Park Place Concept Plan

Appendix

Park Place Concept Plan

May 30, 2007

City of Oregon City

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A. Park Place Timeline

Park Place
CONCEPT PLAN

Concept Planning Timeline: 1980s - 2007

early 1980s
Livesay portion of Park Place area added to Metro UGB

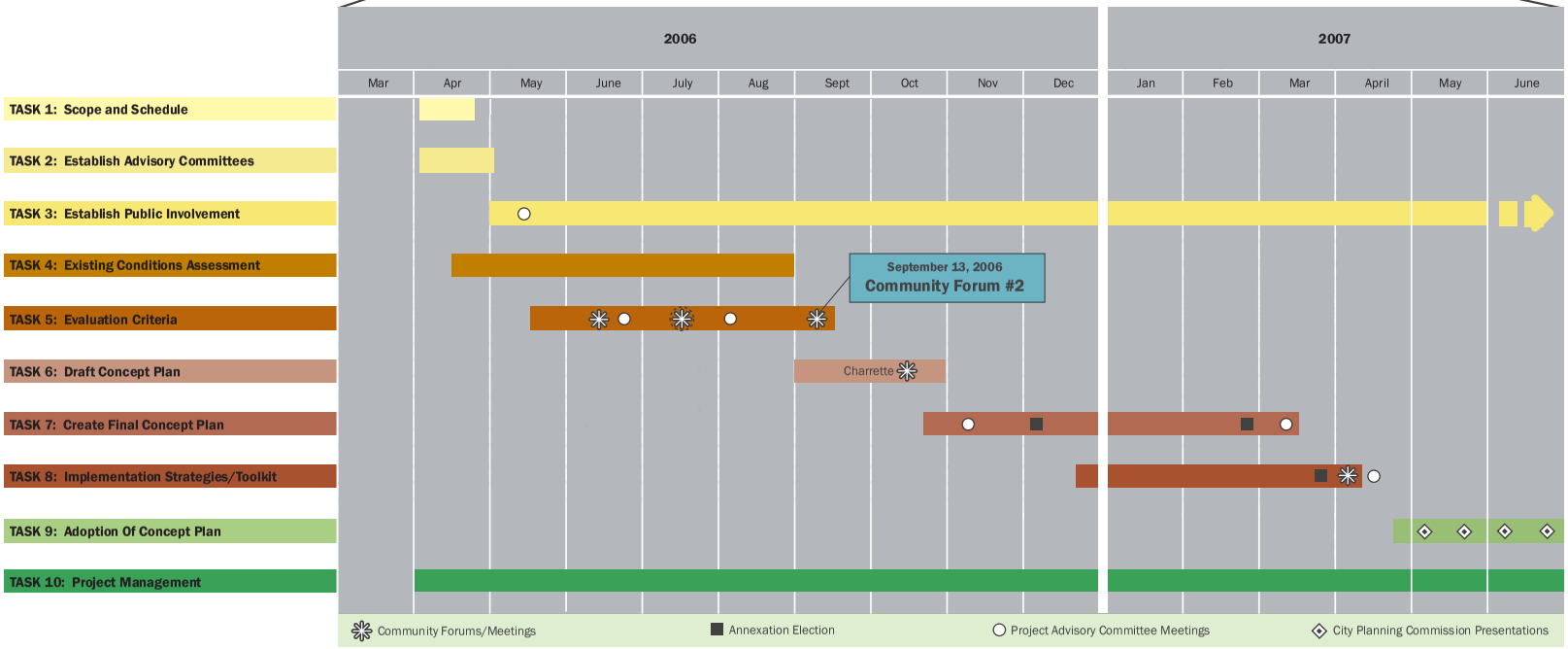
2002
Additional Park Place area added to Metro UGB

2006
Oregon City initiates process to prepare Concept Plan

2006 - 2007
City, consultant team and citizens engage in concept planning process

2007
Property owners initiate annexation requests; adopt new Plan and zoning designations

beyond 2007
Area develops over 10 to 20 years

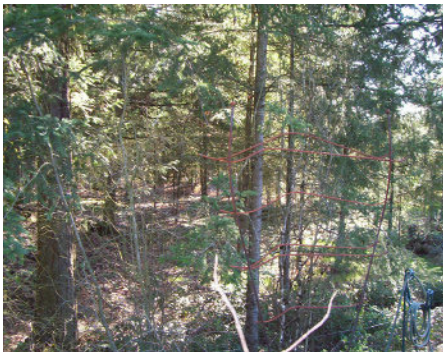


A. Park Place Timeline

B. Existing Conditions Report

B. Existing Conditions Report

Land Use



The Park Place study area is located east of Highway 213 and south of Redland and Holcomb Roads. The land area of the study area is approximately 470 acres of which 180 acres are located immediately adjacent to Oregon City limits in the vicinity of Livesay Road. These 180 acres were brought into the urban growth boundary (UGB) in the 1980s, but have not been annexed as part of the City of Oregon City. The remaining approximately 300 acres were brought into the UGB in 2002 and consist of portions of Alternative areas 24, 25 and 26, which were study areas determined by Metro during its regional growth assessment in 2000.

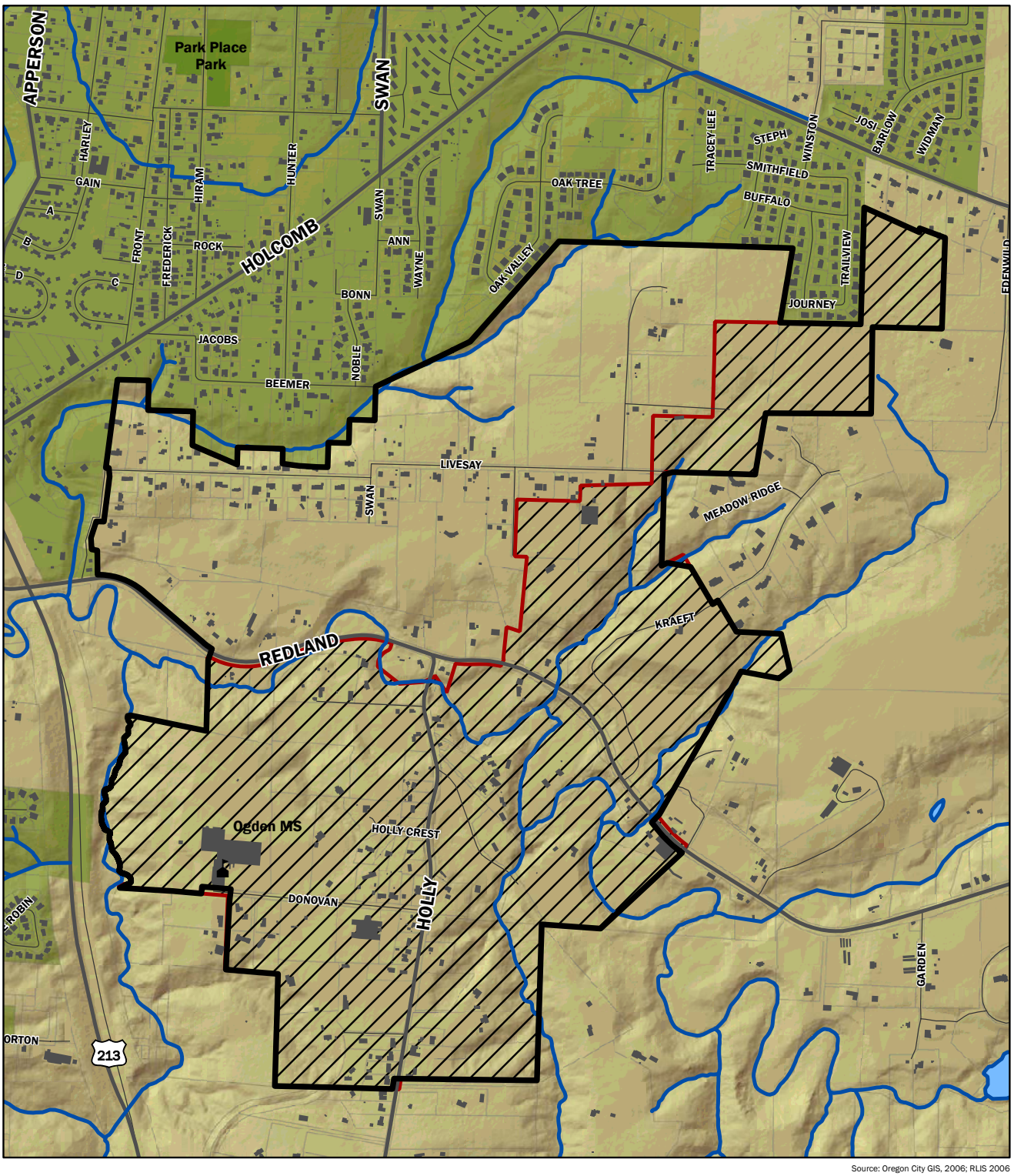
The study area is comprised of 138 individual property owners. To date, the largest amount of acreage under one ownership is approximately 48 acres. Thirty-eight acres are in public ownership, the majority of which comprise the Ogden Middle School (Oregon City School District). More importantly, nearly half of the parcels in the study area are one acre or less. This fact illustrates that any large-scale development will likely take many years to be fully realized unless a significant number of people are compelled to sell property to a single entity. New development patterns will likely be fragmented and uncoordinated, stressing the importance of a cohesive vision and growth strategies for the area.

The primary land uses in the study area are rural farms, low density residential housing and civic uses, like schools and churches. There are no commercial, office or industrial land uses within the study area; the closest commercial nodes are located on Holcomb Road near Front Street (Steve's Market) and at the intersection of Redland and Holcomb Roads. A regional power center is being developed a half-mile from the westernmost edge of the study area, which will influence the type and subsequent success of future land uses and traffic patterns in the study area.

The majority of the housing in the study area is located along Livesay Road and Holly Road near Donovan Street, which is the primary connection to Ogden Middle School. These areas are generally characterized by low to moderately angled slopes and minimal wildlife habitat. Houses in the study area were constructed as early as 1900 and as recently as 2005; the majority of the housing was constructed between 1960 and 1980. Architectural styles in the study area primarily consist of modest sized cottages, farm houses, and ranch style houses. The study area is surrounded by pockets of higher density, high-end single-family residential subdivisions including Barlow Crest, Trailview Estates, Meadowridge Estates, and Holcomb Ridge.

Conclusion

Creating a truly mixed use neighborhood in the Park Place study area will be challenging due to the study area's natural topographic constraints, lack of connectivity, adjacent land uses and regional objectives, and existing land use patterns. The study area's existing low density, coupled with the relatively large number of individual property owners and the limited amount of property under single ownership, will further inhibit a mix of uses at higher density.



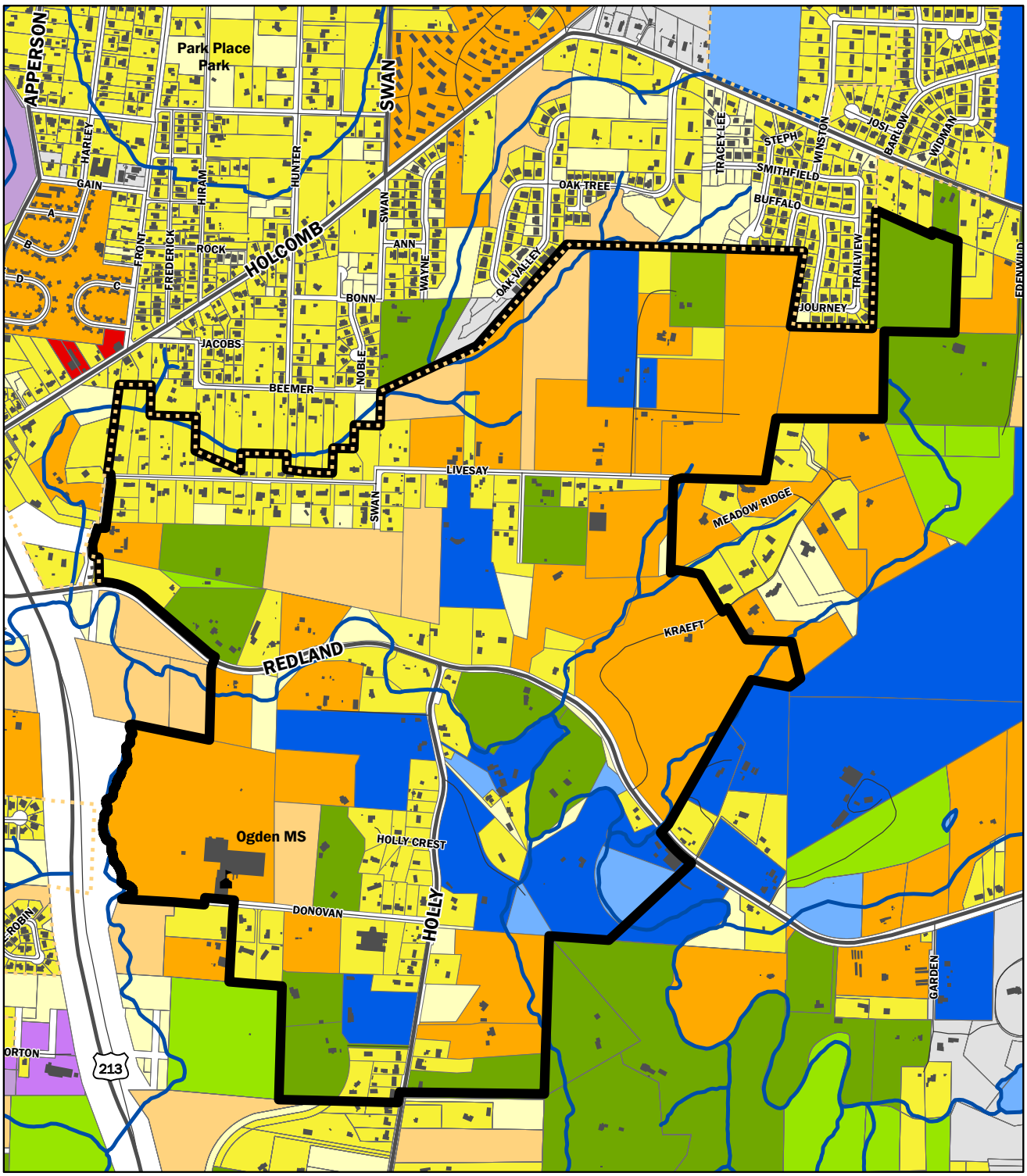
Source: Oregon City GIS, 2006; RLIS 2006

project boundary
Oregon City limits
Major roadways
Minor roadways
buildings
taxlots
streams
waterbodies
UGB Expansion Area

Park Place Concept Plan

Project Area

0 500 1,000
Feet



Source: Oregon City GIS, 2006; RLIS 2006

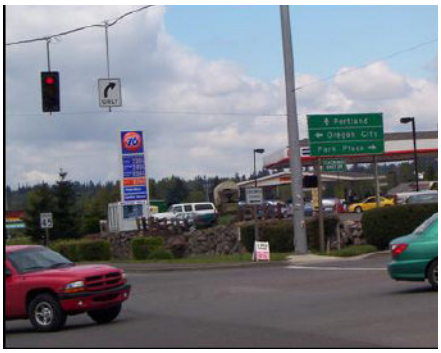
no data	Commercial land - improved	Tract land - vacant	EFU farmland vacant
Residential land - vacant	Misc. Operating assessed	Tract land - improved	Designated forestland and.or SWO - vacant
Residential land - improved	Industrial land - vacant	Non-EFU farmland - vacant	Designated forestland and/or SWO - improved
Commercial land - vacant	Industrial land - improved	Non-EFU farmland - improved	Manufactured structure park

Park Place Concept Plan

Land Use: Existing land use

0 500 1,000
Feet

Transportation Existing Conditions



Project Description

The City of Oregon City is seeking to develop a concept plan for an area encompassing nearly 500 acres located east of Highway 213 and south of Holcomb Road, which will be adopted into the City's Comprehensive Plan. The Park Place Concept Plan will integrate a multi-modal transportation system with a mixed-use development pattern to achieve a highly efficient and sustainable design. The Concept Plan will identify a network of internal and external pedestrian, bicycle, transit, and street connections that serve the study area and connect it to the surrounding community and the broader region.

The Concept Plan will ensure that the land brought in is planned in an efficient and sustainable manner that will maximize the use of the available lands while protecting the natural resources in the study area. This project will identify compatible land uses, which may include industrial, commercial, and residential uses, thereby reducing the need for vehicle trips, maximizing the efficiency of public transportation, offering multi-modal transportation options, and reducing the need to expand the Urban Growth Boundary (UGB).

Contents of the Memorandum

This memorandum focuses on the following transportation issues related to the Park Place Concept Plan:

- Study Area
- Existing Roadway Facilities
- Existing Transit Facilities
- Existing Pedestrian Facilities
- Existing Bicycle Facilities
- Existing Traffic Conditions
- Planned Improvements

Study Area

The overall study area and study intersections were selected based on direction provided by Oregon City staff. As illustrated in Figure 1, the study area encompasses the vicinity around Highway 213 bounded by the I-205/Highway 213 interchange to the north and Beavercreek Road to the south. Kittelson & Associates visited and observed the study area in August 2006.

Existing Roadway Facilities

As illustrated in Figure 1, Highway 213, Redland Road, Holcomb Road, and Holly Lane are the major roadway corridors within the study area.

Highway 213

Highway 213 is a major connection to the regional transportation system for residents of Oregon City. Traffic on Highway 213 is highly directional in nature, as it is heavily used by commuters in the a.m. and p.m. peak hours each weekday, with congestion occurring during both peak periods. Highway 213 is a four-/five-lane expressway from the I-205 interchange to the Molalla Avenue intersection. Traffic flow

in this segment is only interrupted by signalized intersections at Washington Street, Redland Road, and Beavercreek Road. As defined in the Oregon City Transportation Plan (TSP), an expressway primarily serves motorized vehicle traffic and is expected to provide a high level of mobility and access control for those vehicles. The expressway has shoulder bike lanes, but offers no sidewalks.

Redland Road

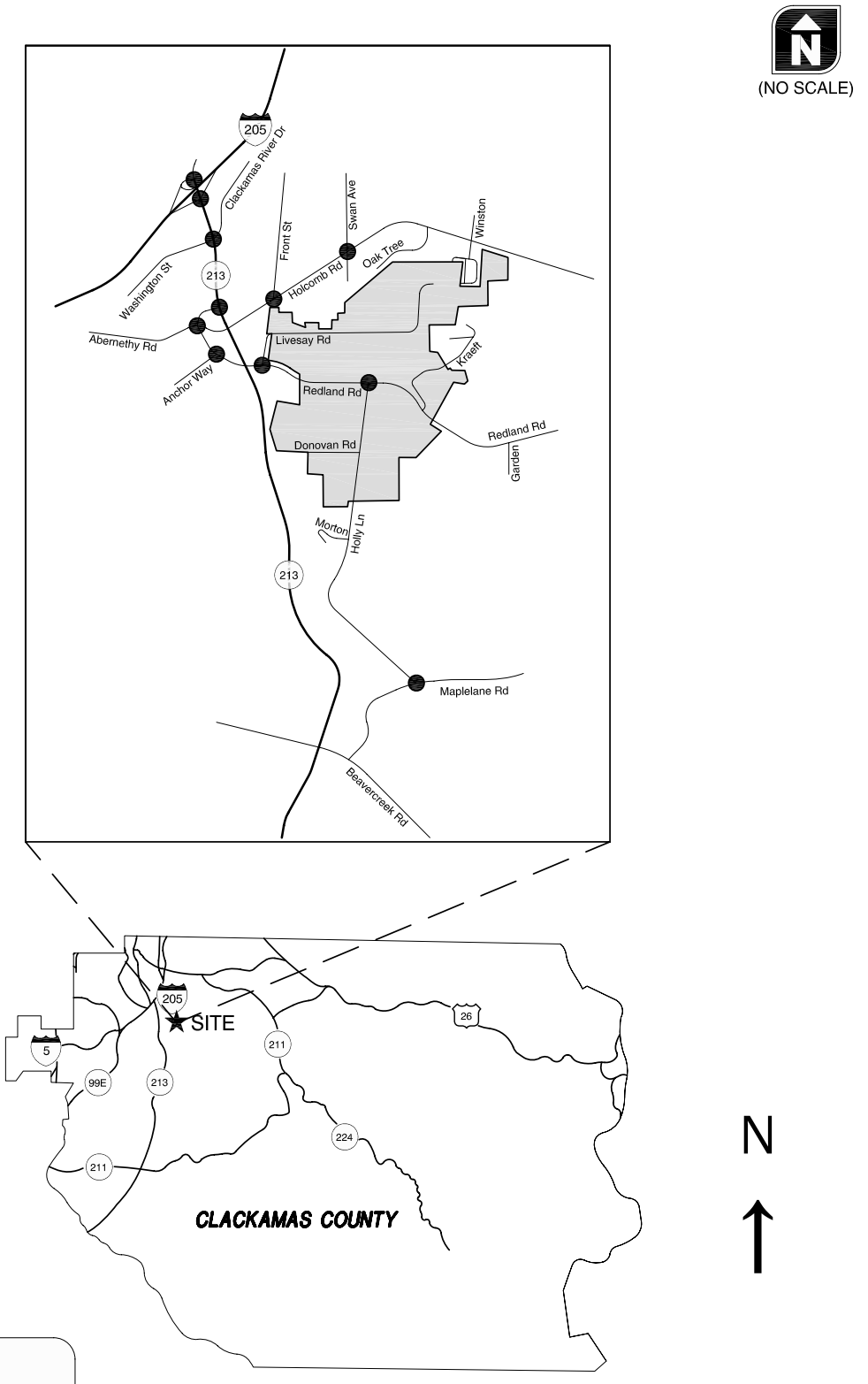
Redland Road is a minor arterial providing Oregon City residents with access to and from the area east of Highway 213. Redland Road is a two-lane minor arterial facility that serves as a link between Highway 213 and several residential areas to the east. Vehicles traveling through on Redland Road do not have to stop or yield at any intersections in the study area beyond the signalized intersections at Highway 213 and Holcomb Boulevard-Abernethy Road. As defined in the Oregon City TSP, a minor arterial is expected to carry local traffic between neighborhoods and community and regional facilities within a city. Minor arterials have limited parking and possible public transit; however, they require sidewalk and bicycle facilities. The current cross section is rural in design, with open ditches, shoulder bike lanes and no curb, gutter or sidewalks on either side.

Holcomb Boulevard

Holcomb Boulevard is a minor arterial providing Oregon City residents with access to and from the area east of Highway 213. Holcomb Boulevard is a two-lane minor arterial facility that transitions into Abernethy Road at the Redland Road intersection. Vehicles traveling through on Holcomb Road do not have to stop or yield at any intersections in the study area beyond the signalized intersection at Redland Road. As defined in the Oregon City TSP, a minor arterial is expected to carry local traffic between neighborhoods and community and regional facilities within a city. Minor arterials have limited parking and possible public transit; however, they require sidewalk and bicycle facilities. The rural cross section of today, with narrow shoulders

Table 1: Existing Transportation Facilities and Roadway Designations

Roadway	Classification	Cross Section	Speed Limit (mph)	Sidewalks	Bicycle Lanes	On-Street Parking
I-205	Freeway	6-lane	55	No	No	No
Highway 213	Expressway	4/5-lane	55	No	Yes	No
Washington Street	Minor Arterial	2/3-lane	35/45	Partial	Yes	No
Redland Road	Minor Arterial	2-lane	45	No	Yes	No
Holcomb Boulevard	Minor Arterial	2-lane	35	Partial	No	Partial
Maplelane Road	Minor Arterial	2-lane	45	No	No	No
Anchor Way	Minor Arterial	2-lane	25	Partial	No	No
Front Street	Collector	2-lane	25	Partial	No	Partial
Swan Avenue	Collector	2-lane	25	Partial	No	Partial
Holly Lane	Local Street	2-lane	40/45	No	No	No
Livesay Road	Local Street	2-lane	25	No	No	No



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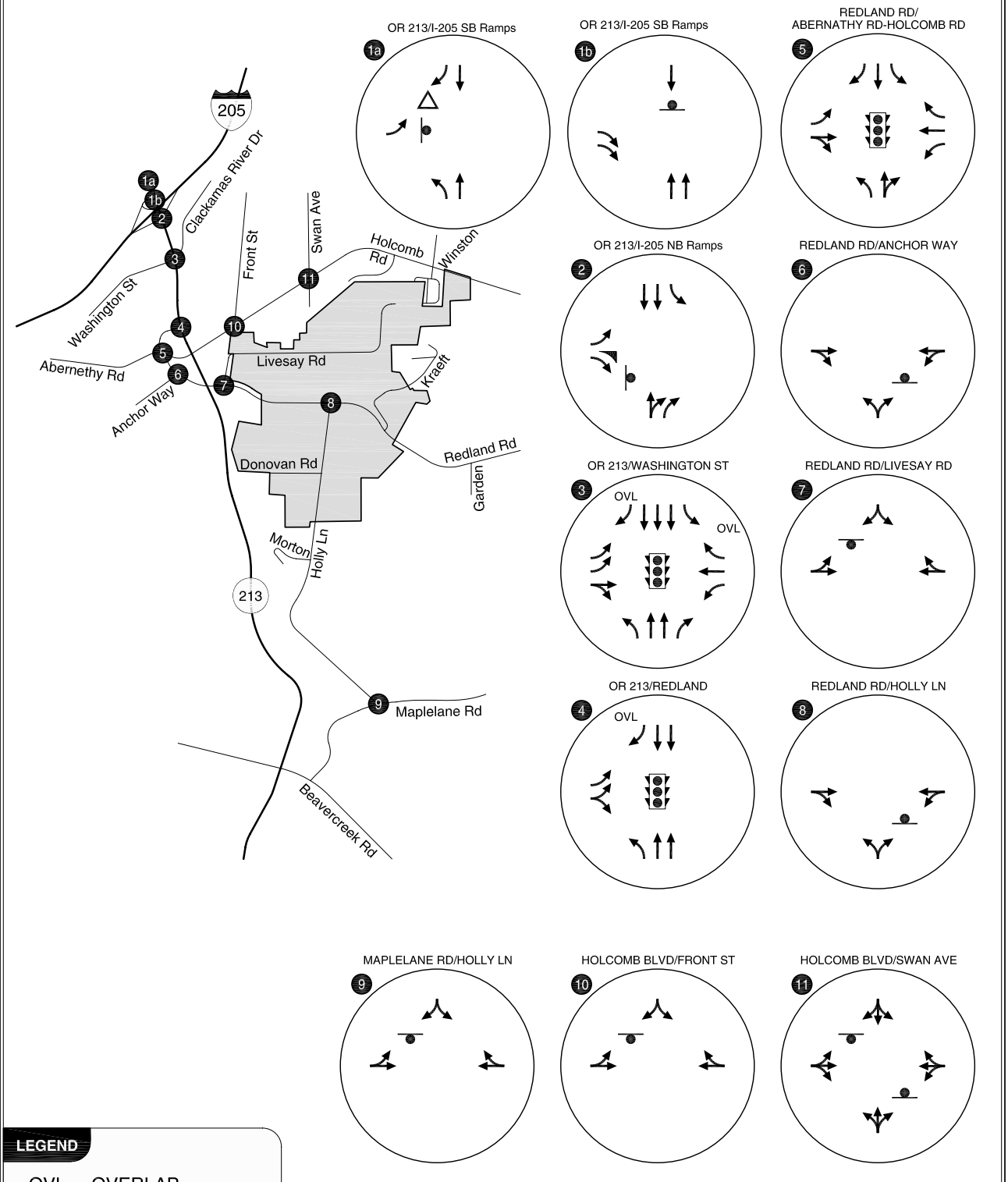

LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES
OREGON CITY, OREGON

FIGURE **2**

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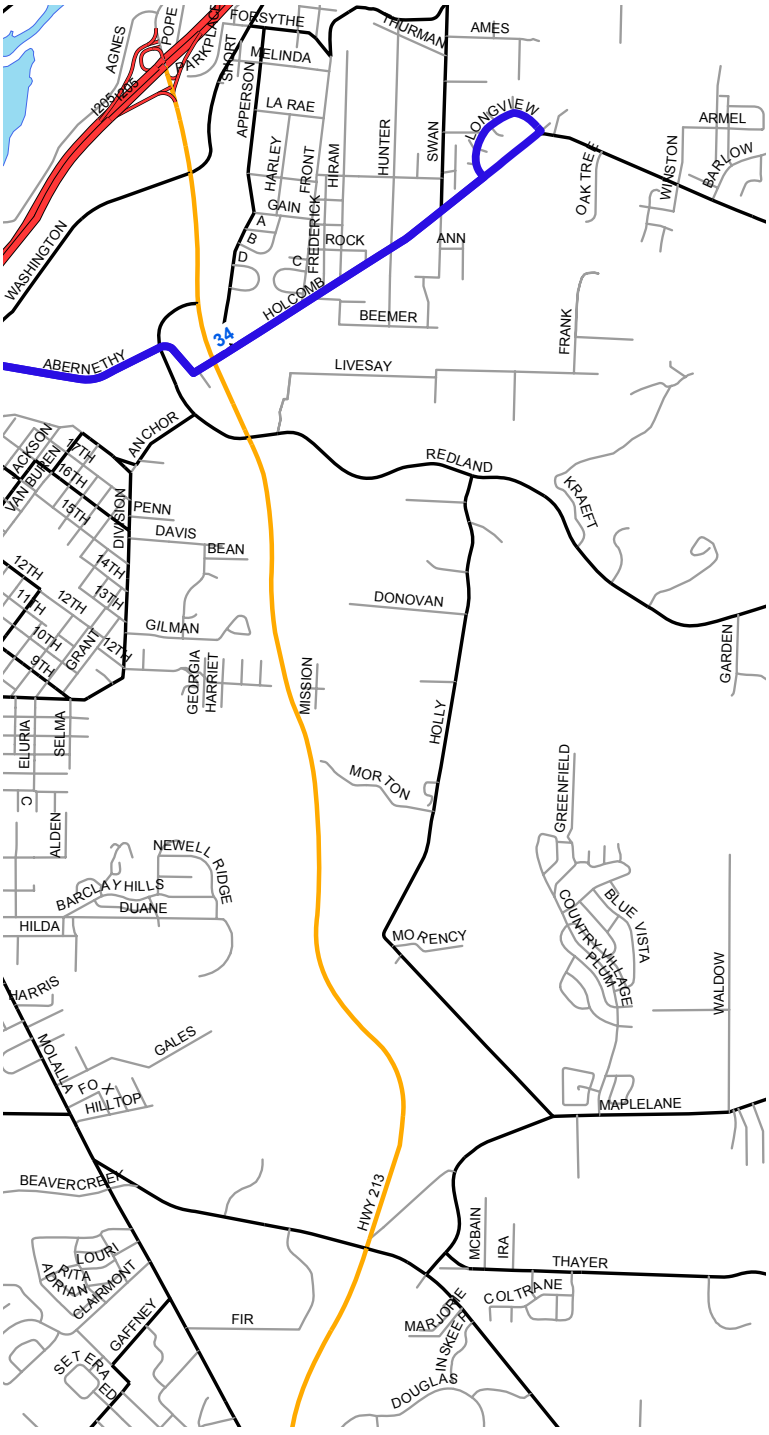
Park Place Concept Plan *August 2006*



LEGEND

Bus Line

34

EXISTING TRI-MET BUS ROUTES
OREGON CITY, OREGON

FIGURE 3

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and no curbing, gutters or sidewalks, is transitioning to a typical urban cross section (curb, gutter, sidewalks and bike lanes) as infill and redevelopment occur.

Holly Lane

Holly Lane is a local street that runs between Redland Road and Maplelane Road providing service to several residential properties and Ogden Middle School via South Donovan Road. Holly Lane is a free flowing two-lane facility except at its two terminating locations where it has stop control. Holly Lane has several horizontal and vertical curves, steep grades and narrow shoulders. As defined in the Oregon City TSP, a local street is expected to provide direct access to adjacent properties and land uses within neighborhoods; as a result, they have the lowest mobility function and the highest accessibility function. Sidewalks and landscaping are required along local streets; however, bicycle lanes are optional. Holly Lane is built to a rural county standards, with open ditches, narrow to nonexistent shoulders and no curb, gutter, sidewalks or bike lanes.

As illustrated in Figure 1, there are several other roadways within the study area that will be included in this projects analysis. Table 1 provides a summary of the roadway facilities included in this analysis.

Intersection Configurations

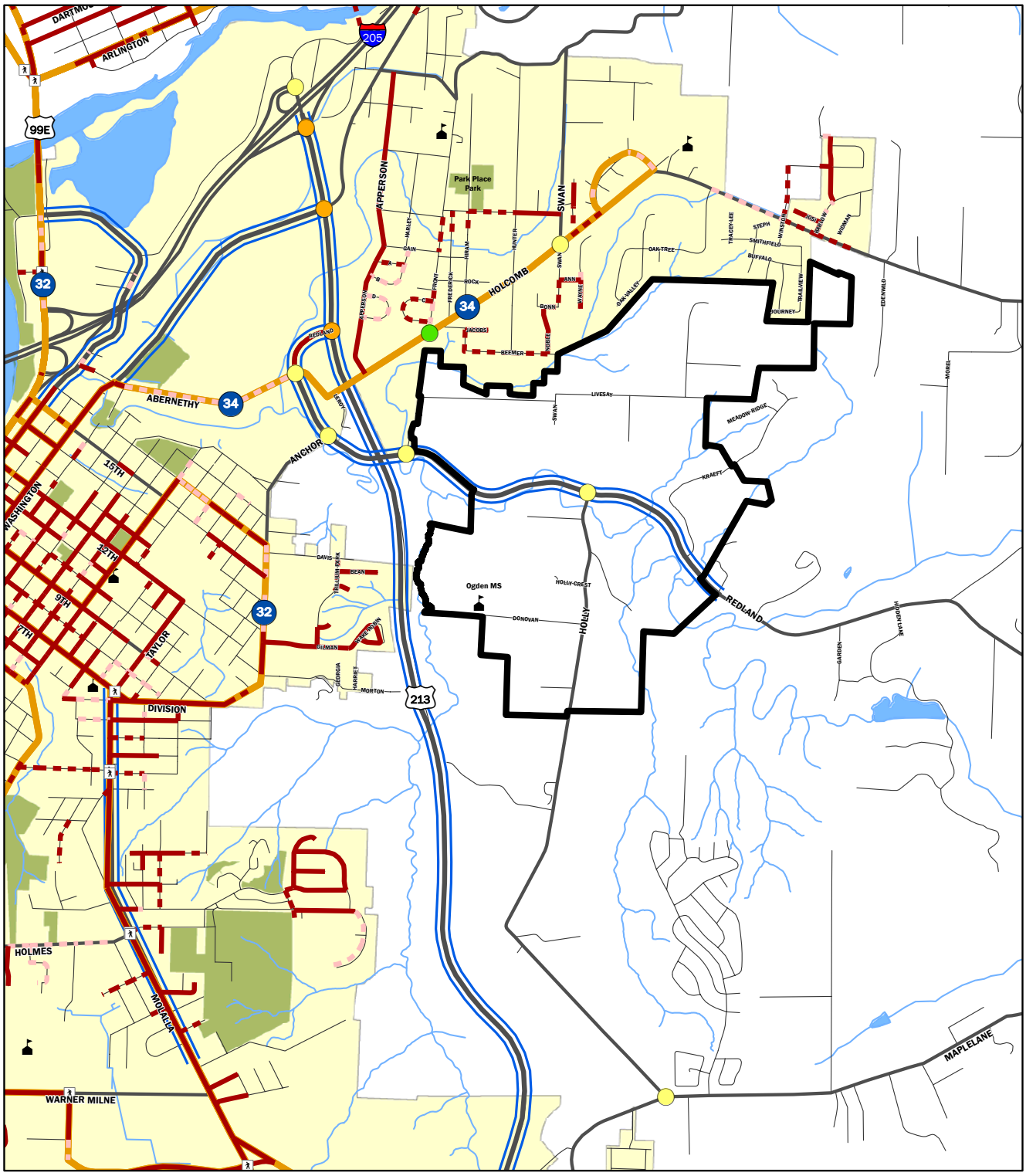
Lane configurations and traffic control devices were inventoried during the August 2006 field visit at the following 11 study intersections and are summarized in Figure 2:

- Highway 213/I-205 Southbound Ramps
- Highway 213/I-205 Northbound Ramps
- Highway 213/Washington Street
- Highway 213/Redland Road
- Redland Road/Abernethy Road-Holcomb Boulevard
- Redland Road/Anchor Way
- Redland Road/Livesay Road
- Redland Road/Holly Lane
- Maplelane Road/Holly Lane
- Holcomb Boulevard/Front Street
- Holcomb Boulevard/Swan Avenue

The Highway 213/I-205 Southbound interchange terminal comprises two intersections because the northbound left-turn movement must yield to the uncontrolled southbound through movement in the northern portion of the intersection (intersection 1a) while the southbound through movement is stop-controlled just south of there (intersection 1b) to give way to an uncontrolled eastbound right-turn movement. Therefore, intersection 1a is the northernmost intersection where traffic exiting the freeway is turning left and traffic from Highway 213 is turning onto the freeway on-ramp. Intersection 1b is where traffic exiting the freeway is turning right onto southbound Highway 213 and southbound through traffic on Highway 213 is stop-controlled.

Transit Facilities

Figure 3 summarizes the existing transit service in the study area. The figure is generated from Metro's RLIS database, Reference 1. As illustrated in Figure 3, transit service in the study area is very limited, with only the following Tri-Met bus route



Source: Oregon City GIS, 2006; RLIS 2006

Existing bicycle lane
Bus Route

Sidewalk on left side only
Sidewalk on right side only
Sidewalk on both sides

Intersection Operation
good
fair
poor

Oregon City limits
project boundary

Park Place Concept Plan

Transportation: Existing Facilities: Bike, Pedestrian and Transit

0 0.2 0.4 0.6
Miles

discussed below providing service within the general site vicinity. The bus route and schedule information was collected from Tri-Met's website, Reference 2.

Route 34: River Road, which provides service between Clackamas Heights and the Milwaukie Transit Center, travels along Holcomb Boulevard, Longview, and Abernethy Road in the study area with scheduled stops at the Oregon City Transit Center and Clackamas Heights (Holcomb Boulevard/Longview Way intersection). Service is provided from 5:45 a.m. to 6:30 p.m. at approximately one-hour headways, except during the peak periods, at the Oregon City Transit Center. However, service is provided to Clackamas Heights twice during each weekday peak period and once in the mid-day. Service is not provided on the weekend.

Existing Pedestrian Facilities

Existing pedestrian facilities are illustrated in Figure 4. The pedestrian facility figure was created from Metro's pedestrian inventory map on their FTP website, Reference 3. Notable generators of pedestrian activity in the immediate study area include Ogden Middle School, the Steve's Market area, Holcomb School and the area around the Plaid Pantry near the Holcomb Boulevard/Redland Road intersection. As illustrated in Figure 4 and summarized in Table 1, the pedestrian system is incomplete, with sidewalk facilities in the study area being very limited. In addition, several of the roadways within the study area that do not have sidewalks have narrow or nonexistent shoulders and create an unsafe and undesirable environment for pedestrians. Improvements to the existing pedestrian transportation system are planned and listed in the planned improvement section of this memo.

Existing Bicycle Facilities

Existing bicycle facilities are illustrated in Figure 5. The bicycle facilities figure was created from Metro's RLIS database, Reference 1. As illustrated in Figure 4 and summarized in Table 1, the bicycle system is incomplete, with only Highway 213, Washington Street and Redland Road having striped bike lanes. Holcomb Boulevard is considered a high traffic through street, making it a potentially dangerous route for bicyclists so long as there are not striped bike lanes on the road. Anchor Way, Holly Lane, and Maplelane Road are considered caution areas for cyclists due to, among other factors, high speeds, narrow or nonexistent shoulders and ditches below pavement grade. Improvements to the existing bicycle transportation system are planned and listed in the planned improvement section of this memo.

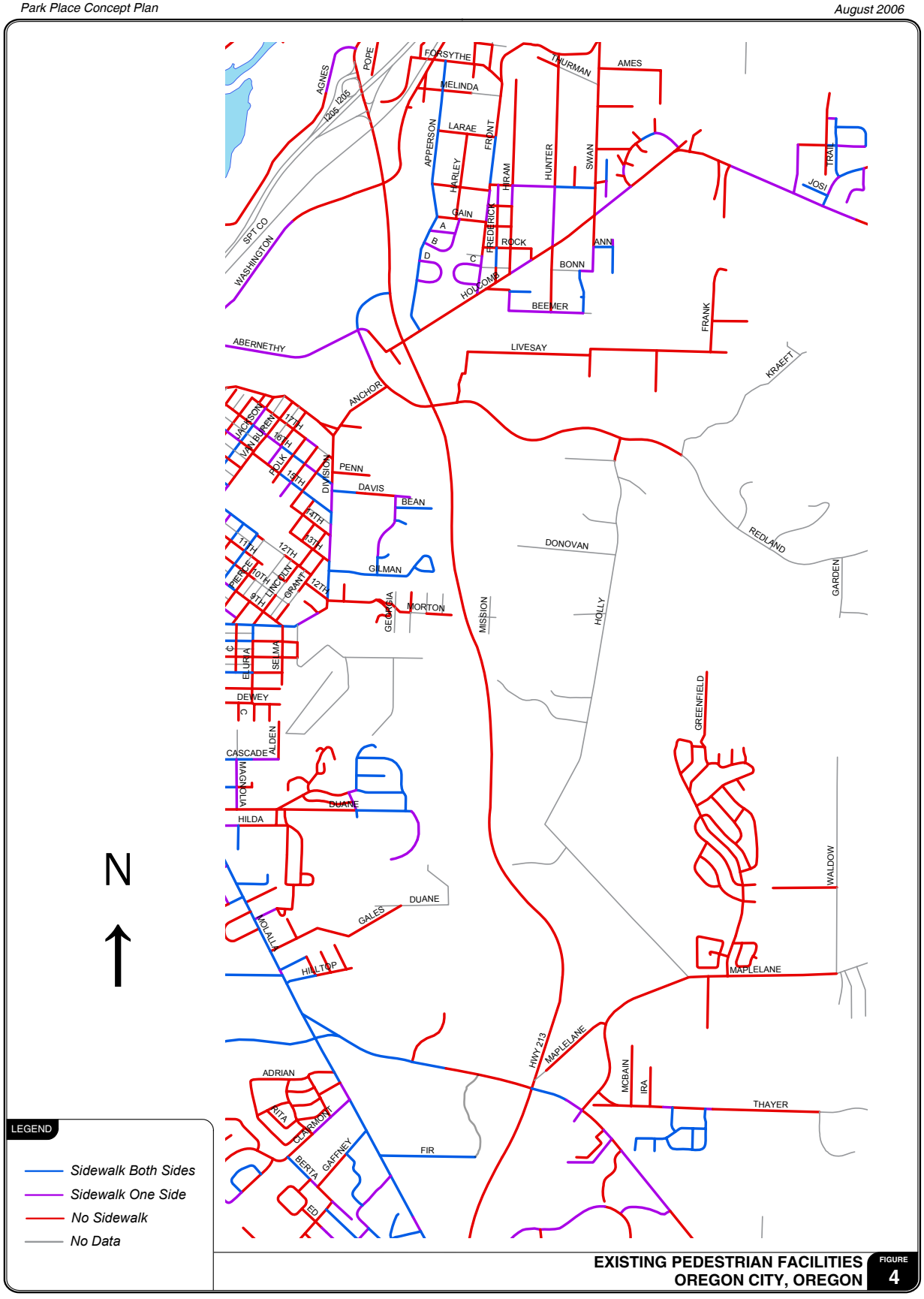
Existing Traffic Conditions

Manual turning movement counts for the study intersections were obtained from past projects in the area and newly ordered counts. These counts were conducted during the weekday evening peak hour. All counts were taken between July 2005 and June 2006. Older counts were balanced with new counts to obtain existing year traffic volumes. Heavy vehicle percentages were entered by approach. The turning movement counts from the weekday p.m. peak hour are summarized and rounded to the nearest five vehicles per hour as shown in Figure 6. Appendix C1 contains the traffic count sheets used in this study.

