Metropolitan Transportation Plan for Clark County

Southwest Washington Regional Transportation Council

CHAPTER 3

IDENTIFICATION OF REGIONAL TRANSPORTATION NEEDS

INVENTORY OF THE EXISTING REGIONAL TRANSPORTATION SYSTEM

As an introduction to planning for the future development of a regional transportation system, an inventory of the existing system is provided. Also, a brief description of the context for regional transportation planning, with regard to meeting federal requirements and designation of federal transportation area boundaries is described.

FEDERAL TRANSPORTATION BOUNDARIES

When the Intermodal Surface Transportation Efficiency Act (ISTEA) was passed in 1991, the Act required Metropolitan Planning Organizations (MPOs), such as RTC, to carry out review of several elements of the regional transportation planning program. First, the Act called for review and revision of the federal transportation **Urban Area Boundary** (UAB); a boundary delineating areas which are urban in nature from those that are largely rural in nature. The federal transportation Urban Area Boundary is not to be confused with the Urban Growth Areas being established under the Washington State Growth Management Act (GMA), as described in Chapter 2. The UAB should cover, at a minimum, the area designated by the 1990 Census as "urbanized" by meeting certain population and density criteria. Within Clark County, the Vancouver urban area has a population of over 50,000 and is therefore defined as an urbanized area by the U.S. Census and Camas/Washougal are defined as an urban area or urban place because they have populations of over 5,000 but are not within the main Vancouver urbanized area. Therefore, for federal transportation purposes there is a Vancouver federal transportation Urban Area Boundary and an adjoining Camas/Washougal Urban Area Boundary. (Refer to Figure 3-1; *Transportation Boundaries*).

ISTEA also called for MPO's to establish a **Metropolitan Area Boundary** which marks the area to be covered by MPO regional transportation planning activities and which, at a minimum, has to include the urban area, the contiguous area expected to be urbanized within the next twenty years and in air quality non-attainment areas, such as the Vancouver area, must include the area enclosed by the **non-attainment area boundary** (i.e. the Vancouver Air Quality Maintenance Area). The Vancouver area's classification as a moderate non-attainment area for carbon monoxide and a marginal non-attainment area for ozone resulted in development and submission to the Environmental Protection Agency (EPA) of Air Quality Maintenance Plans for both carbon monoxide and ozone. This has implications for regional transportation planning as the region strives to attain and then maintain national ambient air quality standards. The entire county is enclosed by the Metropolitan Area Boundary established for the Clark County region. (Refer to Figure 3-1; *Transportation Boundaries*).

With a population of over 200,000 the Portland-Vancouver metropolitan area was designated as a **Transportation Management Area** (TMA) by the U.S. Secretary of Transportation. Within TMAs, the MPO has to develop a congestion management system. The RTC Board adopted the Transportation Management Systems at their May 2, 1995 meeting (RTC Board Resolution 05-95-14). The MPO has authority to select, in consultation with the state, projects to receive federal funds (see Chapter 4 for further details).

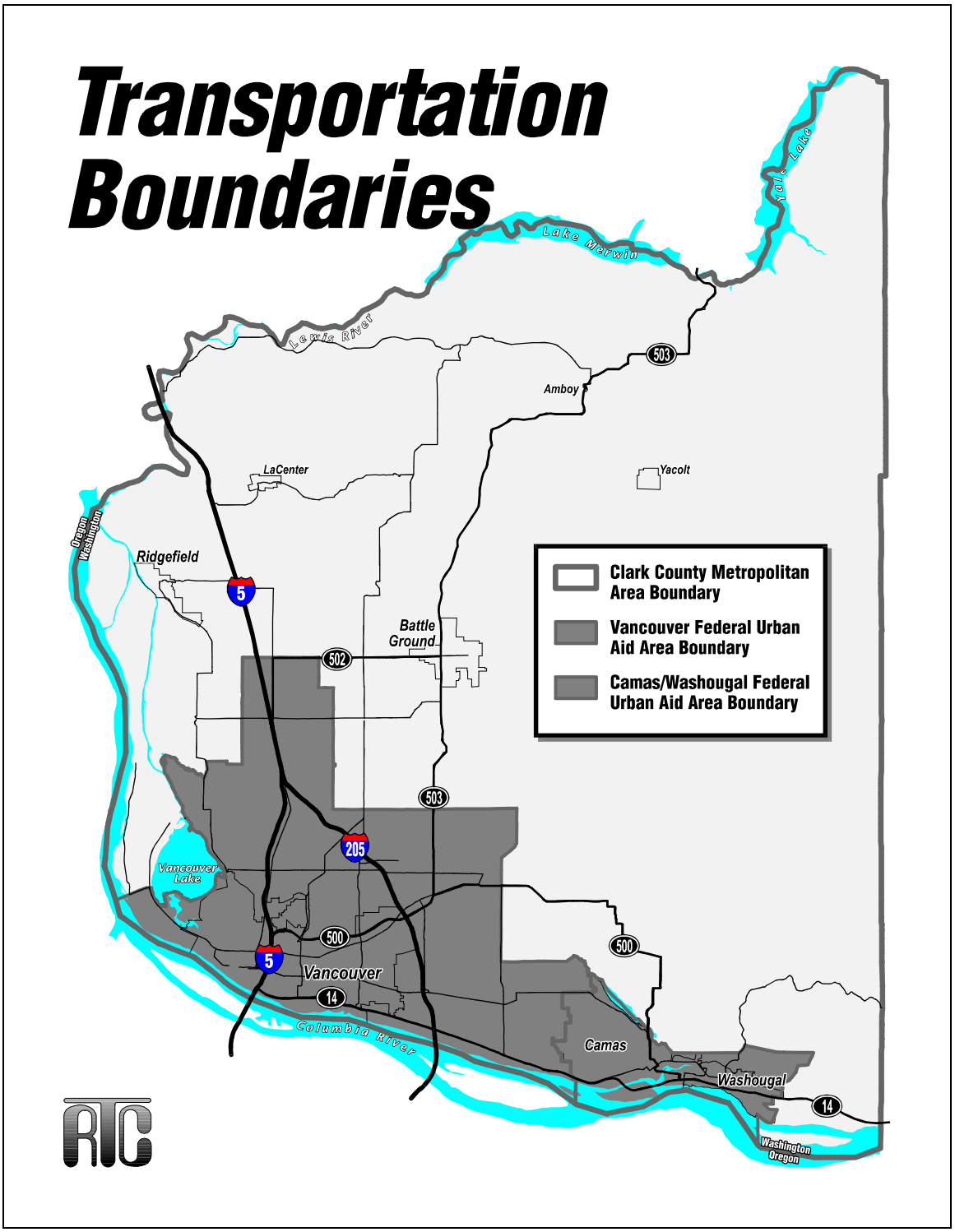
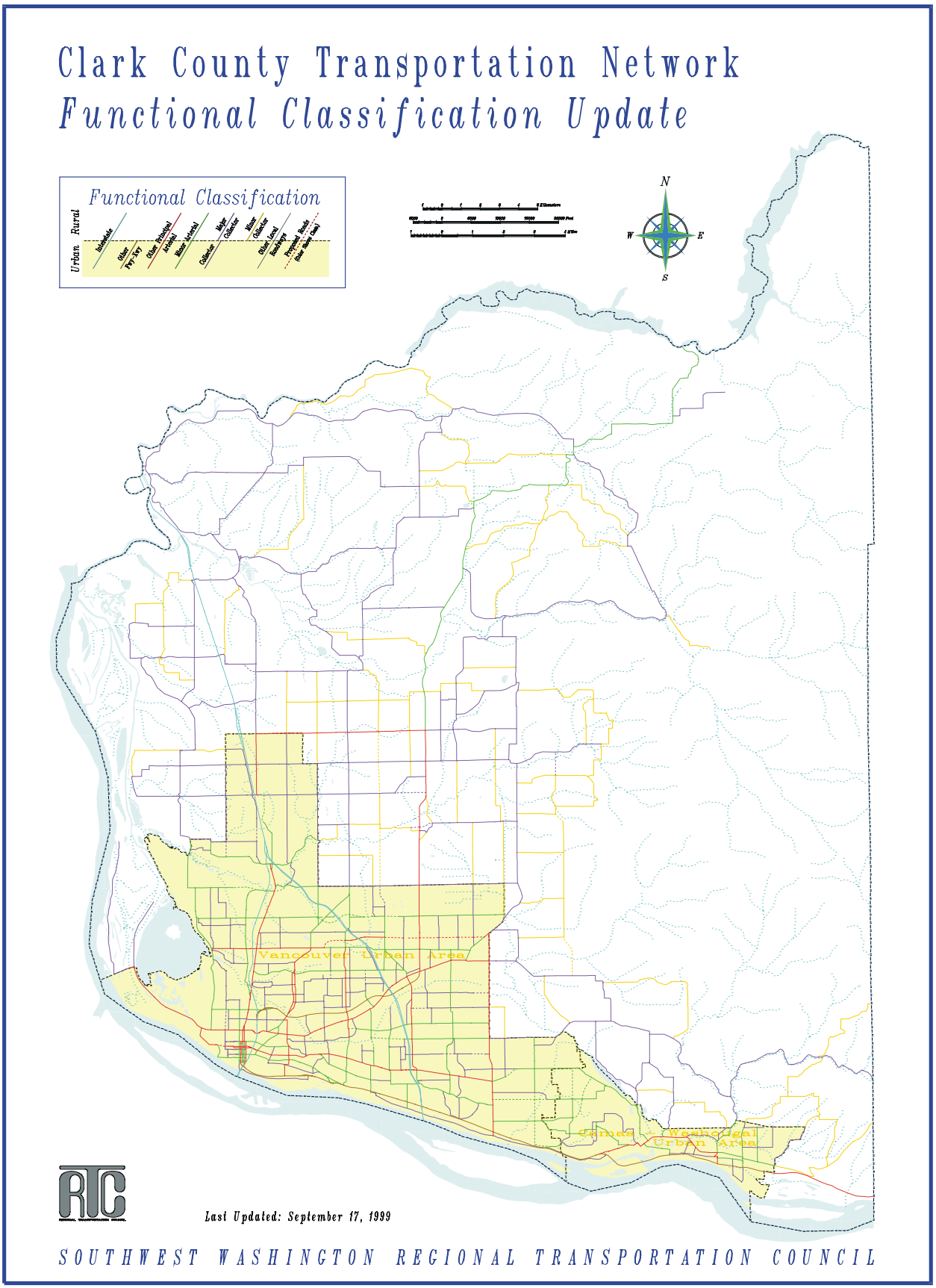


Figure 3-1: Transportation Boundaries

Figure 3-2: Clark County Federal Functional Classification Map



Functional Classification of the Regional Highway System

Arterials are categorized into a functional classification system; the classifying of highways, roads and streets into groups having similar characteristics for providing mobility and/or land access. Interstate freeways, classified as divided principal arterials, are designed to provide for the highest degree of mobility of large volumes of long-distance traffic, they are not designed to provide for access to land uses. Collector facilities generally provide equal emphasis upon mobility and land use accessibility. Local facilities emphasize access to land uses.

