

Technical Memorandum #1

DATE: May 28, 2007
TO: Project Management Team
FROM: Carl Springer, PE; Colette Snuffin, PE

**SUBJECT: Task 2.2: Technical Memorandum # 1 –
Existing Conditions and 2030 Base Future Conditions**

P07024-000

This memorandum provides a review of existing and 2030 base future transportation conditions for the ORE 43 Conceptual Design Plan. An analysis of how the transportation system performs today was made to establish a baseline for evaluations. This information is compared to identified performance or design standards, as appropriate, and any elements that are found to be deficient are identified. This information also serves as a basis of comparison for the Proposed Conceptual Design evaluations that will follow. The system review and performance analysis was based upon the transportation system inventory compiled during November 2006, February 2007 and March 2007.

The following ten intersections along Highway 43 (ORE 43) were selected for focused operations analysis. The study intersections are identified in Figure 1.

- Highway 43 / Marylbrook Drive (at Marylhurst University in Lake Oswego)
- Highway 43 / Arbor Drive
- Highway 43 / Marylhurst Drive-Lazy River Way
- Highway 43 / Cedaroak Drive
- Highway 43 / Hidden Springs Road
- Highway 43 / Pimlico Drive
- Highway 43 / West A Street
- Highway 43 / Holmes Street
- Highway 43 / Lewis Street-Webb Street
- Highway 43 / Hood Street-McKillican Street

At each location, traffic data was gathered and analyzed to evaluate current conditions and performance for all modes of travel. Additional data was collected for other aspects of the transportation system including reported vehicle crashes, built facilities as described by City and Metro GIS data, and reported traffic volumes on state and county facilities. The following sections describe the characteristics, usage, and performance of Highway 43 in the City of West Linn.

Existing Conditions

Motor Vehicle

Field inventories were conducted to determine characteristics of major roadways in the study area. Data collected included posted speed limits, roadway lanes, geometry and lane configurations, and intersection controls. These characteristics define roadway capacity and operating speeds through the corridor. The results are listed in Table 1.

Table 1: Existing Study Area Roadway Characteristics by Functional Classification¹

Corridor	Posted Speed (mph)	ROW Width (ft)	Number of Lanes	Lane Width (ft)
<i>Principal Arterial</i>				
Highway 43 (Willamette Drive)	35	50-100	2-4	12
<i>Arterial</i>				
Hidden Springs Road	25	60	2	11
West A Street	25	60	2	11
<i>Collector</i>				
Marylhurst Drive	25	50	2	10
Cedaroak Drive	25	50	2	11
Pimlico Drive	25	60	2	14-16
Hood Street	25	40	2	11
McKillican Street	25	60	2	12

Intersection control types at study intersections are shown on Figure 2. Seven of the ten study intersections are controlled by traffic signals. The intersection at Highway 43 / Holmes Street is controlled by a pedestrian-actuated traffic signal. The remaining intersections at Highway 43 / Arbor Drive, Highway 43 / Pimlico Drive, and Highway 43 / Lewis Street-Webb Street are stop-controlled on the minor street approaches.

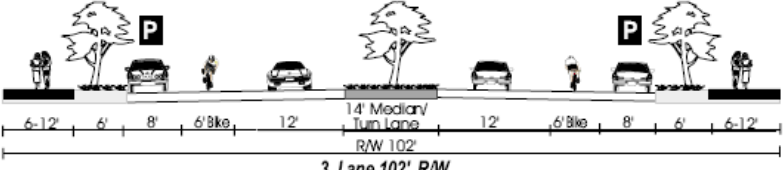
Highway 43, also known as the Oswego Highway, ORE 43 and Willamette Drive, is a state facility managed by ODOT. The Oregon Highway Plan identifies the Highway 43 as a Statewide Highway within the study area and for the majority of its length in West Linn. Statewide Highways often function as connectors to larger urban areas, ports, provide safe and efficient, high-speed, continuous flow operations, and serve as inter-urban and inter-regional connectors.

Functional classifications and the corresponding design standards for Highway 43 differ slightly between the 1998 West Linn TSP, the Clackamas County Comprehensive Plan and the ODOT's standards. The most significant difference between the three sets of standards is

¹ 1998 West Linn Transportation System Plan, Figure 3-12.

that ODOT does not allow parking while the other two would allow limited parking. Travel lane, bike lane, and sidewalk widths vary somewhat between the three standards. The sample cross section from the West Linn TSP depicts the maximum right-of-way width for a three-lane principal arterial. ODOT standards would require that cross section to have a 16-foot median/turn lane and no parking for a total maximum right-of-way width of 80 feet. The City, County, and State functional classifications and design standards for Highway 43 are listed in Table 2.

Table 2: Functional Classifications and Design Standards

Jurisdiction	Functional Classification	Design Standard
City of West Linn	Principal Arterial	<p>Vehicle Lane Widths: 11-14' On Street Parking: limited Bike Lanes: 5-6' Sidewalks: 6-12' Landscape Strips: 0-8' Medians/Turn Lane Widths: 0-14' ROW Width on Hwy 43 (per Development Code): 60-80'</p> <p>Sample Cross Section from the TSP:</p> <p style="text-align: center;">Principal Arterial</p> 
Clackamas County	Major Arterial	<p>Paved Width: 36-98' Roadside Parking: restricted Bikeways: yes Sidewalk: yes Landscape Strip: yes, unless impractical due to physical constraints Minimum ROW Width: 60-125'</p>
ODOT	Urban Principal Arterial, Statewide Highway and National Highway System	<p>Travel Lane Width: 12' Left Turn Lane: 16' including 12' raised median with 2' shy on both sides or 12' lane with 2' raised median and 2' shy On-street Parking: none Right Side Shoulder (or Bike Lane): 6' Sidewalk: 6-8' if curbside; 6' with 4-8' buffer strip if separated</p>

Sources: 1998 West Linn TSP, City of West Linn Community Development Code, Clackamas County Comprehensive Plan (updated August 2005), Oregon Highway Plan (updated January 2006), 2003 ODOT Highway Design Manual (Table 8-4)

Motor Vehicle Volumes

An inventory of peak hour traffic conditions was performed during November 2006, February 2007, and March 2007. Ten study intersections were selected for focused analysis in coordination with the City of West Linn and ODOT staff to address areas of concern along Highway 43. AM (7:00 to 9:00) and PM (4:00 to 6:00) peak period turn movement counts were conducted at the study intersections for establishing current traffic performance. Existing peak hour turn movement volumes, lane configurations and traffic control type are shown on Figure 2.