Current Levels of Service

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the 2000 Highway Capacity Manual, Reference 4. A description of level of service and the criteria by which it is determined is presented in Appendix "C2." Appendix "C2" also indicates how level of service is measured and what is generally considered the acceptable range of level of service.

Park Place Concept Plan *August 2006*



EXISTING PEDESTRIAN FACILITIES
OREGON CITY, OREGON

FIGURE 4

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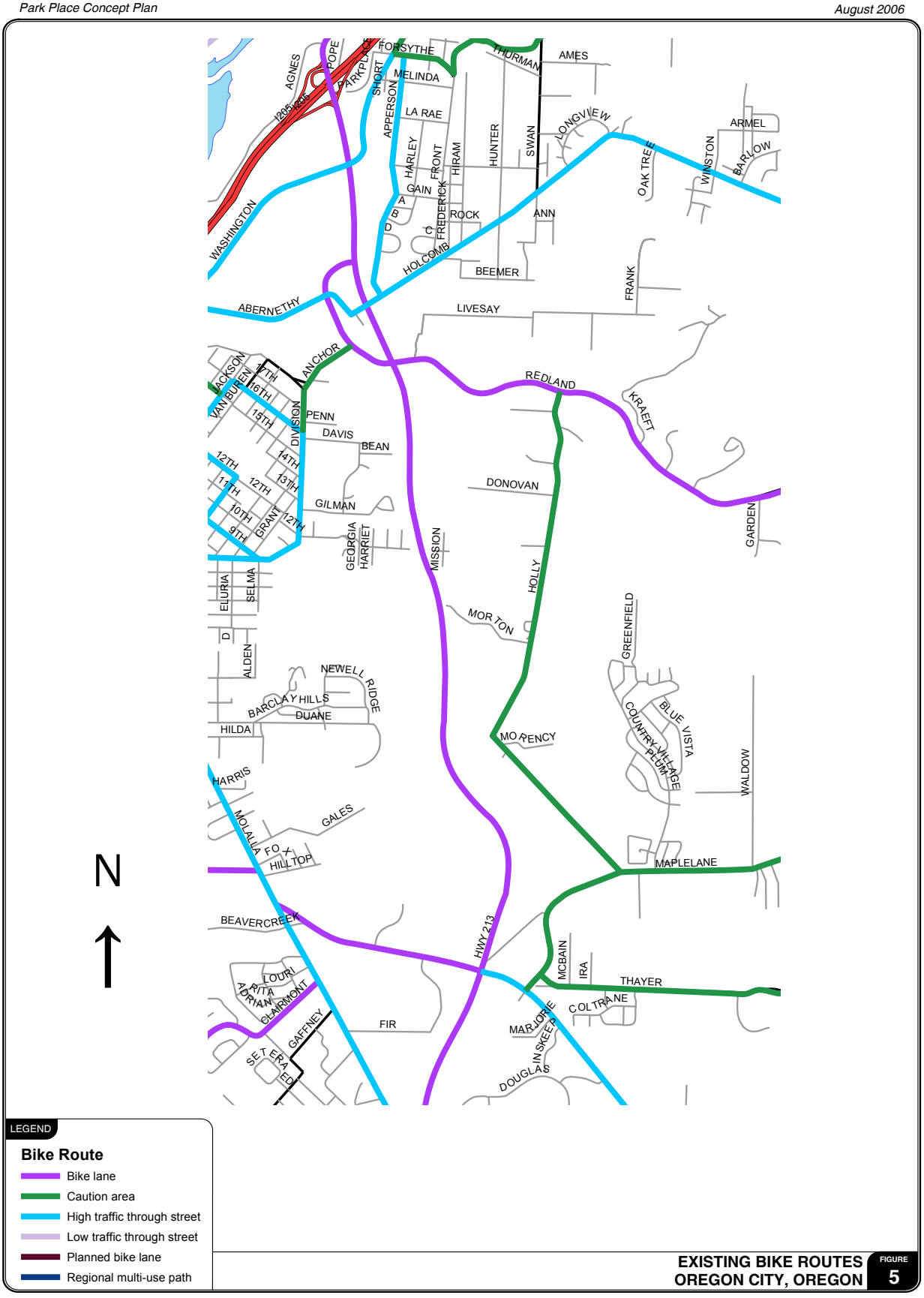

LEGEND

Bike Route

- Bike lane
- Caution area
- High traffic through street
- Low traffic through street
- Planned bike lane
- Regional multi-use path

EXISTING BIKE ROUTES
OREGON CITY, OREGON

FIGURE 5

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The peak 15-minute flow rates during the weekday peak hours were used in the evaluation of all intersection levels of service to ensure that this analysis was based on a reasonable worst-case scenario. For this reason, the analyses reflect conditions that are only likely to occur for 15 minutes out of each average peak hour. Traffic conditions during all other weekday time periods will likely operate under conditions better than those described in this report.

Level of Service (LOS) analyses conducted for signalized intersections in this report are based on the average control delay per vehicle entering the intersection. Level of Service (LOS) is a measure used by transportation engineers to determine the quality of the transportation system in an area. In general, LOS is linked to transporttion time (the shorter, the better) and speed. For unsignalized intersections, LOS is based on the intersection's capacity to accommodate the worst, or critical, movement.

Volume-to-capacity (v/c) ratios and levels of service were calculated for the three signalized and the eight unsignalized study intersections using the weekday p.m. peak hour traffic volumes, as shown in Figure 6. Appendix "C3" includes the year 2006 existing conditions level-of-service worksheets.

Highway 213 Corridor

The Oregon Department of Transportation (ODOT) does not have any standards regarding level of service. Instead, the Department uses volume-to-capacity ratio standards to assess the study intersections along the Highway 213 corridor. ODOT standards require that the v/c ratios on all intersections of Highway 213 included within the Urban Growth Boundary (UGB) not exceed 0.99, except for the I-205 interchange ramp intersections. ODOT has special standards for freeway interchange ramp intersections. The freeway interchange ramp intersections are required to maintain a v/c ratio at or below 0.85. It should be noted that the signalized intersections along the Highway 213 corridor were analyzed using Synchro files provided by ODOT.

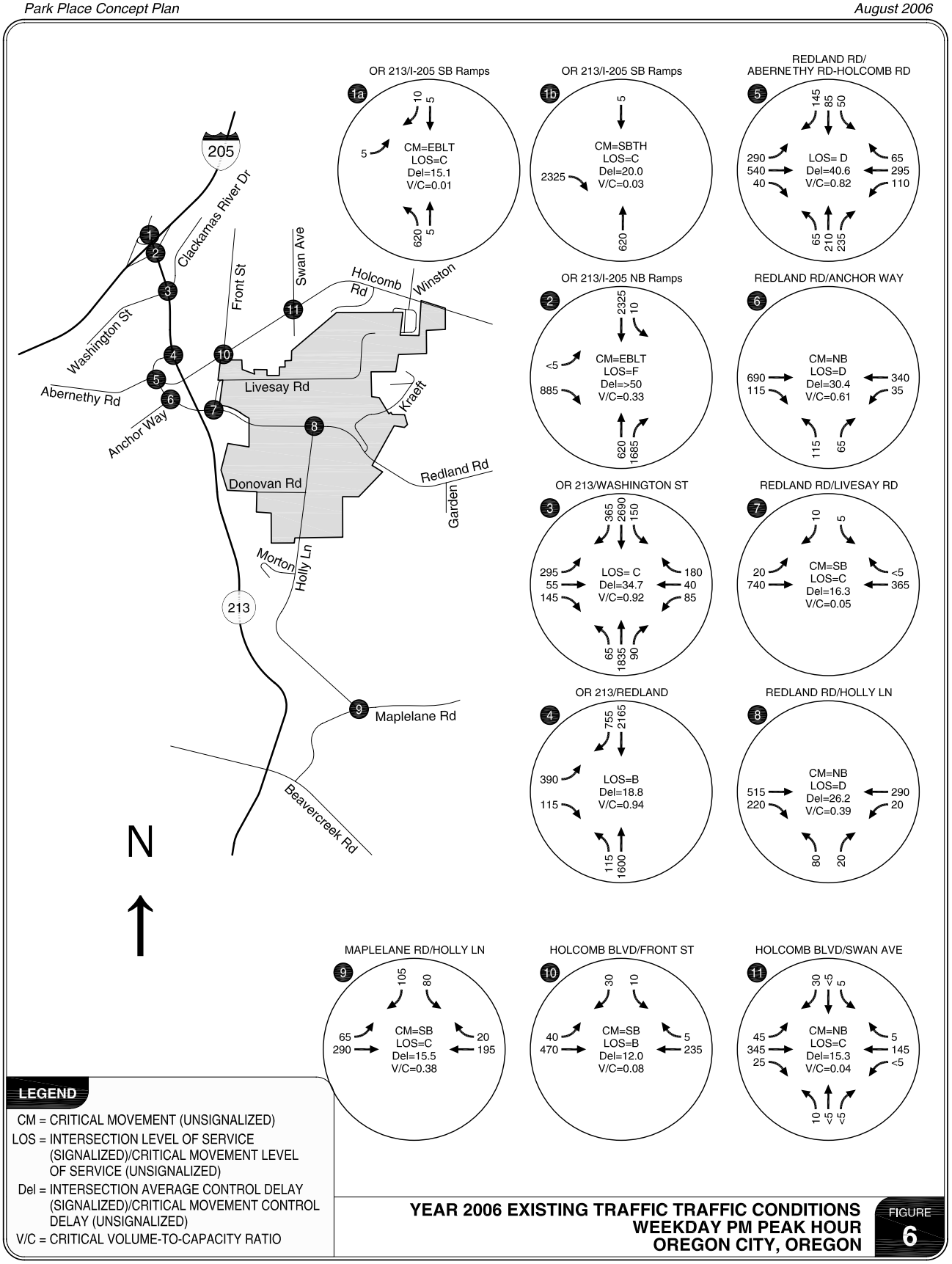
As Figure 6 illustrates, all study intersections along the Highway 213 corridor are operating at acceptable volume-to-capacity levels. Weekday p.m. peak hour field observations revealed that significant queuing occurs at the Washington Street and Redland Road intersections. Southbound queues from the Washington Street intersection spilled back to the I-205 overcrossing. Despite the long queues, all stopped vehicles were able to clear the Washington Street intersection and the Redland Road intersection during each signal cycle. No approach or movement failures were observed at either intersection during the weekday p.m. peak hour.

In addition to analyzing the intersection operations along the Highway 213 corridor, a road segment analysis was performed on Highway 213 between I-205 and Beavercreek Road, assuming a free flow speed of 55 miles per hour. Table 2 summarizes the results of the road segment analysis.

As summarized in Table 2, all of the road segments along the Highway 213 corridor are expected to operate at acceptable levels.

Redland Road/Holcomb Boulevard/Holly Lane Corridors

For analysis of intersections along the Redland Road, Holcomb Boulevard, and Holly Lane corridors, Oregon City and Clackamas County level-of-service standards are applied. The City of Oregon City and Clackamas County require that LOS "D" or better be maintained for all signalized intersections and LOS "E" or better be maintained for all unsignalized intersections. The City of Oregon City and Clackamas County do not have any standards regarding volume-to-capacity ratios.



LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

YEAR 2006 EXISTING TRAFFIC TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE 6

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As Figure 6 illustrates, all study intersections within the Redland Road, Holcomb Boulevard, and Holly Lane corridors are operating at acceptable levels.

Planned Improvements

Three planned and funded transportation improvement projects were identified in the study area through discussions with ODOT, Clackamas County, and City of Oregon City staff. Table 3 provides a summary of these improvement projects.

Several additional planned transportation improvement projects were identified through a review of the Metro 2004 Regional Transportation Plan (RTP), Reference 6, the ODOT 2008-2011 Draft Statewide Transportation Improvement Program (STIP), Reference 7, and the City of Oregon City Transportation System Plan (TSP), Reference 8; however, these projects are not yet funded. Table 4 provides a summary of the planned and unfunded transportation improvement projects in the project study area.

Conclusion

The study area is served by a multi-modal transportation system that includes roadway, transit, bicycle and pedestrian facilities and services. Isolated locations on the roadway system experience congestion and delays; however, applicable agency standards are met at all study intersections and road segments.

The Highway 213 corridor is approaching capacity, particularly on the segment between Redland Road and the I-205 interchange. Federal appropriations have been obtained through the Safe, Accountable, Flexible, EfficientTransportation Equity Act: A Legacy for Users (SAFTEA-LU) for the planning of Highway 213 improvements,

Table 2: Highway 213 Road Segment Analysis

Segment		Direction	LOS[1]	Density (pc/mi/ln)[2]
From	To			
I-205 SB Ramps	I-205 NB Ramps	Northbound	A	6.3
		Southbound	C	23.3
I-205 NB Ramps	Washington	Northbound	C	23.4
		Southbound	C	21.4
Washington Street	Redland Road	Northbound	C	20.2
		Southbound	C	19.7
Redland Road	Beavercreek Road	Northbound	B	16.4
		Southbound	C	23.1

Table 3: Planned and Funded Transportation Improvement Projects

Location	Project	Description
Hwy 213/I-205 NB	I-205 Northbound Ramp Meter	ODOT
Washington St. Hwy 213 - 5th St. (partially complete)	Striped 5-6 foot bike lanes in both directions	City of Oregon City
Hwy 213/I-205	Funds appropriated for an IAMP and EA for improvements to Hwy 213/I-205 interchange	Federal

Table 4: Planned and Unfunded Transportation Improvement Projects			
Location	**Project Description**	**Estimated Cost**	**Document Source**
Highway 213/Beavercreek Rd	Provide dual northbound left-turn lanes.	-	City of Oregon City TSP
Anchor Way: 18th St –Redland Rd	Provide curb, gutter, and sidewalks along both sides.	$350,000	City of Oregon City TSP
Holcomb Road: Redland Rd – UGB	Provide curb, gutter, and sidewalks along both sides.	$1,510,000	City of Oregon City TSP
Redland Road: Anchor Way – UGB	Provide curb, gutter, and sidewalks along both sides.	$296,000	City of Oregon City TSP
Swan Avenue: Holcomb Rd – Forsythe Rd	Provide curb, gutter, and sidewalks along both sides.	$528,000	City of Oregon City TSP
Washington St/Clackamas River: Abernethy Rd - UGB	Provide curb, gutter, and sidewalks along both sides.	$1,670,000	City of Oregon City TSP
Holcomb Rd/Front St.-Beemer Jacobs Way	Realign offset intersection	$500,000	City of Oregon City TSP
Highway 213: I-205-Redland Rd	Phase 1A improvement from HWY 213 Urban Corridor Design Study	$10,000,000	City of Oregon City TSP
Highway 213/Beavercreek Rd	Single Point Diamond grade separated interchange improvement as described in the Highway 213 Corridor Study.	$20 Million	City of Oregon City TSP
Redland Rd/Anchor Way	Signalization (could be development driven)	$582,000	City of Oregon City TSP
Redland Road extension between Abernethy Rd and Washington St	Frontage connection complementing the Highway 213 Corridor Phase 1A improvements – Minor Arterial.	-	City of Oregon City TSP
Abernethy-Holcomb Blvd: Washington St-Winston Dr	Provide sidewalk along north side.	$450,000	City of Oregon City TSP
Abernethy-Holcomb Blvd: Redland Rd-Winston Dr	Provide sidewalk along south side.	$307,500	City of Oregon City TSP
Clackamas River Drive: Highway 213 - UGB	Provide sidewalk along both sides.	$450,000	City of Oregon City TSP
Front Avenue: Forsythe Rd-Holcomb Blvd	Fill in gaps without sidewalks.	$500,000	City of Oregon City TSP
Redland Road: Highway 213 – Abernethy Rd	Provide sidewalk along both sides.	$69,100	City of Oregon City TSP
Redland Road: Abernethy Rd – UGB	Provide sidewalk along both sides.	$685,400	City of Oregon City TSP
Swan Avenue: Forsythe Rd – Holcomb Blvd	Provide sidewalk along both sides.	$216,000	City of Oregon City TSP
Washington Street: Abernethy Rd – Highway 213	Provide sidewalk along one side.	$325,000	City of Oregon City TSP
Highway 213: I-205 – Molalla Ave	Redesign bike/ped intersections and enhance bike use between Redland Rd and the old 82nd Ave bridge.	$4,500	City of Oregon City TSP
Anchor Way: Redland Rd – Division St	Resurface and widen to accommodate 4-6-foot bike lanes in both directions.	$50,000	City of Oregon City TSP
Front Avenue: Forsythe Rd – Holcomb Rd	Provide striped bike lanes.	$4,000	City of Oregon City TSP
Holcomb Boulevard: Abernethy Rd – UGB	Provide striped bike lanes.	$15,000	City of Oregon City TSP
Swan Avenue: Forsythe Rd – Holcomb Blvd	Sign as a bike route.	$3,000	City of Oregon City TSP
Clackamas River Drive: Hwy 213 to UGB	Provide striped bike lanes.	$10,000	City of Oregon City TSP
Abernethy Road: Washington St – Redland Rd	Provide striped bike lanes.	$5,000	City of Oregon City TSP
Oregon City Transit Center – Clackamas Community College	Increase frequency of the existing service (Clackamas Community College to Oregon City Transit Center) from 30-minute headways to 10 or 15-minute headways on an existing bus route.	-	Tri-Met

Location	Project Description	Estimated Cost	Document Source
I-205: 99E – Highway 213	General purpose, express, HOV or peak period pricing capacity improvements to be determined based on I-205 South Corridor Study	$86,625,000	Metro 2004 RTP
Highway 213/Washington St	Grade separate southbound Highway 213 at Washington Street and add a northbound lane to Highway 213 from just south of Washington	$10,395,000	Metro 2004 RTP
Highway 213/Abernethy	Intersection improvements.	$3,465,000	Metro 2004 RTP
Highway 213/Beavercreek Rd	Grade separate existing intersection	$20,790,000	Metro 2004 RTP
I-205/Highway 213	Reconstruct southbound off-ramp to Highway 213 to provide more storage and enhance freeway operations and safety.	$1,155,000	Metro 2004 RTP
Highway 213 south of I-205	Corridor analysis to study long-term transit and road improvements	$577,500	Metro 2004 RTP
Abernethy Road: Highway 213 – Main St	Widen Abernethy from Highway 213 to Main Street.	$3,580,500	Metro 2004 RTP
Washington/Abernethy	Construct new two lane minor arterial with sidewalks and bike lanes.	$4,000,000	Metro 2004 RTP
Washington Street: Abernethy – 5th St	Complete boulevard design improvements.	$1,022,175	Metro 2004 RTP
Washington Street: Abernethy – Highway 213	Complete boulevard design improvements.	$1,524,600	Metro 2004 RTP
McLoughlin, Main, Washington, 7th, 5th, and neighborhood streets	Improve sidewalks, lighting, crossings, bus shelters and benches.	$1,155,000	Metro 2004 RTP
Oregon City Regional Center	Implement a transportation management association program with employers.	$200,000	Metro 2004 RTP

including funding for an Environmental Impact Statement (EIS) and preliminary engineering.for the I-205/OR 213 interchange.

The public transit system provides limited service to this low-density, suburban location. Additionally, the bicycle and pedestrian systems are incomplete, but plans exist to make incremental improvements. Until pedestrian, bicycle, and transit improvements are made, current conditions will make travel by these modes undesirable and will promote greater vehicular trip-making.

REFERENCES

1. Metro. RLIS Database. Accessed July 2006.
2. Tri-Met. July 27, 2006. http://www.trimet.org/schedules/buslines.htm.
3. Metro. 2001 Sidewalk Inventory. 2001
4. Transportation Research Board. Highway Capacity Manual. 2000.
5. Oregon Department of Transportation. 1999 Oregon Highway Plan. 1999.
6. Metro. 2004 Regional Transportation Plan. 2004.
7. ODOT. 2008-11 Draft Transportation Improvement Program. 2006.
8. Oregon City. Transportation System Plan. 2001.

Existing Conditions: Regulatory Framework

In December 2002, the Portland metropolitan regional government Metro approved an Urban Growth Boundary (UGB) expansion on the eastern edge of Oregon City, in the Park Place neighborhood. The approximate 300 acre site, combined with 180 acres that were brought into the UGB in the 1980s, forms the project area for the Park Place Concept Plan. Concept planning is a regional requirement that outlines the vision and strategies for establishing public facilities, transportation, land use, and urban form in UGB expansion areas designated for future urbanization.

This section assesses the policies and regulations that the Park Place Concept Plan must comply with and implement. (A complete analysis of applicable goals, policies, and land use procedures is described in Appendix A.)

Metro Urban Growth Management Functional Plan

The whole foundation for concept planning is based on requirements established in Title 11 of Metro's Urban Growth Management Functional Plan ("Functional Plan"). Title 11 requires the following urbanization elements to be addressed. (See Appendix B for a detailed description of Concept Planning Requirements.)

- Annexation and urban services
- Minimum residential densities
- Affordable housing and needed housing types
- Commercial and industrial land needs
- Conceptual transportation planning
- Conceptual public facilities and services planning for sewer, water, storm water, parks, police, and fire protection
- Conceptual school facilities planning
- Natural resource protection/conservation planning

As a result, the concept plan should include a diagram that shows the locations of the following features.

- Constrained lands
- Protected/conservation lands
- Public facilities including transportation
- Single- and multi-family housing
- Commercial and industrial lands
- Mixed use areas
- Neighborhood centers
- Parks and open spaces

Urban Growth Management Agreement

The existing Urban Growth Management Agreement (UGMA) between Clackamas County and the City of Oregon City was adopted October 25, 1990. The UGMA guides coordination between Oregon City and Clackamas County for managing land inside the Oregon City UGB that is not yet incorporated into the city. This land is

bounded by the Urban Growth Management Boundary (UGMB). The Park Place project area is entirely UGMB land that is subject to the terms of this agreement.

Park Place Buildable Land Inventory Methodology

Title 11 of Metro's Urban Growth Functional Plan states that new urban area plans require a "provision for average residential densities of at least 10 dwelling units (du) per acre of net vacant buildable land in zones…" This average residential density is only applicable to areas recently added to the urban growth area. This section established the number of units required in the larger study area and defines the term "buildable lands" for the Park Place Concept Plan. This includes outlining a strategy for determining which lands within the project area qualify as "buildable lands."

Based upon the Buildable Lands Analysis, described in Table 1, for the Livesay area and the aforementioned UGB expansion area, 1465 housing units need to be considered as part of this concept plan. Per the direction of Metro, these units can be distributed throughout the study area. Implementation of this residential density, within the study area, is dependent upon the comprehensive plan designations and zoning that is developed as part of this planning process.

For this study, buildable land is defined as land that is suitable for development or redevelopment. Briefly, the methodology for determining suitable lands in the Park Place project area is as follows:

Vacant Land + Redevelopable Land - Constrained Land - Other Land = Gross Buildable Land

Definitions

Vacant Land is sourced through Metro's Regional Land Inventory System (RLIS). This process, outlined in detail in Chapter 4 of the *2002-2022 Urban Growth Report: A Residential Land Need Analysis*, defines vacant land as tax parcels with no improvement value or buildings, and partially-vacant land as parcels with an undeveloped portion of a lot that is larger than one-half acre. In this context, vacant land is simply that. It does not indicate whether the parcel is buildable or marketable.

Redevelopable Land is defined as non-vacant land that meets redevelopment thresholds established by the market professional. The primary assumption is that all properties with a square foot value (SFV) of $10/sf or less is a candidate for redevelopment. This is based upon recent land transactions which indicate a value in excess of $10/sf. for commercial (retail and office) land and approaching $10/sf for residential property. The SFV is derived by dividing the total market value of the property by the total area of the site (market value/area = $/sf).

Constrained Land is land that is considered environmentally-sensitive and/or has limited or no redevelopment potential. Constrained lands considered unbuildable for inclusion in the buildable lands inventory are:

- Class I and II Riparian Habitat areas [recognized as "High" and "Moderate" Habitat Conservation Areas (HCA) by Metro]
- Steep slopes – Slopes greater than 25%
- Major easements
- Other Land is defined as land that has cultural and/or historic value. The category is also open to land that may be omitted from the buildable inventory for reasons not currently apparent.

Buildable Land Summary - Livesay Area

		acres	
+	Vacant land (1)	129.5	
+	Redevelopable Land (2)	42.1	171.6
	Development Base aggregate	*171.6*	
-	25% > slopes (3)	37.2	
-	Habitat Conservation Areas (4)	11.5	48.7
-	Right-of-way needs (5)	22.1	122.9
-	Stormwater facilities (6)	3.1	
-	Civic uses (7)	4.3	
-	School area	n/a	
-	Historic properties - listed landmark (8)	1.66	
-	Easements		
	Total buildable land	91.7	
	at R-10 zoning density (4 du/acre)	367	units

Notes:

(1) RLIS database inventory (2006) clipped to Livesay area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

(6) 2.5% of "buildable" land as determined by Clackamas County (ibid)

(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"

Net Buildable Lands Summary - UGB Expansion Area

		acres	
+	Vacant land (1)	208.36	
+	Redevelopable Land (2)	38.54	246.9
	Development Base aggregate	*246.9*	
-	25% > slopes (3)	70.1	
-	Habitat Conservation Areas (4)	33.3	103.4
-	Right-of-way needs (5)	25.8	143.5
-	Stormwater facilities (6)	3.6	
-	Civic uses (7)	5.0	
-	School area	n/a	
-	Historic properties - listed landmark (8)	0	
-	Easements		
	Total buildable land	109.1	
	Required minimum density (10 du/acre)	1091	units

Notes:

(1) RLIS database inventory (2006) clipped to expansion area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

(6) 2.5% of "buildable" land as determined by Clackamas County (ibid)

(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"

Table 1.

Gross Buildable Area and Net Buildable Area

Since the residential density is based on "net buildable land," it is necessary to convert gross buildable land to net buildable land to account for land needs for new roadways, sewer infrastructure, other public facilities, and civic institutions (i.e., churches, fraternal organizations, etc.) This planning process proposed using a methodology similar to that used for the Damascus-Boring Concept Plan, which allocates percentages of the gross buildable land for these services based on past performance, professional judgement, and community input. We proposed the following percentages to accommodate land needs for new infrastructure:

- New Local Streets – 18%
- Storm Drainage – 2.5%
- Police, fire, and civic institutions – 3%

The total percentage of land deducted from the gross buildable area is 23,5%. Therefore, the equation for net buildable land is:

- Gross Buildable Land – (23.5% of Gross Buildable Land) = Net Buildable Land

Oregon City Comprehensive Plan

Concept Planning for Park Place must comply with Oregon City's Comprehensive Plan policies if the area is to be approved for annexation to the city. The policies of the following goals generally apply to the Park Place Concept Plan and project area. Brief commentary is offered for some of the goals below.

- Goal 1, Citizen Involvement

The Park Place Concept Plan involves forming a citizen advisory committee, which is scheduled to meet six times between May and December 2006. Three community forums addressing the evaluation criteria are scheduled between June and October 2006. A design charrette for the Draft Concept Plan will be held in October 2006. Another community forum is scheduled for in November 2006 in order to discuss implementation strategies. Finally, a series of six Planning Commission presentations are scheduled from December 2006 to April 2006. The Park Place Concept Plan hosts its own website, which is accessible through the City's Planning Department web page.

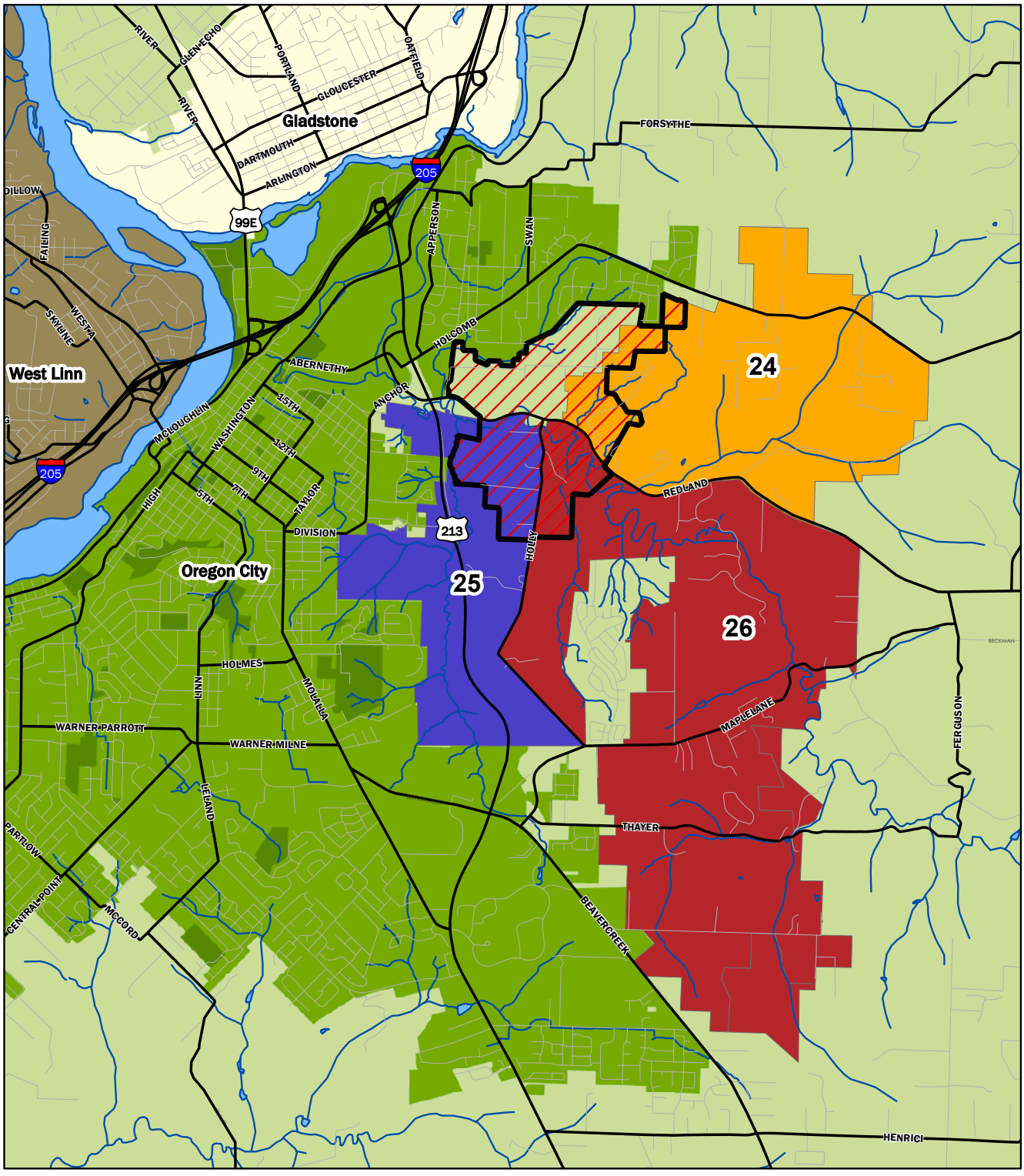
The Park Place Neighborhood Association provides a means of public participation specifically for the Park Place project area.

- Goal 2, Land Use

Presently, the Park Place project area is part of unincorporated Clackamas County, and is designated for Low Density Residential, Forest, and Rural uses according to the County's Comprehensive Plan. The City's Comprehensive Plan designates the project area as Low Density Residential (LR) and Future Urban (FUH). Existing Comprehensive Plan designations in parts of the city adjacent to the project area include Low Density Residential (LR), Medium Density Residential (MR), and a small area of Mixed Use Corridor (MUC).

Zoning classifications for Park Place may both draw from existing classifications and modify existing classifications to create new zones.

- Goal 5, Open Spaces, Scenic and Historic Areas, and Natural Resources



Source: Oregon City GIS, 2006; RLIS 2006

Oregon City
Gladstone
West Linn
Clackamas Co.
project boundary
Alternative 24
Alternative 25
Alternative 26

Park Place Concept Plan

Context: Area Zoning

0 0.4 0.8 1.2
Miles

Concept planning requires that an inventory and protection strategies be prepared for Goal 5 natural and cultural resources in the Park Place project area. The Comprehensive Plan indicates that Park Place is one of a few areas in Oregon City that has older homes and structures that need to be examined for historic identification, preservation, and renovation before they deteriorate and are torn down. The Park Place project area contains parts of Abernethy Creek, Tour Creek, and Newell Creek. Metro's 2002 Alternatives Analysis for Study Areas 24, 25, and 26 identified the area around these creeks and other land as potential Goal 5 natural resources in need of some level of protection.

- Goal 6, Quality of Air, Water, and Land Resources
- Goal 7, Natural Hazards
- Goal 8, Parks and Recreation

Oregon City prepared a Park and Recreation Master Plan in 1999, which is reviewed later in this report. The master plan may be updated to reflect park and recreation facilities that Park Place will need.

- Goal 9, Economic Development

Concept planning requires that sufficient commercial and industrial opportunities be provided in the project area, given the area's 2040 Growth Concept design types. The Economic Development Technical Report prepared for the City's 2004 Comprehensive Plan found that the City as a whole had the capacity to accommodate 8,370 employees, which was 75% of the 11,172 employment target.

The report recommended adding one- to two-acre neighborhood commercial areas (generating roughly 10-15 employees each) to serve under served residential areas and to help increase the employment capacity within the city. The Park Place project area is not a likely candidate for industrial development due to the constrained nature of the land and the planning of the Beavercreek Road area, southeast of the City for industrial development.

- Goal 10, Housing

Concept planning will need to demonstrate how Park Place will provide housing that is affordable to households with incomes at or below the area median income, without the use of public subsidy.

The City's Comprehensive Plan Housing Resource Document (October 2002) found that the City's existing land supply was deficient by 1,444 units in order to accommodate the demand for 6,075 new units by 2017. These needed units are split between 10 single-family units and 1,434 multi-family units.

- Goal 11, Public Facilities

The Park Place Concept Plan will be required to provide conceptual facilities and service plans for sewer, water, storm water, transportation, parks, police, and fire/emergency services. Preliminary cost estimates and implementation strategies must be a part of the conceptual plans.

The Park Place project area consists of portions of Study Areas 24, 25, and 26, and Metro's 2002 Alternatives Analysis evaluated these study areas to assess for how easy it would be to provide them with water, sewer, and stormwater services.

Stormwater services in all the study areas were judged to be easy to serve from the perspective of service provider Clackamas County Water Environment Services because the facilities would be provided by developers on a per-project basis. Area 24 was determined to be moderately difficult to serve with both water and sewer. Sewer service in Area 25 was also deemed to be moderately difficult to provide, while water service would be easy to provide. Area 26 was also deemed to be easy to serve with water, but difficult to serve with sewer.

- Goal 12, Transportation
- Goal 13, Energy Conservation
- Goal 14, Urbanization

The goals and policies of Goal 14 in the Oregon City Comprehensive Plan directly address concept planning requirements including Goal 14.3 – Orderly Provision of Services to Growth Areas and Goal 14.4 Annexation of Lands to the City.

Oregon City Municipal Code

Municipal code sections addressing zoning, design standards, master plans, subdivisions, and legislative procedures can be viewed online at: http://www.orcity.org/community-develop/planning/New_Code/New_Code.htm. Zoning and other pertinent regulations are described in Appendix A.

Zoning

Once incorporated into the City, the Park Place project area will receive a full set of City zoning designations. Existing City zoning and Comprehensive Plan designations of city land adjacent to the project area are primarily residential (Low Density Residential, R-10, R-8, and R-6, to Medium/High Density Residential, R-3.5) with a small area of mixed use (Mixed Use Corridor, MUC-1). A range of residential zones will need to be employed in Park Place in order to achieve the target of an average of 10 dwelling units per net buildable acre in the new UGB expansion portion of the Park Place project area. Commercial or mixed use zoning will be necessary to site businesses that can serve housing in the project area.

Lot Standards and Use Standards

Lot standards and use standards for all the residential zones (R-10, R-8, R-6, R-3.5, and R-2), commercial and neighborhood commercial zones (C and NC), and mixed use commercial zones (MUC-1 and MUC-2) that may be used in the Park Place project area are provided in the Land Use and Development Standards Tables located in Appendix B.

In considering commercial zoning for the Park Place project area, it is to be noted that mixed use commercial (MUC-1 and MUC-2) zoning is more permissive of different types of housing than is the neighborhood commercial (NC) zone. The MUC-1 zone, for instance, allows existing single-family detached units, single- and two-family attached units, and multi-family units whereas the NC zone only allows dwelling units as limited uses above permitted and conditional uses.

Other Regulations and Standards

The City's Code regulates the following aspects of development that may apply to the Park Place project area at different points in its planning and development process.

- Design standards (Section 17.20.030)
- Development application review (Chapter 17.50)

- Site plan and design review (Chapter 17.72)
- Master planning (Chapter 17.65)
- Subdivision (Chapters 16.08 and 16.12)
- Legislative hearing process (for Comprehensive Plan amendments) (Section 17.50.170)
- Annexations (Section 14.04.050)

Oregon City Transportation System Plan

The Park Place Concept Plan will be required to provide conceptual transportation and street plans that are consistent with the local Transportation System Plan (TSP), the Regional Transportation Plan (RTP) and the Oregon Transportation Planning Rule (TPR). Preliminary cost estimates and implementation strategies must be a part of the conceptual plans.

The conceptual transportation plan should be guided by the goals that the City's TSP establishes for multi-modal travel options, safety, capacity, and implementation.

Transportation Standards

The conceptual transportation plan must be compatible and consistent with different standards and guidelines instituted by the TSP, including functional classifications, design standards, and access management. Parking space requirements are determined according to land use, and those are presented in Table 5-14 of the TSP. Functional Classifications

- Highway 213 is classified as an expressway in City's TSP and as a freeway/ expressway in the County's TSP.
- Holcomb Road is classified as a minor arterial in the City's TSP and as part minor arterial and part collector in the County's TSP.
- Redland Road is classified as a minor arterial in the City's TSP and as a major arterial in the County's TSP.
- Holly Lane is classified as a minor arterial in the County's TSP.
- All other roads in the project area are classified as local roads.

Metro's 2004 Regional Transportation Plan (RTP) also assigns its own sets of classifications to Highway 213 and Redland Road, with the exception of a public transportation designation.

General street design standards by functional classification are provided in Figures 5-2A and 5-2B of the City's TSP (see Appendix A). The TSP reports that design and access standards required by the RTP will be incorporated into the Oregon City Street Design Standards Manual, which is adopted separately from the TSP.

Access Management

Tables 6 and 7, included in Appendix A, provide standards for intersection and access/driveway spacing in the city. (See Appendix A.)

Planned Roadway, Pedestrian, Bicycle, and Transit Projects

Conceptual plans for streets and transportation in the Park Place project area should also be compatible with improvements planned for the vicinity. Table 8, included in Appendix A, presents roadway, pedestrian, bike, and transit projects planned for the vicinity around the Park Place project area. (See Appendix A.)

Clackamas County's Capital Improvement Program 2006/07-2010/11 includes one

project in the Park Place project area vicinity.

- Project 707 – Holcomb Boulevard Pedestrian Enhancement Program; Highway 213 to the UGB; Proposed Phase 1: Design pedestrian Improvements to fill in gaps in sidewalks; City of Oregon City and Clackamas County 50/50 partnership; Project Development 2006/07-2007/08.

Oregon City Trails Master Plan

Parks and transportation plans for the Park Place Concept Plan must incorporate the goals and projects established in the 2004 Oregon City Trails Master Plan. Contracting for an update of the plan is currently underway. Existing master plan goals address trail development and regional connections, access, transit synergy, community linkages, amenities, maintenance, emergency access, and preservation of rights-of-way, scenic views, and natural areas.

The master plan is linked through the City's Planning Department web page, including a map of proposed trails. The map depicts three levels of trails proposed for the Park Place project area and vicinity.

- Regional trails are proposed on the western edge of the project area, east of Highway 213, associated with Newell Creek. The trail forks at Ogden Middle School, where one fork continues south and the other heads east on Donovan to Holly and then south.
- A community trail is proposed trail along Abernethy Creek and Redland Road through the middle of the project area.
- Several local trails are proposed associated with streams in the project area.

Table 12 in the master plan presents the design standards established for the three types of trails. (See Appendix A)

Oregon City Park and Recreation Master Plan

The City of Oregon City is currently updating its Park and Recreation Plan. Currently, the 1999 Oregon City Park and Recreation Master Plan addresses the following types of parks and recreation spaces being planned for the city.