In 1993, to meet the requirements of ISTEA, the Federal Functional Classification system for Clark County roads was reviewed. This review led to a revision of the classification system within some jurisdictions and the result was a county-wide uniform classification system (see Figure 3-2; *Clark County Transportation Network, Functional Classification Update*). In May, 1993, RTC was informed by WSDOT that the revised functional classification system had been approved by the Federal Highways Administration. Since the 1993 approval, minor changes have been made to the federal functional classification system. The changes include re-designation of Burton Road, from Andresen Road to NE 162nd Avenue from a collector to minor arterial (MTP, 1996), and re-affirmation of NE 20th Avenue/NE 15th Avenue from Highway 99 to NE 179th Street as a minor arterial. Clark County is now in the process of reviewing classification of certain streets in their system and will be re-classifying following approval of Clark County Arterial Atlas changes by the Board of County Commissioners. The City of Vancouver has requested street re-classifications for: Simpson Avenue (Mill Plain to Fourth Plain) from minor arterial to local and NE 97th Avenue (between Mill Plain and NE 18th Street) from collector to minor arterial.

As a pre-requisite for review of the functional classification system, the Urban Area Boundary had to be defined (refer to Figure 3-1; *Transportation Boundaries*). Facilities classified as collector or above in urban areas are eligible for federal funding while in the rural area, those facilities classified as major collector and above are eligible. In rural areas, minor collectors are not eligible for federal funding. A description of the urban functional classification categories follows:

PRINCIPAL ARTERIALS

Principal arterials permit traffic flow through the urban area and between major elements of the urban area. They are of great importance in the regional transportation system as they interconnect major traffic generators, such as the central business district and regional shopping centers, to other major activity centers and carry a high proportion of the total urban area travel on a minimum of roadway mileage. They also carry traffic between communities. Frequently principal arterials carry important intra-urban as well as intercity bus routes.

Many principal arterials are fully or partially controlled access facilities emphasizing the through movement of traffic. Within the category are (1) interstates (2) other freeways and expressways and (3) other principal arterials.

Spacing of principal arterials may vary from less than one mile in highly developed central business areas to five miles or more in the sparsely developed urban fringes.

MINOR ARTERIALS

Minor arterials collect and distribute traffic from principal arterials to lesser classified streets, or allow for traffic to directly access their destinations. They serve secondary traffic generators such as community business centers, neighborhood shopping centers, multiple residence areas, and traffic from neighborhood to neighborhood within a community. Access to land use activities is generally permitted. Such facilities are usually spaced under two miles apart and in core areas can be spaced at 1/8 to 1/2 mile apart.

COLLECTORS

Collectors provide for land access and traffic circulation within residential neighborhoods and commercial and industrial areas. They distribute traffic movements from such areas to the arterial system. Collectors do not handle long through trips and are not continuous for any great length.

LOCAL STREETS

Local streets provide direct access to abutting land and access to the higher classification facilities. They offer the lowest level of mobility and usually contain no bus routes. They are not intended to carry through traffic but make up a large percentage of the total street mileage.

Rural roads consist of those facilities that are outside of urban areas. They too are categorized into functional classifications:

RURAL PRINCIPAL ARTERIALS

Rural principal arterials are sub-divided into two sets (1) interstate facilities and (2) other principal arterials. They consist of a connected rural network of continuous routes and provide an integrated network without stub connections.

RURAL MINOR ARTERIALS

In conjunction with the principal arterials, the rural minor arterials form a rural network which link cities and larger towns together with other major traffic generators. The principal arterials and rural minor arterials are spaced at such intervals that all developed areas of the state are within a reasonable distance of an arterial highway. Minor arterials should be expected to provide for relatively high overall travel speeds with minimum interference to through movement.

The other rural road classifications are:

Rural Major Collector Roads (are eligible for federal funding)

Rural Minor Collector Roads (are not eligible for federal funding) and

Rural Local Roads

NATIONAL HIGHWAY SYSTEM (NHS)

ISTEA also required that roads be designated as National Highway System (NHS) facilities. Congress approved the NHS system with passage of the National Highway System Designation Act of 1995 (NHS Act). In Clark County the following roads have been designated as NHS facilities:

Table 3-1: Designated NHS Facilities; Clark County

DESIGNATED NHS FACILITIES - Clark County	
Facility	**Extent**
I-5	Oregon State Line to Clark County line (north)
I-205	Oregon State Line to I-5 Interchange
SR-14	I-5 to Clark County line (east)
SR-500	I-5 to SR-503 intersection
SR-501	I-5 to Port of Vancouver access
SR-502	I-5 to SR-503 intersection
SR-503	SR-500 intersection to SR-502 intersection

Table 3-2: Federal Functional Classification Mileage

FEDERAL FUNCTIONAL CLASSIFICATION OF CLARK COUNTY ROADS Mileage of Classified and Local Roads					
Facility Type	**Vancouver Urban Area**	**Camas Urban Area**	**Rural Remainder of County**	**Total Clark County**	**% of Total**
Interstates	22.1	0.0	9.2	31.4	1.2%
Expressways & Principals	78.2	11.5	14.2	103.9	4.0%
Minor Arterials	94.5	24.1	19.7	138.3	5.3%
Urban Collectors and Rural Major Collectors	133.2	16.0	204.4	353.5	13.6%
Rural Minor Collectors	0.0	0.0	143.1	143.1	5.5%
Local Roads	625.8	71.3	1,136.3	1,833.4	70.4%
Total	953.8	123.0	1,526.9	2,603.6	100.0%

There is a state-wide limitation on the percentage of roads which can be functionally classified as Principal Arterial per federal guidelines. As a result, Clark County was unable to classify the facilities listed in Table 3-3 according to their plans for design standards for the facilities. The County intends that the listed facilities be developed to the GMA classification system design standards and, at the earliest opportunity, should be re-classified under the federal functional classification system so that both GMA and federal systems match. As the mileage of local roads increases, then the mileage of principal arterials or minor arterials could potentially be increased.

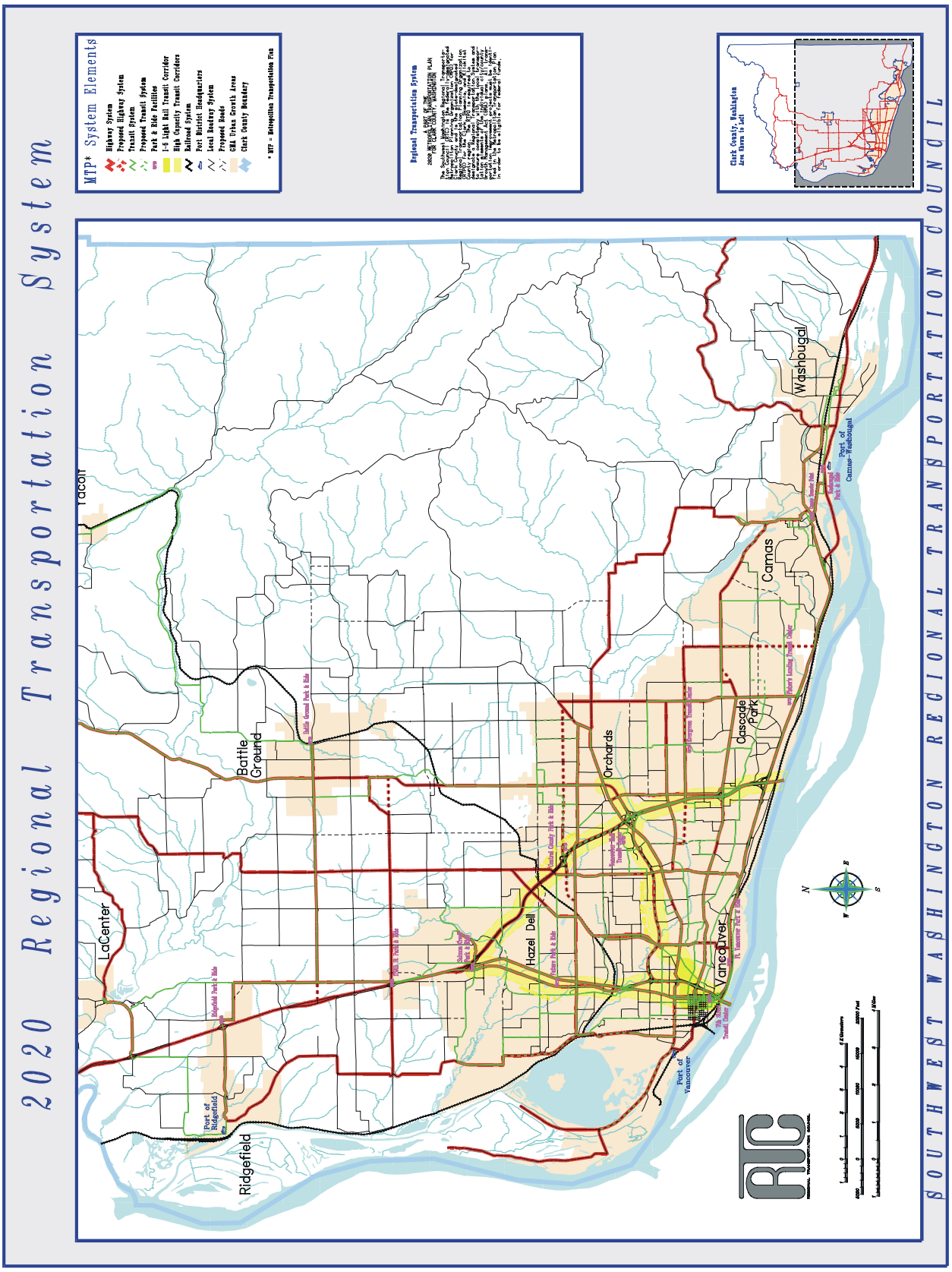
HIGHWAYS OF STATEWIDE SIGNIFICANCE (HSS)

