



## STAFF REPORT

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December 17, 2009

**Mayor**  
Keith Mays

To: Members of the Planning Commission

From: Bob Galati PE, City Engineer

**Councilors**  
Dave Heironimus  
Dave Grant  
Linda Henderson  
Lee Weislogel  
Robyn Folsom  
Del Clark

Re: Cannery Site PUD – Traffic Impact Study Commentary

**City Manager**  
Jim Patterson

### Introduction

This commentary is being submitted to answer several questions residents had raised during the December 8, 2009 Planning Commission meeting reviewing the Cannery PUD. The residents and several commission members had questions concerning the streets and intersections studied in the Cannery Traffic Impact Study (TIS) performed by DKS Associates, dated January 2009. Specifically, did the TIS review the conditions and impacts to the roads and intersections south and southwest of the Cannery PUD site, and what are the recommended mitigation measures specified for those intersections. Also, does the TIS include impacts from the future Langer development and the Adams Avenue construction.



2009 Top Ten Selection

### Traffic Impact Study Area

The TIS focused its study on the following intersections:



2007 18<sup>th</sup> Best Place to Live

Highway 99W & Meinecke Road	Pine Street & Railroad Street
Highway 99W & Sherwood Boulevard	Pine Street & Columbia Street
Highway 99W & Tualatin Sherwood Road	Pine Street & Willamette Street
Sherwood Boulevard & Langer Drive	Washington Street & 3 <sup>rd</sup> Street
Sherwood Boulevard & Century Drive	Main & 3 <sup>rd</sup> Street
Pine Street & 3 <sup>rd</sup> Street	Willamette Street & Lincoln Street
Pine Street & 1 <sup>st</sup> Street	Oregon Street & Lincoln Street
Oregon Street & Murdock Road	Oregon Street & Tonquin Road

A map of the Traffic Impact Study area (Figure 1) is shown as Exhibit A in the appendix.

The following intersections, which are close to the Cannery PUD, were not included in the study:

Highland Drive & Willamette Street	Highland Drive & Pine Street
Orrcutt Place & Willamette Street	Willamette Street & Foundry Street
Tualatin Street & Pine Street	Tualatin Street & Washington Street

In determining which intersections to include as part of the study, the rule of thumb is to identify which routes represent the most logical route a user would take to get from beginning point to destination. In most cases, a circuitous route through a neighborhood would not qualify as a logical

**Exhibit Y**

route if another more direct route is available. The intersections noted above are associated with streets that would not be logical routes for traffic flow to use.

As such Highland Drive is a stop controlled entry onto Willamette Street and Pine Street, as Willamette and Pine Streets are the identified through route for traffic flow. A similar condition holds for the Tualatin Street intersections.

### **Review of the Traffic Impact Study Findings**

The existing and full build-out intersection performance analysis (Table 2 of the TIS) is shown as Exhibits C1 and C2 in the appendix. Exhibit D of the appendix presents definitions and numbers which will help the reader to understand the information presented in Exhibit C. The City's TSP delineates that when traffic impacts reduce an intersection LOS rating to E or F, mitigation requirements come into effect. The intent of this requirement is to maintain a LOS of D or better on City streets and intersections.

In estimating the future traffic flow trip distribution, the TIS assigned percentages to the assumed main routes from the PUD to major traffic corridors (i.e. Oregon Street, Hwy99W, and Sunset Boulevard). These traffic flow trip distribution estimates (Figure 4 of the TIS) are shown on Exhibit B in the appendix. From Exhibit B the following estimates can be identified:

- 45% of the traffic flow will use Sherwood Boulevard.
- 10% of the traffic flow will use Meinecke Road.
- 25% of the traffic flow will use Oregon Street.
- 10% of the traffic flow will use Main Street.
- 5% of the traffic flow will use Willamette Street.
- 5% of the traffic flow will use Pine Street.

The TIS presents the following information for the specific intersections where residents and Planning Commission members had questions and concerns.

**Pine Street & Willamette Street Intersection:** The LOS rating went from a current LOS A to a full buildout rating LOS B. The intersection V/C ratio at full build out is estimated at 0.39. Based on this result no mitigation measures were identified or needed.

**Oregon Street & Lincoln Street:** The LOS rating went from a current LOS A to a full build out LOS A. The intersection V/C ratio at full build out is estimated at 0.16. Based on this result no mitigation measures were identified or needed.