Figure 2 also shows the average daily two-way existing traffic volumes on Highway 43. Vehicle volumes on this roadway within the study area range between 20,700 and 26,800 vehicles per day. These two-way traffic volumes can vary from day to day and month to month based on weather, surrounding roadway conditions (such as construction), and holidays.

Existing Operation Conditions

Level of Service (LOS) and volume to capacity (v/c) ratios are both used as measures of effectiveness for intersection operation. LOS is similar to a “report card” rating based upon average vehicle delay. Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. Level of Service F represents conditions where average vehicle delay exceeds 80 seconds per vehicle entering a signalized intersection and demand has exceeded capacity. This condition is typically evident in long queues and delays. Unsignalized intersections provide levels of service for major and minor street turning movements. For this reason, LOS E and even LOS F can occur for a specific turning movement; however, the majority of traffic may not be delayed (in cases where major street traffic is not required to stop). LOS E or F conditions at unsignalized intersections generally provide a basis to study intersections further to determine availability of acceptable gaps, safety and traffic signal warrants.

A volume to capacity ratio (v/c) is the peak hour traffic volume at an intersection divided by the maximum volume that intersection can handle. For example, when a v/c is 0.80, peak hour traffic is using 80 percent of the intersection capacity. If traffic volumes exceed capacity, queues will form and will lengthen until demand subsides below the available capacity. When the v/c approaches 1.0, intersection operation becomes unstable and small disruptions can cause traffic flow to break down.

Level of service, delay and volume to capacity ratios are used as measures of effectiveness for study intersection performance. The minimum operational standard specified in the *City of West Linn Comprehensive Plan* (April 2006) is LOS D for all facilities except principal arterials (Highway 43) where the minimum is LOS E. The

ODOT operating performance standards² require intersections on Highway 43 within the study area to operate below a maximum volume-to-capacity (v/c) ratio of 0.99. Although Metro's 2040 Growth Concept Plan Map shows a Town Center area between approximately West A Street and McKillican Street, the area has not met specific development criteria spelled out in the Regional Transportation Plan so ODOT does not apply the Town Center v/c standard to this segment.³

The PM peak hour intersection volumes were used to determine the existing study intersection operating conditions based on the *2000 Highway Capacity Manual* methodology for signalized and unsignalized intersections⁴. Traffic volumes and level of service calculations can be found in the appendix.

Table 3 summarizes the existing weekday AM and PM peak hour intersection operation at study intersections. Intersections controlled by traffic signals operate within accepted standards during both periods. Two locations with the highest level of peak hour usage are at two adjoining locations. The ORE 43 intersections at Hidden Springs and at Cedaroak use 83 to 90 percent of available capacity⁵ today during peak hours, and can serve some additional traffic growth before reaching the maximum 99 percent level specified by ODOT.

The study intersections that are stop-controlled on the minor approaches do not operate within acceptable standards. The estimated delay for vehicles turning left onto the highway from the minor street is very significant, with an LOS F rating. This is a common situation on major highways throughout the State, and, in most cases, the side street volumes are too low to justify additional improvements. Further review will be made to determine if volumes and spacing are sufficient to justify installation of traffic signals or other higher capacity traffic controls.

²1999 *Oregon Highway Plan*, Oregon Department of Transportation, August 2006, Policy 1F.

³Ross Kevlin, ODOT, March 9, 2007.

⁴2000 *Highway Capacity Manual*, Transportation Research Board, 2000.

⁵Percent of capacity = volume-to-capacity ratio. For example, 83% used capacity is the same as 0.83 v/c ratio.

Table 3: Existing (2007) Weekday Peak Hour Intersection Level of Service

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	Average Delay (Sec)	Volume/Capacity (v/c)	LOS	Average Delay (Sec)	Volume/Capacity (v/c)
<i>Signalized Intersections</i>						
Hwy 43 / Marylbrook Dr	A	6.3	0.39	A	9.7	0.46
Hwy 43 / Marylhurst Dr-Lazy River Way	B	16.5	0.79	B	16.3	0.80
Hwy 43 / Cedaroak Dr	C	22.9	0.90	B	10.4	0.65
Hwy 43 / Hidden Springs Rd	B	18.7	0.73	C	25.0	0.83
Hwy 43 / West A St	B	14.5	0.67	B	12.5	0.74
Hwy 43 / Hood St-McKillican St	C	21.6	0.72	C	23.6	0.76
<i>Unsignalized Intersections</i>						
Hwy 43 / Arbor Dr	A/E	44.3	0.00/0.35	B/F	> 50	0.03/0.37
Hwy 43 / Pimlico Dr	A/F	> 50	0.08/>1	B/F	> 50	0.16/>1
Hwy 43 / Holmes St	A/E	45.5	0.03/0.12	B/F	> 50	0.02/0.65
Hwy 43 / Lewis St-Webb St	B/F	> 50	0.01/0.29	B/F	> 50	0.01/0.24

Notes: LOS = Level of Service

Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

Unsignalized Intersection Operations:

A/A = Major street turn LOS / Minor street turn LOS

= Major street turn v/c / Minor street turn v/c

Traffic Signal Warrants

PM peak hour traffic signal warrants were evaluated for the unsignalized study intersections. The intersection of Highway 43/Pimlico Drive does meet this warrant for the existing traffic volumes; however, the intersection would require additional mitigation with the installation of a traffic signal to meet operational standards. It should also be noted that meeting the PM peak hour traffic signal warrant alone is not sufficient justification for installation of new signal and additional study would be required. The remaining unsignalized intersections do not meet the PM peak hour warrant for existing conditions.

Parking

Very little on-street parking is available on Highway 43 within the study area.

Access Management

Proper roadway access spacing is important to maintain operating characteristics and safety. Typically, each parcel is allowed access to the adjacent roadway. However, when roadway access points are located too frequently along a roadway, action may need to be taken. Access management practices can include closure, consolidation or relocation of accesses.