The 1999 state legislature adopted the Highways of statewide significance, fulfilling a requirements of House Bill 1487 passed in 1998. In Clark County highway facilities defined as of Statewide Significance are I-5, I-205 and SR-14.

Table 3-3: Clark County Functional Re-classification

Clark County Facilities for Functional Re-classification			
Facility	**Extent**	**Federal Functional Classification**	**GMA Functional Classification**
St. John's	NE 78th St to NE 72nd Ave	Minor Arterial	Principal
Andresen/NE 72nd Ave	NE 78th St to NE 119th St	Minor Arterial	Principal
NE 18th St (part proposed, part existing)	Andresen to NE 162nd Ave	Minor Arterial	Principal
SE/NE 192nd Ave (part proposed, part existing)	SR-14 to NE 18th St	Minor Arterial	Principal
Mill Plain (part proposed, part existing)	NE 164th Ave to SE 1st St (180th Ave vicinity)	Minor Arterial	Principal
Mill Plain	180th Ave vicinity to Camas City Limits	Minor Arterial	Principal
179th St	NW 11th to NE 29th Ave	Collector	Principal
Lakeshore/36th Ave	Bliss Rd to NE 78th St	Minor Arterial	Principal
Ward Rd	Fourth Plain to 162nd Ave	Minor Arterial	Principal
Andresen Rd	NE 18th St to Mill Plain	Minor Arterial	Principal

Figure 3-3: 2015 Regional Transportation System



Designation Of The RTP Regional Transportation System

Consistent with the state's Regional Transportation Planning Program Planning Standards, the designated MTP regional transportation system (see Figure 3-3) includes:

1. All state transportation facilities and services (including highways, state-owned park-and-ride lots etc.)

2. All local freeways, expressways, and principal arterials (the definition of principal arterials can be the same as used for federal classification or be regionally determined).

3. All high-capacity transit systems (any express-oriented transit service operating on an exclusive right-of-way including high occupancy vehicle (HOV) lanes).

4. All other transportation facilities and services, including airports, transit services and facilities, roadways, rail facilities, marine transportation facilities etc. that the RTPO considers necessary to complete the regional plan.

5. Any transportation facility or service that regional need or impact places in the plan, as determined by the RTPO.

It is the designated regional transportation system which is the focus for transportation planning in the MTP.

A detailed description of the designated MTP Regional Transportation System follows:

1. **All state transportation facilities and services** (including state highways, state owned park and ride lots etc.)

In Clark County this category includes Interstate facilities I-5 and I-205.

Clark County has a 20.78 mile section of **I-5**, the major interstate freeway serving the west coast of the U.S.A.. I-5 provides for north-south travel and is used for interstate travel from southern California, through the state of Oregon northward through Washington State to the Canadian border. I-5 crosses the Columbia River from Oregon to Washington over the Interstate Bridge. I-5 has three lanes in each direction from the Interstate Bridge north to the Highway 99 off-ramp. There are currently two travel lanes in each direction from I-5/Highway 99 to the point at which I-205 joins I-5. North of the I-5/I-205 interchange there are again three travel lanes in each direction.

A 10.07 mile stretch of **I-205** traverses Clark County until it joins I-5 just north of N.E. 134th Street. I-205 was constructed as an alternative route to I-5, as a by-pass facility through the Portland/Vancouver metropolitan area. I-205 crosses the Columbia River over the Glenn Jackson Bridge which was opened in 1982. The Glenn Jackson Bridge has four travel lanes in each direction. North of the bridge the facility has three lanes in each direction to a point just north of the interchange with SR-500. I-205 continues as a two lane in each direction facility until it joins I-5.

State routes in Clark County include SR-14., SR-500, SR-501, SR-502 and SR-503. Following the adoption of the Road Jurisdiction Committee's criteria guiding the designation, addition or deletion of state routes it was recommended and legislated that SR-140 be returned to local jurisdictions.

SR-14 provides the main east-west access from south-west Washington state to south-east Washington State along the north bank of the Columbia River. The facility extends 21.77 miles through Clark County to the Skamania County line with two lanes in each direction up to mile post 12 and one lane in each direction thereafter.

SR-500 is a 20.37 mile facility entirely within Clark County and allows for east-west cross-county travel. From the interchange with I-5 the facility has two-lanes in each direction until it reaches Ward Road. The facility then becomes a one-lane in each direction facility and traverses rural Clark County until the Camas urban area is reached. SR-500 meets SR-14 in Camas. The facility carries traffic to and from the Clark County regional shopping mall, Vancouver Mall. The segment of SR-500 between I-5 and I-205 was opened as a limited access facility in 1984.

SR-501 is comprised of two unconnected segments. The south segment extends, as a four-lane facility, from the interchange with I-5 westward along Fourth Plain. This segment of SR-501 carries traffic to and from the Port of Vancouver. The facility reduces to two lanes and branches into two in the Vancouver Lake lowlands area with both branches terminating in the lowlands. The northern segment extends as a two-lane facility from I-5 westward to the City of Ridgefield where it terminates. Originally it was intended that the two segments be joined to complete a circumferential route around the westside of the Vancouver urban area and to carry traffic to and from the lowlands industrial area. However, the facility was never completed.

SR-502 extends from the I-5/N.E. 179th Street interchange northward to N.E. 219th Street where it turns eastbound toward Battle Ground.

SR-503 extends northward from its intersection with SR-500 to the Cowlitz County line. The route has four lanes to N.E. 144th Street at which point it reduces to two lanes.

Table 3-4: State Route Mileage in Clark County

STATE ROUTE MILEAGE IN CLARK COUNTY					
Facility	**Beginning Mile Post**	**Begins at: (Description)**	**Ending Mile Post**	**Ends at: (Description)**	**Route Mileage**
I-5	0	Oregon State Line on Interstate Bridge	20.78	Cowlitz Co. Line	20.78
I-205	0	Oregon State Line on Glenn Jackson Bridge	10.07	Interchange with SR-5	10.07
SR-14	0	Interchange with SR-5, Vancouver	21.77	Skamania Co. Line	21.77
SR-500	0	Interchange with SR-5	20.37	Intersection with SR-14, Camas	20.37
SR-501 S. Section	0	Interchange with SR-5	12.72	Terminus of south segment	19.88
SR-501 N. Section	16.91	City of Ridgefield	19.88	Interchange with I-5/ N.E. 269th St.	
SR-502	0	Intersection with SR-5, at N.E. 179th St.	7.56	Intersection with SR-503	7.56
SR-503	0	Intersection with SR-500	19.73	Cowlitz Co. line	19.73

2. **All local freeways, expressways, and principal arterials**

Local expressways and principal arterials are also designated as part of the regional transportation system. Principal arterials, such as Mill Plain, Fourth Plain, N.E. 78th Street, N.E. 112th Avenue, SE/NE164th/162nd Avenue. and segments of St. John's and Andresen are included. Future planned arterials on the regional system are marked on Figure 3-3 by a dashed red line. Future planned facilities include the Padden Expressway, the Mill Plain Extension, 192nd Avenue (from SR-14 north) and NE 18th Street extension west from NE 102nd Avenue to NE 87th Avenue.

3. **All high-capacity transit systems** (any express-oriented transit service operating on an exclusive right-of-way including high occupancy vehicle (HOV) lanes).

The I-5 (from State line to the vicinity of NE 134th Street), I-205 (from state line to vicinity of NE 134th Street) and SR-500 (from I-5 to the Orchards area) corridors are designated as High Capacity Transit (HCT) corridors. Planning for Light Rail Transit (LRT) in the I-5 corridor, terminating in the vicinity of Clark College, is underway.

4. **All other transportation facilities and services considered necessary to complete the regional transportation plan**. These include transit services and facilities, roadways, rail facilities, airports, marine transportation facilities etc.

Clark County is served by the C-TRAN transit system which operates a **FIXED ROUTE BUS SYSTEM** on urban and rural routes in Clark County and express bus service for commuters to Portland, Oregon. Figure 3-3 marks C-TRAN's existing fixed route system and also marks potential extension of the system with green dashed lines. Table 3-5 describes the existing fixed-route bus system.

