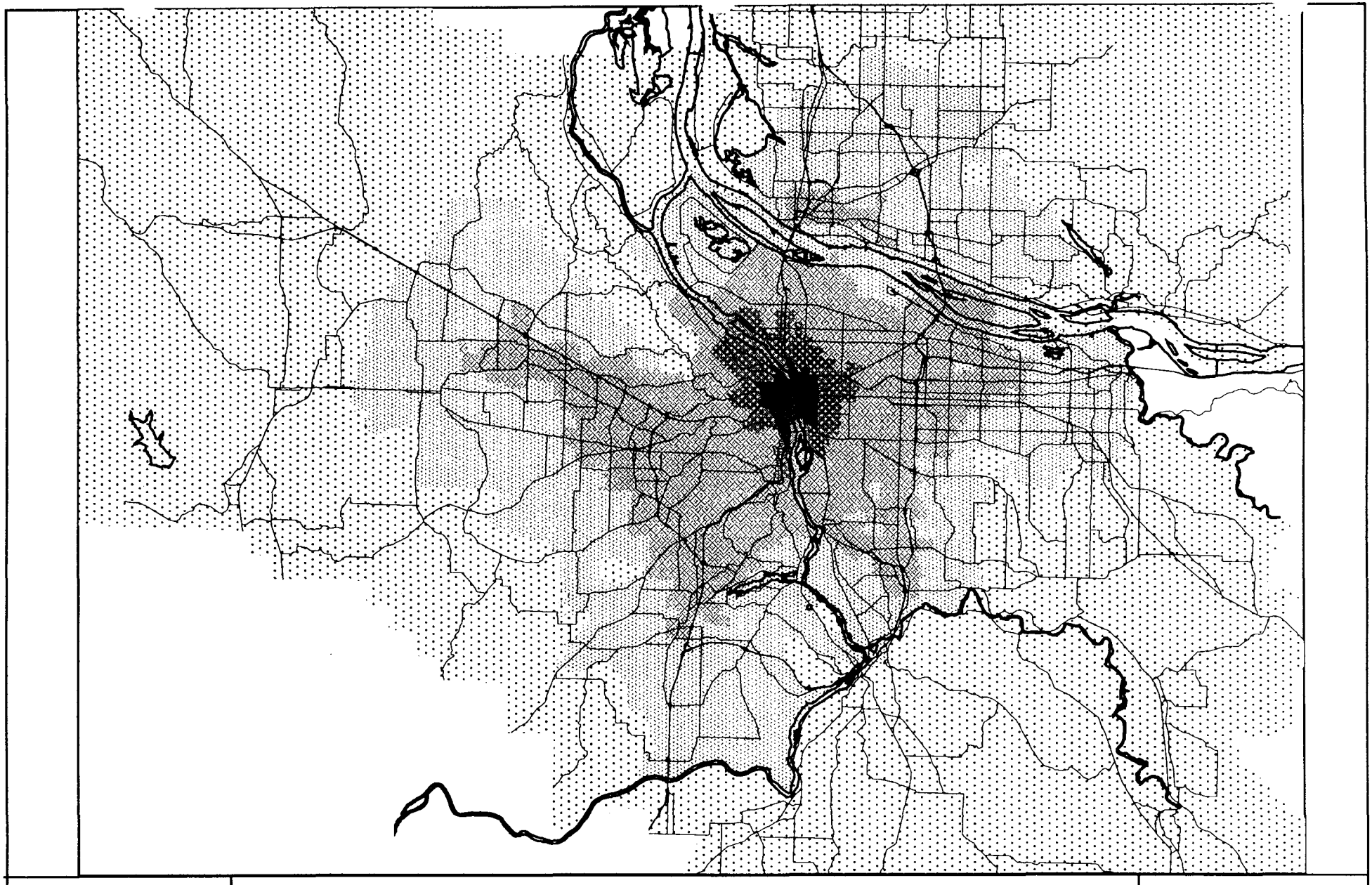
Expected Result:

- Congestion limits access to the central city and regional centers

Actual Result:

Not substantially


METRO
1994 Base Network
Absolute Auto Accessibility
Employer Access to Labor Force
Major Arterials
Rivers
Households to Jobs
0 - 24.99
25 - 49.99
50 - 99.99
100 - 149.99
150+



METRO

2015 Committed Network
Absolute Auto Accessibility

Employer Access to Labor Force

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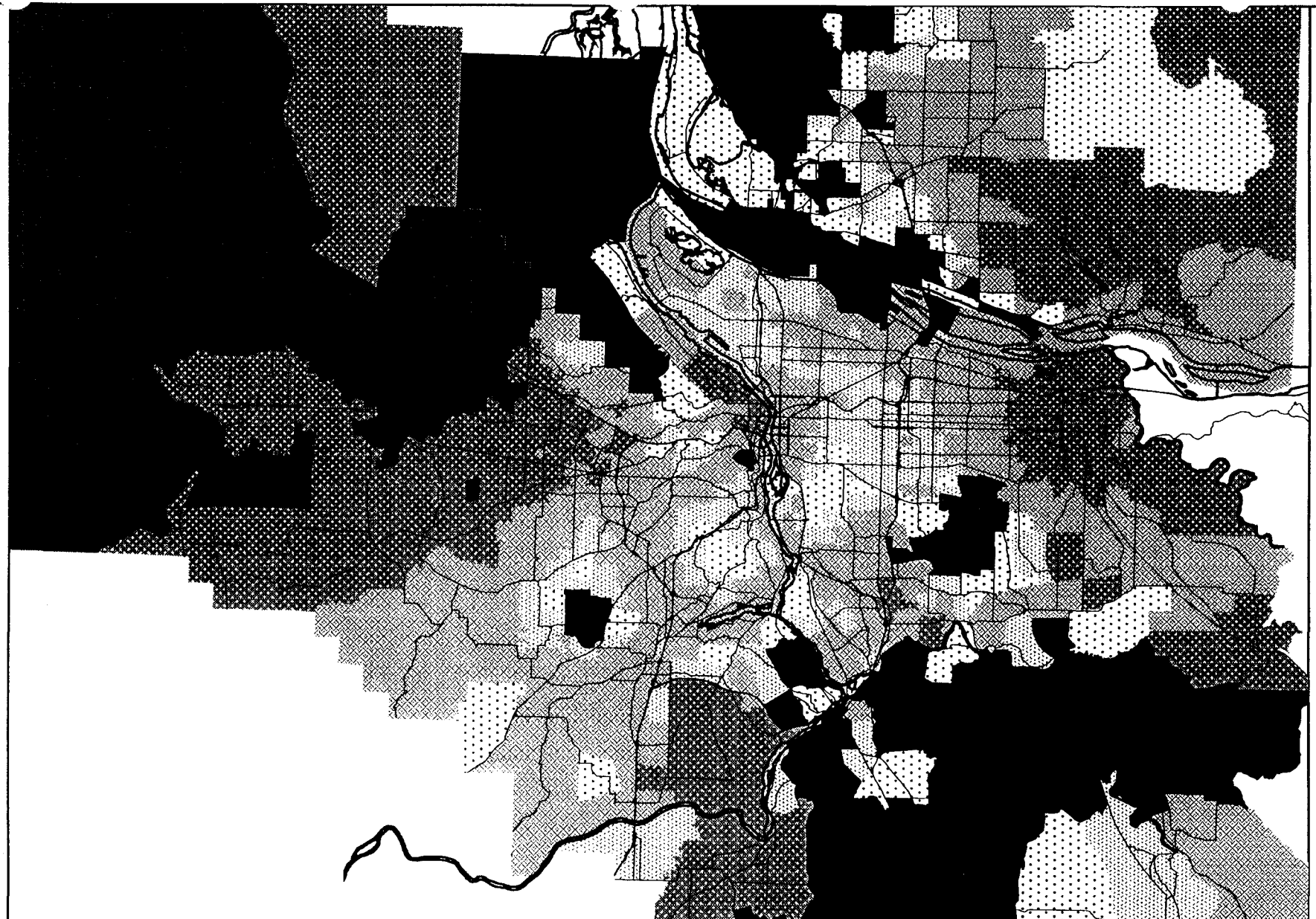

METRO

1994 Base to 2015 Committed Network
Percent Change in Auto Accessibility

Employer Access to Labor Force

Major Arterials
Rivers
Percent Change
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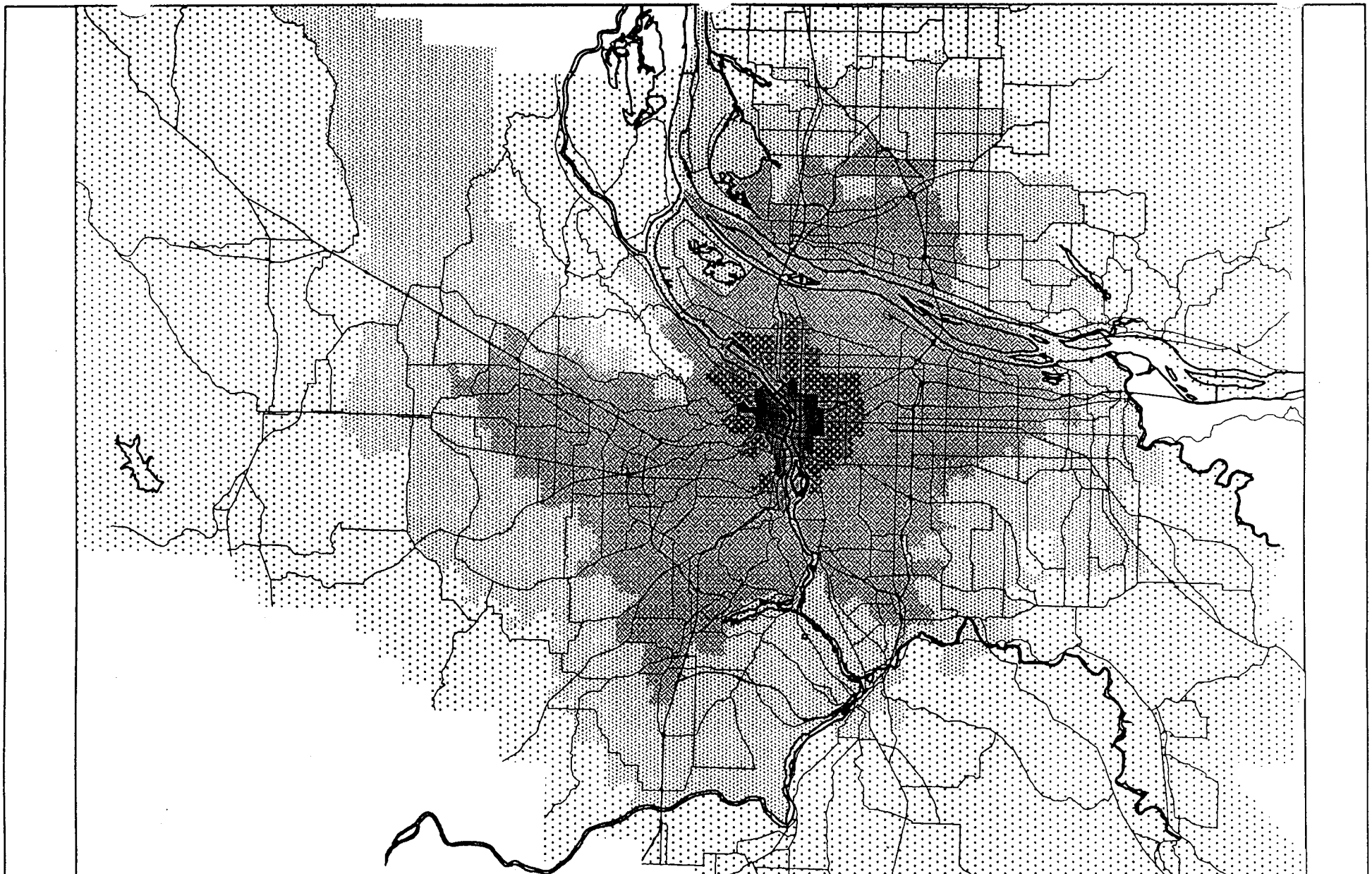

METRO

2015 Low Build Network
Absolute Auto Accessibility

Employer Access to Labor Force

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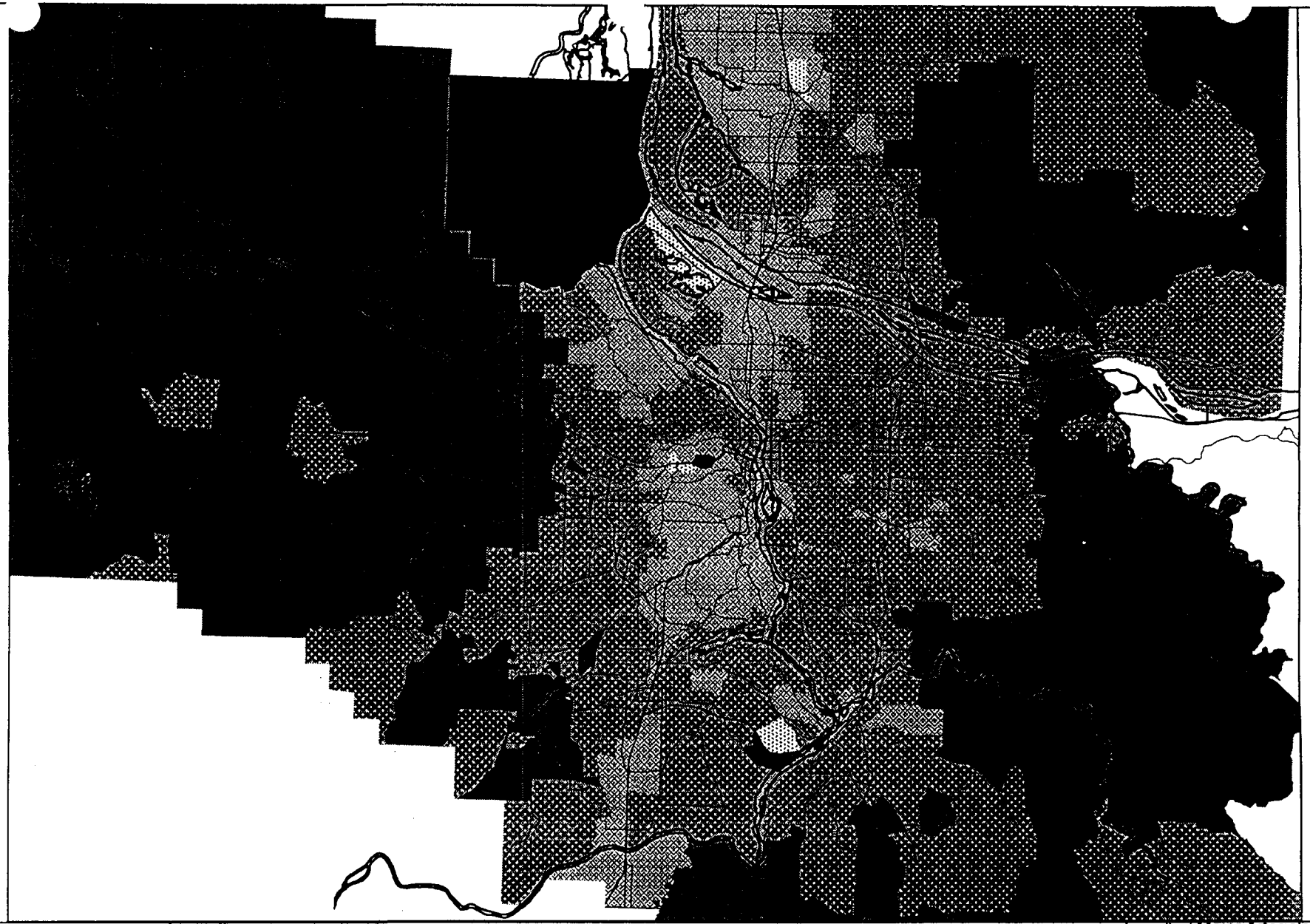

METRO

1994 to 2015 Low Build Network
Percent Change in Auto Accessibility

Employer Access to Labor Force

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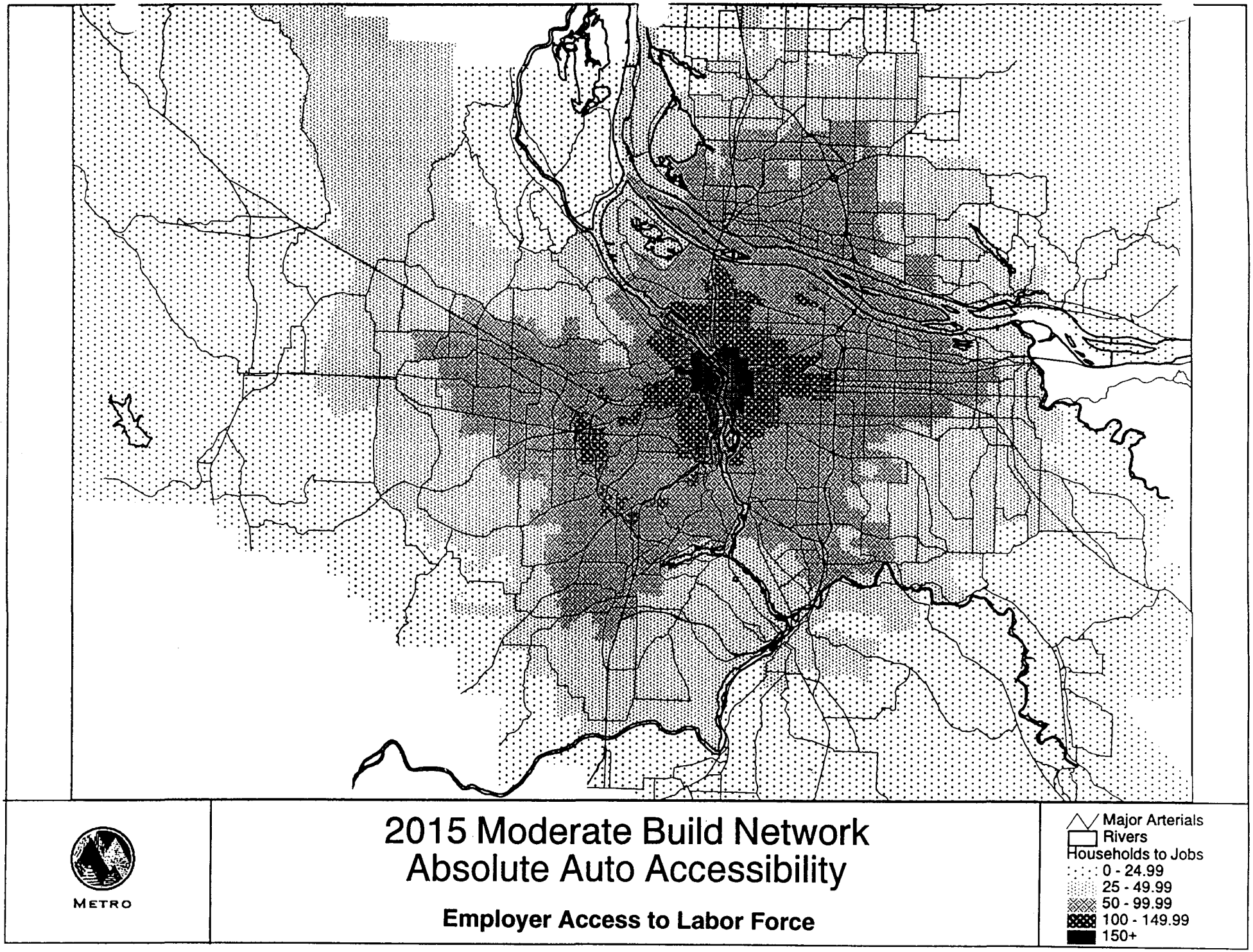
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METRO

2015 High Build Network
Absolute Auto Accessibility

Employer Access to Labor Force

METRO

1994 to 2015 High Build Network
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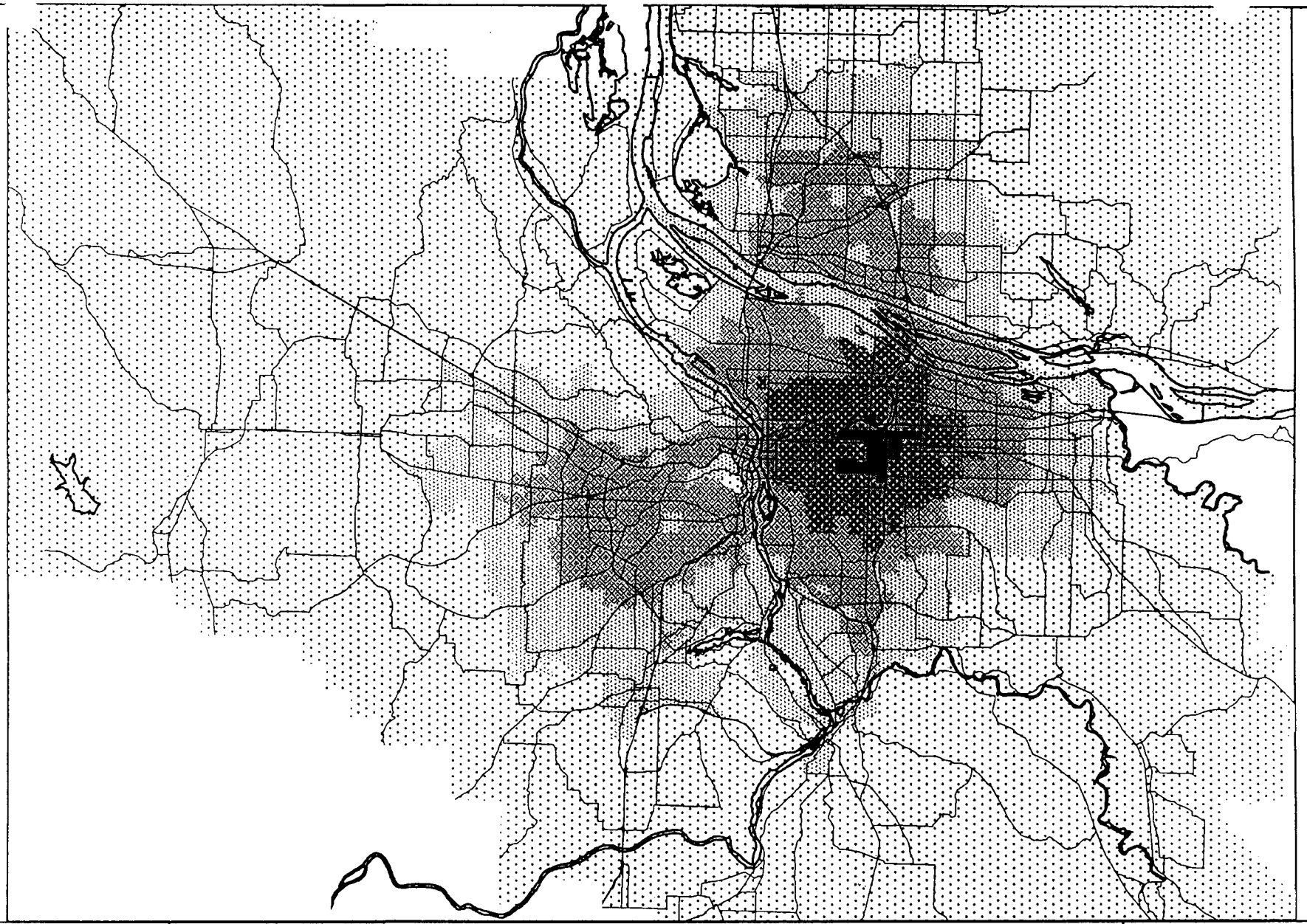

