APPENDIX C

Existing Conditions No-Build Analysis Technical Memorandum

(TPAU Memo, March 2002)

STATE OF OREGON **INTEROFFICE MEMO**

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Transportation Development Branch
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File Code: FINAL DRAFT

Date: March 6, 2002

TO: **Richard Upton, P.E., Area 4 Manager**
Nancy Reynolds, Project Leader Region 2

FROM: **Dorothy J. Upton, P.E., Senior Transportation Analyst**
Stephen B. Wilson, Transportation Analyst
Transportation Planning Analysis Unit (TPAU)

SUBJECT: **Technical Memorandum #1, Existing Conditions No-Build Analysis**
Oregon 34 (ORE 34) Expressway Refinement Plan
Corvallis – Lebanon Highway (No. 210), MP 0.06 – 16.73
And Corvallis – Newport Highway (No. 33), MP 54.03 – 56.80
Linn & Benton Counties

A traffic analysis was requested for the ORE 34 Expressway Refinement Plan to document current and future traffic conditions. The purpose of this memo is to analyze existing (base year 2000) and future year (2027) conditions to determine concerns and problems for the existing configuration, including non-compliance with the Oregon Highway Plan (OHP) mobility standards.

For base year (2000) traffic volumes, five of the six signalized intersections exceeded mobility standards, and one of the 16 unsignalized intersections does not meet the mobility standards. There is one major private driveway (Morse Bros.) that exceeds the mobility standards. One intersection (Columbus Street) meets preliminary signal warrants. The merge/diverge segments at the ORE 99E interchange are within OHP mobility standards. Mainline straightaway segments meet mobility standards, with the exception of the three-lane weave section between ORE 99W and 15th Street, and the 2-lane section between 15th and 35th Street in Corvallis.

For design year (2027) traffic volumes, all signalized intersections exceeded the OHP mobility standards. In the design year, most of the unsignalized intersections exceed capacity, due for the most part too high volumes on the mainline. Four intersections, Columbus Street, Seven Mile Lane, Oakville Road North and 26th Street, would meet preliminary signal warrants. The ORE 99E merge/diverge segments would still be within mobility standards. By the design year, the mainline segments from Oakville Road North, to the west, including all mainline segments of US20/ORE34 to 35th Street are near-to or would exceed the mobility standards.

EXISTING CONDITIONS

This refinement plan encompasses 19-½ miles of the Corvallis – Lebanon Highway, ORE 34 (No. 210) from Burkhart Creek near Lebanon to its intersection with the Corvallis – Newport Highway, US 20/ORE 34 (No. 33) just east of Corvallis. It then continues onto US 20/ORE 34 from its intersection with ORE 34 to the intersection with Western Boulevard, which is also known as the Corvallis Bypass.

The expressway designation currently stops at I-5, where traffic volumes drop off dramatically. The section between Lebanon and I-5 will likely need localized analysis when specific proposals are made. It was decided that the traffic (needs) analysis would go from Seven Mile Lane, the first intersection to the east of I-5 (M.P. 10.77), west to the intersection of ORE 34/US 20 and Western Blvd. in Corvallis (M.P. 54.08).

Currently, ORE 34 is a five-lane section with four travel lanes (two in each direction) and channelized left-turn lanes. ORE 34/US 20 varies from two to four through lanes between Philomath and downtown Corvallis. The Average Daily Traffic (ADT) on this section of ORE 34 is currently between 13,400 and 32,800, and between 15,000 and 17,100 vehicles on US 20/ORE 34. This route contains numerous private accesses to residences and local businesses, as well as both signalized and unsignalized public road intersections.

ORE 34 is classified as a District Level highway from Lebanon to I-5. The next 9.80 miles (M.P. 10.14 – 0.34) is classified as an Expressway of Statewide and Freight importance. This route is a primary freight route to Interstate 5 from both Corvallis and Lebanon and is a primary commute route between Corvallis and Lebanon. The refinement plan, covering 19-½ miles, will determine current and future needs for the entire length of roadway, including the expressway and will propose solutions to mitigate these needs.

The Corvallis-Newport Highway ORE 34/US 20 is classified as an Expressway of Statewide and Freight importance from about the Corvallis East City Limit to ORE 34, since it is a major freight route between the Willamette Valley and the Oregon Coast.

From Seven Mile Lane (M.P. 10.77) to its intersection with the Corvallis – Newport Highway (M.P. 0.34), ORE 34 is a multilane facility with two 12-foot lanes in each direction. It has a paved median varying in width from 8 to 14 feet, and paved shoulders varying in width from 4 to 8 feet. The paved median is not present on the structure over I-5. This facility is not access controlled and there are numerous private driveways, and both signalized and unsignalized intersections.

US 20/ORE 34 from milepost 56.80 to 54.32 has one lane in each direction averaging 12 feet per lane, and paved shoulders varying from 4 to 12 feet. At the at-grade interchange with Western Blvd., from milepost 54.39 to 54.03, the highway is comprised of two roadbeds, separated by a planted median, with a 16-foot travel lane and paved shoulders

varying between 4 and 12 feet. There are a few private driveways at the westernmost end of this section, but the majority of this section is access controlled, with approaches only available at signalized and unsignalized intersections.

Region 2 personnel performed a crash analysis for this corridor, which is discussed in a separate memo. The existing safety corridor on the majority of the roadway is covered in the crash analysis.

TRAFFIC DEVELOPMENT

The base and future year traffic data used for transportation analysis is typically developed from the following:

- Traffic counts
- ODOT's Permanent Recorder Stations
- ODOT's Transportation Volume Tables
- Transportation Demand Models

Traffic Counts

A combination of manual turn movement and hose tube counts were collected by Traffic Smithy between June 1999 and October 2001 to develop the base year 2000 30th highest hour volumes (30HV). See Figures A1 – A8 for location and type of traffic counts taken. All traffic volumes reflect a peak hour from 4:30 to 5:30 PM.

ODOT's Permanent Recorder Stations

ODOT maintains 120 permanent recorder stations throughout the state highway system that record information about highway use throughout the year. The data gathered from these recorders include Average Daily Traffic (ADT), Maximum Day, Maximum Hour, 10th, 20th, 30th Highest Hours shown as percent of ADT, directional traffic splits, and seasonal variations in traffic. The Permanent Recorder data used for this study came from North Santiam recorder, #24-004. Although this recorder is not located within the project boundaries, it has similar traffic flow volume and characteristics as those found on ORE 34 in the studied area. Seasonal adjustment factors used in this analysis are given in Appendix A.

Transportation Volume Tables

ODOT's Transportation Volume Tables contain tabulation listings of ADT values for all state highways. These tables provide data on current ADT values. ODOT uses this ADT information to develop historic growth trends. Future year traffic projections are typically performed through the use of cumulative analysis, historic growth trends or transportation models. The method used in an area depends on the type and availability of information.

This project used historic growth trends. An annual growth rate of 2.7% was used to factor the Year 2000 base year data to a year 2027 Design Hourly Volume (DHV) for the entire corridor. To obtain 2027 DHV volumes, a growth factor of 1.73 was applied to the Year 2000 30HV data.

City of Corvallis Travel Demand Model

DKS & Associates developed the current travel demand model for the City of Corvallis in 1996. This model was built using projected population figures that were not linked to any specific year. After reviewing the available documentation, we determined that a specific volume could not be linked to a specific year. Because of this, a decision was made not to use model based growth rates for the Corvallis Bypass (US 20/ORE 34) segment of this analysis.

Talks with the city's transportation engineering group revealed that when they developed their last comprehensive plan, the measured growth rate on city streets averaged at approximately 1% per year. When implementing their comprehensive plan, the City of Corvallis decided to use 2% growth per year for all city streets. The 2% annual growth rate was also applied to traffic volumes along US 20/OR 34.

The no-build analysis was completed using the 30th highest hour traffic volumes (Year 2000 – Figures C1-C8) and the design hour volumes (Year 2027 – Figures E1-E8) for roadways located in the study area.

ANALYSIS METHODOLOGY

The Volume to Capacity (V/C) ratios for signalized intersections were analyzed using Synchro and SimTraffic, which are intended to be used as companion models. The signalized intersection V/C is a quantitative measure of the ratio between the existing or projected volumes, to the ideal capacity of the roadway at a given location. Volume to capacity ratios and intersection queuing were determined using Synchro and SimTraffic. The 1999 Oregon Highway Plan lists V/C mobility standards based on highway classification and surrounding land use.

The 1999 Oregon Highway Plan (OHP) sets guidelines for mobility goals on State Highways in Oregon. For highways like the Corvallis – Lebanon or the Corvallis – Newport Highway, that are classified as an Expressway of Statewide and Freight importance, with speeds greater than 45 mph, and in a non-MPO area; the maximum allowable V/C is 0.70. If the City of Corvallis were to be designated as an MPO, then for the segment of the Corvallis – Newport Highway that is within the Urban Growth Boundary (UGB), the maximum allowable V/C would change to 0.80.

Synchro is a software package for intersection capacity analysis, modeling actuated signals and optimizing traffic signal timings. Synchro determines V/C ratios and delays at a macro level, while SimTraffic determines problems that may not be realized with a macro-level model. Synchro represents traffic in terms of aggregate measures for each intersection movement. Measures of effectiveness like delay and queue length are determined with equations. These models do not account for "bottleneck" situations where upstream traffic deficiencies reduce the amount of traffic reaching downstream intersections. This situation would have Synchro showing more delay than SimTraffic because of the reduced volumes arriving at the intersection.

SimTraffic is a traffic simulation and animation software that models the behavior of vehicles. Turning moves use gap acceptance methodology. SimTraffic provides average speeds for the link conditions, and maximum queue length over the designated time period. SimTraffic also includes vehicle and driver performance characteristics developed by the Federal Highway Administration for use in traffic modeling. SimTraffic is a microscopic simulation model that has the capability to simulate a variety of traffic controls, including a network with traffic signals operating on different cycle length or operating under fully actuated conditions. Most other traffic analysis software packages do not allow for a direct evaluation of these types of traffic conditions.

All V/C's for the interchange area (merge/diverge) were obtained from Highway Capacity Software (HCS) or the Highway Capacity Manual (HCM) methods. Two-way and T-intersection stops were analyzed using HCS.

The segment on US 20/ORE 34 between ORE 99W and 15th is currently a 3-lane section, with two through lanes in the westbound direction and one in the eastbound. The HCM methodology does not allow for such an analysis. The second westbound lane in this segment adds at the juncture of the westbound on-ramp leading from ORE 99W, and drops at the 15th Street intersection, where it becomes an exclusive right-turn lane. This induces a weave section, and could potentially lead to crashes. To quantify this segment, a procedure of Functional Intersection Area was used. This procedure examines the distance from the stop-bar that is required for the safe operations of this intersection, and takes into account the distance traveled when making a lane change, the deceleration distance required to stop, the perception/reaction or PIEV distance traveled, and the 95th percentile queue length.

NO-BUILD ALTERNATIVE

There were six different analyses performed on this corridor's data. First was the unsignalized intersection analysis, followed by the preliminary traffic signal warrant analysis. Third was an analysis of the existing signalized intersections, followed by mainline segment analysis, interchange analysis and spacing requirements.

Unsignalized Intersection Analysis

In the analysis corridor, 16 unsignalized intersections and one major driveway were studied. There are more unsignalized intersections that were not included due to low traffic volumes. Table 1 lists the analysis results for both the base year (2000) and design year (2027) no-build scenarios and shows that all unsignalized intersections are well within the OHP's mobility standards. In the base-year, only 26th Street and the Morse Bros. Driveway exceeded the mobility standards. The driveway exceeded the mobility standards because of the large percentage of heavy trucks. This will have an impact on future mobility because as volumes on ORE 34 increase, it will become more difficult for trucks to finds gaps large enough for them to enter the mainline traffic flow.

Table 1 – Unsignalized Intersection Analysis Results

		2000 30HV		2027 DHV		
Intersection	**M.P.**	**V/C**	**70% Warrant**	**V/C**	**70% Warrant**	**Controlling Movement**
Corvallis/Lebanon Hwy. @						
Seven Mile Ln.	10.77	0.24	**Met**	**>2.0**	**Met**	SBL
Tangent Loop Rd.	9.41	0.05	Unmet	0.29	Unmet	NBL
Columbus St.	9.16	0.62	**Met**	**>2.0**	**Met**	SBL
Looney Ln.	7.03	0.38	Unmet	**1.09**	Unmet	SBR
Oakville Rd. (North)	5.36	0.45	Unmet	**>2.0**	**Met**	SBR
Oakville Rd. (South)	5.10	0.14	Unmet	**>2.0**	Unmet	NBL
Excor Rd.	4.26	0.14	Unmet	**0.82**	Unmet	SBL
Orleans Rd.	3.53	0.01	Unmet	0.06	Unmet	n/a
Riverside Dr.	3.05	0.19	Unmet	0.68	Unmet	SBL
White Oak Rd.	2.78	0.28	Unmet	**>2.0**	Unmet	NBL
Colorado Lake Rd.	2.55	0.08	Unmet	**0.88**	Unmet	SBL
Melody Ln.	2.16	0.09	Unmet	**1.54**	Unmet	SBL
Terra Circle Dr.	1.94	0.22	Unmet	**>2.0**	Unmet	NBL
Wolcott Rd.	1.22	0.01	Unmet	0.06	Unmet	n/a
Morse Bros. Driveway	1.03	**1.43**	n/a	**>2.0**	n/a	NBL
Electric Rd.	0.70	0.13	Unmet	**0.95**	Unmet	SBL
Corvallis/Newport Hwy. @						
26th St.	55.15	**>2.0**	Unmet	**>2.0**	**Met**	SBL

By 2027, all but four of the unsignalized intersections will exceed the mobility standards. With many of these intersections, the predicted volumes are relatively low, but when compared to the predicted mainline volumes, the intersection functionality is severely restricted.

Preliminary Signal Warrants

Of the eight traffic signal warrants in the Manual on Uniform Traffic Control Devices (MUTCD), Page 4C-1, only Warrant 1(Case A or Case B) can be used to project a future need for a traffic signal, according to Oregon Administrative Rule 734-020-0460. Case A (Minimum vehicular volume) is mainly for high volumes on the minor street. Case B (Interruption of continuous volume) deals with high volumes on the major street and the potential delays and safety hazards with minor street traffic crossing or turning onto the major street.

When evaluating preliminary signal warrants for the unsignalized intersections in this analysis, ADT values for 70 percent of standard warrants were used because the 85th percentile speed is greater than 40 miles per hour. Table 2 shows the results of the no-build preliminary signal warrants analysis. The intersections analyzed for Preliminary Signal Warrants were selected because the volume of their minor approach was greater than 90 vehicles per hour.

Table 2 – Preliminary Signal Warrant Analysis Results

		70% Warrants	
Intersection	**M.P.**	**2000 30HV**	**2027 DHV**
ORE 34 @ Seven Mile Lane	10.77	No	**Yes**
ORE 34 @ Columbus Street	9.16	**Yes**	**Yes**
ORE 34 @ Oakville Road (North)	5.36	No	**Yes**
US 20/ORE 34 @ 26th Street	55.15	No	**Yes**

Meeting preliminary signal warrants does not guarantee that a signal will be installed. Before any signals are considered for installation on the state system, ODOT Region Traffic personnel need to perform a field warrant analysis and submit a recommendation to the ODOT Traffic Management Section. Even if the MUTCD signal warrants are met, the State Traffic Engineer must approve of the signals before they may be installed.