- Mini-parks
- Neighborhood parks
- Community parks
- Regional parks
- Linear parks
- Special use areas
- Natural open space areas
- Undeveloped lands
- Pathways and trails
- Specialized recreational facilities
- Indoor recreation facilities
- Sports field facilities

The master plan includes a needs assessment, standards, and guidelines for each

type of park in Oregon City. The plan provides both conceptual maps of neighborhood and community park service areas and a map of specific proposed park and recreation facilities. Per Table 13, new facilities and facility improvements planned for the Park Place project area and vicinity include the following (see Appendix A):

- Neighborhood Parks – N-3 Holcomb School/Park (proposed), N-5 Park Place Park (existing), N-8 Livesay Park (proposed);
- Community Parks – Holcomb Road Park (proposed); and
- Natural Open Space Areas – Redland Road (proposed), Abernethy Creek (proposed), Newell Creek Canyon (existing).

Regional Facilities

Existing natural park and open space in the project area vicinity that is managed by Metro is located in Newell Creek Canyon. Metro is also sponsoring a bond measure for the November 2006 election that proposes to acquire or assist in acquiring three areas in the Park Place project area. The bond measure includes funding for acquisition of land along Abernethy Creek and Holcomb Creek as well as and further acquisition along Newell Creek.

Conclusion

Development of a Concept Plan fulfills regional planning requirements as established in the Metro 2040 Plan and Urban Growth Management Functional Plan. These regional plans as well as local comprehensive plans and codes are responsible for complying with and implementing Statewide Planning Goals.

The Concept Plan must include the following elements: governance, housing plans (including minimum density, diversity, and affordability), commercial and industrial land uses as needed, a conceptual transportation plan, a natural resources and protection plan, a public facilities plan, and a plan for public schools. Conceptual plans for these elements must reflect and account for policies and projects established in the City's Comprehensive Plan, Transportation System Plan, Trails Master Plan, and Parks and Recreation Master Plan. Ultimately these element plans will be presented as a report and illustrated in an Urban Growth Diagram.

Following adoption of the Concept Plan and any necessary plan amendments by City Council, the next step in the process is for the City to determine the appropriate Comprehensive Plan designations based on the Preferred Concept Diagram and to develop an Annexation Strategy. Once areas of the Park Place study area are annexed, the City will then adopt zoning according to the Comprehensive Plan Designations. It is anticipated that the majority of the study will remain low density, which is compatible with existing uses and development patterns. In order to meet the growth target of 1,465 housing units as established in the Buildable Land Summary, zoning in the study area will need to include higher density residential designations (e.g. R-3.5 and R-2) and mixed-use designations (e.g. MUC-1 and MUC-2). In addition, new high density, mixed-use, or overlay zones may need to be developed or existing zones may need to be modified in order to meet growth targets and implement the type and intensity of development that is envisioned in the Preferred Alternative. The Preferred Alternative will be developed at the public charrette, in October.

Resources

1. Metro Urban Growth Management Functional Plan - Title 11
2. Urban Growth Management Agreement
3. Oregon City Comprehensive Plan - Policies from Goals 1, 2, and 5-12
4. Oregon Municipal Code – Zoning, design standards, master plans, subdivisions, administration and procedures (comprehensive plan amendments), and annexations
5. Oregon City Transportation System Plan
6. Oregon City Trails Master Plan
7. Oregon City Park and Recreation Master Plan
8. Housing Resource Document for the City of Orgogn City Comprehensive Plan.
9. Oregon City School District future needs assessment (pending)

Water Infrastructure

The purpose of this memo is to provide existing condition information for water, sanitary and stormwater infrastructure as well as Goal 5 resources for the Park Place UGB Concept Plan area. The memo has been organized into the following sections:

A. Study Area Overview
B. Summary of Documents Reviewed
C. Water Infrastructure Existing Conditions
D. Sanitary Sewer Infrastructure Existing Conditions
E. Stormwater Infrastructure Existing Conditions
F. Goal 5 Resource Existing Conditions

A. STUDY AREA OVERVIEW

The project study area is roughly bounded on the west by Newell Creek and on the northwest by Livesay Creek. Both are tributaries of Abernethy Creek. The south and west sides are irregularly bounded as shown on the attached maps. The area is generally sparsely developed with the greatest existing development in about ½ acre to 3 acre lots along Livesay road and on the west side of Holly Lane. The character of the terrain is variable with slopes exceeding 25% near the major streams and a few smaller drainages. In addition large areas exist with slopes of less than 10%.

B. WATER INFRASTRUCTURE EXISTING CONDITIONS

Water Supply

Overview of Water Supply System

Wholesale water is currently supplied to the Park Place Concept Plan area by South Fork Water Board (SFWB) which is jointly owned by the cities of Oregon City and West Linn. SFWB treats the water in a plant at Hunter Avenue and Thurman Street, and has rights to withdraw 42.6 MGD at the existing intake, with an estimated maximum withdrawal rate of 52 MGD. The cities of Oregon City and West Linn purchase water from SFWB for distribution and storage within each municipal utility.

Capacity of Water Supply System

According to the Oregon City Water Master Plan, adequate water supply capacity exists to serve the study area under current development conditions. Regarding future development conditions, adequate water supply capacity appears to exist as well based on the development assumptions of the Water Master Plan. Future concept planning efforts in the Park Place area should coincide with the development assumptions of the Oregon City Water Master Plan.

Water Distribution

Distribution System Overview

The Livesay portion of the Concept Plan area is served by the Oregon City water distribution system. Much of the Concept Plan area has no current water service – either from private wells or from public distribution systems or districts. The Oregon City Water Master Plan includes recommended improvements to provide retail water service to the Concept Plan area.

The Clackamas River Water District (CRW) purchases water from the SFWB and distributes it to areas primarily south and east of the Concept Plan area. Oregon City's

water system currently serves the Livesay Road area from the Livesay Road Pump Station with 6-inch diameter pipes. Clackamas River Water currently serves the unincorporated portion of the study area south of Abernethy Creek.

The Water Master Plan does not provide detailed information about the existing pipe system, but it does show pipes in Redland Road, Donovan Road, and in Holly Lane. One pipe system passes in a southeasterly direction across the area and provides water to an unincorporated area that includes the Canyon and Country Village Pressure Zones to the southeast – outside of the study area.

The area of this concept plan encompasses 4 different pressure zones (as shown in Figure 2-8 from the master plan). Most of the Park Place Concept Plan area is in the Park Place Lower Zone. In addition, the northeast portion of the study area includes the following pressure zones: The entire Livesay Road Pressure .Zone, a portion of Park Place Intermediate Zone, and a portion of Park Place Upper Zone.

The master plan identifies the Park Place Lower Zone as including an already developed area to the north plus the majority of the area for this study on its south end. As can be seen on Figure 2-8 from the master plan, the recent UGB expansion area constitutes about 1/3 of the future Park Place Lower Zone. Future development (including full buildout of the Livesay Road area) will more than double the developed area in Park Place Lower Zone.

Currently water demand in Park Place Lower Zone is split between Barlow Crest Reservoir and Mountainview Reservoir. While Mountainview has ample storage capacity (10.5 million gallons) for both existing and future demand, Barlow Crest reservoir (1.75 mg) will ultimately require expansion. According to the master plan, complete buildout will require 3.23 million gallons of capacity at Barlow Crest.

The main pump station that will serve the area is the Hunter Avenue Station. It has a pumping capacity of 2,700 gpm in 3 pumps. Its primary purpose is to fill the Barlow Crest Reservoir which serves a large area of existing development as well as the proposed development area. The only other pump station in the area is the one at Livesay Road which serves only a small and sparsely developed area. It has a pumping capacity of 30 gpm.

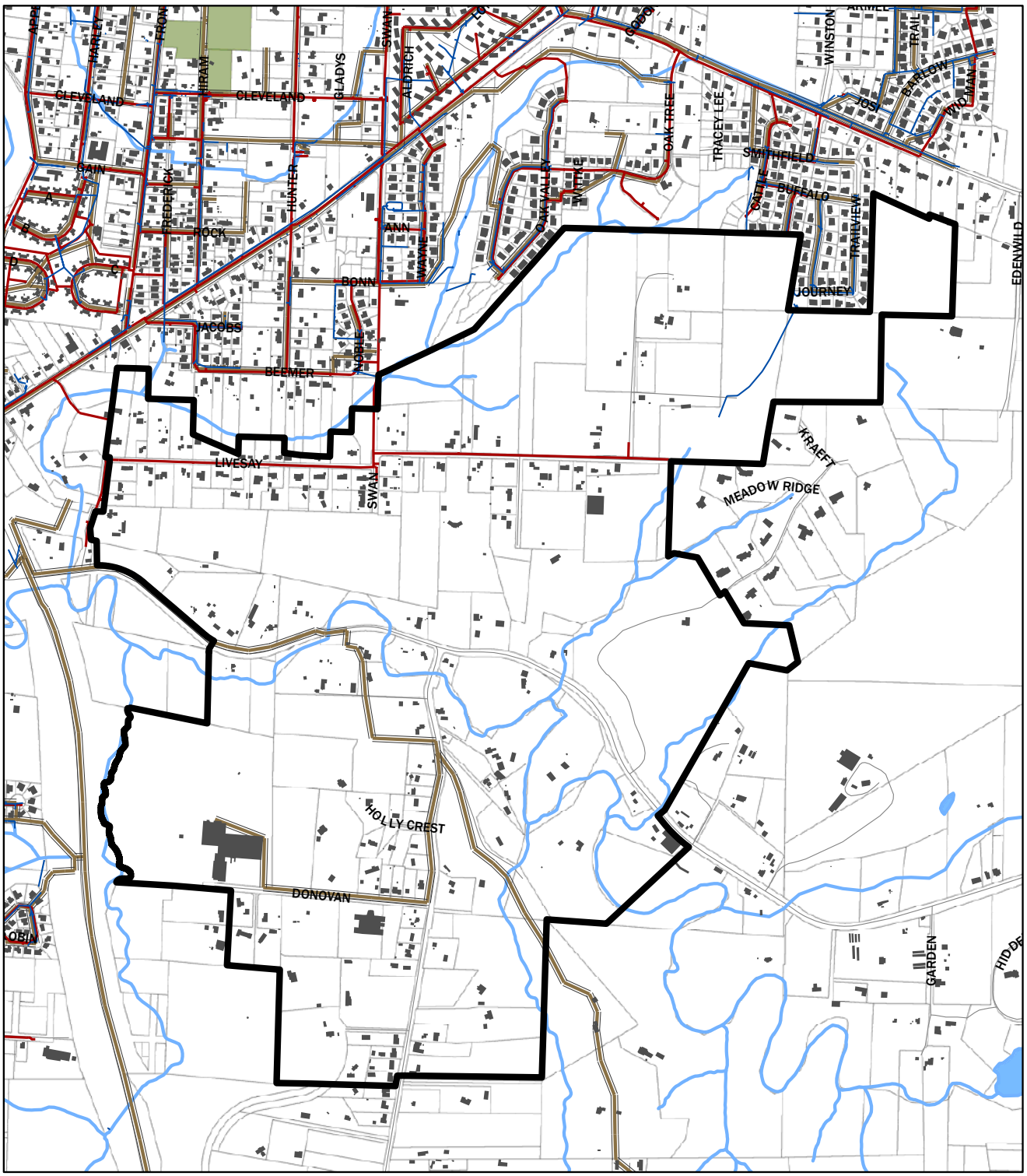
Capacity of Water Distribution System

As noted before, limited water service is provided within the Concept Plan area. The current distribution system is adequate to serve existing development. Moreover, it is assumed that the CRW transmission mains are adequate to serve existing and future development outside the Concept Plan area.

Storage

The Oregon City Water Master Plan states that Oregon City's existing system contains a storage capacity of 16.25 million gallons for treated water. This is adequate for current levels of demand. It also states that existing treated water storage capacity will be adequate during much of the build-out period. However, ultimately expansion of the Barlow Crest Reservoir will be necessary.

Fire flow capacities in the Park Place Lower Zone will eventually will need to be enhanced in the higher elevation areas. The Water Master Plan suggests construction of a new reservoir south of the UGB expansion area on Holly Lane to address this need.



Source: Oregon City GIS, 2006

sewer line water line stormwater line buildings

Park Place Concept Plan
Infrastructure: Existing Utilities

0 0.1 0.2 0.3
Miles

Pumps

There is currently a pump station at Livesay Road that the Oregon City Water Master Plan recommends be decommissioned. According to Oregon City, this pump station is small and experiences frequent operations and maintenance issues and lacks fire flow capacity. A future distribution system extension will incorporate the Livesay Road Pressure Zone into the Park Place Intermediate Zone.

Distribution

The Oregon City Water Master Plan indicates that the Oregon City water pipes (6-inch) currently serving the Livesay Road area from the Livesay Road Pump Station will be replaced. In addition, the Oregon City Water Master Plan notes that it is likely that upgrading much of the Clackamas River Water system pipes will be required.

C. SANITARY SEWER INFRASTRUCTURE EXISTING CONDITIONS

Sanitary Sewer Treatment System

Capacity of Sanitary Sewer Treatment System

Tri-Cities Sewer District (TCSD) provides sanitary sewer interceptor service and treatment for the most developed areas south of Redland Road and for a portion of the Livesay Road area. TCSD owns and operates the existing pipe system which consists of an interceptor line and a small collection system. Oregon City provides sanitary collection service within City limits. According to Oregon City, the small collection system owned by TCSD is remnant from disorderly annexation. Their interceptor system provides essential infrastructure to convey sanitary sewerage to the treatment plan. The interceptor line runs generally south to north down highway 213 as far as Redland Road. The collection system includes a pipe in Donovan Road, connecting to a pipe in Holly Lane and Redland Road. One branch passing through the study area connects incorporated areas located to the southeast.

The Oregon City Sanitary Sewer Master Plan does not include information on the capacity of the existing Tri-Cities Treatment Plant. However, according to TCSD the treatment plant has capacity to service the Concept Plan area.

Sanitary Sewer Collection System

Capacity of Sanitary Sewer Collection System

The Oregon City Sanitary Sewer Master Plan indicates that there are no existing collection pipes in the Concept Plan area. As such, a sanitary collection system will need to be constructed as the area develops. The Oregon City Sanitary Master Plan does include a projection of future flow at build-out (3.48 cfs). The master plan also identified Area E-5, which is essentially the same as the 2003 UGB expansion area, will be served entirely by the existing TCSD interceptor.

No specific recommendations were made for future sanitary infrastructure within area E-5, as the Master Plan only dealt with then existing Oregon City infrastructure. However, its clear that additional collection and trunk lines will be required to serve new development in the Concept Plan area. According to the Oregon City Sanitary Sewer Master Plan, the following future development assumptions were made:

- Full “buildout” will occur in 2024 based on a 3% annual growth rate.
- An average of 2.3 residents per dwelling unit was assumed for residential areas.
- 25% of the land area is used for infrastructure and parking. The remaining land was assumed to be developed as follows: 10% commercial, 10% industrial, 30% residential (RA-2), and 50% residential (R10).

D. STORMWATER INFRASTRUCTURE EXISTING CONDITIONS

There appears to be no major surface water infrastructure in the study area other than roadside ditches and natural drainage channels. However, one storm outfall line passes through the area to drain a development just outside of the study area's northeast corner.

The area is drained by Abernethy Creek flowing generally east to west through the middle of the area and two of its tributaries, Newell Creek on the west, Livesay Creek on the northwest. Wetlands have been identified along several areas near Abernethy Creek. Abernethy Creek and Newell Creek are subject to occasional flooding; however, no significant flood damage is known to have occurred in the study area. The 1996 flood was the most severe in recent history. Within the study area, the 1996 event primarily impacted undeveloped areas along Abernethy Creek causing little if any property damage.

City of Oregon City – Drainage Master Plan, January 1988

Only one small portion of the study area is included in this master plan. This is the Livesay Creek drainage basin that partially overlaps into the study area. One drainage issue was identified for this basin: The master plan recommended replacement of the Livesay Creek culvert under Redland Road. It is not stated that any damage has been caused by this apparently under-sized culvert. The culvert itself is outside of the study area boundaries. It is not clear whether any backwater effects from the under-sized culvert affect properties in the study area.

City of Oregon City – Draft Stormwater Managemet Plan, 2006

This document was created primarily to address water quality issues to meet the requirements for the NPDES MS4 permit. This document provides a general outline of how the city will apply best management practices (BMPs) to address stormwater pollution issues. The BMPs discussed include various street and storm system maintenance measures; water quality educational programs; prevention of illicit discharges; and pollutant monitoring. It is relevant to the current study in that these same BMPs will need to be applied to the study area as it develops.

City of Oregon City – Stormwater Grading and Design Standards, December 1999

This document spells out the City's requirements for site grading and for design of stormwater quality and quantity control (detention and infiltration) systems. These requirements are intended to mitigate the hydrologic and water quality impacts of creating new impervious surfaces. Upgrades These same requirements will also apply to new development in the study area after it is annexed into the city.

E. GOAL 5 NATURAL RESOURCES EXISTING CONDITIONS

In September 2005, the Portland metropolitan regional government Metro approved the Nature in Neighborhoods ordinance that is designed to help local communities meet the requirements of Statewide Planning Goal 5: Open Spaces, Scenic and Historic Areas, and Natural Resources. By approving the ordinance, Metro adopted a new title (Title 13, "Nature in Neighborhoods") to the Urban Growth Management Functional Plan, amended the Regional Framework Plan, and adopted a model ordinance for use by cities and counties. The ordinance relies on voluntary, incentive-based approaches for development in upland areas and will use regulation to protect the region's highest value streamside habitat, which has been designated as "habitat conservation areas."

This section addresses these habitat conservation areas in the Park Place Concept Plan project area through a discussion of the maps that form the basis of Metro's

fish and wildlife habitat protection program. The maps include the Regionally Significant Fish and Wildlife Habitat Inventory map (the "Inventory Map") and the Habitat Conservation Area ("HCA") map.

Regionally Significant Habitat Inventory Map
("Goal 5: Environmental Resources")

The Goal 5 inventory process began in 1999 as part of the draft Streamside CPR (Conservation, Protection, and Restoration) Report. The Water Quality and Flood Management map, adopted as part of Metro's Urban Growth Management Function Plan (Title 3) served as the starting point, or base map, for the Regionally Significant Habitat Inventory Map. A habitat is an area that provides food and shelter for fish and wildlife. The Inventory Map identifies those areas that Metro has determined are of greatest significance, called "regionally significant habitat," and includes riparian areas (i.e., the land and vegetation adjacent to waterbodies such as streams, river, wetlands and lakes), wildlife habitat, and parks and open spaces.

Metro took an ecological functions approach to define the riparian corridor and identify upland wildlife habitat. An extensive review of the scientific literature, mapping and field work served to develop two sets of criteria to identify the location and health of fish and wildlife habitat, one for riparian habitat and one for drier upland wildlife habitat.

Riparian corridor ecological functions and criteria for GIS model scoring:

- Microclimate and shade
- Streamflow moderation and water storage
- Bank stabilization, sediment, and pollution control
- Large wood and channel dynamics
- Organic matter input

Wildlife habitat characteristics and criteria for GIS model scoring:

- Habitat patch size
- Habitat interior
- Connectivity and proximity to water resources
- Connectivity and proximity to other patches
- Habitats of concern and habitats for unique and sensitive species (sites known to be critical for sensitive species or to be scarce and declining in the Metro region)

In 2001, Metro began the effort to map the specific landscape features associated with these criteria, such as stands of trees, woody vegetation, meadows, wetlands, stream centerlines, steep slopes, and flood areas. The methodology assigned values to fish and wildlife habitat features that allowed comparison of their cumulative health and importance. Areas that received a score of one to 30 were identified as regionally significant resources. Metro differentiated its inventory of regionally significant fish and wildlife habitat by type (riparian/wildlife and upland wildlife) and quality (high-, medium-, and low-value), creating six habitat categories (Riparian Class I, II and III, and Upland Wildlife Class A, B and C). Each category covers a geographically discrete portion of the inventory, and may include riparian and/or wildlife functions and also may be a "habitat of concern." The Inventory Map also identifies "impact areas" that define where allowed land uses or activities could harm the fish and wildlife habitat, which focuses primarily on two aspects of the Goal 5 natural resource inventories: primary functional criteria for streams and waterbodies, and tree root-zone protection. This map was updated in September 2004.

Habitat Conservation Areas Map

The Habitat Conservation Area Map ("HCA Map") is the graphic representation of the culmination of Metro's Goal 5 process and identifies the highest value streamside habitat that will be subject to regulatory performance standards and best management practices.

The Goal 5 process generally follows three steps. The first is to identify regionally significant fish and wildlife habitat, which Metro completed in 2002 with the Inventory Map. The economic, social, environment and energy (ESEE) analysis is the second step. This step applies the tradeoffs associated with allowing, limiting, or prohibiting conflicting uses, such as a land use or activity that could adversely affect a significant Goal 5 resource, with the need to protect significant natural resources. The third step is development of a program to protect significant fish and wildlife habitat.

Metro's approach for conducting a region-wide ESEE consequences analysis focused on achieving the goals of the 2040 Growth Concept. Metro's ESEE Analysis consisted of four steps that included: (1) identification of conflicting uses from a regional perspective (using seven generalized regional zones) and considering Metro's 2040 design type hierarchy, (2) identifying the "impact area" surrounding the significant resources, described above, (3) analyzing the ESEE consequences, and (4) determining whether to allow, limit, or prohibit conflicting uses for significant resource sites.

Metro weighed and considered the many factors for and against allowing, limiting, or prohibiting conflicting uses within the most significant resources to make a balanced "Allow, Limit, Prohibit" (ALP) Decision that seeks to conserve and preserve the highest value and most critical habitat (Class I and II riparian habitat), ensure that the Metro region's economy continues to thrive, protects and improves the region's water quality and prevents water pollution, and respects property rights. Metro found that none of the significant resources are of such importance relative to conflicting uses to support a decision to prohibit such conflicting uses, and is not limiting development in wildlife habitat because the economic and social impacts of such a decision, as well as the impact on meeting the region's housing and employment needs, would be too significant compared with the value of such protections. Instead, Metro is developing aggressive non-regulatory programs to conserve and preserve such habitat.

The resultant HCA Map therefore illustrates the areas in the region that are subject to the performance standards and best management practices described in Section 4 of Title 13 "Nature in Neighborhoods." Highly ranked riparian habitat areas within the current urban growth boundary were identified as "habitat conservation areas" and will be subject to high, moderate, and low levels of conservation based on habitat value or quality and urban development value per the results of the ESEE consequences of protecting or not protecting the habitat, public input, technical review, and Metro's decision to balance conflicting uses in habitat areas.

The Habitat Conservation Areas (HCA) disturbance area limitations are identified in Section 6 of the Title 13 ordinance. These include:

- Single-family residential – Maximum disturbance area (MDA) allowed within HCAs is determined by subtracting the area of the lot or parcel outside of the HCAs from the total disturbance area (TDA) calculated below [TDA – Area outside the HCA = MDA]

HCA Total Disturbance Area Limitations for SFR	
HCA Type	**Total Disturbance Area**
High	50 percent of the lot area, up to a max of 5,000 sq. ft.
Moderate/Low	65 percent of the lot area, up to a max of 6,000 sq. ft.

- All other zones – Maximum disturbance area (MDA) allowed by right within Low, Moderate and High HCAs in these zones are noted; this MDA is subject to mitigation requirements iterated below.

HCA Disturbance Area Limitations for all zones other than SFR	
HCA Type	**Total Disturbance Area**
High	10 percent of HCA on site
Moderate	15 percent of HCA on site
Low	50 percent of HCA on site

- Mitigation requirements for disturbance in HCAs – Tree replacement and vegetation planting are required when development intrudes into an HCA, except for wetlands and waterway mitigation requirements imposed by state and federal law.

  Trees, shrubs and ground cover must be native plants selected from the Metro Native Plant List. Must meet Mitigation Option 1 or 2, whichever results in more tree plantings; except that where the disturbance area is one acre or more, Mitigation Option 2 must be used.

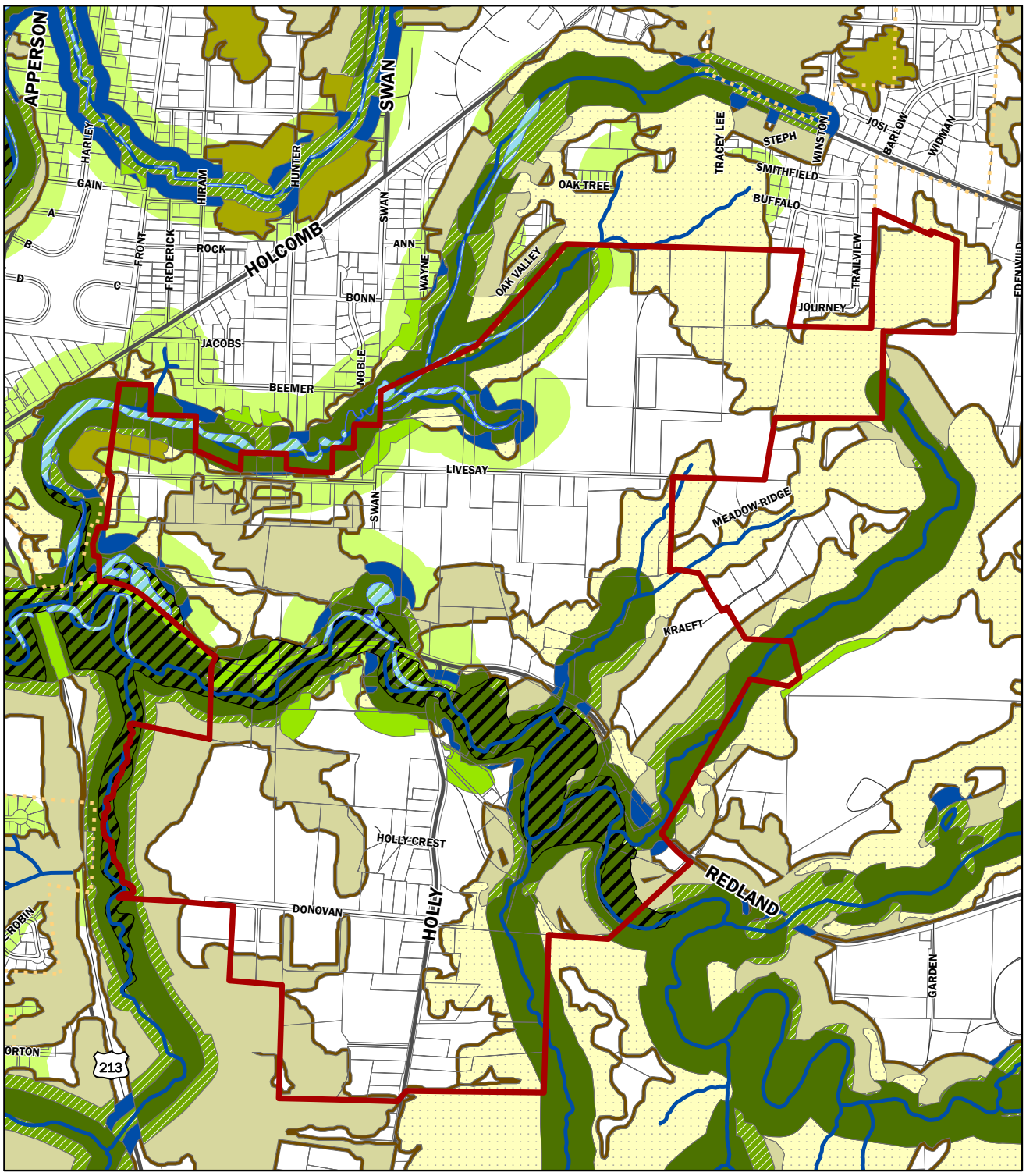
  Mitigation Option 1: Mitigation requirement is based on number and size of trees removed from site. Trees must be replaced per the following table. Bare ground must be planted or seeded with native grasses or herbs.

Mitigation Option 1: Tree Replacement	
Size of tree to be removed (inches in diameter)	**Number of trees and shrubs to be planted**
6 to 12	2 trees and 3 shrubs
13 to 18	3 trees and 6 shrubs
19 to 24	5 trees and 12 shrubs
25 to 30	7 trees and 18 shrubs
Over 30	10 trees and 30 shrubs

  Mitigation Option 2: Mitigation requirement is based on the size of the disturbance area within a HCA. Trees and shrubs must be planted at a rate of 5 trees and 25 shrubs every 500 square feet of disturbance area.

  Plant spacing and location – Trees will be planted between 8 and 12 feet on-center and shrubs will be planted between 4 and 5 feet on center, or clustered in single species groups of no more than 4 plants, with each cluster planted between 8 feet and 10 feet on center.

  All vegetation must be planted on the applicant's site within the HCA or in an area contiguous to the HCA, provided that if the vegetation is planted outside of the HCA then the applicant shall preserve the contiguous area by executing a deed restriction.



Source: Oregon City GIS, 2006; Metro 2005

- project boundary
- streams
- wetlands
- Riparian Corridor Class I
- Riparian Corridor Class II
- Riparian Corridor Class III
- Upland Wildlife Habitat Class A
- Upland Wildlife Habitat Class B
- Upland Wildlife Habitat Class C
- Aquatic Impact Areas
- Upland Impact Areas
- 1996 flood zone
- WQR area

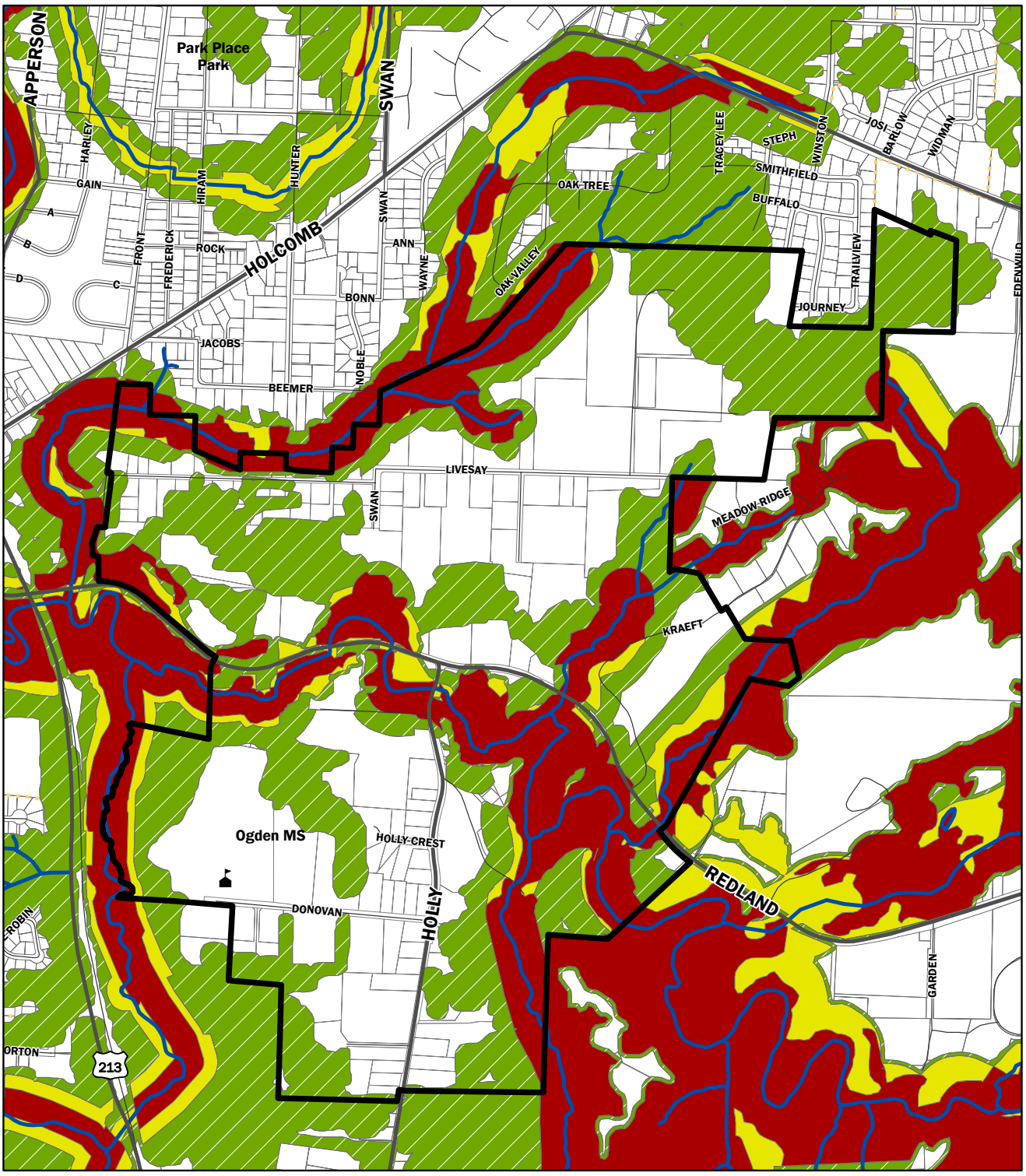
Water Quality Resource Area (WQRA) data is from the City of Oregon City

Park Place Concept Plan

Environmental: Goal 5

Note: Title 3 analysis for the area within the new urban growth boundary has not been completed by the City of Oregon City as of July 2006.

0 500 1,000
Feet



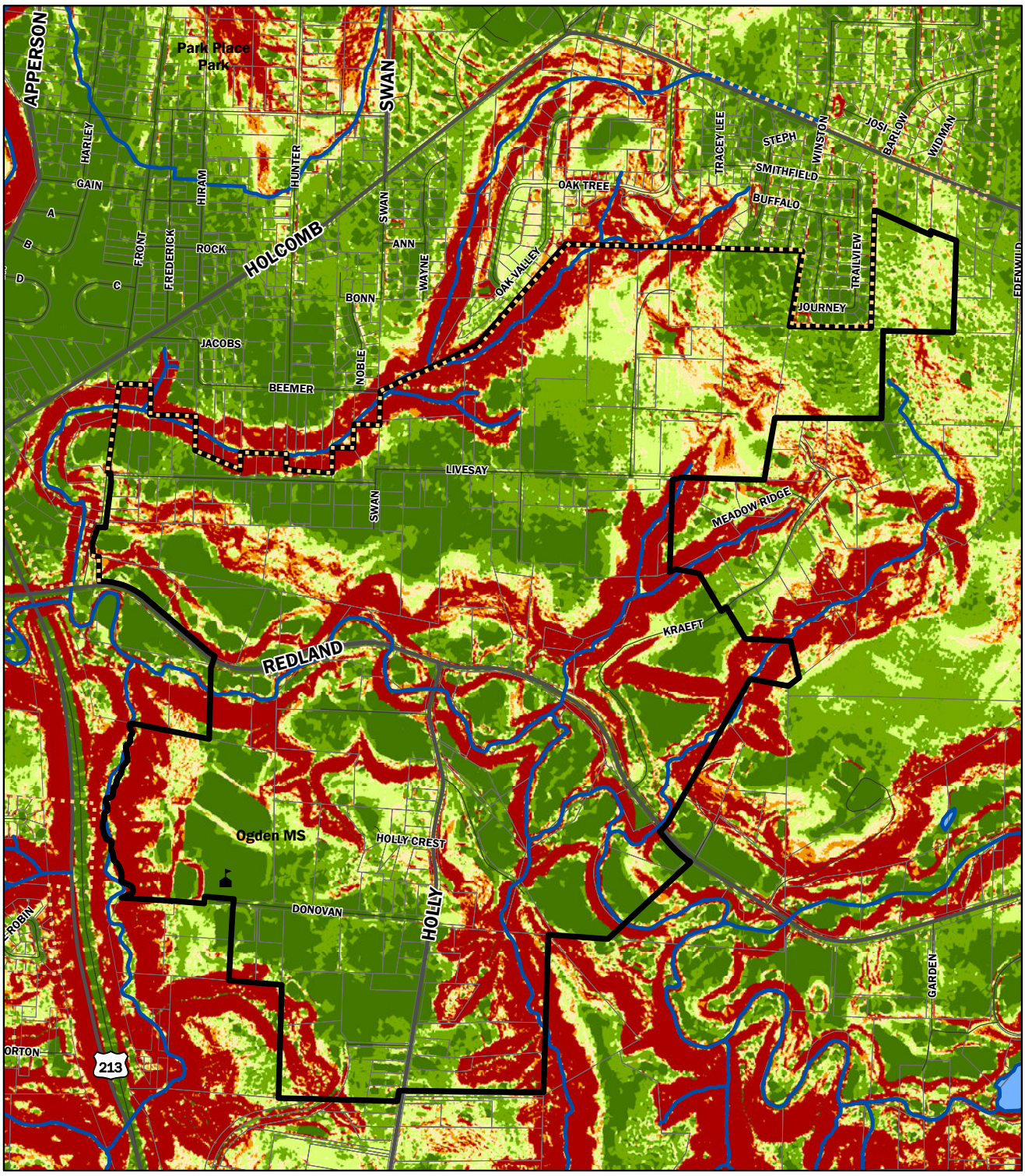
Source: Oregon City GIS, 2006; RLIS 2006

HIGH
MODERATE
LOW
NO HCA

Park Place Concept Plan

Habitat Conservation Area Values

0 500 1,000
Feet



Source: Oregon City GIS, 2006; RLIS 2006

less than 5%
5% - 10%
10% - 15%
15% - 20%
20% - 25%
greater than 25%

Park Place Concept Plan

Environmental: Slope Analysis

0 500 1,000
Feet

Park Place Goal 5 Resources

The accompanying Metro Inventory Map and HCA Map of the Park Place study area clearly identify three major riparian corridors. These include Livesay Creek, Abernethy Creek, and Newell Creek.

Livesay Creek

Livesay Creek lies along but largely outside the northwest border of the study area, yet some of its associated features, including the following significant natural resources, are included in the study area:

- Waterways – two tributaries of Livesay Creek
- Wetlands – identified largely as linear features associated with the tributaries
- Riparian Corridor Class I – lies adjacent to the tributaries at varying widths
- Riparian Corridor Class II – several very narrow small areas lie near the study area's western border and northern border
- Riparian Corridor Class III – two small areas of this resource are identified
- Upland Wildlife Area Habitat Class A – several small areas including a linear feature lie parallel to the waterways just beyond the riparian habitat, and a large area is represented in the northeast corner of the study area
- Upland Wildlife Area Habitat Class C – one small area of this resource is located just north of the confluence with Abernethy Creek.

Abernethy Creek

Abernethy Creek is the largest of the waterways within the Park Place study area and generally runs east to west near the center of the study area. The following significant resources are associated with or are located near Abernethy Creek:

- 1996 Flood Zone – the majority of the main stem of Abernethy Creek is mapped as flood zone
- Waterways – Abernethy Creek along with several tributaries that lie along the southeastern boundary of the study area
- Wetlands – three are identified, one near the confluence with Livesay Creek, a linear feature associated with Abernethy Creek, and a pond-like feature just north of the creek near the center of the study area
- Riparian Corridor Class I – lies adjacent to the main stem and its tributaries at varying widths
- Riparian Corridor Class II – several small narrow areas lie adjacent to the Class I resources near the main stem and tributaries with a wider width resource associated with the northern tributary along the southwest boundary
- Riparian Corridor Class III – several areas of this resource are located north and south of the main stem near the center of the study area
- Upland Wildlife Area Habitat Class A – the majority of the resource is associated with the tributaries and lies just beyond the riparian corridors or immediately adjacent to the waterway
- Upland Wildlife Area Habitat Class B – there are several large irregular areas of this resource located near the interior of the study area north and south of Abernethy Creek and along the southern border of the study area, and several linear features associated with the tributaries

Newell Creek

A portion of Newell Creek lies along but largely outside the southwest border of the Park Place study area, yet some of its features, including the following significant natural resources, are included in the study area:

- 1996 Flood Zone – all of Newell Creek within the study area is identified as flood zone
- Waterways – Newell Creek
- Riparian Corridor Class I – a narrow band lies adjacent to the creek
- Riparian Corridor Class II – a very narrow ban lies adjacent to the Class I resource
- Upland Wildlife Area Habitat Class B – a relatively large irregular area of this resource is located immediately east of the riparian habitat.

F. SUMMARY OF FINDINGS

Water Infrastructure (water, sanitary and stormwater)

Limited water service exists within the study area except for a small portion of Livesay Road which is served by the Oregon City water distribution system. Capacity exists within the Oregon City system to be expanded within the study area. Transmission mains, owned by Clackamas River Water, run through the study area to serve communities outside the study area and should be maintained.

Limited sanitary sewer collection exists within the study area. Many properties are on septic systems. A number of interceptor lines, owned by the Tri-City Sewer District, pass through the study area conveying sanitary flows from communities outside the study area and Ogden Middle School to the wastewater treatment plant. These interceptors and the treatment plant have capacity to serve future development within the study area.

Stormwater is presently managed in the study area with roadside ditches and natural drainage channels. No major stormwater infrastructure facilities exist beyond these surface facilities. All stormwater within the study area is conveyed to Abernethy Creek, Newell Creek, and Livesay Creek. Abernethy Creek and Newell Creek are subject to occasional flooding; however, no significant flood damage is known to have occurred in the study area since the 1996 flood.

Water, Sanitary and Stormwater General Findings:

- Limited water distribution exists
- Capacity exists in the water system to serve the study area
- Limited sanitary sewer collection exists
- Wastewater Treatment Plant and interceptors have capacity to serve the study area
- A natural stormwater drainage system exists

Natural Resources (goal 5 resources)

Natural Resources: Through evaluation and mapping efforts performed by Metro, habitat conservation areas in the Park Place Concept Plan project area have been established. Metro created an Inventory Map showing areas of greatest significance, called “regionally significant habitat,” which includes riparian areas, wildlife habitat, and parks and open spaces. From this map, Metro established a Habitat Conservation Area Map which identifies the highest value streamside habitat that will be subject to regulatory performance standards and best management practices. The Habitat Conservation Area Map will be utilized to establish buildable lands (ie, where to build, where to build with restrictions, and where not to build) within the Concept Plan area.