The ODOT access management standards, as defined in OAR 734-051, call for minimum distances between access points on the same side of the highway. The distances required depend on the posted speed of the facility. Within the study area, the ODOT minimum spacing standard that applies to Highway 43 is 770 feet⁶ based on the functional classification of Statewide Highway with a posted speed of 35 mph. ODOT would like to change the functional classification of this segment of Highway 43 to a District Highway.⁷ The minimum spacing standard for a District Highway with a posted speed of 35 mph is 350 feet⁸.

Most segments of the Oswego Highway (OR 43) do not meet ODOT access spacing standards as a result of frequent roadway intersections or driveways located along the highway as it passes through residential areas.

⁶ 1999 Oregon Highway Plan, Oregon Department of Transportation, August 2006, Table 13.

⁷ Ross Kevlin, ODOT, noted on March 21, 2007, that the state would like to change the classification of Highway 43 in West Linn to District Highway, but that it is unknown at this time when that change would occur.

⁸ 1999 Oregon Highway Plan, Oregon Department of Transportation, August 2006, Table 15.

Traffic Safety

The last two and a half years (2003 through 2006) of available collision data were obtained from ODOT to identify any areas of traffic safety concern along Highway 43.

Table 4 summarizes the collisions experienced at study intersections and the resulting collision rate calculates the number of collisions per million vehicles entering the intersection. Collision rates of 1.0 or greater are generally used as indicators that specific intersections should be investigated further for potential safety enhancements. As shown, all study intersections maintain collision rates well below 1.0.

Table 4: Collision Rates

Intersection	Total Collisions (Year 2003-2006)	Collision Rate
Highway 43 / Marylbrook Drive	2	0.14
Highway 43 / Arbor Drive	1	0.07
Highway 43 / Marylhurst Drive-Lazy River Way	8	0.56
Highway 43 / Cedaroak Drive	5*	0.33
Highway 43 / Hidden Springs Drive	6	0.38
Highway 43 / Pimlico Drive	0	0.00
Highway 43 / West "A" Street	2	0.13
Highway 43 / Holmes St	2	0.13
Highway 43 / Lewis St-Webb St	3	0.20
Highway 43 / Hood Street-McKillican Street	0	0.00

Source: ODOT – Transportation Data Section – Crash Analysis and Reporting Unit, Continuous System Crash Listing, City of West Linn, 2003-2006.

* One crash at this intersection involved one pedestrian.

Crash Rate = (Crashes*1000000) / (Years*ADT*340)

Truck Freight

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. Clackamas County and the City of West Linn identify Highway 43 as a freight route within the West Linn UGB.

Truck (heavy vehicle) volumes were collected as part of the intersection turn movement counts and were used in motor vehicle operations calculations. Truck volumes and percentages at the study intersections are listed in Table 5. In general, truck volumes are a

much higher percentage of total vehicle traffic during the AM peak hour, 4 to 7 percent, while during the PM peak hour they are typically only 1 or 2 percent of the total traffic flow.

Table 5: Peak Hour Truck Volumes at Study Intersections

Intersection	Intersection Truck Volume		Truck % of All Vehicular Traffic	
	AM	PM	AM	PM
Highway 43 / Marylbrook Drive	86	24	6%	1%
Highway 43 / Arbor Drive	57	26	4%	1%
Highway 43 / Marylhurst Drive-Lazy River Way	71	26	4%	1%
Highway 43 / Cedaroak Drive	112	31	6%	2%
Highway 43 / Hidden Springs Drive	122	23	6%	1%
Highway 43 / Pimlico Drive	109	54	6%	3%
Highway 43 / West "A" Street	108	60	6%	3%
Highway 43 / Holmes St	117	45	7%	2%
Highway 43 / Lewis St-Webb St	121	45	7%	2%
Highway 43 / Hood Street-McKillican Street	91	42	5%	2%

Source: Traffic Counts conducted November 2006, February 2007, and March 2007

Pedestrian

Narrow sidewalks exist along portions of the study corridor with few connections to existing sidewalks or paths on side streets. At side streets with no vehicular connection to Highway 43, there is generally some way for pedestrians to make their way to Highway 43, but these connections are not ADA compliant. There are no sidewalks north of Cedaroak Drive. South of Cedaroak Drive, there is a narrow sidewalk on at least one side of Highway 43.

Pedestrian crossing volumes at the study intersections were counted between during the AM and PM peak periods. The weather on the days of the counts was cloudy to partly cloudy with precipitation between 0.01 and 0.94 inches and high temperatures in the mid 50s to mid 60s. The peak hour pedestrian volumes indicate the relative differences in pedestrian demand at study intersections. Although the study area vehicular evening peak hour typically occurs from 4:00 to 5:00 PM, intersections located near schools and other activity centers may experience higher pedestrian volumes earlier in the day. The highest pedestrian counts for the study area were near the existing park-and-ride facility at Cedaroak Drive. Pedestrian volumes at each study intersection are shown in Table 6. The location with the highest pedestrian counts during the peak period is highlighted in gray.

Table 6: Peak Hour Pedestrian Crossing Volumes at Study Intersections

Intersection	North/South Pedestrian Volume		East/West Pedestrian Volume	
	AM	PM	AM	PM
Highway 43 / Marylbrook Drive	0	6	1	1
Highway 43 / Arbor Drive	0	2	0	0
Highway 43 / Marylhurst Drive-Lazy River Way	2	7	0	3
Highway 43 / Cedaroak Drive	3	2	2	14
Highway 43 / Hidden Springs Drive	0	2	1	0
Highway 43 / Pimlico Drive	1	1	4	1
Highway 43 / West "A" Street	0	1	0	3
Highway 43 / Holmes St	2	1	2	6
Highway 43 / Lewis St-Webb St	0	1	0	0
Highway 43 / Hood Street-McKillican Street	1	0	1	1

Source: Traffic Counts conducted November 2006, February 2007, and March 2007

Bicycle

Bike lanes are present throughout the study area on Highway 43. The only connecting street with bike lanes within the study area is West A Street.