**Willamette Street & Lincoln Street:** The LOS rating went from a current LOS A to a full build out LOS A. The intersection V/C ratio at full build out is estimated at 0.24. Based on this result no mitigation measures were identified or needed.

Exhibits E1 and E2 show intersection data for the three intersections noted above. These drawings are a side by side comparison of "existing" versus "background" and "full build out" peak hour traffic flows. The "background" volume represents the expected traffic volume based on existing conditions (i.e. excluding the Cannery development). As can be seen from the exhibits, the greatest increases in traffic volume are along Pine Street and Oregon Street. What also becomes apparent is that most of the traffic volume growth comes from the background growth in traffic volume.

### **Langer Development and Adams Avenue Impacts**

The Cannery PUD TIS did not include the Langer development as part of its study. The reasoning is that any off-site impacts that are generated due to the Langer development must be identified by and be mitigated for, by the Langer development. The Cannery TIS identifies off-site impacts and mitigation requirements that are strictly associated with the Cannery site development. Currently, the Langer development has not made a submittal for land use review, nor has it performed a TIS of its own project. In addition, City staff has not received any information of what type and density of use is planned for the Langer site, and therefore cannot make any valid assumptions. The current Adams Avenue design is based on the TSP designation for a 3 lane collector status road.

Consideration of any impacts that are strictly associated with the construction of Adams Avenue, without the Langer Development, were part of the Columbia Street functional reclassification analysis performed by DKS, dated July 9, 2009. The analysis results concluded that, "downgrading the Columbia Street to a local road could be an appropriate action", if approved by the City. The addition of an eastbound right-turn lane to the Oregon Street/Lincoln Street intersection was the only additional mitigation requirement.

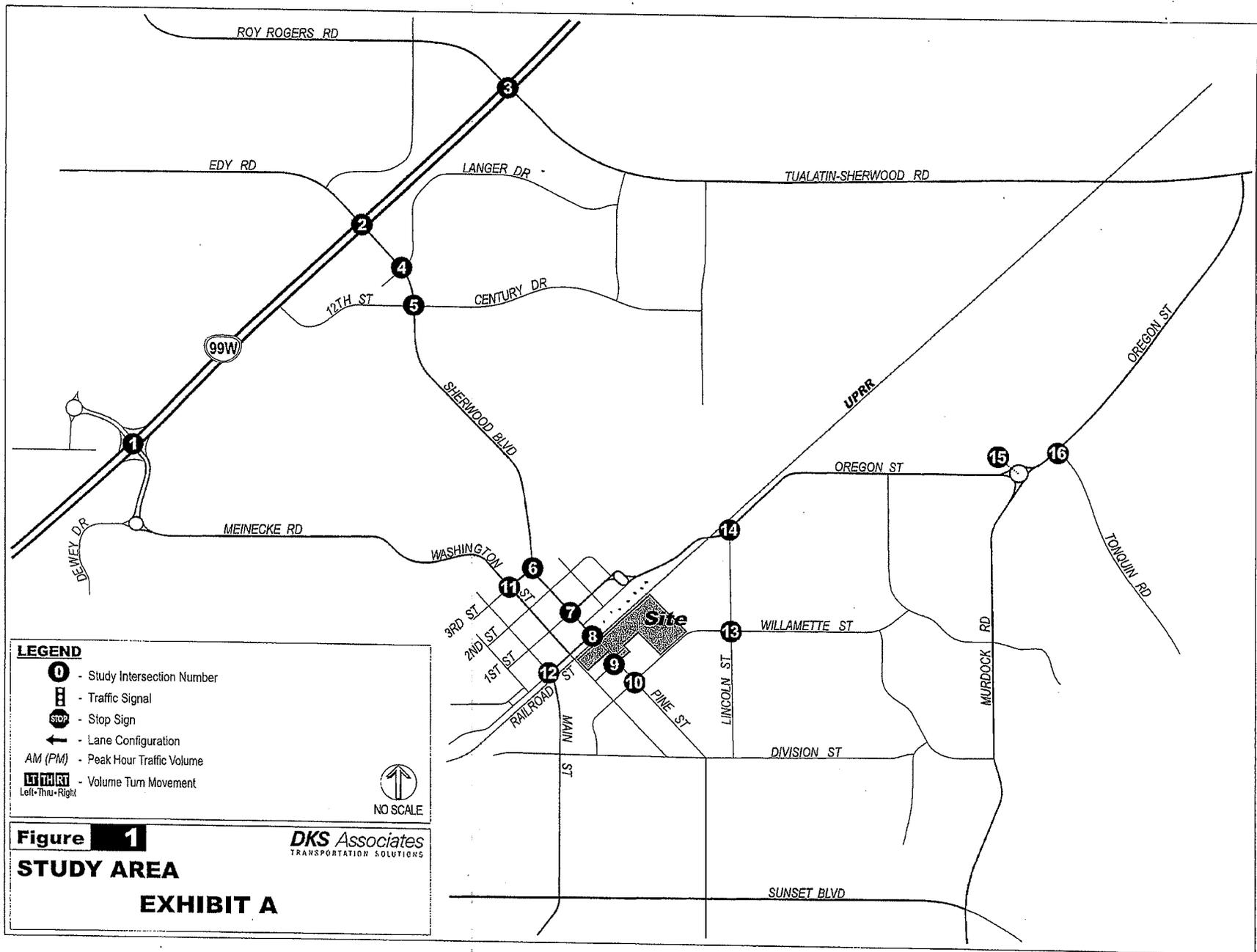
When viewing commuter or pass through traffic that uses Tualatin-Sherwood Road and Roy Rogers Road, and what might be the most logical route through downtown Sherwood, staff proposes that northbound traffic would use the Oregon Street/Tonquin Road route as it is the shortest route through the center of the City. The southbound traffic on Roy Rogers Road would use the Borchers Road/Edy Road/Sherwood Blvd route through downtown Sherwood. The construction of the Adams Avenue collector by itself (exclusive of the Langer development) does not appear to significantly increase or decrease the existing traffic flow patterns or quantities through downtown Sherwood.