Signalized Intersection Analysis

There are six signalized intersections within the study corridor. Table 3 lists the analysis results of the existing conditions. Note that only the I-5 Northbound Ramp Terminal currently meets OHP mobility standards, while the remaining are at or over capacity.

Table 3 – Signalized Intersection Analysis Results

Intersection	M.P.	2000 30HV V/C	2000 30HV Controlling Movement	2027 DHV V/C	2027 DHV Controlling Movement
ORE 34 @ I-5 NB Ramps	10.12	0.52	NBTL	**0.84**	EBT
ORE 34 @ I-5 SB Ramps	9.95	**1.07**	SBR	**1.84**	SBR
ORE 34 @ Peoria Road	1.21	**1.01**	NBL	**1.77**	EBT
ORE 34 @ Corvallis Bypass	0.34	**1.25**	NBR	**2.07**	EBT
US 20/ORE 34 @ 15th Street	55.45	**1.01**	SB	**1.52**	SB
US 20/ORE 34 @ 35th Street	54.65	**0.99**	SB	**1.84**	SB

Table 3 lists the design year analysis results. By 2027, all the signalized intersections will exceed the mobility standards. Note that the controlling movements for the Corvallis Bypass, Peoria Road, and I-5 Northbound Ramp terminals all changed to the eastbound through movement.

To improve the capacity at these intersections for base year (2000) traffic volumes; a variety of possible solutions should be examined. For example:

- SB I-5 Ramp Terminal – The addition of a southbound free right would improve the capacity of this intersection, to an estimated V/C of 0.77 by year 2027.

- Peoria Road and Corvallis Bypass Intersections – Traffic volumes at these intersections have exceeded the potential for at-grade capacity improvements. Grade separation should be examined to improve the operations of these intersections. The Corvallis Bypass intersection is at milepost 0.34 and the Peoria Road intersection is at milepost 1.21. Because of their close proximity (0.87 miles), these two intersections should be examined together. Since expressway design standards specify three-mile spacing, these two intersections are too close to allow grade separation at each location. Perhaps a single grade-separated solution for both the Corvallis Bypass and Peoria Road should be investigated.

- 15th and 35th Street Intersections – The addition of an extra through lane in each direction on the mainline would improve the capacity of these intersections. The addition of right-turn lanes on the minor approaches would also add to the capacity of the intersections.

Mainline Segment Analysis

To determine capacity for both 2000 and 2027 volumes, this study divided the mainline into eleven segments, seven on ORE 34 and four on US 20/ORE 34. Table 4 lists the analysis results. Using the HCM methodology, the 4-lane segments on ORE 34 were analyzed for both eastbound and westbound, while the 2-lane segments of US 20/ORE 34 were given an overall V/C.

The segment on US 20/ORE 34 between ORE 99W and 15th Street does not have a V/C ratio listed because it cannot be analyzed using HCM methodology. The distance between the westbound on-ramp and the 15th Street stop-bar is approximately 0.2 miles. Using the Functional Intersection Area method analysis for the 15th Street intersection, it was determined a vehicle entering the highway from the westbound on-ramp has barely enough distance to cross two lanes of traffic to the left-turn lane given current conditions. By 2027, the functional intersection area analysis indicates there would not be enough room for westbound merging traffic to safely maneuver into the westbound left-turn lane at 15th Street. For the base year, the 95th percentile queue from the westbound through traffic at the 15th Street signal would queue beyond the gore-point of the westbound on-ramp.

Table 4 – Mainline Capacity Analysis Results

				2000 30HV		2027 DHV	
Begin M.P.	**End M.P.**	**Segment Description**	**Lanes**	**WB V/C**	**EB V/C**	**WB V/C**	**EB V/C**
10.77	**10.04**	ORE 34, Seven Mile Lane to I-5	4	0.13	0.24	0.23	0.42
10.04	**9.16**	ORE 34, I-5 to Columbus Street	4	0.24	0.38	0.41	**0.66**
9.16	**7.65**	ORE 34, Columbus Street to ORE 99E	4	0.21	0.40	0.38	**0.69**
7.65	**5.36**	ORE 34, ORE 99E to Oakville Road North	4	0.26	0.48	0.38	**0.68**
5.36	**3.05**	ORE 34, Oakville Road North to Riverside Drive	4	0.31	0.48	0.53	**0.81**
3.05	**1.21**	ORE 34, Riverside Drive to Peoria Road	4	0.33	0.51	0.56	**0.64**
1.21	**0.34**	ORE 34, Peoria Road to Corvallis Bypass	4	0.43	0.62	**0.72**	**>1.0**
56.80	**55.86**	ORE 34, Covallis-Lebanon Highway to ORE 99W	2	0.53		**0.81**	
55.86	**55.45**	US 20/ORE 34, ORE 99W to 15th Street	3	**n/a**		**n/a**	
55.45	**55.15**	US 20/ORE 34, 15th Street to 26th Street	2	**0.70**		**1.13**	
55.15	**54.65**	US 20/ORE 34, 26th Street to 35th Street	2	0.67		**1.03**	

Ramp Analysis

Within this corridor, there are two interchanges. One at ORE 99E, Albany – Junction City Highway (No. 58), and at ORE 99W, Pacific Highway West (No. 1W). The interchange ramps at ORE 99E were analyzed for future year (2027) no-build conditions and all but the eastbound off-ramp were found to meet OHP mobility standards (results in Table 5). The HCM methodology for analyzing merging and diverging ramps assumes a minimum of two highway lanes in one direction. At the interchange of ORE34 and ORE 99W, there is only one highway lane in each direction. Due to its geometry, the interchange at ORE 99W was not analyzed.

Table 5 – ORE 34 at ORE 99E, Merge/Diverge Analysis Results

Ramp Description	2027 V/C's	
	Influence Area	Ramp
ORE 34 @ EB Off-Ramp	**0.72**	0.38
ORE 34 @ EB On-Ramp	0.67	0.34
ORE 34 @ WB Off-Ramp	0.47	0.16
ORE 34 @ WB On-Ramp	0.36	0.16

Intersection and Ramp Spacing and Other Conflict Points

There are currently three interchanges along this corridor, where I-5, ORE 99E and ORE 99W intersect ORE 34. As stated previously, there are four unsignalized intersections that could potentially meet signal warrants by the design year (2027). Table 6 lists the locations of the three interchanges, the six signalized intersections, and the four potentially signalized intersections.

According to the OHP, traffic signals should be discouraged on Expressways in rural areas, and, on rural Expressways, interchange spacing must be restricted to three miles (Crossroad to crossroad centerline distance). Therefore, if this corridor is to be upgrade to Expressway standards as planned, interchanges or connections to interchanges via frontage roads would most likely be constructed at all intersections currently signalized and those with the potential to be signalized. As is demonstrated by Table 6, there are potential interchange spacing conflicts along this corridor.

Table 6 – ORE 34 Rural Interchange/Intersection Locations (Spacing)

Description	M.P.	Distance to Prior (Miles)	Note
ORE 34 @ Seven Mile Lane	10.77	n/a	Unsignalized, 2000 Warrants
ORE 34 @ I-5 Interchange	10.03	**0.74**	Ramp Terminals Signalized
ORE 34 @ Columbus Street	9.16	**0.87**	Unsignalized, 2000 Warrants
ORE 34 @ ORE 99E	7.65	**1.51**	Free Flow Interchange
ORE 34 @ Oakville Road North	5.36	**2.29**	Unsignalized, 2027 Warrants
ORE 34 @ Peoria Road	1.21	4.15	Signalized
ORE 34 @ Corvallis Bypass	0.34	**0.87**	Signalized
Corvallis Bypass @ ORE 34	56.80	n/a	Signalized
Corvallis Bypass @ US 20/ORE 99W	55.94	**0.86**	Free Flow Interchange

Besides strongly discouraging the installation of traffic signals, the Expressway standards also stress the importance of minimizing all access along the route. Private accesses should not be allowed and public road intersections should also be minimized and located so as to

minimize impacts to the through traffic. Having fewer conflict points increases safety since vehicles can move easier through the system.

CONCLUSIONS

Unsignalized Intersections

Seventeen unsignalized intersections and one major driveway access were analyzed for capacity. In the base year, all but 26th Street and the Morse Bros. driveway were within the OHP mobility standards. Due to the large percentage of heavy trucks that use the Morse Bros. driveway, it will become more difficult for them to enter the mainline traffic flow as the volumes increase and the flow is severely constrained. An alternative access for Morse Bros. should be investigated.

By 2027 mainline traffic volumes will have increased to the point of seriously impacting the unsignalized intersections along this corridor, which is not unusual for stop-controlled intersections. Alternatives should be considered that reduces the number of conflict points between these accesses and the mainline flows.

Preliminary Signal Warrants

Currently, the unsignalized intersection at Columbus Street meets preliminary signal warrants. By 2027, Oakville Road (North), Seven Mile Lane and 26th Street in Corvallis will also meet preliminary warrants. Installing traffic signals on designated expressways is contrary to OHP Expressway standards; therefore other unsignalized alternatives should be examined.

Signalized Intersections

Currently, this corridor contains six signalized at-grade intersections. Only the northbound I-5 ramp terminal currently operates within the OHP mobility standards. The rest are operating at or above mobility standards. By 2027, all signalized intersections fail to meet OHP mobility standards. Capacity improvements need to be examined for all these locations.

Mainline Capacity

ORE 34 between Lebanon and Corvallis has been designated as an expressway. For the base year (2000), most mainline segments operate within OHP standards, except for certain segments of US 20/ORE 34 between ORE 34 and 35th Street that are near or at the V/C standard of 0.70. If the City of Corvallis obtains its MPO status as projected, the V/C standard would change from 0.70 to 0.80. The segment of US 20/ORE 34 between ORE 99W and 15th street does not currently function adequately. Current geometrics need improvement and westbound through traffic queues from the signal extends beyond the gore

point of the westbound on-ramp. Also, the segment between 15th Street and 26th Street is currently at the OHP mobility standard.

In the design year (2027), all segments of ORE 34 from 35th Street to Peoria Road will exceed OHP mobility standards. Mainline capacity improvements will need to be addressed for this entire corridor.

Merge / Diverge Ramps

There are two interchange connections within this corridor. Due to its geometry, the ramps leading from ORE 99W to US 20/ORE 34 were not analyzed. The interchange with ORE 99E and ORE 34 was analyzed for future year (2027) no-build conditions. By that time, the influence area of the eastbound off-ramp will exceed mobility standards.

Interchange Spacing Standards

For rural segments of an Expressway, the OHP standard for interchange spacing is three miles. If all rural signalized intersections were to be upgraded to grade-separated interchanges, there are potential conflicts with the OHP spacing standard. The design team should investigate this issue, particularly related to the Peoria Road/Corvallis Bypass intersections.

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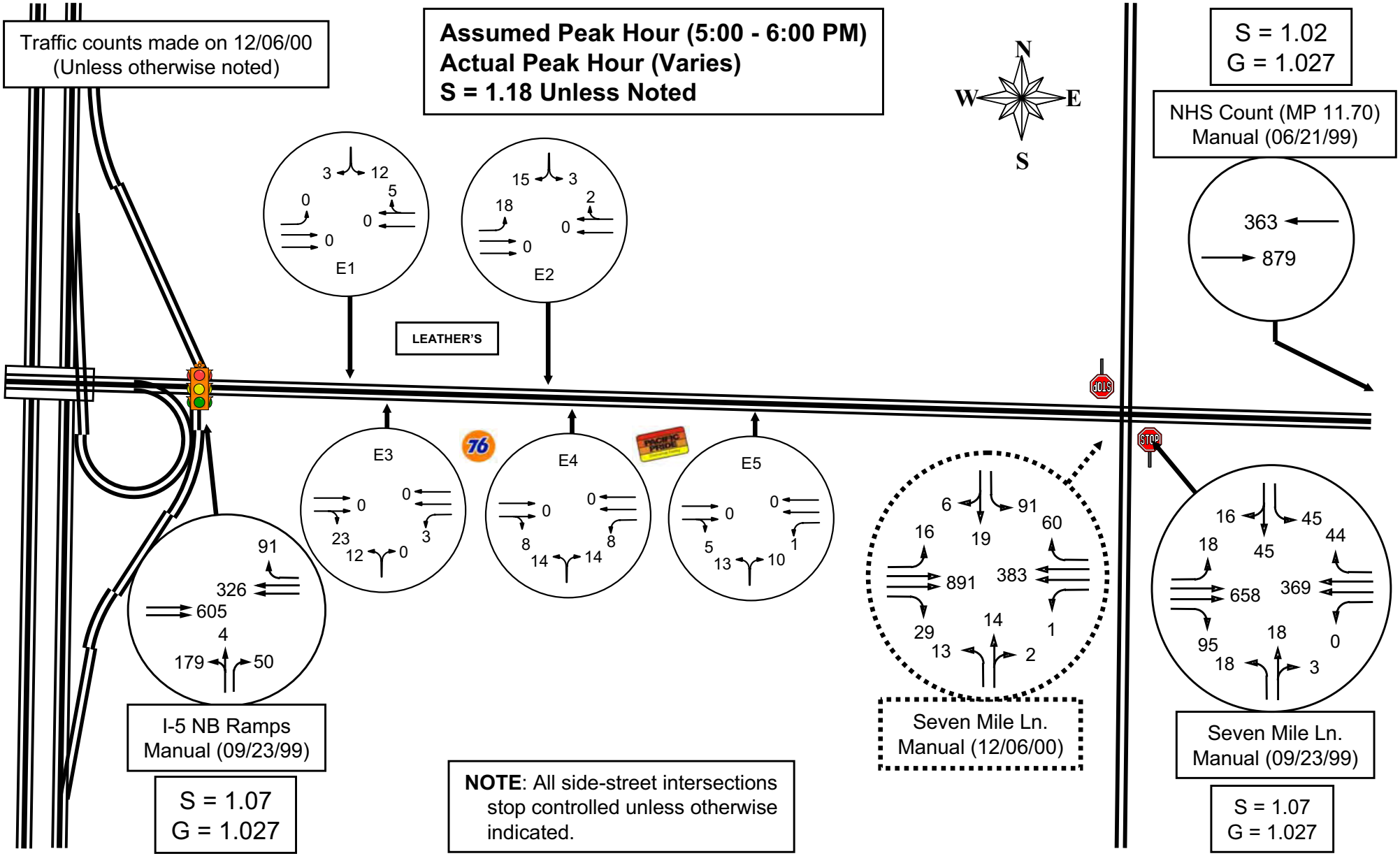
David Greenberg, P.E. – Traffic Design Engineer
Steven Lindland, P.E. – Preliminary Design Engineer
Robert Fynn, P.E. – Region 2 Traffic Operations Engineer
File