Bicycle counts were conducted during the AM and PM peak periods. The weather on the days of the counts was cloudy to partly cloudy with precipitation between 0.01 and 0.94 inches and high temperatures in the mid 50s to mid 60s. The peak hour bicycle volumes at each study intersection are shown in Table 7. These volumes indicate extremely low bicycle activity at the study intersections.

Table 7: Bicycle Crossing Volumes at Study Intersections

Intersection	North/South Bicycle Volume		East/West Bicycle Volume	
	AM	PM	AM	PM
Highway 43 / Marylbrook Drive	0	0	0	0
Highway 43 / Arbor Drive	0	0	0	2
Highway 43 / Marylhurst Drive-Lazy River Way	0	0	0	0
Highway 43 / Cedaroak Drive	0	0	0	1
Highway 43 / Hidden Springs Drive	0	0	0	0
Highway 43 / Pimlico Drive	0	1	0	0
Highway 43 / West "A" Street	0	0	0	0
Highway 43 / Holmes St	1	0	0	1
Highway 43 / Lewis St-Webb St	1	0	0	1
Highway 43 / Hood Street-McKillican Street	0	1	0	0

Source: Traffic Counts conducted November 2006, February 2007, and March 2007

Transit

Transit service is provided in West Linn by the Tri County Metropolitan Transportation District of Oregon (TriMet), which provides transit service for the Portland Metro area including the counties of Clackamas, Multnomah and Washington. TriMet Route 35 travels through West Linn along Highway 43, connecting the Oregon City Transit Center and downtown Portland. There is one park-and-ride in West Linn located at Highway 43 / Cedaroak Drive for commuters wishing to travel north on Route 35. TriMet service to the study area is summarized in Table 8.

Table 8: Transit Service Route Weekday Peak Period Level of Service

Transit Route	Average Headways (Minutes)			Level of Service Based on Time between Buses		
	AM	Midday	PM	AM	Midday	PM
#35 Inbound	13	30	27	B	E	D
#35 Outbound	30	30	18	E	E	C

Note: AM Period = 6:00-08:30 AM, Midday Period = 8:30 AM-4:00 PM, PM Period = 4:00-6:00 PM

Level of Service for transit service based on headway: less than 10 minutes = LOS A;

10-14 minutes = LOS B; 14-19 minutes = LOS C; 20-29 minutes = LOS D; 30-60 minutes = LOS E;

And greater than 60 minutes = LOS F.

The existing transit routes, shelters and amenities are illustrated on Figure 3. Within the study area, there are only two stops with bus shelters, at Marylhurst University and near the Bolton Area shopping center.

Of the 60 bus stops currently within West Linn, TriMet is proposing to abandon eight stops for Route 35 on Highway 43 due to low ridership and poor pedestrian access.⁹ The stops listed in Table 9 and labeled on Figure 3 will likely be removed spring 2007.

Table 9: Bus Stops TriMet Proposing to Abandon

Stop ID	Cross Street	Travel Direction	Relative Position
9243	Chow Mein Lane	Northbound	Opposite
9244	Chow Mein Lane	Southbound	Farside
6342	Mohawk Way	Northbound	Opposite
6343	Mohawk Way	Southbound	Farside
6323	Hughes Lane	Northbound	Nearside
6315	Failing Street	Northbound	Nearside
6316	Failing Street	Southbound	Opposite
6313	Easy Street	Southbound	Farside

⁹ Information from Young Park, TriMet, received March 5, 2007. For additional information regarding the status of the proposal, contact Myleen Richardson, TriMet.

A TriMet bus stop generally has to serve at least 35 passengers per weekday to be a candidate for a shelter. Based on a TriMet 2006 ridership census, only two stops in the study area have more than 35 passengers per weekday, Highway 43 / Cedaroak Drive (northbound) and Highway 43 / Hidden Springs Drive (southbound). The stop with the next highest activity level is the northbound stop at Highway 43 / Marylbrook Drive, which does not have a shelter, but serves too few passengers to warrant one.

2030 Base Future Conditions

Future travel forecast information was developed for the Highway 43 study area for the year 2030 using the current regional travel demand forecast model from Metro.

Travel Forecasting Method

The growth in peak hour volume through the corridor averages just over 1 percent per year. These forecasts include expected local re-development and infill changes, as well as regional growth that would use the corridor. The base year traffic volumes at the study intersections were factored¹⁰ to estimate 2030 volumes by applying the rate calculated from the travel demand model. Figure 4 provides a summary of the forecasted AM and PM peak hour traffic volumes for the 2030 Future Base Conditions that were developed based on the regional travel demand model.

Future Operations Analysis

The study intersection performance for the 2030 Future Base Conditions listed in Table 10 is based on existing geometries and traffic controls. No roadway capacity or operational improvements have been assumed in this analysis; we used the same roadway features and traffic control measures as exists today to determine how well traffic would operate without any improvements.

¹⁰ Growth factor of 1.1 percent per year for 23 years was applied to 2007 traffic counts. The total growth for the study period was 1.29 times current volumes.

Table 10: 2030 Future Base Weekday Peak Hour Intersection Level of Service

Intersection	AM Peak Hour			PM Peak Hour		
	LOS	Average Delay (Sec)	Volume/Capacity (v/c)	LOS	Average Delay (Sec)	Volume/Capacity (v/c)
<i>Signalized Intersections</i>						
Hwy 43 / Marylbrook Dr	A	6.8	0.51	B	10.8	0.59
Hwy 43 / Marylhurst Dr-Lazy River Way	D	41.9	>1	D	44.7	>1
Hwy 43 / Cedaroak Dr	E	78.1	>1	B	15.2	0.84
Hwy 43 / Hidden Springs Rd	C	31.3	0.95	D	54.9	>1
Hwy 43 / West A St	C	23.8	0.88	C	25.4	0.95
Hwy 43 / Hood St-McKillican St	D	36.0	0.93	D	48.8	>1
<i>Unsignalized Intersections</i>						
Hwy 43 / Arbor Dr	A/F	> 50	0.00/0.98	B/F	> 50	0.05/>1
Hwy 43 / Pimlico Dr	B/F	> 50	0.12/>1	B/F	> 50	0.27/>1
Hwy 43 / Holmes St	B/F	> 50	0.06/>1	B/F	> 50	0.04/>1
Hwy 43 / Lewis St-Webb St	B/F	> 50	0.02/0.91	B/F	> 50	0.02/0.87

Notes: LOS = Level of Service

Delay = Average vehicle delay in the peak hour for entire intersection in seconds.