Table 3-5: C-TRAN Fixed Route System (January 1999)

C-TRAN FIXED SYSTEM - BUS ROUTES (January 1999)							
Bus Route Number	**Route Name**	**Weekday Service First Run Begins**	**Weekday Service Last Run Begins**	**Weekday Service Frequency**	**Saturday Service**	**Sunday/ Holiday Service**	**Area Served** (TC = Transit Center; P&R = Park and Ride)
1	Fruit Valley	5:35 am	9:27 pm	30 mins	Yes	Yes	7th St TC to west side Vancouver
2	Capitol Hill	5:15 am	9:45 pm	30 mins	Yes	Yes	7th St TC to JM Plaza
3	Rosemere/ Brandt	5:28 am	9:45 pm	35 mins	Yes	Yes	7th St TC to close-in east-side Vancouver, including Vancouver Memorial Hospital
4	Fourth Plain	5:10 am	10:20 pm	15 mins	Yes	Yes	7th St TC to Vancouver Mall, via 4th Plain
6	Hazel Dell	5:07 am	10:30 pm	23 mins	Yes	Yes	7th St TC to Salmon Creek P&R via Hazel Dell Ave
7	Battle Ground	5:45 am	9:30 pm	45 mins	Yes	Yes	Van Mall TC to Battle Ground
8	Ridgefield/ La Center	6:15 am	6:34 pm	Peak	No	No	From Ridgefield and La Center to Salmon Creek P&R
10	Eastridge via 5 Corners	6:30 am	9:17 pm	35 mins	Yes	Yes	Vancouver Mall to Orchards area
11	Columbia Shores	5:45 am	9:25 pm	30 mins	Yes	Yes	7th St TC to Water Resources Education Center
12	112th Avenue	5:15 am	9:45 pm	30-60 mins	Yes	Yes	Evergreen TC to Vancouver Mall
18	Parker Loop	5:15 am	9:38 pm	30-60 mins	Yes	No	Evergreen TC to Parker St via 162nd , SE 1st, Payne Rd, SE 34th
21	Felida	5:45 am	9:30 pm	30-45 mins	Yes	Yes	7th St TC to Salmon Creek P&R via Hwy 99, NE 78th St and NW 36th Ave
25	St. John's	5:45 am	9:30 pm	30 mins	Yes	Yes	7th St TC to Salmon Creek P&R via Minnehaha area and WSU
30	Burton	4:55 am	10:45 pm	23-60 mins	Yes	Yes	7th St TC to Evergreen TC via Burton Road
31	Sifton via Orchards	6:15 am	8:59 pm	35 mins	Yes	Yes	Vancouver Mall to Sifton/Orchards
32	Evergreen	5:15 am	9:45 pm	35 mins	Yes	Yes	7th St TC to Van Mall, via Evergreen Blvd
33	Camas/ Washougal	6:40 am	9:10 pm	60 mins	Yes	Yes	Local Camas/Washougal service
37	Mill Plain	4:50 am	10:15 pm	20 mins	Yes	Yes	7th St TC to Evergreen TC via Mill Plain Blvd

C-TRAN FIXED SYSTEM - BUS ROUTES (January 1999)							
Bus Route Number	**Route Name**	**Weekday Service First Run Begins**	**Weekday Service Last Run Begins**	**Weekday Service Frequency**	**Saturday Service**	**Sunday/ Holiday Service**	**Area Served** (TC = Transit Center; P&R = Park and Ride)
38	MacArthur/ Cascade Park.	5:21 am	9:41 pm	30-60 mins	Yes	Yes	7th St TC to Fisher's Landing
41	Hearthwood/ Camas	5:45 am	8:45 pm	30-60 mins	Yes	No	Evergreen TC to Camas
71	Highway 99	4:55 am	10:00 pm	23 mins	Yes	Yes	7th St TC to Salmon Creek P&R via Hwy 99
74	Battle Ground/ Yacolt/Amboy	7:15 am	7:12 pm	Peak	No	No	Battle Ground to Yacolt, Chelatchie Prairie and Amboy
78	78th Street	6:00 am	10:00 pm	24-48 mins	Yes	Yes	Vancouver Mall to NW 9th Ave & NW 82nd St via NE 78th St
97	Downtown Vancouver Free Shuttle	6:20 am	7:00 pm	20 mins	Yes	No	Downtown Vancouver
98	Marshall Center/ Officers' Row Free Shuttle	9:00 am	2:00 pm	30 mins mid-day	No	No	Downtown Vancouver to Marshall Center
99	99th Street	6:16 am	10:18 pm	24-28 mins	Yes	Yes	Vancouver Mall to NW 9th Ave/NW 82nd St via NE 99th St
105	Express via I-5	5:15 am	7:15 pm	10-60 mins	No	No	7th St TC to Downtown Portland
114	Camas/ Washougal Express	6:35 am	5:15 pm	1 trip a.m. 1 trip p.m.	No	No	Camas/Washougal via 7th St TC to Downtown Portland
134	Salmon Creek Express	5:15 am	7:15 pm	Peak 5-30 mins	No	No	Salmon Creek P&R to Downtown Portland
154	BPA Express	5:50 am	5:45 p.m.	Peak 4 trips a.m. 6 trips p.m.	No	No	BPA Park-and-Ride to Downtown Portland
155	Lloyd Center Express			Peak 4 trips a.m. 5 trips p.m.	No	No	BPA Park-and-Ride to Lloyd Center District
173	Battle Ground Limited	5:30 am	5:15 pm	1 trip a.m. 1 trip p.m.	No	No	Battle Ground/Chelatchie Prairie to 7th St TC, Vancouver
175	Gateway Express	5:40 am	6:45 pm	25-55 mins	No	No	Evergreen TC to Downtown Portland via Gateway
176	Van Mall Ltd	5:40 am	6:45 pm	Peak 30 mins	No	No	Vancouver Mall to Gateway TC
177	Evergreen Express	5:05 am	7:12 pm	Peak 15-25 mins	No	No	Evergreen TC to Downtown Portland
190	Marquam Hill Express	6:00 am	4:45 pm	Peak 2 trips a.m. 2 trips p.m.	No	No	Van Mall to Marquam Hill via Bonneville Power Ross Complex Park and Ride

C-TRAN FIXED SYSTEM - BUS ROUTES (January 1999)							
Bus Route Number	**Route Name**	**Weekday Service First Run Begins**	**Weekday Service Last Run Begins**	**Weekday Service Frequency**	**Saturday Service**	**Sunday/ Holiday Service**	**Area Served** (TC = Transit Center; P&R = Park and Ride)
191	Swan Island Express	6:00 am	5:00 pm	Peak	No	No	Van Mall to Swan Island via Bonneville Power Ross Complex Park and Ride

During normal C-TRAN service hours, a connection is provided between the Vancouver Amtrak Station and the 7th Street Transit Center. All of the C-TRAN local routes now use buses equipped with wheelchair lifts making them accessible to people with disabilities. C-TRAN also operates a paratransit service, C-VAN. C-TRAN's paratransit service plan is described in their publication *1997 C-TRAN ADA Paratransit Service Plan* (January, 1997). C-TRAN attained full compliance with the ADA in January of 1997. C-TRAN had a fleet of ten paratransit vehicles in 1991 and anticipates a fleet of sixty by 2000.

Table 3-6: C-TRAN; Paratransit Service

C-TRAN PARATRANSIT SERVICE (C-VAN)		
Year	**Paratransit Trips**	**Paratransit Revenue Hours Per Year**
1994	99,036	32,212
1995	115,841	41,803
1996	142,495	48,317
1997	170,816	56,728
1998	186,665	67,769
1999 (to end July, 1999)	110,097	37,532

All of C-TRAN's buses are also equipped with bicycle racks. C-TRAN runs a training program to prepare bicyclists for use on transit.

C-TRAN's facilities include transit centers and park-and-ride lots described in Table 3-6, below. C-TRAN uses security measures to make the transit system safe for its users. These security measures include provision of private security patrols at the Seventh Street Transit Center in Downtown Vancouver, the Salmon Creek Park and Ride, the Evergreen Transit Center and Vancouver Mall Transit Center. The City of Vancouver's Police Department bike patrol regularly patrols the 7th Street Transit Center. C-TRAN has contracted with the City of Vancouver to ensure that the bike patrol monitors the 7th Street Transit Center. C-TRAN buses are equipped with emergency alarms and two-way radios. Additionally, randomly placed surveillance cameras are located on various buses. Customer service facilities are located at both the 7th Street and Vancouver Mall Transit Centers, and public restrooms are located at 7th Street and Evergreen. Passenger shelter, bench, and waiting facilities are provided at most of the park and ride lots. Bicycle locker or rack facilities are provided at some of the lots.

Table 3-7: C-TRAN; Transit Centers and Park and Ride Facilities (September 1999)

C-TRAN TIME TRANSFER CENTERS AND PARK AND RIDE FACILITIES (SEPTEMBER 1999)			
FACILITY	**TRANSIT CENTER/ PARK-AND-RIDE**	**PARKING SPACES**	**BUS ROUTES**
Downtown Vancouver, 7th Street Transit Center	Transit Center	N/A	1, 2, 3, 4, Tri-Met 5, 6, 11, 21, 25, 30, 32, 37, 38, 71, 97, 98, 105, 114, 173
Vancouver Mall	Transit Center	N/A	4, 7, 10, 12, 31, 32, 78, 99, 176
Evergreen Transit Center	Transit Center and Park-and-Ride	279	12, 18, 30, 37, 41, 175
Salmon Creek	Park-and-Ride	436	6, 8, 25, 71, 134
BPA Ross Complex	Park-and-Ride	200+	154, 155, 190, 191
Vancouver Mall (Regal Cinemas)	Park-and-Ride	60+	4, 7, 10, 12, 31, 32, 78, 99, 176
Battle Ground	Park-and-Ride	28	7, 173, 174
Camas/Washougal	Camas Transfer Center Washougal Park-and-Ride	20	33, 41, 114 33,114
NE 179th Street	Park-and-Ride	20	8, 173
NE 269th Street	Park-and-Ride	48	8

All of C-TRAN's fixed route system and facilities are included as part of the designated regional transportation system.

Greyhound provides **INTER-CITY BUS** service in the I-5 corridor from its bus depot in Downtown Vancouver.