METRO

1994 Base Network
Absolute Auto Accessibility

Neighborhood Access to Jobs

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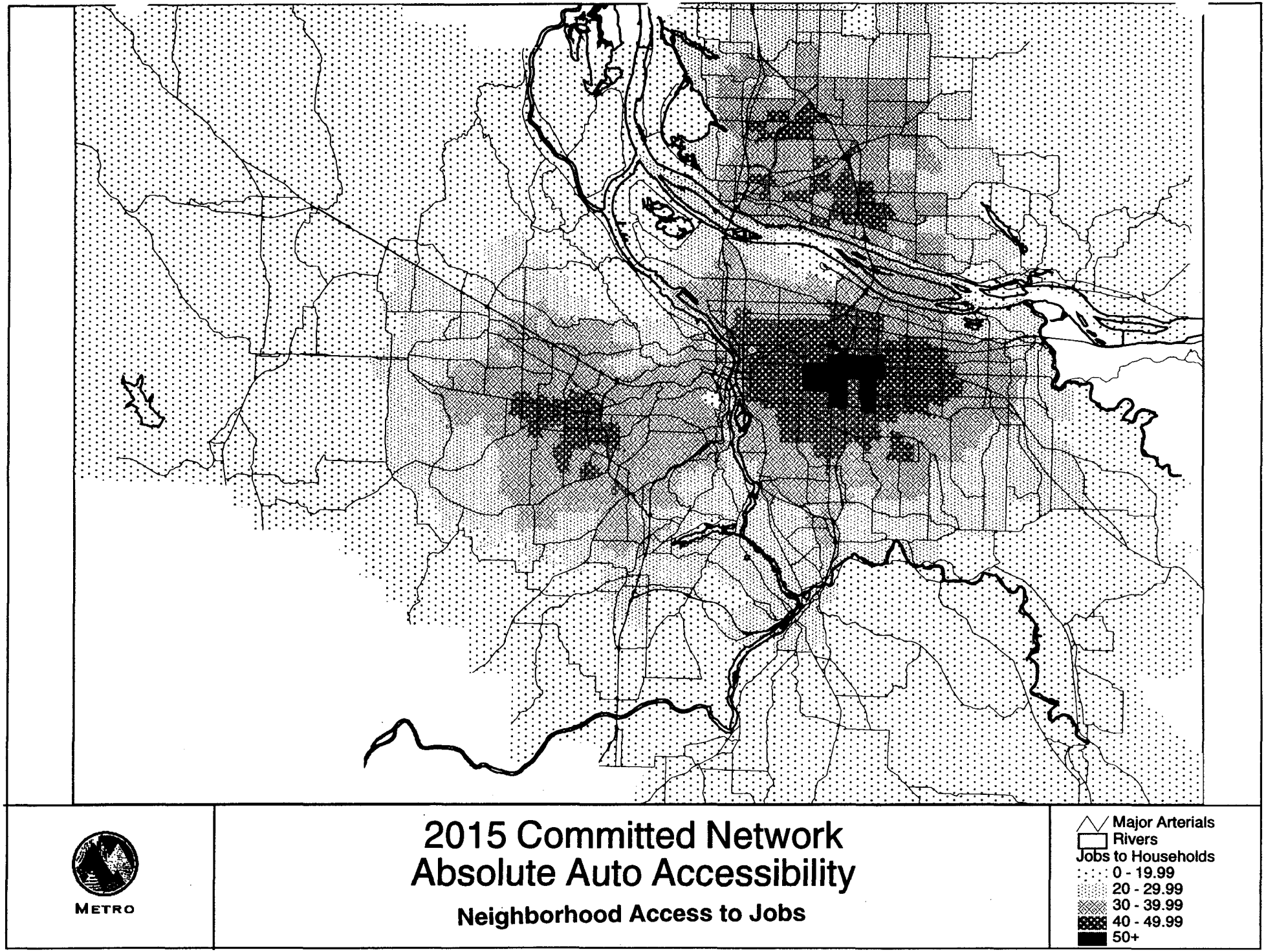
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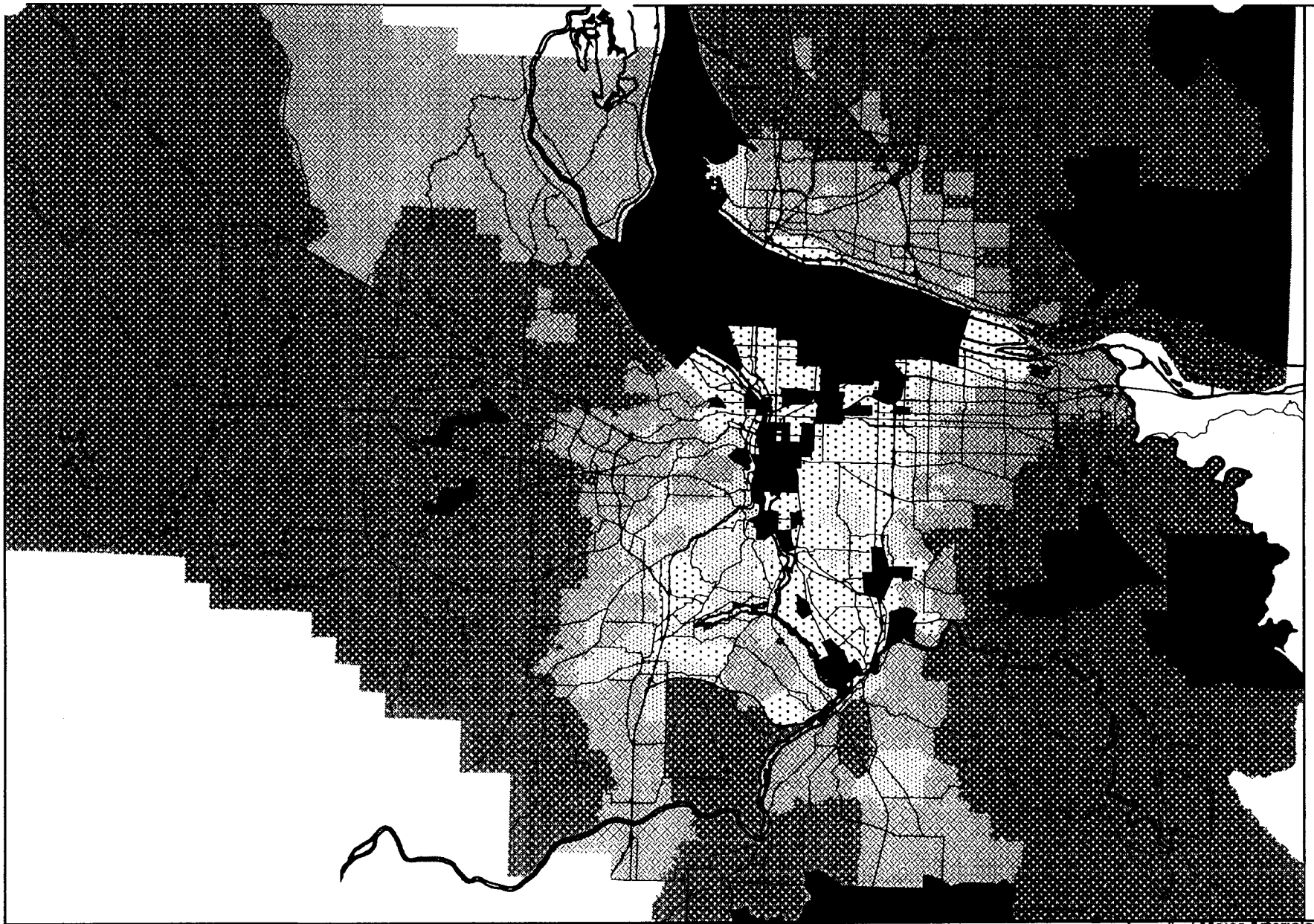
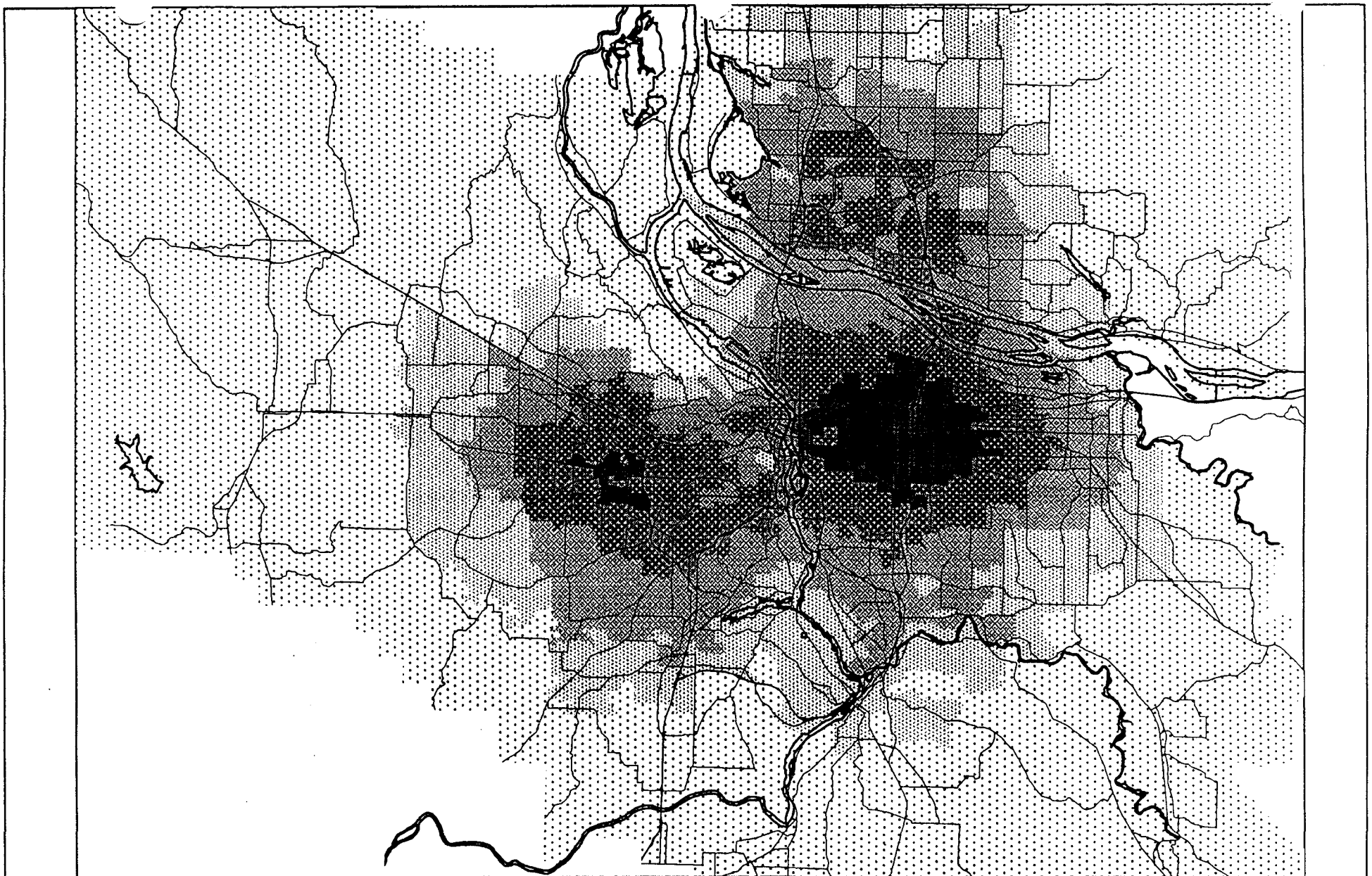


METRO

1994 Base to 2015 Committed Network
Percent Change in Auto Accessibility

Neighborhood Access to Jobs



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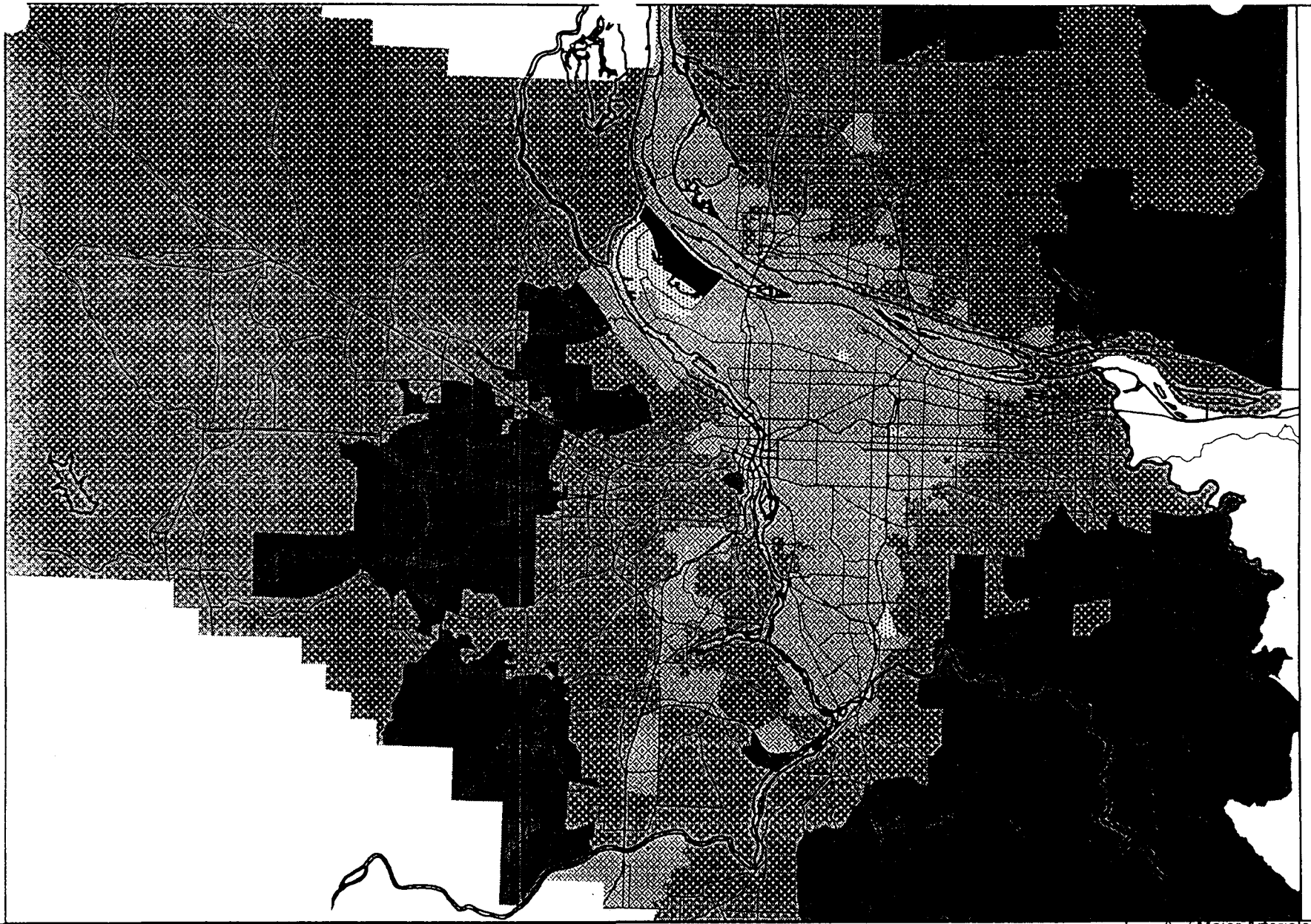

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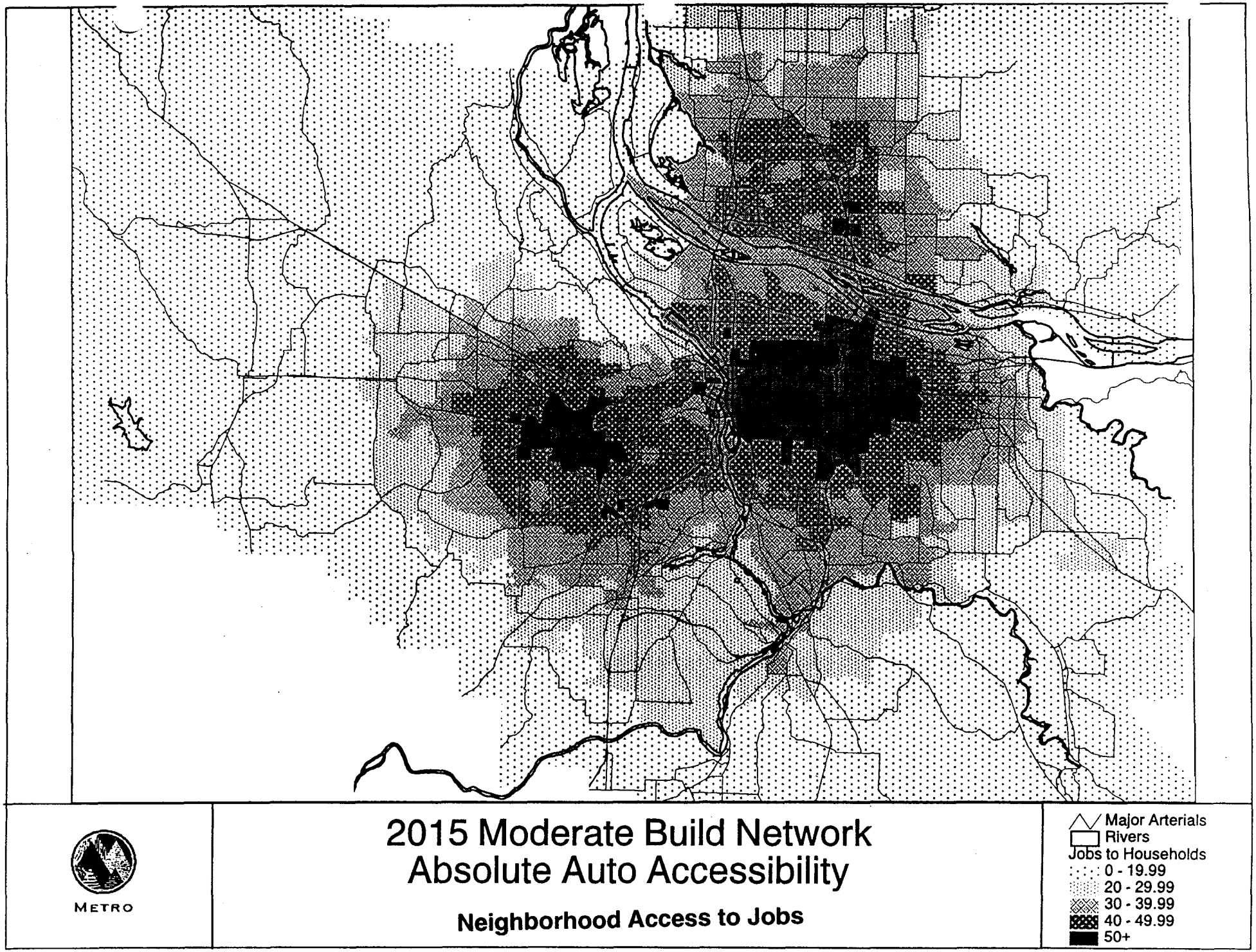
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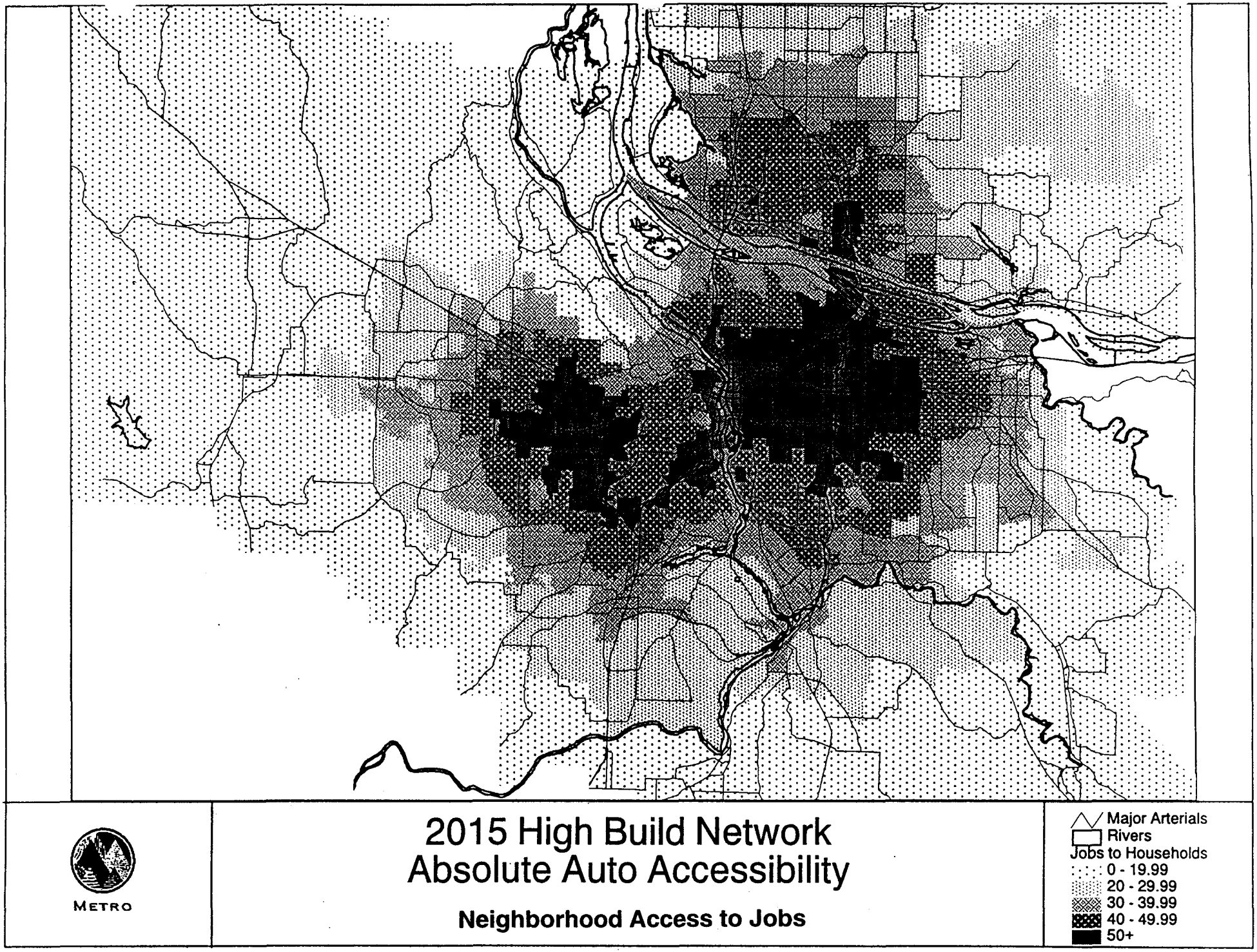
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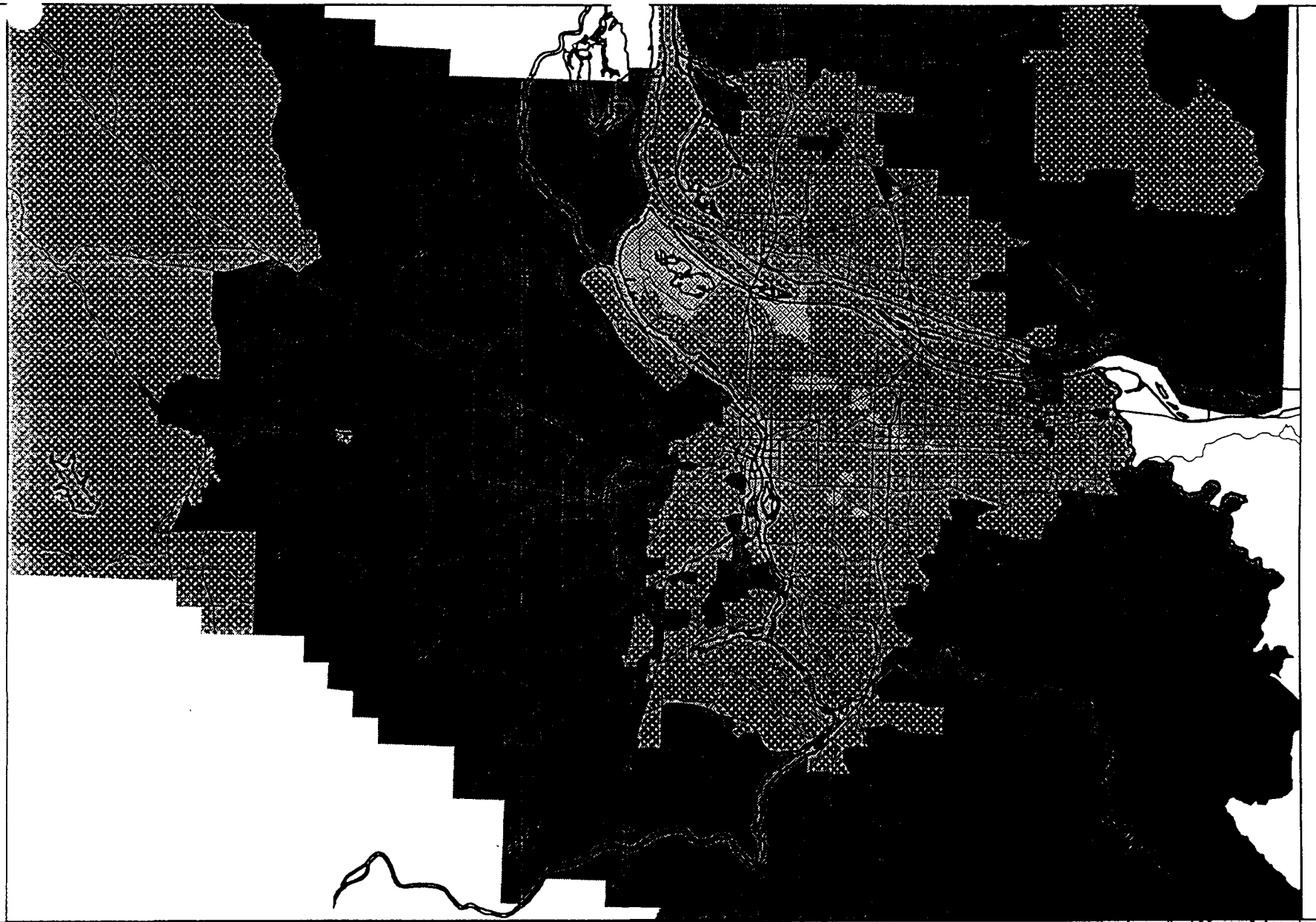