Natural Resources General Findings:

- Regionally Significant Habitats areas have been inventoried
- Habitat Conservation Areas have been identified including three major riparian corridors: Livesay Creek, Abernethy Creek, and Newell Creek.
- Development best management practices have been established

G. DOCUMENTS REVIEWED

Water Infrastructure:

- Water Master Plan, City of Oregon City (Yost West and Associates, October 2004)
- Water Master Plan, Clackamas River Water (MWH, May 25, 2005)

Sanitary Sewer Infrastructure:

- Sanitary Master Plan, City of Oregon City (TetraTech/KCM, December 2003)

Stormwater Infrastructure:

- Drainage Master Plan, City of Oregon City (January 1988)
- Draft Stormwater Management Plan, City of Oregon City (2006)
- Stormwater and Grading Design Standards, City of Oregon City (December 1999)

Goal 5 Resources:

- Metro's Nature in Neighborhoods Regionally Significant Fish and Wildlife Habitat Inventory Map (the "Inventory Map")
- Metro's Nature in Neighborhoods Habitat Conservation Area Map

Market Assessment

Market Assessment for the Park Place Concept Plan

The focus of this section is on outlining current and anticipated market conditions impacting viable development forms in the study area. The market for a range of prospective product types will substantively impact concept planning efforts in the area, informing the process in terms of development forms and scale of supportable uses.

Macroeconomic Overview

National Trends

National economic performance has been outstanding for an extended period of time, but there is concern that we are nearing the end of the current business cycle. The national economy expanded at a 5.3% rate in the first three months of 2006, the strongest performance since the Summer of 2003. Private spending on automobiles, computers and equipment, a surge in exports due to the weak dollar, and significant spending on post-Hurricane Katrina rebuilding by the federal government spurred the economy in the first quarter.

Given the failure of fuel price spikes to immediately slow economic growth, the housing market has emerged over the past three months as perhaps the most-watched economic variable. Consensus has emerged that the national market indeed peaked in August of 2005, declining thereafter with gradual increases in long-term interest rates. Nationwide, measures of the housing market are decidedly mixed and contributing to some ambiguity for Federal Reserve policy.

Caution is the order of the day, both from larger home builders and from the Federal Reserve. Economic strength in the face of higher fuel prices has Fed policy still biased towards rate escalation, but rate hikes have clearly put the brakes on the market via higher cost of short-term construction lending, higher cost of credit for consumers, and a hit to the lending sector. Johnson Gardner fully expects the Federal Reserve to continue to push short-term rates upward, at least once more before September.

Johnson Gardner is still bullish about the national economy, despite a cooling housing market nationwide. Fuel cost increases have appeared to not significantly affect economic strength as has been anticipated. While the recent jump in economic activity of 5.3% was impressive, it will not be sustained and activity is anticipated to return to 3.1%-3.3% annual growth for the remainder of 2006 provided households continue to react rationally and mildly to rising rates.

Portland-Vancouver Metropolitan Area

The City of Oregon City is considered part of the Portland metropolitan area, which is defined as for statistical purposes as Clackamas, Clark, Columbia, Multnomah, Skamania, Washington and Yamhill counties. The local economy continued to realize substantial employment growth throughout the first quarter, averaging around 39,000 more jobs in the quarter, and finishing March with employment levels exceeding 2004 levels by approximately 38,000. Trends in the commercial and industrial markets also indicate better than reported rates of growth or greater optimism for future space needs.

Employment gains during the last year were widespread, with all major industrial sectors reporting growth. In terms of the magnitude of growth, Manufacturing (4,900

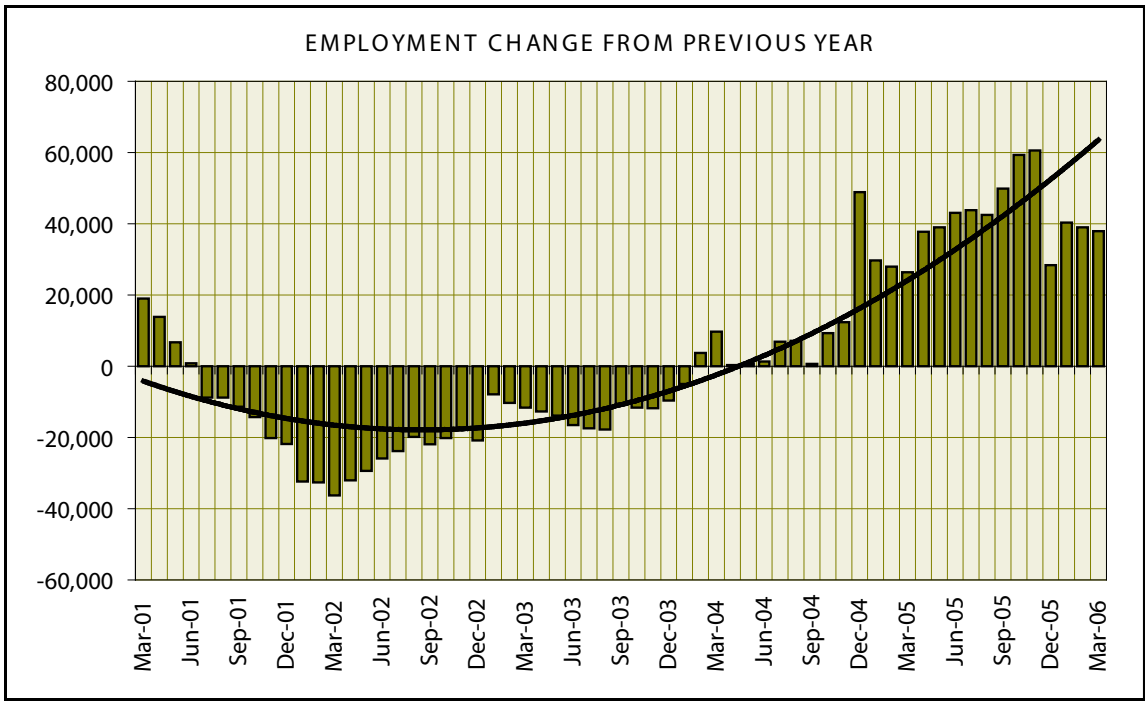
jobs), Professional and Business Services (4,700 jobs), Education/Health Services (4,100 jobs), and Trade Transportation Warehousing and Utilities (3,600 jobs) led the way. In terms of rate of growth, Manufacturing (9.0%), High Tech (4.3%) and Professional and Business Services (3.8%) grew the fastest.

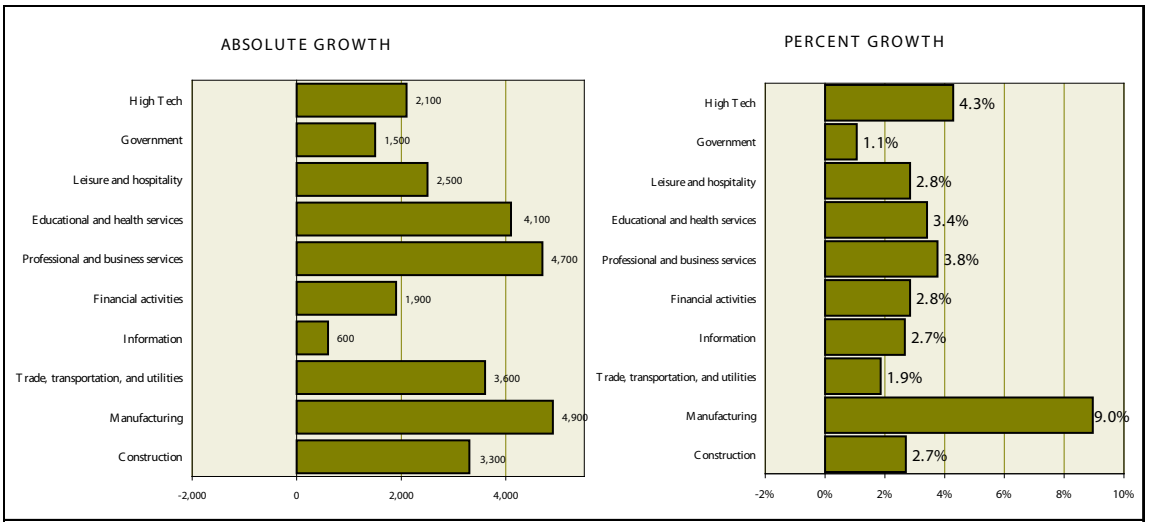
Population & Residential Permitting

While a positive rate of population growth was maintained during the recent economic decline in the Portland metropolitan area, the strong positive employment growth is a welcome sign that the level of growth can be sustained. Population growth has ranged from 1.0% to 2.6% for the last decade, a pace we expect to continue. Employment growth is expected to be around 4.0% during the next couple years, followed by growth under 2.0%, allowing the locally high unemployment rate to continue to drop to a more sustainable level.

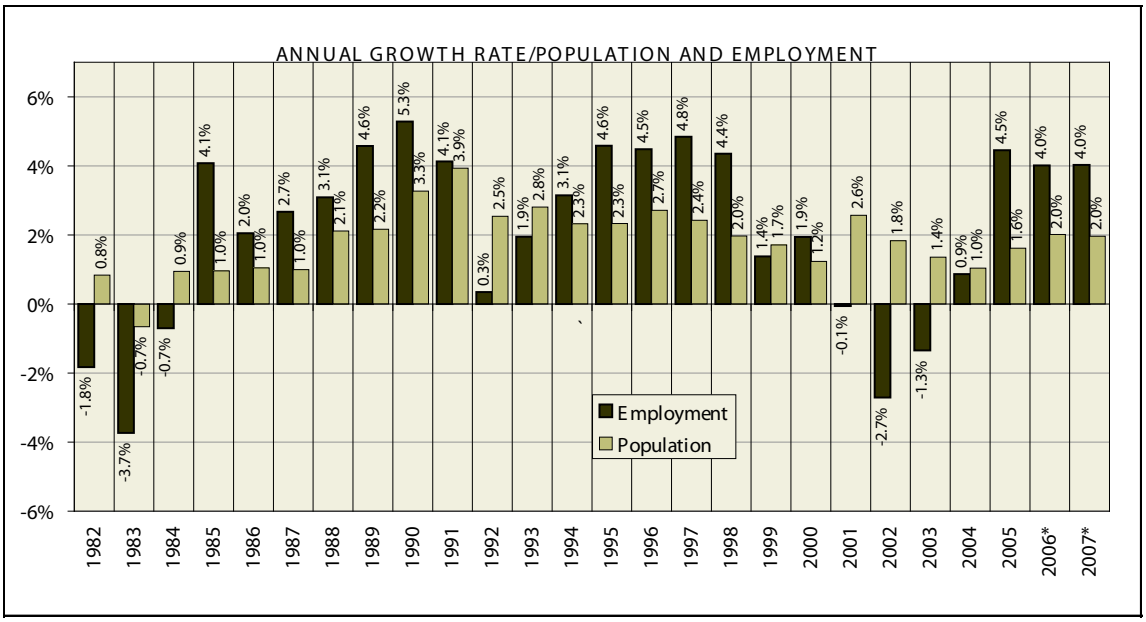
Population growth in the Portland metropolitan area has been shifting away from Multnomah County and towards the more suburban areas. Clackamas County has lagged behind both Washington and Clark Counties in terms of population growth rate over the last decade, but increasing land scarcity in Washington County is expected to drive a greater share of metropolitan area demand to Clackamas County over the next decade.

Continued population growth allowed for a continued strong level of residential construction activity.



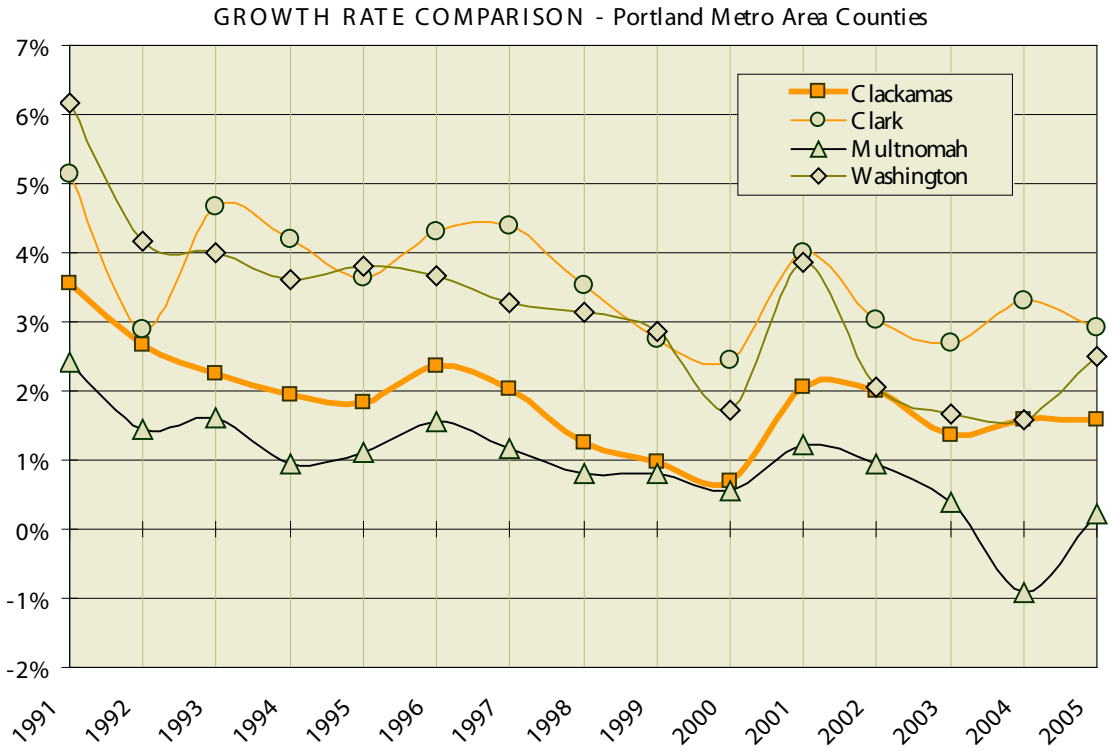


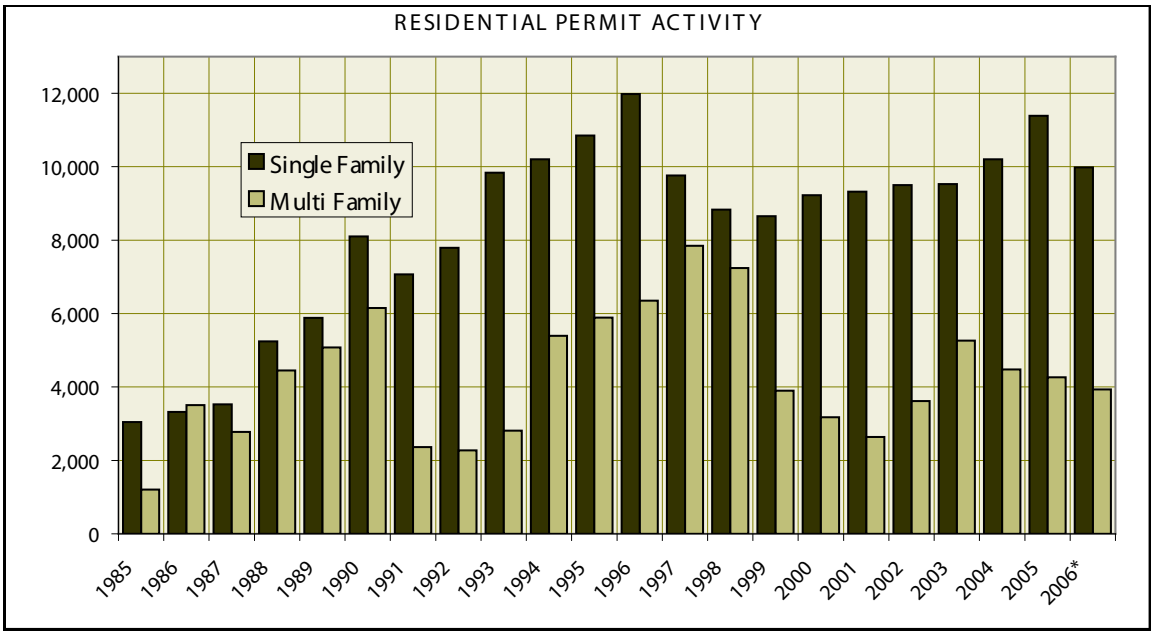
1/ Trade, Transportation, Warehousing & Utilities



*Reflects 2000 Census; updated historical data not yet available.

SOURCE: Center for Population Research and Census, State of Washington Office of Finance, and Johnson Gardner





* 2006 permit activity annualized based on activity through March
SOURCE: Bureau of the Census and Johnson Gardner

	July 1 Population Estimates						Census Population	
	2000	2001	2002	2003	2004	2005	4/1/2000	4/1/1990
CLACKAMAS	340,000	345,150	350,850	353,450	356,250	361,300	338,391	278,850
Barlow	140	140	140	140	140	140	140	118
Canby	12,910	12,790	13,440	13,910	14,110	14,385	12,790	8,990
Damascus						9,670		
Estacada	2,380	2,460	2,440	2,440	2,450	2,480	2,371	2,016
Gladstone	11,470	11,450	11,620	11,790	12,140	12,170	11,438	10,152
Happy Valley	4,650	4,930	5,810	6,370	6,640	7,275	4,519	1,519
Johnson City	635	630	630	630	630	630	634	586
Lake Oswego (part)*	33,115	33,270	33,428	33,530	33,595	33,740	32,989	28,317
Milwaukie	20,540	20,550	20,550	20,580	20,590	20,655	20,490	18,670
Molalla	5,710	5,690	5,780	5,800	5,930	6,395	5,647	3,637
Oregon City	26,200	26,680	27,270	28,100	28,370	28,965	25,754	14,698
Portland (part)*	750	760	759	770	780	785	747	707
Rivergrove (part)*	290	290	290	290	310	315	287	267
Sandy	5,425	5,380	5,780	6,200	6,360	6,680	5,385	4,154
Tualatin (part)*	2,695	2,725	2,740	2,820	2,895	3,065	2,664	1,406
West Linn	22,440	23,090	23,430	23,820	23,970	24,075	22,261	16,389
Wilsonville (part)*	14,360	14,165	15,585	14,225	14,595	14,855	13,987	7,096
Unincorporated	176,290	180,150	181,157	182,035	182,745	175,020	176,288	160,128

Oregon City Area Trends

Population

The City of Oregon City experienced rapid population growth during the 1990s, with the pace of growth decreasing in the last several years.

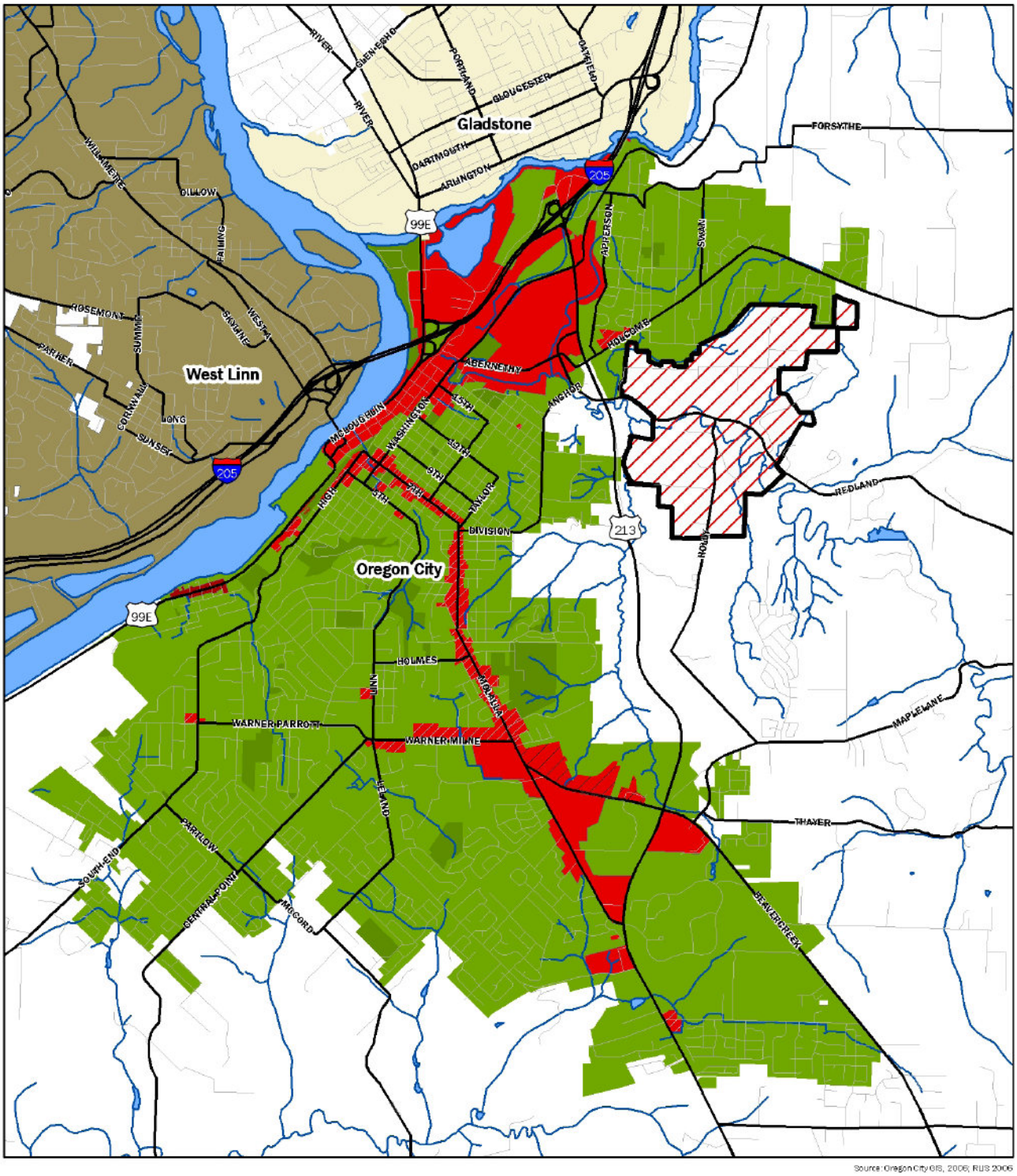
The City of Oregon City's population base grew at an average annual rate of 5.8% from 1990 through 2000, almost three times the rate of growth for Clackamas County during the same period (2.0%). The rate of growth since 2000 has ranged from 1.0% to 3.0%, as the supply of developable land has diminished.

Oregon City has accounted for a greater share of recent population growth in Clackamas County than any other jurisdiction. The population base grew at an average of over 1,100 persons from 1990 through 2000, with annual growth in the last five years ranging from an estimated 270 to 830 persons. Increasing price pressure in the Portland metropolitan area has led to a shift to markets such as Oregon City that offer a greater housing value. The level of population growth in Oregon City is increasingly constrained by land supply, which the concept planning areas such as Park Place will address for a period of time.

Residential permit trends mirror this trend, with annual permit levels exceeding 200 units per year for all but one year over the last decade.

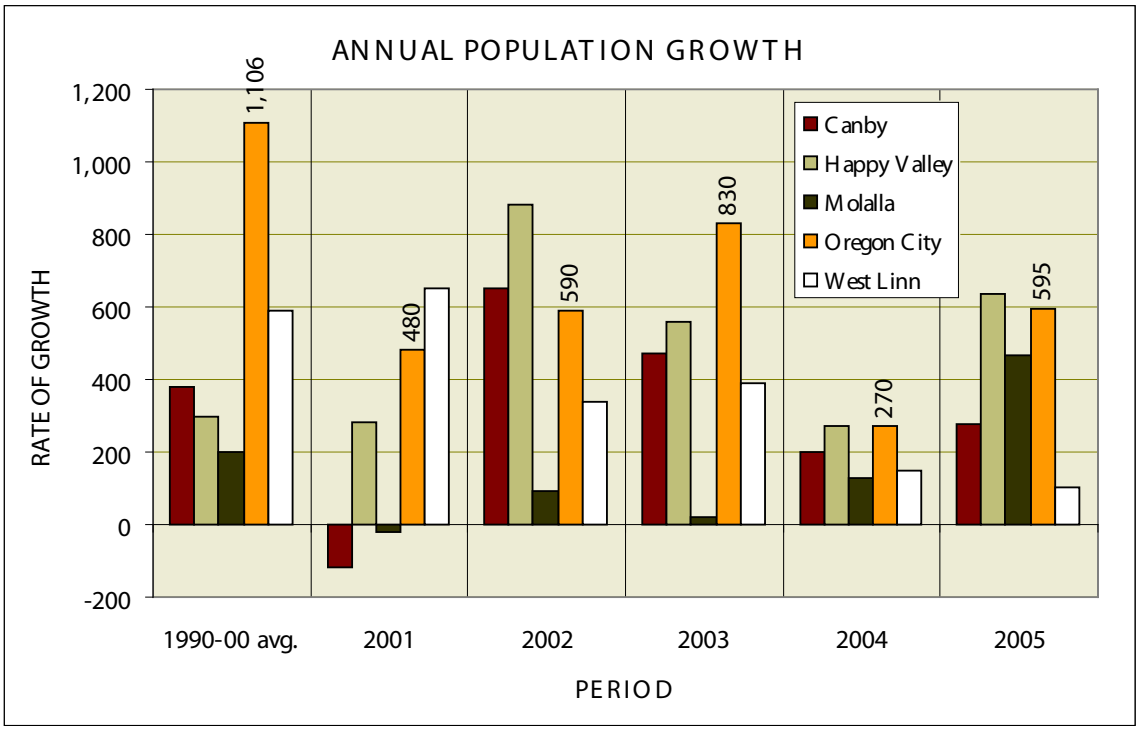
Retail Market Trends

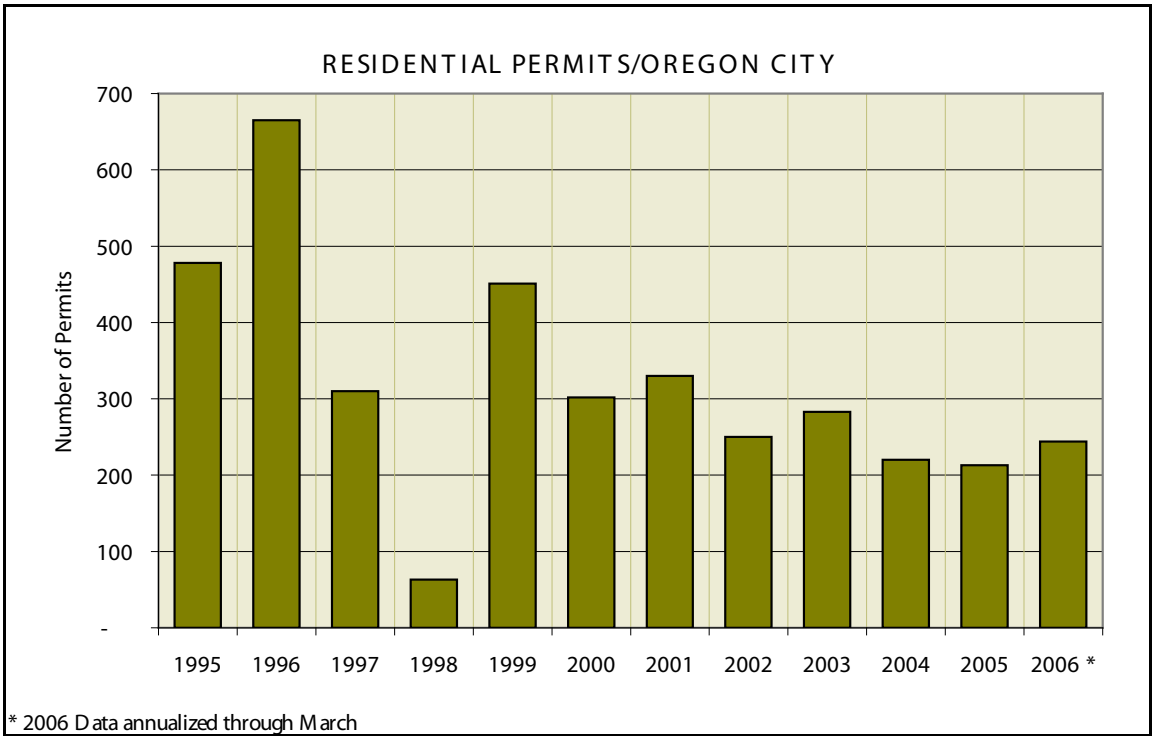
The retail market is currently an area of opportunity for Oregon City, as population levels and local buying power increase. The area of greatest apparent need is for regional serving retail uses, as typically found in centers such as Clackamas Town Center, Bridgeport Village and Washington Square.



Park Place Concept Plan

Context: Oregon City Commercial Zoning - Relationship to Study Area





* 2006 Data annualized through March

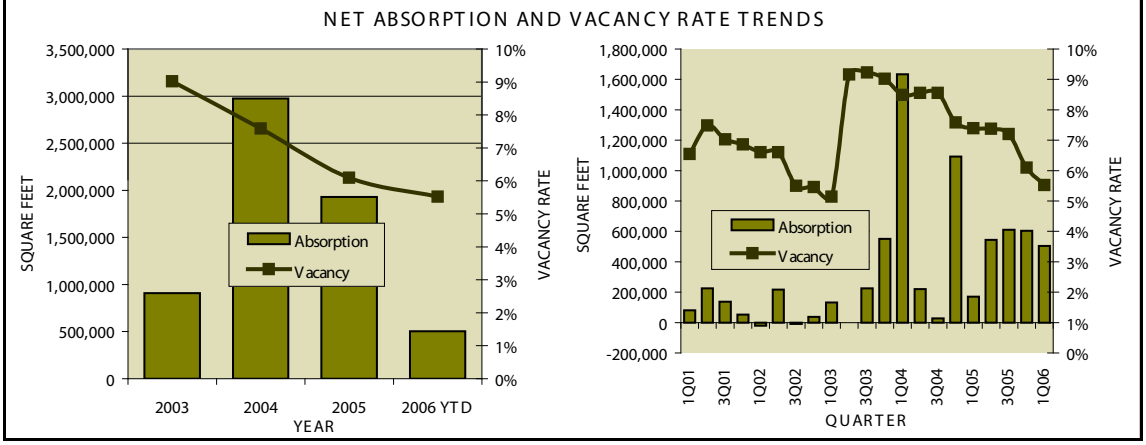
Portland Metropolitan Area Trends

The Portland metropolitan area's retail market vacancy rate continues its ten-quarter gradual decline from a high of 9.2%. In the first quarter, the market absorbed 504,000 square feet while adding 163,000 square feet of new space. Vacancy in tracked space on Co-Star dropped from the last quarter to 5.5%. In regional and power centers , vacancy remained minimal, while community/neighborhood centers continued their positive trend, with vacancy dropping to only 4.2%. Mixed-use (9.9%) and strip/specialty/urban centers (8.8%) again had the highest vacancy rates, though occupancy was up substantially for both compared to the previous quarter.

Mixed-use retail space typically reports vacancy levels well above average, as this type of space does not include typical anchor stores (such as a grocery or department store), and the tenants tend to turn over on a more regular basis.

The most significant recent retail development in the Region, Bridgeport Village in Tualatin, sold last year for a price of $366 per square foot. The 465,000 square-foot lifestyle center has been well received and several new retail projects are scheduled

	Speculative Inventory	New Construction	Inventory Adjustments	Net Absorption	Vacancy S.F.	Vacancy Rate
BREAKOUT BY CLASS						
Strip/Specialty/Urban	19,908,766	86,388	1,120,835	345,245	1,752,208	8.8%
Community/Neighborhood	24,740,783	0	-2,716,765	218,441	1,030,945	4.2%
Mixed Use	1,729,813	76,488	35,205	114,919	170,874	9.9%
Power/Regional	11,402,999	0	-2,497,855	-174,479	235,322	2.1%
Total	57,782,361	162,876	-4,058,580	504,126	3,189,349	5.5%



for construction in the area along I-5. Major upcoming additions to Portland area retail include the 280,000 square-foot IKEA megastore, which is set to begin construction later this year at Cascade Station, and Kohl's, which will be building three stores and converting a fourth.

A total of 1.30 million square feet of new space is projected to enter the market over the next twelve months, while demand is estimated at 1.16 million square feet. While the Portland market has successfully absorbed recent surges in construction, this will be tested with the large amounts of new supply scheduled to enter the market in the next two years. Our demand model predicts market vacancy will edge up slightly to 5.6% by the first quarter of 2007, and continue upwards to 6.4% by the first quarter of 2008.

The City of Oregon City is included as part of the broader Oregon City/McLoughlin Corridor subregion. This market is among the healthiest in the Portland metropolitan area, with an overall vacancy rate of just over 5%. To-date, the area has been missing a regional retail center, but the proposed development by CenterCal in Oregon City will address that deficiency. Current plans for that center appear to indicate a "lifestyle center" concept, which mirrors a traditional downtown environment. The proximity of this development to the study area will have a profound influence on viable retail forms in the planning area.

The retail market appears to be quite healthy, despite what is probably considerable leakage of regional retail expenditures outside of the area. The recent and anticipated level of residential growth in the area should allow for an expansion of retail opportunities locally, while new development addresses the regional retail needs of the community. Marginal rent levels appear to be adequate to support new construction.

The study area suffers somewhat as a retail location, with limited exposure and a location on the periphery of the urbanized area of Oregon City. There is some opportunity to capture sales from traffic passing through from more rural areas to the east and north, but this will be limited. The existing and projected population base in the study area will likely support only a limited scale of retail development, which will be neighborhood oriented. The largest anticipated tenant would be a grocer, but this is seen as unlikely unless support is anticipated from a broader trade area.

Office Market Trends

Portland Metropolitan Area

On a metropolitan area level, the office market has been recovering from an extended over-build period. While the overall market was soft, most of the vacancy was felt

	Speculative Inventory	Vacancy S.F.	Vacancy Rate
BREAKOUT BY CLASS			
Strip/Specialty/Urban	551,236	19,334	3.51%
Community/Neighborhood	1,822,545	108,597	5.96%
Mixed Use	54,500	2,850	5.23%
Power/Regional	0	0	N/A
Total	2,428,281	130,781	5.39%
BREAKOUT BY SUBMARKET			
Damascus/Sandy	202,838	72,058	35.52%
SE Outlying	406,611	3,970	0.98%
Oregon City	1,377,904	52,457	3.81%
Canby	440,928	2,296	0.52%
Total	2,428,281	130,781	5.39%

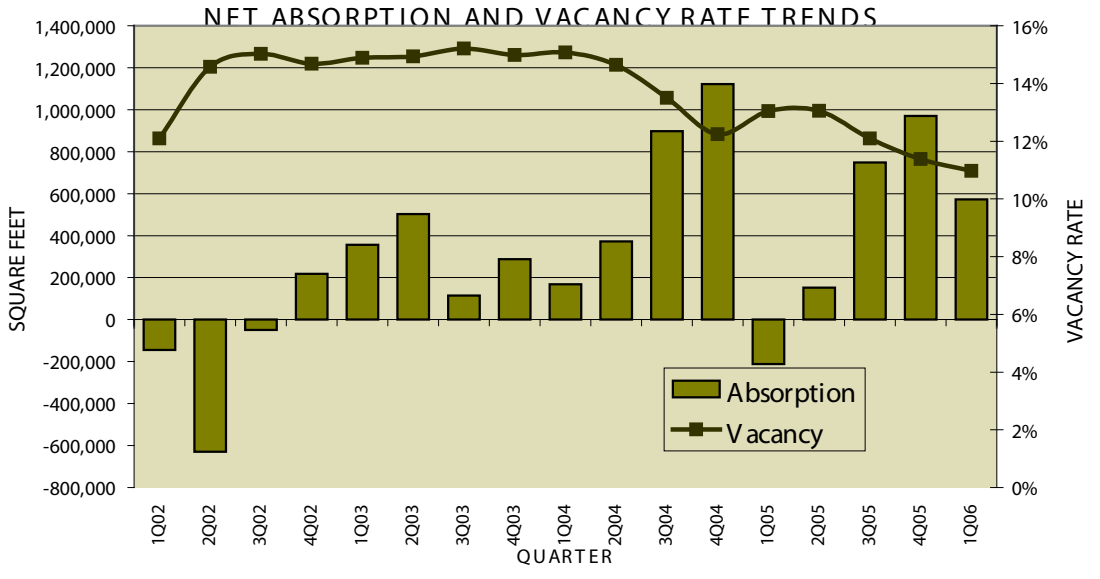
NET ABSORPTION AND VACANCY RATE TRENDS

in the tech-heavy Sunset Corridor and downtown Portland submarkets. The suburban markets remained relatively healthy, as population growth continued bringing an associated demand for uses such as medical office.

The Portland metropolitan area's speculative office market reported an increase in overall occupied office space during the first quarter of 2006 of over 570,000 square feet, the fifth-largest quarterly gain in the past five years despite significant new construction. The strong absorption and general tightening of the market suggest a continued positive future outlook. The direct vacancy rate and total vacancy including sublease space dropped to 11.0% and 11.5%, respectively. Office space is typically underwritten with an assumed 10% vacancy rate, which is considered a structural rate of vacancy consistent with a balanced market. Using this baseline, the market overall is still somewhat over-supplied, but moving towards stabilization.

The direct vacancy rate for Class-A space is estimated at 7.6%, or 8.3% with sublease space included, a drop that is consistent with the overall market. Direct vacancy is estimated at 13.4% and 12.4% for Class-B and Class-C space, reflecting a continued move to quality in this buyer's market. An estimated 7.3 million square

	Speculative Inventory	Net Absorption	Vacancy Direct	Vacancy Sublease	Vacancy Direct	Vacancy Total
BREAKOUT BY CLASS						
Class A	25,707,577	134,623	1,962,987	165,588	7.64%	8.28%
Class B	26,550,035	352,473	3,566,105	131,488	13.43%	13.93%
Class C	14,021,915	85,959	1,742,335	43,857	12.43%	12.74%
Total	66,279,527	573,055	7,271,427	340,933	10.97%	11.49%



feet of tracked space is directly vacant, with 341,000 square feet of space identified for sublease. The amount of sublease space has now declined consistently over the past nine quarters, and both direct and total vacancies have been generally trending downward over the past three years.

We are seeing vacancy rates below 10% in the I-5 South Corridor, the Sunset Cor-

ridor/Hillsboro, and the East Multnomah County subregions. The first two markets, along with Kruse Way/ Washington Square, serve major executive housing concentrations and have performed far better than the Portland CBD over the last decade. The strongest submarkets in terms of occupancy are Close-In Northeast Portland (3.8%), the I-205 corridor in East Multnomah County (5.6%), and Kruse Way in Lake Oswego (6.2%).

Soft market conditions and low net lease rates are expected to limit new supply over the next year to just over 1.0 million square feet, while demand is forecasted to exceed 2.3 million square feet. Our demand forecasts for office space are employment driven, and as a result do not factor in the marginal impact of soft market conditions and reduced effective lease rates. During periods of relatively high vacancy, aggressive leasing tactics have the ability to generate demand through reducing the effective cost of space to tenants. While this can lead to an increase in net absorption, it is important to recognize that the impact is temporary, and does not change the underlying demand for space if priced appropriately. Our projected demand increase reflects predictions for improved economic performance in the region.

Oregon City Area

Oregon City is included within the broader Oregon City/Gladstone/Milwaukie submarket in terms of tracked office space. This market reported a 13.9% vacancy rate at the end of the first quarter of 2006, and is heavily weighted towards lower quality Class B and Class C space. The vacancy rate has improved significantly over the last few years.

The Oregon City market has only a limited amount of Class A office space, which is typically found in more regional-serving office concentrations with outstanding regional access. Due to the limited visibility and access in the study area, any office space demand will likely be based on community needs, supported by the area's population base. Likely tenant types would include medical office, insurance brokerages, real estate brokerages, title companies, and other professional office users. These types of office tenants will often utilize ground floor commercial space, as they have a significant amount of customer traffic, but can be located in more traditional office configurations.

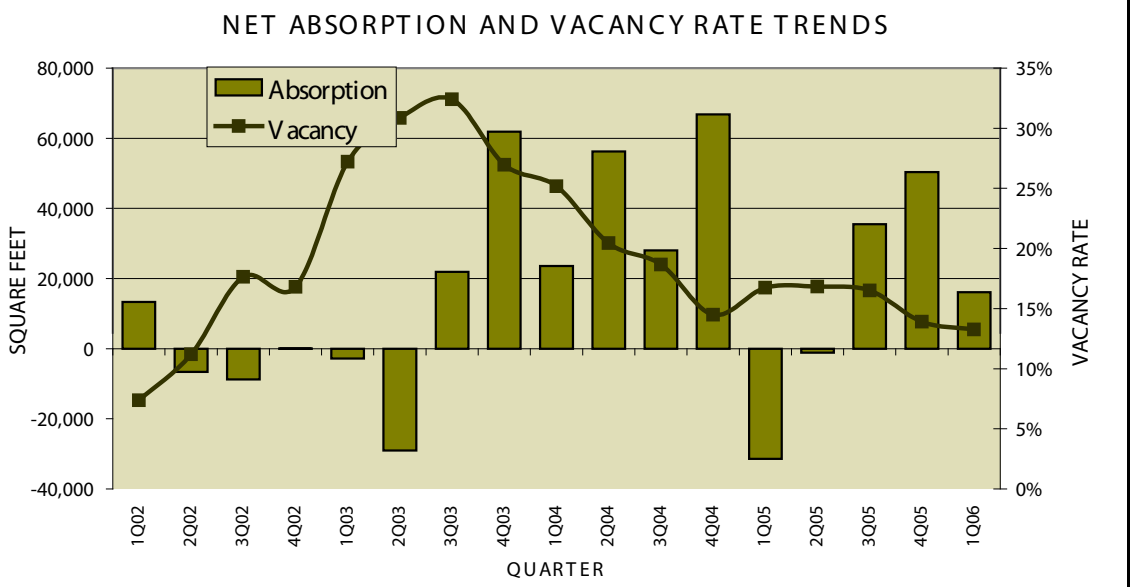
Conclusion

The study area is characterized by varied topography, with limited access points and visibility. As a result, the predominant land uses in the area is expected to be residential. We would expect that a level of commercial (retail and office) development will be supportable in the area, which will assist in organizing the concept planning while being limited in scale. The metropolitan area economy has been enjoying a period of substantial employment growth. Trends in the commercial and industrial markets also indicate better than reported rates of growth or greater optimism for future space needs. Population growth held steady during the recent economic decline in the Portland metropolitan area, and the recent employment growth indicates that the level of growth can be sustained.