#### **Parking Impacts**

The TIS did not include a Parking Study as part of the transportation analysis.

## APPENDIX

EXHIBIT A	STUDY AREA MAP
EXHIBIT B	PROJECT TRIP DISTRIBUTION MAP
EXHIBIT C1	TABLE 2 OF TIS
EXHIBIT C2	TABLE 9 OF TIS
EXHIBIT D	DEFINITIONS
EXHIBIT E1	INTERSECTION TRAFFIC VOLUME DATA DRAWING C-1
EXHIBIT E2	INTERSECTION TRAFFIC VOLUME DATA DRAWING C-2



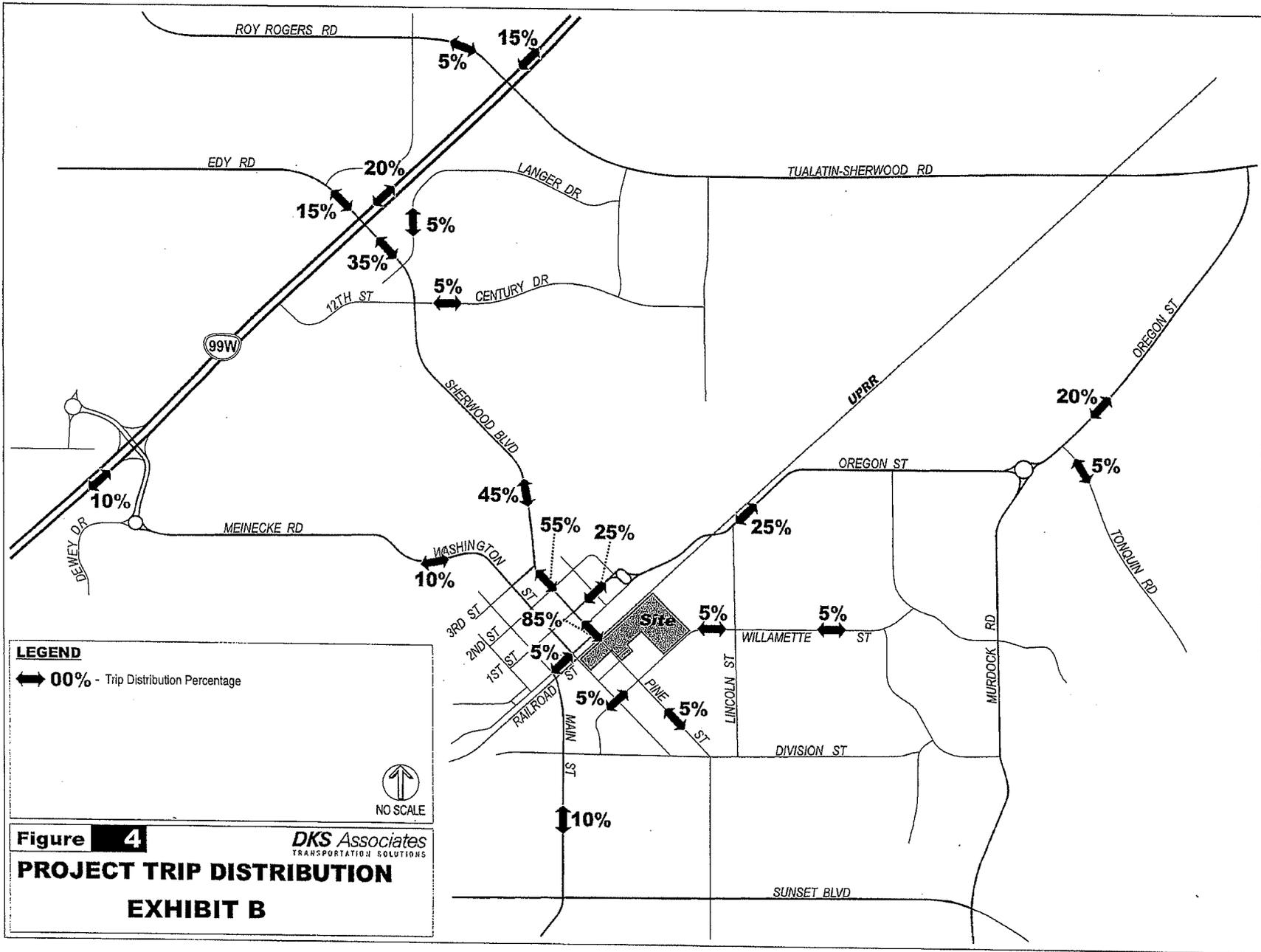
**LEGEND**

- 0** - Study Intersection Number
-  - Traffic Signal
-  - Stop Sign
-  - Lane Configuration
- AM (PM) - Peak Hour Traffic Volume
-  - Volume Turn Movement  
Left-Thru-Right

NO SCALE

**Figure 1**  
**STUDY AREA**  
**EXHIBIT A**

**DKS Associates**  
TRANSPORTATION SOLUTIONS



# EXHIBIT C1

## PROJECT TRAFFIC IMPACT

The additional traffic from the proposed project combined with background growth to 2017 would degrade traffic operations below the City of Sherwood's level of service standards at eight study intersections. Operations at two of these intersections are currently below the standards. All three intersections of Highway 99W and would experience a significant increase in volume-to-capacity (V/C) ratio with the addition of background growth to 2017. However, the trips associated with the proposed project would not worsen the operating conditions at the intersection of Highway 99W/Meinecke Road. All other intersections would meet applicable performance standards during the three study periods. Table 2 lists the existing intersection operating conditions and the 2017 plus project operating conditions. A series of transportation recommendations are outlined to reduce the transportation impacts of the proposed development and future traffic growth.