METRO

1994 to 2015 High Build Network
Percent Change in Auto Accessibility

Neighborhood Access to Jobs

(Numbers subject to change due to model refinement)

Motor Vehicle Alternatives Analysis **DRAFT - 7/11/97**

METRO

System Performance Measures for Intra-UGB Trips* (within Metro UGB, excludes Clark County, Washington)

	1994	2015 Committed	2015 Low Hwy/LOS F**	2015 Moderate Hwy/LOS E**	2015 High Hwy/LOS D**
Network Data					
1. Population	1,142,463	1,565,813	1,565,813	1,565,813	1,565,813
2. Employment	791,410	1,225,948	1,225,948	1,225,948	1,225,948
3. Person Trips	4,830,251	6,962,060	6,929,499	6,920,467	6,916,137
Motor Vehicle Data					
1. Total Lane Miles	3,947	4,034	4,508	4,793	5,115
Freeway	595	604	688	779	903
Arterial	3,352	3,430	3,820	4,014	4,212
2. Total Lane Miles Added (from 1994)	N/A	87	561	846	1,168
3. AWD Total Auto Person Trips	4,201,468	5,938,523	5,877,953	5,882,255	5,884,345
4. AWD Total VMT (no trucks or externals)	14,379,674	20,641,798	21,532,574	22,211,368	22,710,446
5. AWD VMT/Capita (no trucks or externals)	12.59	13.18	13.75	14.19	14.50
6. AWD VMT/Capita change from 1994	N/A	4.71%	9.26%	12.70%	15.23%
7. Single Occupant Vehicle (SOV) Percent of Person Trips	60.36%	59.24%	58.89%	59.01%	59.06%
8. Non-SOV Percent of Person Trips (shared ride, walk, bike, transit)	39.64%	40.76%	41.11%	40.99%	40.94%
9. AWD Motor Vehicle Average Trip Length (miles) *(PM 2-HR)*	4.05 *(4.11)*	4.01 *(4.10)*	4.22 *(4.32)*	4.35 *(4.46)*	4.45 *(4.56)*
10. AWD Auto Occupancy	1.18	1.17	1.16	1.17	1.16
11. PM 2-HR Motor Vehicle Average Travel Time (minutes)	9.73	10.73	10.17	10.07	9.91
12. PM 2-HR Average Motor Vehicle Travel Speed (miles per hour)	25.34	22.93	25.49	26.57	27.61
13. Total Miles in Network	3,524	3,582	3,704	3,704	3,704
14. Congested miles (v/c >0.8) *(percentage of total miles in network)*	276 *(7.83%)*	768 *(21.44%)*	560 *(15.12%)*	437 *(11.80%)*	300 *(8.10%)*
15. Motor Vehicle Hours	119,831	197,274	184,786	182,844	179,796
16. PM 2-HR Motor Vehicle Hours of Delay (time accrued above v/c > 0.8)	8,848	35,633	17,456	12,211	7,859
17. Percent Motor Vehicle Hours of Delay	7.38%	18.06%	9.45%	6.68%	4.37%
Freeway *(percentage of total motor vehicle hours)*	3,456 *(2.88%)*	12,832 *(6.5%)*	10,416 *(5.64%)*	8,038 *(4.40%)*	5,597 *(3.11%)*
Arterial *(percentage of total motor vehicle hours)*	8,534 *(7.12%)*	22,801 *(11.56%)*	7,040 *(3.81%)*	4,173 *(2.28%)*	2,262 *(1.26%)*
18. Total Highway Capacity-Miles	4,078,618	4,160,896	4,660,434	4,995,550	5,401,635
Freeway	1,069,641	1,085,042	1,251,204	1,414,141	1,642,272
Arterial	3,008,977	3,075,845	3,409,223	3,581,409	3,759,363
Freight Data					
1. AWD Total Truck Trips	186,310	284,774	284,774	284,774	284,774
2. AWD Truck Average Trip Length (miles)	3.8	4.04	4.04	4.04	4.04
3. PM 2-HR Truck Average Travel Time (minutes)	8.96	10.29	9.52	9.18	8.88
4. Truck Hours	3,723	6,866	6,251	5,929	5,660
5. Truck Vehicle Hours of Delay	311	1,603	817	484	277
6. Percent Truck Hours of Delay	8.35%	23.35%	13.07%	8.16%	4.89%
7. Lane Miles Added to Freight Network (from 1994)	N/A	19.7	254.2	425.7	635.6
8. Freight Network Miles	590	590	611	611	611
9. Congested Freight Network Miles	104	264	213	178	122
10. Percent Congested Freight Network Miles	17.63%	44.75%	34.86%	29.13%	19.97%

(Numbers subject to change due to model refinement)

Motor Vehicle Alternatives Analysis **DRAFT - 7/11/97**

System Performance Measures for Intra-UGB Trips* (within Metro UGB, excludes Clark County, Washington)

	1994	2015 Committed	2015 Low Hwy/LOS F**	2015 Moderate Hwy/LOS E**	2015 High Hwy/LOS D**
Transit Data					
1. AWD Total Transit Trips (originating riders) (intra-Oregon)	169,911	267,723	325,173	322,384	322,280
2. AWD Transit Revenue Hours (intra-Oregon)	4,349	5,508	6,239	6,156	6,109
3. Transit Percent of Person Trips	3.52%	3.85%	4.69%	4.66%	4.66%
4. AWD Originating Riders Per Revenue Hour (intra-Oregon)	39.07	48.61	52.12	52.37	52.75
5. Percent Covered Households (w/in 1/4 mile)	64.68%	61.04%	61.36%	61.36%	61.36%
6. Percent Covered Employment (w/in 1/4 mile)	80.73%	78.78%	79.75%	79.75%	79.75%
Pedestrian Data					
1. Total Walk Trips (does not include walk trips to transit)***	227,506	395,732	376,543	367,587	362,223
2. Walk Percent of Person Trips	4.70%	5.68%	5.43%	5.31%	5.24%
Bicycle Data					
1. Total Bike Trips****	35,329	55,025	53,409	52,307	51,720
2. Bike Percent of Person Trips	0.70%	0.79%	0.77%	0.76%	0.75%
Motor Vehicle Financial Data (in constant 1997 dollars, Metro region only)					
1. Construction Cost for Widening Highways/Arterials	N/A		$2,325,000,000	$4,024,575,000	$6,222,475,000
2. Construction Cost for Widening Bridges and Other Structures	N/A		$1,628,705,280	$3,799,342,640	$5,767,279,680
3. Right-of-Way Acquisition Costs for Widening Projects	N/A		$745,296,860	$1,182,451,410	$1,564,362,730
*Total Costs*****			*$4,699,002,140*	*$9,006,369,050*	*$13,554,117,410*
Land Consumption Data (Metro region only)					
1. Existing Right-Of-Way (all streets) (in acres)	35,609		N/A	N/A	N/A
2. Additional Right-Of-Way (highway/arterial) (in acres)	N/A		1,062	1,544	2,067

* Data reflects intra-UGB trips only

** All 2015 motor vehicle alternative scenarios were modeled against the "moderate" transit alternative which represents a 44 percent increase over 1994 service hour levels and includes all planned LRT.

*** Walk trips are consistently understated between alternatives because they represent only trips 6 blocks or longer in length and improvement in pedestrian environment is not accounted for.

**** Bike trips are consistently understated between alternatives due to the broad area of coverage and sample size of the 1994 Metro Travel Behavior Survey. Metro is currently applying for a TGM grant to further study bike travel in the region.

***** The estimated cost of roadway expansion projects in the "Preferred RTP Network" as listed in the 1995 *Interim Federal Regional Transportation Plan* is $3,028,060,628 (in 1997 dollars) and includes bridges, highways and arterials.

School Bus trips account for 2.66 percent of total person trips in 1994 and 2.85 percent of total person trips in all three 2015 scenarios.

Costs are for projects beyond 2015 committed network.

All costs are estimates and include contingency amounts.

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(Numbers subject to change due to model refinement)

Motor Vehicle Alternatives Analysis **DRAFT - 7/11/97**

METRO

System Performance Measures for Total Region Trips (includes Clark, Clackamas, Multnomah and Washington counties)

	1994	2015 Committed	2015 Low Hwy/LOS F*	2015 Moderate Hwy/LOS E*	2015 High Hwy/LOS D*
Network Data					
1. Population	1,552,673	2,190,433	2,190,433	2,190,433	2,190,433
2. Employment	947,647	1,479,544	1,479,544	1,479,544	1,479,544
3. Person Trips	6,448,871	9,616,454	9,616,120	9,616,028	9,615,684
Motor Vehicle Data					
1. Total Lane Miles	7,200	7,310	7,997	8,404	8,861
Freeway	1,047	1,087	1,208	1,326	1,492
Arterial	6,153	6,223	6,789	7,078	7,369
2. Total Lane Miles Added (from 1994)	N/A	110	797	1,204	1,661
3. AWD Total Auto Person Trips	5,652,749	8,314,044	8,261,755	8,273,312	8,279,267
4. AWD Total VMT (no trucks or externals)	22,386,536	33,586,276	34,920,688	35,919,360	36,621,276
5. AWD VMT/Capita (no trucks or externals)	14.42	15.33	15.94	16.40	16.72
6. AWD VMT/Capita change from 1994	N/A	6.32%	10.57%	13.73%	15.96%
7. Single Occupant Vehicle (SOV) Percent of Person Trips	61.10%	60.32%	59.94%	60.02%	60.06%
8. Non-SOV Percent of Person Trips (shared ride, walk, bike, transit)	38.90%	39.68%	40.06%	39.98%	39.94%
9. AWD Motor Vehicle Average Trip Length (miles) *(PM 2-HR)*	4.68 *(5.34)*	4.65 *(5.27)*	4.86 *(5.54)*	4.99 *(5.69)*	5.09 *(5.79)*
10. AWD Auto Occupancy	1.18	1.16	1.16	1.16	1.16
11. PM 2-HR Motor Vehicle Average Travel Time (minutes)	11.21	12.49	11.70	11.50	11.36
12. PM 2-HR Average Motor Vehicle Travel Speed (miles per hour)	28.58	25.32	28.41	29.69	30.58
13. Total Miles in Network	6,903	6,938	7,086	7,086	7,086
14. Congested miles (v/c >0.8) *(percentage of total miles in network)*	322 *(4.66%)*	963 *(13.88%)*	677 *(9.55%)*	500 *(7.06%)*	310 *(4.37%)*
15. Motor Vehicle Hours	155,430	263,700	246,538	242,722	238,665
16. PM 2-HR Motor Vehicle Hours of Delay (time accrued above v/c > 0.8)	10,052	42,828	19,662	13,065	8,353
17. Percent Motor Vehicle Hours of Delay	6.47%	16.24%	7.98%	5.38%	3.50%
Freeway *(percentage of total motor vehicle hours)*	3,810 *(2.45%)*	16,271 *(6.17%)*	11,739 *(4.76%)*	8,723 *(3.59%)*	6,081 *(2.55%)*
Arterial *(percentage of total motor vehicle hours)*	6,242 *(4.02%)*	26,557 *(10.07%)*	7,923 *(3.21%)*	4,343 *(1.79%)*	2,272 *(0.95%)*
18. Total Highway Capacity-Miles	7,461,294	7,599,933	8,310,823	8,793,054	9,359,891
Freeway	1,940,916	2,010,651	2,233,955	2,459,176	2,765,150
Arterial	5,520,378	5,589,275	6,076,868	6,333,878	6,594,741
Freight Data					
1. AWD Total Truck Trips	298,101	495,934	495,934	495,934	495,934
2. AWD Truck Average Trip Length (miles)	6.4	6.48	6.48	6.48	6.48
3. PM 2-HR Truck Average Travel Time (minutes)	11.98	13.60	12.55	12.10	11.72
4. Truck Hours	5,144	9,805	8,988	8,589	8,268
5. PM 2-HR Truck Vehicle Hours of Delay (time accrued above v/c > 0.8)	310	1,603	817	484	277
6. Percent Truck Hours of Delay	6.03%	16.35%	9.09%	5.64%	3.35%
7. Lane Miles Added to Freight Network (from 1994)	N/A	34.3	370.3	619.1	904.2
8. Freight Network Miles	1143	1143	1169	1169	1169
9. Congested Freight Network Miles	131	357	275	216	128
10. Percent Congested Freight Network Miles	11.46%	31.23%	23.52%	18.48%	10.95%

(Numbers subject to change due to model refinement)

Motor Vehicle Alternatives Analysis **DRAFT - 7/11/97**

METRO

System Performance Measures for Total Region Trips (includes Clark, Clackamas, Multnomah and Washington counties)

	1994	2015 Committed	2015 Low Hwy/LOS F*	2015 Moderate Hwy/LOS E*	2015 High Hwy/LOS D*
Transit Data					
1. AWD Total Transit Trips (originating riders) (excluding C-TRAN)	185,738	304,813	379,553	378,518	378,549
2. AWD Transit Revenue Hours (excluding C-TRAN)**	4,674	6,225	6,993	6,903	6,852
3. Transit Percent of Person Trips	2.88%	3.17%	3.95%	3.94%	3.94%
4. AWD Originating Riders Per Revenue Hour (excluding C-TRAN)	39.74	48.97	54.28	54.83	55.25
5. Percent Covered Households (w/in 1/4 mile)	59.67%	57.37%	56.62%	56.62%	56.62%
6. Percent Covered Employment (w/in 1/4 mile)	79.27%	77.57%	78.09%	78.09%	78.09%
Pedestrian Data					
1. Total Walk Trips (does not include walk trips to transit)***	278,250	479,864	458,804	449,332	443,629
2. Walk Percent of Person Trips	4.31%	4.99%	4.77%	4.67%	4.61%
Bicycle Data					
1. Total Bike Trips****	43,575	67,846	66,122	64,973	64,346
2. Bike Percent of Person Trips	0.68%	0.71%	0.69%	0.68%	0.67%
Motor Vehicle Financial Data (in constant 1997 dollars, Metro region only)					
1. Construction Cost for Widening Highways/Arterials	N/A		$2,325,000,000	$4,024,575,000	$6,222,475,000
2. Construction Cost for Widening Bridges and Other Structures	N/A		$1,628,705,280	$3,799,342,640	$5,767,279,680
3. Right-of-Way Acquisition Costs for Widening Projects	N/A		$745,296,860	$1,182,451,410	$1,564,362,730
*Total Costs*****			*$4,699,002,140*	*$9,006,369,050*	*$13,554,117,410*
Land Consumption Data (Metro region only)					
1. Existing Right-Of-Way (all streets) (in acres)	35,609		N/A	N/A	N/A
2. Additional Right-Of-Way (highway/arterial) (in acres)	N/A		1,062	1,544	2,067

* All 2015 motor vehicle alternative scenarios were modeled against the "moderate" transit alternative which represents a 44 percent increase over 1994 service hour levels and includes all planned LRT.

** Revenue hours are based on current span of service factors.

*** Walk trips are consistently understated between alternatives because they represent only trips 6 blocks or longer in length and improvement in pedestrian environment is not accounted for.

**** Bike trips are consistently understated between alternatives due to the broad area of coverage and sample size of the 1994 Metro Travel Behavior Survey. Metro is currently applying for a TGM grant to further study bike travel in the region.

***** The estimated cost of roadway expansion projects in the "Preferred RTP Network" as listed in the 1995 *Interim Federal Regional Transportation Plan* is $3,028,060,628 (in 1997 dollars) and includes bridges, highways and arterials.

School Bus trips account for 2.83 percent of total person trips in 1994 and 3.01 percent of total person trips in all three 2015 scenarios.

Costs are for projects beyond 2015 committed network.

All costs are estimates and include contingency amounts.

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4 Public Transportation Alternatives

METRO

Public Transportation Alternatives Analysis Results

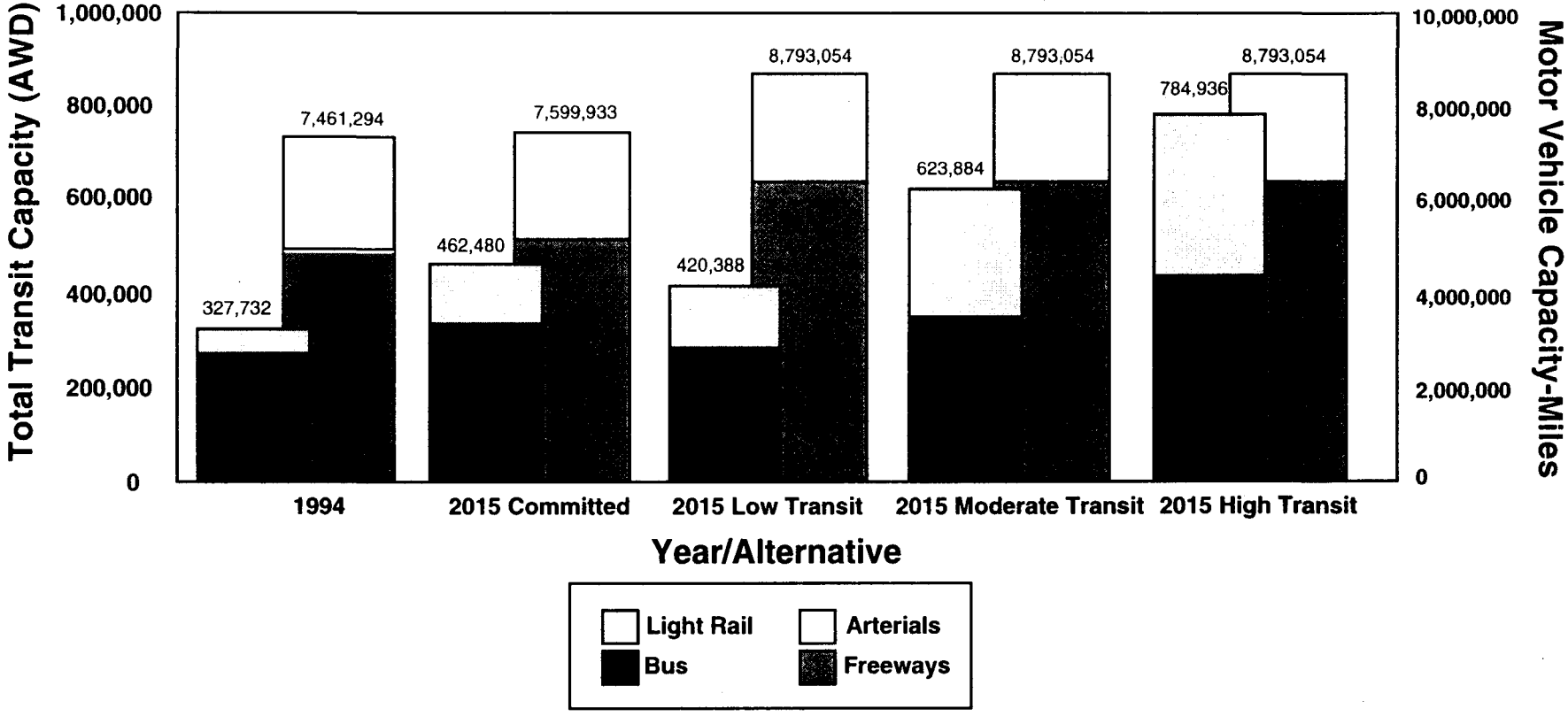
Building the Public Transportation Alternatives

- Uses 2015 pop/emp forecast
- Uses 1994 local intersection density index and 2015 mixed-use index to describe pedestrian environment
- Uses 2015 long-term parking costs for limited areas in the region (Portland CBD, Oregon City, Vancouver, WA, North Macadam district, Lloyd district, Washington Square, Beaverton CBD, Hillsboro, Milwaukie CBD, Clackamas Town Center, Gresham, Gateway, OMSI)
- No variation in parking costs and improvements to pedestrian environment among the alternatives
- Improvements and coverage focused on regional centers, town centers and main streets
- Motor vehicle network static across all three alternatives, representing 1,204 more lane miles (region-wide) than 1994 (a 17% increase)
- Low transit network includes E/W LRT, S/N LRT from CTC to Lombard. Moderate transit network includes low network plus S/N LRT to Vancouver, and airport LRT. High transit network includes moderate network plus LRT from Vancouver to Oregon City, LRT from Portland CBD to Tigard/Tualatin (via 217) and LRT from CTC to Vancouver on the eastside of Willamette River

METRO

Public Transportation Alternatives Analysis

Building the Transit Alternatives



Source: Metro 1997

METRO

Public Transportation Alternatives Analysis Results

Issue 1: Transit Use and 2040 Land Use/ Transportation Connection

Expected Result:

- 2040 land use/transportation connection increases transit use

  (In 1995, Portland, as compared to 20 other transit districts serving a similar population size, ranked third in terms of annual boarding transit trips per capita.)