Unsignalized Intersection Operations:

A/A = Major street turn LOS / Minor street turn LOS

##/ = Major street turn v/c / Minor street turn v/c

Traffic Signal Warrants

PM peak hour traffic signal warrants were evaluated for the unsignalized study intersections. The intersection of Highway 43/Pimlico Drive does meet this warrant for the existing traffic volumes and the 2030 future base conditions; however, the intersection would require additional mitigation with the installation of a traffic signal to meet operational standards. It should also be noted that meeting the PM peak hour traffic signal warrant alone is not sufficient justification for installation of new signal and additional study would be required. The remaining unsignalized intersections would not meet the PM peak hour warrant for 2030 Future Base conditions.

Findings

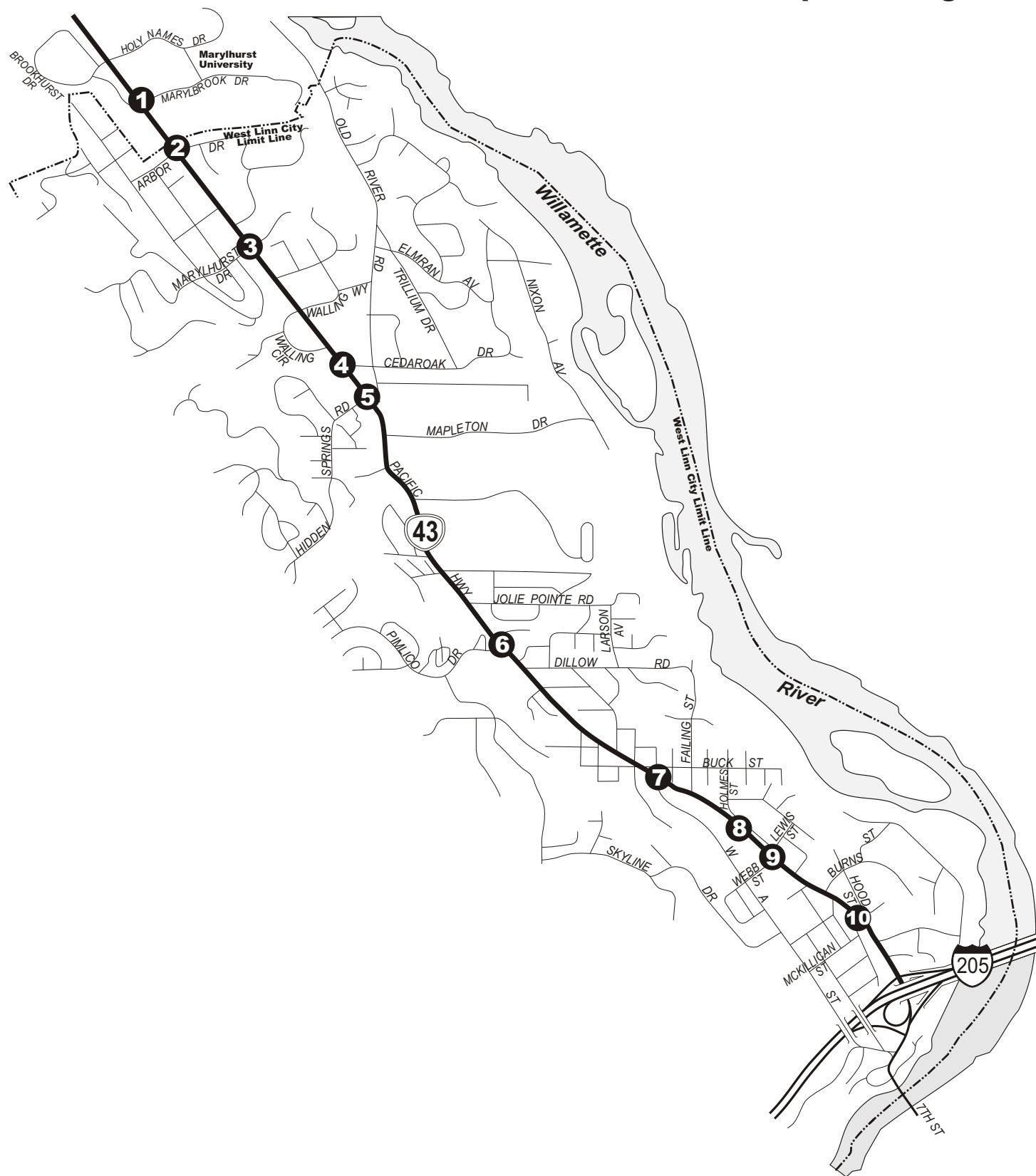
Recommended mitigations have not been determined. Several of the study intersections fail to meet the ODOT operating standards during the AM and PM peak hours. The deficient locations include:

- | | |
|--|----------------------|
| ▪ Highway 43 / Marylhurst Dr. – Lazy River Way | AM and PM peak hours |
| ▪ Highway 43 / Cedaroak Drive | AM peak hour |
| ▪ Highway 43 / Hidden Springs Road | PM peak hour |
| ▪ Highway 43 / Hood St. – McKillican St. | PM peak hour |

In addition, all locations without traffic signals will have major delays for side street approaching traffic during peak hours. This is consistent with the current findings under existing volumes.

Further evaluation is required to determine the specific type and extent of improvements that may address the poor performance noted above. This analysis will be addressed in subsequent technical reports.