**Table 2: Existing and 2017 With Project Intersection Performance**

Intersection	Existing (2008)		2017 With Project	
<b>Unsignalized—Two Way Stop Control</b>	Major /Minor LOS, Minor V/C		Major /Minor LOS, Minor V/C	
	<i>AM Peak</i>	<i>PM Peak</i>	<i>AM Peak</i>	<i>PM Peak</i>
Sherwood Boulevard /Century Drive	A/F 1.00	A/D 0.44	B/F 1.00	A/F 1.00
Pine Street/Railroad Street	A/B 0.22	A/B 0.24	A/C 0.34	A/C 0.40
Pine Street/Site Access	--	--	A/B 0.14	A/B 0.21
Pine Street/Columbia Street	A/A 0.00	A/A 0.00	A/A 0.00	A/A 0.00
Main Street/Railroad Street	A/B 0.17	A/B 0.22	A/D 0.37	A/C 0.30
Oregon Street/Lincoln Street	A/B 0.10	A/B 0.04	A/B 0.16	A/B 0.06
Oregon Street/Tonquin Road	B/D 0.56	A/F > 1.00	C/F > 1.00	A/F > 1.00
<b>Unsignalized--All-Way Stop Control*</b>	Delay, LOS, V/C		Delay, LOS, V/C	
	<i>AM Peak</i>	<i>PM Peak</i>	<i>AM Peak</i>	<i>PM Peak</i>
Sherwood Boulevard/3 <sup>rd</sup> Street	15.1 C 0.60	17.1 C 0.72	55.5 F 0.82	52.8 F 0.92
Pine Street/1 <sup>st</sup> Street	13.6 B 0.63	17.7 C 0.67	75.6 F 0.81	96.3 F 0.84
Pine Street/Willamette Street	8.3 A 0.25	8.2 A 0.28	10.3 B 0.39	9.3 A 0.34
Washington Street/3 <sup>rd</sup> Street	13.9 B 0.48	7.8 A 0.26	84.7 F 0.60	8.8 A 0.36
Willamette Street/Lincoln Street	7.6 A 0.19	7.4 B 0.19	7.8 A 0.21	7.7 A 0.24
Oregon Street/Murdock Road (Roundabout)	1.0 A 0.45	0.4 A 0.48	--	--
<b>Signalized*</b>	Delay, LOS, V/C		Delay, LOS, V/C	
	<i>AM Peak</i>	<i>PM Peak</i>	<i>AM Peak</i>	<i>PM Peak</i>
Highway 99W/ Meinecke Rd	35.7 C 0.94	15.6 B 0.68	59.9 E 1.09	19.0 B 0.76
Highway 99W/ Edy Road/ Sherwood Boulevard	52.2 D 0.94	40.3 D 0.84	92.8 F 1.12	53.1 D 1.01
Highway 99W/ Roy Rogers Drive	60.7 E 0.75	68.1 E 1.00	57.6 E 0.86	100.9 F 1.13
Sherwood Boulevard/Langer Drive	18.1 B 0.51	20.3 C 0.48	18.9 B 0.53	21.3 C 0.55

\*Average intersection values reported

Note: Shaded values exceed jurisdiction's performance standard

## EXHIBIT C2

**DKS Associates**

TRANSPORTATION SOLUTIONS

Table 9 lists the performance at study intersections when site traffic is added to background conditions. The analysis indicates the intersection of Pine/1<sup>st</sup> Street will exceed the City of Sherwood LOS standards (AM and PM peak) as a result of the Phase I (2014) development program. The Phase II development program will result in the City of Sherwood LOS standard being exceeded at the intersection of Sherwood Boulevard/3<sup>rd</sup> Street. Four intersections are deficient in 2014 with the Phase I development and six intersections are deficient in 2017 with the project build out.