- Transit use would increase even faster with improved pedestrian environment and increased regional parking costs

Actual Result:

Yes

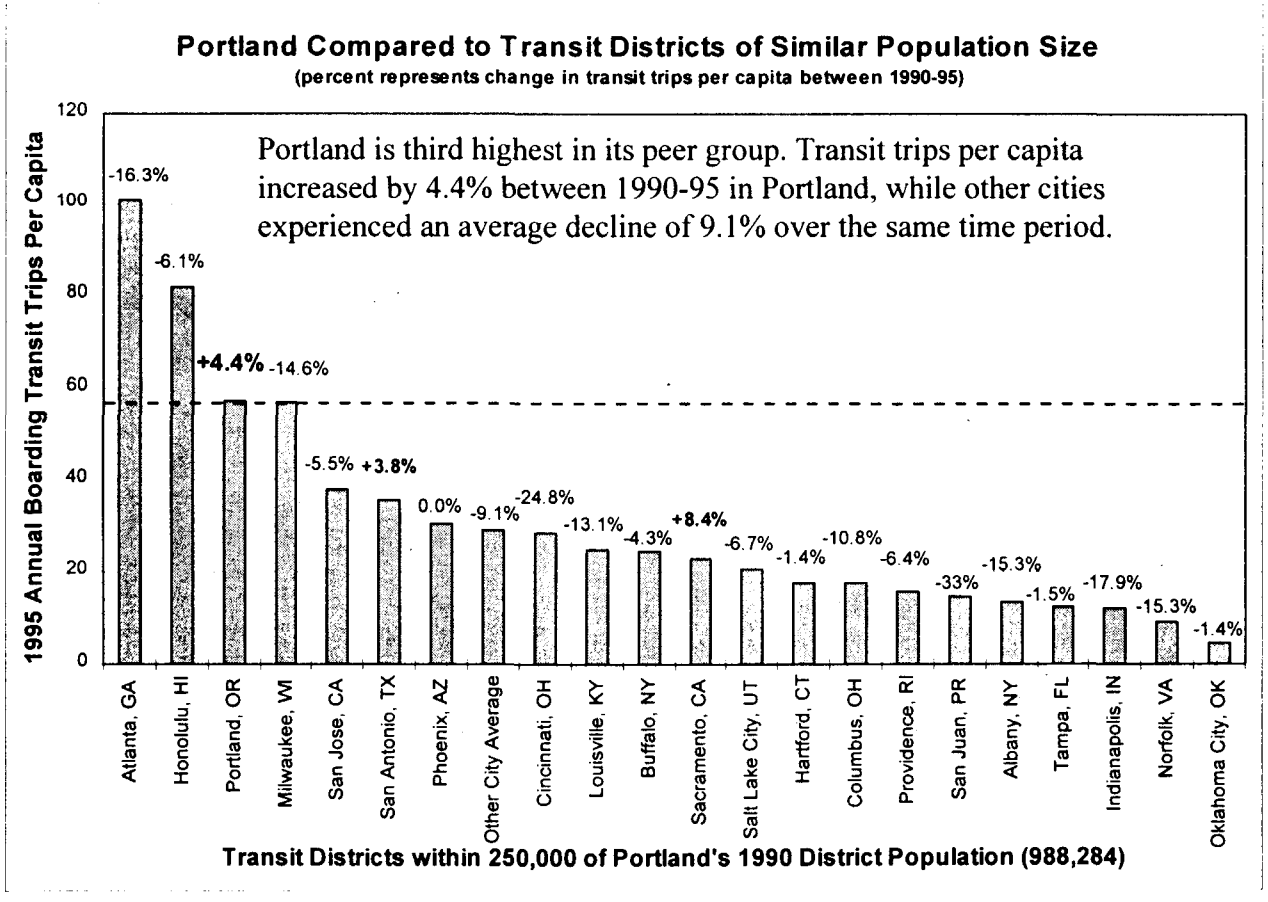
- Transit use increased faster than population, therefore cost per rider is lower than today in each of the 2015 alternatives

To be determined

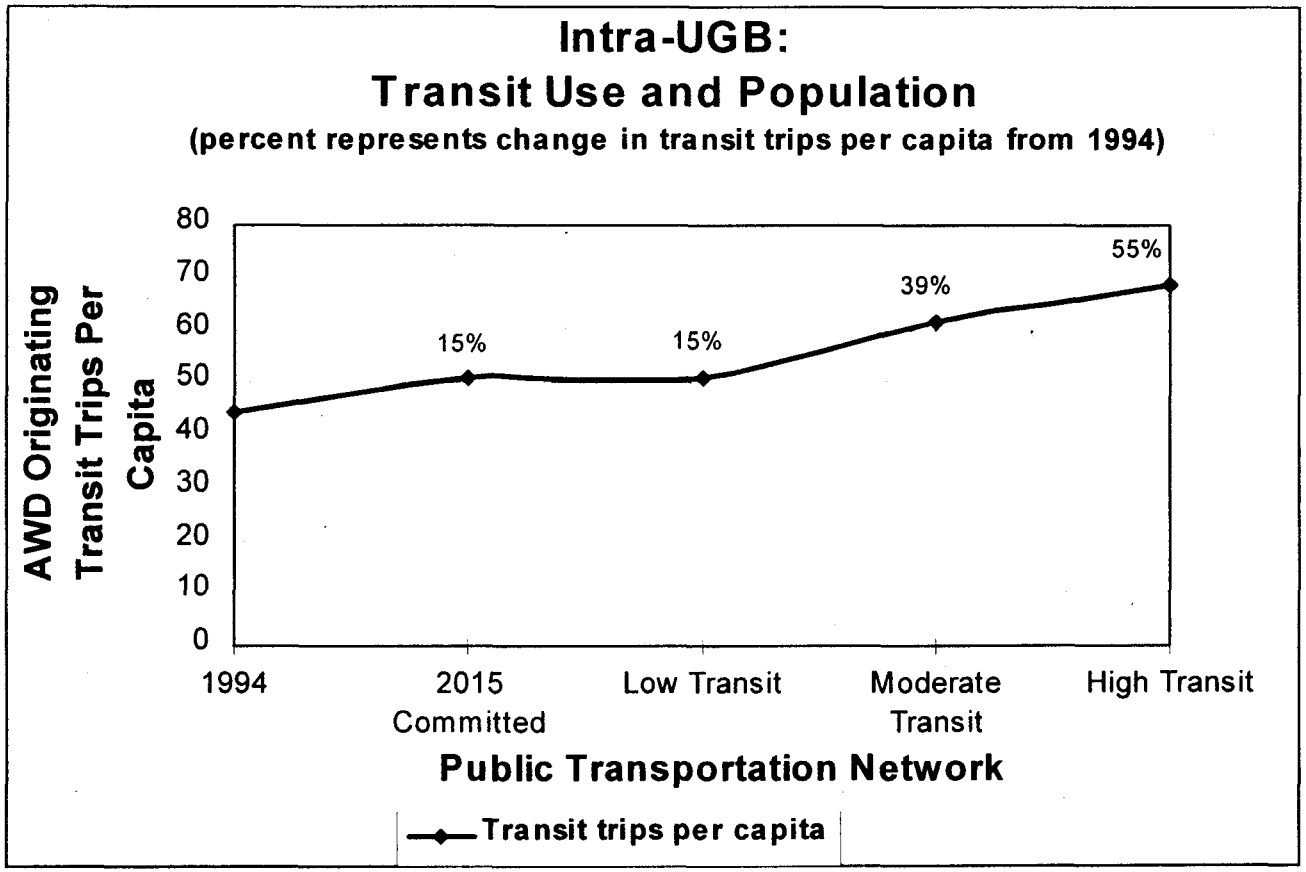
METRO

Public Transportation Alternatives Analysis Results

Issue 1: Transit Use and 2040



Issue 1: Transit Use and 2040 *(continued)*



METRO

Public Transportation Alternatives Analysis Results

Issue 2: Transit Efficiency

Expected Result:

- Transit use per revenue hour will show a diminishing return

  (For the last ten years, transit ridership has grown 38% faster than revenue service hours.)

- Transit use per revenue hour would increase even faster with improved pedestrian environment and increased regional parking costs

Actual Result:

Yes

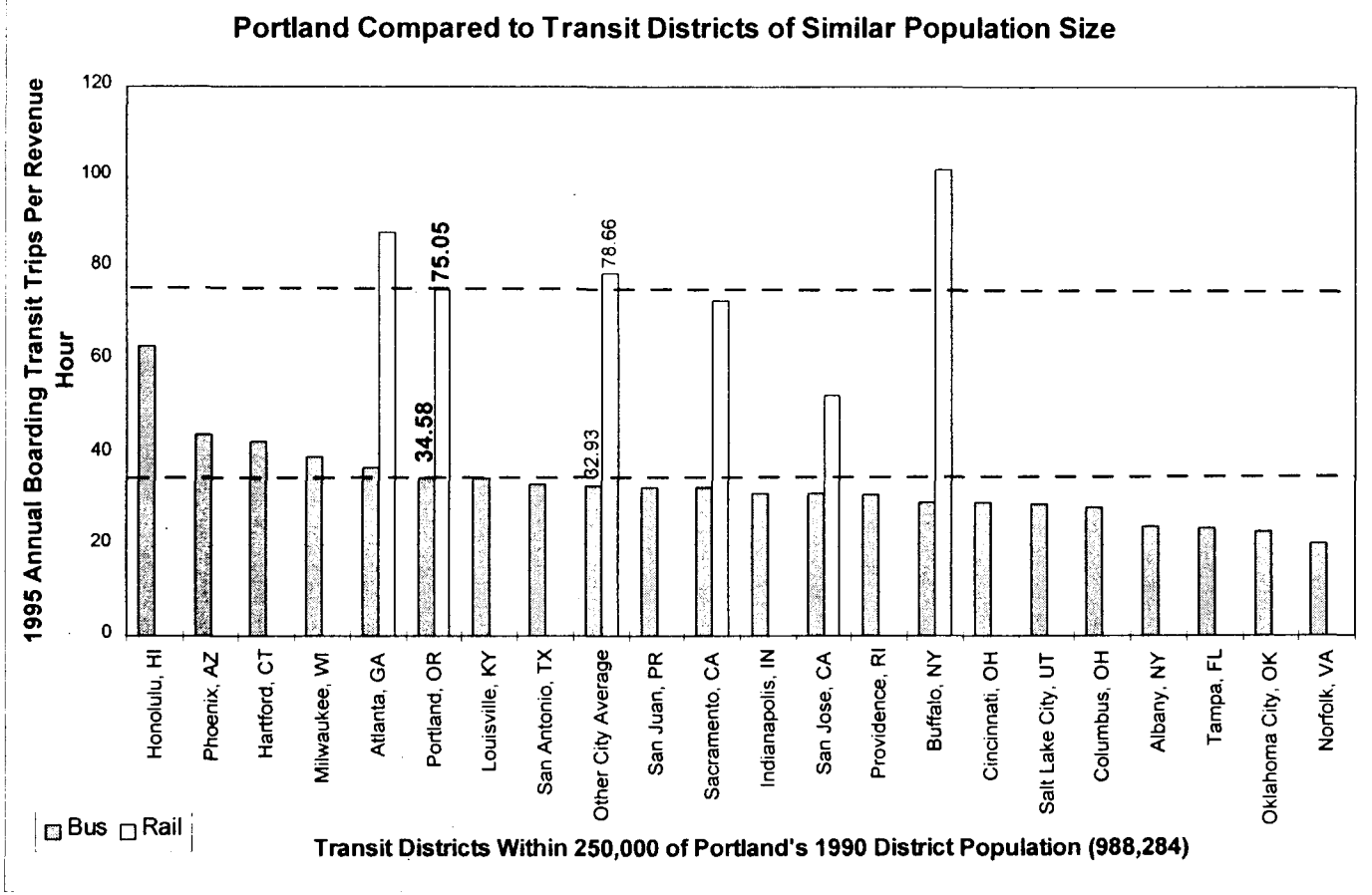
- Transit use increased faster than revenue service hours
- Productivity dropped off, but is still better than today

To be determined

METRO

Public Transportation Alternatives Analysis Results

Issue 2: Transit Efficiency



METRO

Public Transportation Alternatives Analysis Results

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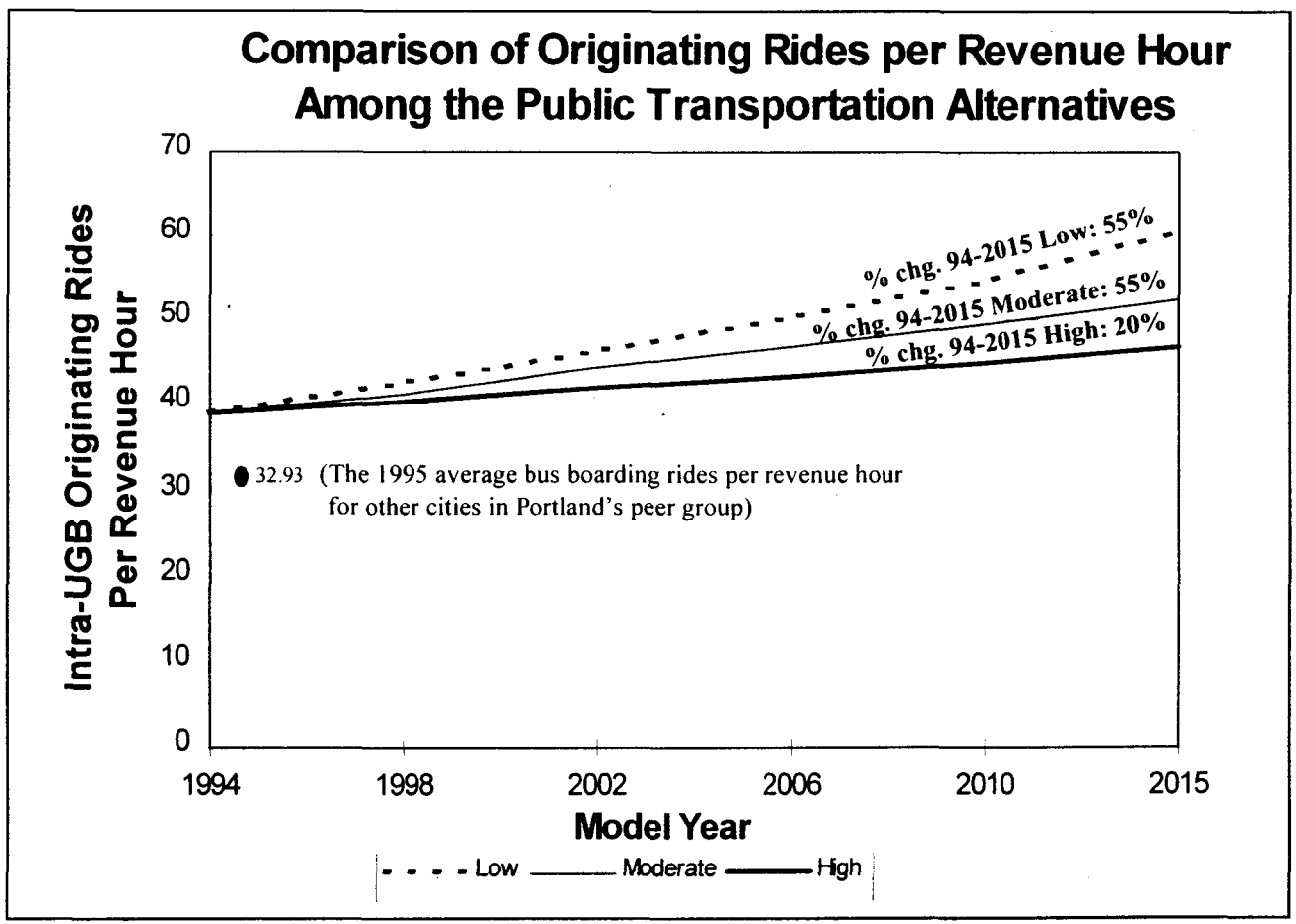


METRO

Public Transportation Alternatives Analysis Results

Issue 3: Transit Use and Service Coverage

Expected Result:

- Increased emphasis on development in centers/ corridors, and infill/ redevelopment produces better service coverage than 1994 levels

(To date, suburban growth has outpaced the expansion of transit service to those areas. Currently, 70% of Tri-Met service is provided in Multnomah County, while 70% of future growth is expected to occur in suburban locations outside of Multnomah County.)

Actual Result:

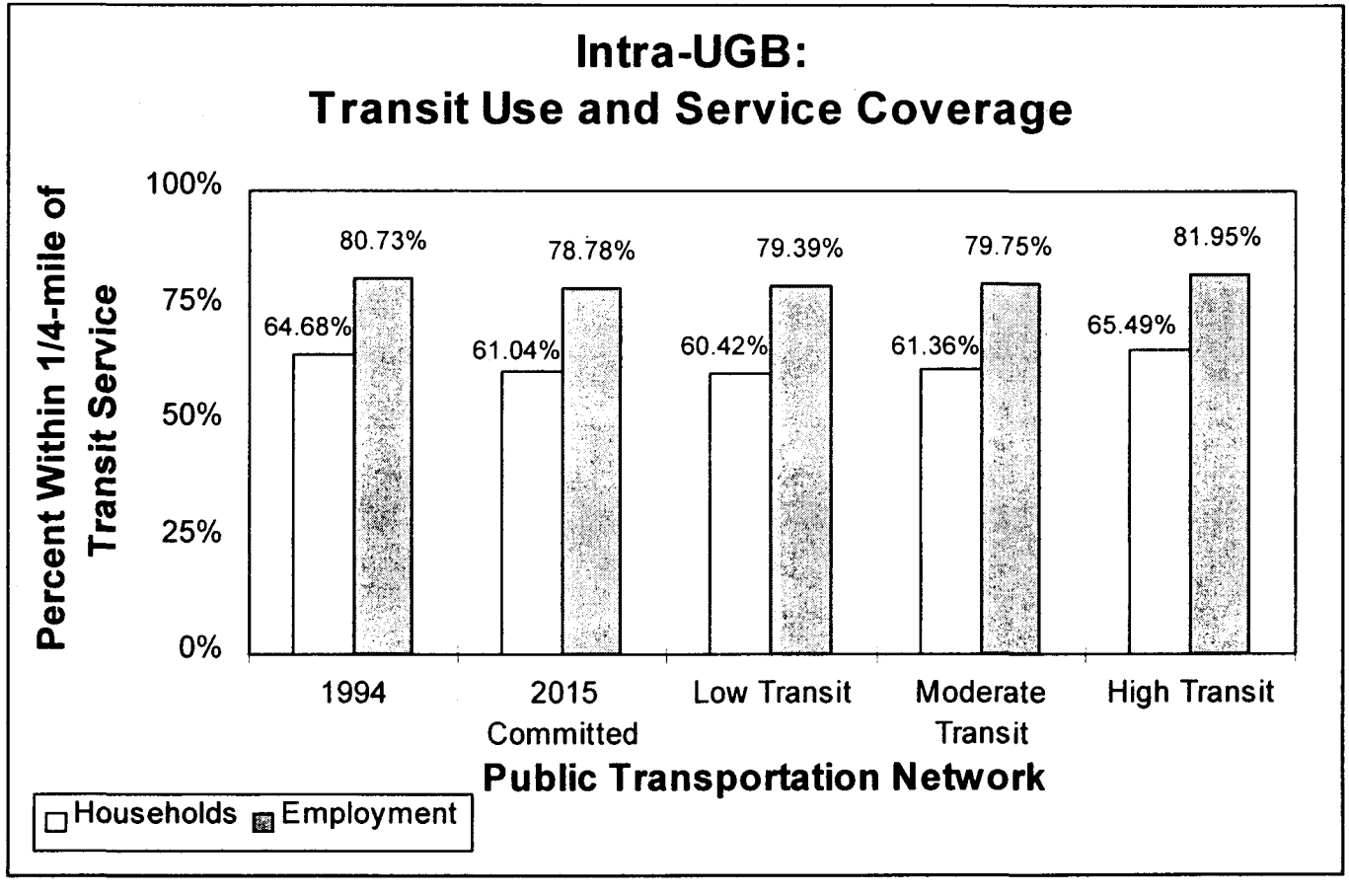
Somewhat

- Low network nearly maintains 1994 employment coverage levels while high network exceeds 1994 levels
- Except for the high transit network, population coverage is diluted by contined growth on suburban lands between 1994-2015

METRO

Public Transportation Alternatives Analysis Results

Issue 3: Transit Use and Service Coverage



METRO

Public Transportation Alternatives Analysis Results

Issue 4: Transit Use and Regional Centers

Expected Result:

- Transit use to regional centers should increase substantially as revenue hours to these areas are increased

Actual Result:

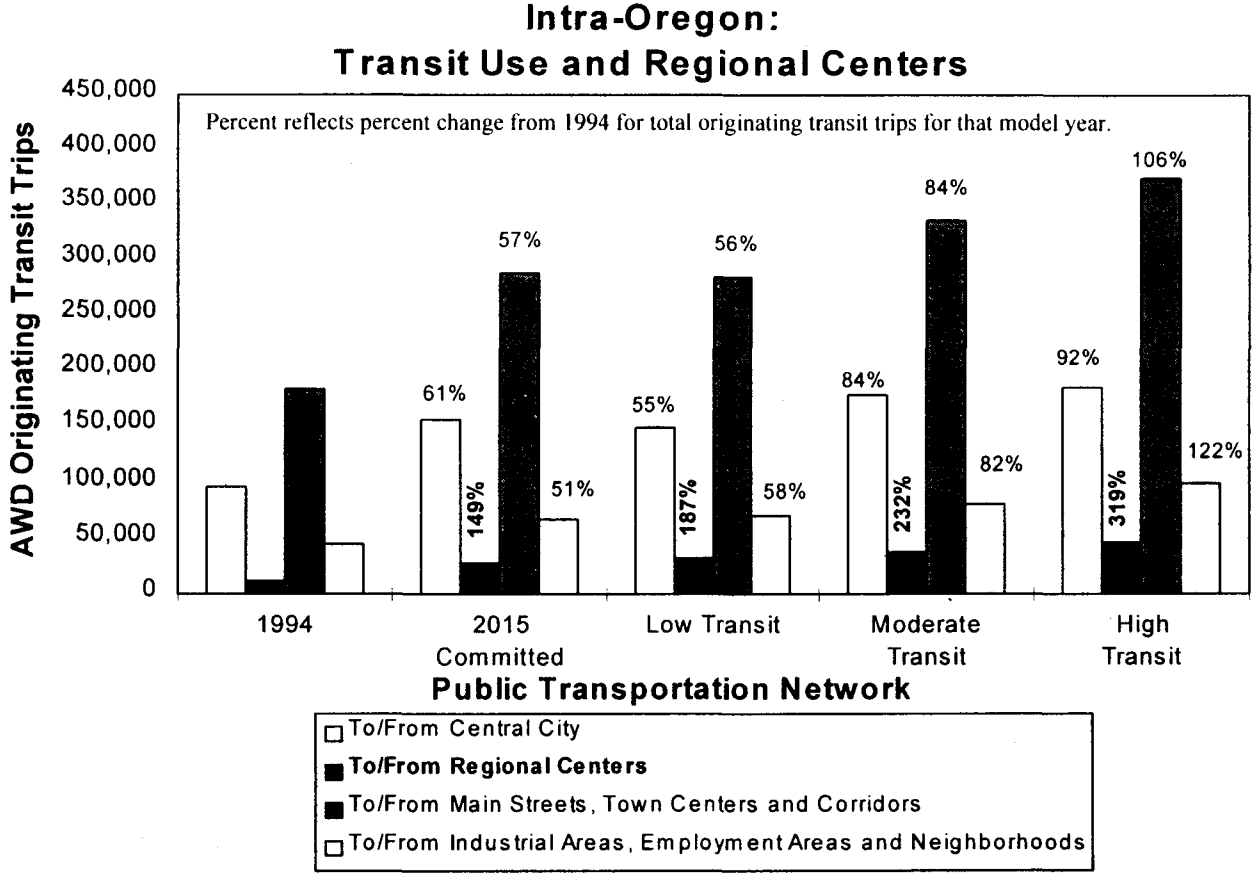
Yes

- Transit use to regional centers increased dramatically over 1994 levels

METRO

Public Transportation Alternatives Analysis Results

Issue 4: Transit Use and Regional Centers



METRO

Public Transportation Alternatives Analysis Results

Issue 5: Transit Use and Congestion

Expected Result:

- Congestion decreases with more transit use

- Congestion would decrease even more significantly with improved pedestrian environment and increased regional parking costs

Actual Result:

Yes

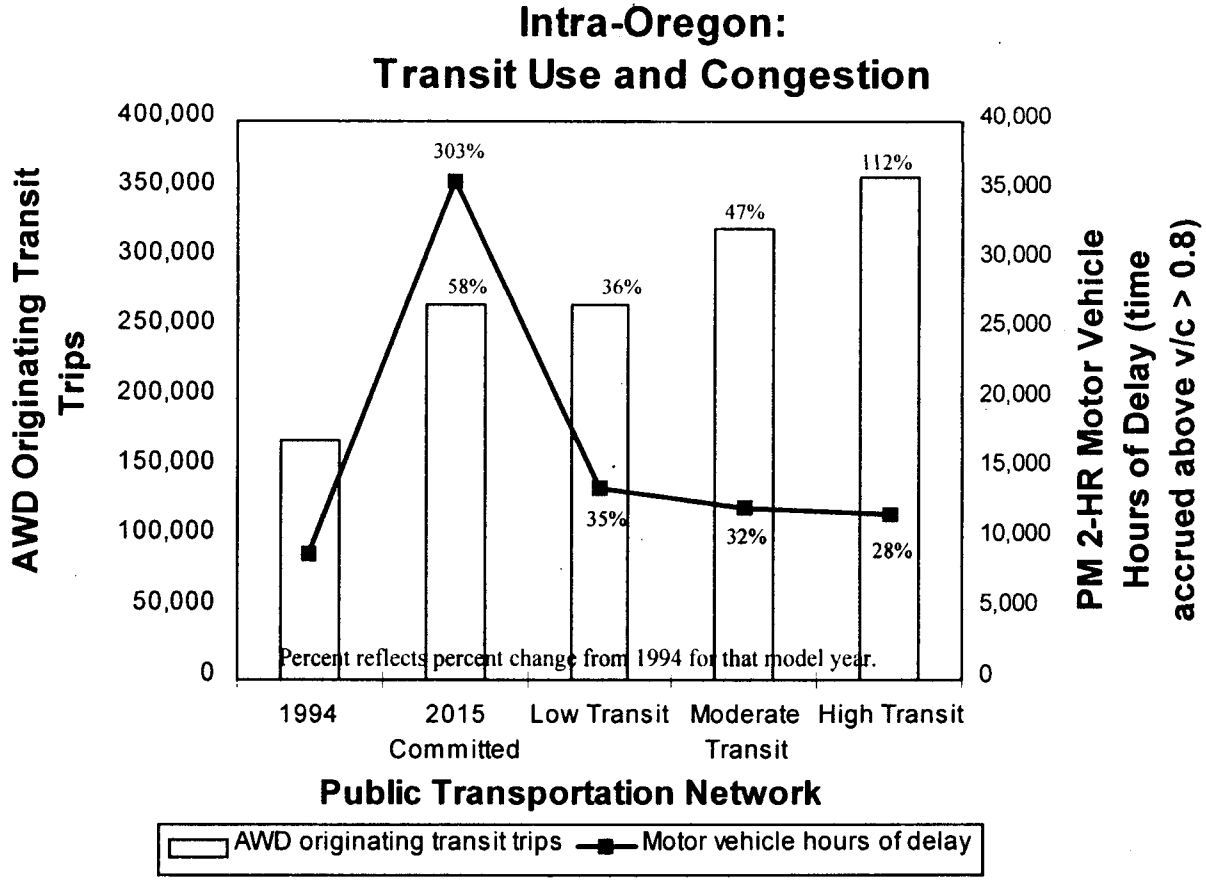
- Modest decrease in congestion

To be determined

METRO

Public Transportation Alternatives Analysis Results

Issue 5: Transit Use and Congestion



Note: The committed system assumes a small number of road improvements beyond 1994. All three of the transit networks assume a 21% increase in roadway capacity over 1994.