ORE 43 Conceptual Design Plan



LEGEND

0 - Study Intersection & Number

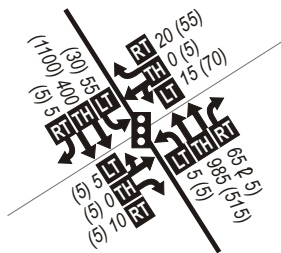
DKS Associates
TRANSPORTATION SOLUTIONS



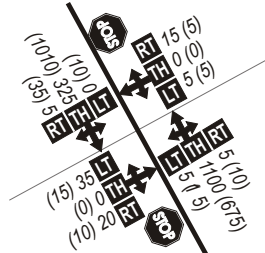
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Figure 1
STUDY AREA

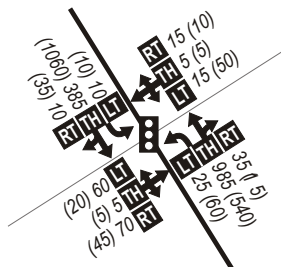
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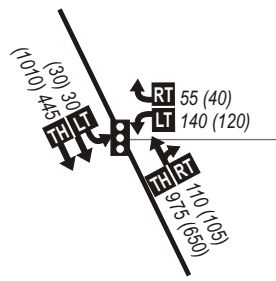
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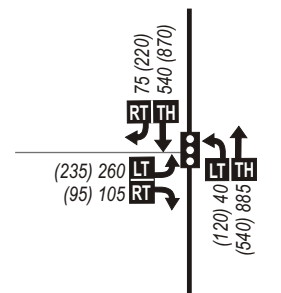
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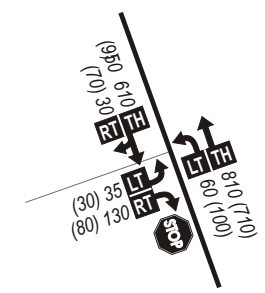
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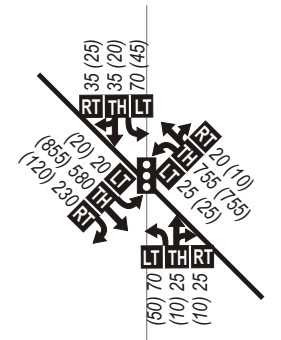
5 Hwy 43 @ Hidden Springs Rd



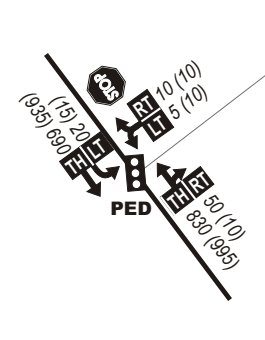
6 Hwy 43 @ Pimlico Dr



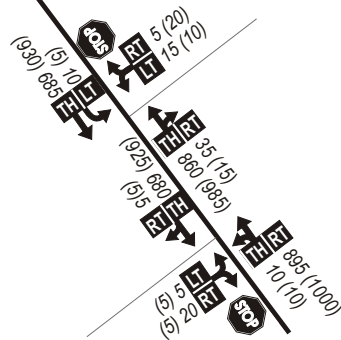
7 Hwy 43 @ West A St



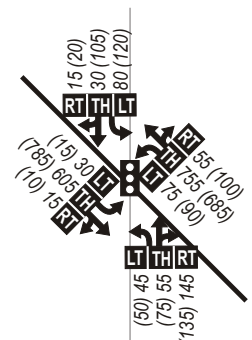
8 Hwy 43 @ Holmes St



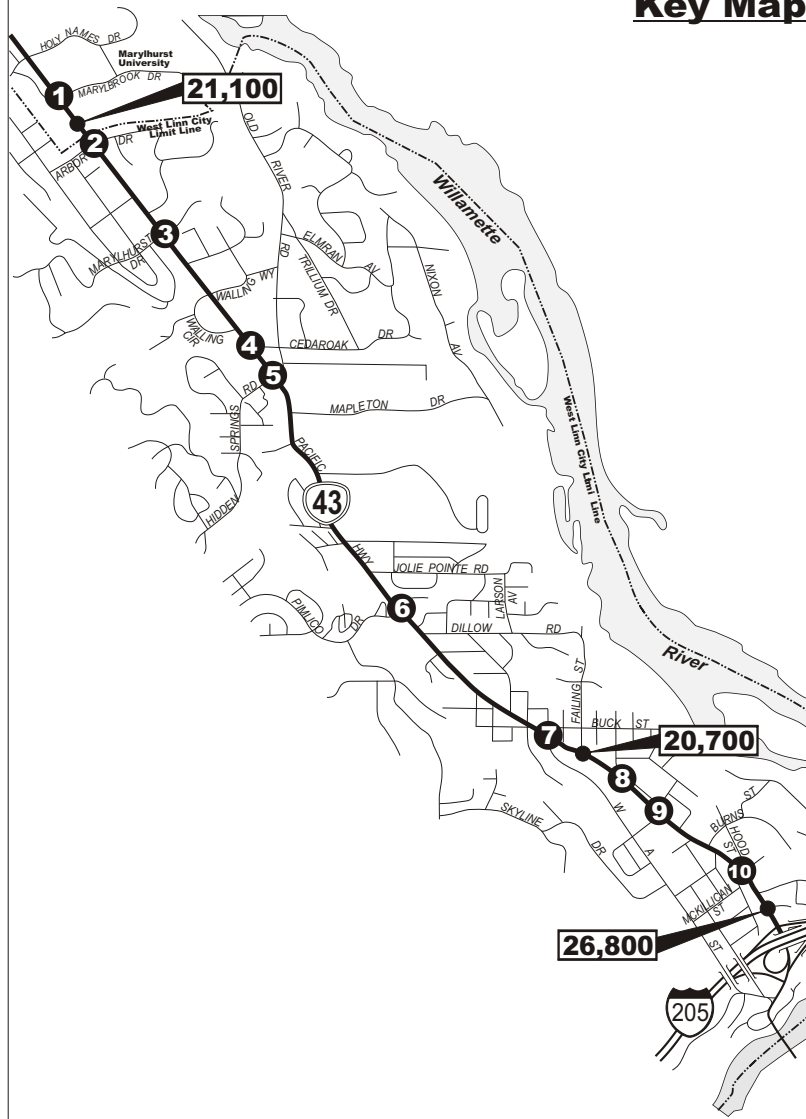
9 Hwy 43 @ Lewis St-Webb St



10 Hwy 43 @ Hood St-McKillican St



ORE 43 Conceptual Design Plan Key Map



LEGEND

- - Study Intersection & Number
- ← - Lane Configuration
- STOP - Stop Sign
- ⬆ - Traffic Signal