	ATR #24-004, NORTH SANTIAM											
	JAN_15	FEB_1	FEB_15	MAR_1	JUN_1	JUN_15	JUL_15	SEP_15	OCT_1	OCT_15	NOV_15	DEC_15
2000 SF	1.20	1.17	1.14	1.13	1.03	1.00	1.00	1.02	1.05	1.08	1.11	1.14
1998 SF	1.34	1.28	1.23	1.21	1.10	1.07	1.00	1.06	1.10	1.13	1.18	1.23
1996 SF	1.31	1.30	1.29	1.23	1.09	1.05	1.00	1.06	1.08	1.10	1.17	1.20
AVG SF	**1.28**	**1.25**	**1.22**	**1.19**	**1.08**	**1.04**	**1.00**	**1.05**	**1.08**	**1.11**	**1.15**	**1.19**

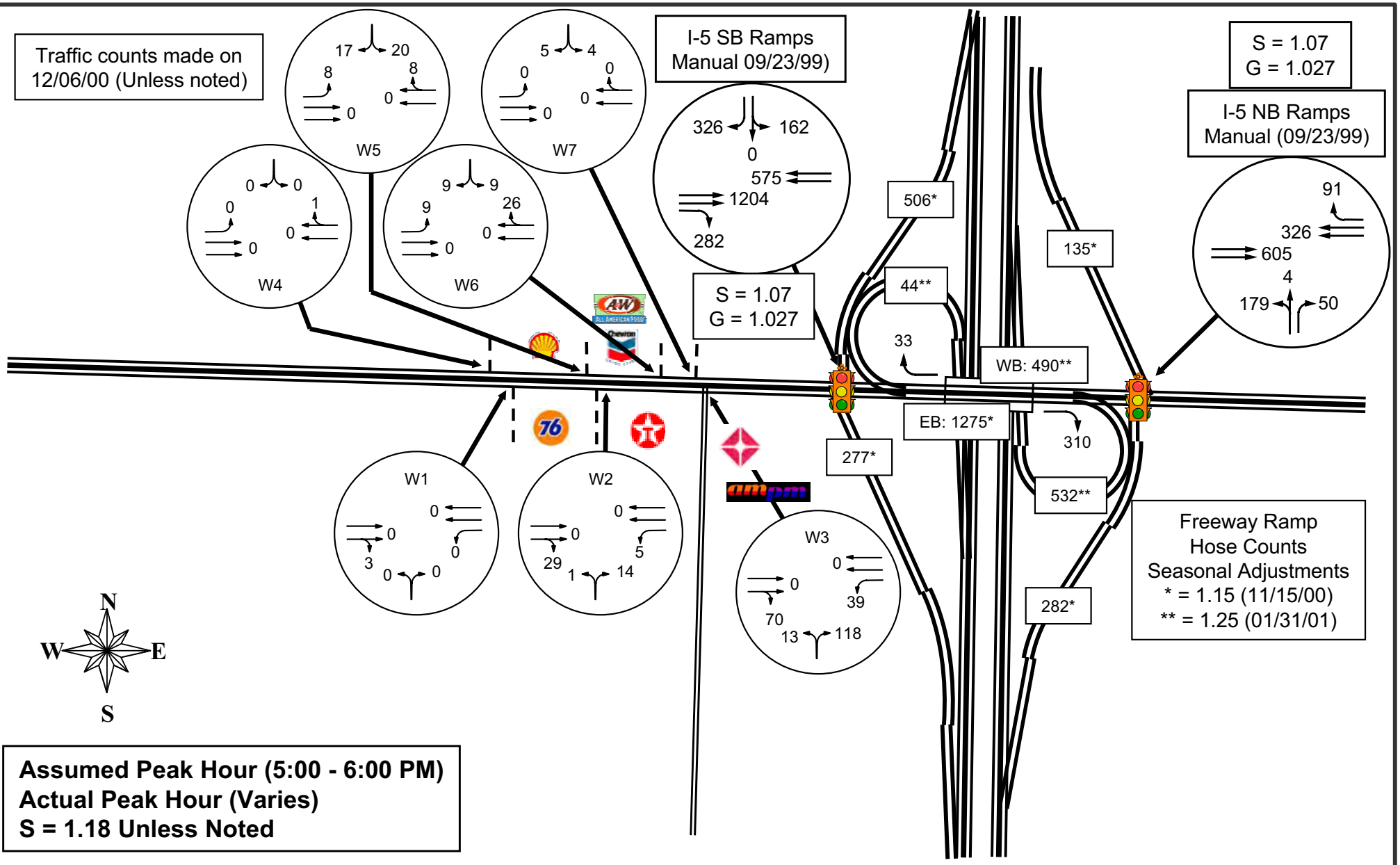
SEASONAL FACTORS	
JAN_23	1.26
JAN_30	1.25
FEB_20	1.20
JUN_21	1.02
SEP_23	1.07
OCT_04	1.09
OCT_09	1.10
OCT_17	1.11
NOV_14	1.15
DEC_05	1.18
DEC_06	1.18



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA
PDX/081040006.PDF

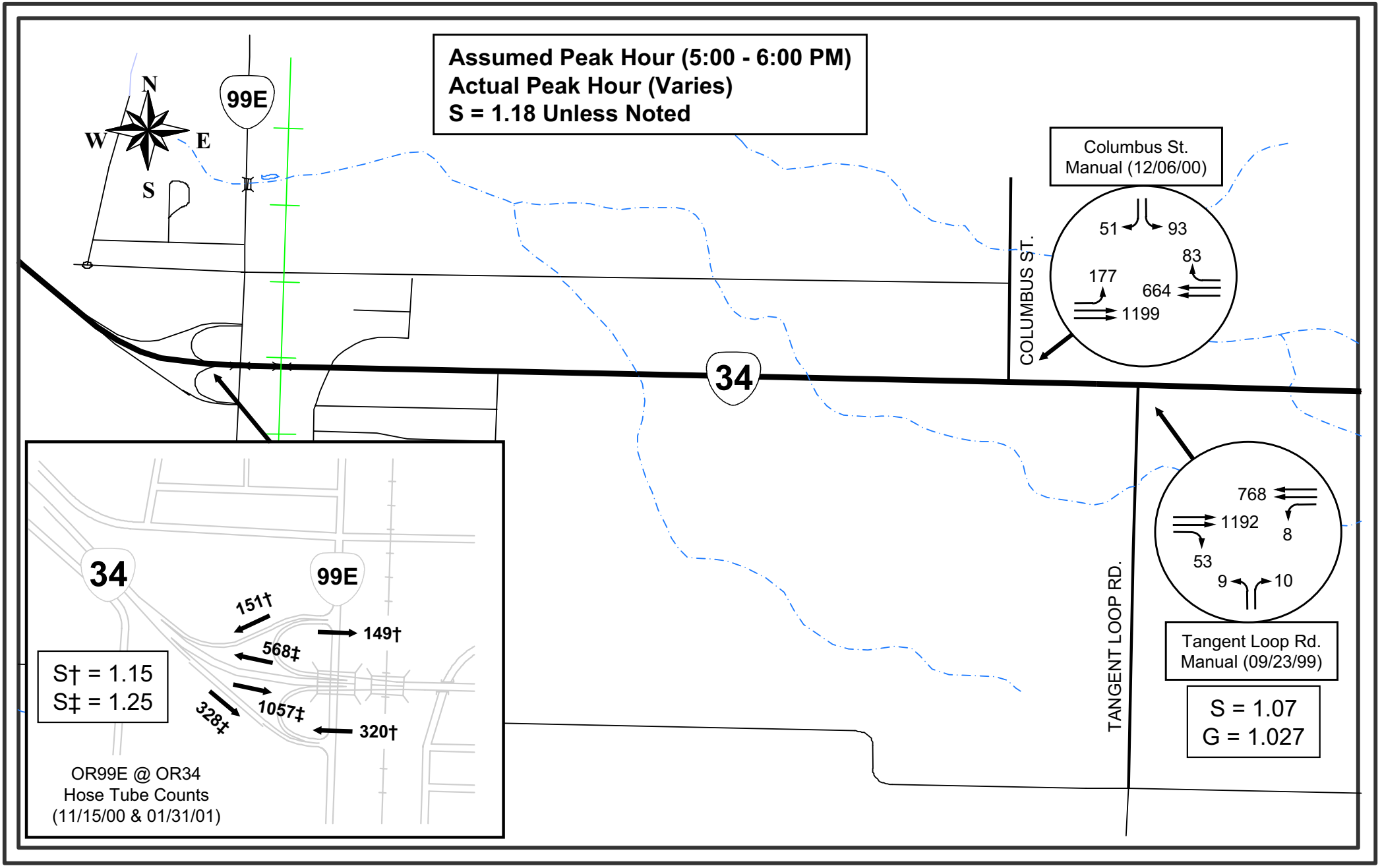
File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE A1
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA
PDX/061040006.PDF

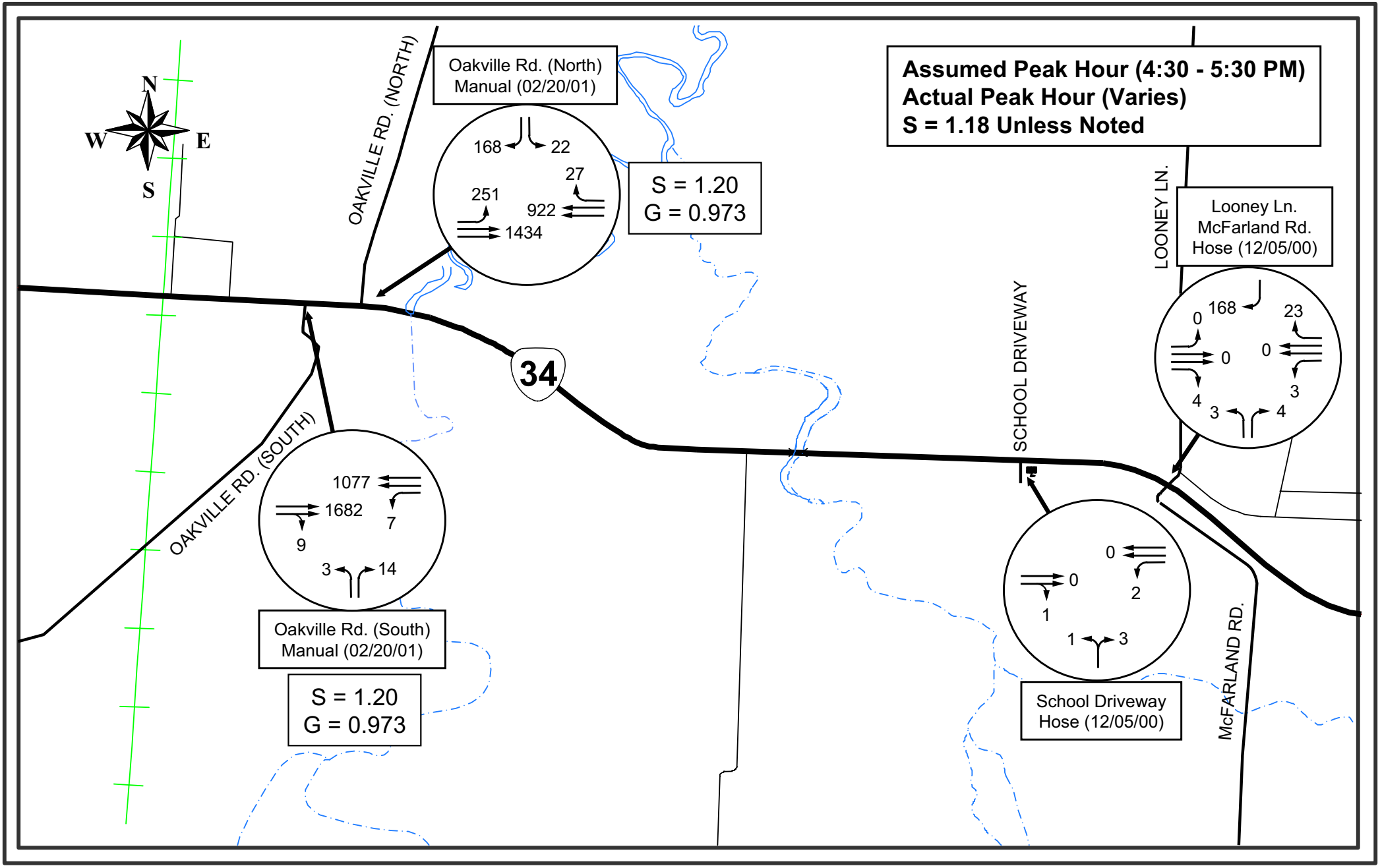
File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE A2
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA
PDX/061040006.PDF

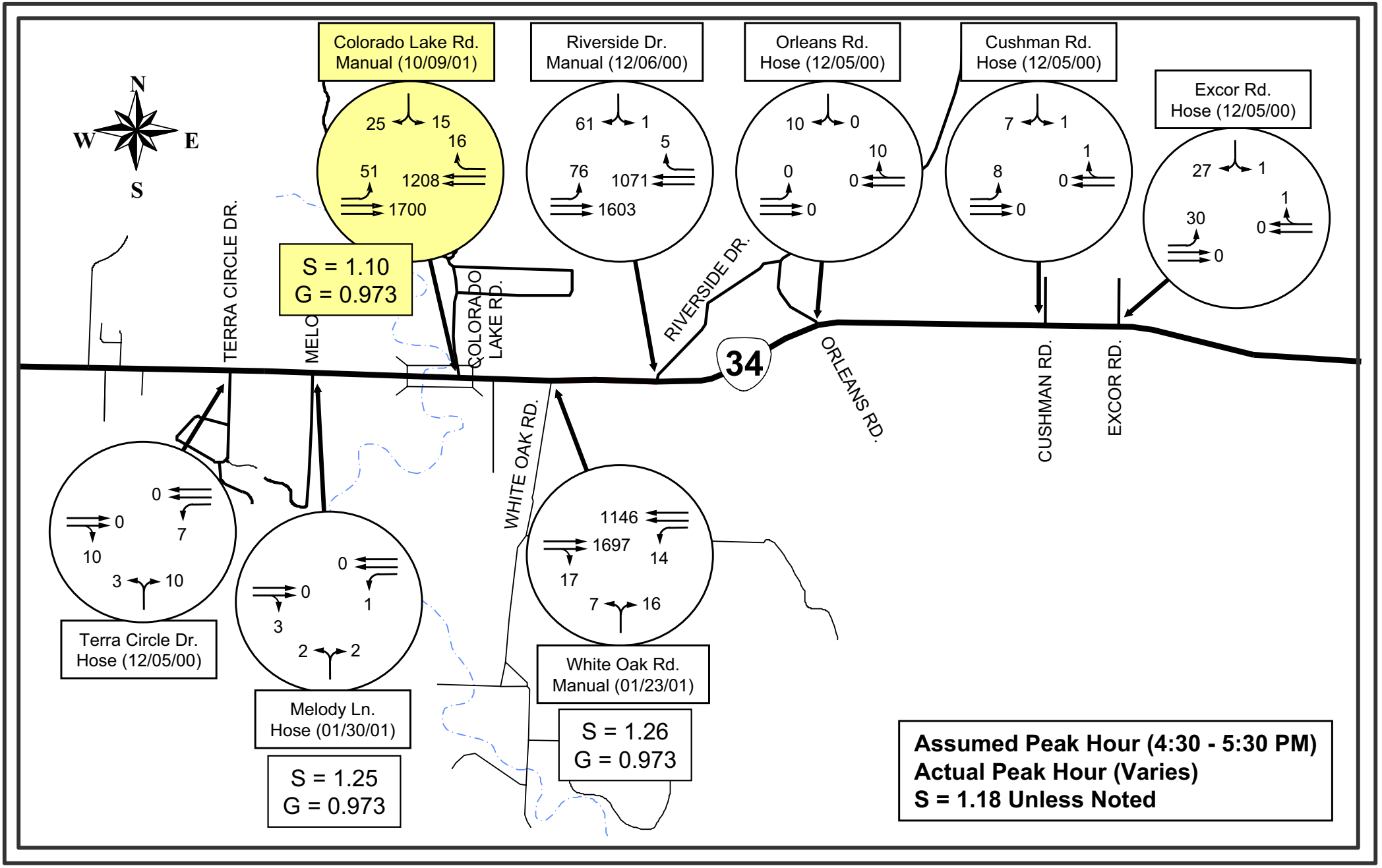
File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE A3
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA
PDX/061040006.PDF