The retail market is currently sound in the Oregon City area, although there is a notable lack of regional-draw retail space. Retail is an area of obvious opportunity in the Oregon City area, as population levels arise and associated levels of local buying power increase. The pending development of a major regional retail center in the immediate area will address the need for the broader community, with retail development in the study area limited to neighborhood supported uses.

The study area is expected to support between 20,000 and 40,000 square feet of retail space when fully developed. The area has limited access points, making it an

	Speculative Inventory	Net Absorption	Vacancy Direct	Vacancy Sublease	Vacancy Direct	Vacancy Total
BREAKOUT BY CLASS						
Class A	171,710	9,412	56,595	0	32.96%	32.96%
Class B	941,960	-13,052	130,565	0	13.86%	13.86%
Class C	855,749	19,757	73,893	0	8.63%	8.63%
Total	1,969,419	16,117	261,053	0	13.26%	13.26%



unlikely candidate for more regional serving retail services. From a market perspective, a commercial center that can capitalize on through traffic from existing arterials will increase the viability of retail space, particularly during the study area's build-out period.

Office space demand within the study area will respond to community needs, supported by the area's population base and industrial activity. Likely tenant types would include medical office, insurance brokerages, realty companies, title companies, and other professional office users. These types of office tenants will often utilize ground floor commercial space, as they have a significant amount of customer traffic, but could be located in more traditional office configurations.

Commercial development in the planning area is not seen as necessary for the success of the area, which is expected to be developed largely as residential. The commercial needs of the planning area could be met outside of the concept planning area by existing and planned developments. Commercial development can serve in the role of organizing the concept plan, providing a community center. In addition, commercial development can meet some of the needs of the community, providing a marketable amenity for the residential development while reducing trips out of the neighborhood.

References

1. Goal 9 data from the City of Oregon City.

C. Charrette Process

C. Charrette Process

Concept Plan

The Preferred Concept for the Park Place study area was developed during a multi-day planning charrette which was held on October 15-October 19, 2006. Following the five-day charrette, the consultant team updated the Preferred Alternative to more accurately reflect the location of existing and proposed streets, neighborhoods and resource areas as well as buildable and non-buildable lands [reference buildable lands table]. Per this process, the revised Preferred Concept Plan became the Final Concept Plan [reference to final plan diagram].Following is is a brief summary of the agenda used at the charrette.

I. Overview of Charette

- Day 1 (Sunday, October 15)

  Reviewed with stakeholders the core values and evaluation criteria.

  Reviewed with stakeholders the opportunities and constraints diagram.

  Conducted site tour with stakeholders of selected locations in the study area.

- Day 2 (Monday, October 16)

  Held stakeholder meetings with public agency representatives, property owners, neighborhood group representatives and others, including PAC members (morning).

  Consultant team developed five preliminary planning alternatives (afternoon).

  Held Public Open House to review and comment on preliminary alternatives (evening).

- Day 3 (Tuesday, October 17)

  Met with public agency representatives and others who were unable to attend Day 2 stakeholder meetings and/or decided to return for additional individual meetings.

  Consultant team narrowed five preliminary planning alternatives to two refined alternatives; evaluated refined alternatives using evaluation criteria/core values (afternoon).

  Held Second Public Open House to review and comment on two refined alternatives using criteria/core values (evening).

- Day 4 (Wednesday, October 18)

  Held stakeholder group meetings with public agency representatives, property owners, neighborhood group representatives and others, including PAC members to review refined alternatives and recommend

preferred alternative (morning).

Consultant team refined preferred alternative based on feedback from morning stakeholder group meetings (afternoon).

- Day 5 (Thursday, October 19)

  Consultant team continued to refine preferred alternative (morning and afternoon).

  Held public meeting (Clackamas County Community College) to present preferred alternative (evening).

II. First Public Open House: Five Alternatives

As described above, Day 2 (Monday, October 16) of the charrette consisted of the team developing five land use and transportation alternatives which were presented to the public in an open house that evening, In general, the Holly Lane Extension, the Front-Holly Extension, the Holly-Swan Extension and the Holly Lane Extension-Variation with Redland Highway were well received by stakeholders. Stakeholders identified the following advantages to these four schemes:

- Direct connections to Holcomb and Redland Roads;
- Protection of riparian areas, floodways, steep slopes and other sensitive environmental or habitat areas;
- Development of mixed-use centers north and south of Redland, with a preferred center at the intersection of Livesay Road and the proposed Holly Lane Extension;
- Protection of the lower Livesay neighborhood cluster; and
- Development of a higher density residential cluster at Holly and Redland.

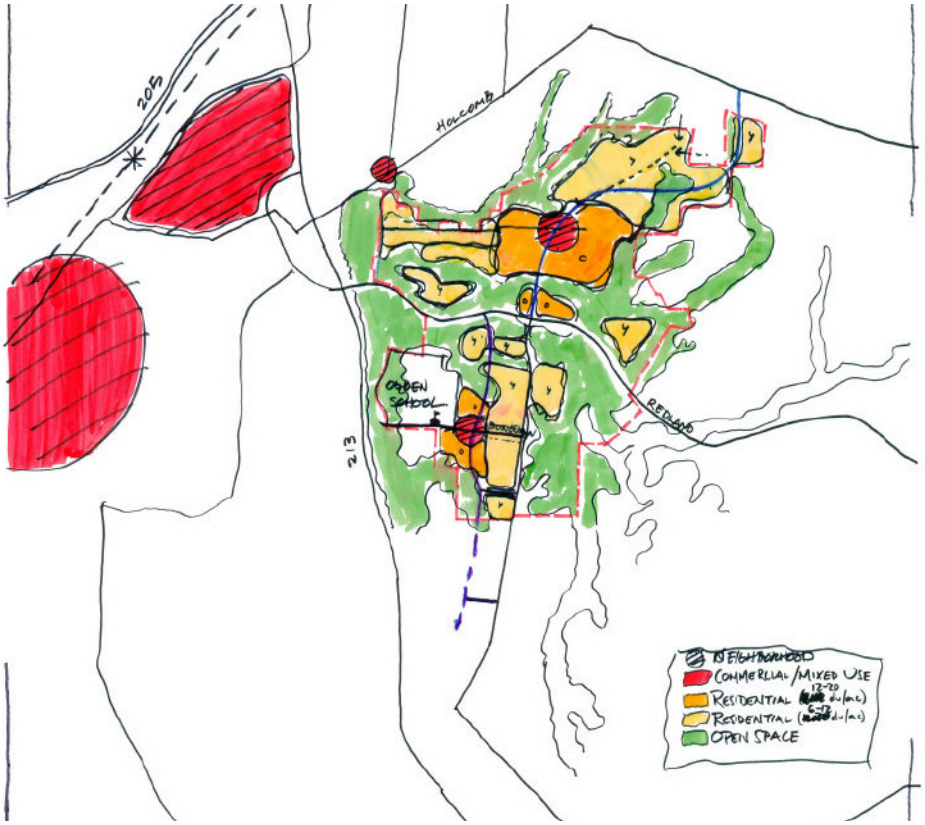
III. Second Public Open House: Two Refined Alternatives

Day three of the charrette (Tuesday, October 13), narrowed the five preliminary planning alternatives to two refined alternatives – the Holly Lane Extension and the Swan Avenue Extension. Successful common elements of the two schemes include:

- Direct connections to Holcomb and Redland Roads;
- Protection of riparian areas, floodways, steep slopes and other sensitive environmental or habitat areas;
- Development of mixed-use centers north and south of Redland, with a preferred center at the intersection of Livesay Road and the proposed Holly Lane Extension;
- Protection of the lower Livesay neighborhood cluster;
- Development of a higher density residential cluster at Holly and Redland.
- Use of the existing topography to incorporate a new road between Redland

and Holcomb (thereby limiting expensive infrastructure costs);

- Incorporation of a small loop road parallel to Holly and south of Redland;
- The provision of trail corridors along streams and between activity centers and neighborhoods;
- Bicycle and pedestrian connections to adjacent neighborhoods and schools;



Holly Lane Extension

Unique features of the Holly Lane Extension include

- *A new road parallel to the existing Holly Lane that terminates at Redland*
- *The extension of Holly Lane north of Redland through the pinch point located east of the Trailview Estates neighborhood to the intersection of roughly Holcomb and Barlow*

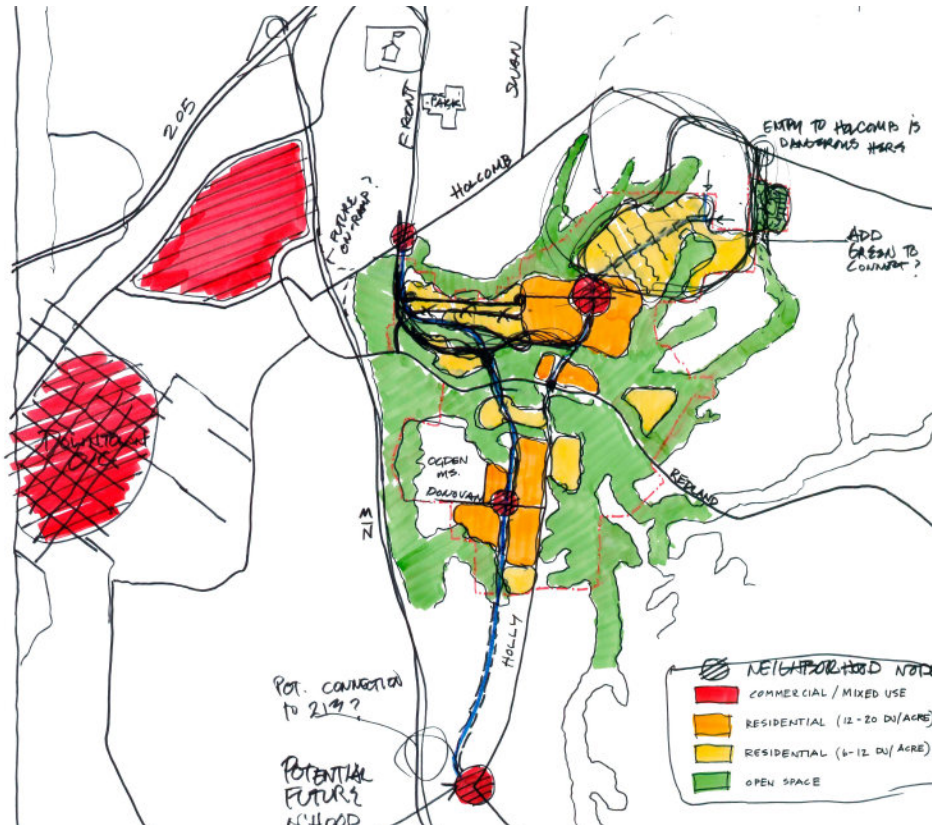
Unique features of the Holly Lane Extension-Variations with Redland Highway include:

- *A smaller loop road parallel to the existing Holly Lane that starts and ends at Holly Lane*
- *The extension of Holly Lane north of Redland through the pinch point located east of the Trailview Estates neighborhood to the intersection of roughly Holcomb and Barlow*

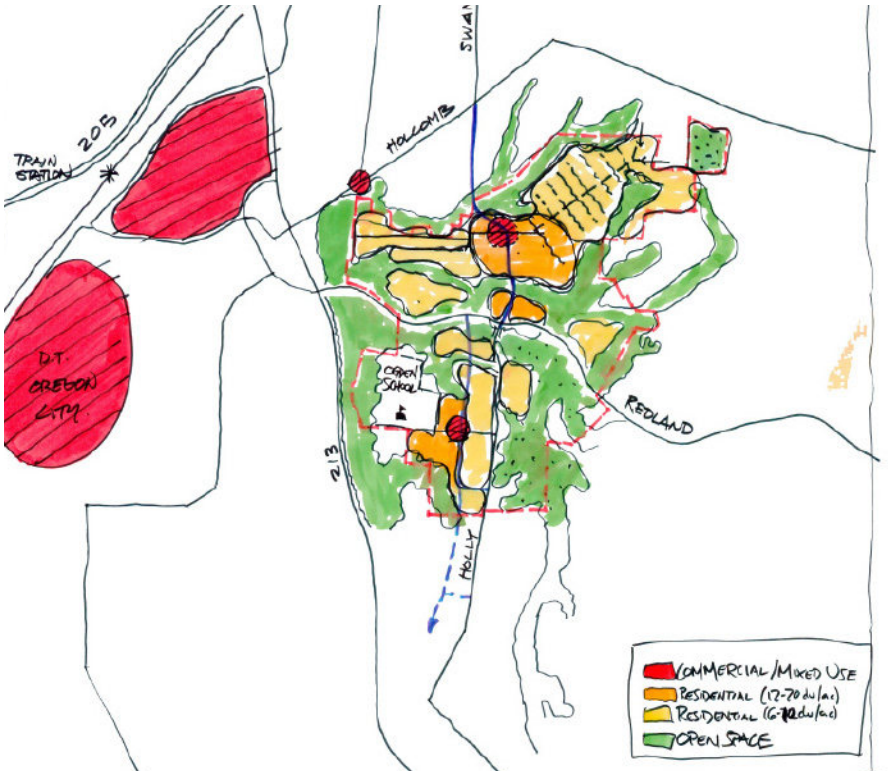
Holly Lane Extension/Variations

Unique features of the Front-Holly Extension include:

- *A new road parallel to the existing Holly Lane that crosses Redland and connects to Front Street, west of lower Livesay Road*
- *A new mixed-use commercial center at the intersection of Holcomb and Fronts Street*
- *The extension of Holly Lane north to the existing street network within the Trailview Estates Neighborhood.*



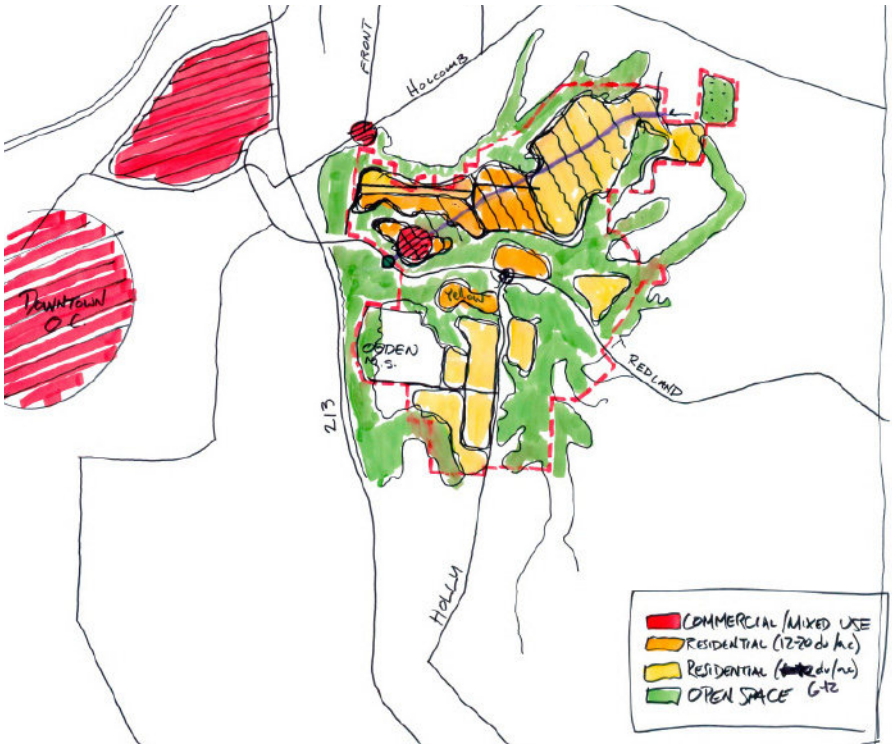
Front/Holly Extension



Holly/Swan Extension

Unique features of the Holly-Swan Extension include:

- *A new road parallel to the existing Holly Lane that terminates at Redland*
- *An extension of Holly Lane to Swan Avenue*
- *An extension of Upper Livesay Road to the existing street network within the Trailview Estates Neighborhood*



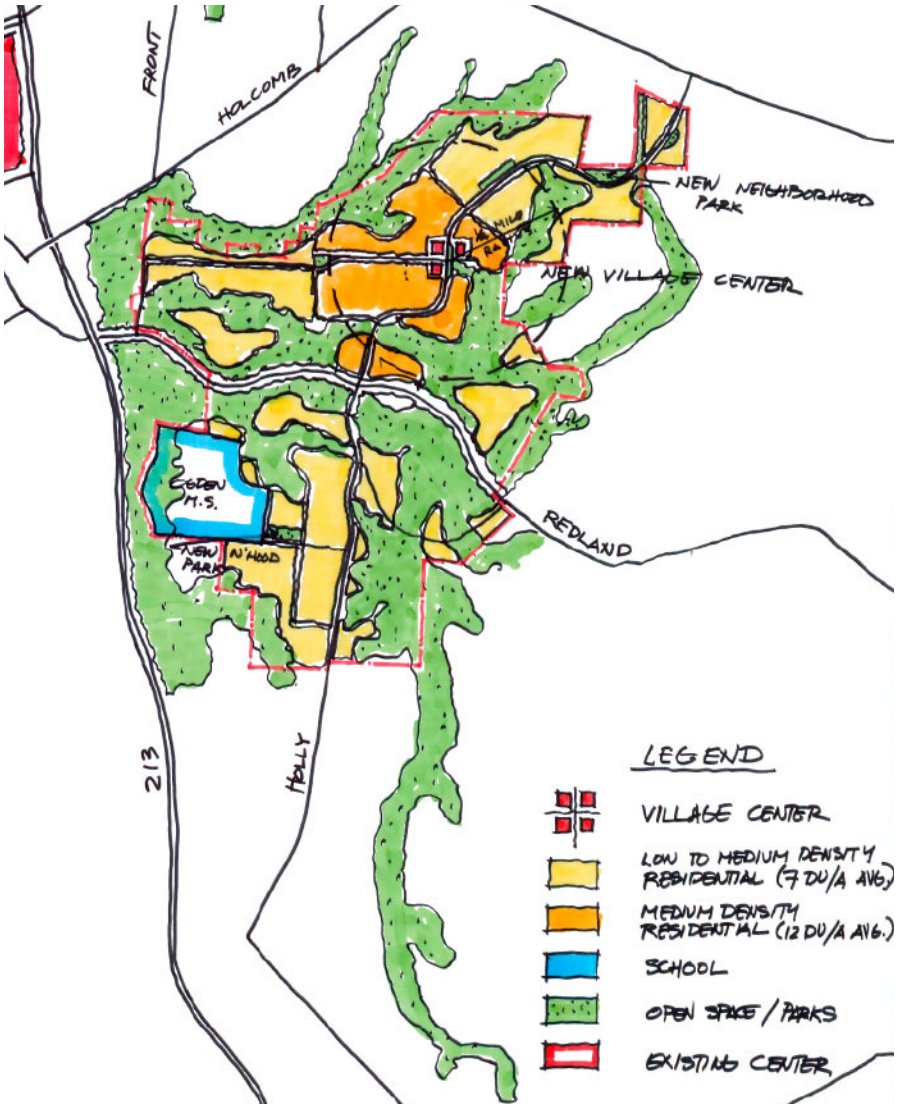
No Extention

The No Extension Alternative garnered limited support from stakeholders. Disadvantages of this scheme include:

- *No direct connections between Holcomb and Redland*
- *Lack of north-south connections through the larger study area*
- *The location of a large node west of Holly near the Highway 213 / Redland Interchange which does not serve the heart of the future community*

Unique features of the Holly Lane Extension include:

- *Extension of Holly Lane north of Redland to Holcomb Avenue, east of Trailview*
- *Retention of the existing single-family residential pattern, south of Redland*
- *Incorporation of medium density housing and neighborhood commercial-oriented land uses around a node at Upper Livesay and Holly Lane.*

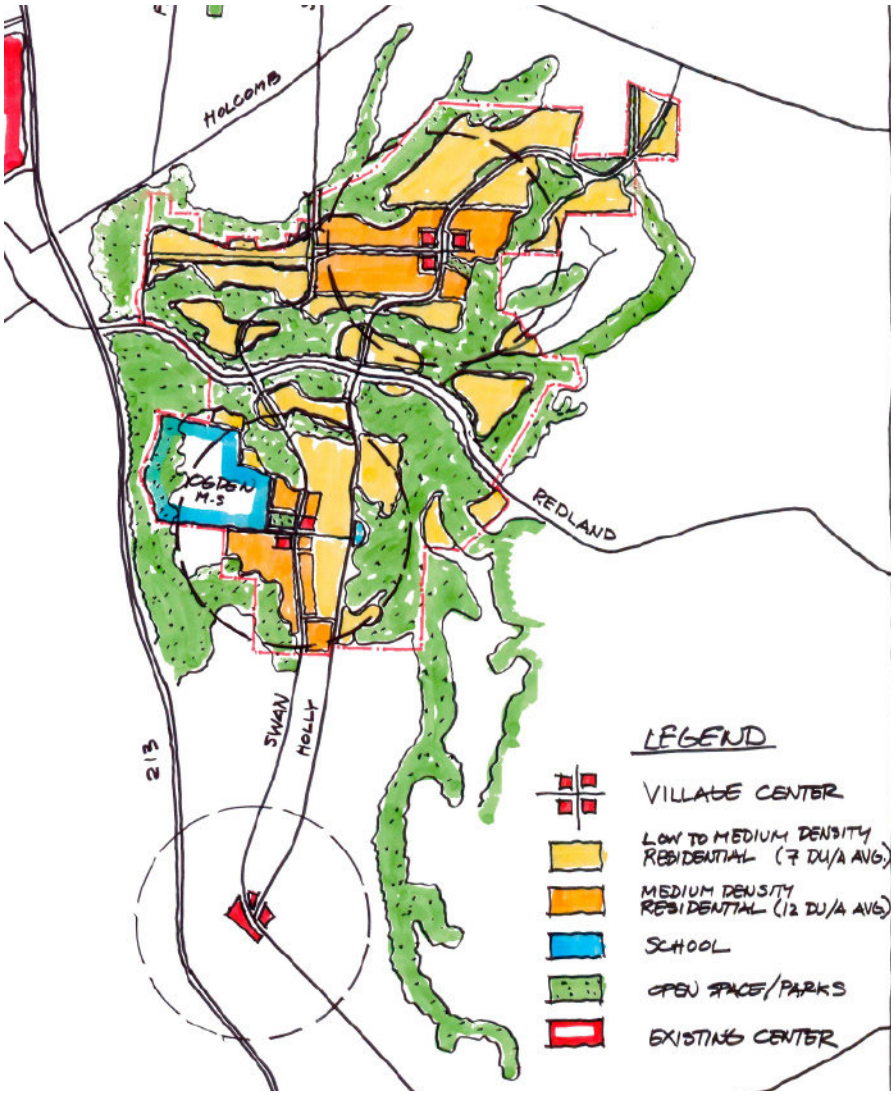


Holly Lane Extension

- Development of a mix of medium density (1 unit per 6,000 square feet) and higher density (1 unit per 3,500 square feet) housing.

The primary difference between the two refined alternatives is how the north-south connection through the site is treated. The Holly Lane Extension treats Holly Lane as the sole north-south connection. The new roadway builds off the existing roadway, which currently terminates at the intersection of Holly Lane and Redland Road. The new, extended roadway crosses Redland where it intersects with upper Livesay, creating the opportunity for a neighborhood-oriented commercial node, before connecting to Holcomb Road, east of Trailview.

By putting all the emphasis on Holly Lane, it is expected that the existing roadway and proposed street extension, as well as the existing bridge will need to be significantly enlarged to handle the traffic associated with the proposed new development north of Redland Road, as well as the increasing number of sub-divisions in the area. As part of the Holly Lane Extension proposal, the existing single-family residential development pattern south of Redland Road would



Swan Avenue Extension

Unique features of the Swan Avenue Extension include:

- *Extension of Holly Lane north of Redland to Holcomb Avenue, east of Trialview.*
- *Extension of Swan Avenue, which is identified in the City of Oregon City's Transportation System Plan as a collector, across Redland Road through Donovan Road.*
- *Development of a mixed-use "Main Street" along Upper Livesay.*
- *Incorporation of medium density housing and neighborhood commercial-oriented land uses at Donovan and Swan.*
- *Development of a Main Street along Livesay between Holly and Swan.*
- *Development of a node (gateway) at the intersection of Lower Livesay and Swan Avenue.*

be retained, with lands identified as buildable in the Buildable Lands Analysis developing over time with low and medium density single-family housing.

The Swan Avenue Extension proposal increases connectivity through the study area by adding a new north-south connection to Swan Avenue, in addition to the Holly Lane Extension. Both Holly Lane and Swan Avenue are designated as a City Collector in the City of Oregon City's Transportation System Plan. In this scheme, Swan Avenue is extended southward across the ____ravine through the intersection of Upper and Lower Livesay Road, across Redland Road through Donovan Road, before connecting with Holly Lane. Development of this secondary collector parallel to Holly Lane will provide additional opportunities for north-south connections through the study area, and is expected to help minimize the cross section width of both Swan Avenue and Holly Lane. In the short term, until traffic volumes increase with new development in the region, Holly Lane, including the bridge over Abernathy Creek would function using the existing right of way.

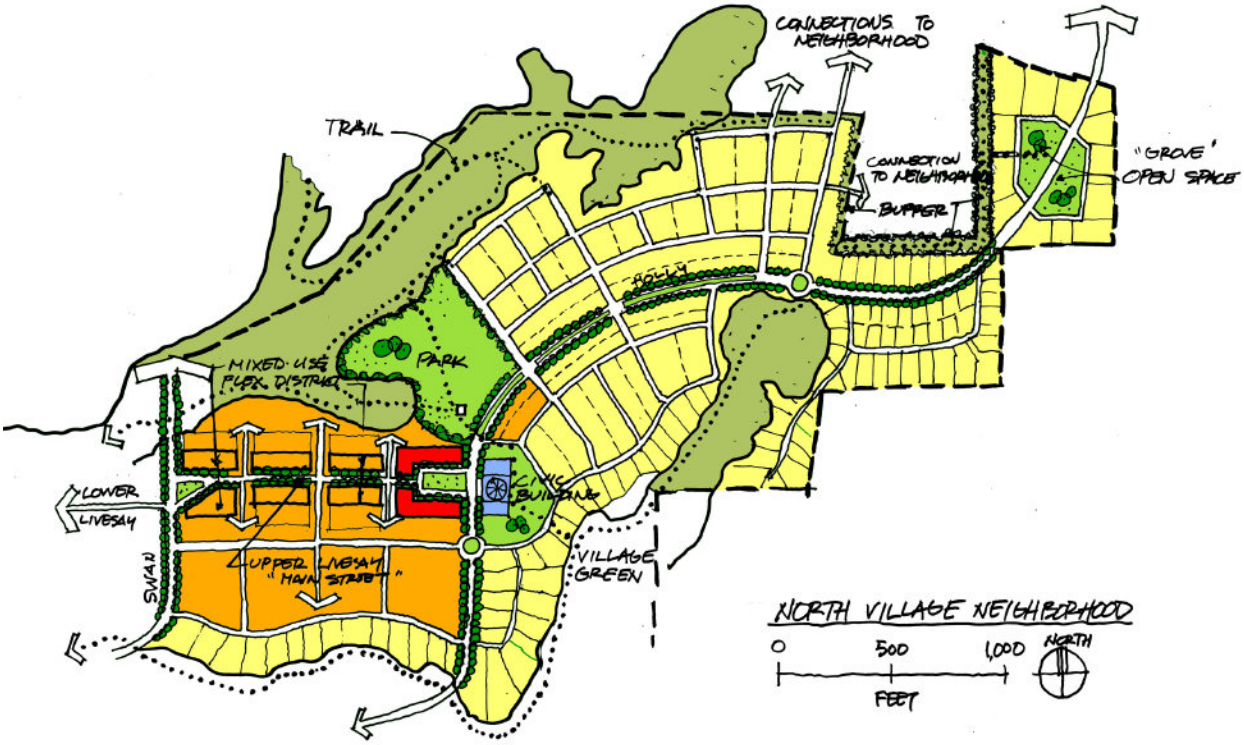
In addition to increased connectivity, the Swan Avenue Extension incorporates a commercial node both north and south of Redland Road. The Alternative North

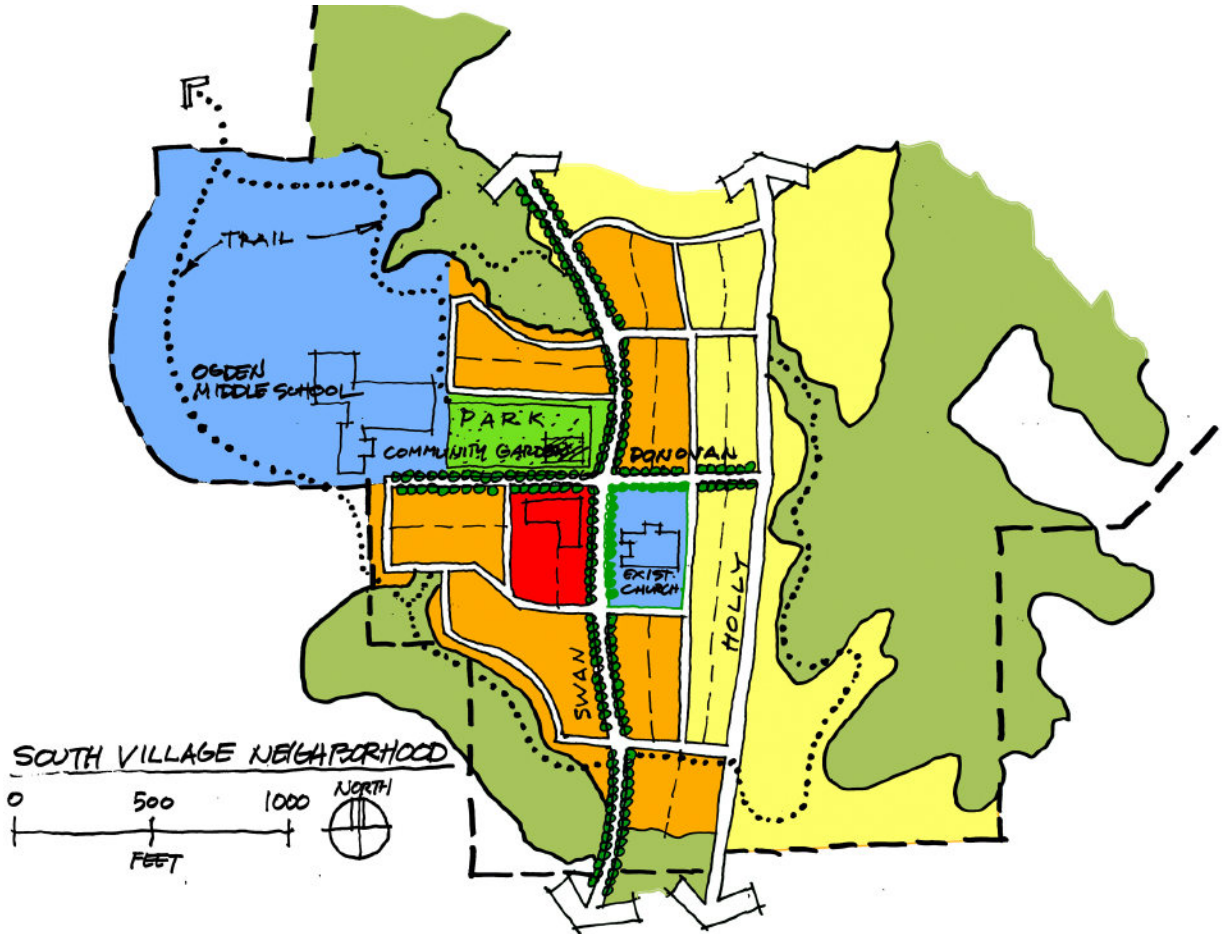
Village Neighborhood envisions a Mixed-Use “Main Street” along upper Livesay between Holly Lane and the proposed Swan Avenue Extension. A smaller village is proposed to the south at the intersection of Swan Avenue and Donovan Road.

Evaluation of the Two Refined Alternatives

On Tuesday evening, about 50 people attended a community open house. Participants reviewed and commented on the two Refined Alternatives. Earlier in the afternoon, the team performed an evaluation of the two alternatives using the evaluation criteria developed for the project. The team asked for comment, and conducted discussions with participants about the alternatives and the evaluation.

Y= Yes H= High Medium N=No L=Low		
--- = Not enough information to evaluate. To be assessed during subsequent phase.		
Criteria	Alt. 1: Holly Ln.	Alt. 2: Swan Ave.
Community Design		
Identifiable centers and green edges	Y	Y
Existing low density clusters	Y	Y
Mix of housing types and densities	M	H
Housing affordable to range of incomes	M	M
Greenway, street lighting, street furnishings	---	---
One or more mixed use centers	M	H
Central public space	Y	Y
Future school sites	N	N
Natural Resources		
Parks and open space per guidelines	Y	Y
Trail and open space connections	Y	Y
Protect natural resources	H	H
Avoid development in stability hazard areas	Y	Y
Water Infrastructure		
Mimic existing hydrology	---	---
Consistent with capacity of infrastructure	---	---
Optimize existing infrastructure	---	---
Transportation		
Street sized to handle future growth	Y	Y
Provide safe environment for all modes of travel	M	H
Opportunities for all modes of travel	M	H
Connectivity within and outside study area	M	H
Minimize increases in impervious surfaces	H	M
Minimize adverse impacts on existing properties	M	M
Financing and Other Criteria		
Funding sources pay for facilities and services	---	---
Uses fund costs of added services	---	---
Open and transparent process	---	---
Y= Yes H= High Medium N=No L=Low		


CONNECTIONS TO NEIGHBORHOOD
TRAIL
CONNECTION TO NEIGHBORHOOD
"GROVE" OPEN SPACE
BUFFER
HOLLY
PARK
MIXED USE FLEX DISTRICT
CIVIC BUILDING
LOWER LIVESAY
UPPER LIVESAY "MAIN STREET"
SWAN
VILLAGE GREEN
NORTH VILLAGE NEIGHBORHOOD
0
500
1,000
FEET
NORTH


TRAIL
OGDEN MIDDLE SCHOOL
PARK
COMMUNITY GARDEN
DONOVAN
EXIST. CHURCH
SWAN
HOLLY
SOUTH VILLAGE NEIGHBORHOOD
0
500
1000
FEET
NORTH

D. Evaluation Criteria

Park Place CONCEPT PLAN

Draft Evaluation Criteria

These criteria are intended to be both qualifiable and where appropriate quantifiable. These criteria build off applicable local and regional community development standards and practices. Criteria that involve quantitative or qualitative comparisons will use a consistent scale (low/ medium/high or 1/2/3 for comparison purposes).

- ☐ Do alternatives have easily identifiable centers and green edges that serve as a buffer between developed and natural areas? (yes/no criterion)
- ☐ Does the alternative maintain existing clusters of low density residential development and meet community / study area goals? (yes/no criterion)
- ☐ Is the potential mix of different types and densities of housing, in the alternative, compatible with existing community-wide conditions or goals? (yes/no; quantitative measure and comparison of alternatives)
- ☐ Does the alternative include housing types that are affordable to households with lower incomes (e.g., multi-family, single-family attached and single family homes on small lots)? (quantitative measure and comparison of alternatives)
- ☐ Does the alternative include potential designated gateways, street lighting, street furnishings or historical / artistic elements that add to the legibility of the neighborhood? (yes/no criterion)
- ☐ Does the alternative include one or more neighborhood commercially oriented uses or centers? (yes/no criterion)

Park Place
CONCEPT PLAN

- ☐ Is the heart of the commercial node oriented to a central public space or center? (yes/no criterion)
- ☐ Do the alternatives identify the location of future schools (and other civic uses) based on projected population estimates? (yes/no criterion)

NATURAL RESOURCES: PARKS, OPEN SPACE, NATURAL AND SENSITIVE ENVIRONMENTAL AREAS

- ☐ Does the alternative provide for parks and/or open space, consistent with city or national goals or standards? (quantitative comparison to existing or proposed standards)
- ☐ Does each alternative identify trail or open space connections between centers (yes/no for part 1 and low/medium/high for part 2)
- ☐ Does the alternative preserve and enhance existing natural resources (i.e., floodways, riparian areas, wetlands and wildlife habitat) and avoid development in inappropriate sites? (qualitative assessment and/or quantitative measure of the amount of constrained land devoted to open space and/or resource protection)
- ☐ Does the alternative avoid development in areas with slope stability hazard potential based on available slope stability information and assessment of degree of risk by consulting team? (yes/no criterion)

Park Place
CONCEPT PLAN

WATER INFRASTRUCTURE: STORMWATER, WATER AND SANITARY SEWER FACILITIES

- ☐ Do alternatives mimic natural hydrology (to the extent practicable) through the use of site-specific and regional stormwater management best management practices? (Assess existing watershed characteristics and relative impacts of each alternative)
- ☐ Are projected levels of development consistent with the capacities of existing or potential planned future infrastructure systems? (yes/no criterion)
- ☐ Do alternatives optimize the use of the existing infrastructure systems and improved infrastructure systems? (yes/no for part 1 and low/medium/high for part 2)

TRANSPORTATION INFRASTRUCTURE

- ☐ Are existing and proposed streets appropriately sized to accommodate projected growth in the planning area? (yes/no criterion)
- ☐ Will proposed transportation improvements provide a safe environment to travel by each mode? (qualitative: low/medium/high criterion)

Park Place CONCEPT PLAN

TRANSPORTATION INFRASTRUCTURE, continued.

- ☐ Are there appropriate opportunities to travel by multiple modes of transportation (walking, bicycling, driving, and transit) and are residents likely to use such facilities? (yes/no for part 1 and low/medium/high for part 2)
- ☐ Are there appropriate levels of connectivity by multiple modes within the area and to other areas of the community? (qualitative: low/medium/high criterion)
- ☐ Do proposed transportation improvements minimize increases in impervious surface and related environmental impacts? (qualitative: low/medium/high criterion)

FINANCING AND OTHER CRITERIA

- ☐ Do probable funding needs and prospective funding methods pay for enhanced levels of public service? (yes/no criterion)
- ☐ Do the alternatives optimize the use of existing public services and facilities? (yes/no criterion)

Park Place
CONCEPT PLAN

FINANCING AND OTHER CRITERIA, continued.

- ☐ Do the alternatives provide for a land use mix with fiscal characteristics adequate to fund the marginal cost of law enforcement, fire and other emergency services? (yes/no criterion)

- ☐ Was the Park Place Concept Plan an open and transparent process that is characterized by a clear, complete, timely and open communication and meaningful opportunities for involvement in the planning process? (yes/no criterion; approach: qualitative assessment by PAC members and community forum participants through evaluation questionnaire)

- ☐ Do the alternatives identify the location of future schools (and other civic uses) based on projected population estimates? (yes/no criterion)

E. Buildable Lands Methodology

Park Place Buildable Land Inventory Methodology

Title 11 of Metro's Urban Growth Functional Plan states that new urban area plans require a "provision for average residential densities of at least 10 dwelling units (du) per acre of net vacant buildable land in zones…" This average residential density is only applicable to areas recently added to the urban growth area. This section define the term "buildable lands" for Park Place Concept Plan study and outline a strategy for determining which lands within the project area qualify as "buildable lands." The purpose of this exercise is to determine the density of development required as part of Title 11.

For this study, buildable land is defined as land that is suitable for development or redevelopment. Briefly, the methodology for determining suitable lands in the Park Place project area is as follows:

Vacant Land + Redevelopable Land - Constrained Land - Other Land = Gross Buildable Land

Definitions

Vacant Land is sourced through Metro's Regional Land Inventory System (RLIS). This process, outlined in detail in Chapter 4 of the 2002-2022 Urban Growth Report: A Residential Land Need Analysis, defines vacant land as tax parcels with no improvement value or buildings, and partially-vacant land as parcels with an undeveloped portion of a lot that is larger than one-half acre. In this context, vacant land is simply that. It does not indicate whether the parcel is buildable or marketable.

Redevelopable Land is defined as non-vacant land that meets redevelopment thresholds established by market professionals and community members during the planning process. The primary assumption is that all properties with a square foot value (SFV) of $10/sf or less is a candidate for redevelopment. The SFV is derived by dividing the total market value of the property by the total area (market value/area = $/sf).

Constrained Land is land that is considered environmentally-sensitive and/or has limited or no redevelopment potential. Constrained lands considered unbuildable for inclusion in the buildable lands inventory are:

Class I and II Riparian Habitat areas (recognized as “High” and “Moderate” Habitat Conservation Areas (HCA) by Metro)
Steep slopes – Slopes greater than 25%
Major easements
Other Land is defined as land that has cultural and/or historic value. The category is also open to land that may be omitted from the buildable inventory for reasons not currently apparent.

Gross Buildable Area and Net Buildable Area

Since the residential density is based on “net buildable land,” it is necessary to convert gross buildable land to net buildable land to account for land needs for new roadways, sewer infrastructure, other public facilities, and civic institutions (i.e., churches, fraternal organizations, etc.) This planning process proposed using a methodology similar to that used for the Damascus-Boring Concept Plan, which allocates percentages of the gross buildable land for these services based on past performance, professional judgement, and community input. We proposed the following percentages to accommodate land needs for new infrastructure:

New Local Streets – 18%
Storm Drainage – 2.5%
Police, fire, and civic institutions – 3.5%

The total percentage of land deducted from the gross buildable area is 24%. Therefore, the equation for net buildable land is:

Gross Buildable Land – (24% of Gross Buildable Land) = Net Buildable Land

Net Buildable Lands Summary - UGB Expansion Area		
		acres
+	Vacant land (1)	208.36
+	Redevelopable Land (2)	38.54
	Development Base aggregate	*246.9*
-	25% > slopes (3)	70.1
-	Habitat Conservation Areas (4)	33.3
-	Right-of-way needs (5)	25.8
-	Stormwater facilities (6)	3.6
-	Civic uses (7)	5.0
-	School area	n/a
-	Historic properties - listed landmark (8)	0
-	Easements	
	Total buildable land	109.1
	Required minimum density (10 du/acre)	1091

Notes:

(1) RLIS database inventory (2006) clipped to expansion area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

(6) 2.5% of "buildable" land as determined by Clackamas County (ibid)

(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"

Buildable Land Summary - Livesay Area		
		acres
+	Vacant land (1)	129.5
+	Redevelopable Land (2)	42.1
	Development Base aggregate	*171.6*
-	25% > slopes (3)	37.2
-	Habitat Conservation Areas (4)	11.5
-	Right-of-way needs (5)	22.1
-	Stormwater facilities (6)	3.1
-	Civic uses (7)	4.3
-	School area	n/a
-	Historic properties - listed landmark (8)	1.66
-	Easements	
	Total buildable land	91.7
	at R-10 zoning density (4 du/acre)	367

Notes:

(1) RLIS database inventory (2006) clipped to Livesay area

(2) Clackamas County Total Market Value / Total Area (sf) of $10/sf or less

(3) 25%> slopes clipped to development base generated off a TIN from 2' contour shapefile

(4) Habitat Conservation Areas (HCA) with a rating of "High" or "Medium" as determined by Metro

(5) 18% of "buildable" land, as determined by Clackamas County (Pleasant Valley/Damascus Concept Plan)

(6) 2.5% of "buildable" land as determined by Clackamas County (ibid)

(7) 3.5% of "buildable" land for civic uses, including parks, police and fire

(8) Identified in the Clackamas County historic inventory as a "landmark"

F. Typology

PARK PLACE: COMMERCIAL TYPOLOGIES

VILLAGE COMMERCIAL

Mixing residential and commercial activities contributes to “eyes on the street” and focuses human activity in core areas at all times of the day. Commercial can be retail, office or civic uses, depending on demand.