PED - Pedestrian Actuated Traffic Signal

AM (PM) - Peak Hour Traffic Volume

LT TH RT - Volume Turn Movement

Left-Thru-Right

000 - 2005 Average Annual Daily Traffic Volume (From ODOT Data)

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NO SCALE

Figure 2

EXISTING CONDITIONS



43

ORE 43 Conceptual Design Plan






FIGURE 3







EXISTING TRANSIT FACILITIES

LEGEND

-  Bus Route w/ Route No. < 30 Min. Headway
-  Bus Route w/ Route No. > 30 Min. Headway

Transit Facilities

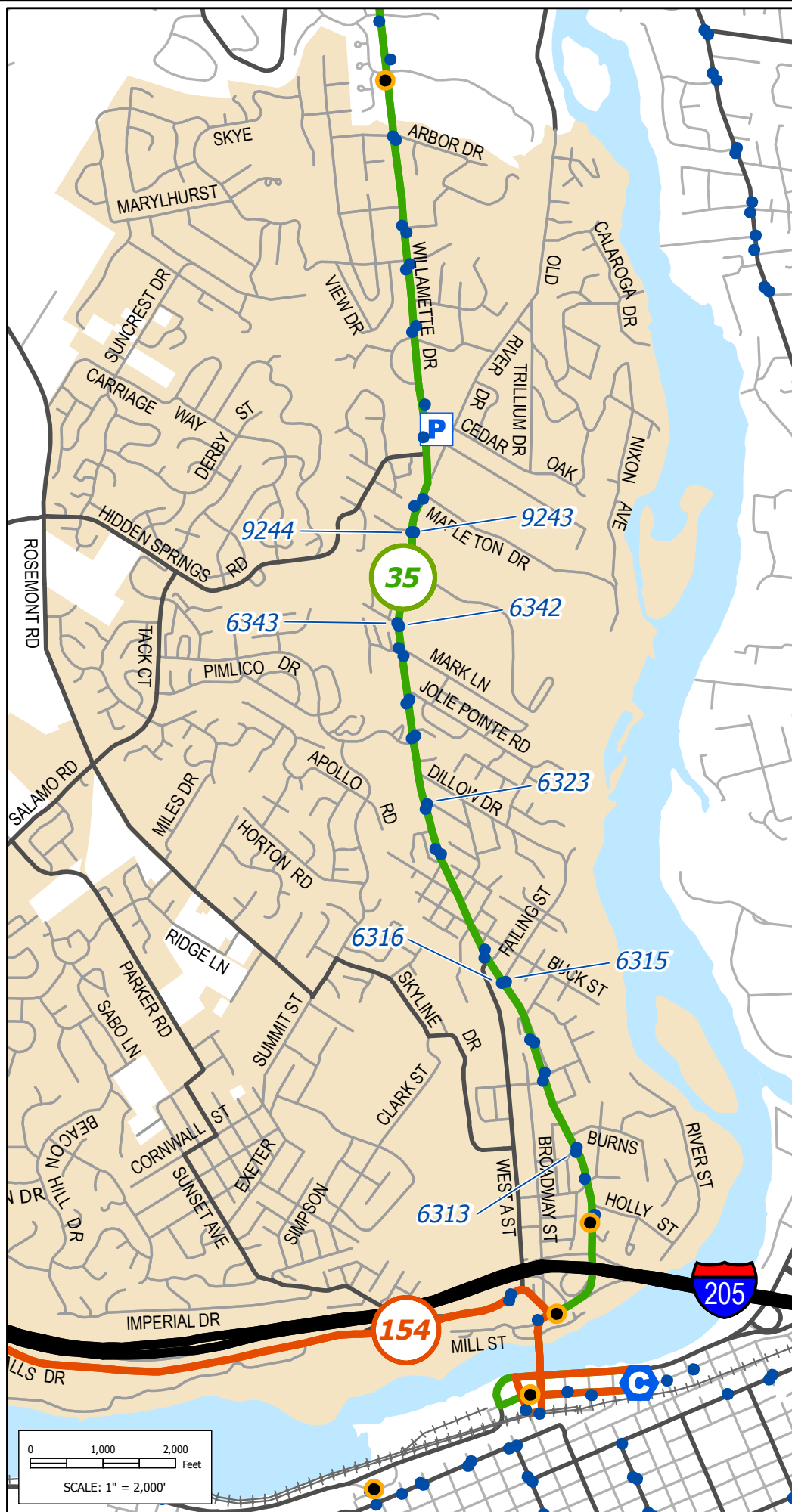
-  Stop
-  Stop ID
-  Shelter
-  Transit Center
-  Park and Ride

-  Freeway
-  Major Roads
-  Streets
-  Railroad
-  Water
-  City Limits

Note: bus routes outside West Linn not shown

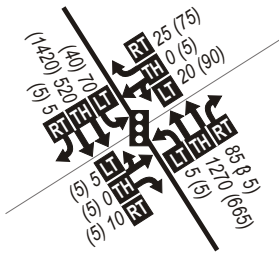


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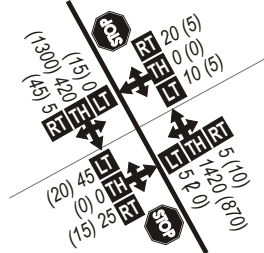