Issue 6: Transit Use and VMT per Capita

Expected Result:

- VMT per capita decreases with more transit use

- VMT per capita would decrease even more significantly with improved pedestrian environment and increased regional parking costs

Actual Result:

Yes

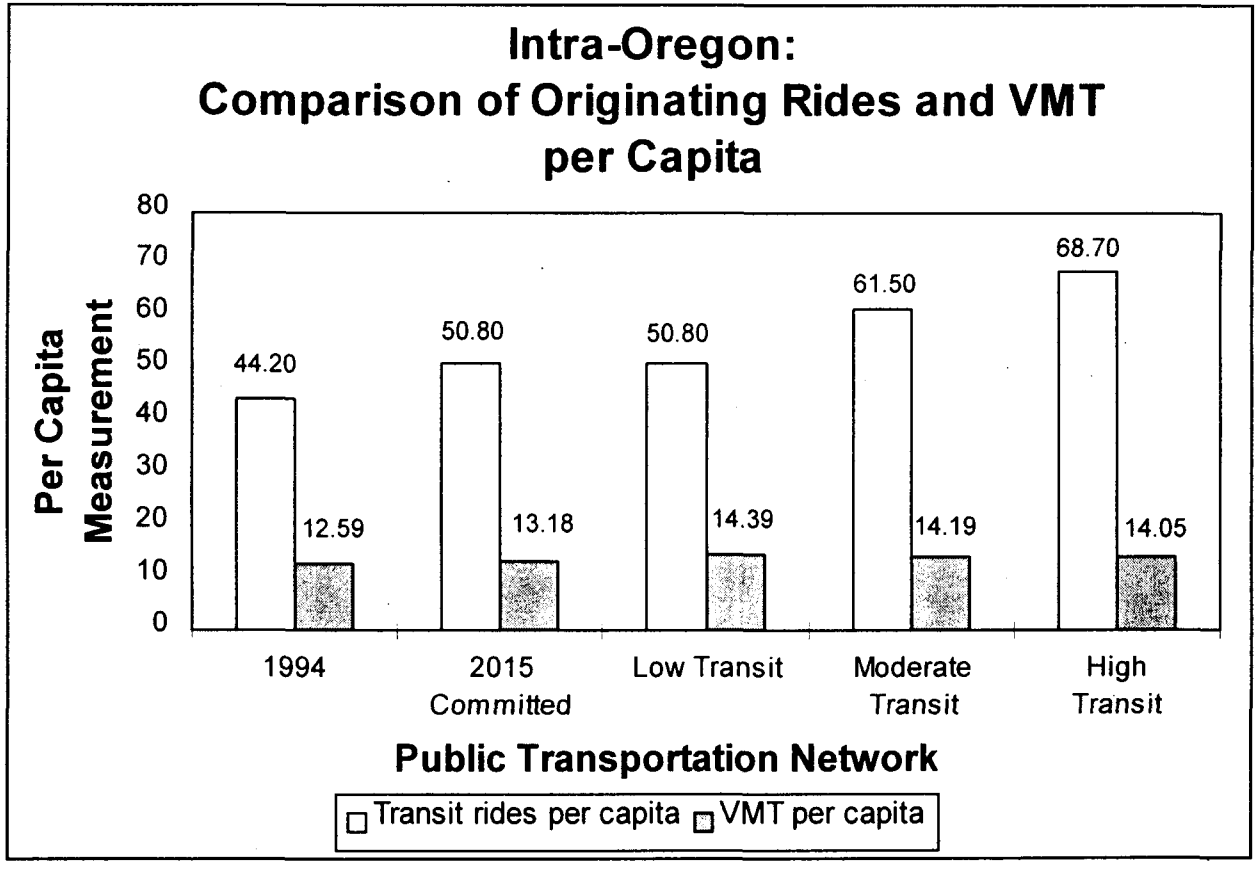
- Modest decrease in VMT per capita

To be determined

METRO

Public Transportation Alternatives Analysis Results

Issue 6: Transit Use and VMT per Capita



Originating rides per capita adjusted for increased light rail transit share of ridership in 2015.

Issue 7: Comparison of Transit and Motor Vehicle Travel Times

Expected Result:

- Point-to-point travel times improve with improved transit service

Actual Result:

Yes

- Point-to-point travel times improve where separated right-of-way provides a speed advantage

METRO

Public Transportation Alternatives Analysis Results

Issue 7: Comparison of Transit and Motor Vehicle Travel Times

Point-to-Point Travel Times (minutes)

Origin-Destination	1994	2015 Committed	2015 Low	2015 Moderate	2015 High
Beaverton-Tualatin					
Auto	17.81	22.02	18.23	18.12	17.91
Transit	49.95	41.82	49.91	24.06	20.74
Hillsboro- Portland CBD					
Auto	36.51	41.52	39.27	38.85	38.53
Transit	46.24	41.01	38.76	38.76	38.76
Oregon City - Portland CBD					
Auto	31.50	42.47	32.47	32.13	31.99
Transit	41.07	61.37	40.21	41.21	38.86
Clackamas TC- Portland CBD					
Auto	25.94	32.15	27.40	27.14	26.93
Transit	35.98	38.73	29.86	29.86	29.86
Tigard - Portland CBD					
Auto	19.69	23.04	20.92	20.55	20.26
Transit	28.70	25.69	26.52	24.08	27.84
PIA - Portland CBD					
Auto	24.45	32.53	25.10	24.75	24.63
Transit	41.21	43.94	39.16	30.29	30.29

(am 2-HR auto and am 2-HR transit in-vehicle times)

Issue 8: Transit Costs and the Effect of Congestion

Expected Result:

- Costs increase (e.g., more revenue service hours) in order to provide the same level of transit service when congestion increases

Actual Result:

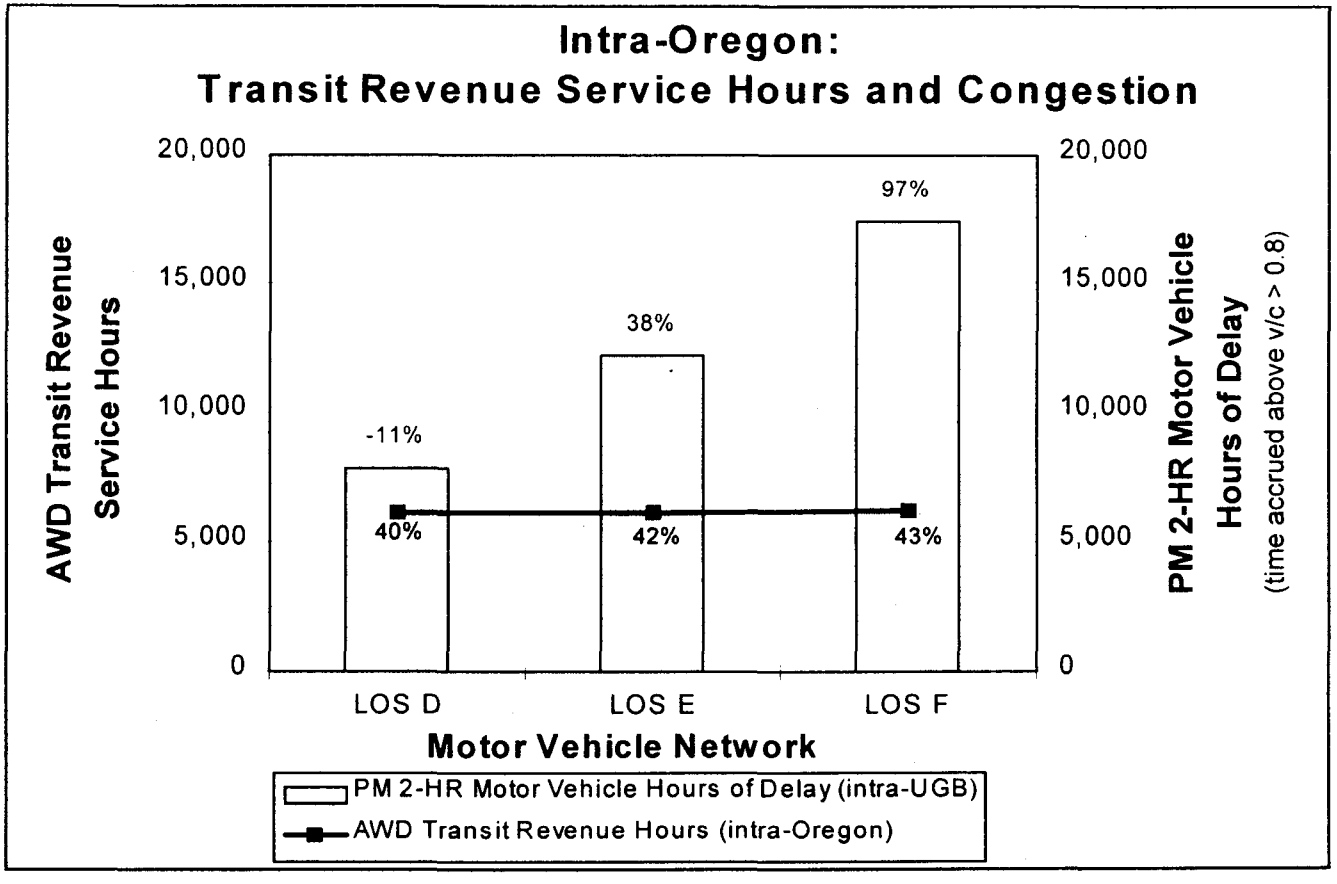
Yes

- Modest increase in cost

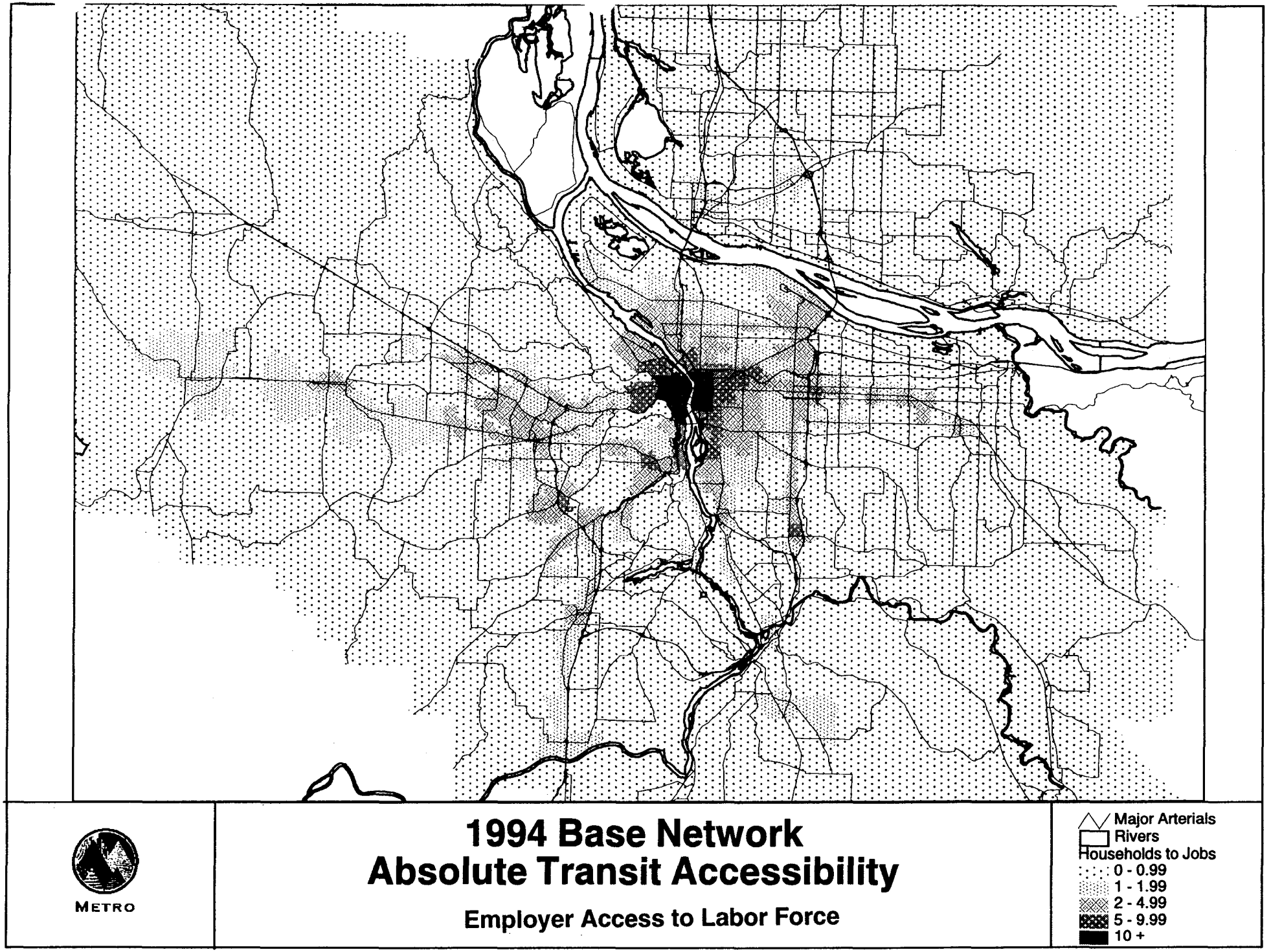
METRO

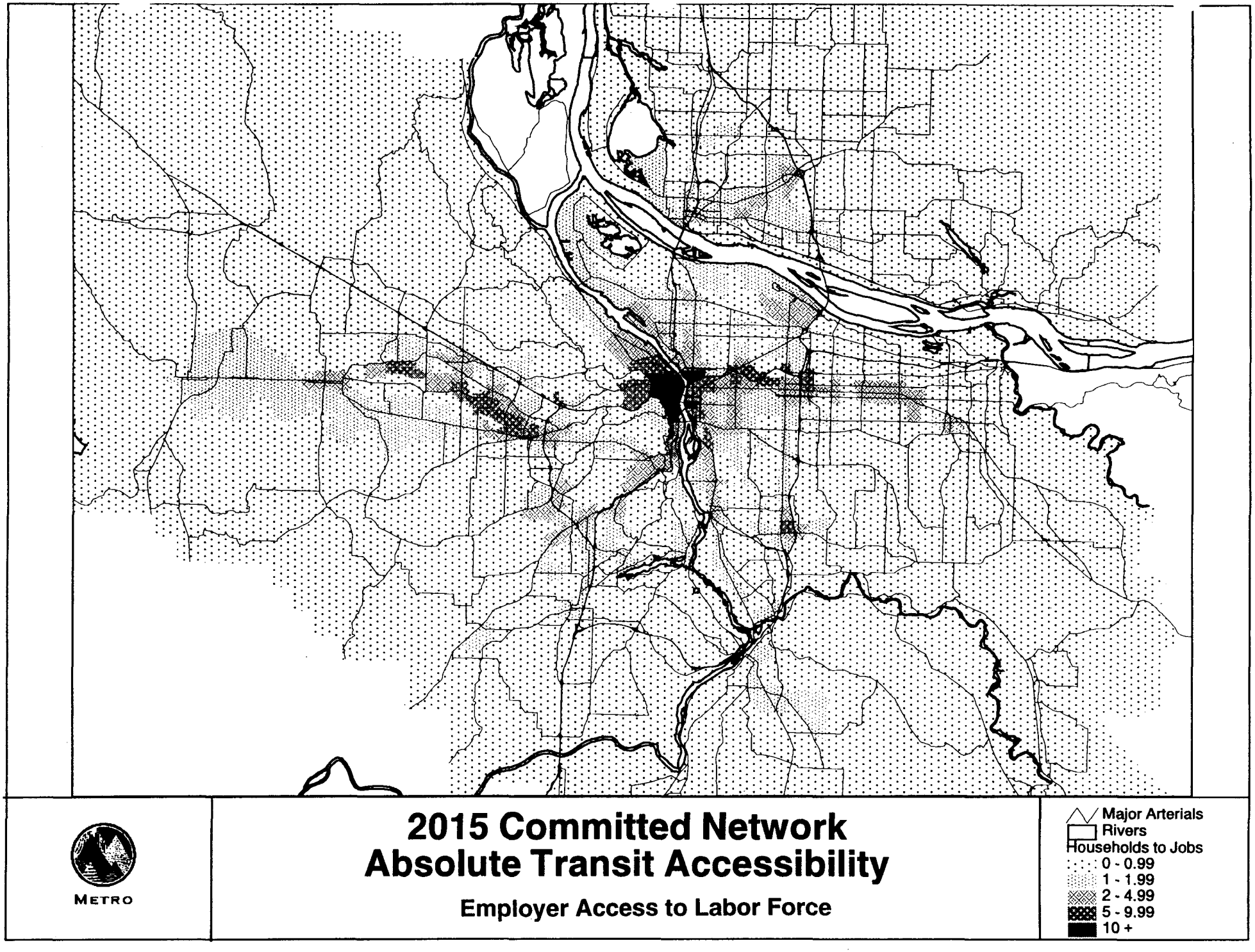
Public Transportation Alternatives Analysis Results

Issue 8: Transit Costs and the Effect of Congestion



Percent reflects percent change from 1994 for that model year. Each motor vehicle alternative was modeled against the "moderate" transit network.


METRO
1994 Base Network
Absolute Transit Accessibility
Employer Access to Labor Force
Major Arterials
Rivers
Households to Jobs
0 - 0.99
1 - 1.99
2 - 4.99
5 - 9.99
10 +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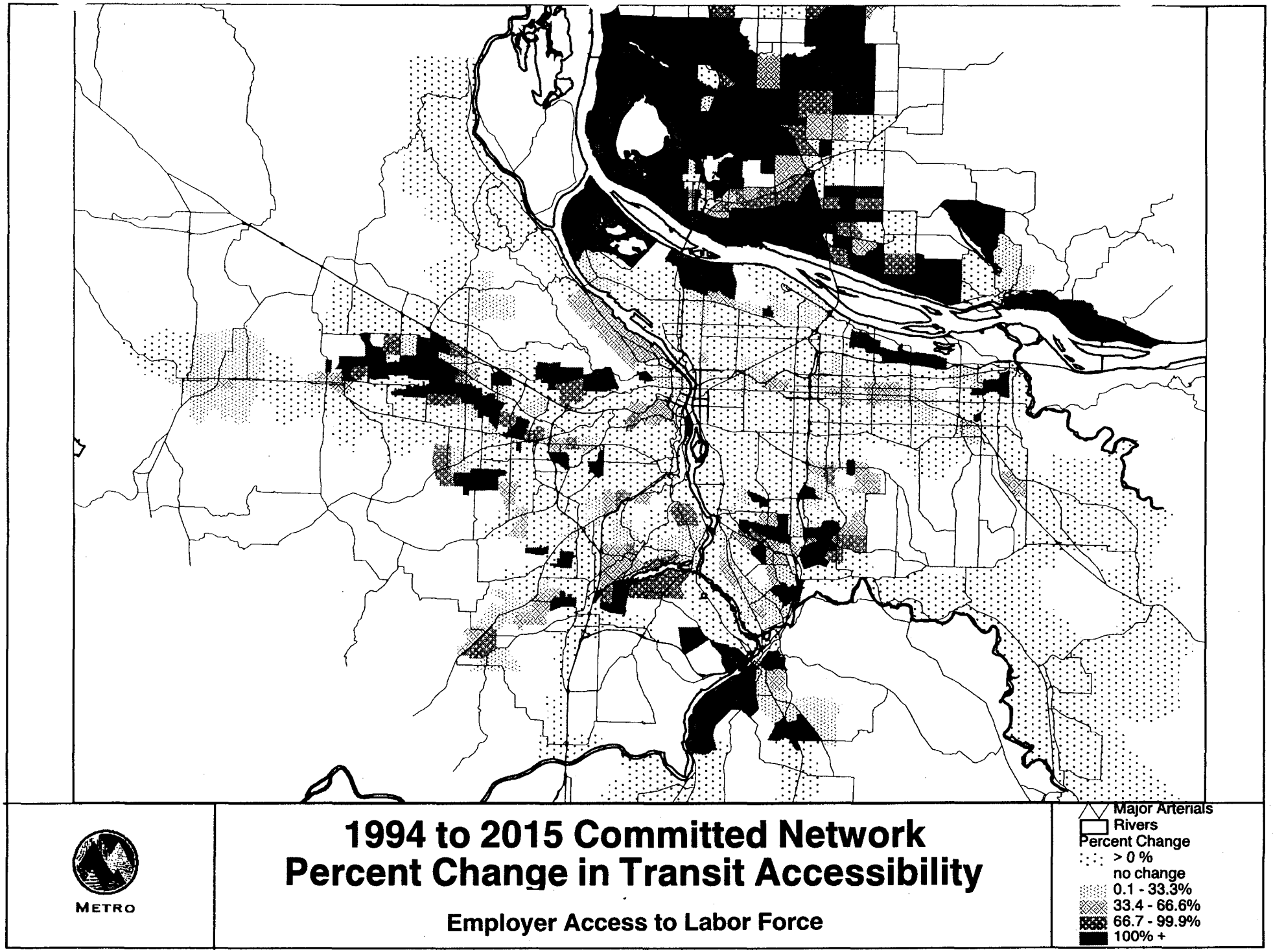
METRO
1994 to 2015 Committed Network
Percent Change in Transit Accessibility
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Rivers
Percent Change
> 0 %
no change
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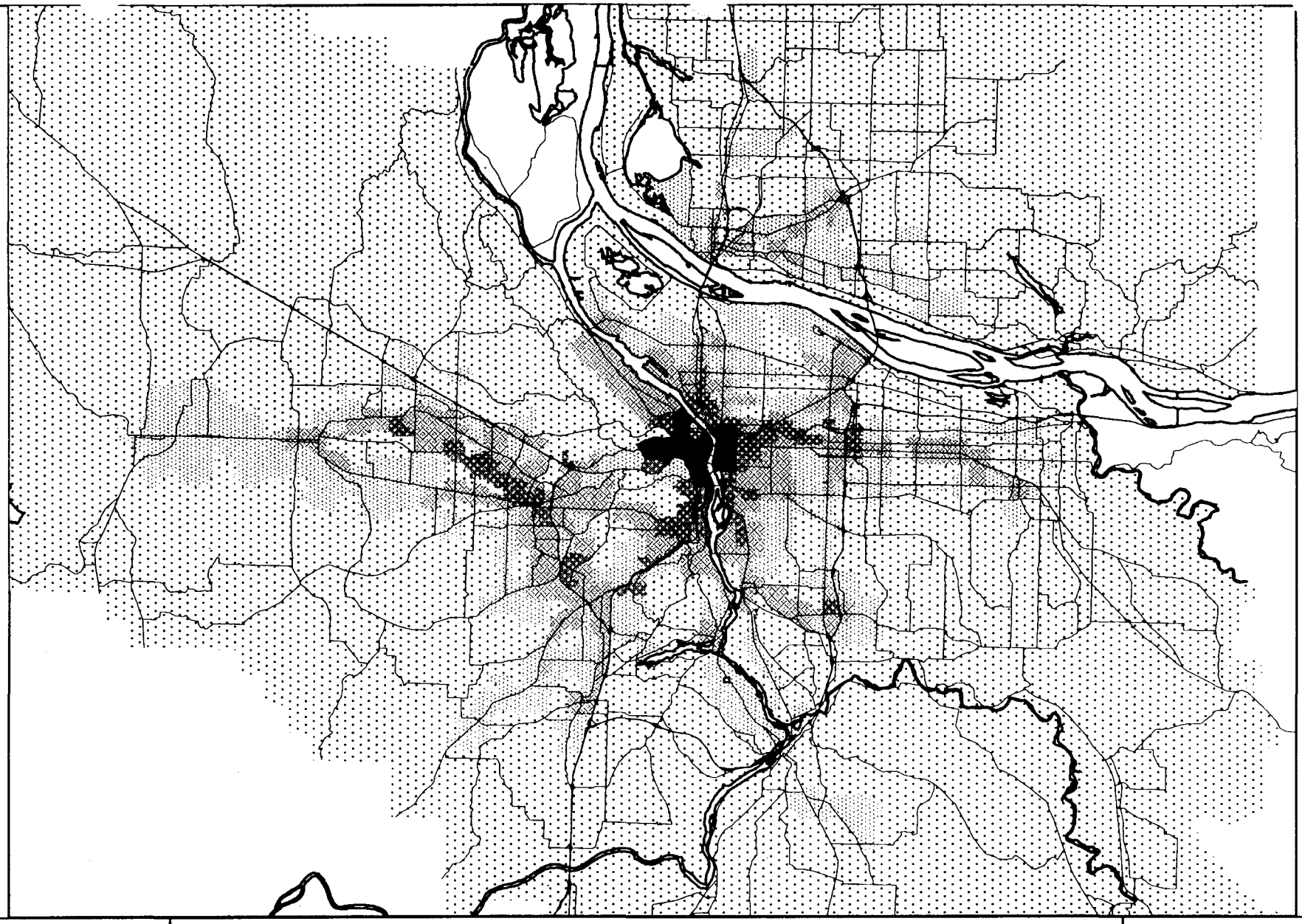
33.4 - 66.6%
66.7 - 99.9%
100% +