**Table 9: 2014 and 2017 with Project Traffic Intersection Performance**

Intersection	2014 Traffic With Project (Phase I)		2017 Traffic With Project (Phase II--Build Out)	
	Major /Minor LOS, Minor V/C		Major /Minor LOS, Minor V/C	
<i>Unsignalized--Two Way Stop Control</i>				
	<i>AM Peak</i>	<i>PM Peak</i>	<i>AM Peak</i>	<i>PM Peak</i>
Sherwood Boulevard /Century Drive	A/D >1.00	A/E >1.00	B/F >1.00	A/T >1.00
Pine Street/Railroad Street	A/C 0.31	A/C 0.35	A/C 0.34	A/C 0.40
Pine Street/Site Access	A/B 0.12	A/B 0.14	A/B 0.14	A/B 0.21
Pine Street/Columbia Street	A/A 0.00	A/A 0.00	A/A 0.00	A/A 0.00
Main Street/Railroad Street	A/C 0.29	A/B 0.27	A/D 0.37	A/C 0.30
Oregon Street/Lincoln Street	A/B 0.14	A/B 0.05	A/B 0.16	A/B 0.06
Oregon Street/Tonquin Road	B/F >1.00	A/F >1.00	C/F >1.00	A/T >1.00
<i>Unsignalized--All-Way Stop Control*</i>				
	Delay, LOS, V/C		Delay, LOS, V/C	
	<i>AM Peak</i>	<i>PM Peak</i>	<i>AM Peak</i>	<i>PM Peak</i>
✓ Sherwood Boulevard/3 <sup>rd</sup> Street	33.6 D 0.76	34.7 D 0.86	55.4 F 0.82	52.8 F 0.92
✓ Pine Street/1 <sup>st</sup> Street	37.6 E 0.75	56.9 F 0.76	75.6 F 0.81	96.3 F 0.84
→ Pine Street/Willamette Street	9.5 A 0.36	8.9 A 0.32	10.3 B 0.39	9.3 A 0.34
✓ Washington Street/3 <sup>rd</sup> Street	44.4 E 0.55	8.4 A 0.32	84.7 F 0.60	8.8 A 0.36
Willamette Street/Lincoln Street	7.7 A 0.20	7.6 A 0.22	7.8 A 0.21	7.7 A 0.24
Oregon Street/Murdock Road (Roundabout)	1.8 A 0.58	0.5 A 0.54	2.4 A 0.65	0.6 A 0.56
<i>Signalized*</i>				
	Delay, LOS, V/C		Delay, LOS, V/C	
	<i>AM Peak</i>	<i>PM Peak</i>	<i>AM Peak</i>	<i>PM Peak</i>
Highway 99W/ Meinecke Rd	37.9 D 0.95	17.4 B 0.73	42.1 D 0.99	19.0 B 0.76
Highway 99W/ Edy Road/ Sherwood Boulevard	68.5 E 1.02	47.6 D 0.95	64.1 E 1.01	53.1 D 1.01
Highway 99W/ Roy Rogers Drive	57.7 E 0.83	90.5 F 1.10	57.6 E 0.86	100.9 F 1.13
Sherwood Boulevard/Langer Drive	18.6 B 0.50	20.8 C 0.54	18.5 B 0.58	21.3 C 0.55

\*Average intersection values reported

Note: Shaded values exceed jurisdiction's performance standard

The capacity deficiencies at the six deficient locations were reviewed to identify improvements to meet performance standards. Table 10 identifies the needed improvement and the resultant performance levels with mitigation for these eight intersections.

## EXHIBIT D

### Definitions

**Level of Service (LOS)** – a qualitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort, and convenience; can be calculated for roadway segments, intersections, merges, diverges, weaving areas, and other roadway features. The level of service (LOS) designation is a mathematical area defined within the volume to capacity ratio (V/C) curve. There are six defined areas (LOS A through LOS F) within the V/C curve.

**V/C ratio** – volume-to-capacity ratio is a measure of the amount of traffic on a given roadway in relation to the amount of traffic the roadway was designed to handle. The V/C ratio value varies based on the classification of the roadway and the design speed. A freeway experiences higher V/C ratio values for the individual LOS levels as the speed increases. For urban roadways (arterial, collector, neighborhood and residential classifications), the V/C ratio values for the individual LOS levels tend to be much lower. The V/C ratio is also an indicator of the amount of delay an intersection experiences.

### LOS A

- LOS A represents free flow conditions. Individual users are virtually unaffected by the presence of other users in the traffic stream.
- The user is free to select desired speed and to maneuver within the traffic stream without impedance from other users.
- The general level of comfort and convenience provided to the user is excellent.
- Intersection traffic delay is 10 seconds or less.

### LOS B

- LOS B represents stable flow, however the presence of other users within the traffic stream is beginning to be noticeable.
- The user's ability to select the desired speed remains relatively unaffected, however, there is a slight decrease in the user's ability to maneuver within the traffic stream.
- The level of comfort and convenience provided the user is slightly reduced as the presence of other users within the traffic stream begins to affect individual user behavior.
- Intersection delay is between 10 to 20 seconds.

### LOS C

- LOS C represents stable flow, however, the presence of other users within the traffic stream begins to significantly affect the individual operational behavior of users.
- The user's ability to select speed is decreased, and there is a significant decrease in the ability of the user to maneuver within the traffic stream.
- A substantial amount of awareness and vigilance is required by the user at this level.

- The level of comfort and convenience provided the user declines noticeably at this level.
- Intersection delay is between 20 and 35 seconds.

#### **LOS D**

- LOS D represents high-density, but stable flow.
- The user's ability to select speed and maneuver within the traffic flow are highly restricted.
- The user experiences a poor level of comfort and convenience at this level.
- Small increases in traffic flow will generally cause operational problems at this level.
- Intersection delay is between 35 and 55 seconds.