F. Typology

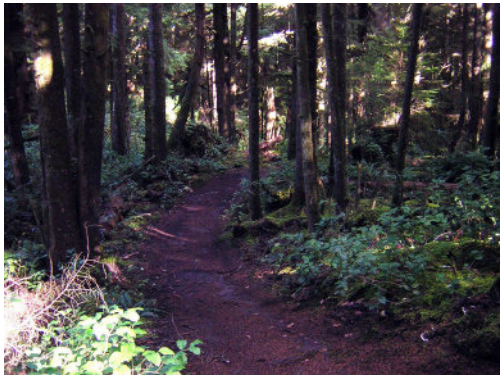
PARK PLACE: PARKS AND OPEN SPACE TYPOLOGIES

UNDEVELOPED NATURAL AREAS

Undeveloped natural areas are unprogrammed open areas typically consisting of steep slopes, wetlands, and other sensitive natural areas.

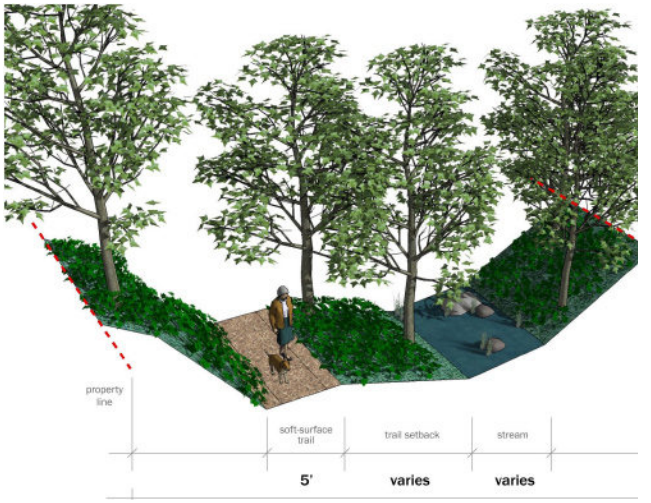
preserving creek corridors as open space provides benefits for both habitat and humans

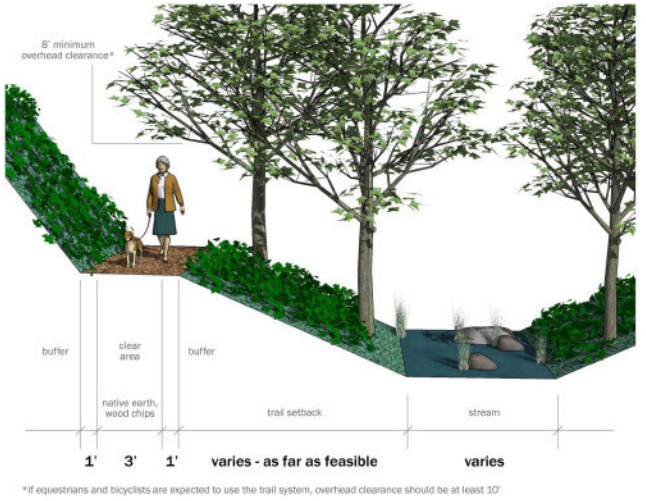
preserved wetlands can provide a natural buffer and transition area between development and natural areas



clusters and significant stands of trees should be preserved for habitat, shade, and windbreak

a greenway is a more formal way to preserve mature trees and open space and improve connectivity through the community



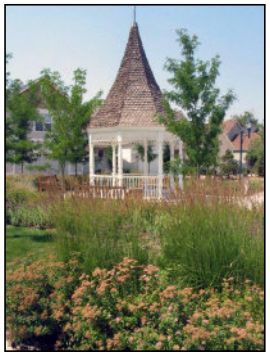


*if equestrians and bicyclists are expected to use the trail system, overhead clearance should be at least 10'

PARK PLACE: PARKS AND OPEN SPACE TYPOLOGIES

DEVELOPED OPEN SPACE: PARKS

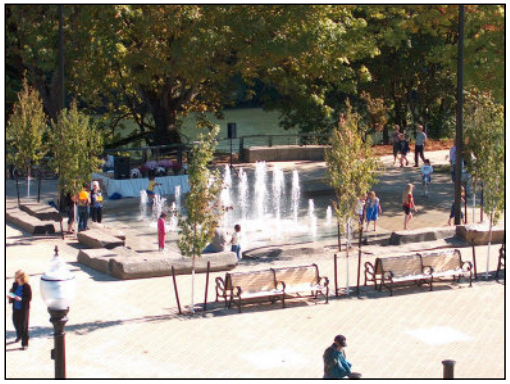
This type of open space is intended to provide public gathering and recreation space for community residents. A neighborhood park should be within 1/2 mile of each home in the community so that residents can easily walk or bicycle to them. Ideally, the parks should be connected with a trail system.



PARK PLACE: PARKS AND OPEN SPACE TYPOLOGIES

DEVELOPED OPEN SPACE: VILLAGE CENTER COMMONS

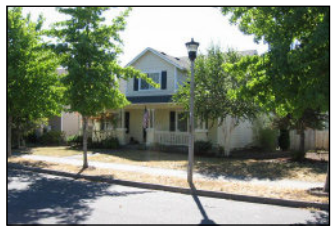
A Village Center Plaza or Commons provides a mix of soft and hardscapes for a variety of community uses, like farmers' markets, bazaars, concerts, and festivals. The urban design of the space creates a sense of enclosure but also permeability, with access from multiple points.



PARK PLACE: RESIDENTIAL TYPOLOGIES

SINGLE-FAMILY RESIDENTIAL

Single-family houses can be a range of sizes, styles, and colors. Above all, they should be community-oriented with architectural elements that encourage "eyes on the street" and neighbor interaction.



Rural roots. Variety. Community oriented. Green. Quality. Classic.

SINGLE-FAMILY RESIDENTIAL: affordable alternatives

Part of the challenge of meeting the housing needs of a growing and thriving region is to offer housing types that address the values that drive demand for detached, single family housing, but with smaller spaces and smaller price tags.

Housing Variety

Houses don't always have to have to maximize their size to provide a quality living space. A variety of housing sizes and types attract a mixture of ages, incomes, family structures and lifestyles to help create a richer, more diverse community.

Cottage Clusters

Cottage housing provides an option that preserves the privacy and personal space of a detached house in a smaller and less costly unit. Cottages provide a way to trade **quantity** of space **for quality** of space.

PARK PLACE: RESIDENTIAL TYPOLOGIES

MULTI-FAMILY HOUSING

There are a variety of ways to provide quality, community-oriented apartments. In some cases, apartment complexes can be designed to look like single-family residences and contain six or seven apartments. This provides density without dramatically changing the character of the neighborhood.

Highland's Garden (Denver, CO)

Multi-family housing clustered around common open spaces (instead of parking lots) help foster a sense of community that usually isn't found in conventional apartment complexes. Vehicle access is provided in the rear and with alleys.

MULTI-FAMILY HOUSING: alternatives

An ADU over a garage.

An auxillary dwelling unit (ADU) or "granny flat" is a second self-contained dwelling unit created on a lot with a house, attached house or manufactured home. These dwellings are typically small (no larger than 800 sf) and are intended to provide housing options for a variety of single occupant tenants. Units can be joined to/over garages or stand alone on the property.

The Rose House is a net-zero energy ADU in Portland. Net-zero energy means that the house produces as much energy as it uses.

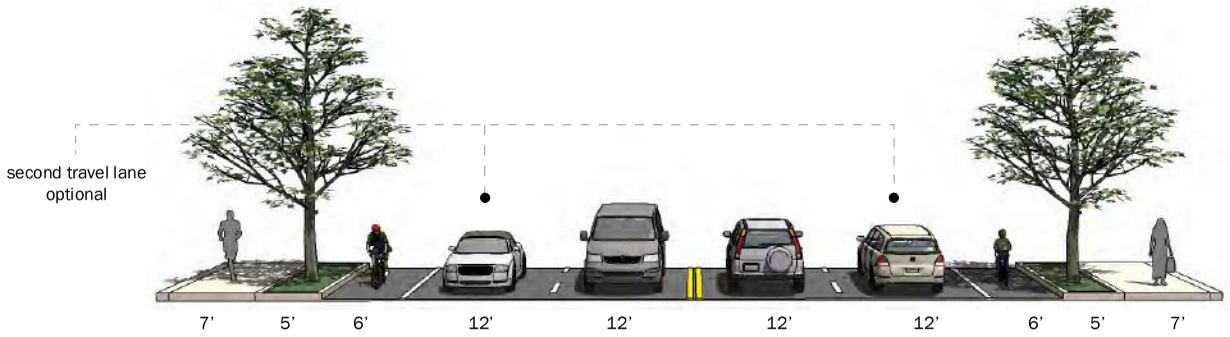
PARK PLACE: ROADWAY TYPOLOGIES

ARTERIAL ROADS

MINOR ARTERIAL 1

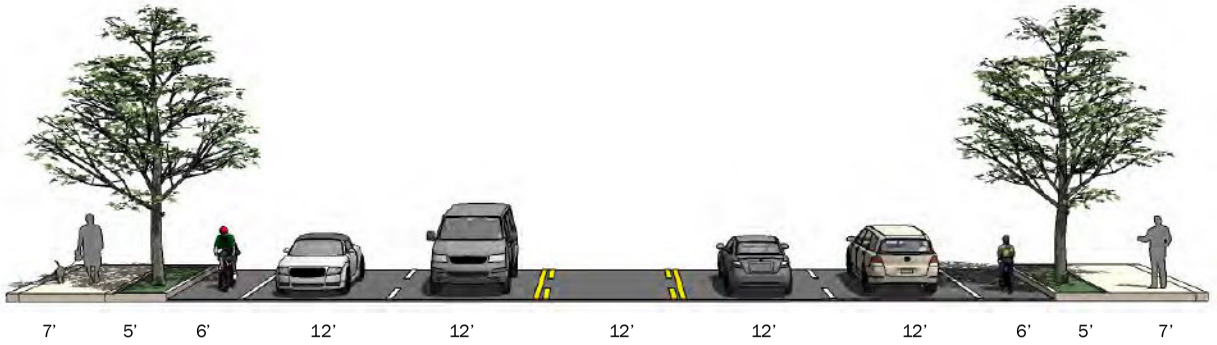
TOTAL ROW = 86'

TOTAL ROW WITHOUT SECOND TRAVEL LANE = 62'



MINOR ARTERIAL 2

TOTAL ROW = 98'



MINOR ARTERIAL 3

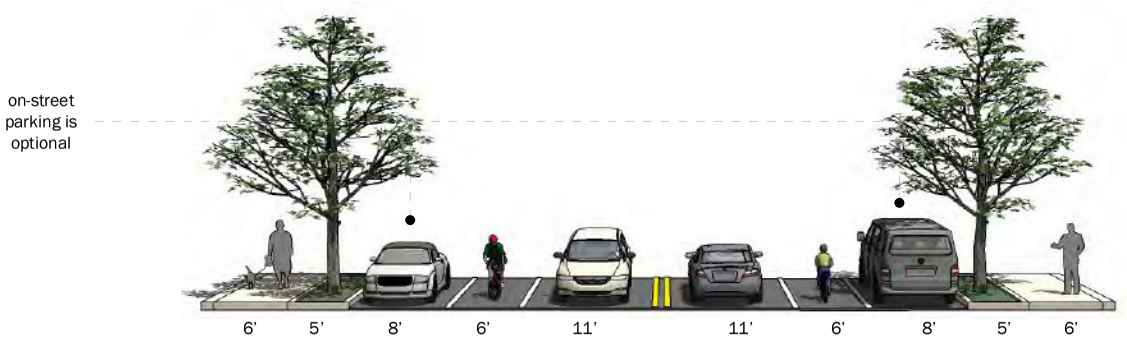
TOTAL ROW = 98'

PARK PLACE: ROADWAY TYPOLOGIES COLLECTOR ROADS

COLLECTOR 1

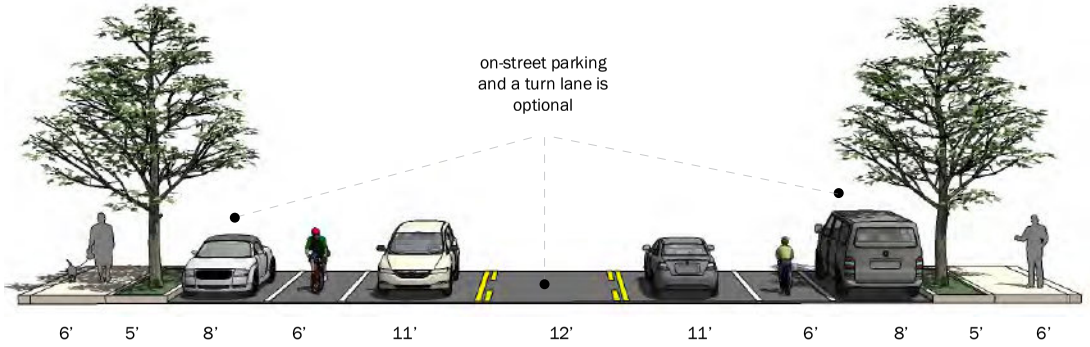
TOTAL ROW = 74'

TOTAL ROW WITHOUT PARKING= 58'



COLLECTOR 2

TOTAL ROW = 86'



COLLECTOR 3

TOTAL ROW = 86'

PARK PLACE: ROADWAY TYPOLOGIES

COLLECTOR ROADS

NEIGHBORHOOD COLLECTOR 1

TOTAL ROW = 68' - 72'

10' - 12' | 8' | 5' | 11' | 11' | 5' | 8' | 10' - 12'

NEIGHBORHOOD COLLECTOR 2

TOTAL ROW = 81'

TOTAL ROW WITHOUT PARKING= 58'

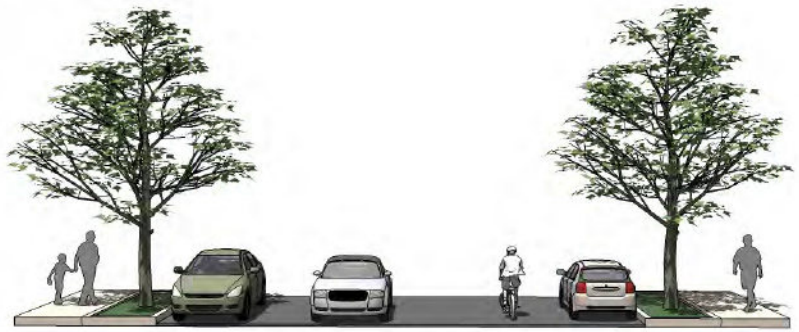
vegetated median would have pockets for left turns

5' | 5' | 8' | 5' | 11' | 11' | 11' | 5' | 8' | 5' | 5'

PARK PLACE: ROADWAY TYPOLOGIES LOCAL ROADS

LOCAL ROAD 1

TOTAL ROW = 58’



5’ 5’ 10’ 16’ shared lane 10’ 5’ 5’

LOCAL ROAD 2

TOTAL ROW = 36’

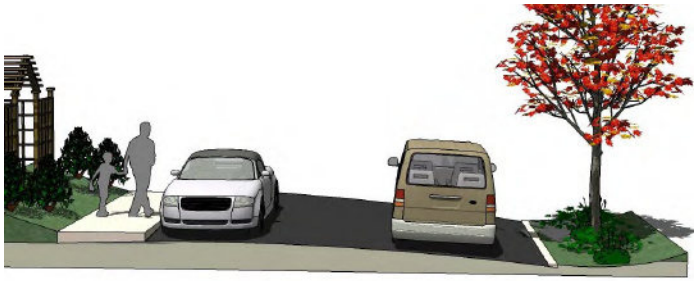
5’ 5’ 16’ shared lane 5’ 5’

HILLSIDE ROAD*

TOTAL ROW = 86’

A Hillside Road would be appropriate for roads that traverse steeper slopes and have limited or no development on one side (typically the downhill side). The road is graded such that surface stormwater is directed to a large bio-swale on the downhill side of the slope. The bio-swale pretreats and absorbs some of the stormwater before it enters the local waterways.

* This roadway treatment is not an accepted standard for the City of Oregon City.



5’ 8’ 16’ shared lane 10’ - 12’ swale

PARK PLACE: ROADWAY TYPOLOGIES

INNOVATIVE ROAD AND EDGE TREATMENTS






permeable pavers for parking strips and full road treatments





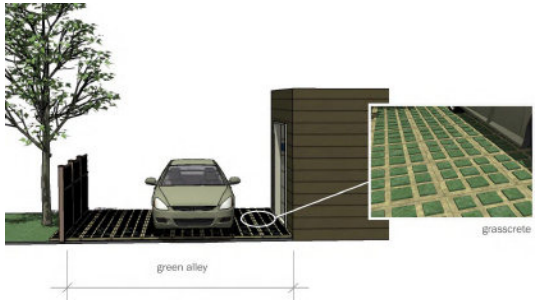
bio-swales collect and pre-treat stormwater runoff

PARK PLACE: ROADWAY TYPOLOGIES

INNOVATIVE ROAD AND EDGE TREATMENTS

a green alley incorporates "green" features like permeable pavement, pavers, and/ or a small vegetated filter strip to reduce stormwater runoff

woonerf is the dutch term for a "living street"



G. Title 11

Introduction

This memo provides the findings for compliance with the following land use elements of Metro's Title 11 regulations governing concept planning within Metro's jurisdiction.

- Annexation
- Housing density
- Variety of housing types
- Housing affordability
- Commercial/Industrial development
- Transportation
- Mapping
- Public Facilities and Services
- Schools
- Urban Growth Diagram
- Plan Amendments

The following sections provide overviews of these elements and how they comply with Title 11 concept planning requirements.

Annexation

Chapter 14 of the City's existing code establishes regulations for annexation. These regulations require an application process, hearings, and review by the Planning Commission and City Commission before the annexation is decided by Oregon City voters.

In addition to a legal description of the proposed annexation area, written consent of property owners, site plans, and an application fee, an annexation proposal must provide statements addressing the following:

- availability, capacity and status of existing water, sewer, drainage, transportation, park and school facilities;
- increased demand for such facilities to be generated by the proposed development, if any, at this time;
- additional facilities, if any, required to meet the increased demand and any proposed phasing of such facilities in accordance with projected demand;
- method and source of financing required to provide additional facilities, if any;
- overall development concept and methods by which the physical and related social environment of the site, surrounding area and community will be enhanced;
- potential physical, aesthetic, and related social effects of the proposed, or potential development on the community as a whole and on the small sub community or neighborhood of which it will become a part; and proposed actions to mitigate such negative effects, if any; and
- the type and nature of any comprehensive plan text or map amendments, or zoning text or map amendments that may be required to complete the proposed development.

The Planning Commission's recommendation to the City Commission and the City Commission's decision as to whether to advance the proposal to the voters for a decision depend on whether adequate access and public facilities and services can be provided; impacts to Goal 5 resources, natural hazard areas, and the overall economic, social, and physical community are avoided or are minimal; and the proposal complies with goals and policies in the City's Comprehensive Plan.

Annexation of Park Place should be guided by the ability to serve subareas with public facilities such as roads, water, sewer, and storm water. For these reasons, subareas of Park Place that are adjacent to existing city boundaries, facilities, and services are likely to be annexed first. The northern portion of Park Place was brought into the City's Urban Growth Boundary (UGB) in the 1980s, long before the

rest of Park Place was in 2002, and is particularly primed for annexation, due to existing development and property owners' interest in developing.

More detailed explanations of serving subareas of Park Place with public facilities are provided in Appendix J.

Housing Density

B. Provision for average residential densities of at least 10 dwelling units per acre of net vacant buildable land in zones in which residences are allowed, or such other densities that the Council specifies pursuant to Section 3.01.040 of the Urban Growth Boundary Functional Plan.

The Park Place Concept Plan must provide for an overall average residential density of at least 10 dwelling units per residential acre within the southern portion of Park Place added to the UGB in 2002. The remaining northern portion of Park Place that was added to the UGB in the 1980s is only required to meet the density of the existing base zone (4 dwelling units maximum in the R-10 zone). The total number of housing units that the buildable land in these two subareas of Park Place can provide, given their respective densities, is the target amount of housing that proposed land use designations and zoning in the overall Park Place Concept Plan area must accommodate. The amount of net buildable land in the northern and southern subareas of Park Place and the total number of units each subarea can provide, based on their respective density requirements, is presented in Table 1.

Table 1: Buildable Land and Target Number of Housing Units

2002 UGB Expansion Area	
Vacant + Developable Land	246.9 acres
Constrained Land	-103.4 acres
New Roads and Utilities	-34.4 acres
Net Buildable Land	109.1 acres
Units (10 du/acre)	*1,091 units*
1980 UGB Expansion Area (Livesay Area)	
Vacant + Developable Land	171.6 acres
Constrained Land	-48.7 acres
New Roads and Utilities	-31.2 acres
Net Buildable Land	93.4 acres
Units (4 du/acre)	*367 units*
Park Place Study Area Total	**1,458 units**

The proposed land use designations for the Park Place Concept Plan are shown in the Urban Growth Diagram in Figure 1-1 of the Park Place Area Concept Plan. Land designated for residential use is a mixture of low/medium- and medium/high-density. The low/medium-density is planned for a minimum of 6 units/acre and the medium/high-density for a minimum of 9 units/acre. These densities roughly correspond to the maximum densities allowed in the City's existing R-6 and R-3.5. However, only the minimum densities for these zones – 5 units/acre in the R-6 zone and 9 units/acre in the R-3.5 zone – can be guaranteed to be developed based on the current zoning code.[1] Therefore, strictly applying the existing R-6 zone will not achieve the required minimum density necessary to reach the overall housing target of 1,458 units. To achieve this minimum density and create a more conventional minimum lot size, code revisions (e.g. new base zones) that ensure development at a minimum of 6 units/acre in a low/medium-density residential zone are recommended. These code provisions will help implement the Concept Plan and demonstrate compliance with Title 11.

Conclusions and Recommendations

In order to provide the amount of housing required by Title 11, it is recommended a new residential zone be developed for use in Park Place and citywide: low/medium-density residential (R-5) zone with a minimum density of 6 units/acre. Using an existing medium/high-density residential zone (R-3.5 zone), with some modifications which would apply only in Park Place, is also recommended.

The low/medium-density and medium/high-density zones are proposed for the areas shaded orange and yellow, respectively, in the Urban Growth Diagram (see Figure 1-1 of the Park Place Area Concept Plan). The location and size of these zones were determined through a rigorous multi-day charrette process described in Appendix C.

The areas shaded green include environmentally constrained lands and, as a result, are recommended to be zoned with the lowest-density residential district available in the City, the R-10 zone. Density requirements and other standards for these zones are discussed further in the implementation section (see Appendix I).

The mixed-use designation (MUC-1) proposed along the main street in Park Place's largest neighborhood center, North Village, will allow for stand-alone high-density residential uses and a combination of residential and commercial uses. This area is represented in pink in the Concept Plan Urban Growth Diagram (see Figure 1-1 of the Park Area Concept Plan). Standards proposed in the implementation appendix of this report, however, are intended to provide flexibility for ground floor development that would support a combination of residential and commercial uses.

As presented in Table 3 in the following section on housing variety, the land proposed for low/medium-density residential and medium/high-density residential zoning provides for the housing target of 1,458 units. The low-density R-10 zone shaded green in Park Place will also provide housing, but the amount of housing is uncertain and will likely be limited due to environmental constraints in these areas.. As is shown in the spreadsheet of land use areas (see Appendix I), the single-family or low/medium-density zone is represented in the Urban Growth Diagram includes approximately 203 gross acres and the multi-family or medium/high-density zone includes approximately 57 gross acres.

[1] Subdivision regulations in Oregon City Code Section 16.12.232 establish minimum density as 80% of the maximum density. Minimum density is not required for partitions of one to three lots. However, more than three lots must be created if there is enough land for more than three lots given minimum lot size requirements. In this case, the land division would then be subject to subdivision regulations.

Variety of Housing Types

C. Demonstrable measures that will provide a diversity of housing stock that will fulfill needed housing requirements as defined by ORS 197.303. Measures may include, but are not limited to, implementation of recommendations in Title 7 of the Urban Growth Management Functional Plan.

The Concept Plan must provide for a diversity of housing stock to meet projected housing needs. Based upon the "Best Practices" images (see Appendix F), the plan will identify housing types that can meet desired densities, contribute to community character, and accommodate future area residents. It is recommended that the types of housing include accessory dwelling units (ADUs), detached or attached single-family residences (townhouses), and duplexes or other small multiplexes.

A range of housing types would be allowed within the zones recommended for use in Park Place.

- Low-Density Residential (R-10, maximum 4 units/acre)
  - Single-family detached dwelling units (including manufactured homes)
  - Accessory dwelling units (ADUs) [2]
- Low/Medium-Density Residential (proposed R-5, minimum 6 units/acre)
  - Single-family detached dwelling units (including manufactured homes)
  - Accessory dwelling units (ADUs)
  - Single-family attached dwelling units (townhouses/rowhouses)
  - Two-family dwelling units (duplexes)
- Medium/High-Density Residential (R-3.5, minimum 9 units/acre)
  - Single-family detached dwelling units (including manufactured homes)
  - Single-family attached dwelling units
  - Two-family dwelling units (duplexes)
  - Multi-family dwelling units (proposed)
- Medium-Density Mixed Use Corridor (MUC-1)
  - Pre-existing single-family detached dwelling units
  - Single-family and two-family attached dwelling units (duplexes)
  - Multi-family dwelling units
- Neighborhood Commercial (NC)
  - Dwelling units above ground floor (if in conjunction with a permitted or conditional use)

Cogan Owens Cogan determined the number of needed housing units according to housing type, which is presented in Table 2. These figures are based on the number of units required by Title 11 to be provided in Park Place and the ratio of existing housing types in Oregon City according to the 2000 Census.

Table 2: Type and Amount of Needed Housing

Type of Housing	Number of Units Needed
Single-Family Residential Detached	950
Two-Family Residential Attached (Duplex)	87
Manufactured Home in Park	48

[2] According to the supplemental standards in OCMC Section 17.54.090, accessory dwelling units (ADUs) are allowed in all single-family residential zones, subject to special development and occupancy standards. However, ADUs are not explicitly listed as allowed uses in the R-10 and R-6 zones, and for clarity it is recommended that they be listed.

Type of Housing	Number of Units Needed
Single-Family Residential Attached	9
Multi-Family Residential	282
Accessory Dwelling Units	17
Group Quarters	65
TOTAL	***1,458***

Manufactured homes on their own are permitted in any zone where single-family detached housing units are permitted, which includes the low-density, low/medium-density, and medium/high-density zones. They also will be permitted in the new R-5 zone proposed for use in Park Place and citywide, as described in the implementation technical memorandum (See Appendix I). The R-10, R-5, and R-3.5 zones are the primary residential zoning proposed for use in Park Place.

Group quarters including boarding and lodging houses, correctional facilities, and nursing homes are all permitted as conditional uses in Oregon City residential zones according Oregon City Municipal Code (OCMC) Section 17.56.030 (See Appendix I) of the City's existing code. Definitions of group quarters in Oregon Revised Statutes (ORS) 197.660 differentiate between residential homes and residential facilities as uses serving up to five residents versus six to 15 residents, respectively. Given this definition, residential homes are permitted/permitted conditionally in Oregon City single-family residential zones (R-10, R-8, R-6, R-3.5, and the proposed R-5) and residential facilities in two-family and multi-family residential zones (R-3.5 and R-2).

Conclusions and Recommendations

Most of the housing planned for Park Place is proposed to be accommodated in a new proposed low/medium-density R-5 zone and the City's existing medium/high-density R-3.5 zone with proposed allowances for multi-family housing in Park Place. Table 3 provides a summary of what acreage is needed in each zone in order to accommodate the needed number and variety of housing units.

Table 3: Type and Amount of Housing by Land Use Designation

Residential Land Use Designation/Zone	Number of Units Needed	Housing Type
Low/medium-density residential (yellow) – minimum 6 units/acre	907	Single-Family Residential Detached (including Manufactured Homes)
	17	Accessory Dwelling Units (ADUs) sited with Single-Family Residential
Sub-total	924	
Medium/high-density residential (orange) - minimum 9 units/acre	117	Single-Family Residential (Detached and Attached)
	369	Two-Family Residential Attached (Duplex) and Multi-Family Residential
	65	Group Quarters
Sub-total	551	
Total	**1,475**	

The low/medium-density zone is more likely to be the site of manufactured homes and ADUs than the medium/high-density zone. The distribution of housing types in Table 3, however, represents only one scenario for accommodating needed housing within zones proposed for Park Place. It is possible that housing types may develop in different ratios, including development of attached single-family housing in the low/medium-density residential zone.

Housing Affordability

D. Demonstration of how residential developments will include, without public subsidy, housing affordable to households with incomes at or below area median incomes for home ownership and at or below 80 percent of area median incomes for rental as defined by U.S. Department of Housing and Urban Development for the adjacent urban jurisdiction. Public subsidies shall not be interpreted to mean the following: density bonuses, streamlined permitting processes, extensions to the time at which systems development charges (SDCs) and other fees are collected, and other exercises of the regulatory and zoning powers.

Title 11 requires that the planning area allow for inclusion of and adequate supply of affordable housing without public subsidy. According to the 2000 Census, the median household income (MHI) in Oregon City is $45,531. Affordable housing is typically defined as housing which does not cost more than 30% of a household's income. In addition, very low income households are typically defined as those earning less than 30% of median household income; low-income households as those earning less than 50% of median household income; and moderate income households are those making between 50% and 80% of median income. These income ranges have been used to estimate the cost of housing that would be considered affordable to households with very low, low, and moderate incomes. Table 4 shows the results of this analysis for Oregon City.

Table 4: Affordable Housing in Oregon City

Percentage of MHI	Percentage of Households	Percentage Difference	Affordable Rent/Mortgage
0-30% MHI	11%	-	$341
0-50% MHI	20%	9%	$569
0-80% MHI	38%	18%	$911

Typically, the types of housing most affordable to people with low and moderate incomes are single-family homes on small lots, attached single family homes, duplexes and multi-family housing, as well as accessory dwelling units. These types of housing are expected to account for a significant portion of all housing units in the plan area – 370-500 units (25%-35%), depending on the proportion of higher density detached single-family homes that fall into affordable price ranges. This range is consistent with the percentage of lower income households that could be expected to need housing units in the area, if they are representative of the City as a whole.

Conclusions and Recommendations

While Title 11 requires that the planning area allow for development of affordable housing without public subsidy, it is anticipated that the City will work with other public agencies, non-profit groups and developers to identify funding opportunities to further increase the supply of affordable housing in the area. The other housing elements of Title 11 compliance describe how a range of housing types, and a corresponding potential range of affordable housing, can be accommodated within the Park Place plan area and its proposed land use designations. Affordable housing goals, policies, and strategies are presented in the Plan Elements section of Chapter 3 of the Concept Plan.

Commercial and Industrial Development

E. Provision for sufficient commercial and industrial development for the needs of the area to be developed consistent with 2040 Growth Concept design types. Commercial and industrial designations

in nearby areas inside the Urban Growth Boundary shall be considered in comprehensive plans to maintain design type consistency.

The plan must provide for sufficient commercial and industrial development to meet the needs of the area, if a demand for such land and associated services or employment exists. The planning process will determine whether there is land suitable for this type of development within the Park Place area, whether it is consistent with the community goals and vision for the area, and if so how much of it and where it should be located to best meet the needs of residents.

Commercial Development

Johnson Gardener, the consulting firm providing market analysis for this project, estimates that the Park Place Concept Plan area can support about 20,000 to 40,000 square feet of retail services. The plan area is not a likely candidate for regional retail services because of limited access and regional commercial centers that are already present or are planned nearby. Johnson Gardener recommends that if neighborhood-scale commercial uses are planned for the Park Place Concept Plan area, they be located so as to maximize exposure and business from through traffic.

The need for office employment space will be more loosely based on community needs. Office uses in the area that are considered to be the most viable and likely to develop include medical, insurance, real estate, and other professional services.

Conclusions and Recommendations

Both the Neighborhood Commercial (NC) and Medium-Density Mixed Use (MUC-1) zones will accommodate commercial development and are recommended for use in Park Place; the MUC-1 zone is proposed for limited use along the main street (Livesay) in the proposed North Village.[3] Either zone could accommodate the retail and employment uses envisioned for the area. However, the NC zone will be targeted for primarily retail use and the MUC-1 zone for office/employment and housing. Table 5 identifies the amount of floor area proposed for each of these commercial uses.

The amount of land that will accommodate retail development includes land for parking and landscaping. Given approximately 79,000 square feet of total land area and assuming approximately 50% lot coverage, the NC zone yields about 0.91 acre (39,595 square feet) of building area and the same area for parking and landscaping. This closely approximates the upper end of retail building area that consultant Johnson Gardner estimated that Park Place could support.

There is roughly 274,500 square feet of total land area in the MUC-1 zone, although if the MUC-1 zone were to be developed with office uses on the ground floor, only a portion of the land area (e.g. 50%) would likely develop in order to allow for parking and landscaping. Therefore, the roughly 137,000 acres reported in Table 5 represents the capacity that the MUC zone has for commercial/office development. The market will determine how much of this floor area capacity is ultimately developed in the MUC-1 zone. Similarly, if the ground floor initially develops as residential, "live/work" development standards that are proposed incorporation into the MUC-1 zone in Park Place will allow commercial uses to eventually develop on the ground floor if there is demand for those uses. Live/work standards would allow up to 50% of the ground floor to be used for commercial purposes. As assumed above, if the building covers half of the lot, 50% of the ground floor area in the MUC zone yields 68,607 square feet that could be developed as live/work commercial space depending on the market.

[3] The NC zone is shaded as red in the Urban Growth Diagram and the MUC-1 zone as pink. (See Figure 1-1 of the Park Place Area Concept Plan)

Table 5: Proposed Area of Commercial Uses in Park Place

Type of Commercial Use	Proposed Zone	Land Area (sq. ft.)	Floor Area (sq. ft.)
Retail	Neighborhood Commercial (NC)	79,191	39,595
Office	Medium Density Mixed-Use Corridor (MUC-1)	274,428	137,214
TOTAL		***353,619***	***176,809***

There are numerous development standards in the City's existing code that will promote an urban atmosphere, a pedestrian friendly environment, and energy and natural resource conservation for commercial development in these zones. The implementation section of this report recommends additions or revisions of these standards (see Appendix I).

Industrial Development

Potential industrial uses in the area would be constrained by limited access and suitable buildable land (large sites with little or no slope). Land zoned industrial to the north of Park Place focused around an I-205 interchange and land with existing and planned industrial zoning (as part of a concept plan) for the Beavercreek area directly south of Park Place provide suitable and adequate industrial land for the City.

Conclusions and Recommendations

No industrially zoned land is recommended or planned for Park Place.

Transportation

F. A conceptual transportation plan consistent with the applicable provision of the Regional Transportation Plan, Title 6 of the Urban Growth Management Functional Plan, and that is also consistent with the protection of natural resources either identified in acknowledged comprehensive plan inventories or as required by Title 3 of the Urban Growth Management Functional Plan. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

The Park Place Concept Plan includes a multi-modal transportation system that complies with city, regional, and statewide transportation plans and ensures a safe and adequate multi-modal transportation system to meet the forecast travel needs of the planning area. The Conceptual Transportation Plan comprises street, transit, bicycle, and pedestrian facilities and services that make each mode viable to meet certain travel needs, while minimizing the need to travel in single-occupant motor vehicles. Plan components include the following:

1. A functionally classified set of streets that provide appropriate connections within and across the planning area and adequately serve local and longer-distance vehicular travel (see Figure 3-5 of the Park Place Concept plan). An emphasis of the Plan is to expand the City's functionally classified network such that it protects the HWY 213 corridor as a regional facility of critical importance.
2. A network of local and higher-order streets that provides redundancy for emergency access, appropriate ventilation to neighborhoods and commercial nodes of activity, and efficient connections to minimize travel distances (see Figure 3-4 of the Park Place Concept Plan).
3. A variety of street cross sections that reflect the needs of adjacent land uses and respond to the constraints of topography, limited rights-of-way, and the costs of construction (see Figures 3A-3J of the Park Place Concept Plan).
4. A network of on-street and off-street pedestrian and bicycle facilities that meet the needs of commuters, recreationists, residents, and employees (see Figures 3-8 and 3-10 of the Park Place Concept Plan). These facilities are planned to provide safe routes to schools and other

key pedestrian/bicycle generators in the planning area. In addition, they provide seamless connections to anticipated transit service in the area. Finally, the comprehensive nature of this network promotes these modes as viable options for a variety of trip purposes.

5. A conceptual routing of future transit service that connects the planning area to major transit centers in the Oregon City area, as well as key destinations within Oregon City (see Figures 3-7 of the Park Place Concept Plan).

Construction cost estimates for the planned transportation improvements have been prepared and a conceptual financing plan has been developed

Mapping

G. Identification and mapping of areas to be protected from development due to fish and wildlife habitat protection, water quality enhancement and mitigation, and natural hazards mitigation, including, without limitation, all Habitat Conservation Areas, Water Quality Resource Areas, and Flood Management Areas. A natural resource protection plan to protect fish and wildlife habitat, water quality enhancement areas, and natural hazard areas shall be completed as part of the comprehensive plan and zoning for lands added to the Urban Growth Boundary prior to urban development. The plan shall include zoning strategies to avoid and minimize the conflicts between planned future development and the protection of Habitat Conservation Areas, Water Quality Resource Areas, Flood Management Areas, and other natural hazard areas. The plan shall also include a preliminary cost estimate and funding strategy, including likely financing approaches, for options such as mitigation, site acquisition, restoration, enhancement, and easement dedication to ensure that all significant natural resources are protected.

Required mapping and preliminary costs are included in the Concept Plan and in Appendix L.

Public Facilities and Services

H. Provide a conceptual public facilities and services plan for the provision of sanitary sewer, water and storm drainage. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

Conceptual public facility plans have be developed for the provision of sanitary sewer, water and storm drainage. These plans have been developed to comply with goals of the local community, City of Oregon City, Metro and the following documents:

- City of Oregon City Water Master Plan
- City of Oregon City Sanitary Sewer Master Plan
- City of Oregon City Drainage Master Plan
- City of Oregon City Draft Stormwater Management Plan
- City of Oregon City Stormwater and Grading Design Standards

The City of Oregon City Water Master Plan was referenced to determined anticipated water demands within the concept plan area. Average daily demand as well as peak demand and fire demand were evaluated at a preliminary level. In general, water demand from planned development within the concept plan area is consistent with demands anticipated in the Water Master Plan.

The City of Oregon City Sanitary Sewer Master Plan was referenced to determined anticipated sanitary sewer generation within the concept plan area. In general, similar sanitary flows were developed. As a result, sanitary flows generated by development within the concept plan area are consistent with those found in the Sanitary Sewer Master Plan.

All three stormwater documents emphasize minimizing the amount of post-development stormwater runoff to pre-development conditions and reducing pollution loads. The Concept Plan stormwater approach was developed to meet these goals.

Law Enforcement. The Clackamas County Sheriff's Department currently provides law enforcement services. As the area is annexed, the City of Oregon Police Department will assume service responsibilities for the area.

Fire protection. Fire protection services currently are provided by Clackamas Fire District #1 (CFD) which serves the City of Oregon City as well as four other cities in Clackamas County. CFD is expected to continue to serve the area as it is annexed.

Libraries. Currently, the Clackamas County Libraries District has the responsibility for serving unincorporated portions of Clackamas County, including the planning area. As the area is annexed, the City will work with the County to determine the most efficient approach for providing library services to the Park Place area.

Parks. The Concept Plan includes two neighborhood parks, each located in a neighborhood center adjacent to commercial and civic uses as well as medium and/or higher density housing. The parks are intended to provide basic recreational opportunities for residents and may include amenities such as play equipment, athletic fields picnic table or shelters, walking trails and other features. The north village neighborhood includes an 8-10 acre neighborhood park, while the south village park is about 3-5 acres.

Parks needs are consistent with those generally identified the City of Oregon City's existing Parks Master Plan. That plan identifies a community park and a neighborhood park service area within the Concept Plan study area. Local and national guidelines for these types of parks indicate a need for about 10 – 30 acres of developed park land in the planning area. The City is currently updating its Parks Master Plan which may provide more refined guidance on the size of future parks in the area and/or needed amenities within them

The open spaces identified in environmentally constrained portions of the study area are also are expected to provide extensive opportunities for outdoor recreation including an extensive trail system.

New land and facilities to meet parks and recreation needs are expected to be paid for by assessing systems development charges on new development and/or collecting fees or land donations in lieu of SDCs. Other potential mechanisms for acquiring land and/or paying for park or recreation facilities could include voluntary donations from private landowners or other citizens, partnerships with community groups or organizations, and/or joint development or use agreements with the Oregon City School District. Ongoing operation and maintenance of park facilities is expected to be funded through a combination of general fund money, user fees, cooperative efforts with community groups, and possibly joint use and maintenance agreements with the school district if joint facilities are developed in the vicinity of Ogden Middle School. The City updated Parks System Master Plan may identify additional possible funding mechanisms."