METRO

2015 Low Build Network
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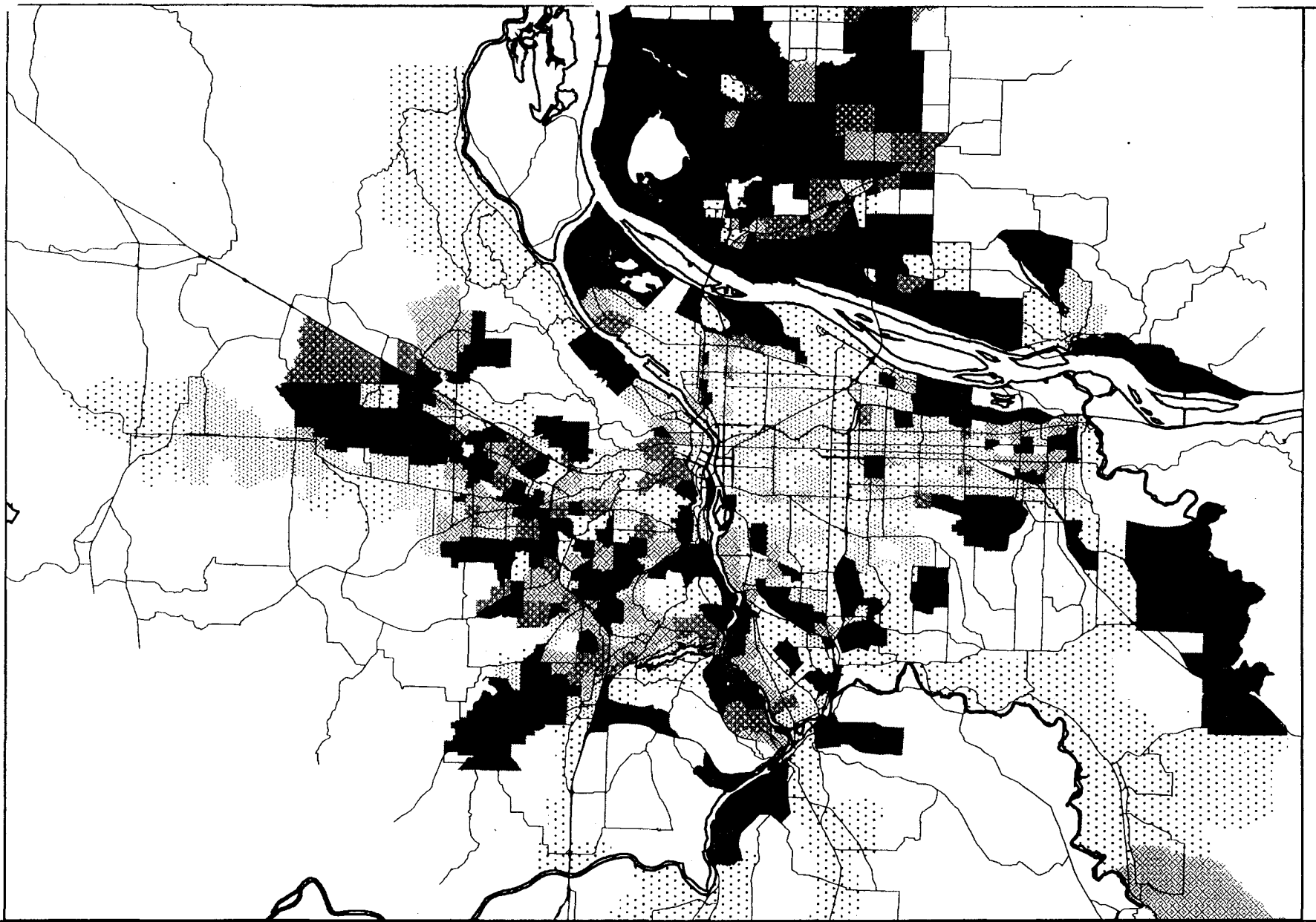
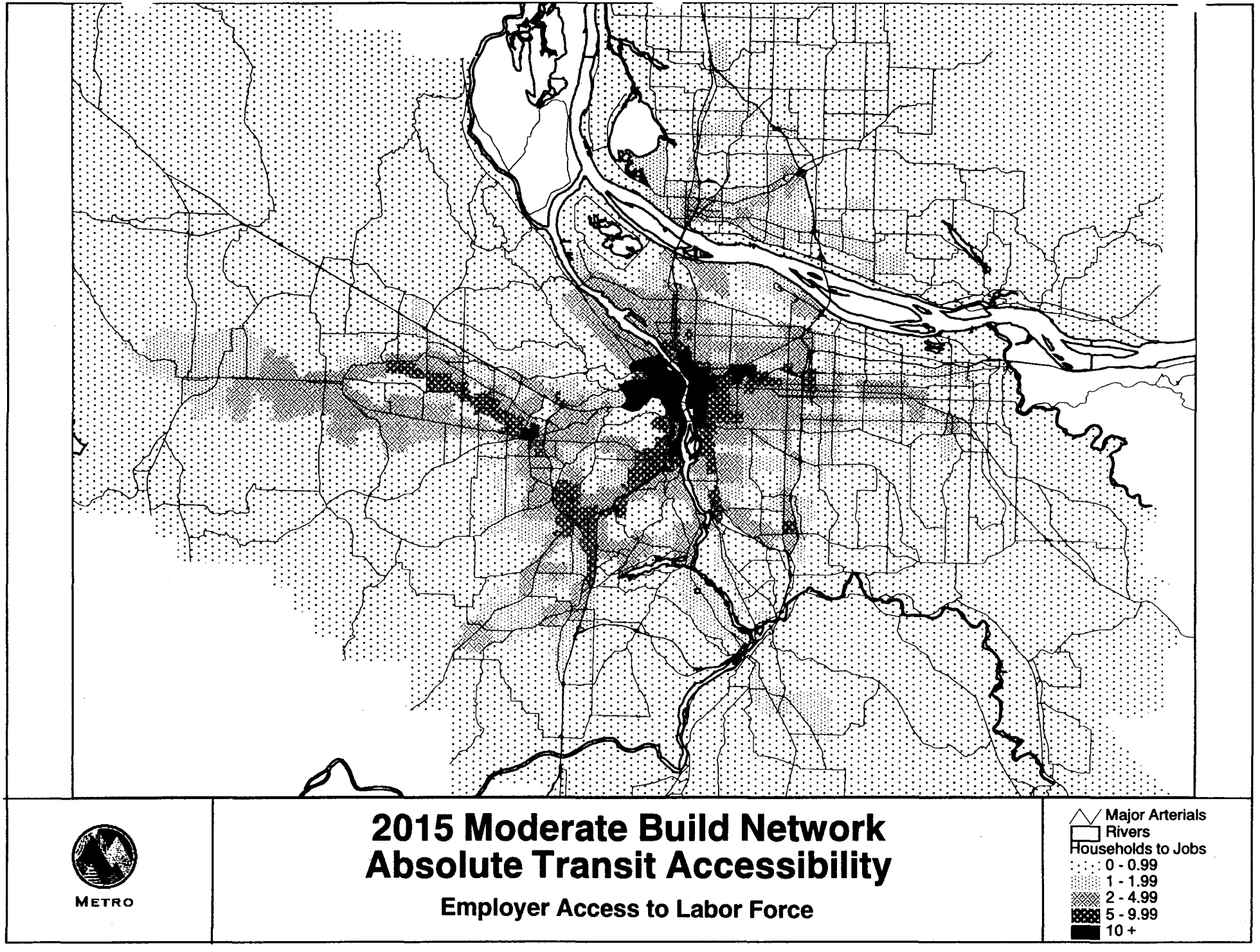


METRO

1994 to 2015 Low Build Network
Percent Change in Transit Accessibility

Employer Access to Labor Force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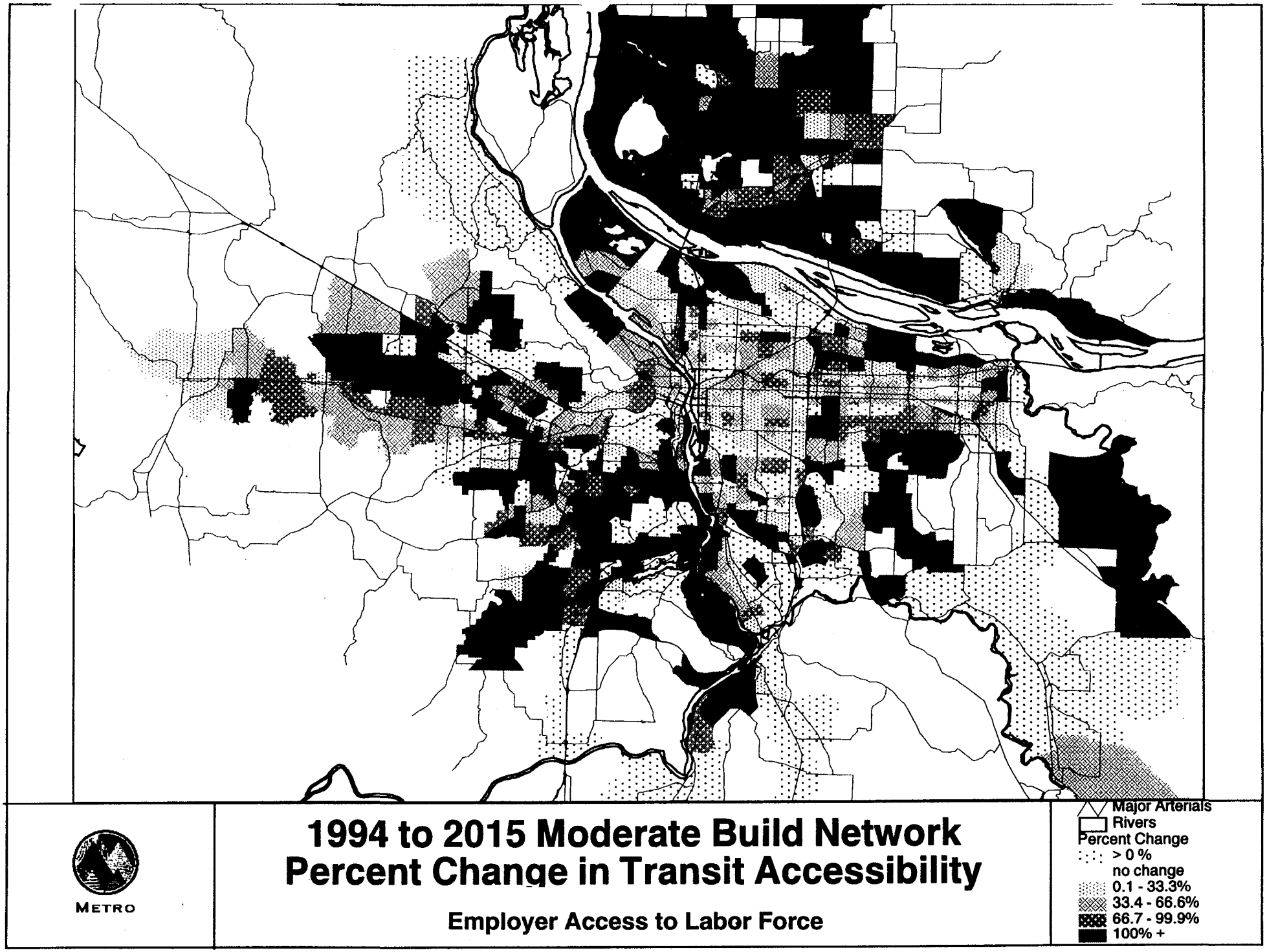
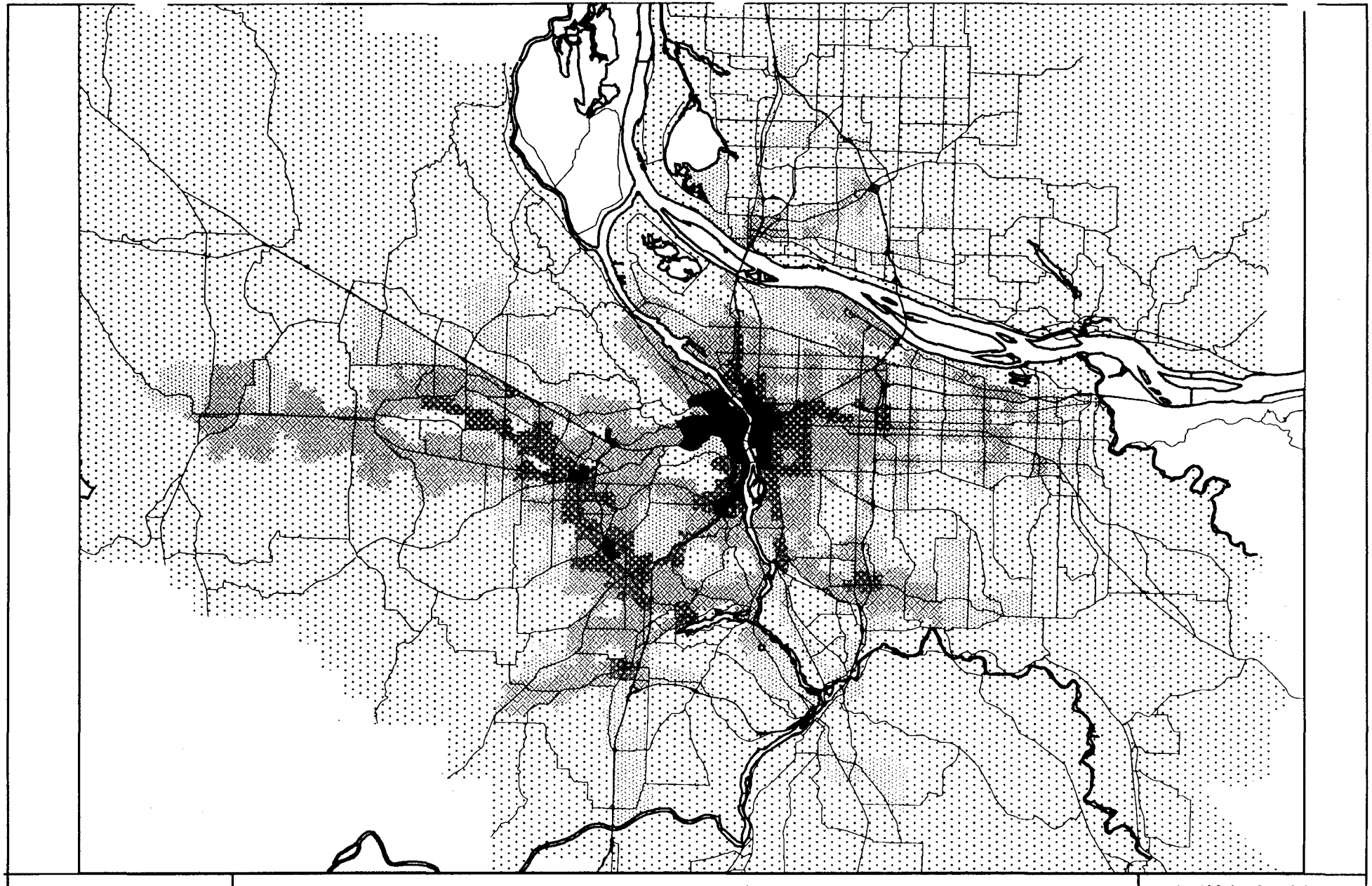


METRO

1994 to 2015 Moderate Build Network Percent Change in Transit Accessibility

Employer Access to Labor Force



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2015 High Build Network
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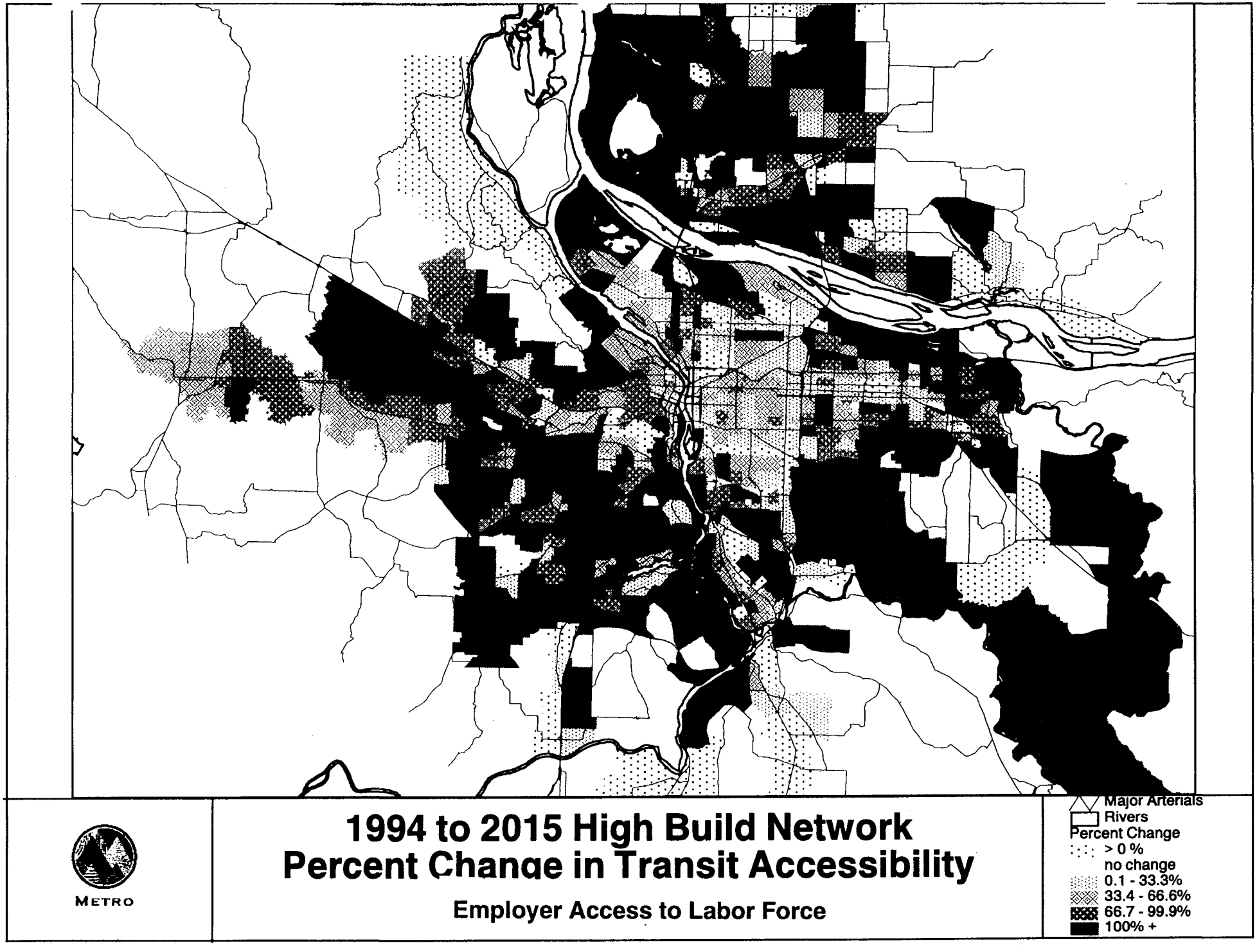
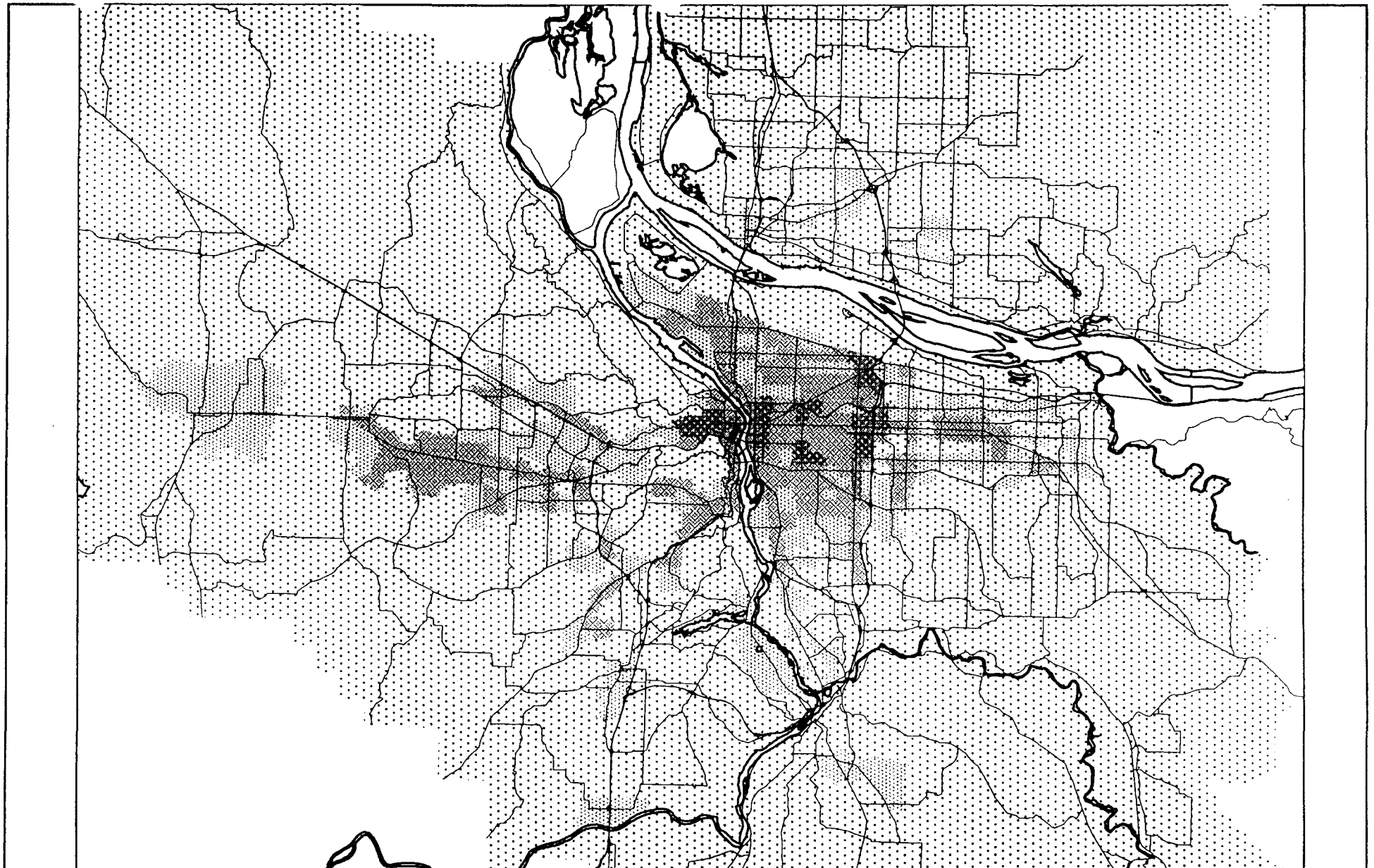