#### **LOS E**

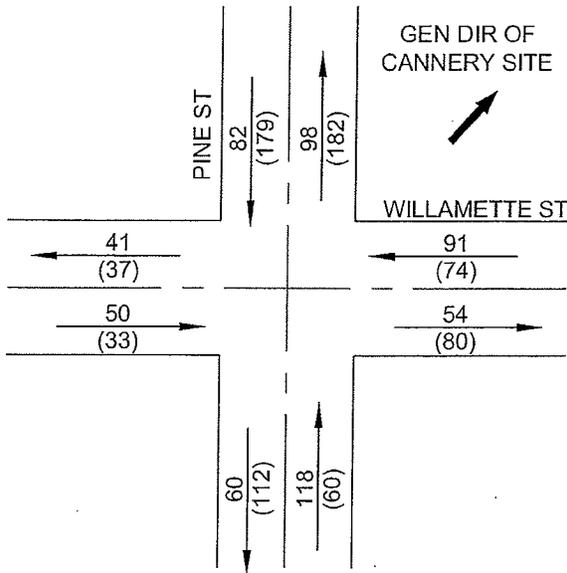
- LOS E represents operational conditions at or near the traffic flow capacity level.
- All speeds are reduced to a low, but relatively uniform value.
- Freedom to maneuver within the traffic stream is extremely difficult, and is generally accomplished by users forcing their way into the adjacent traffic stream.
- The user experiences an extremely poor level of comfort and convenience, and generally has a high level of frustration.
- Operational conditions at this level are usually unstable. Small increases in traffic flow or minor incidents within the traffic stream will cause operational breakdown.
- Intersection delay is between 55 and 80 seconds.

#### **LOS F**

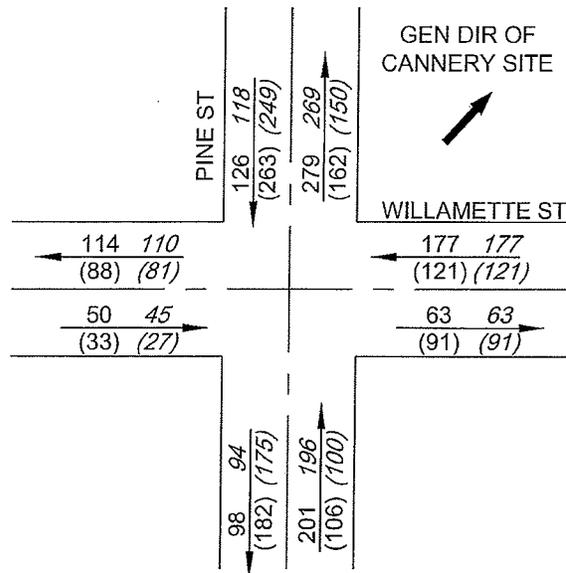
- LOS F represents forced or operational breakdown flow. Traffic flow exceeds the traffic flow capacity of the roadway.
- At such points where this level occurs, traffic queuing results. Operations at these points are characterized by stop and go traffic flow.
- Traffic flow within this level is extremely unstable.
- It is at this point that the user experiences the worst level of comfort and convenience.
- Intersection delay is greater than 80 seconds.