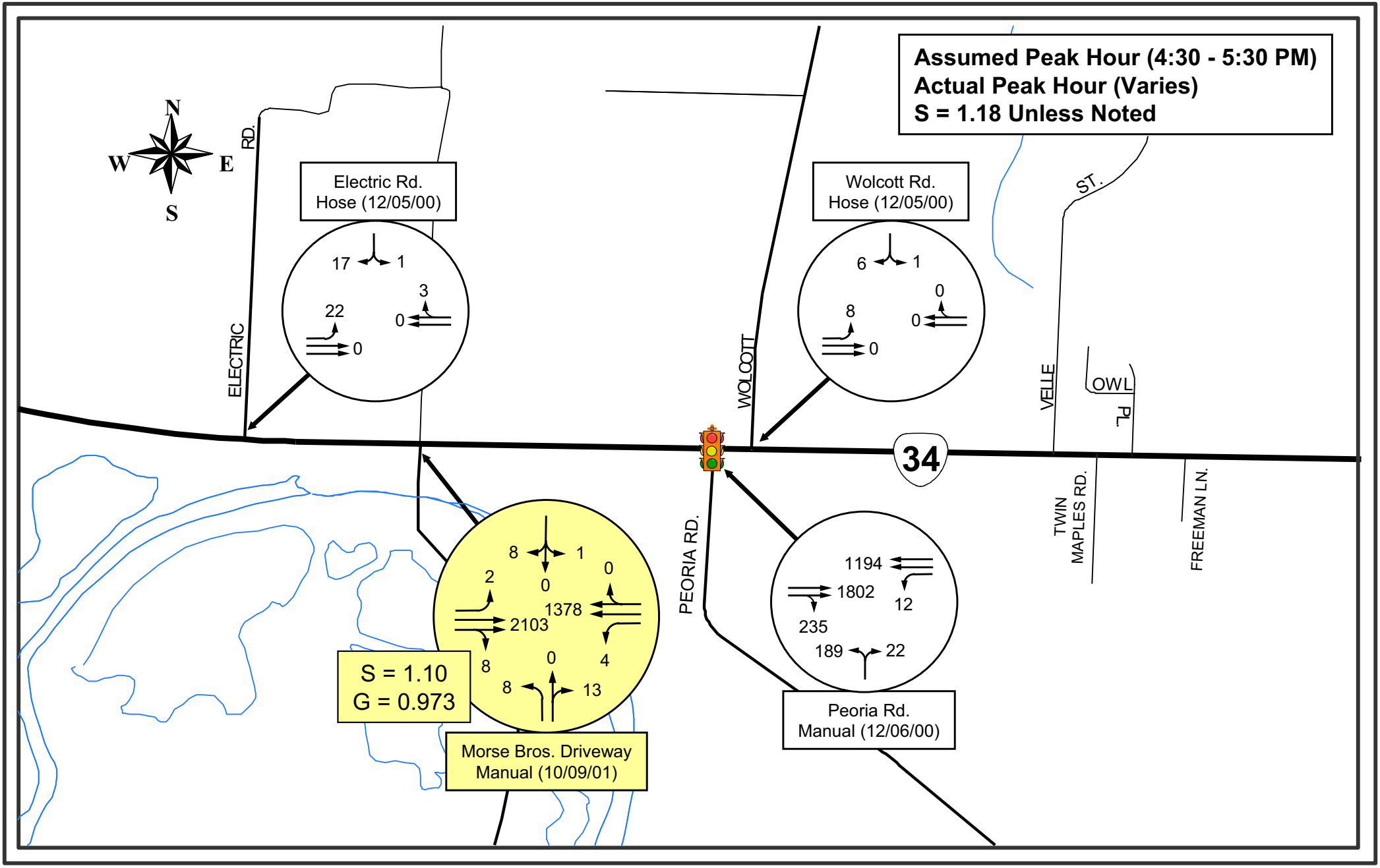
File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE A4
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA
PDX/061040006.PDF

File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE A5
Date : 03/01/02	Reviewed By: H.L. Nale, PE	

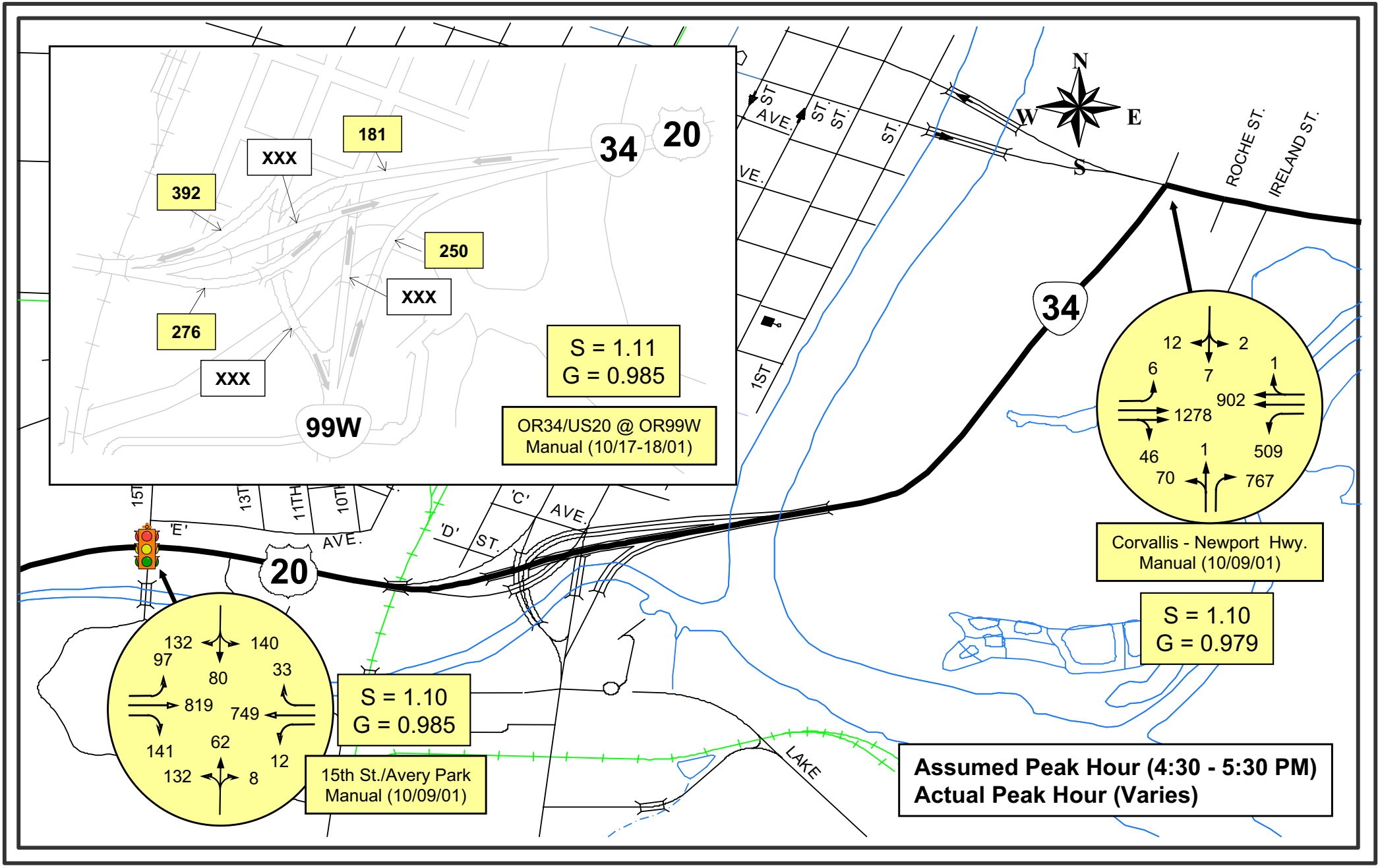


OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA
PDX/061040006.PDF

File : OR34.PPT	Prepared By: S.B. Wilson
Date : 03/01/02	Reviewed By: H.L. Nale, PE

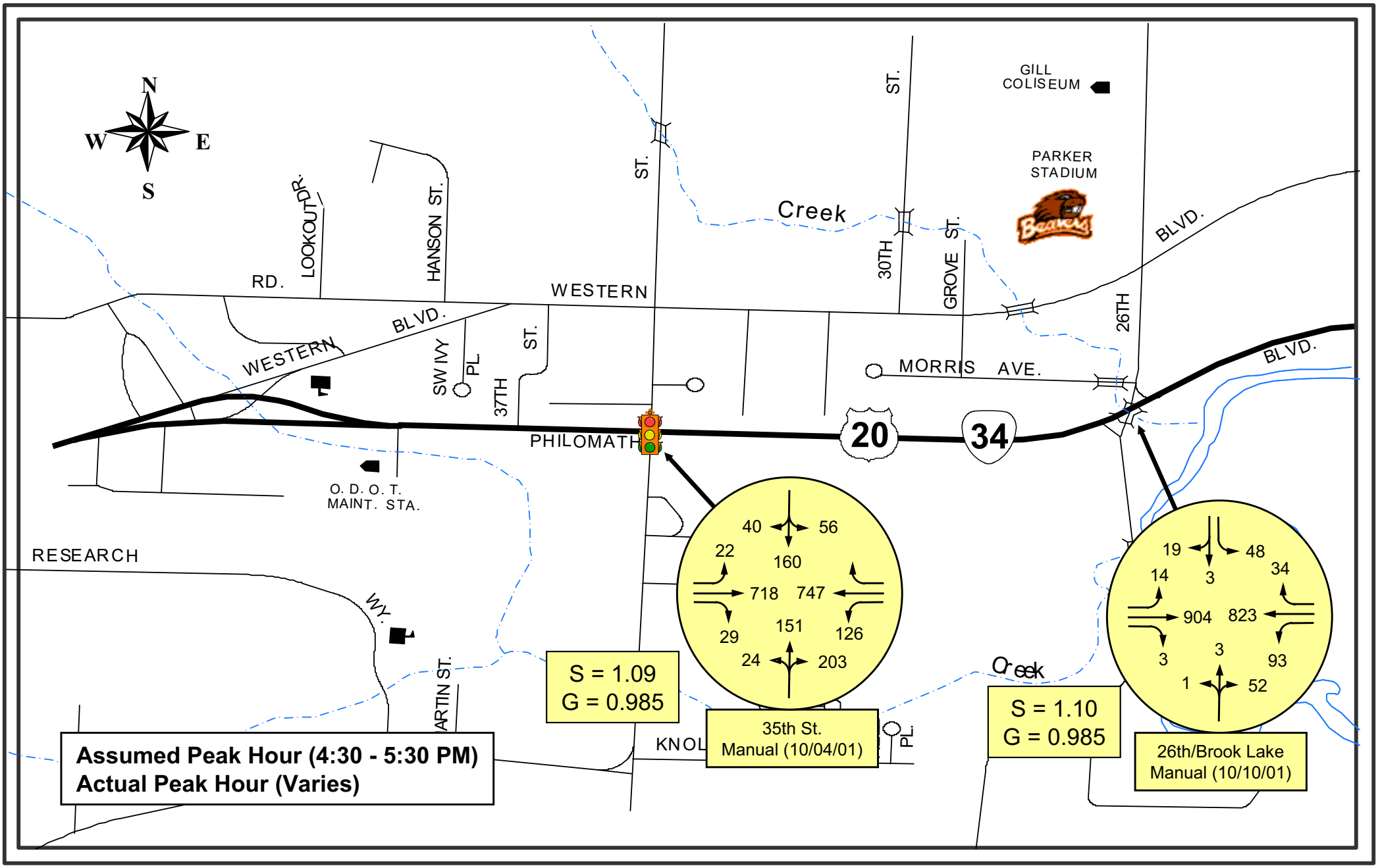
FIGURE A6



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

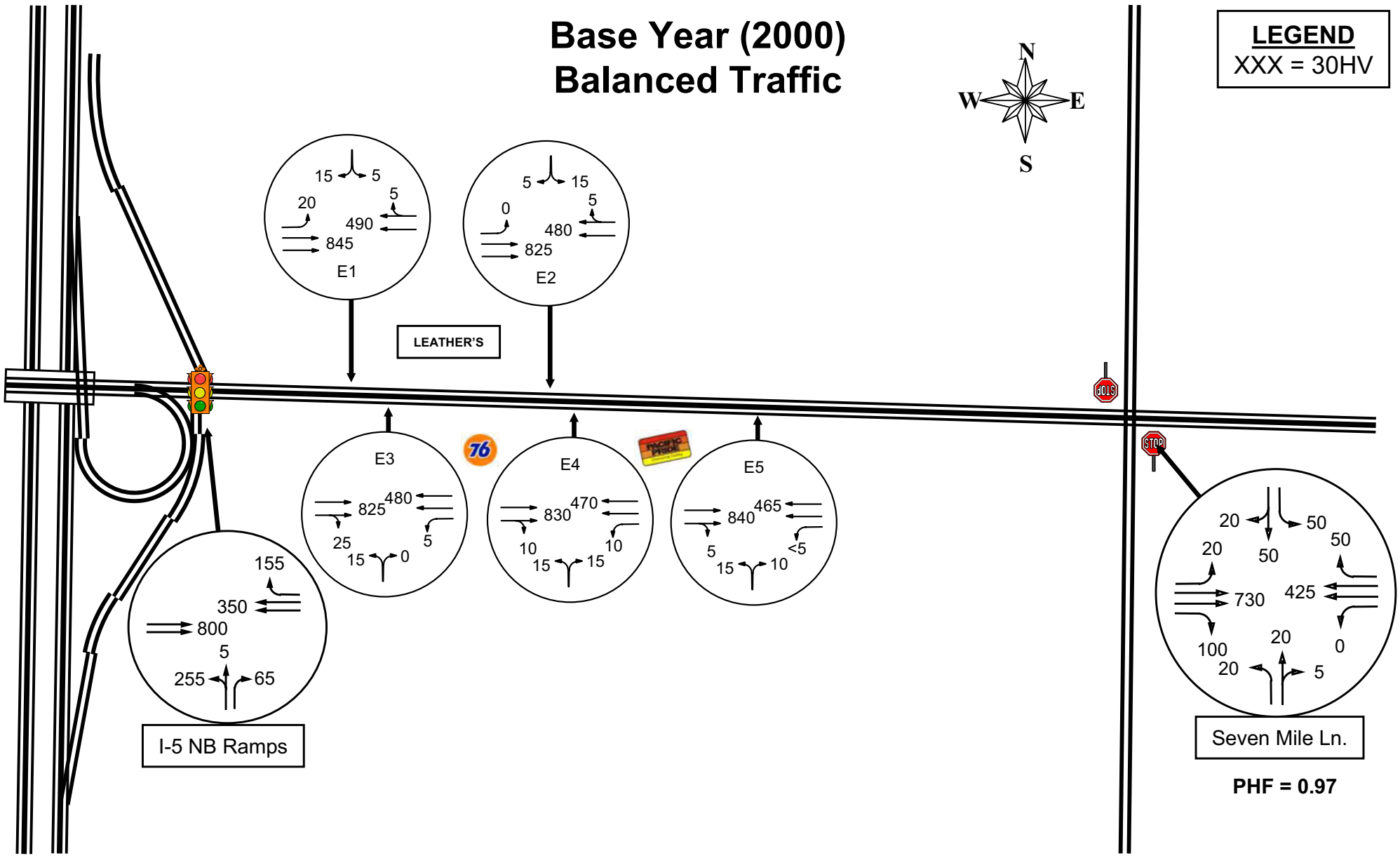
CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA
PDX/061040006.PDF