METRO

1994 to 2015 High Build Network
Percent Change in Transit Accessibility

Employer Access to Labor Force



METRO

1994 Base Network
Absolute Transit Accessibility

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Rivers
Jobs to Households
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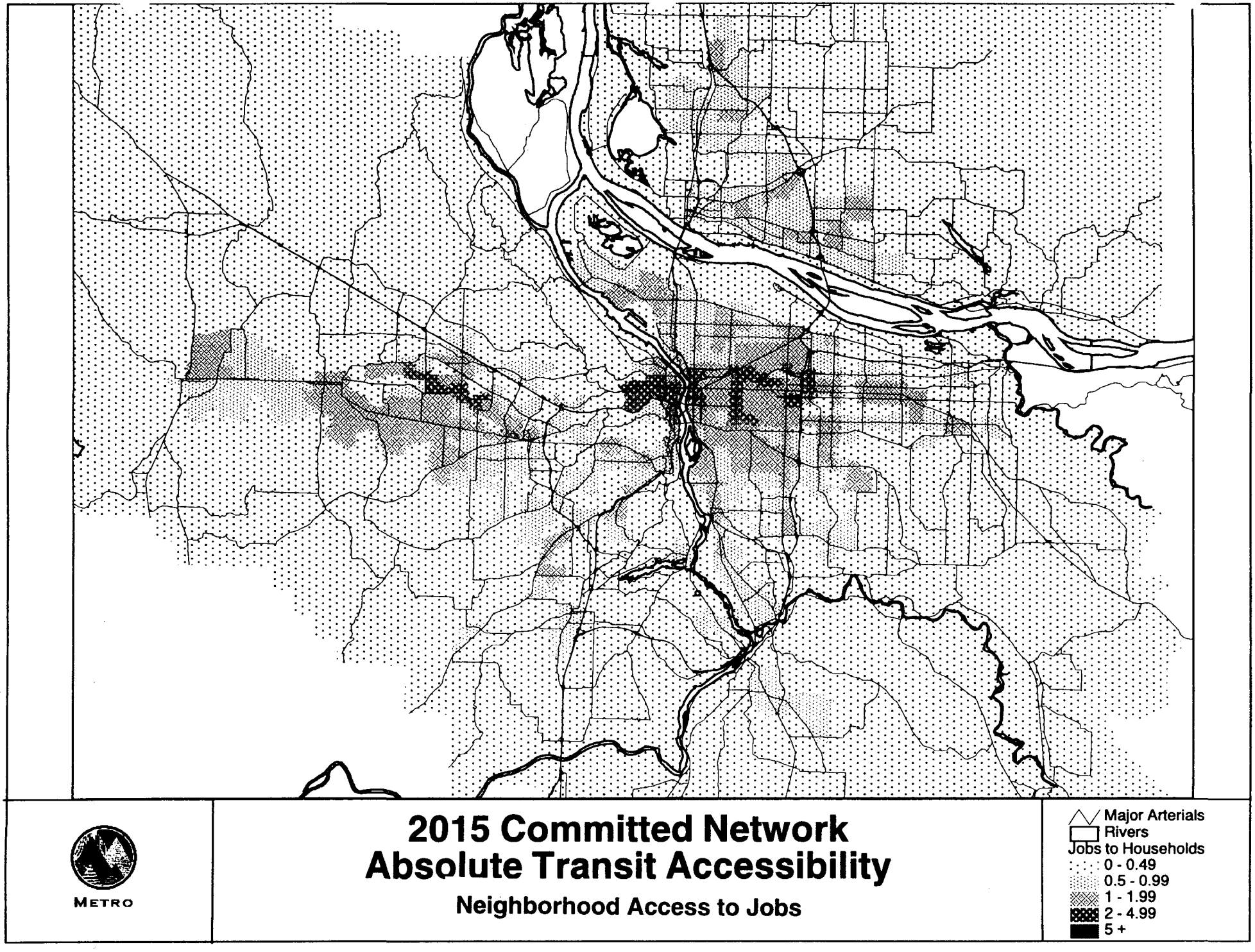
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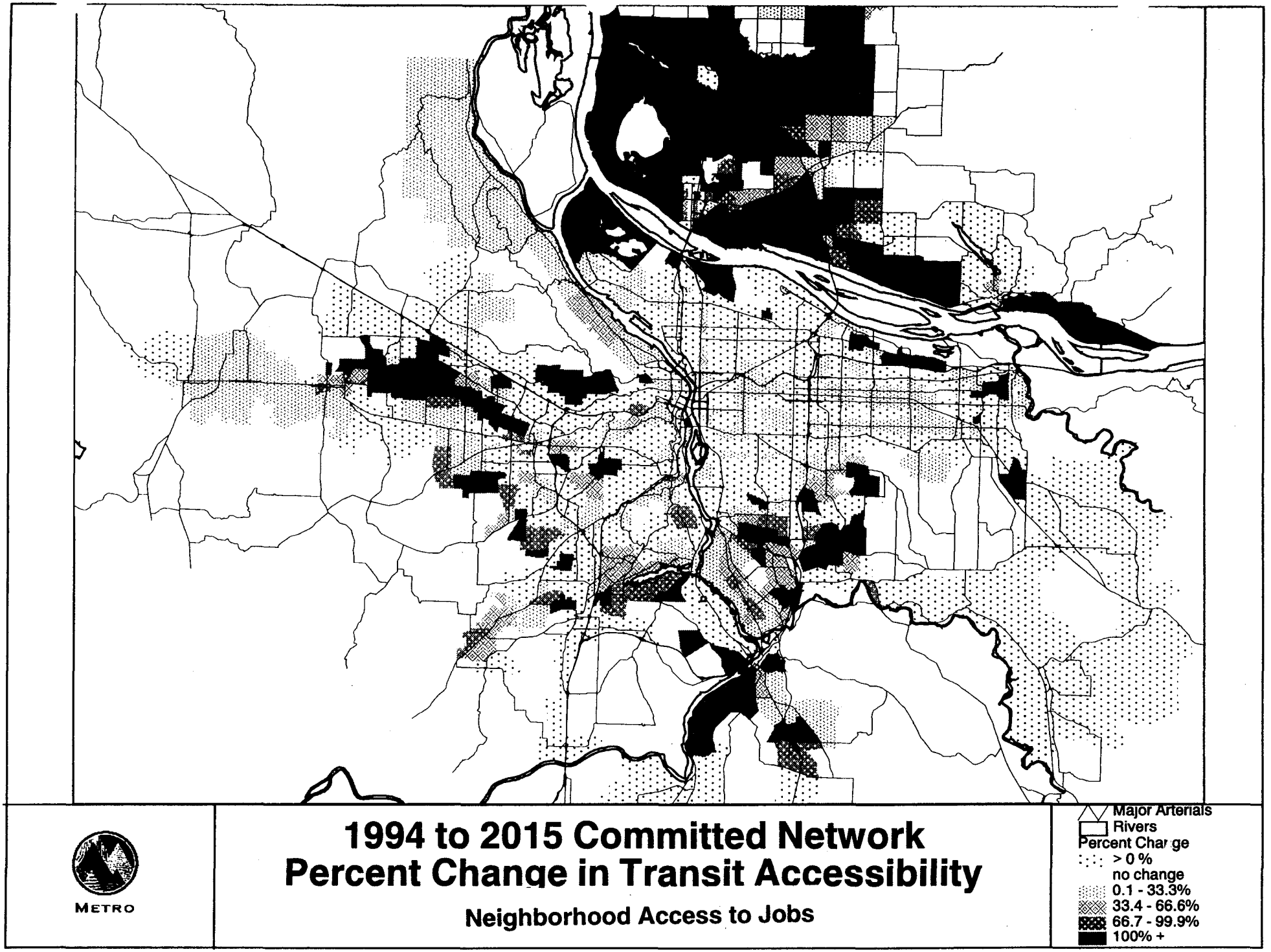
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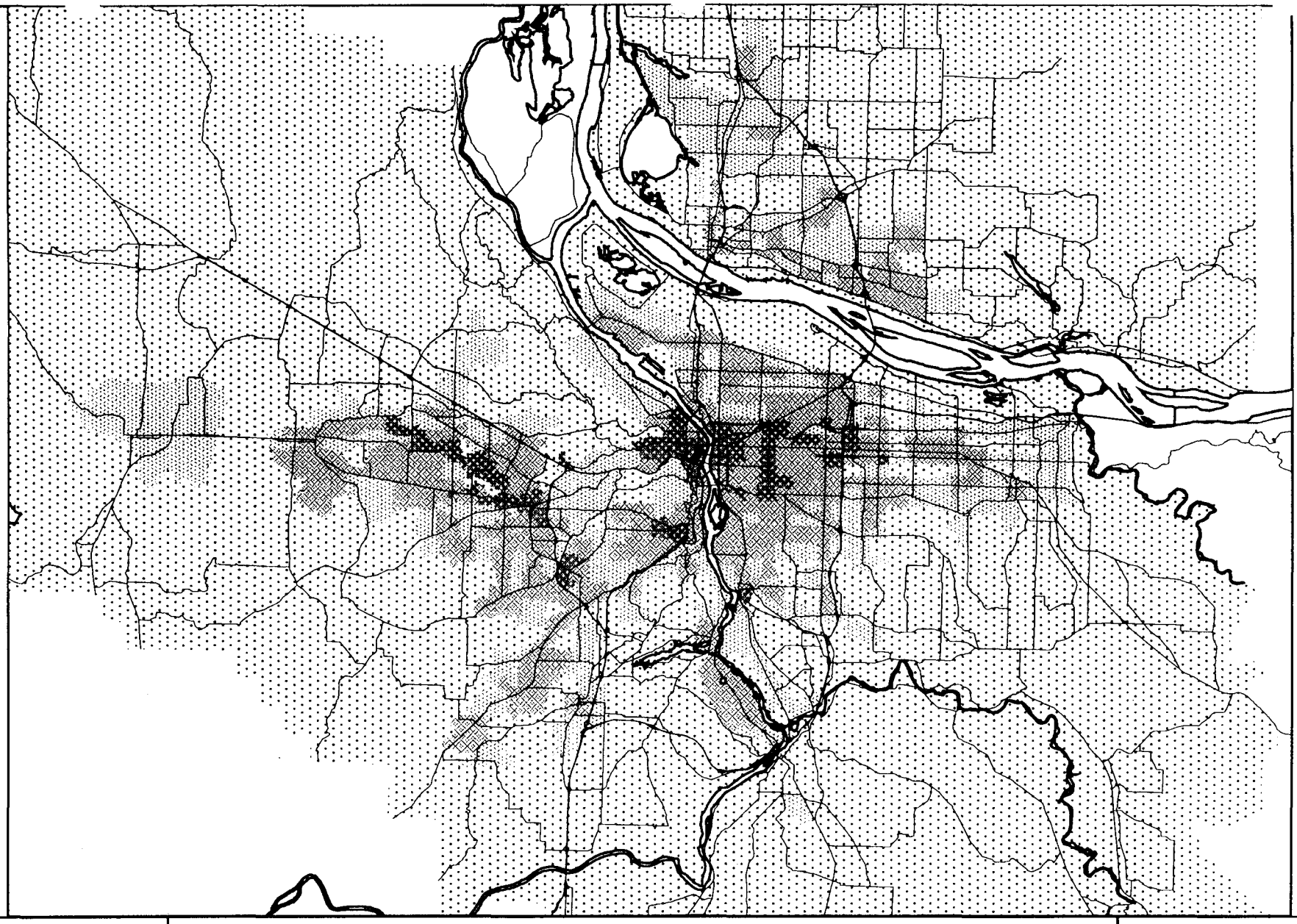

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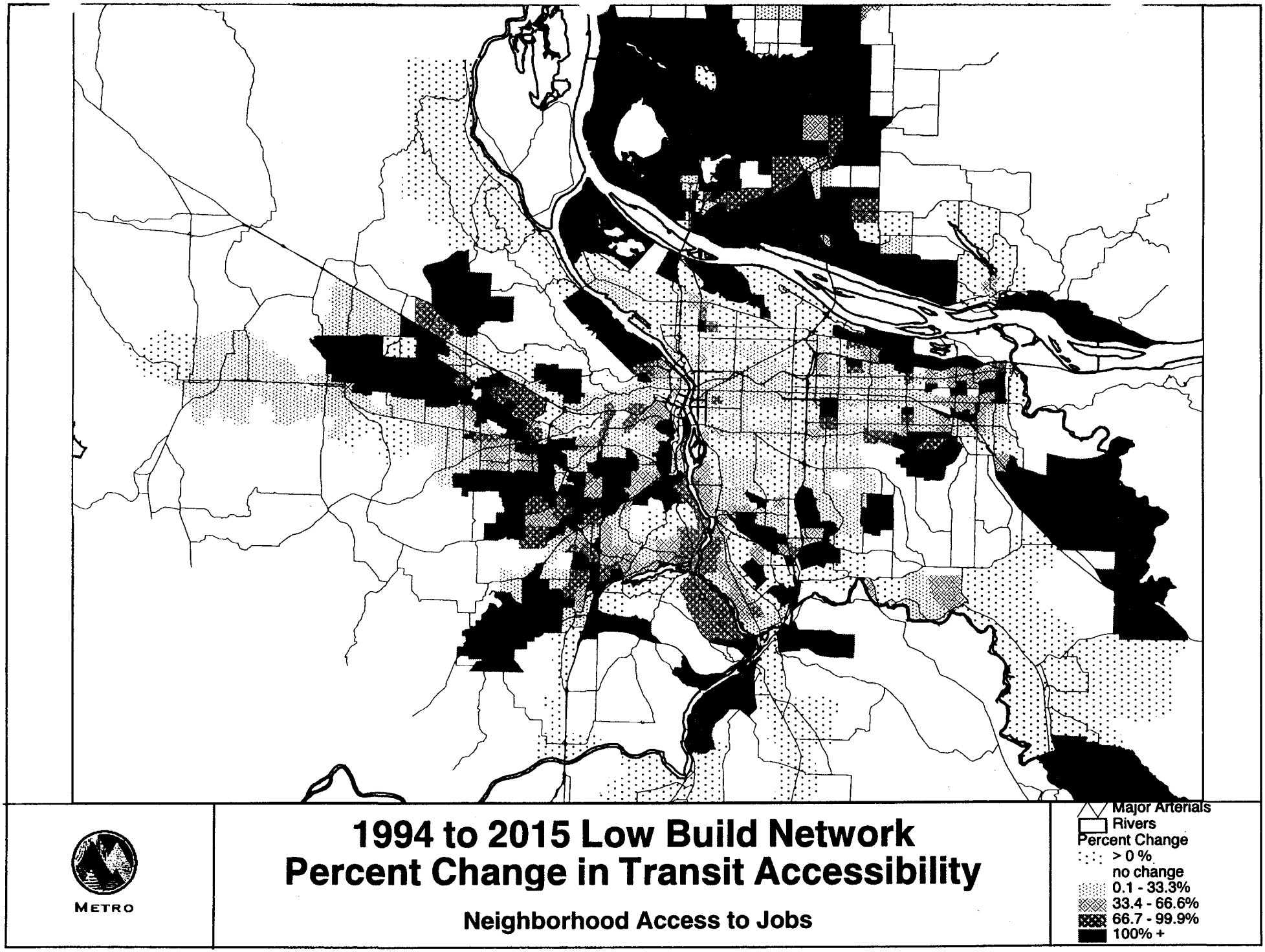
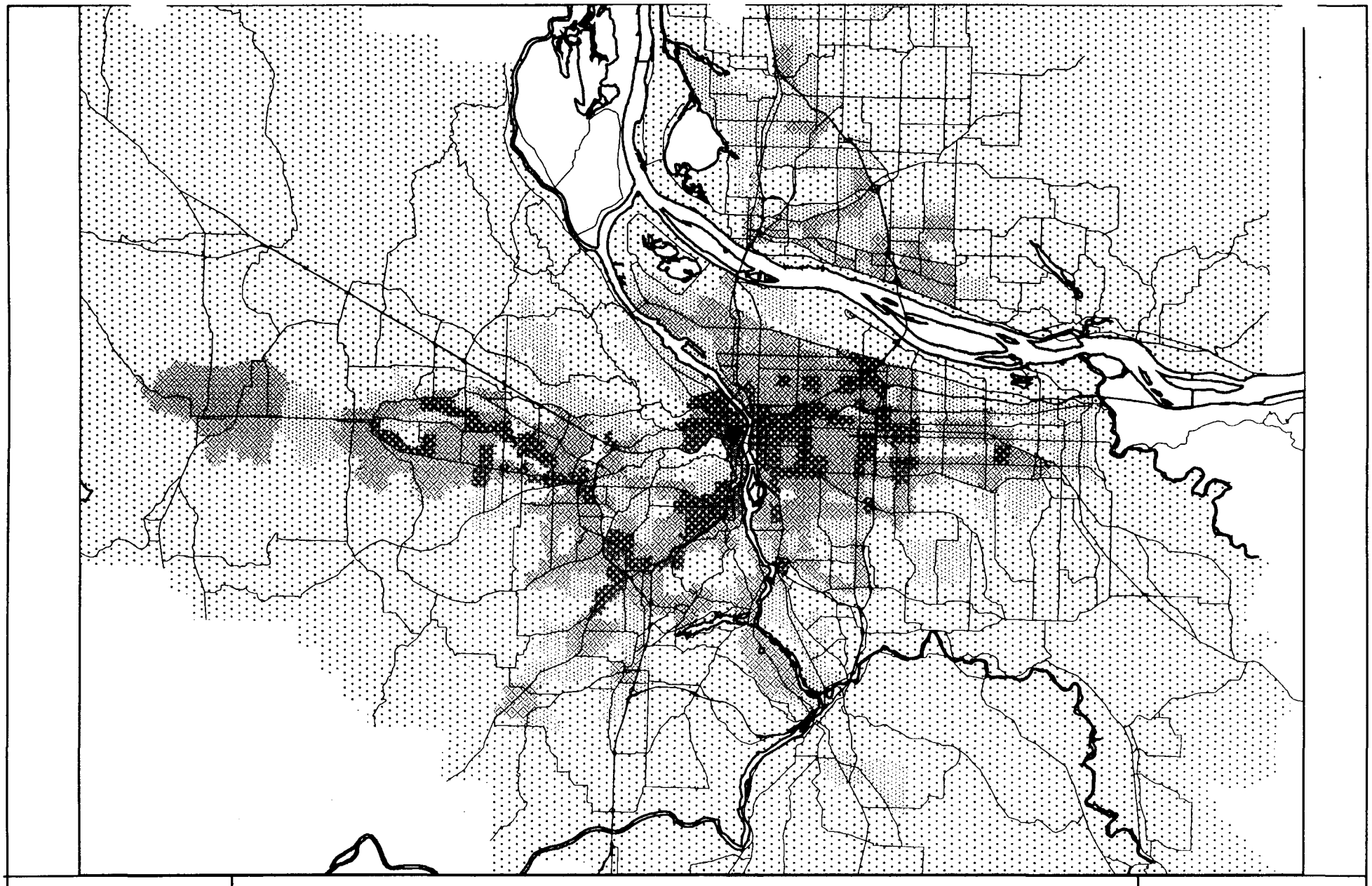