NUMBERS SHOWN IN PARENTHESIS ARE PM VOLUMES  
 ITALICIZED NUMBERS ARE BACKGROUND VOLUMES

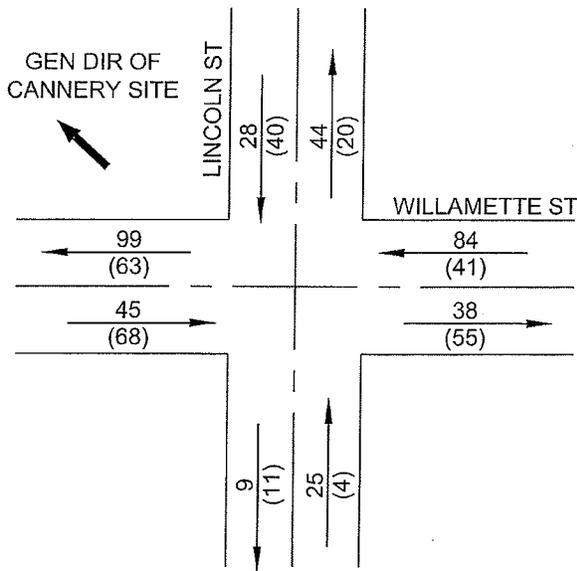
EXHIBIT E1



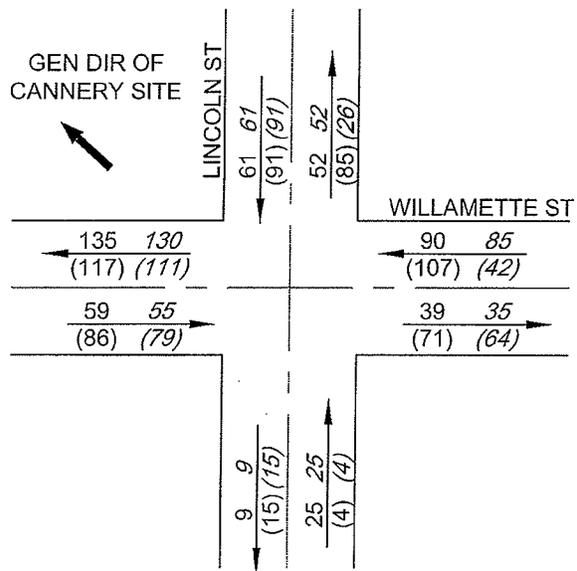
WILLAMETTE ST/PINE ST INTERSECTION  
 EXISTING CONDITION TRAFFIC VOLUME



WILLAMETTE ST/PINE ST INTERSECTION  
 BACKGROUND & FULL BUILD-OUT  
 TRAFFIC VOLUMES



WILLAMETTE ST/LINCOLN ST INTERSECTION  
 EXISTING CONDITION TRAFFIC VOLUME



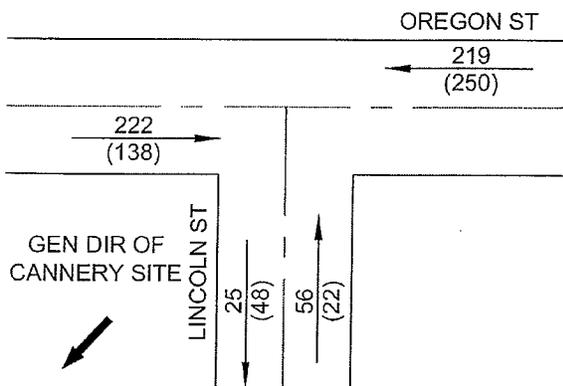
WILLAMETTE ST/LINCOLN ST INTERSECTION  
 BACKGROUND & FULL BUILD-OUT  
 TRAFFIC VOLUMES



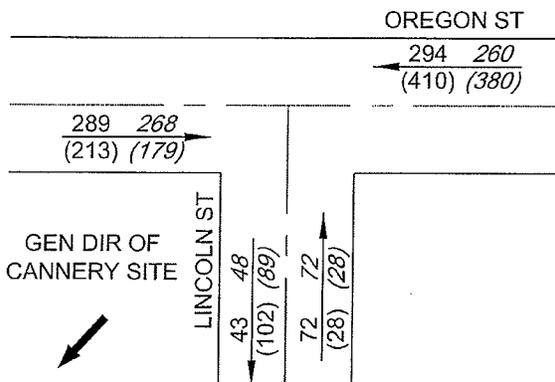
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Any alteration of this drawing may not be associated in any way with the City of Sherwood Standard Drawings.	SCALE	DATE
	N.T.S.	DEC 2009

## EXHIBIT E2

NUMBERS SHOWN IN PARENTHESIS ARE PM VOLUMES  
 ITALICIZED NUMBERS ARE BACKGROUND VOLUMES



OREGON ST/LINCOLN ST INTERSECTION  
 EXISTING CONDITION TRAFFIC VOLUMES



OREGON ST/LINCOLN ST INTERSECTION  
 BACKGROUND & FULL BUILD-OUT  
 TRAFFIC VOLUMES

 City of Sherwood Oregon	STANDARD DRAWING TITLE		DRAWING NUMBER
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	Any alteration of this drawing may not be associated in any way with the City of Sherwood Standard Drawings.	SCALE	DATE
	N.T.S.	DEC 2009	