File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE A7
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

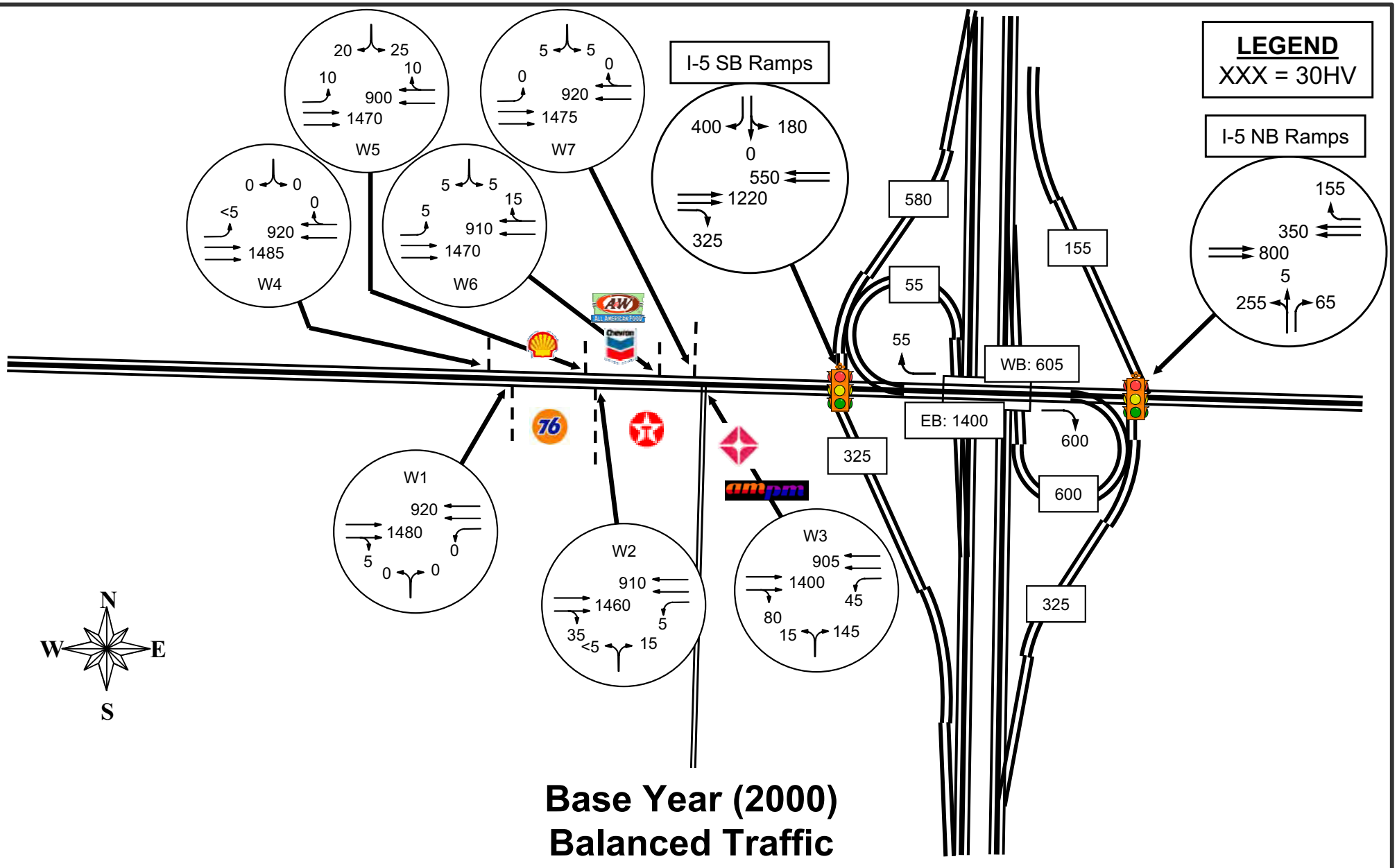
CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - RAW DATA PDX/061040006.PDF	File : OR34.PPT Date : 03/01/02	Prepared By: S.B. Wilson Reviewed By: H.L. Nale, PE	FIGURE A8



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA
PDX/081040006.PDF

File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE C1
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION

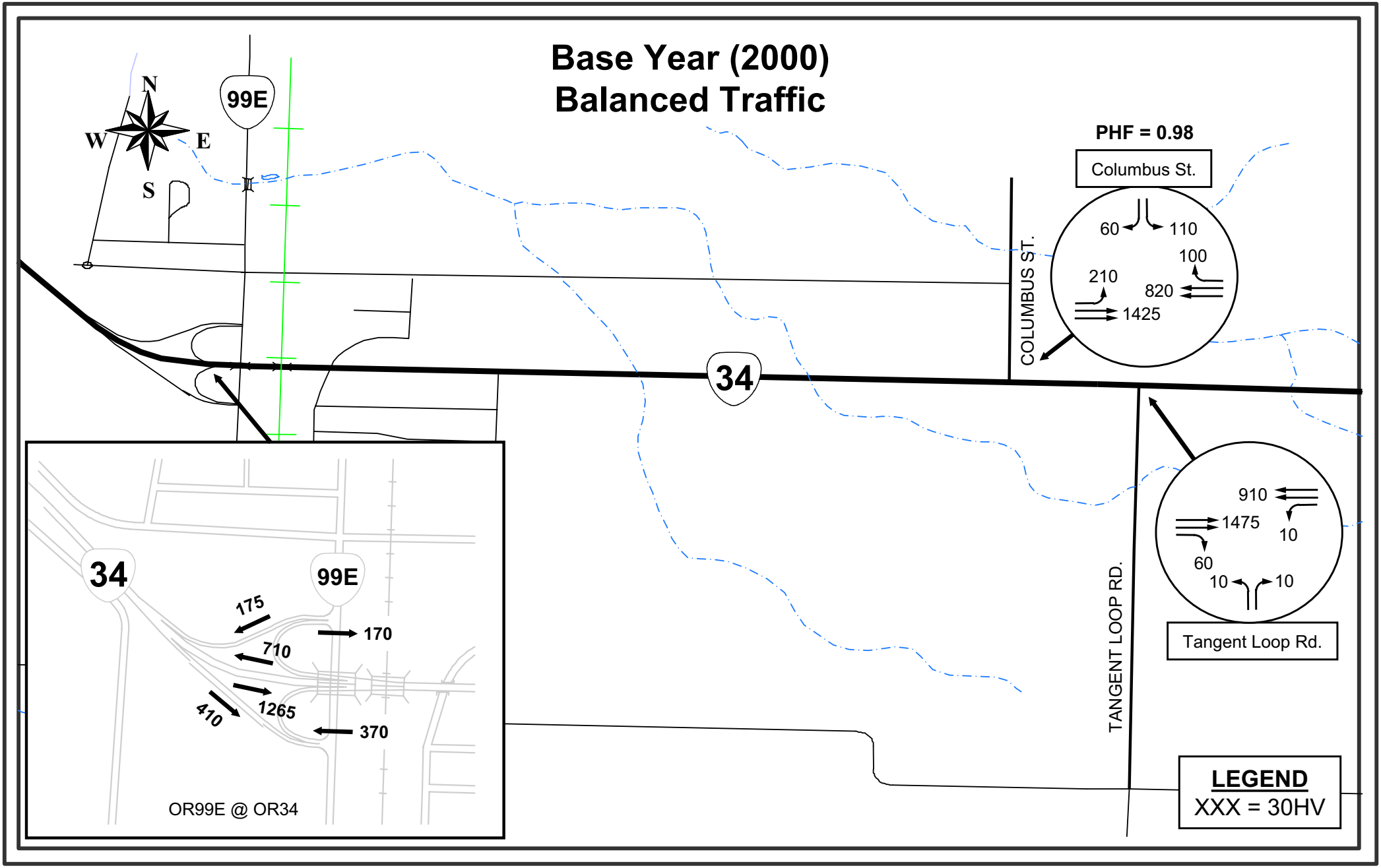
TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA
PDX/061040006.PDF

File : OR34.PPT
Date : 03/01/02

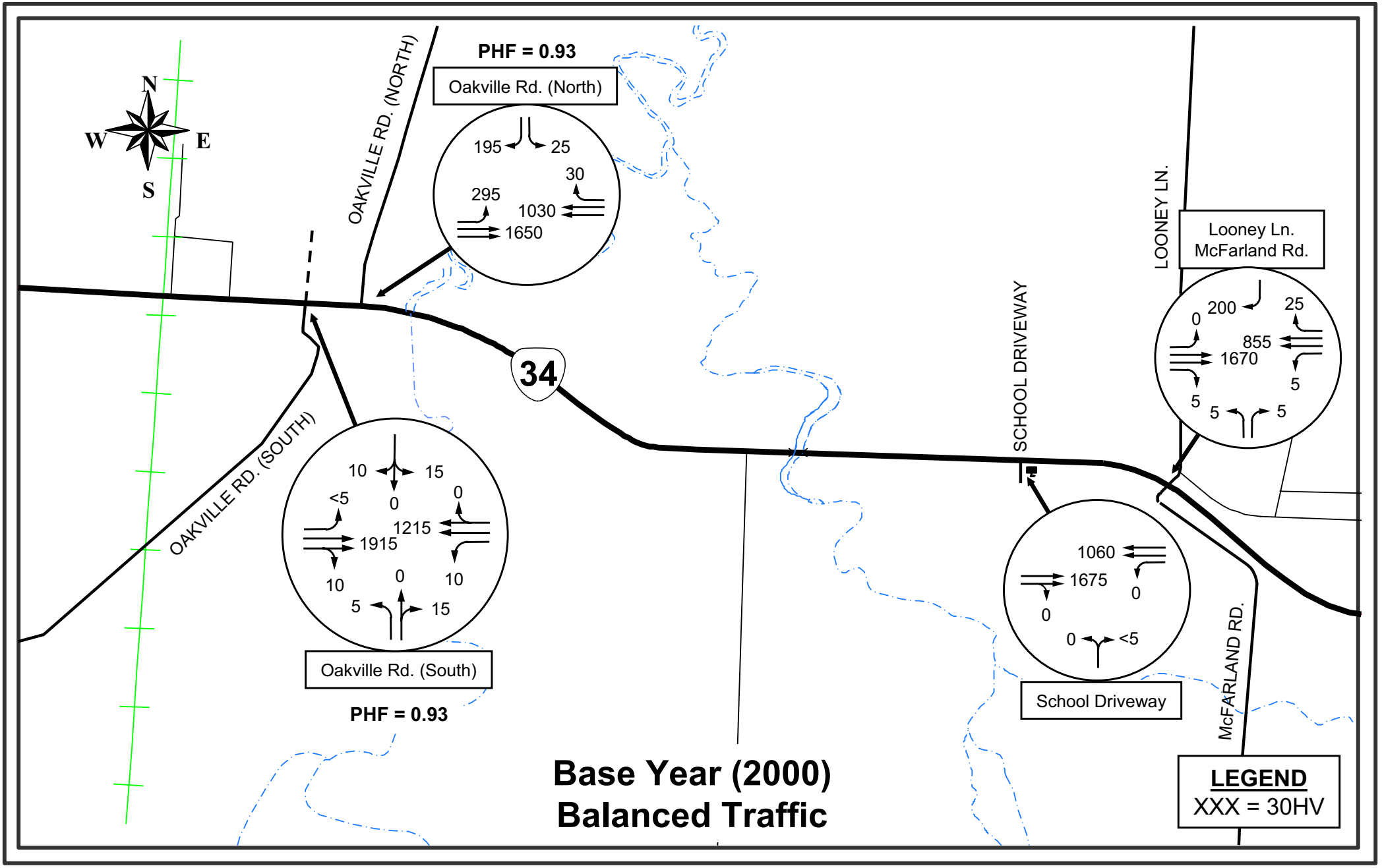
Prepared By: S.B. Wilson
Reviewed By: H.L. Nale, PE

FIGURE C2



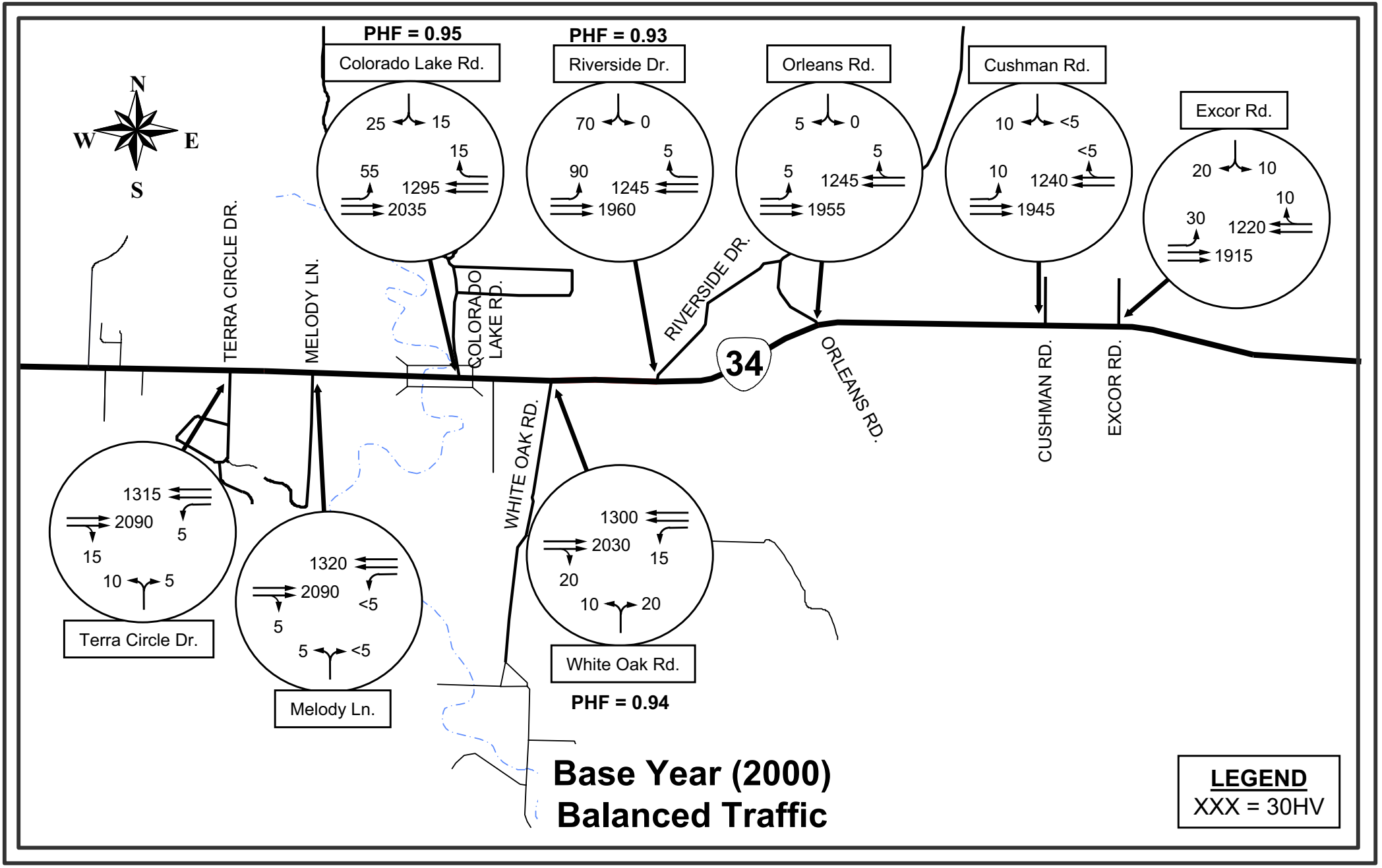
OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT Date : 03/01/02	Prepared By: S.B. Wilson Reviewed By: H.L. Nale, PE	FIGURE C3