ORE 43 Conceptual Design Plan Key Map

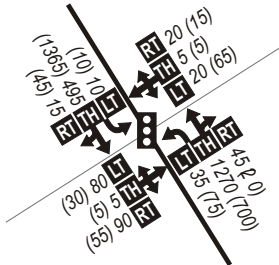
1 Hwy 43 @ Marylbrook Dr



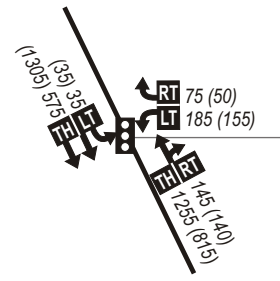
2 Hwy 43 @ Arbor Dr



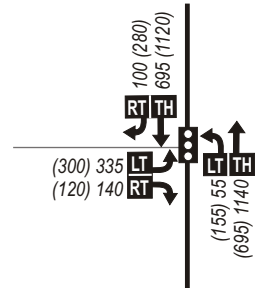
3 Hwy 43 @ Marylhurst Dr-
Lazy River Wy



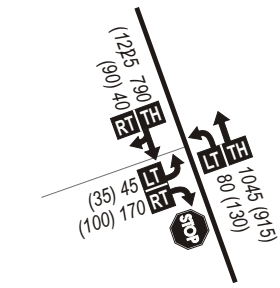
4 Hwy 43 @ Cedaroak Dr



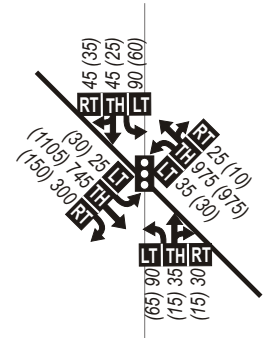
5 Hwy 43 @ Hidden Springs Rd



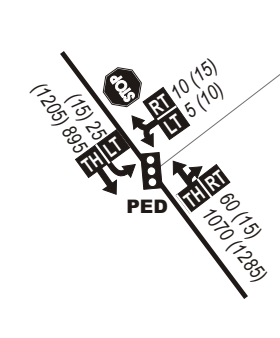
6 Hwy 43 @ Pimlico Dr



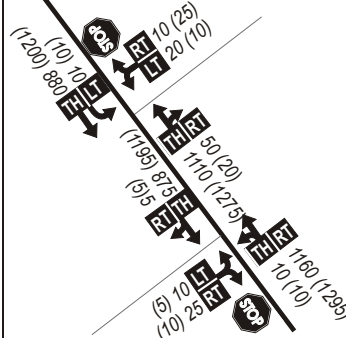
7 Hwy 43 @ West A St



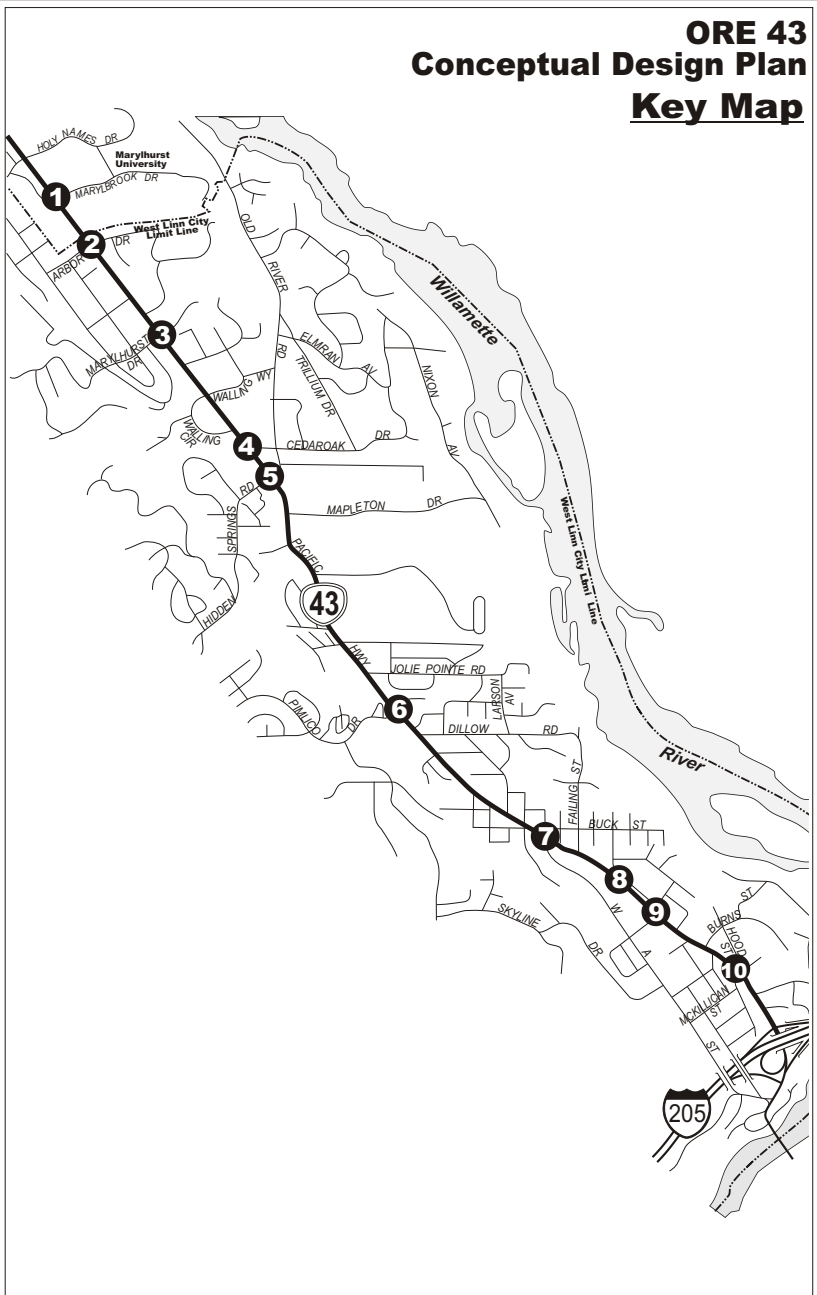
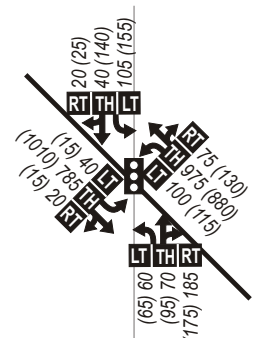
8 Hwy 43 @ Holmes St



9 Hwy 43 @ Lewis St-Webb St



10 Hwy 43 @ Hood St-McKillican St



LEGEND

- Study Intersection & Number
- Lane Configuration
- Stop Sign
- Traffic Signal

- PED - Pedestrian Actuated Traffic Signal
- AM (PM) - Peak Hour Traffic Volume
- Volume Turn Movement
Left•Thru•Right

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Figure 4

**2030 BASE CASE
TRAFFIC VOLUMES**