Clark County has three **PORT DISTRICTS**; the Port of Vancouver, the Port of Camas-Washougal and the Port of Ridgefield.

The **Port of Vancouver** operates an international cargo dock used by over 440 ships, carrying over 5.6 million metric tons of cargo, a large percentage of which was grain, in 1995. The Port is expanding its dry bulk handling facilities. The Port also has industrial property with around forty tenants and holds property in the Vancouver Lake Lowlands for future development of recreational facilities, a business park, industrial sites and expansion of its marine terminal operations.

The **Port of Ridgefield**'s taxing district extends over 110 square miles of land. Port-owned assets include a 78-acre industrial park, located near the I-5/269th interchange and N.W. Timm

Road, and a golf course. The Port's land adjacent to the Ridgefield Junction is zoned for light industrial use and currently houses six businesses. The Port also holds 4,615 acres of the Ridgefield Wildlife Refugee, parcels of land within the Ridgefield city limits totaling less than 5 acres and has 5 acres of industrial-zoned land on the Lake River waterfront.

The **Port of Camas/Washougal**'s taxing district extends over 95 square miles of land with an industrial park, marina, airport, a park and wildlife refuge. The 430-acre industrial park, located south of SR-14 by Index and 27th to 32nd Streets, has 25 industries each employing between 1 and 164 people. The marina has moorage to accommodate 330 plus 25 additional spaces for guests, a restaurant, two yacht clubs and a boat launch. The Port district also operates Grove Field Airport (described in a later section).

There are two main **RAIL LINES** in use in the County which provide freight and passenger service. Both main lines are owned by Burlington Northern/Santa Fe (BNSF). In addition, a privately owned rail line in the county also offers freight and tourist train passenger service.

The BNSF Seattle/Vancouver line is in excellent condition and has 70 to 80 trains operating in the corridor each day. The Vancouver/Eastern Washington line is also in excellent condition and handles about 35 trains daily. The Rye Branch is a short segment which diverges from the main northern line around N.W. 78th Street to Rye yard off St. John's Road. The track is in fair condition; freight trains use it about twice weekly. Union Pacific Railroad operates some freight trains to Tacoma and Seattle on BNSF's lines. AMTRAK has an agreement with BNSF to operate passenger service on the freight carrier's rail lines. AMTRAK trains serve Vancouver daily. The *Coast Starlight* travels between Seattle and Los Angeles via Vancouver and Portland, the *Mount Rainier* travels between Seattle and Eugene, Oregon, the *Empire Builder* travels between Chicago and Spokane with one part of the train continuing on to Seattle and the other part continuing on, via Pasco and Bingen-White Salmon, to Vancouver and the service terminates in Portland. In October, 1994, an additional Portland-Seattle run, the *Mount Adams*, sponsored by Washington State, was added to increase the reliability of rail travel for regional intercity travel in the northwest. Service now continues to Eugene, Oregon. The *Mount Baker*, sponsored by Washington State, now runs between Seattle and Vancouver, British Columbia, Canada daily. In August 1995, there were 44,000 train riders on the Eugene to Vancouver B.C. line and in August 1996 the ridership had increased to 51,000; a 15% increase.

Today, rail corridor planning is moving ahead. The Pacific Northwest Rail Corridor is one of only five designated high-speed corridors in the nation which pre-qualifies the region for federal high-speed rail funding. In late 1995, the Washington State Department of Transportation (WSDOT) and project partners released the *Options for Passenger Rail in the Pacific Northwest Rail Corridor* report. An Environmental Impact Statement on corridor improvements should be complete and construction on some rail system improvements began in 1998. In addition, three custom-built Talgo trains will be in service on Amtrak's Pacific Northwest Rail Corridor service. Plans are underway to upgrade the Vancouver Amtrak station facility and site as part of the Eugene to Vancouver B.C. passenger rail service improvements in preparation for high speed rail service in the corridor. For a description of the Commuter Rail Study and conclusions it reached

regarding future capacity of rail corridors in the region, please see Chapter 5, Commuter Rail/Rail Capacity Issues section.

The Lewis & Clark Railway line is county-owned but leased to a private operator. The 30 mile line extends from the Rye yard to Chelatchie Prairie. Freight cargo deliveries of plasterboard, plastics, chemicals and machinery can be made to local industries.

For **AIR TRANSPORTATION**, Clark County largely relies on the Portland International Airport (PIA) located in Portland, Oregon to the south-west of the I-205 Glenn Jackson Bridge. This is a regional airport with domestic and international passenger and freight service. Passenger airlines currently serving PIA include Alaska, Continental, Delta, Delta Connection, United, United Express, American, TWA, Northwest, America West, Horizon, Southwest, Reno Air, Hawaiian, Frontier, Harbor Air, Skywest, and Air BC. PIA has seen rapid growth in passenger numbers and freight in recent years and now consistently serves over 1 million passengers per month. In 1998, passenger numbers surpassed 13 million for the first time. 1998 cargo was 267,788 tons. July 1999 passengers served by PDX exceeded 1.38 million, beating all previous monthly records. The airport is served by Tri-Met public passenger bus service from Portland.

Within Clark County, the following general aviation airfields are in operation: (1) Pearson Field, located 2 miles south west of Downtown Vancouver off SR-14, is operated by the City of Vancouver and covers 134 acres owned by the U.S. Park Service. The Airpark has one paved runway (3,200 feet by 60 feet) and can accommodate 177 aircraft. The Airpark is on the Washington State Historical Register. Pearson is designated as a part of the regional transportation system. 2) Evergreen Airport is located six miles east of Vancouver, off Mill Plain. It is a privately-owned, 102-acre airfield with one asphalt and two turf runways, 99 hangars and 170 tie-downs providing a base for 250 planes. (3) Grove Field, located 3 miles north of the City of Camas, is operated by the Port of Camas\Washougal. It has one turf runway, 31 hangars and can accommodate 42 aircraft on its 42 acre site. Estimates of aircraft operations at the three airfields are provided in Table 3-8. In addition, there are a number of private airfields located in Clark County which include those described below. Taylor's Green Mountain Airpark is a 23-acre facility, located 9 miles east of downtown Vancouver with one paved runway, six hangars and ten-tie downs. Eight aircraft are based at the Airpark. Goheen Airport, located three miles northwest of Battle Ground, is privately owned. It has one turf runway and provides a base for about 18 planes. 45 acres of Goheen's 60 acre area are zoned for airport use.

The Washington State Department of Transportation's Aeronautics Division and the local pilots' association have proposed that an additional airport should be sited in Clark County because of the vulnerability of existing airfields in the County due to ownership issues and development pressures. Efforts in the 1980's to site such a facility were thwarted when neighborhood residents opposed a proposed airport location in the vicinity of the I-5/Ridgefield Junction. Federal and state agencies and local jurisdictions have to work together to site such facilities and local jurisdictions must ensure that the land uses surrounding the facility are compatible with aircraft operations and remain that way.

Table 3-8: Aircraft Operations Estimates

AIRCRAFT OPERATIONS ESTIMATES 1998 from *Washington State Continuous Airport System Plan* (WSDOT/Aeronautics)								
	Based Aircraft:							
Airport Name All are Private	**Single Engine**	**Multi-Engine**	**General Aviation Local**	**General Aviation Itinerant**	**Air Carrier**	**Air Taxi**	**Commuter**	**Military**
Evergreen Field (Vancouver)	240	5	170,000	30,000			0	50
Fly for Fun (Clark County)	9		500	2,500	0	0	0	0
Goheen (Battle Ground)	35		1,350	270	0	0	0	0
Grove Field (Camas)	60	1	5,600	7,000			0	0
Pearson Field (Vancouver)	210	10	23,228	84,201		3,471	0	1,100

Notes:
(1) No regional airlines or major national airlines serve Clark County airports/airfields

Source: FAA 5010 Forms; Airport Management Records; Washington State Aeronautics Division Records

CURRENT AND FUTURE REGIONAL TRANSPORTATION SYSTEM PERFORMANCE

GROWTH IN TRAFFIC VOLUMES

As a result of socio-economic and demographic changes described in Chapter 2 Clark County has seen significant growth in traffic volumes in recent years. The MPO compiles traffic count data from local jurisdictions and periodically publishes data in the *Regional Traffic Count Manual*. Traffic count data is factored to adjust for seasonal, monthly, weekly and daily fluctuations in volumes. Examples of growth in traffic volumes at selected Clark County locations are listed in Table 3-9 below.

Permanent traffic recorders are in place on the I-5 and on the I-205 bridges. RTC compiles the traffic counts provided by Oregon Department of Transportation from these recorders. In March, 1995 RTC published the *Columbia River Bridge Traffic, 1961 - 1994* report. This data is now updated annually and is available on RTC's web site (http://www.rtc.wa.gov/tc/brdgawd.htm). Figure 3-4 shows the average weekday traffic volumes crossing the Columbia river bridges, 1978 to 1998. The most recent traffic counts available for the two bridges are for June, 1999. In June, 1999 the average daily traffic for the month on the I-5 Interstate Bridge was 127,989 [ADT] (132,185 average weekday traffic [AWD]). On the I-205 Glenn Jackson Bridge, the average weekday daily traffic for the month of June, 1999 was 131,128 [ADT] (137,917 average weekday traffic [AWD]). In June 1999, the maximum weekday evening peak hour I-5 Interstate Bridge

northbound crossings were 5,682 and 7,710 northbound on the I-205 Glenn Jackson Bridge. In June 1999, maximum weekday morning peak hour crossings were 5,787 southbound on the I-5 Interstate Bridge and 7,097 crossings southbound on the I-205 Glenn Jackson Bridge.