METRO

1994 to 2015 Low Build Network Percent Change in Transit Accessibility

Neighborhood Access to Jobs

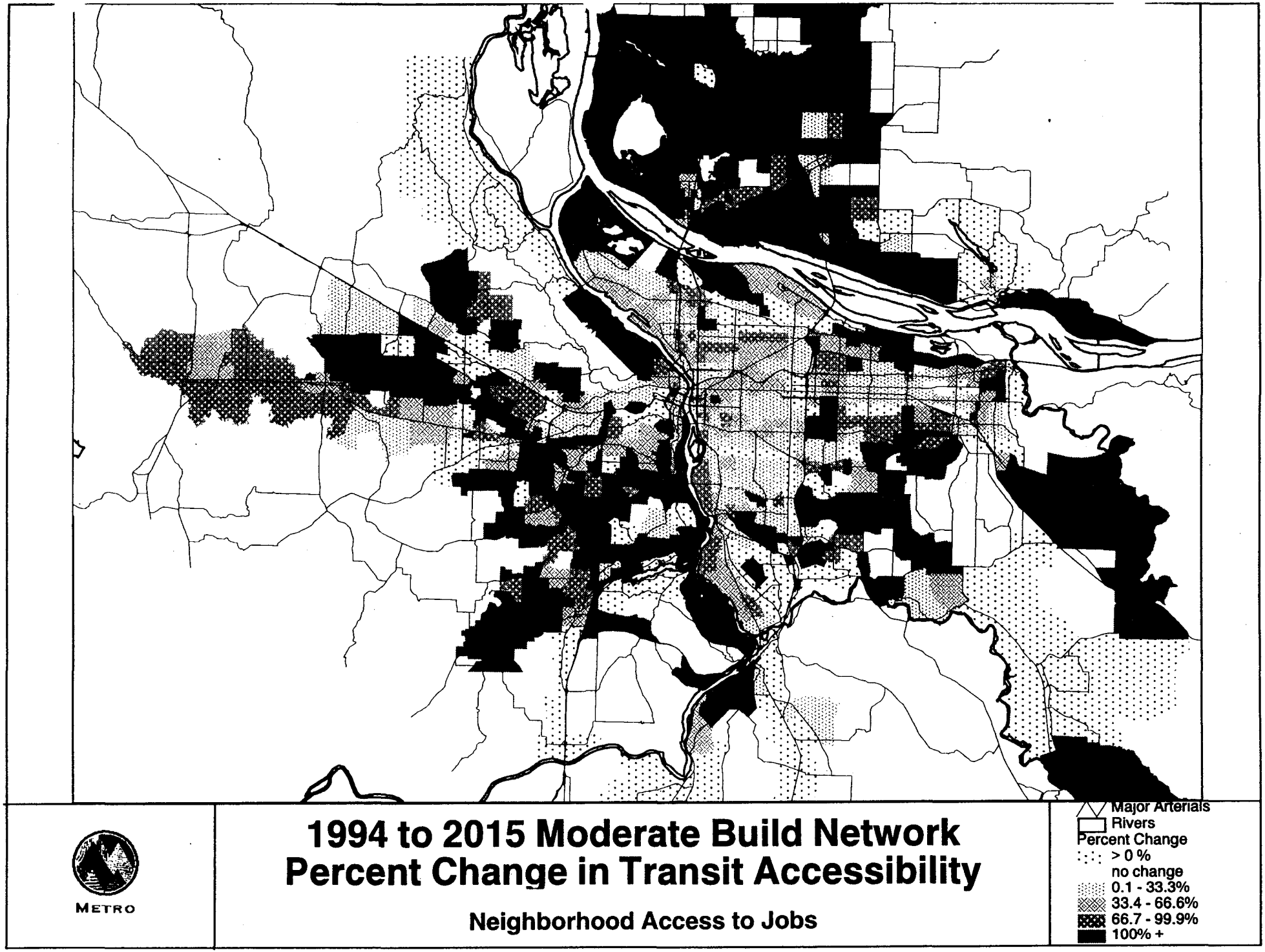


METRO

2015 Moderate Build Network
Absolute Transit Accessibility

Neighborhood Access to Jobs

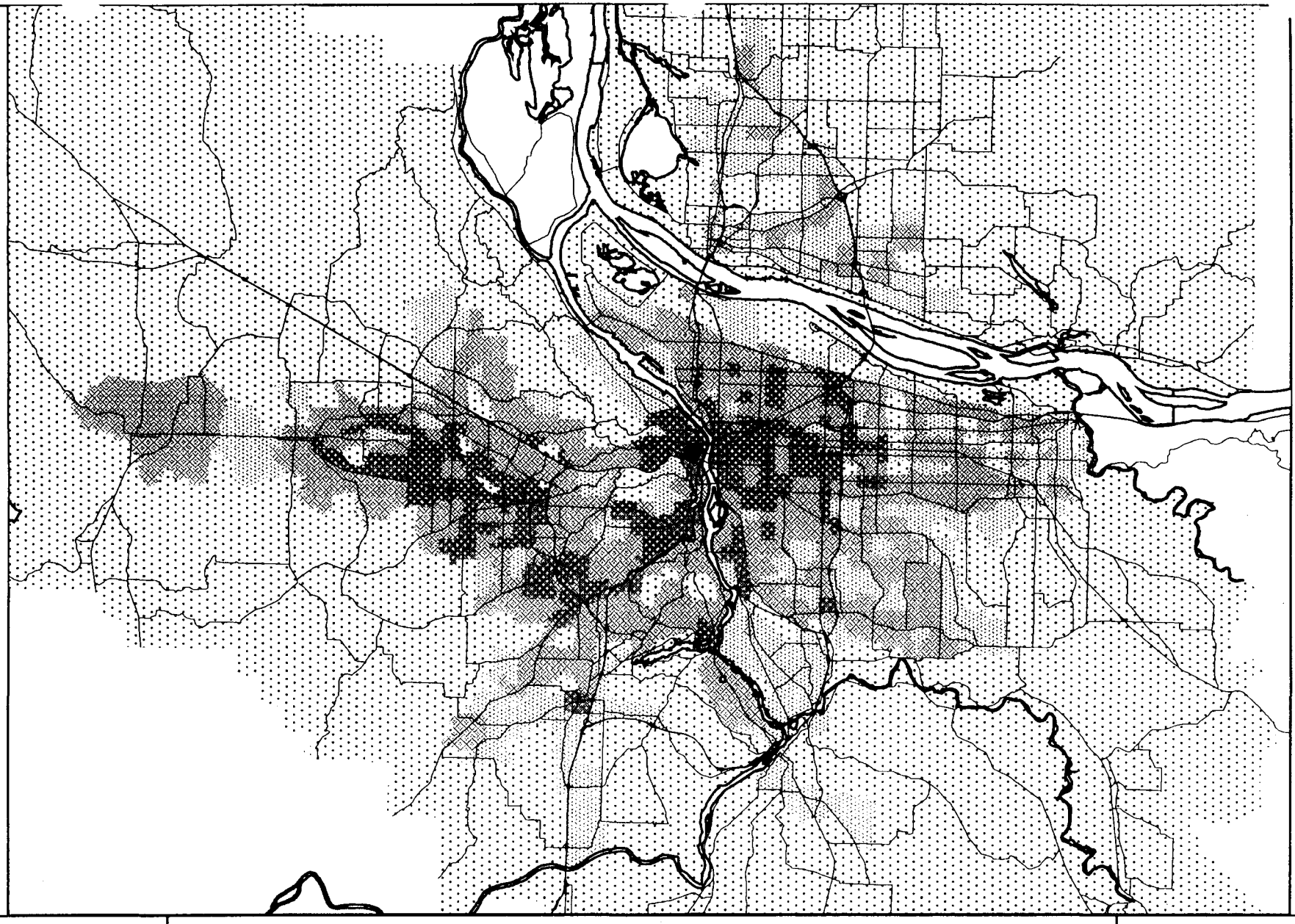
Major Arterials
Rivers
Jobs to Households
0 - 0.49
0.5 - 0.99
1 - 1.99
2 - 4.99
5 +



METRO

1994 to 2015 Moderate Build Network Percent Change in Transit Accessibility

Neighborhood Access to Jobs



METRO

2015 High Build Network
Absolute Transit Accessibility

Neighborhood Access to Jobs

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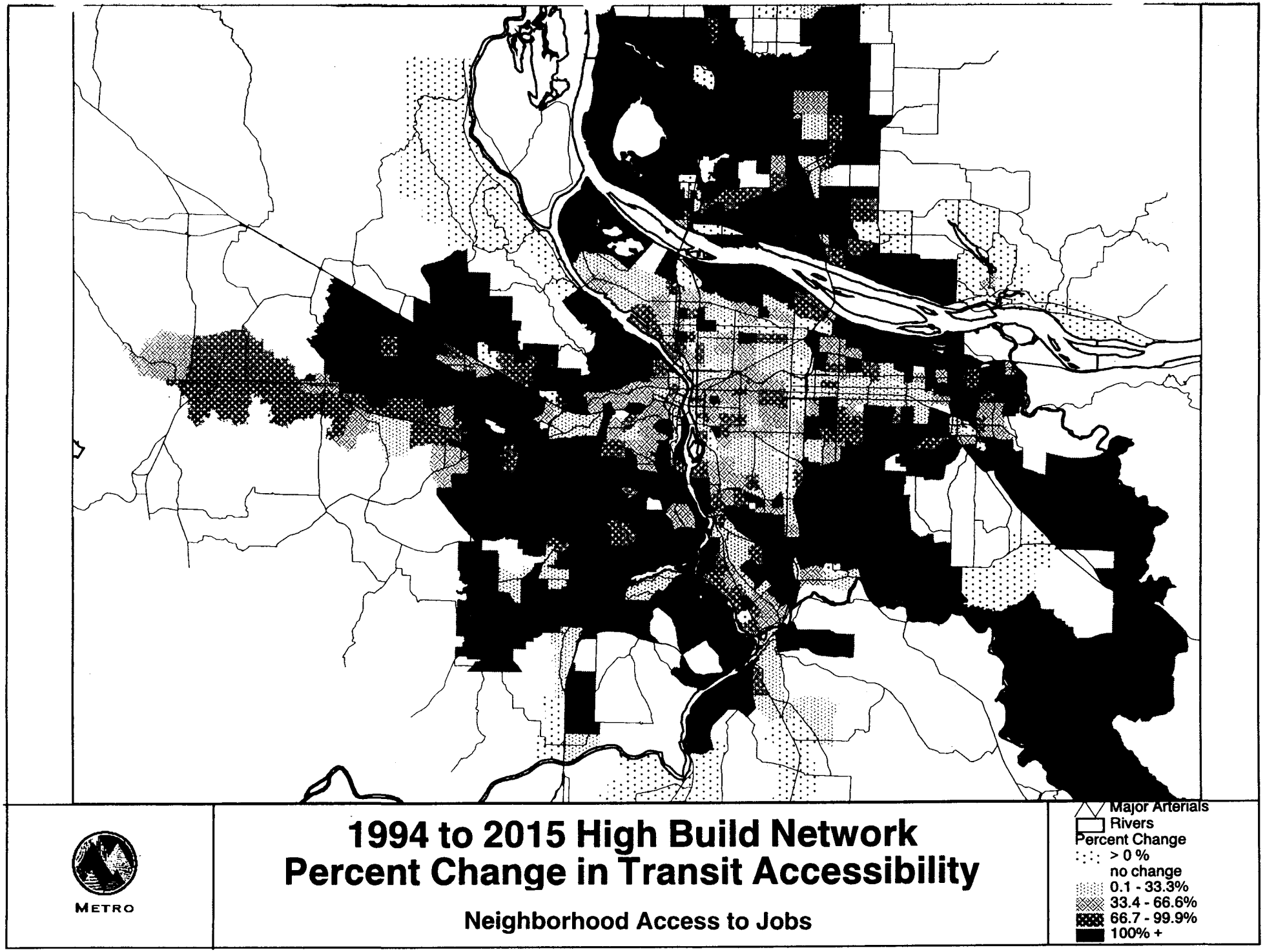
METRO
1994 to 2015 High Build Network
Percent Change in Transit Accessibility
Neighborhood Access to Jobs
Major Arterials
Rivers
Percent Change
> 0 %
no change
0.1 - 33.3%
33.4 - 66.6%
66.7 - 99.9%
100% +

METRO **Public Transportation Alternatives Analysis**

System Performance Measures for Intra-UGB Trips* (within Metro UGB, excludes Clark County, Washington)

	1994	2015 Committed	2015 Scaled Low Transit**	2015 Moderate Transit**	2015 High Transit**
Network Data					
1. Population	1,142,463	1,565,813	1,565,813	1,565,813	1,565,813
2. Employment	791,410	1,225,948	1,225,948	1,225,948	1,225,948
3. Person Trips	4,830,251	6,962,060	6,935,397	6,920,467	6,913,960
Motor Vehicle Data					
1. Total Lane Miles	3,947	4,034	4,793	4,793	4,793
Freeway	595	604	779	779	779
Arterial	3,352	3,430	4,014	4,014	4,014
2. Total Lane Miles Added (from 1994)	N/A	87	846	846	846
3. AWD Total Auto Person Trips	4,201,468	5,938,523	5,946,725	5,882,255	5,837,794
4. AWD Total VMT (no trucks or externals)	14,379,674	20,641,798	22,527,830	22,211,368	21,992,460
5. AWD VMT/Capita (no trucks or externals)	12.59	13.18	14.39	14.19	14.05
6. AWD VMT/Capita change from 1994	N/A	4.71%	14.31%	12.70%	11.56%
7. Single Occupant Vehicle (SOV) Percent of Person Trips	60.36%	59.24%	59.62%	59.01%	58.56%
8. Non-SOV Percent of Person Trips (shared ride, walk, bike, transit)	39.64%	40.76%	40.38%	40.99%	41.44%
9. AWD Motor Vehicle Average Trip Length (miles) *(PM 2-HR)*	4.05 *(4.11)*	4.01 *(4.10)*	4.37 *(4.47)*	4.35 *(4.46)*	4.34 *(4.45)*
10. AWD Auto Occupancy	1.18	1.17	1.16	1.17	1.17
11. PM 2-HR Motor Vehicle Average Travel Time (minutes)	9.73	10.73	10.19	10.07	10.01
12. PM 2-HR Average Motor Vehicle Travel Speed (miles per hour)	25.34	22.93	26.32	26.57	26.67
13. Total Miles in Network	3,524	3,582	3,704	3,704	3,704
14. Congested miles (v/c >0.8) *(percentage of total miles in network)*	276 *(7.83%)*	768 *(21.44%)*	426 *(11.50%)*	437 *(11.80%)*	406 *(10.96%)*
15. Motor Vehicle Hours	119,831	197,274	185,045	182,844	181,771
16. Motor Vehicle Hours of Delay (time accrued above v/c > 0.8)	8,848	35,633	13,583	12,211	11,653
17. Percent Motor Vehicle Hours of Delay	7.38%	18.06%	7.34%	6.68%	6.41%
Freeway *(percentage of total motor vehicle hours)*	3,456 *(2.88%)*	12,832 *(6.5%)*	8,776 *(4.74%)*	8,038 *(4.40%)*	7,818 *(4.30%)*
Arterial *(percentage of total motor vehicle hours)*	5,392 *(4.50%)*	22,801 *(11.56%)*	4,807 *(2.60%)*	4,173 *(2.28%)*	3,835 *(2.11%)*
Freight Data					
1. AWD Total Truck Trips	186,310	284,774	284,774	284,774	284,774
2. AWD Truck Average Trip Length (miles)	3.8	4.04	4.04	4.04	4.04
3. PM 2-HR Truck Average Travel Time (minutes)	8.96	10.29	9.25	9.18	9.15
4. Truck Hours	3,722	6,866	5,996	5,929	5,899
5. PM 2-HR Truck Vehicle Hours of Delay (time accrued above v/c > 0.8)	311	1,603	529	484	467
6. Percent Truck Hours of Delay	8.36%	23.35%	8.82%	8.16%	7.92%
7. Lane Miles Added to Freight Network (from 1994)	N/A	19.7	425.7	425.7	425.7
8. Freight Network Miles	590	590	611	611	611
9. PM 2-HR Congested Freight Network Miles	104	264	182	178	176
10. PM 2-HR Percent Congested Freight Network Miles	17.63%	44.75%	29.79%	29.13%	28.81%

Public Transportation Alternatives Analysis

METRO System Performance Measures for Intra-UGB Trips* (within Metro UGB, excludes Clark County, Washington)

	1994	2015 Committed	2015 Scaled Low Transit**	2015 Moderate Transit**	2015 High Transit**
Transit Data (intra-Oregon)					
1. AWD Total Transit Trips (originating rides)	169,911	267,723	266,553	322,384	359,958
2. AWD Total Transit Trips(originating rides) Change from 1994	N/A	57.57%	56.88%	89.74%	111.85%
3. Annual Originating Rides Per Capita***	44.20	50.80	54.40	61.50	68.70
4. AWD Transit Revenue Hours	4,349	5,508	4,705	6,156	7,672
5. Transit Percent of Person Trips	3.52%	3.85%	3.84%	4.66%	5.21%
6. AWD Originating Riders Per Revenue Hour	39.07	48.61	56.65	52.37	46.92
7. Percent Covered Households (w/in 1/4 mile)	64.68%	61.04%	60.42%	61.36%	65.49%
8. Percent Covered Employment (w/in 1/4 mile)	80.73%	78.78%	79.39%	79.75%	81.95%
9. AWD Transit Trips to/from Central City	96,532	155,420	149,652	177,972	185,044
10. AWD Transit Trips to/from Regional Centers	11,179	27,816	32,033	37,077	46,856
11. AWD Transit Trips to/from Main Streets, Town Centers and Corridors	182,253	286,811	284,328	335,957	375,186
12. AWD Transit Trips to/from Industrial & Employment Areas and Neighborhoods	44,628	67,239	70,530	81,225	98,941
13. Increase in land area covered by routes					
Pedestrian Data					
1. Total Walk Trips (does not include walk trips to transit)****	227,506	395,732	365,975	367,587	368,409
2. Walk Percent of Person Trips	4.70%	5.68%	5.28%	5.31%	5.33%
Bicycle Data					
1. Total Bike Trips*****	35,329	55,025	51,786	52,307	52,521
2. Bike Percent of Person Trips	0.70%	0.79%	0.75%	0.76%	0.76%
Transit Financial Data (in constant 1997 dollars, Metro region only)					
1. 20-year Transit Operating Costs		$2,109,383,684	$2,191,464,229	$2,536,442,590	$2,842,642,820
2. 20-year Transit Capital (Replacement and Expansion) Costs		$398,333,368	$1,437,831,423	$2,256,549,259	$3,615,294,282
3. Total 20-year Transit Costs		$2,507,717,052	$3,629,295,651	$4,792,991,849	$6,457,937,102
Land Consumption Data (Metro region only)					
1. Existing Right-Of-Way (all streets) (in acres)	35,609		N/A	N/A	N/A
2. Additional Right-Of-Way (highway/arterial) (in acres)	N/A		1,544	1,544	1,544

* Data reflects intra-UGB trips only

** All three 2015 public transportation alternative scenarios were modeled against the "moderate" motor vehicle network.
Transit demand in the low transit network was scaled to fit transit capacity (e.g., transit riders above transit capacity were absorbed into the auto mode).

*** Adjusted for increased LRT share of ridership in 2015.

**** Walk trips are consistently understated between alternatives because they represent only trips 6 blocks or longer in length and improvement in pedestrian environment is not accounted for.

***** Bike trips are consistently understated between alternatives due to the broad area of coverage and sample size of the 1994 Metro Travel Behavior Survey. Metro is currently applying for a TGM grant to further study bike travel in the region.

School Bus trips account for 2.66 percent of total person trips in 1994 and 2.85 percent of total person trips in all three 2015 scenarios.

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(Numbers subject to change due to model refinement)

Public Transportation Alternatives Analysis **DRAFT - 7/11/97**

METRO

System Performance Measures for Total Region Trips (includes Clark, Clackamas, Multnomah and Washington counties)

	1994	2015 Committed	2015 Scaled Low Transit*	2015 Moderate Transit*	2015 High Transit*
Network Data					
1. Population	1,552,673	2,190,433	2,190,433	2,190,433	2,190,433
2. Employment	947,647	1,479,544	1,479,544	1,479,544	1,479,544
3. Person Trips	6,448,871	9,616,454	9,631,698	9,616,028	9,609,670
Motor Vehicle Data					
1. Total Lane Miles	7,200	7,310	8,404	8,404	8,404
Freeway	1,047	1,087	1,326	1,326	1,326
Arterial	6,153	6,223	7,078	7,078	7,078
2. Total Lane Miles Added (from 1994)	N/A	110	1,204	1,204	1,204
3. AWD Total Auto Person Trips	5,652,749	8,314,044	8,362,183	8,273,312	8,232,186
4. AWD Total VMT (no trucks or externals)	22,386,536	33,586,276	36,470,648	35,919,360	35,735,816
5. AWD VMT/Capita (no trucks or externals)	14.42	15.33	16.65	16.40	16.31
6. AWD VMT/Capita change from 1994	N/A	6.32%	15.48%	13.73%	13.12%
7. Single Occupant Vehicle (SOV) Percent of Person Trips	61.10%	60.32%	60.63%	60.02%	59.72%
8. Non-SOV Percent of Person Trips (shared ride, walk, bike, transit)	38.90%	39.68%	39.37%	39.98%	40.28%
9. AWD Motor Vehicle Average Trip Length (miles) *(PM 2-HR)*	4.68 *(5.34)*	4.65 *(5.27)*	5.01 *(5.69)*	4.99 *(5.69)*	4.99 *(5.69)*
10. Auto Occupancy	1.18	1.16	1.16	1.16	1.17
11. PM 2-HR Motor Vehicle Average Travel Time (minutes)	11.21	12.49	11.66	11.50	11.51
12. PM 2-HR Average Motor Vehicle Travel Speed (miles per hour)	28.58	25.32	29.28	29.69	29.66
13. Total Miles in Network	6,903	6,938	7,086	7,086	7,086
14. Congested miles (v/c >0.8) *(percentage of total miles in network)*	321 *(4.65%)*	963 *(13.88%)*	493 *(6.96%)*	500 *(7.06%)*	468 *(6.60%)*
15. Motor Vehicle Hours	155,430	263,700	245,701	242,722	241,786
16. PM 2-HR Motor Vehicle Hours of Delay (time accrued above v/c > 0.8)	10,052	42,828	14,690	13,065	12,542
17. Percent Motor Vehicle Hours of Delay	6.47%	16.24%	5.98%	5.38%	5.19%
Freeway *(percentage of total motor vehicle hours)*	3810 *(2.45%)*	16,271 *(6.17%)*	9686 *(3.94%)*	8723 *(3.59%)*	8531 *(3.53%)*
Arterial *(percentage of total motor vehicle hours)*	6242 *(4.02%)*	26,557 *(10.07%)*	5004 *(2.04%)*	4343 *(1.79%)*	4011 *(1.66%)*
Freight Data					
1. AWD Total Truck Trips	298,101	495,934	495,934	495,934	495,934
2. AWD Truck Average Trip Length (miles)	6.4	6.48	6.48	6.48	6.48
3. PM 2-HR Truck Average Travel Time (minutes)	11.98	13.60	12.18	12.10	12.07
4. Truck Hours	5,144	9,805	8,668	8,589	8,564
5. PM 2-HR Truck Vehicle Hours of Delay (time accrued above v/c > 0.8)	310	1,603	520	484	467
6. Percent Truck Hours of Delay	6.03%	16.35%	6.00%	5.64%	5.45%
7. Lane Miles Added to Freight Network (from 1994)	N/A	34.3	619.1	619.1	619.1
8. Freight Network Miles	1,143	1,143	1,169	1,169	1,169
9. Congested Freight Network Miles	131	357	222	216	215
10. Percent Congested Freight Network Miles	11.46%	31.23%	18.99%	18.48%	18.39%

(Numbers subject to change due to model refinement)

Public Transportation Alternatives Analysis **DRAFT - 7/11/97**

METRO

System Performance Measures for Total Region Trips (includes Clark, Clackamas, Multnomah and Washington counties)

	1994	2015 Committed	2015 Scaled Low Transit*	2015 Moderate Transit*	2015 High Transit*
Transit Data					
1. AWD Total Transit Trips (originating riders)	185,738	304,813	307,197	378,518	412,388
2. AWD Total Transit Trips (originating riders) change from 1994	N/A	64%	65%	104%	122%
3. AWD Transit Revenue Hours (excluding C-TRAN)**	4,674	6,225	5,462	6,903	8,420
4. Transit Percent of Person Trips	2.88%	3.17%	3.19%	3.94%	4.29%
5. AWD Originating Riders Per Revenue Hour	39.74	48.97	56.24	54.83	48.98
6. Percent Covered Households (w/in 1/4 mile)	59.67%	57.37%	55.93%	56.62%	59.49%
7. Percent Covered Employment (w/in 1/4 mile)	79.27%	77.57%	77.80%	78.09%	79.69%
8. Total Fleet size (peak one hour without spares)	519	562	560	707	825
LRT (2-car)	13	27	34	53	62
Bus	447	443	428	557	665
C-TRAN	59	92	98	97	98
9. AWD Transit Trips to/from Central City	100,841	163,063	157,226	199,083	205,570
10. AWD Transit Trips to/from Regional Centers	11,221	27,883	32,138	37,572	47,342
11. AWD Transit Trips to/from Main Streets, Town Centers and Corridors	183,706	288,941	286,875	341,725	380,719
12. AWD Transit Trips to/from Industrial & Employment Areas and Neighborhoods	45,157	68,085	71,497	83,133	100,801
Pedestrian Data* **					
1. Total Walk Trips (does not include walk trips to transit)	278,250	479,864	447,791	449,332	450,039
2. Walk Percent of Person Trips	4.31%	4.99%	4.65%	4.67%	4.68%
Bicycle Data					
1. Total Bike Trips****	43,575	67,846	64,454	64,973	65,168
2. Bike Percent of Person Trips	0.68%	0.71%	0.67%	0.68%	0.68%
Transit Financial Data (in constant 1997 dollars, Metro region only)					
1 20-year Transit Operating Costs		$2,109,383,684	$2,191,464,229	$2,536,442,590	$2,842,642,820
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** Revenue hours are based on current span of service factors. These may change after discussion with Tri-Met.

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COMMITTEE MEETING TITLE Joint JPACT/MPAC/Transp. Plng Comm.

DATE 7-16-97

NAME	AFFILIATION
Jim Hoen	MPAC alternate - Mayor of West Linn
Jim Sitzman	DLCD - Alternate
Dick Benner	DLCD
Bob Baker	Vancouver City Council
R E Pollard	Mayor, Vancouver
Judie Stanton	Clark County Commissioner
Lore Benerecon	City of Vancouver
MEL GORDON	CLARK COUNTY COMMISSIONER
CHARLIE HALES	City of Portland
GYM ZEHREN	CITIZEN
Cities	Wash. Co.
Andy Cotugno	Metro
Jon Kvistad	Metro Council
ROB DRAKE	CITIES OF WASHINGTON CTY. CITY OF BEAVERTON
Susan McLain	Metro
Craig Lomnicki	Cities of Clackamas Co.
Jon Hartstrom	Spec Dist Clackamas Co
Lorell Petersen	C.C. Special Dist MPAC Rep
Bud Stein	Reg. Special Dist Multnomah Co.
Peggy Lynch	MPAC Wash Co. Citizen
David W. Knuck	City of Gresham - Council
Jim Knight	City of Troutdale - Council
STEVE DOTTERRER	CITY OF PORTLAND
SANDRA DOUGEDAY	" " GRESHAM
KEN ZATARAIN	TRI-MET

COMMITTEE MEETING TITLE Joint JPACT/MPAC/Transp. Plng. Comm.

DATE 7-16-97

NAME	AFFILIATION
Danielle McFadden	Intern, Metro Transp. Dept.
Dave Yaden	Tri-Met
Dave Williams	ODOT
John Gillam	Portland
Scott L. Rice	Cornelius City Council
Jim Peterson	MWFNA.
Karl W. Rohde	L.O. City Council, JPACT Alt.
Lynn Peterson	Metro
Rich Ledbetter	METRO
Jim Howell	AORTA
Pamela Peck	Metro
Kristin Greene	Cogan Owen Cogan
John Fregonese	Metro
Art Lewellan	L.O.T.I.