Schools

I. A conceptual school plan that provides for the amount of land and improvements needed, if any, for school facilities on new or existing sites that will serve the territory added to the UGB. The estimate of need shall be coordinated with affected local governments and special districts.

No new school sites are identified for Park Place. There are two existing elementary schools near the study area — Park Place Elementary and Holcomb Elementary. They have a combined capacity for an additional 300 students. Future enrollment projections for these elementary schools are relatively flat, as new households in their service areas are projected to be less likely to include young children than they have in the past.

Ogden Middle School is in the study area and has additional capacity, although it is at its preferred capacity. Middle school enrollment also is projected to decline overall in the surrounding area served by Ogden, exclusive of potential additional development within the Park Place study area.

Based on enrollment projection assumptions used by the Oregon City School District, which vary for different type of housing units, development in the study area is expected to result in the following approximate number of additional students when the area is completely developed:

- 350 elementary school students
- 150 middle school students
- 150 high school students

These increases in enrollment are expected to occur gradually over the next five to twenty years, depending on the pace of annexation and development in the planning area. Given the additional capacity of existing schools, these additional students would not create the need for a new elementary school which averages about 500 students in the Oregon City School District. Similarly, the increase in enrollment would not result in the need for an entire new middle school, which averages about 700 students in the District. Therefore, no additional school site is recommended in the concept plan.

Urban Growth Diagram

J. An urban growth diagram for the designated planning area showing, at least, the following, when applicable:

1. General locations of arterial, collector and essential local streets and connections and necessary public facilities such as sanitary sewer, storm sewer and water to demonstrate that the area can be served;
2. Location of steep slopes and unbuildable lands including but not limited to wetlands, floodplains and riparian areas;
3. Location of Habitat Conservation Areas;
4. General locations for mixed use areas, commercial and industrial lands;
5. General locations for single and multi-family housing;
6. General locations for public open space, plazas and neighborhood centers; and
7. General locations or alternative locations for any needed school, park or fire hall sites.

See Final Concept Plan / Figure 1-1 of the Park Place Concept Plan.

Plan Amendments

K. The plan amendments shall be coordinated among the city, county, school district and other service districts. (Ordinance No. 98-772B, Sec. 2. Amended by Ordinance No. 99-818A, Sec. 3; Ordinance No. 01-929A, Sec. 8; Ordinance No. 02-964, Sec. 5; Ordinance No. 05-1077C, Sec. 6.) to the UGB. The estimate of need shall be coordinated with affected local governments and special districts.

See Final Concept Plan.

H. Transportation

H. Transportation

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TRANSPORTATION MEMORANDUM

Date: May 21, 2007 **Project #**: 7938.0

To: Tim Smith, SERA Architects

From: Phill Worth, Andrew Cibor, and Nick Foster

Project: Park Place Concept Plan

Subject: Future Conditions Analysis

PROJECT DESCRIPTION

The City of Oregon City is preparing a concept plan for an area encompassing nearly 500 acres located east of Highway 213 and south of Holcomb road, which will be adopted into the City's Comprehensive Plan. The Park Place Concept Plan will integrate a multi-modal transportation system with a mixed-use development pattern to achieve a highly efficient and sustainable design. The Concept Plan will identify a network of internal and external pedestrian, bicycle, transit, and street connections that serve the study area and connect it to the surrounding community and the broader region.

The Concept Plan will ensure that this area is developed in an efficient and sustainable manner, optimizing the use of the available lands while protecting the natural resources of the area. This project will identify compatible land uses, which will include a mix of commercial and residential uses, thereby reducing the need for vehicle trips, optimizing the efficiency of public transportation, offering multi-modal transportation options, and reducing the need to expand the Urban Growth Boundary (UGB).

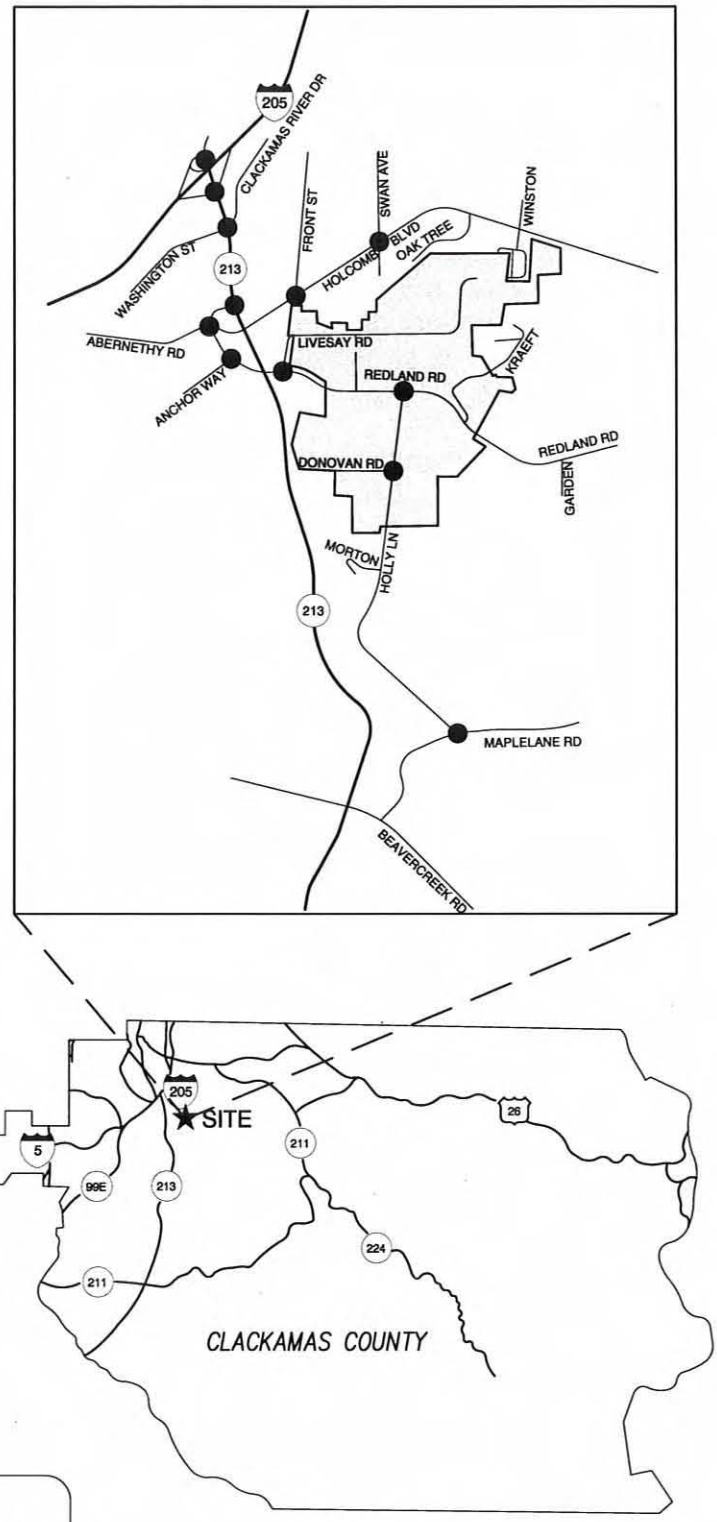
CONTENTS OF THE MEMORANDUM

This memorandum focuses on the following transportation issues related to the Park Place Concept Plan:

- Study Area
- Regional and Local Growth
- Future Year 2027 Forecast No-Build Traffic Conditions
- Future Year 2027 Forecast Build Traffic Conditions
- Recommended Improvements & Costs

STUDY AREA

The study area and study intersections were selected based on direction provided by Oregon City staff. As illustrated in Figure 1, the study area encompasses the vicinity around HWY 213 bounded by the I-205/HWY 213 interchange to the north and Beavercreek Road to the south.



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REGIONAL & LOCAL GROWTH

Increases in regional and local travel demand are most closely associated with growth in population and employment; therefore, it is important to understand the context of the year 2027 No-Build Scenario.

Projected Regional Population & Employment Growth

The Portland metropolitan regional population is projected to exceed 2 million by the year 2030. The region is expected to add nearly 367,000 new households over the next 25 years, to a total of more than 1.1 million households; an increase of nearly 50 percent. More than 900,000 new jobs are expected to be added in the region by year 2030, for a total of more than 2.2 million jobs; an increase of approximately 70 percent.

Projected Oregon City Population & Employment Growth

The Oregon City area is expected to share in this regional growth. Households are expected to grow from approximately 13,500 to nearly 23,750 by 2030; an increase of more than 75 percent. Employment is estimated to grow from just over 18,500 in 2005 to nearly 36,000 by 2030; an increase of more than 90 percent. Figure 2 provides an illustration of the Oregon City area, indicating the city limits (shaded yellow), urban growth boundary (gold boundary line), and the geographic area (black boundary line) that contains the households and jobs associated with Oregon City.

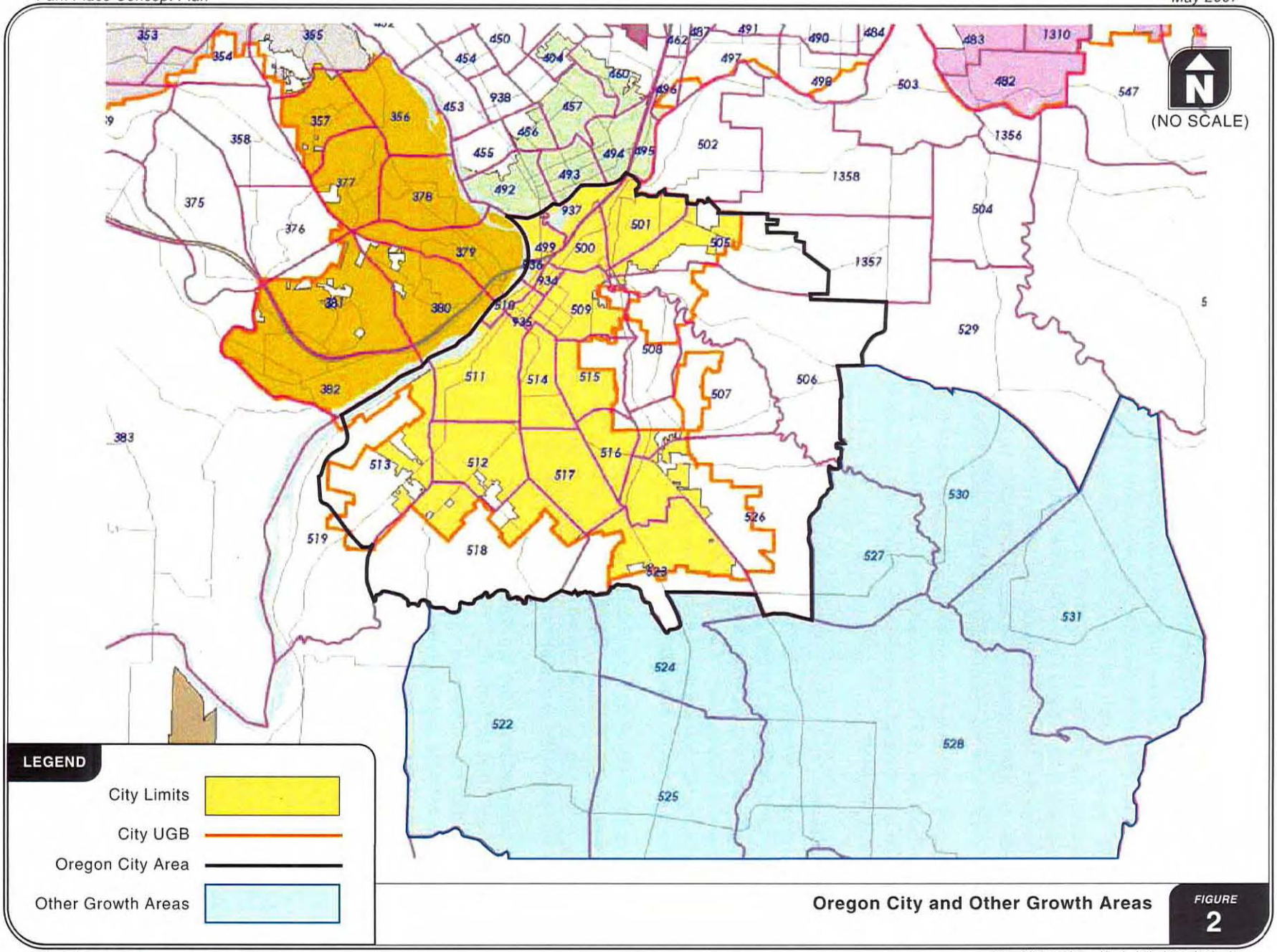
Oregon City Jobs-Housing Balance

The jobs-housing ratio of a city, county, or region can have a significant effect on the quantity of travel that occurs on the transportation system. Cities that serve as "bedroom communities" to regional employment centers often experience higher levels of commuter congestion than do cities of comparable size with a higher jobs-housing ratio. In addition, those commuters are frequently traveling longer-than-average distances; thus, increasing the regional vehicle-miles-traveled per capita. The outcome of this jobs-housing imbalance is a degradation of the quality of life at both the local and the regional level.

The jobs-housing ratio for Oregon City in 2005 was approximately 1.38 compared to 1.69 for the region as a whole. This understanding has led the City of Oregon City to pursue a more balanced jobs-housing ratio as a long-term transportation strategy to improve quality of life, reduce vehicle-miles-traveled per capita, and improve the efficiency of the transportation system. The City is projected to achieve a jobs-housing ratio of 1.52 by 2030, if it is able to successfully attract the number of new jobs and households listed above.

Projected Population & Employment Growth Surrounding Oregon City

Available data from METRO indicates that areas east and south of Oregon City (highlighted in blue in Figure 2) are projected to experience appreciable growth. Households will increase from approximately 2,600 in 2005 to nearly 6,300 by 2030 (an increase of over 140 percent). Employment is forecast to increase from approximately 1,400 jobs in 2005 to almost 2,000 by 2030 (an increase of over 40 percent). This growth will contribute to increased travel demand on such corridors as HWY 213, Redland Road, Holcomb Boulevard, and Holly Lane.



Oregon City and Other Growth Areas

FIGURE 2

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YEAR 2027 NO-BUILD TRAVEL DEMAND FORECAST

The regional travel demand model, built and maintained by METRO, is the forecasting tool used for this project. METRO and its partnering agencies develop versions of the model for various reasons and the version chosen for this project is referred to as the Sunrise Model, which was prepared to support the Sunrise Corridor study being completed in northern Clackamas County. During consultations with Oregon City, Clackamas County, and ODOT staff, this version of the model was selected and key improvements (such as a new Clackamas River crossing connecting the I-205/Gladstone interchange to Clackamas River Drive) were removed to provide a better representation of the existing transportation system in the Oregon City area.

Caution is advised when using a regional travel demand model to conduct a subarea study, in as much as the land use and transportation network structure is very coarse. The result is a generalized forecast of travel demand that is suitable at a regional level, but must be interpreted for use at the subarea level.

Forecast Volumes

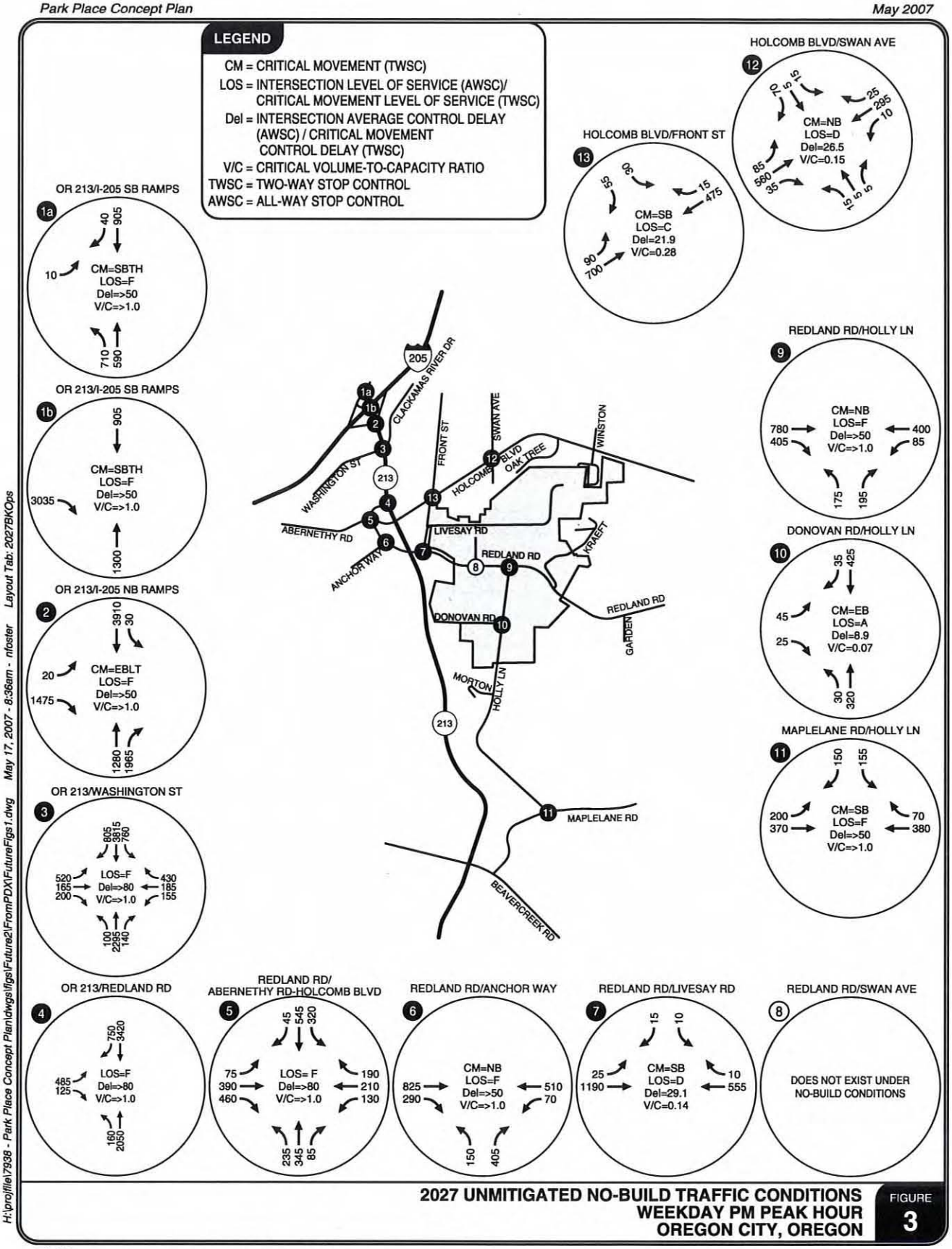
Year 2027 No-Build forecast traffic volumes for the weekday PM peak hour are modified volumes from the Clackamas County 2030 Sunrise model projections. The Sunrise model is chosen because it contains the latest land use assumptions approved of by the City of Oregon City and Clackamas County, as well as model refinements that produce a more suitable forecast for this area than the standard regional model is capable of. Nonetheless, the model forecast must be post-processed to provide reasonable volumes upon which to conduct planning analysis.

National Cooperative Highway Research Program Report 255 describes acceptable approaches for post-processing model forecasts. Various approaches were applied to the 2030 Sunrise model projections to determine which approach produced the most reasonable results. The approach that consistently yielded the most reasonable results is described below.

A model forecast produced from the 2005 "base year" model was subtracted from the 2030 Sunrise model and then multiplied by 80% to produce an estimate of the traffic growth that would occur on each link of the transportation system over the next 20 years. This 20-year traffic growth was then added to existing volumes to produce an estimate of the year 2027 background traffic volumes in the study area.

Final adjustments were then made on a link-by-link basis to better represent how local traffic accesses the transportation system. For example, movements that are not included in the model, or that are otherwise deemed by professional judgment to not be modeled correctly (i.e. extremely large growth due to a zone loading all its traffic at one intersection), must be modified. Traffic is either added to or subtracted from these movements until an amount of growth is obtained that appears reasonable, based on professional judgment, surrounding constraints to or opportunities for growth, and growth at other movements at the same intersection. Future volumes are also modified to ensure that volumes between intersections balance, where appropriate. In these instances, the higher volumes are typically assumed to be correct, in order to provide a conservative forecast. These final Year 2027 future turning movement volumes are shown in Figure 3. *Appendix "A" contains worksheets illustrating the base and modified future Sunrise model output volumes.*

Park Place Concept Plan *May 2007*



2027 UNMITIGATED NO-BUILD TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE **3**

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Growth in Travel Demand

Substantial growth in local and regional travel is anticipated over the next 25 years. The HWY 213 corridor will be hardest hit, with travel demands growing by nearly 50 percent to almost 60,000 vehicle-trips a day. Improvements to this corridor would be very costly and face many difficult challenges to overcome. City and regional planners agree that this vital facility must be protected by enhancing the city's transportation system to better serve local travel.

Redland Road, Holcomb Boulevard, and Holly Lane are also forecast to experience significant increases in travel demands. Each corridor is constrained by narrow rights-of-way, physical features, and/or difficult topography that make improvements difficult. Nonetheless, it is imperative that the local transportation system be improved and expanded to better serve the Oregon City area and protect the regional resources of HWY 213 and I-205.

A comparison of 2027 No-Build forecast traffic volumes to those measured under existing conditions reveals significant growth in demand will occur on several key corridors in the Oregon City area. Table 1 provides examples of existing and forecast volumes on several roadway segments and the percentage of growth that is estimated to occur.

TABLE 1
GROWTH IN TRAVEL DEMAND ON KEY CORRIDORS

Roadway	Existing PM Peak Hour Volumes	2027 No-Build PM Peak Hour Volumes	Percent Increase
HWY 213: North of Washington St.	5,500	8,600	56%
HWY 213: Washington St. to Redland Rd.	4,900	6,700	37%
HWY 213: Redland Rd. to Beavercreek Rd.	4,000	5,800	45%
Redland Rd.: HWY 213 to Abernethy Rd-Holcomb Blvd	900	1,500	67%
Redland Rd.: Abernethy Rd.-Holcomb Blvd. to Anchor Way	1,300	1,800	38%
Redland Rd.: Anchor Way to Livesay Rd.	1,100	1,800	64%
Redland Rd.: Livesay Rd to Holly Ln.	1,100	1,800	64%
Holly Ln..: Redland Rd. to Donovan Rd.	300	900	200%
Holly Ln.: Donovan Rd. to Maplelane Rd.	300	800	167%
Holcomb Blvd.: Redland Rd. to Front St.	800	1,300	63%
Holcomb Blvd.: Front St. to Swan Ave.	600	1,100	83%

The projected growth in travel demand on these corridors ranges between 300 vehicles per hour (on Holly Lane) to 3,100 vehicles per hour (on the northernmost segment of HWY 213). The percent increase ranges from 38 percent to 200 percent. These increases are so significant that demands on several roadways will exceed their existing capacity. The next section presents a summary of how well the existing transportation system can accommodate these 2027 No-Build travel demands and what mitigations are likely necessary to meet agency performance standards.

2027 NO-BUILD TRANSPORTATION DEMAND ANALYSIS

Level-of-Service Analysis

All level-of-service analyses described in this report were performed in accordance with the procedures stated in the 2000 Highway Capacity Manual (Reference 1). *A description of level of service and the criteria by which it is determined is presented in Appendix "B." Appendix "B" also indicates how level of service is measured and what is generally considered the acceptable range of level of service.*

Level of service (LOS) analyses conducted for signalized intersections in this report are based on the average control delay per vehicle entering the intersection. For unsignalized intersections, LOS is based on the intersection's capacity to accommodate the worst, or critical, movement. Volume-to-capacity ratios are the controlling factors for all ODOT facilities and an appropriate general guide for planning studies that recommend long-term improvements to the multimodal transportation system.

Volume-to-capacity (v/c) ratios and levels of service were calculated for the 12 study area intersections using the weekday PM peak hour traffic volumes shown in Figure 3. The existing lane configurations and traffic control devices, summarized in Figure 4, were assumed in the analysis of the year 2027 no-build traffic conditions. *Appendix "C" includes the year 2027 No-Build Traffic Conditions level-of-service worksheets.*

Highway 213 Corridor

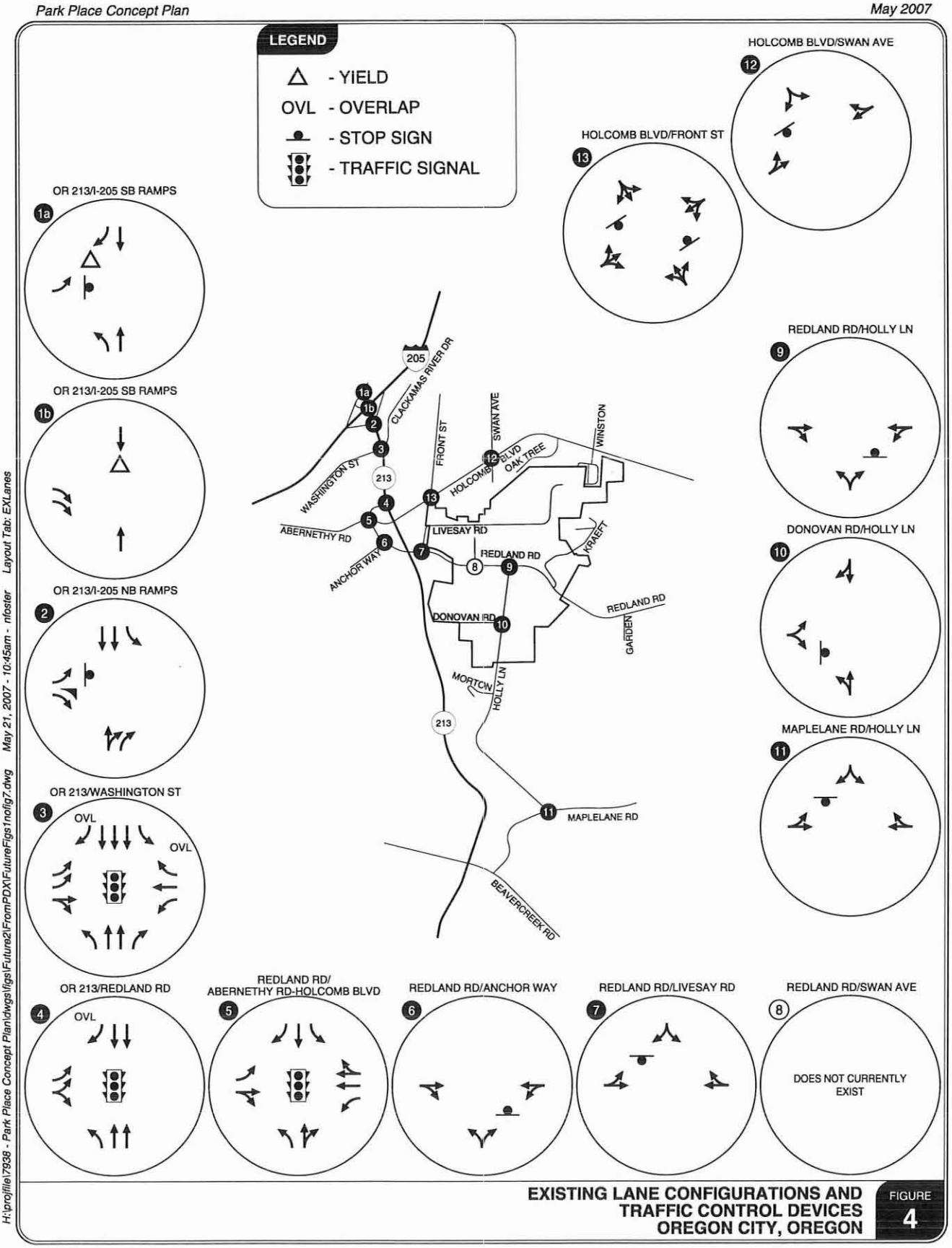
The Oregon Department of Transportation (ODOT) does not have any standards regarding level of service. Instead, the Department uses volume-to-capacity ratio standards to assess the study intersections along the HWY 213 corridor. ODOT standards require that the v/c ratios on all intersections of HWY 213 included within the Urban Growth Boundary (UGB) not exceed 0.99, except for the I-205 interchange ramp intersections. ODOT has special standards for freeway interchange ramp intersections. The freeway interchange ramp intersections are required to maintain a v/c ratio at or below 0.85. It should be noted that the signalized intersections along the HWY 213 corridor were analyzed using Synchro files provided by ODOT.

Figure 3 illustrates that all of the intersections along the HWY 213 corridor will be operating above capacity (v/c > 1.0) under year 2027 No-Build conditions, if all intersections retain the existing configurations shown in Figure 4. Improvements at each of the HWY 213 intersections would be required to meet applicable ODOT standards.

Redland Road/Holcomb Boulevard/Holly Lane Corridors

Oregon City and Clackamas County level-of-service standards are applied to the analysis of intersections along the Redland Road, Holcomb Boulevard, and Holly Lane corridors. The City of Oregon City and Clackamas County require that LOS "D" or better be maintained for all signalized intersections and LOS "E" or better be maintained for all unsignalized intersections. The City of Oregon City and Clackamas County do not have any standards regarding volume-to-capacity ratios.

Park Place Concept Plan *May 2007*



EXISTING LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES OREGON CITY, OREGON

FIGURE 4

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Figure 3 illustrates that several intersections along the Redland Road and Holly Lane corridors are forecast to fall below applicable standards during the PM peak hour in the year 2027. More specifically, the Redland Road/Abernethy Road-Holcomb Boulevard, Redland Road/Anchor Way, Redland Road/Holly Lane, and MapleLane Road/Holly Lane intersections are all expected to operate at LOS "F" without future improvements. Therefore, these intersections will need to be improved regardless of what happens in the Park Place planning area. All other non-highway intersections are expected to operate acceptably.

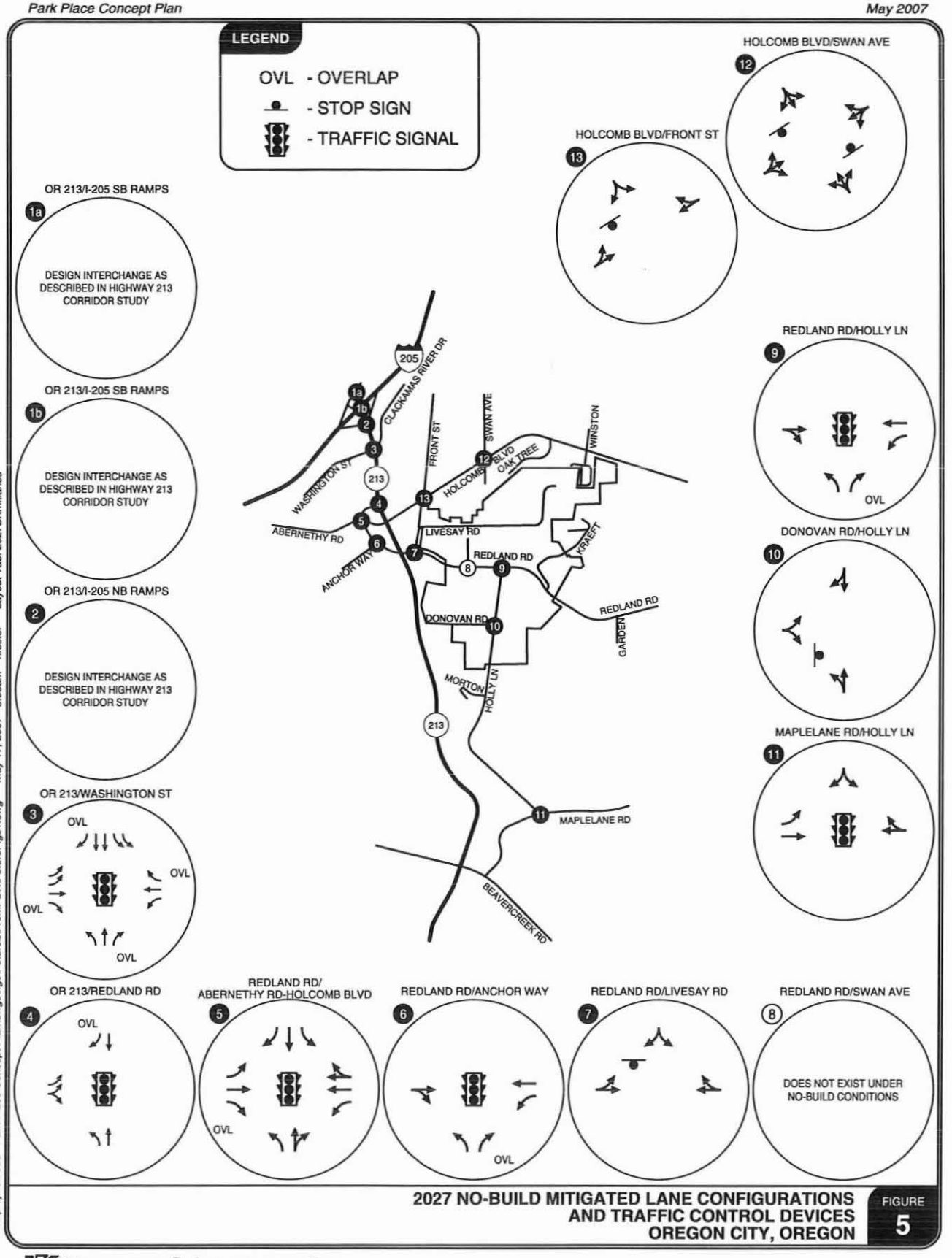
Needed Improvements

Table 2 describes the type of improvements that are necessary for each study intersection to meet its applicable standard. These new lane configurations and traffic control devices are shown in Figure 5 and the results of the operations analysis with these improvements in place are shown in Figure 6. *Appendix "D" contains the year 2027 No-Build Mitigated Traffic Conditions worksheets.*

TABLE 2
NEEDED IMPROVEMENTS UNDER 2027 NO-BUILD CONDITIONS

Intersection	2027 No-Build Conditions		Needed Improvement	2027 Mitigated No-Build Conditions	
HWY 213 Corridor					
	V/C			**V/C**	
HWY 213/I-205 SB Ramps	>1.0		- Construct Alternative 3 of the *HWY 213 Urban Corridor Design Study* (See Figure 7)	No conflicting movements	
HWY 213/I-205 NB Ramps	>1.0				
HWY 213/Washington Street	>1.0		- Construct Alternative 3 of the *HWY 213 Urban Corridor Design Study* (See Figure 7) - Configure intersection as shown in Figure 5	0.99	
HWY 213/Redland Road	>1.0		- Construct Alternative 3 of the *HWY 213 Urban Corridor Design Study* (See Figure 7) - Configure intersection as shown in Figure 5	0.68	
Redland Road/Holcomb Boulevard/Holly Lane Corridors					
	Delay (s)	**LOS**		**Delay (s)**	**LOS**
Redland Road/Abernethy Road-Holcomb Boulevard	>80.0	F	- Construct an EB RT lane - Modify signal	43.1	D
Redland Road/Anchor Way	>50.0	F	- Signalize intersection - Construct a NB LT lane - Construct a WB LT lane	38.1	D
Redland Road/Holly Lane	>50.0	F	- Signalize intersection - Construct a NB LT lane - Construct a WB LT lane	26.4	C
Maplelane Road/Holly Lane	>50.0	F	- Signalize intersection - Construct an EB LT lane	21.1	C

Park Place Concept Plan *May 2007*



2027 NO-BUILD MITIGATED LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES OREGON CITY, OREGON FIGURE 5

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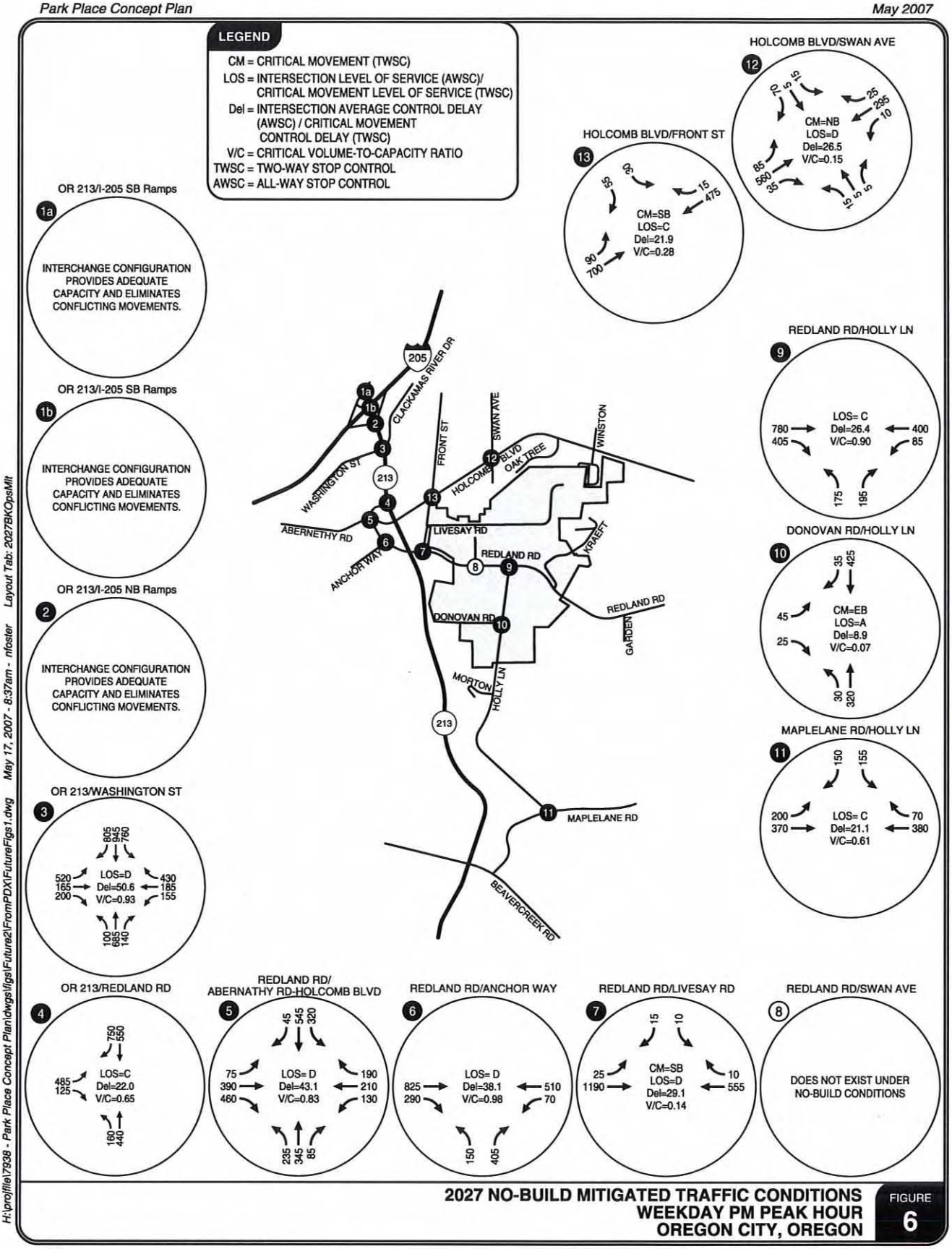

2027 NO-BUILD MITIGATED TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE 6

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Figure 6 and Table 2 both show that with these improvements in place, the operations at all study intersections will meet applicable agency standards.

Highway 213 Corridor Improvement

Figure 7 is an illustration from the *Highway 213 Urban Corridor Design Study*, prepared in June of 2000 (Reference 2). The preferred long-term improvement for the northern-most segment of the corridor is represented in Figure 7 and involves two major components. First, the I-205/HWY 213 interchange would be reconstructed as a "systems interchanging", meaning that all movements between I-205 and HWY 213 would occur without conflict (no ramp terminals or at-grade intersections). Second, traffic bound for either Washington Street or Redland Road would be served by reconfiguring the existing at-grade intersections, while traffic that is to/from HWY 213 further south of Redland Road and going to/coming from I-205 would pass by Washington Street and Redland Road via grade-separated overcrossings.

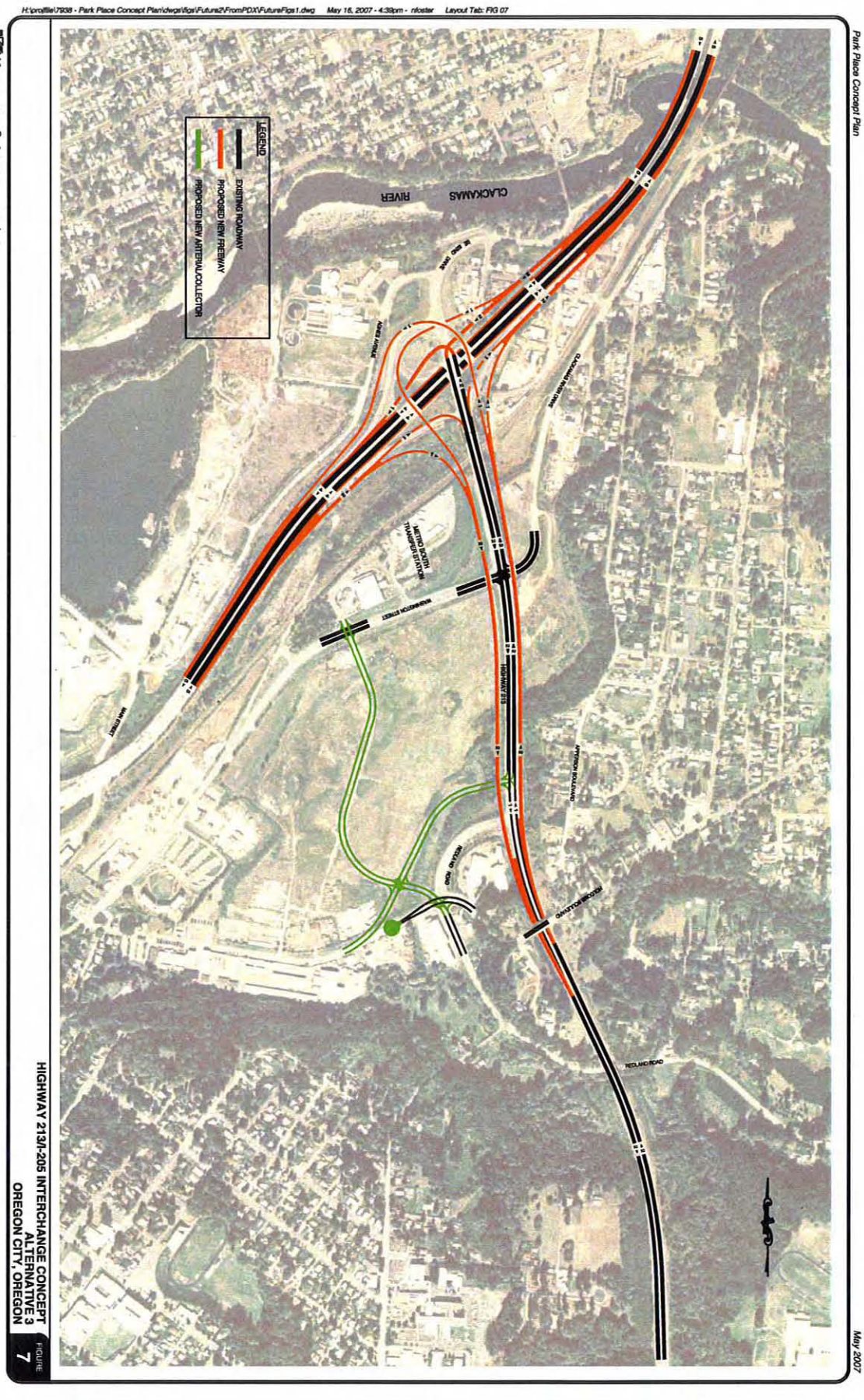
An alternative was developed that assumed a full interchange would not be constructed by the year 2027. Maintaining at-grade interactions at Washington Street and Redland Road, to serve both local traffic and highway through traffic, would require HWY 213 to be widened to four through lanes in each direction, plus turn lanes at the intersections to accommodate all movements. The highway would be twelve lanes wide at the Washington Street intersection, in order to accommodate all movements and achieve an acceptable v/c ratio. These improvements would extend north across the existing railroad overcrossing, as well as the I-205 overcrossing. They would extend south to a point near or beyond the Holcomb Boulevard overcrossing of HWY 213. This would be an interim solution with marginal benefit toward the longer-term solution described in the *Highway 213 Urban Corridor Design Study*. This is not considered a viable alternative.