Table 3-9: Traffic Volumes; 1985, 1996

TRAFFIC VOLUMES - ALL DAY (ADT)				
Location	**1985 Volumes**	**1996 Volumes**	**% Increase**	**Annual % Increase**
I-5 Bridge	92,301	118,557	28.45	2.59
I-205 Bridge	52,568	113,345	115.62	10.51
I-5, South of NE 78th St	52,784	75,106	42.29	3.84
I-205, South of SR-500	40,440	85,035	110.27	10.02
SR-14, West of SE 164th Ave	22,600	53,882	138.42	12.58
Mill Plain, West of NE Andresen	17,232	22,767	32.12	2.92
Mill Plain, West of NE Chkalov	36,859	63,904	73.37	6.67
Fourth Plain, West of NE Andresen	16,060	26,180	63.01	5.73
SR-500, West of NE Andresen	20,054	45,513	126.95	11.54
SR-503, South of NE 76th St	17,460	30,538	74.90	6.81
78th St, West of Hwy 99	23,646	31,234	32.09	2.92
Hwy 99, South of NE 99th St	19,653	22,999	17.03	1.55

The highest daily traffic ever recorded on the I-5 Interstate Bridge was on Friday June 18, 1999 when 149,847 bridge crossings were made. The highest evening peak hour traffic ever recorded on the I-5 Bridge was on Tuesday May 28, 1996 when 10,838 bridge crossing were made; of these 5,520 were northbound and 5,318 were southbound. For the northbound direction, the highest evening peak hour traffic was recorded on Thursday June 11, 1998 when 5,987 bridge crossings were made. For the southbound direction, the highest morning peak hour traffic was recorded on Wednesday May 10, 1995 when 6,069 bridge crossings were made.

The I-205 Glenn Jackson Bridge's highest daily crossings ever recorded was on Friday September 19, 1997 with 158,982 crossings. This was during the I-5 bridge repair project which closed the northbound span of the I-5 bridge. The highest evening peak hour traffic recorded on the I-205 Glenn Jackson Bridge was on Friday May 24, 1996 (Memorial Day weekend) when 12,800 bridge crossings were made. Of these bridge crossings, 8,426 were northbound and 4,374 were southbound. The highest northbound evening peak hour traffic recorded on the Bridge is the 8,426 crossings made on Wednesday Friday May 24, 1996. For the southbound direction, the highest morning peak hour traffic was recorded on Tuesday October 27, 1998 when 8,020 bridge crossings were made.

Regional transportation system intersections with the highest traffic volumes, measured in terms of number of vehicles entering intersection are listed in Table 3-10.

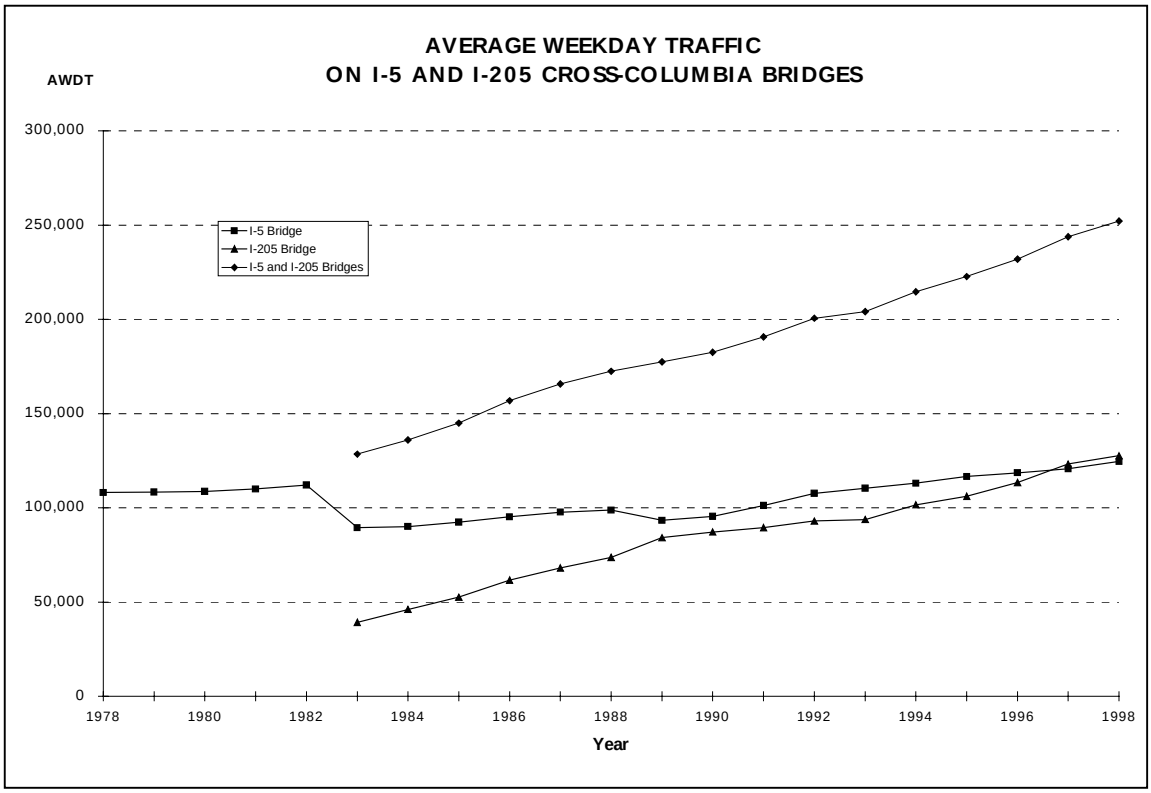


Figure 3-4: I-5, I-205 Average Weekday Bridge Crossings

CLARK COUNTY HIGHEST VOLUME INTERSECTIONS - 1998			
Rank	**East-West**	**North/South**	**Approx. Volume**
1	State Route 500	Gher Rd/NE 112th Avenue	89,000
2	State Route 500	Thurston Way	85,000
3	Mill Plain Blvd.	Chkalov Drive	73,000
4	State Route 500	State Route 503	72,000
5	State Route 500	St. John's Road	64,000
6	Fourth Plain Blvd.	Andresen Road	59,000
7	State Route 500	NE 54th Avenue	57,000
8	State Route 500	NE 42nd Avenue	53,000
9	Mill Plain Blvd.	NE 123rd/124th Avenue	52,000
10	NE 76th Street	State Route 503	51,000
11	NE 78th Street	Highway 99	49,000
12	Mill Plain Blvd.	136th Avenue	49,000
13	Mill Plain Blvd.	Andresen Road	44,000
14	Mill Plain Blvd.	Hearthwood Blvd.	41,000
15	State Route 500	NE 121st Avenue	40,000

Notes: Volumes are based on the total number of vehicles entering an intersection on an average weekday, and are approximate due to the variability from year to year. Freeway ramp intersections with streets were not considered for this listing
Source: RTC's Regional Traffic Count Program.

Table 3-10: Highest Volume Intersections in Clark County, 1998

REGIONAL TRAVEL FORECASTING MODEL: FORECASTING FUTURE TRAVEL DEMAND AND TRANSPORTATION NEEDS

The Regional Travel Forecasting Model for the Clark County region was used to forecast future traffic volumes on the regional transportation system. EMME/2 software is used for the Clark County region's travel forecasting model. In the modeling process, a base year of 1996 was used and a forecast to the year 2020 was made. Growth allocations for future population, housing and employment (as described in Chapter 2) and existing local comprehensive land use plans and zoning were used as a basis for forecasting future population and employment distributions within Clark County. The regional model uses demographic data as a basis for travel forecasts and the data is run through trip generation, trip distribution, mode split and trip assignment processes. Alternative land use scenarios were tested, and their effect on regional transportation needs measured, as a part of the Growth Management planning process. This regional travel forecasting model for the MTP is based on GMA plans.

Trips can be classified according to place of trip production and purpose of trip. The regional travel forecasting model for Clark County categorizes trips into six groups, they are Home-Based Work, Non-Home-Based Work, Home-Based Other, Non-Home-Based Other, School and College trips. Figure 3-5 show the proportion of trips in each of these categories for average weekday Clark County-produced person trips. In Figure 3-5 College and School trips have been aggregated.

Figure 3-5 shows that in the 1996 base year the largest proportion of trips during a 24-hour period are Home-Based-Other trips (44%). This category can include trips from home to the grocery store, home to leisure activities etc. The second highest category is Home-Based Work trips (21%). Non-Home Based Other trips make up 17% of the trips. This category can include such trips as shopping mall to restaurant trips. The home-based categories include trips originating at home and going to a destination as well as the return trip home. The proportions for the year 2020 are 42% Home-Based-Other trips, 21% Home-Based-Work trips and 19% Non-Home Based Other. From 1996 to 2020 there is forecast to be a 66% increase in all-day person trips from around 1,294,000 trips per day in 1996 to over 2.1 million in 2020.