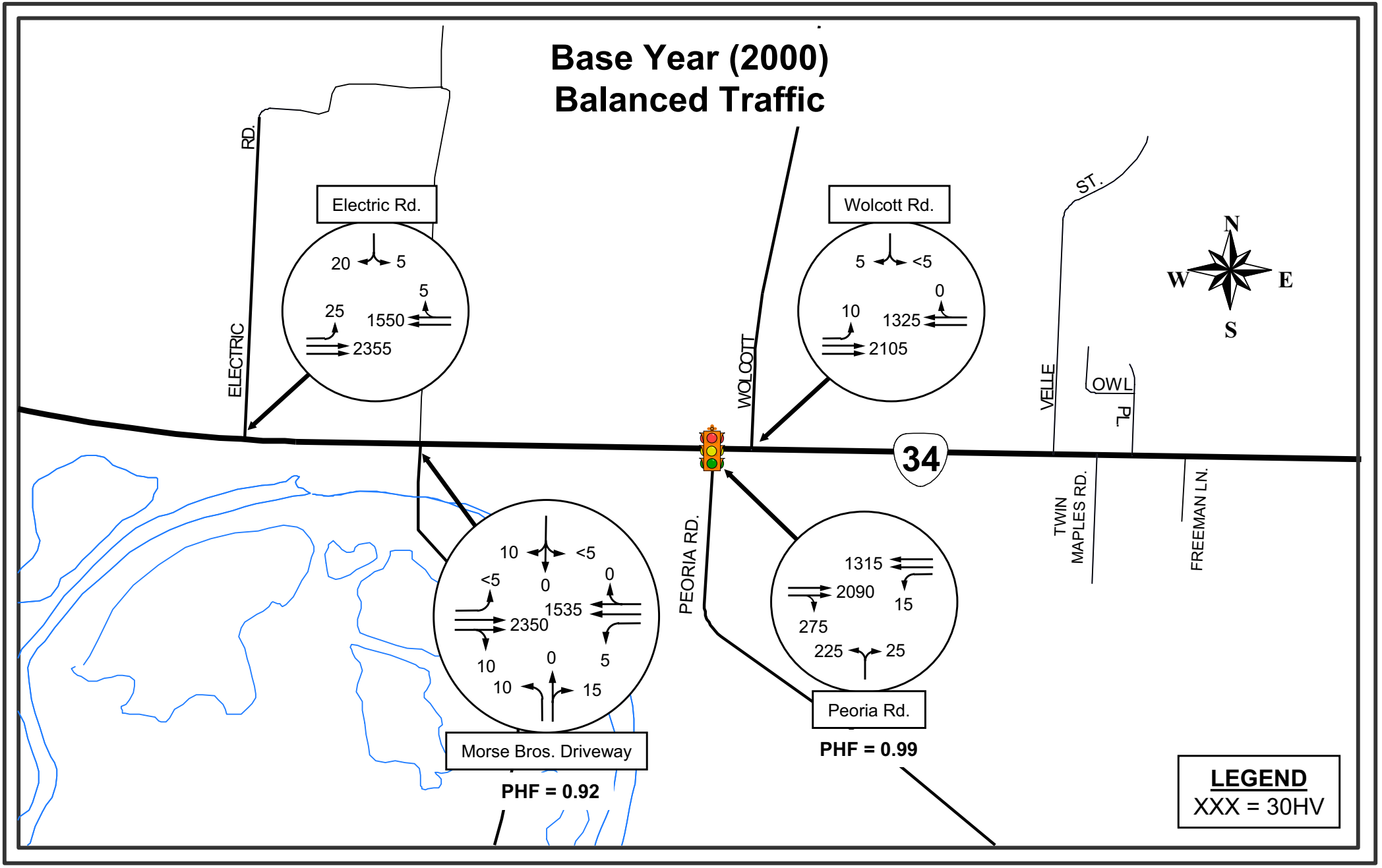
OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT Date : 03/01/02	Prepared By: S.B. Wilson Reviewed By: H.L. Nale, PE	FIGURE C4



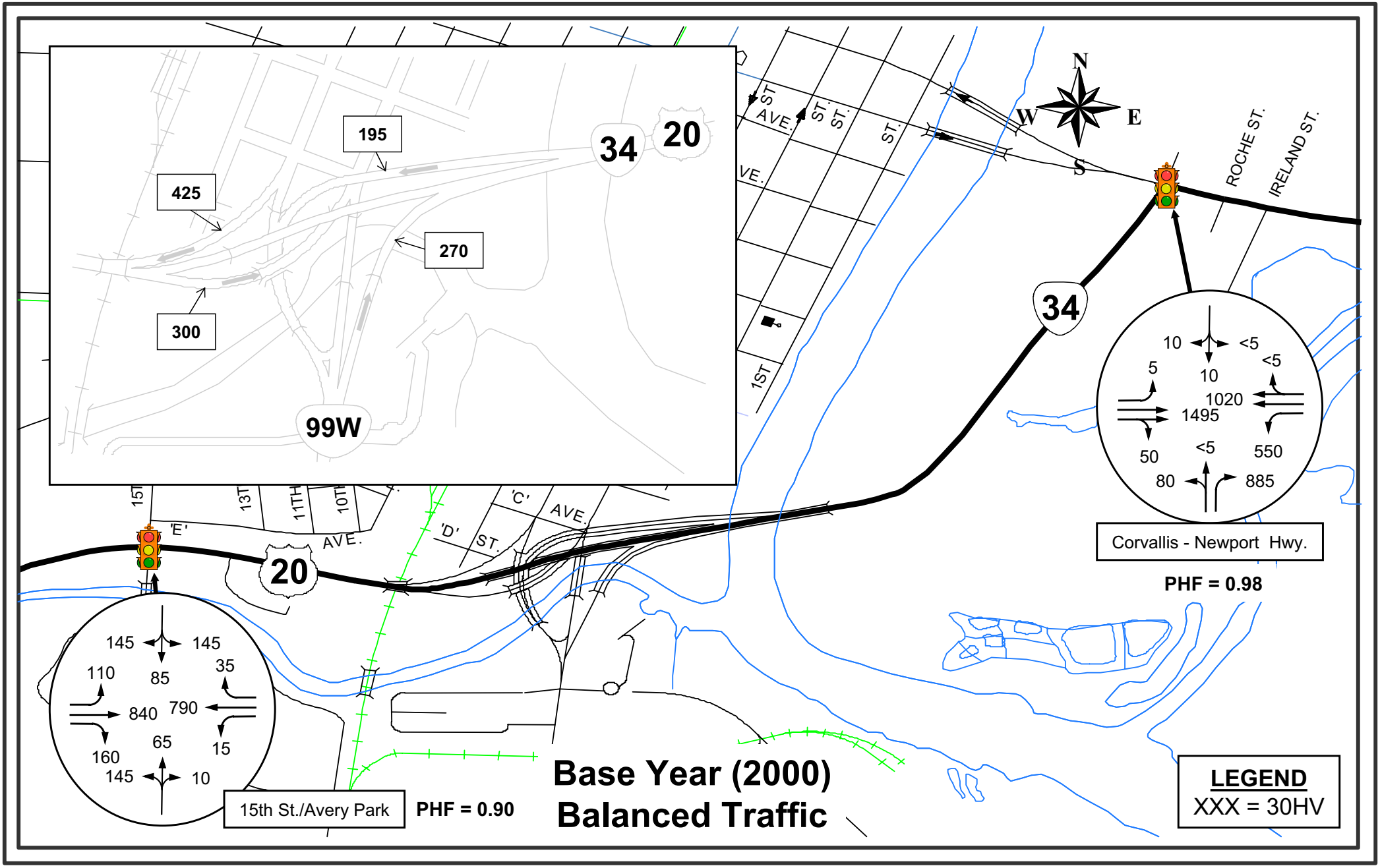
OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA PDX/081040006.PDF	File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE C5
	Date : 03/01/02	Reviewed By: H.L. Nale, PE	



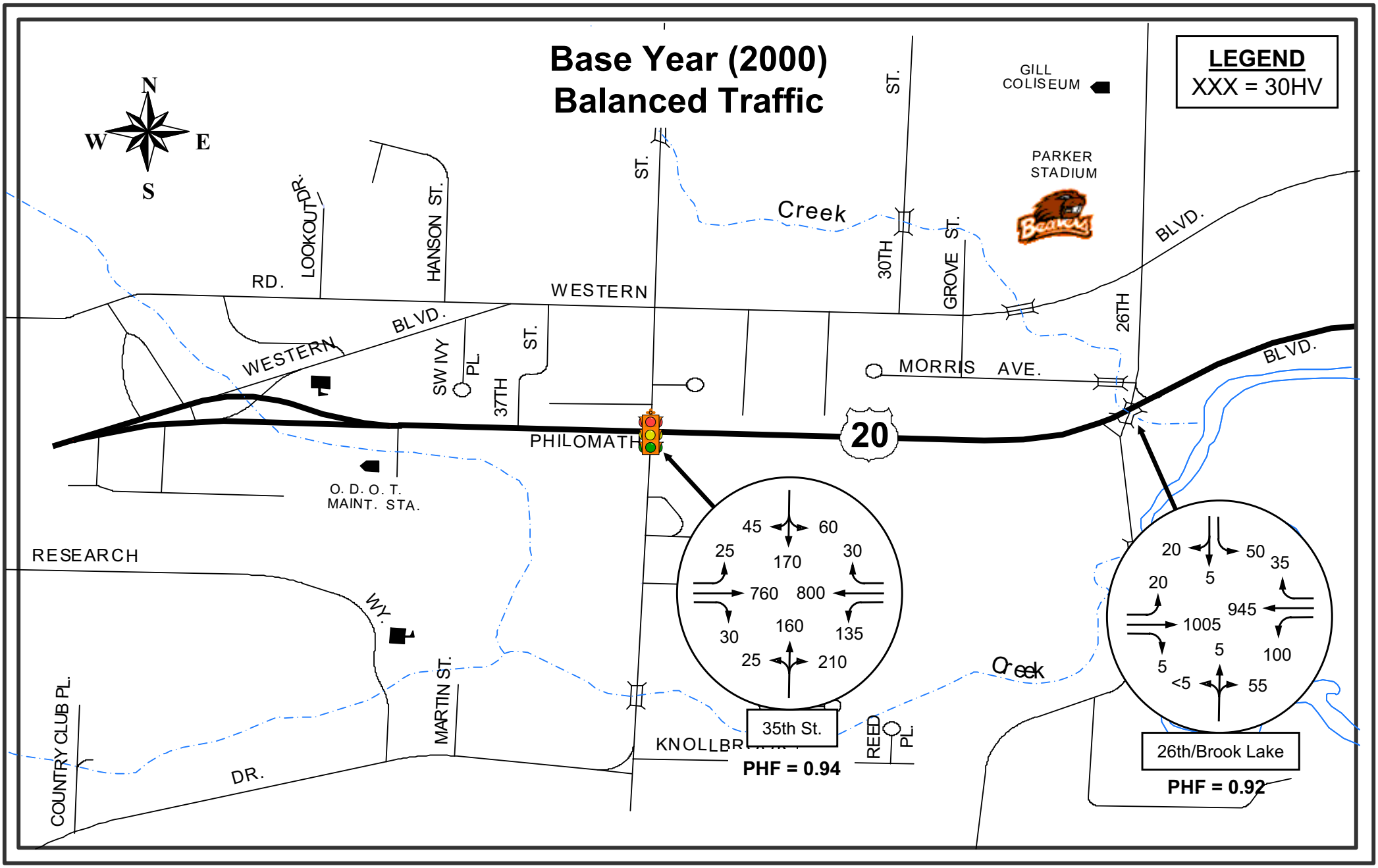
OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE C6
	Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

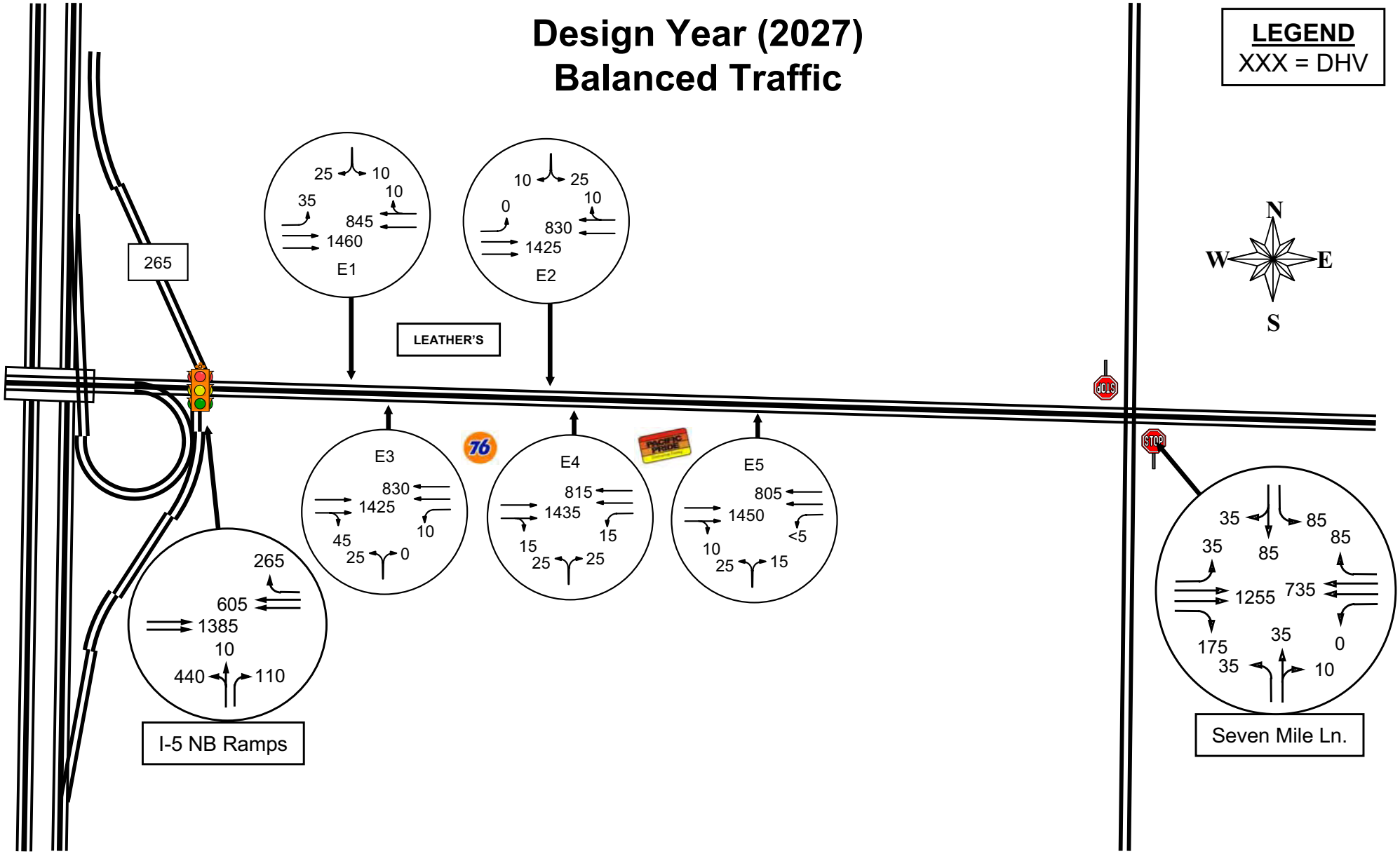
CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT Date : 03/01/02	Prepared By: S.B. Wilson Reviewed By: H.L. Nale, PE	FIGURE C7



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2000 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE C8
	Date : 03/01/02	Reviewed By: H.L. Nale, PE	

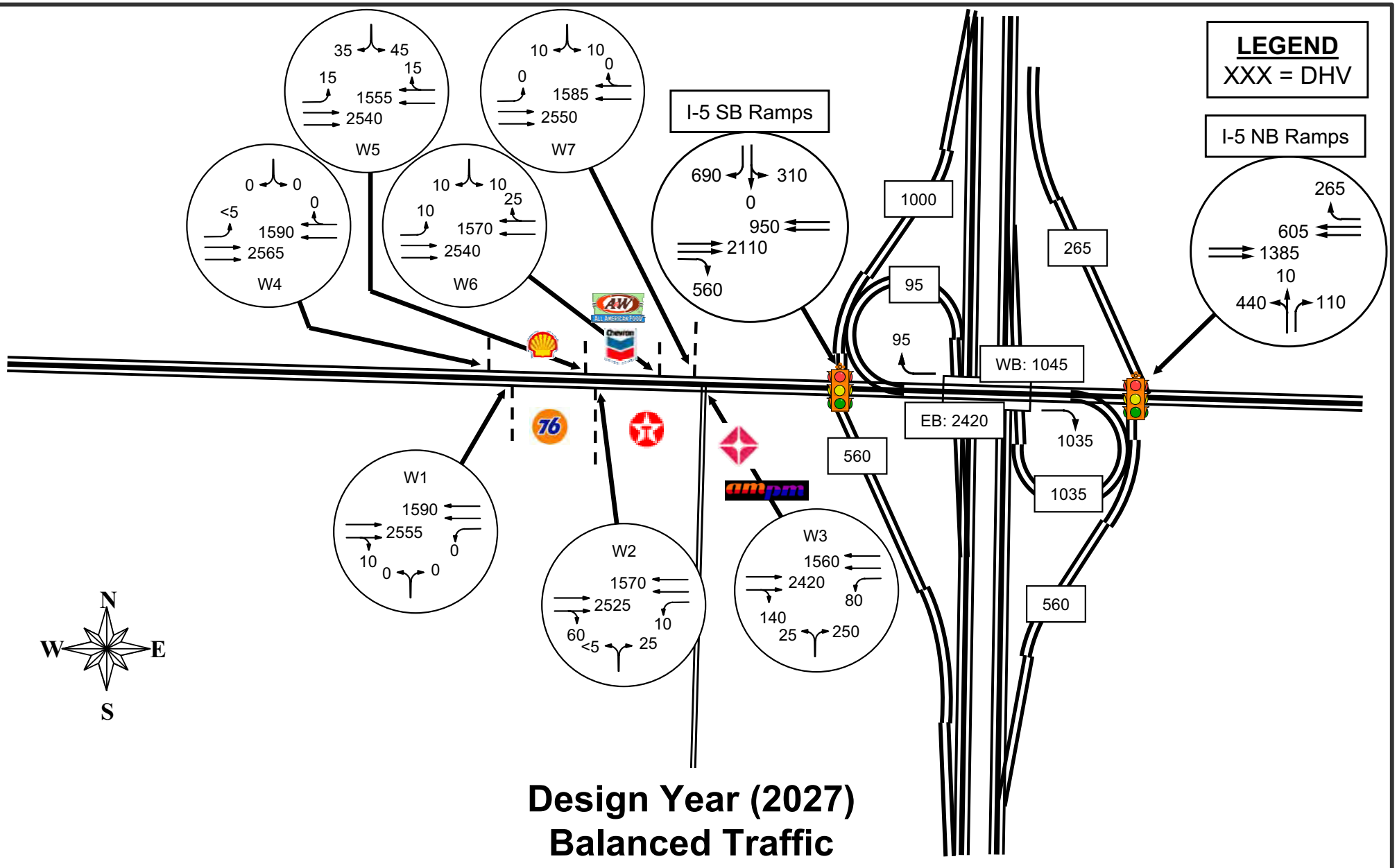
Design Year (2027)
Balanced Traffic



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA
PDX/081040006.PDF

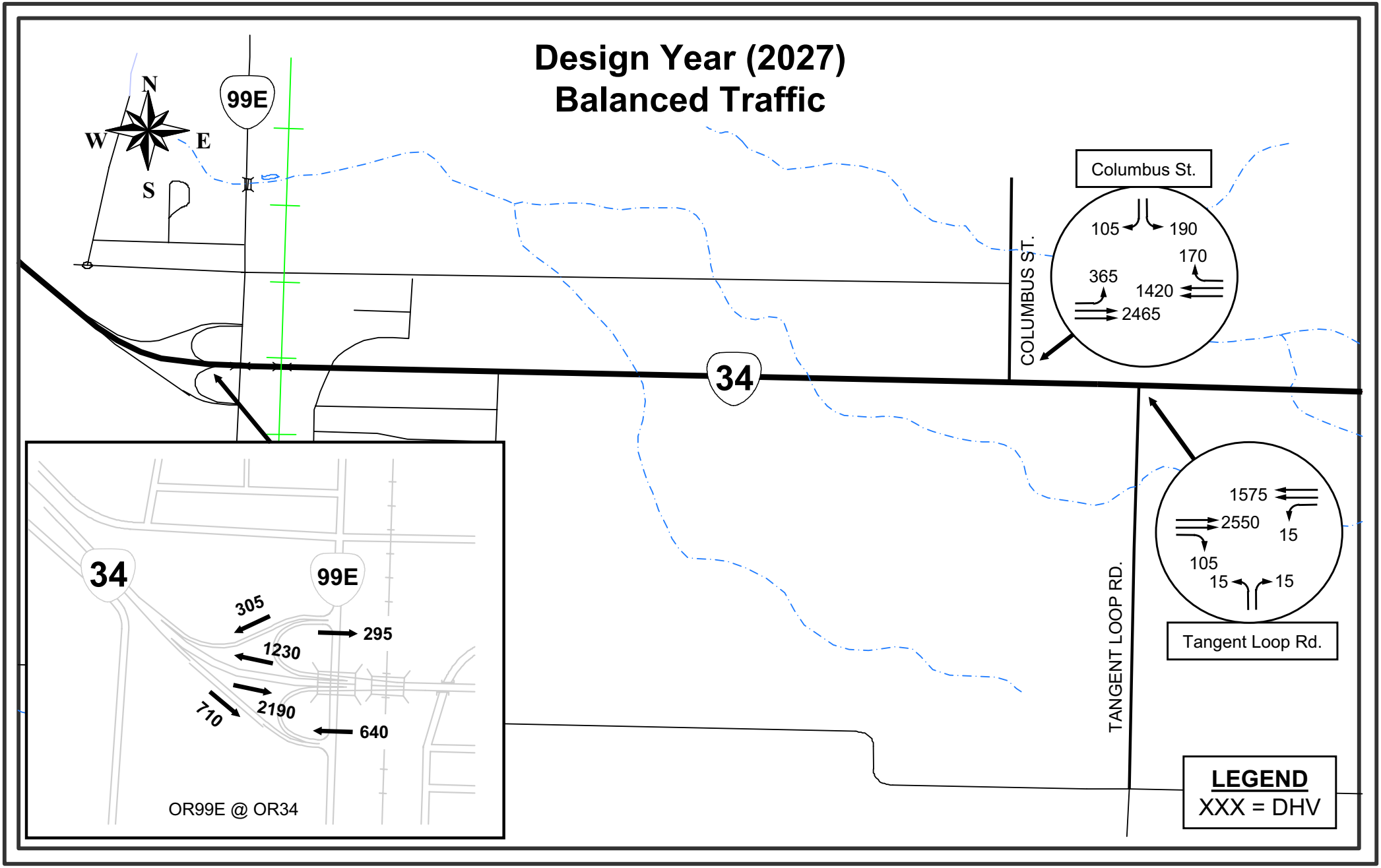
File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE E1
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

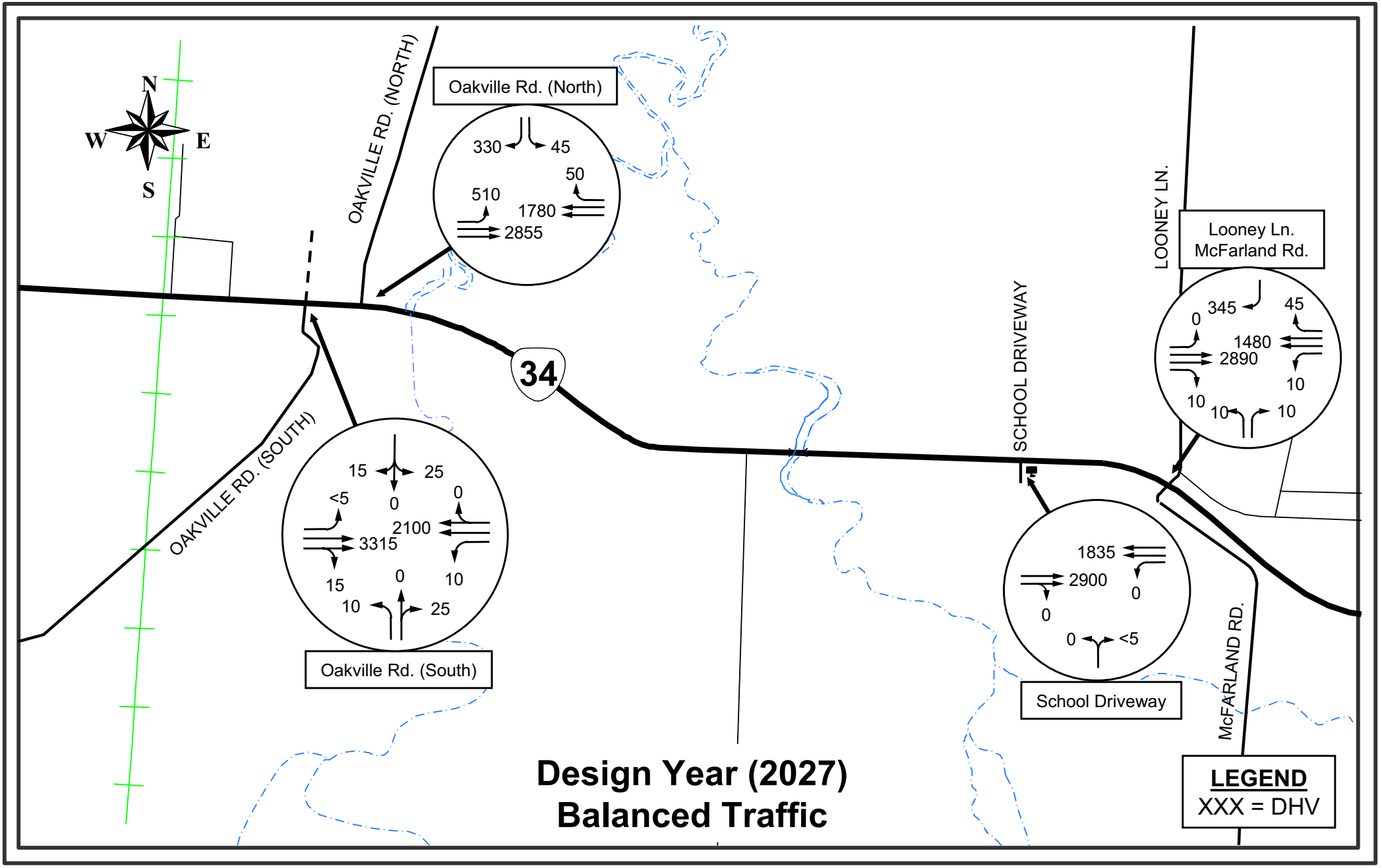
CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT Date : 03/01/02	Prepared By: S.B. Wilson Reviewed By: H.L. Nale, PE	FIGURE E2