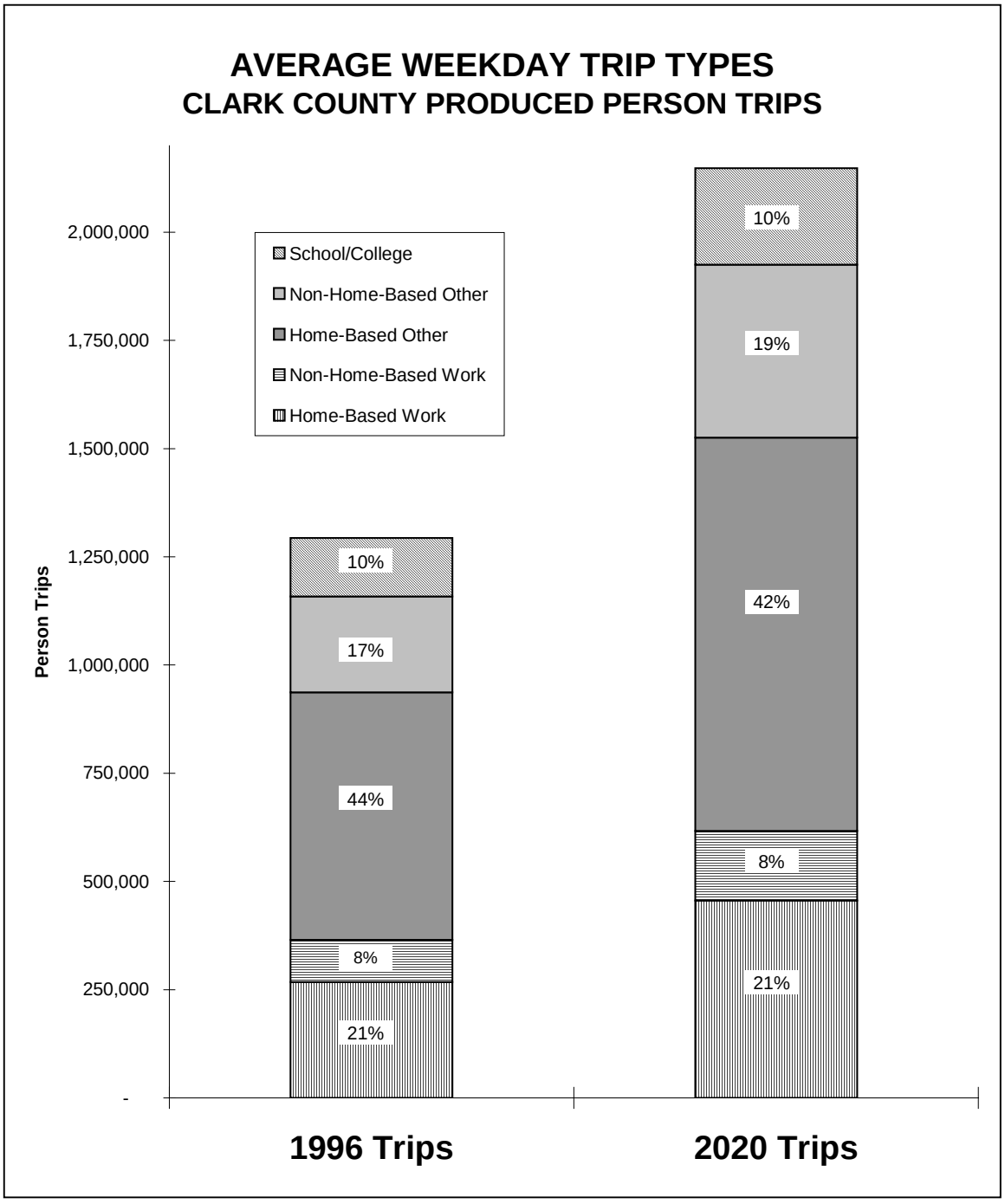


Figure 3-5: Average Weekday Trip Types, Clark County Produced Person Trips

Trips can also be categorized according to where the trips begin and end. Figure 3-5 shows proportions of trips which use the Clark County highway system in terms of those trips which remain in Clark County (87%) and those trips which cross the Columbia River (13%).

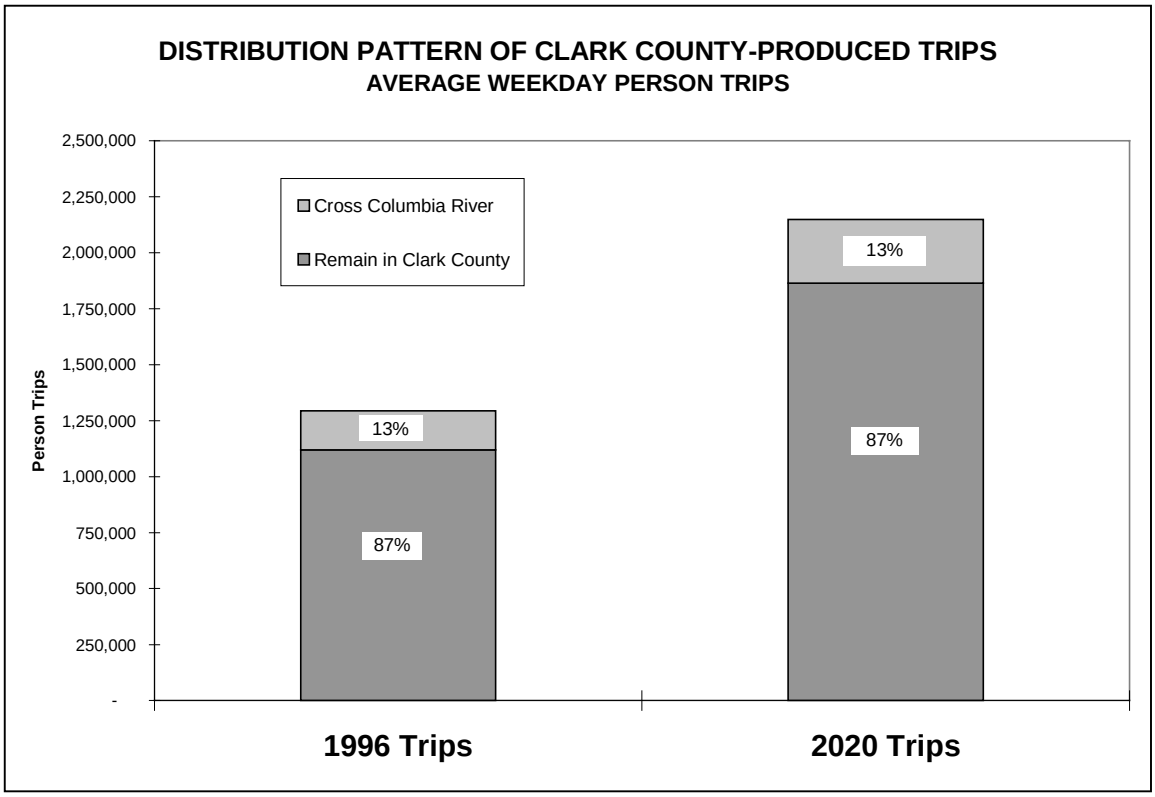


Figure 3-6: Distribution Patterns of Clark County Produced Person Trips, Average Weekday

Needs analysis was then carried out to determine what impact this forecast growth in travel demand might have on the transportation system. In carrying out analysis of existing and future transportation needs the regional travel forecasting model was used to run three scenarios:

Base-Year 1996 traffic volumes on 1996 highway network

2017 Forecast 2017 traffic volumes on 2017 MTP highway network

No-Build Forecast 2020 traffic volumes on "committed" highway network.

The "committed" network has improvements projects for which funds are already committed in the Metropolitan Transportation Improvement Program.

MTP (Year 2020) Forecast 2020 traffic volumes on 2020 highway network with *MTP* improvements listed in Appendix A.

MTP improvements are those improvements programmed in the metropolitan *2000-2003 Transportation Improvement Program* and projects for which there is an identified regional need and strong regional commitment.

Tables 3-11, 3-12, 3-13 and 3-14 present system-wide benchmark results from testing the scenarios described above. Each table presents data by functional classification.

Table 3-11: P.M. Peak Hour Speed

AVERAGE PEAK HOUR SPEED ON CLARK COUNTY HIGHWAYS (Results from Regional Travel Forecasting Model, using EMME/2 software)				
	Speed in Miles per Hour			
Facility Type/Region	**Base-Year 1996**	**2017 (for comparison)**	**No-Build (2020 demand on Committed System)**	**2020 MTP**
Interstates (excluding Ramps)	51	34	27	32
Interstates (including Ramps)	49	33	27	32
Expressways & Principals	36	35	29	34
Minor Arterials	34	32	28	32
Major & Minor Collectors	34	33	31	32
Other Roads	28	28	27	28
Total Clark County System	38	33	29	32

Table 3-12: Peak Hour Vehicle Miles Traveled

VEHICLE MILES TRAVELED ON CLARK COUNTY HIGHWAYS IN P.M. PEAK HOUR (Results from Regional Travel Forecasting Model, using EMME/2 software)				
	Miles of Travel			
Facility Type/Region	**Base-Year 1996**	**2017 (for comparison)**	**No-Build (2020 demand on Committed System)**	**2020 MTP**
Interstates (excluding Ramps)	166,162	238,067	250,909	262,920
Interstates (including Ramps)	183,541	265,373	275,277	290,469
Expressways & Principals	169,431	257,828	279,207	285,154
Minor Arterials	75,326	117,238	136,717	132,890
Major & Minor Collectors	90,752	160,997	201,380	182,354
Other Roads	11,204	20,048	23,993	23,037
Total Clark County System	530,254	821,484	916,574	913,904

Table 3-13: Peak Hour Lane Miles of Congestion

LANE MILES OF CONGESTION IN P.M. PEAK HOUR (Results from Regional Travel Forecasting Model, using EMME/2 software)				
	Lane Miles of Congestion			
Facility Type/Region	Base-Year 1996	2017 (for comparison)	No-Build (2020 demand on Committed System)	2020 MTP
Interstates (excluding Ramps)	3	29	49	35
Interstates (including Ramps)	5	36	55	41
Expressways & Principals	8	34	99	46
Minor Arterials	2	15	44	20
Major & Minor Collectors	5	18	45	28
Other Roads	0	2	5	3
Total Clark County System	19	105	247	138

Table 3-13 (above) presents data on congestion on the Clark County highway system. This measure represents the number of lane miles that operate under congested conditions (at volume to capacity ratio of 0.9 or above; equivalent to level of service E or F) during the full p.m. peak hour. The table is of most use when used to assess the relative growth in congestion which is expected to occur in the future, given the forecast increase in travel demand.