Design Year (2027)
Balanced Traffic



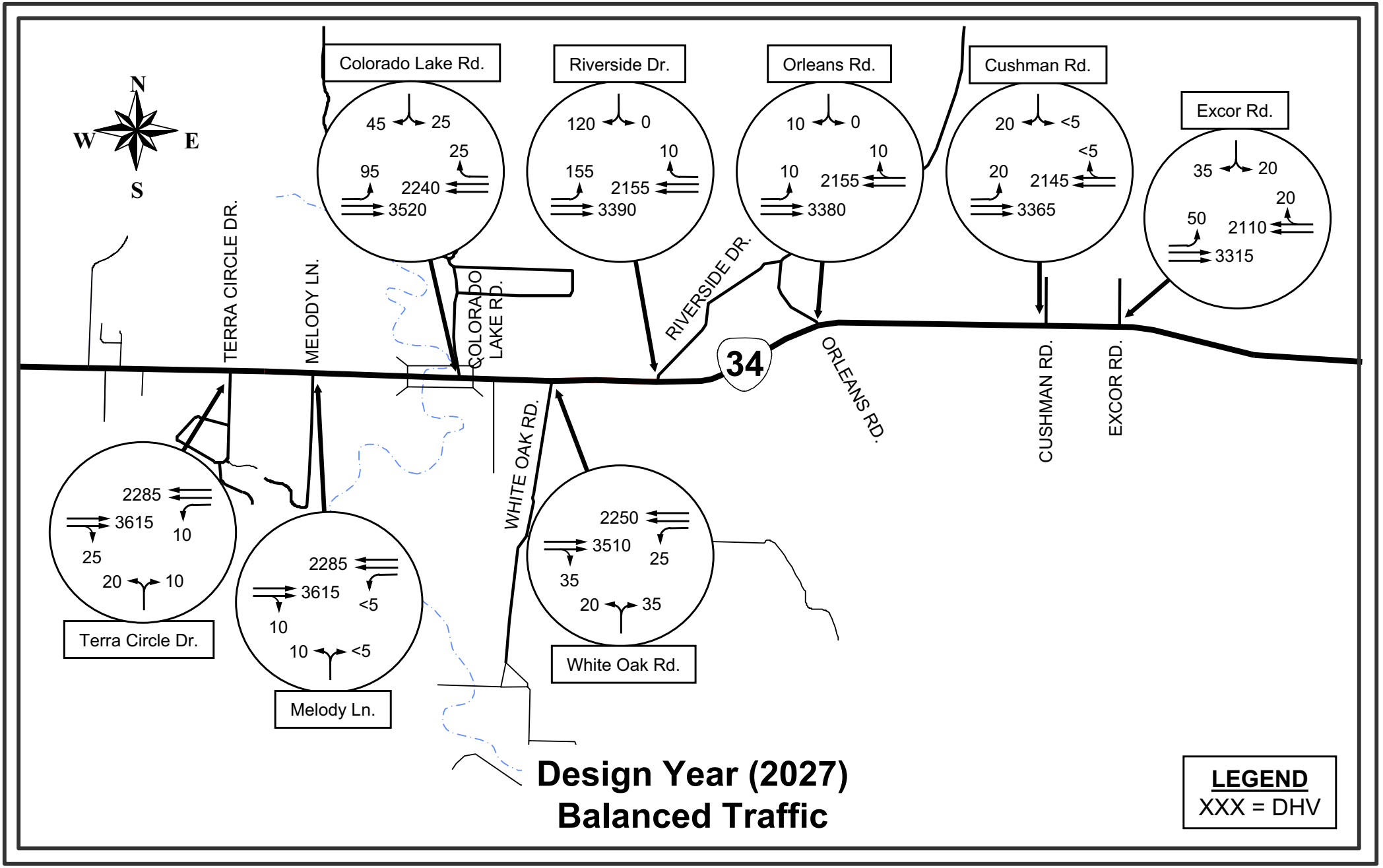
OREGON DEPARTMENT OF TRANSPORTATION TPAU **TRANSPORTATION PLANNING ANALYSIS UNIT**

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) **CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA** PDX/081040006.PDF	**File : OR34.PPT** **Date : 03/01/02**	**Prepared By: S.B. Wilson** **Reviewed By: H.L. Nale, PE**	FIGURE E3



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

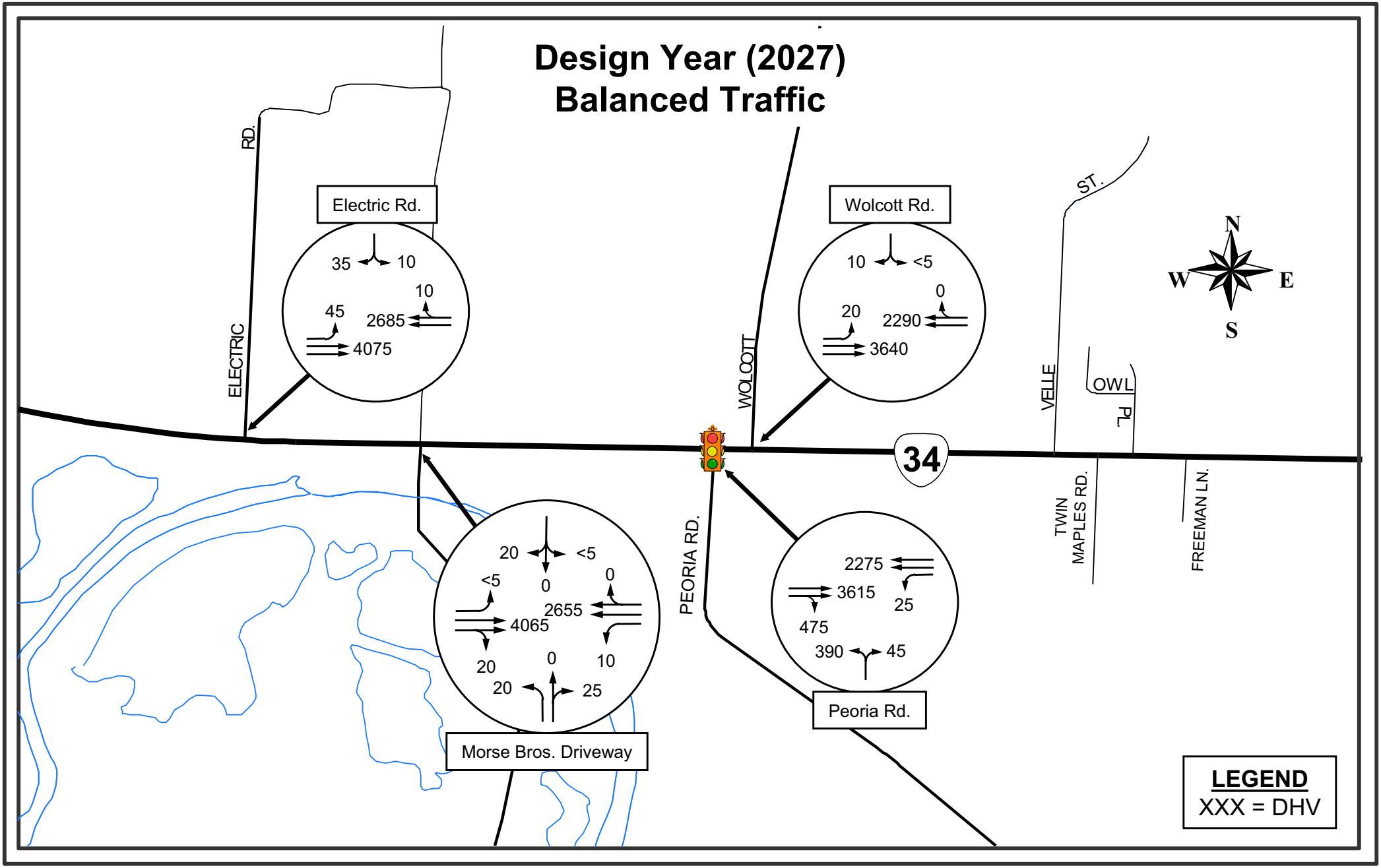
CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT Date : 03/01/02	Prepared By: S.B. Wilson Reviewed By: H.L. Nale, PE	FIGURE E4



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

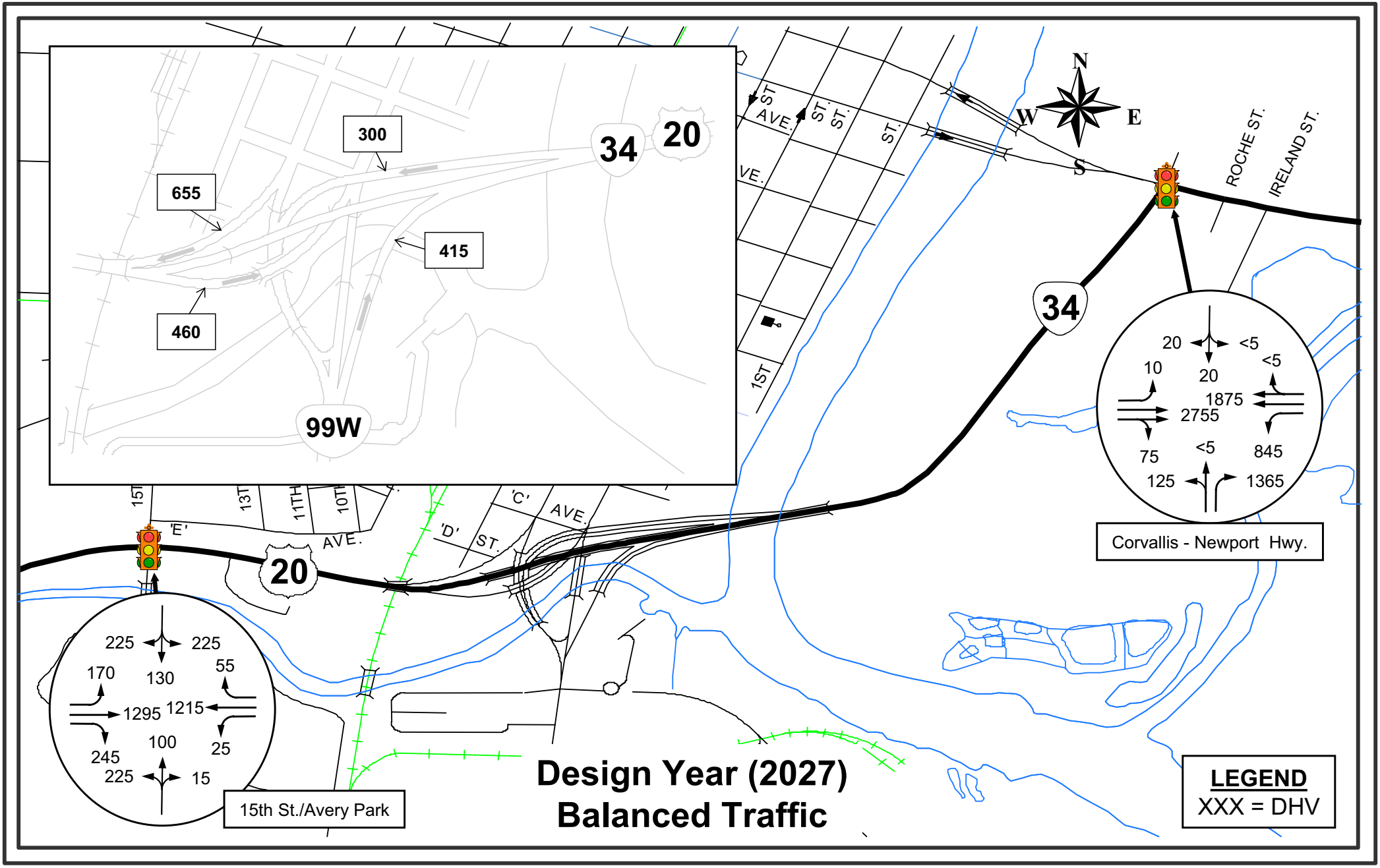
CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA
PDX/081040006.PDF

File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE E5
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

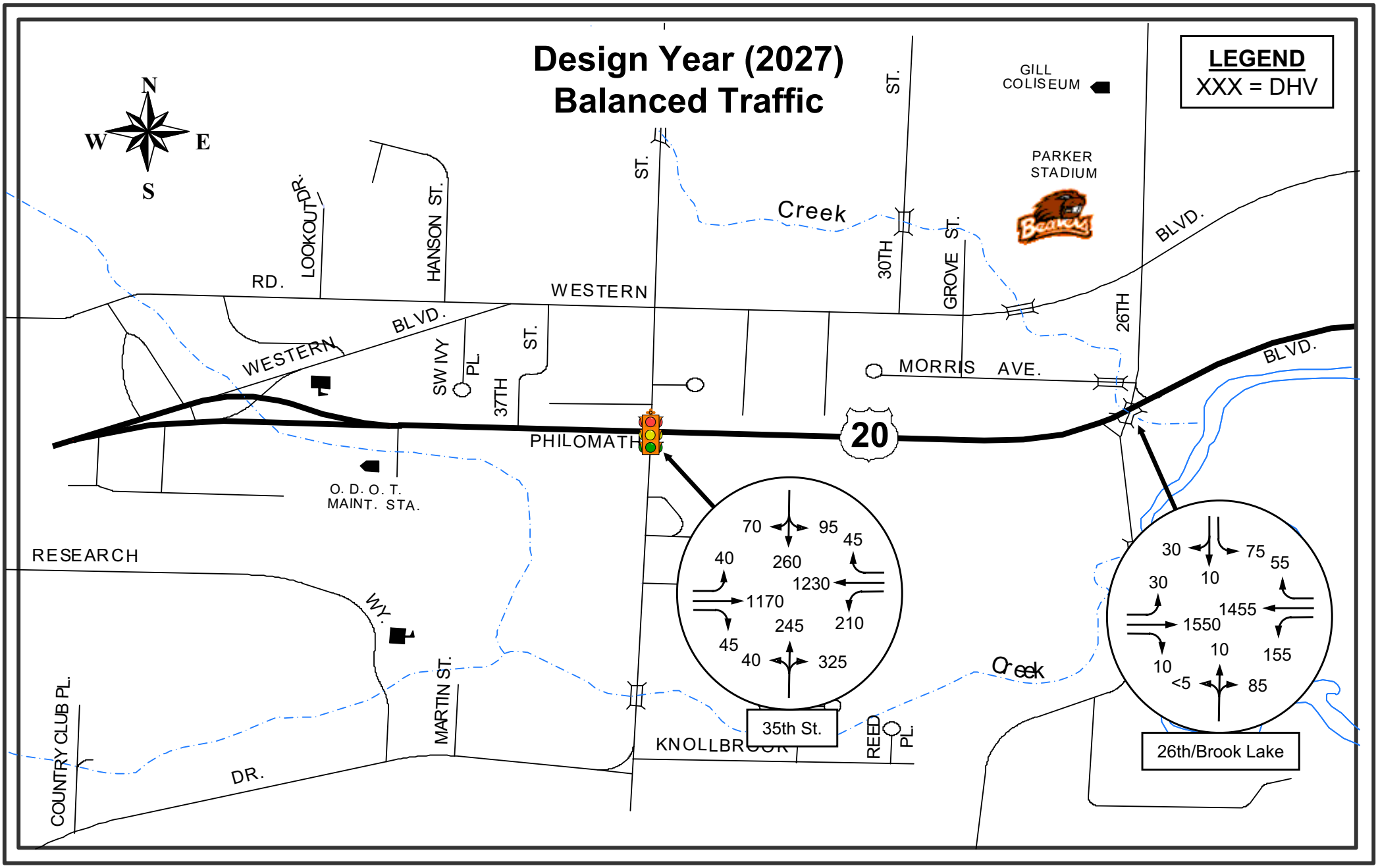
CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA PDX/061040006.PDF	File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE E6
	Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210)
CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA
PDX/081040006.PDF

File : OR34.PPT	Prepared By: S.B. Wilson	FIGURE E7
Date : 03/01/02	Reviewed By: H.L. Nale, PE	



OREGON DEPARTMENT OF TRANSPORTATION TPAU TRANSPORTATION PLANNING ANALYSIS UNIT

CORVALLIS - LEBANON HIGHWAY, OR 34 (#210) **CORRIDOR STUDY - M.P. 54.44 (#33) - M.P. 15.70 (#210) - 2027 BALANCED DATA** PDX/061040006.PDF	**File : OR34.PPT** **Date : 03/01/02**	**Prepared By: S.B. Wilson** **Reviewed By: H.L. Nale, PE**	FIGURE E8