Table 3-14: Peak Hour Vehicle Hours of Delay

P.M. PEAK HOUR VEHICLE HOURS OF DELAY - CLARK COUNTY HIGHWAYS (Results from Regional Travel Forecasting Model, using EMME/2 software)				
	Hours of Vehicle Delay			
Facility Type/Region	Base-Year 1996	2017 (for comparison)	No-Build (2020 demand on Committed System)	2020 MTP
Interstates (excluding Ramps)	164	2,582	3,292	4,457
Interstates (including Ramps)	208	2,708	3,421	4,686
Expressways & Principals	135	633	913	2,065
Minor Arterials	26	121	205	568
Major & Minor Collectors	36	222	366	627
Other Roads	12	33	41	67
Total Clark County System	416	3,717	4,946	8,013

Table 3-14 presents vehicle hours of delay. Using the time taken to travel a highway segment at level of service C as a base condition, any road segment operating at LOS D, E or F is measured against the level of service C base condition. The time difference is calculated, aggregated for the entire highway system and the result is Vehicle Hours of Delay. The data is of use in analyzing the relative increase in delay expected to occur, given the forecast growth in travel demand.

The preceding system-wide data represents measures of assessing highway system performance, but perhaps more meaningful is an analysis of performance and needs within corridors or on individual system links and at intersecting points. A planning level of analysis, using capacity analysis and level of service standards criteria, was carried out resulting in a first-cut analysis of existing and forecast future deficiencies of the regional transportation system.

LEVELS OF SERVICE

Level of service standards represent the minimum performance level desired for transportation facilities and services within the region. They are used as a gauge for evaluating the quality of service on the transportation system and can be described by travel times, travel speed, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. The Washington State Growth Management Act states that these standards should be established locally and standards should be regionally coordinated. The standards are used to identify deficient facilities and services in the transportation plan, and are also to be used by local governments to judge whether transportation funding is adequate to support proposed land use developments.

Levels of service are defined as "qualitative measures describing operational conditions within a traffic stream, and their perception by motorists and/or passengers". A level of service definition generally describes these conditions in terms of such factors as speed and travel time, volume conditions, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. These levels of service are designated A through F, from best to worst. Level of service E describes conditions approaching and at capacity (that is, critical density).

For uninterrupted flow conditions (such as freeways and long sections of roadways between stop signs or signalized intersections), the following definitions[1] apply:

- Level of Service A describes free flow conditions, with low volumes and high speeds. Freedom to select desired speeds and to maneuver with the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.

- Level of Service B is in the range of stable flow but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver with the traffic stream from LOS A.

[1] ..From *Highway Capacity Manual*, Transportation Research Board, 1985

- Level of Service C is still in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.

- Level of Service D represents high-density, but stable flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

- Level of Service E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

- Level of Service F describes forced or breakdown flow. These conditions usually result from queues of vehicles backing up from a restriction downstream. Operations within the queue are characterized by stop-and-go waves, and they are extremely unstable. It marks the point where arrival flow exceeds discharge flow.

These definitions are general and conceptual in nature, and they apply primarily to uninterrupted flow. Levels of service for interrupted flow facilities vary widely in terms of both the user's perception of service quality and the operational variables used to describe them.

CLARK COUNTY/VANCOUVER LOS STANDARDS

Capacity analysis is the estimate of the maximum amount of traffic that can be accommodated by a facility while maintaining prescribed operational qualities. The definition of operational criteria is accomplished using levels of service (as described above). The Growth Management Act requires local jurisdictions to set levels of service standards for transportation facilities and this ties in with the GMA concurrency requirement which requires that transportation and other infrastructure is available concurrency with development. Standards are to be regionally coordinated. LOS standards were coordinated during the GMA planning process and for Clark County are described in Table 3-15. In 1999, the City of Vancouver amended the existing Level of Service (LOS) standards contained in the Mobility Management element of the Comprehensive Plan. Vancouver adopted a corridor-based concurrency ordinance in March, 1998. New Vancouver level of service standards required to implement their concurrency ordinance include: 1) corridor travel times (maximum allowable travel time between two designated points along a corridor); 2) an Average Signalized Intersection Performance Standard (a quantitative standard of the performance of all signalized intersections within an identified transportation corridor or Transportation Management Zone (TMZ); and 3) Mobility Index (the maximum number or percentage of signalized intersections which may have an operating level below the Average Signalized Intersection Performance Standard.

TRANSIT LOS STANDARDS

C-TRAN also has proposed LOS standards to assess the operational quality of the transit system. The matrix outlined in Table 3-16 can be used by local jurisdictions and C-TRAN to assess whether transit system expansion would be feasible in a given area.

Table 3-15: Clark County Level of Service Standards

CLARK COUNTY LEVEL OF SERVICE (LOS) STANDARDS	
LOS B	Rural arterials not identified as LOS C or below
LOS C	Rural connectors that link urban areas to the inter-urban routes Arterials within La Center and Yacolt that are not rural connectors of inter-urban routes All Vancouver urban area roadways not defined as LOS D and were at LOS C or above under 1994 conditions High Occupancy Vehicle (HOV) lanes[1]
LOS D	Battle Ground, Camas, Ridgefield, and Washougal urban areas Vancouver Urban Area: • WSU and Vancouver Mall activity centers • Community subcenters • Arterials connecting community centers and subcenters • Arterials leading out of Vancouver Central Business District (CBD); and, • All other roadways maintain LOS D or maintain existing LOS, if at LOS D or below under 1994 conditions Rural interurban routes (predominantly state highways)
Mitigated LOS D	Major multimodal transportation corridors, LOS D consistent with WSDOT service objective H-23(b), and minimum LOS E[2] Community centers within Vancouver urban area, with existing LOS E, provided TSM or other congestion mitigation measures are in place
LOS E	Downtown Vancouver Activity Center Unsignalized arterial approaches that do not meet signal warrants or a signal is not desired per an approved access management plan for the specific corridor
Mitigated LOS E	Columbia River bridges at or below LOS E are allowed a LOS threshold of E with a 15 percent increase in V/C ratio over existing conditions (i.e. a volume/capacity ratio range of 1.05 to 1.15 vs 0.90 to 1.00).

Sources: 20 Year Comprehensive Growth Management Plan for Clark County; Clark County, (1994)
Grow[th] Management Plan for Clark County, Transportation Element; Clark County, (1994)

1 For future High Occupancy Vehicle (HOV) lanes

2 "Mitigate congestion on urban highways in cooperation with local and regional jurisdictions when the peak period LOS falls below Level of Service D". Source: Washington Transportation Commission, System Plan Service Objectives, H-23(b), approved January 26, 1993

Table 3-16: C-TRAN Level of Service Indicators

C-TRAN LOS INDICATORS									
	PLANNING INDICATORS							SUPPORTING FACTORS	
Service Classes	**Persons per Sq. Mile (Pop+Emp)**	**Peak/ Non-Peak Headways**	**Bus Stop Spacing**	**Accessibility**[2]	**Load Factor**	**Travel Time Ratio (transit/ auto)**	**Service Span (hours/day, days/week)**	**Expected Market Characteristics**	**Other Supporting Characteristics**
Commuter: Inter-state	20,000-25,000	15/NA	major P&R lots	within 5 miles of 80% of pop+emp	1.0	1.75	M-F Peak	Portland employees who live in Washington	Parking mgmt.; HOV priority treatments; P&R spaces
Commuter: Intra-state	20,000-25,000	15/NA	major P&R lots	within 3 miles of 80% of pop+emp	1.0	1.75	M-F Peak	CBD & urban growth centers; employees living in Washington suburbs	Parking mgmt.; HOV priority treatments; large # of P&R spaces
Urban Corridor Service	18,000-20,000	15/30	1/8 mile	within 1/4 mile of 75% of rural pop+emp	1.5	2.0	7 days 12-16 hrs/day	Income, special generators, age, high density residential development	Land use zoning compatibility; parking mgmt.
Urban Residential Connector Service	12,000-18,000	30/60	1/4 mile	within 1/4 mile of 80% of pop+emp	1.5	2.0	5 days 12-16 hrs/day limited weekend. & evening service	Residential development connecting to major activity centers	Parking mgmt.; zoning; land use compatibility
Rural	Policy coverage	60/120	designated pick-up locations	within 5 miles of 75% of rural pop+emp	1.0	2.0-3.0	M-F 10-12 hrs/day ltd. weekend service	Community centers, city halls, post offices	Citizen requests for service
Subscription Bus	30	as needed	NA	NA	1.0	1.15	M-F Peak	Specialized employer needs	Commute trip reduction; parking mgmt.
Vanpool	8-15	as needed	NA	NA	1.0	1.15	M-F Peak	Specialized employer needs	Commute trip reduction; parking mgmt.
C-VAN (disabled)	Policy	as needed	NA	NA	1.0	NA	7 days, 12-16 hrs/day	Elderly & handicapped	NA

[2] Accessibility is defined as the percent of households and jobs within walking distance of a transit stop, transit center, or park and ride lot.

HIGHWAY SYSTEM CAPACITY ANALYSIS

EMME/2 software was used to analyze highway system needs, in terms of capacity, for the Clark County region. Appendix A lists projects identified in the *MTP* as needed to meet existing and future forecast capacity deficiencies determined by assigning forecast 2020 trips onto the *MTP '99* highway system as described earlier in this chapter. The list contained in Appendix A notes projects which are incorporated into the *MTP '99* year 2020 regional travel forecasting model and as a result were considered as part of the air quality conformity analysis.

TRANSPORTATION SYSTEM ANALYSIS

Highway capacity is not the only consideration in analysis of the regional transportation system. Indeed, the Intermodal Surface Transportation Efficiency Act (1991) and Transportation Equity Act for the 21st Century (TEA-21) emphasize the need to develop alternative modes and increase capacity of the existing highway system through more efficient use by means of ridesharing, system management and transit use. Capacity expansion is to be resorted to after other alternatives have been considered. Such strategies are described in more detail in Chapter 5, System Improvement and Strategy Plan. In addition, Chapter 5 also addresses the need for maintenance and preservation of the existing regional transportation system, safety of the transportation system, development of non-motorized modes and high capacity transportation systems.