Redland Road/Holcomb Boulevard/Holly Lane Improvements

Only intersection improvements are required to these three corridors under the No-Build scenario, as is shown in Table 2. It is worth noting that making these improvements will only address intersection capacity issues at key intersections. Redland Road may need to be constructed as a three-lane cross-section from the Abernethy Road-Holcomb Boulevard intersection to its intersection with Holly Lane in order to address capacity and safety issues that may arise in the vicinity of other intersections and private driveways.

PROPOSED LAND USE CONCEPT PLAN

The City of Oregon City, through a series of community meetings and charrettes, has identified a preferred alternative for the development of the Park Place area. The preferred alternative contains a mixture of land uses including residential, retail, mixed-use, park/open space, and civic areas. The mixed-use, retail, and high- and medium-density residential uses are clustered together in two different nodes to encourage area residents to travel by bicycling or walking to access the retail and commercial locations. Table 3 provides a comprehensive list of the land uses identified in the preferred alternative.


H:\proj\file\7938 - Park Place Concept Plan\dwgs\figs\Future2\FromPDX\FutureFigs1.dwg May 16, 2007 - 4:39pm - nfoster Layout Tab: FIG 07
Park Place Concept Plan
LEGEND
EXISTING ROADWAY
PROPOSED NEW FREEWAY
PROPOSED NEW ARTERIAL/COLLECTOR
CLACKAMAS RIVER
I-205
MAIN STREET
WASHINGTON STREET
METRO SOUTH TRANSIT STATION
HIGHWAY 213
MOLALLA AVENUE
REDLAND ROAD
May 2007
KITTELSON & ASSOCIATES, INC.
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HIGHWAY 213/I-205 INTERCHANGE CONCEPT
ALTERNATIVE 3
OREGON CITY, OREGON
FIGURE
7

TABLE 3
CONCEPT PLAN LAND USES

Land Use	Number of Units	Size (Sq. Ft.)
Single-Family Residential	1,106	N/A
Multi-Family Residential	470	N/A
Condo/Townhouses	134	N/A
Retail	N/A	122,750
Office	N/A	274,430

TRIP GENERATION

Estimates of daily and weekday PM peak hour vehicle trip ends for the preferred alternative are calculated using data for similar land uses summarized in the industry standard reference manual, *Trip Generation, 7th Edition*, published by the Institute of Transportation Engineers (ITE) (Reference 3). This approach to estimating trip generation was required because the METRO travel demand forecasting model was not available.

Not all of the trips will be to or from locations outside of the planning area. Several trips remain "internal trips" and are estimated using the methodology outlined in *Trip Generation Handbook, 2nd Edition*, published by the Institute of Transportation Engineers (Reference 4). Finally, the proposed layout of the Park Place area will encourage residents to travel to other locations within the site via bicycling or walking more than a traditional suburban environment does. Therefore a mode-split reduction is also taken to account for these non-vehicular trips. A brief description of these reductions follows.

Internal Trips

Internal trips are those trips that are made from one facility to another within the planning area and, never reach facilities outside of the planning area like HWY 213. This tends to occur when uses are too far away to walk or bicycle, but still closer than similar uses outside the planning area. Based on the type, location, and size of mixed-use development proposed and the methodology presented in the *ITE Trip Generation Handbook* for mixed-use developments, an internal trip rate of five percent was applied (Reference 4).

Mode Split Reduction

The vision of the Park Place Concept Plan is to decrease the use of single-occupancy vehicles and encourage local travel within the planning area via bicycling or walking, more than a traditional suburban environment does. This will be achieved by designing the area as a bicycle- and pedestrian-friendly area. By including parks and mix of land uses, it is expected that the planning area will function more as a neighborhood community than a typical subdivision used by ITE in their trip generation calculations. In addition, it is anticipated that the area will have and make use of regular transit service. Therefore, a mode-split reduction is also taken to account for the anticipated benefits. The reduction factor took into account such factors as proximity to major roadway facilities, the mix of land uses, and the proposed infrastructure. An overall mode-split reduction factor of 5 percent was applied to the planning area.

Table 4 summarizes the estimated site trip generation during a typical weekday, as well as during the weekday PM peak hour (all trip ends shown in Table 4 are rounded to the nearest five trips).

TABLE 4
PARK PLACE CONCEPT PLAN ESTIMATED TRIP GENERATION

Land Use	ITE Land Use Code	Size	Weekday Daily Trips	Weekday PM Peak Hour Trips		
			Total	Total	In	Out
Single Family Residential	110	1,106 HH	10,585	1,120	705	415
Apartments	220	470 HH	3,160	290	190	100
Condo/Townhouse	230	134 HH	785	70	45	25
Specialty Retail	814	122,750 SF	5,440	330	145	185
General Office	710	274,430 SF	3,020	410	70	340
Total New Trips			22,990	2,220	1,155	1,065
Internal Trips (5%)			*1,150*	*110*	*55*	*55*
Mode Split (5%)			*1,150*	*110*	*60*	*50*
Total Net New Trips			20,690	2,000	1,040	960

Table 4 shows that the site is expected to generate approximately 22,990 new weekday daily trips; of which 2,220 will be during the weekday PM peak hour. Approximately 110 of the PM peak hour trips will be internal to the site, while another 110 trips will be made by modes other than a single-occupancy vehicle. This means that the site will generate approximately 2,000 net new trips on the surrounding roadway system during the weekday PM peak hour; of which, approximately 1,040 will be into the site and 960 will be leaving the site.

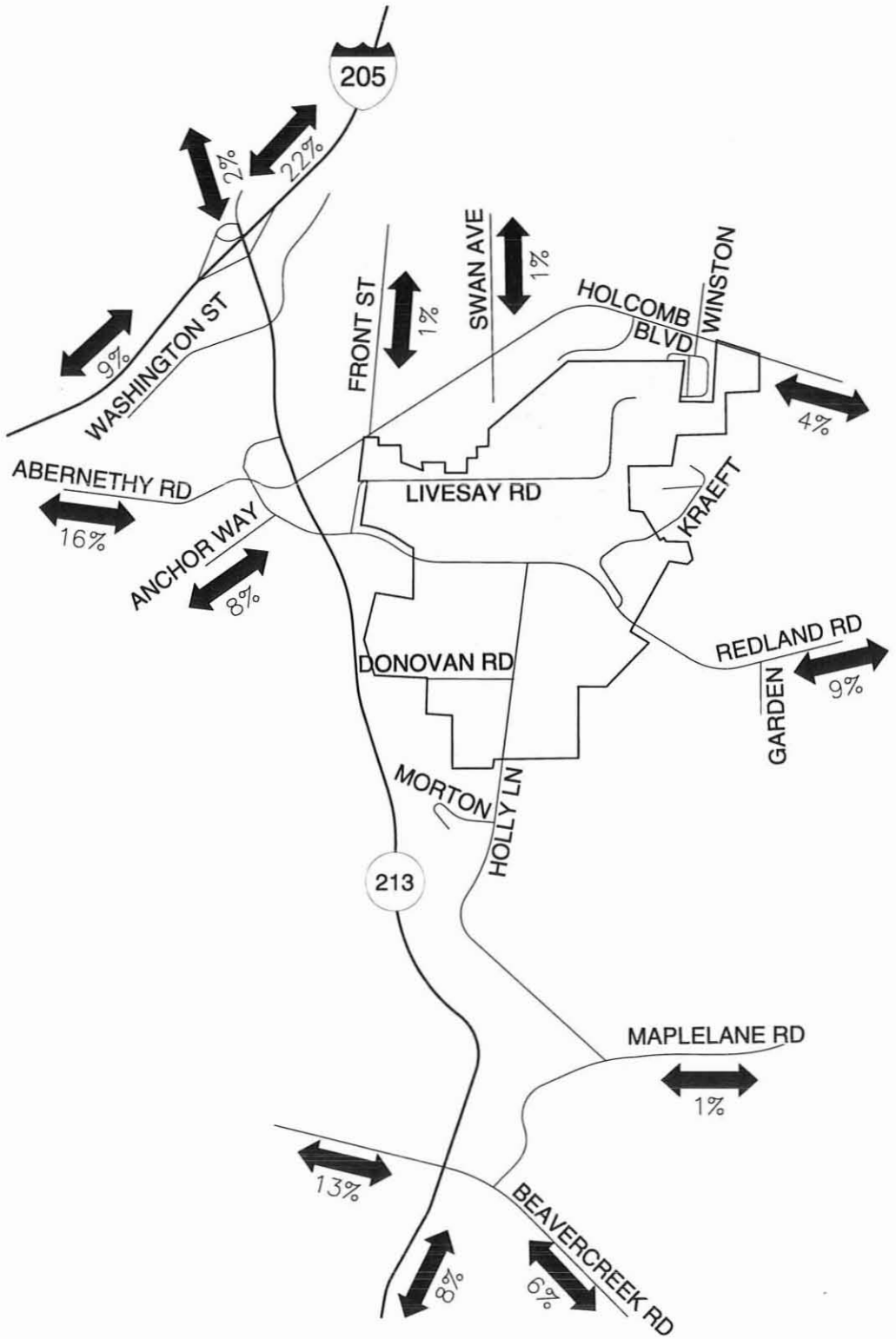
It should be noted that the 2027 No-Build forecast includes growth in households and jobs in TAZs 505, 506, 507, and 508. Because only a fraction of the planning area is in each zone, it is difficult to determine whether some or all of that growth is anticipated within the Park Place concept planning area. No reduction in travel demand was made to try and account for any "overlap" in assumed development. Therefore, it is safe to say the forecasts used in this analysis represent a reasonable worst-case scenario and likely represent greater levels of development than may actually occur. *Appendix "E" contains the land use estimates assumed in the Sunrise model for TAZs located within the planning area.*

Trip Distribution and Assignment

Trip Distribution

Distribution of the net new site-generated trips onto the study area roadway system is estimated based on a review of select zone analyses produced by the METRO Sunrise model, as well as existing traffic patterns, local knowledge of the area, and professional judgment. Figure 8, displays the estimated trip distribution pattern for the net new trips associated with the Park Place Concept Plan. *Appendix "F" contains the select zone analyses results.*

Figure 8 shows that approximately one third of all trips are to/from the I-205 corridor, one third are to/from the west, more than one quarter to/from the south, and 13 percent to/from the east.



ESTIMATED TRIP DISTRIBUTION PATTERN
OREGON CITY, OREGON

FIGURE **8**

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Trip Assignment

The site-generated trips shown in Table 4 are assigned to the roadway network using the estimated trip distribution pattern shown in Figure 8. In order to accomplish this assignment, the Park Place area is divided up into twelve different zones where trips will originate from or travel to. This is necessary to accurately assign trips, given the size of the Park Place area and the varying access options available to travel to and from the area. Table 5 identifies the area each zone encompasses and the number of net new PM Peak hour trips each zone generates.

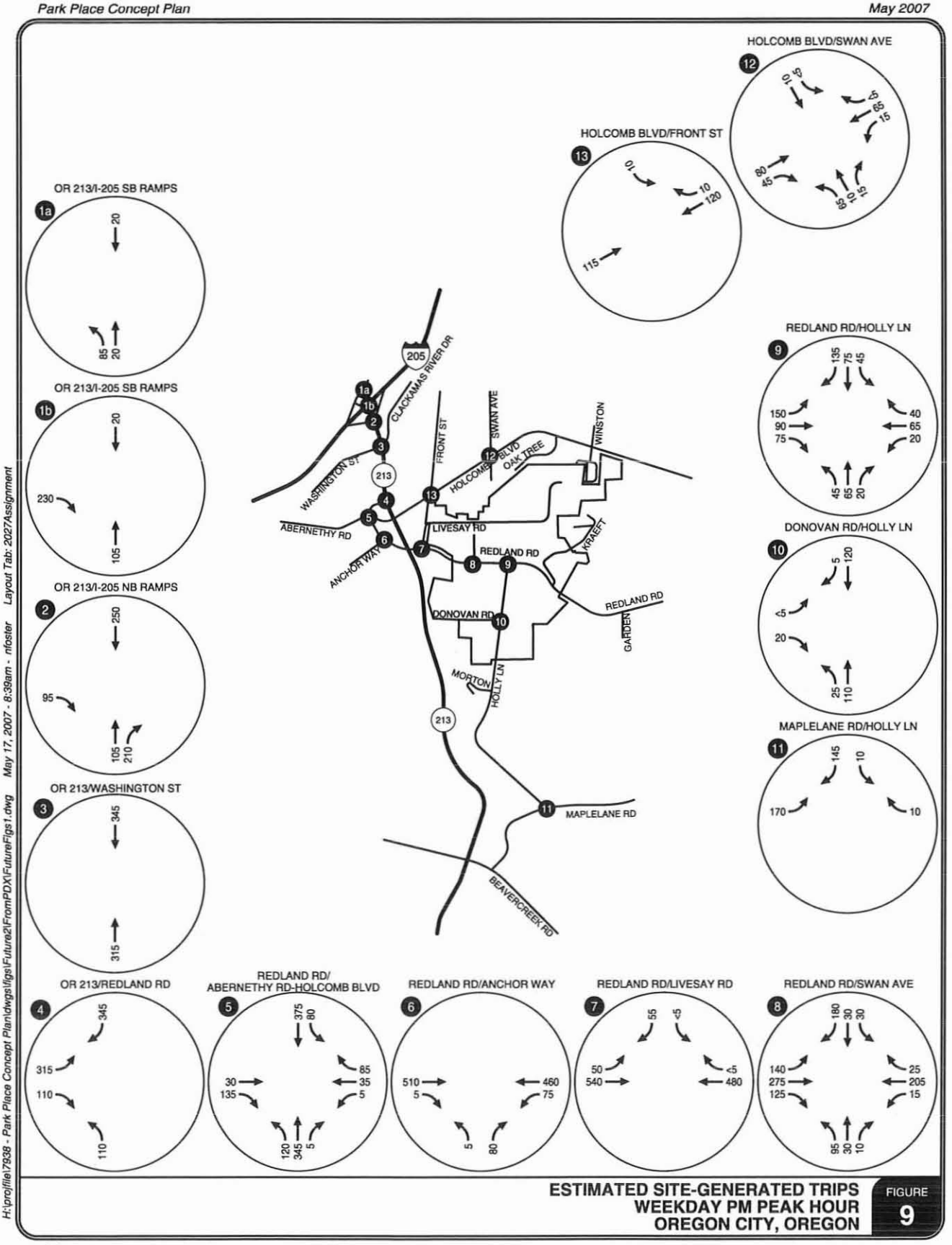
TABLE 5
PARK PLACE CONCEPT PLAN TRIP GENERATION BY ZONE

Zone No.	Description	Net New Weekday PM Peak Hour Trips
1	North of Livesay Road, west of Swan Avenue extension	30
2	Between Redland Road and Livesay Road, west of Swan Avenue extension	165
3	Between Redland Road and Donovan Road, west of Swan Avenue extension	30
4	South of Donovan Road, west of Swan Avenue extension	200
5	South of Donovan Road, between Swan Avenue extension and Holly Lane	70
6	Between Redland Rd and Donovan Rd, Swan Ave Ext., and Holly Ln	120
7	Between Redland Rd and Livesay Rd, Swan Ave Ext., and Holly Ln. Ext	430
8	North of Livesay Road, between Swan Avenue extension and Holly Lane Ext	310
9	East of Holly Lane extension, north of Livesay Road	305
10	East of Holly Lane extension, between Redland Road and Livesay Road	180
11	East of Holly Lane, between Redland Road and Donovan Road	115
12	East of Holly Lane, south of Donovan Road	45

Table 5 shows that zones 7 – 9 generate the most trips during the weekday PM peak hour. This is because each of these areas contains a significant number of multi-family residential units, as well as retail and office space. Meanwhile, zones 1, 3, 5, and 12 primarily contain a small number of single family residential units. Figure 9 illustrates the result of assigning the Concept Plan trips to the roadway system.

PROPOSED TRANSPORTATION CONCEPT PLAN

The Concept Plan calls for a network of transportation facilities to support local and regional travel. Miles of new residential streets are anticipated, in association with the future housing supply. A segment of Livesay Road is recommended to be classified as a Neighborhood Collector and serve as a "Main Street" for the northern commercial node of the planning area. Donovan Road is also recommended for classification as a Neighborhood Collector, to serve the same purpose in the southern commercial node and provide safe connections to the Ogden Middle School. Holly Lane is planned to be extended from Redland Road to Holcomb Boulevard and designated as a Collector facility from Maplelane Road to Holcomb Boulevard. Finally, an extension of Swan Avenue is recommended from its current terminus south of Holcomb Boulevard to an intersection with Holly Lane south of Donovan Road. *Appendix "G" contains the preferred alternative concept plan.*



ESTIMATED SITE-GENERATED TRIPS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE **9**

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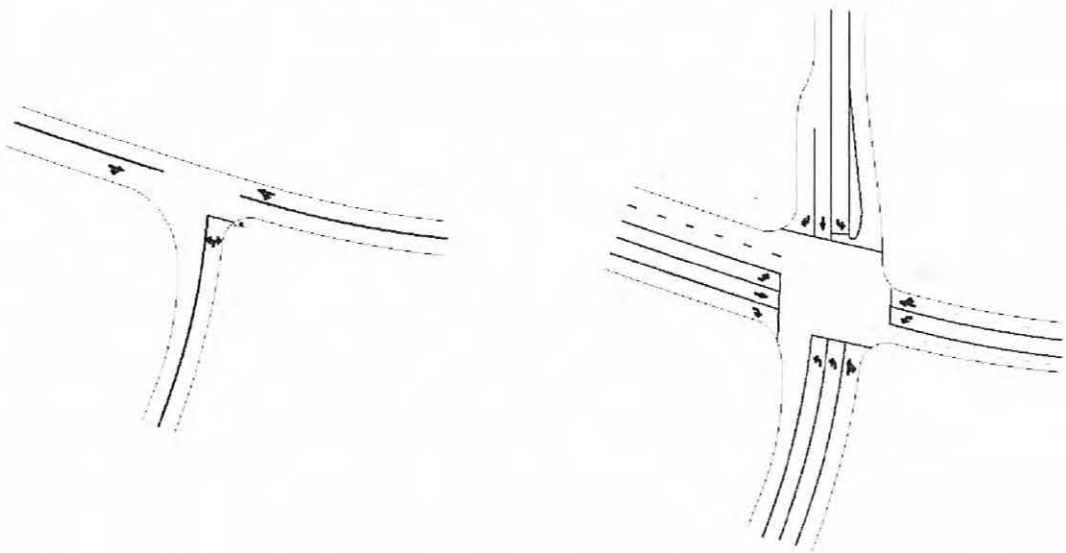
Holly Lane and Swan Avenue Extensions

Holly Lane serves a vital role in both the local and the regional context as the only continuous north/south travel corridor on the east side of HWY 213. Holly Lane connects the northern area of Oregon City to many key destinations in the southern area of the City, such as Berryhill Shopping Center, Clackamas Community College, Oregon City High School, City Hall, and many other retail and employment locations. As a result, this corridor is expected to see travel demands increase by nearly 13,000 vehicles per day to a total of more than 16,000 vehicles per day. Were this to occur, Holly Lane would need to provide five lanes near its intersection with Redland Road and three lanes for the remainder of its length. In addition, Redland Road would need to provide six lanes near its intersection with Holly Lane and five lanes for the remainder of its length to Abernethy Road.

The cost of these improvements is significant (>$15 million) and the feasibility is questionable. Much of the Redland Road corridor is significantly constrained by topography on the north side and by Abernethy Creek on the south side. Much of the Holly Lane corridor has a very narrow right-of-way and improved width, with many single-family residences taking direct access from Holly Lane. Climbing sections of Holly Lane will be very costly to reconstruct and face several engineering challenges. Finally, the existing Holly Lane bridge across Abernethy Creek would need to be demolished and replaced with at least a five-lane bridge. Diagram 1 illustrates the existing lane configurations at the Redland Road/Holly Lane intersection and how the intersection would look, if the Park Place Concept Plan were completed without the Swan Avenue extension. *Appendix "H" contains the Redland Road/Holly Lane intersection level-of-service worksheets without the Swan Avenue extension.*

DIAGRAM #1: REDLAND ROAD/HOLLY LANE INTERSECTION



EXISTING LANE CONFIGURATIONS

2027 BUILD WITHOUT SWAN AVENUE EXTENSION

Park Place Concept Plan provides for a parallel, collector-level corridor to Holly Lane, ·ed to as the Swan Avenue extension, as a solution to the issues described above. ·lishing this corridor from Forsythe Road to points well south of Donovan Road ensures that xisting Holly Lane can remain a two-lane, collector-level facility south of Redland Road. Swan Avenue extension will include bridges across the Livesay Creek canyon and nethy Creek, creating much needed connections between adjacent neighborhoods and ding adequate capacity and system redundancy critically needed during times of gency.

dition, Holly Lane would be extended north from Redland Road to connect with Holcomb :vard, providing good access, connectivity, and system redundancy to the area.

Swan Avenue extension provides the opportunity for a continuous, north/south, collector- facility that is fully equipped to serve all travel modes. The facility will include sidewalks ·n-street striped bike lanes on both sides and accommodate future transit service. Equipped :h, Swan Avenue is anticipated to attract 8,000 to 11,000 vehicles a day, while Holly Lane ·y required to serve 4,000 to 6,000 vehicles per day. This allows the existing Holly Lane to in a two-lane road with improvements to address safety concerns and manage travel speeds.

: are many other benefits derived from the Swan Avenue extension, such as:

- the Livesay Creek Canyon is finally overcome as a barrier of access to schools, parks, retail uses, and neighborhoods, which reduces demands on Redland and Holcomb and reduces out-of-direction travel;
- the new Swan Avenue-Abernethy Creek bridge provides a critical connection that is out of the flood plain, redundant to the Holly Lane-Abernethy Creek bridge crossing, and improves system connectivity and local access;
- areas north and south of Redland Road are more accessible and achieve higher levels of development as a result;
- the Swan Avenue connection from Livesay Road to Redland Road alleviates the need for the existing Livesay Road intersection with Redland Road and dramatically reduces the likelihood of cut-through traffic using lower Livesay Road;
- improvement requirements for Redland Road are appreciably reduced, lowering costs and environmental impacts; and,
- a more complete, robust, and redundant multi-modal transportation system can be developed that is cost-effective and environmentally sound.

Swan Avenue-Livesay Creek Canyon bridge and the Swan Avenue-Abernethy Creek bridge ital links in the local and regional transportation system and critical components to the lity of the land use concept. These allow a continuous collector-level corridor to be created. alleviates the need to widen and significantly improve the Holly Lane corridor, which nizes adverse impacts to existing properties along Holly Lane. The connections provide for direct routes between key destinations in and around the study area. This reduces out-of- tion travel, particularly travel on Holcomb Boulevard and Redland Road. Finally, these :ctions provide convenient access to a large enough population base to fully support the and south mixed-use village areas.

YEAR 2027 BUILD CONDITIONS

The build analysis evaluates how the study area's transportation system will operate in the future forecast year, 2027, assuming full development of the Park Place area, as it is outlined in the preferred alternative. The 2027 no-build traffic volumes for the weekday PM peak hour shown in Figure 6 are added to the site-generated traffic shown in Figure 9 to arrive at the total traffic volumes shown in Figure 10.

Level-of-Service Analysis

Figure 10 also provides a summary of the forecast total traffic levels of service and volume/capacity analyses associated with full build-out of the Park Place area. This analysis assumes that the improvements recommended under the no-build traffic conditions and the lane configurations shown in Figure 5 are in place. *Appendix "I" contains the 2027 Unmitigated Build Conditions worksheets.*

Highway 213 Corridor

Figure 10 illustrates that all of the intersections along the HWY 213 corridor will meet ODOT operating standards except for the intersection of HWY 213 and Washington Street. The HWY 213/Washington Street intersection is expected to operate over capacity during the weekday PM peak hour under year 2027 build traffic conditions. Improvements at the HWY 213 intersections would be required to meet applicable ODOT standards.

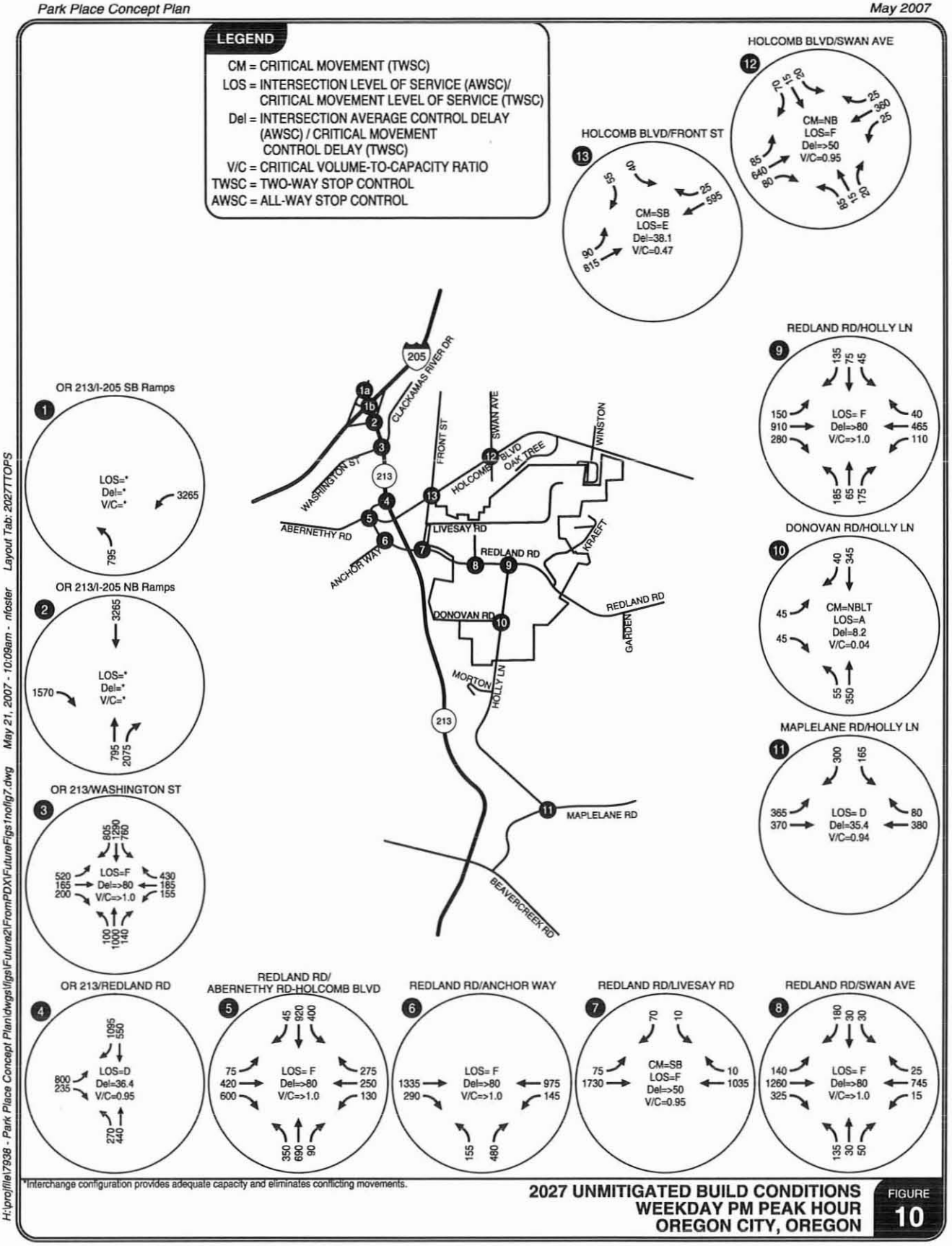
Redland Road/Holcomb Boulevard/Holly Lane Corridors

Oregon City and Clackamas County level-of-service standards are applied to the analysis of intersections along the Redland Road, Holcomb Boulevard, and Holly Lane corridors. The City of Oregon City and Clackamas County require that LOS "D" or better be maintained for all signalized intersections and LOS "E" or better be maintained for all unsignalized intersections. The City of Oregon City and Clackamas County do not have any standards regarding volume-to-capacity ratios.

Figure 10 illustrates that several intersections along the Redland Road and Holly Lane corridors are forecast to fall below applicable standards during the PM peak hour under year 2027 build traffic conditions. More specifically, the Redland Road/Abernethy Road-Holcomb Boulevard, Redland Road/Anchor Way, Redland Road/Livesay Road, Redland Road/Swan Avenue, Redland Road/Holly Lane, and Holcomb Boulevard/Swan Avenue intersections are all expected to operate at LOS "F" without additional future improvements. Therefore, these intersections will need to be improved with build-out of the Park Place planning area. All other non-highway intersections are expected to operate acceptably.

Needed Improvements

Table 6 summarizes the mitigations triggered by the concept plan that are in addition to those made under the 2027 Mitigated No-Build Conditions. In addition, Figure 11 illustrates the 2027 Mitigated Build lane configurations and traffic control devices needed to achieve acceptable performance standards. Figure 12 summarizes the resulting year 2027 Mitigated Build traffic conditions for all study area intersections. *Appendix "J" contains the 2027 Mitigated Build Conditions worksheets.*



*Interchange configuration provides adequate capacity and eliminates conflicting movements.

2027 UNMITIGATED BUILD CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE **10**

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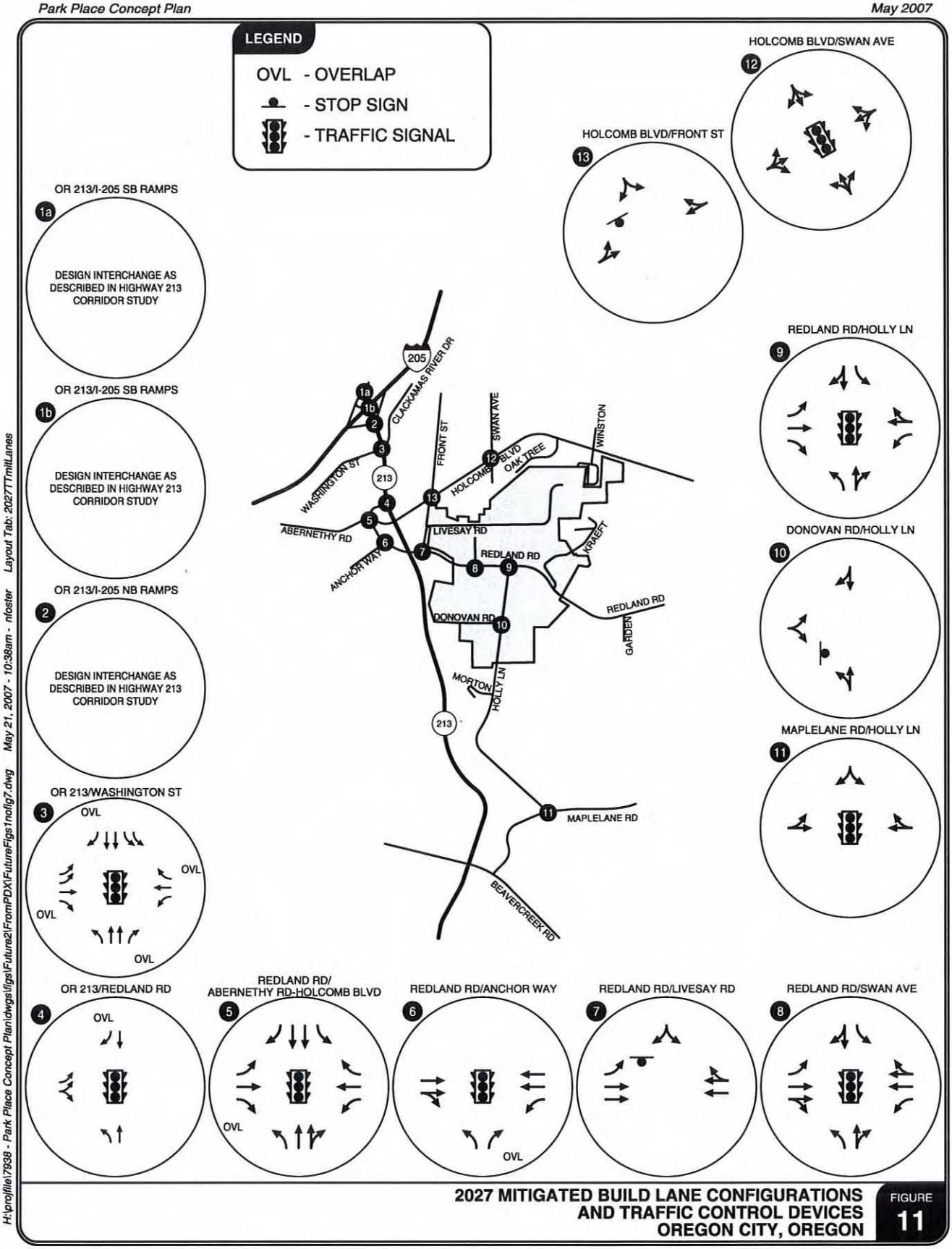

2027 MITIGATED BUILD LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES OREGON CITY, OREGON

FIGURE **11**

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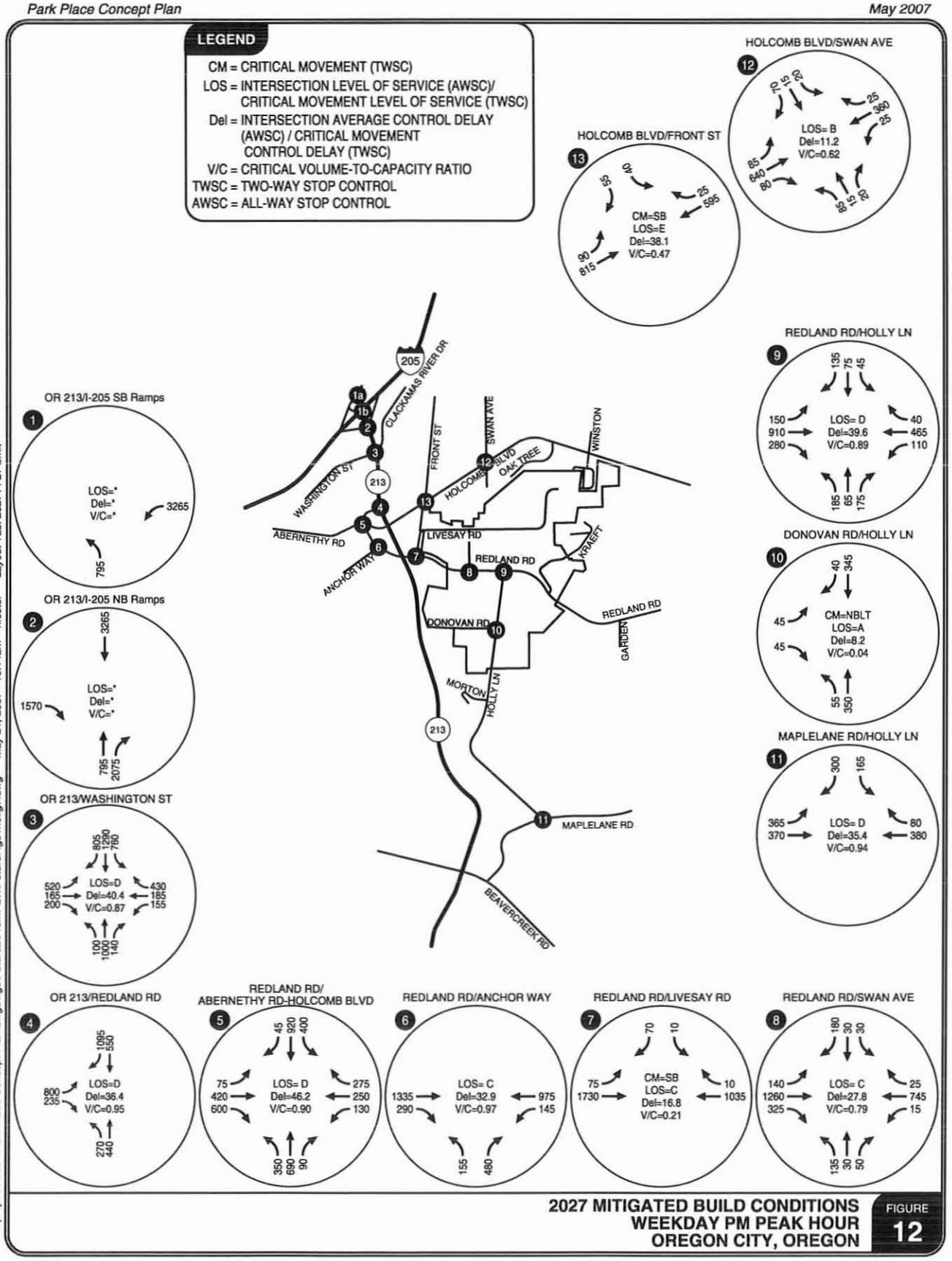
Park Place Concept Plan *May 2007*



2027 MITIGATED BUILD CONDITIONS
WEEKDAY PM PEAK HOUR
OREGON CITY, OREGON

FIGURE **12**

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Table 6 and Figure 12 both show that with these improvements in place, the operations at all study intersections will meet applicable agency standards.

TABLE 6
NEEDED IMPROVEMENTS UNDER 2027 BUILD CONDITIONS

Intersection	2027 No-Build Conditions		Needed Improvement	2027 Mitigated No-Build Conditions	
HWY 213 Corridor					
	V/C			**V/C**	
HWY 213/Washington Street	>1.0		- Construct 2nd NB thru lane	0.87	
Redland Road/Holcomb Boulevard/Holly Lane Corridors					
	Delay (s)	**LOS**		**Delay (s)**	**LOS**
Redland Road (NB-SB)/ Abernethy Road-Holcomb Boulevard (EB-WB)	>80.0	F	- Construct 2nd NB thru lane - Construct 2nd SB thru lane	46.2	D
Redland Road (EB-WB)/ Anchor Way (NB-SB)	>80.0	F	- Construct 2nd EB thru lane - Construct 2nd WB thru lane	32.9	C
Redland Road (EB-WB)/ Livesay Road (NB-SB)	>50.0	F	- Construct 2nd EB thru lane - Construct 2nd WB thru lane	16.8	C
Redland Road (EB-WB)/ Swan Avenue (NB-SB)	N/A	N/A	- Construct north and south approaches with separate LT and shared thru/right lanes - Signalize intersection - Construct 2nd EB thru lane - Construct 2nd WB thru lane	27.8	C
Redland Road (EB-WB)/ Holly Lane (NB-SB)	>80.0	F	- Construct north approach with separate LT and shared thru/right lanes - Construct an EB RT lane - Construct EB and WB LT lanes	39.6	D
Holcomb Boulevard (EB-WB)/ Swan Avenue (NB-SB)	>50.0	F	- Signalize intersection	11.2	B

Highway 213 Corridor

The only intersection along the HWY 213 corridor that needs to be improved is the HWY 213/Washington Street intersection. Widening HWY 213 to include a second northbound through lane through this intersection is all that is necessary to achieve acceptable operations along this corridor.

Redland Road/Holcomb Boulevard/Holly Lane Corridors

Redland Road will need to be widened to five lanes between Abernethy Road-Holcomb Boulevard and Swan Avenue, with the additional eastbound lane becoming a right-turn only drop-lane between Swan Avenue and Holly Lane. Redland Road will most likely need to be a three-lane cross-section east of Holly Lane. No other corridor widening appears to be necessary, though many intersection improvements will also need to be made due to new approaches being added and additional traffic being generated by the planning area.

COST ESTIMATES OF NEEDED IMPROVEMENTS

A planning level cost estimate analysis was conducted in order to approximate the amount of funding that will be needed to construct the needed improvements to the local roadway system, with and without build-out of the planning area. Table 7 (on the following page) lists these improvements and their estimated costs. These generalized cost estimates include assumptions for right-of-way, design, and construction. Table 7 includes all of the intersection improvements listed in Tables 1 and 6, as well as corridor improvements.

CONCLUSION

The Oregon City area is expected to see significant growth over the next twenty-three years. Current forecasts predict increases in travel demand of approximately 50% on the Highway 213 corridor and approximately 60% on the Redland Road corridor. These increases will exceed the capacity of the current transportation system and will likely necessitate phased capacity improvements similar to those recommended in Alternative 3 of the *Highway 213 Urban Corridor Design Study*. The Redland Road corridor is likely to require widening to a three-lane cross-section within the planning area, as a result of the growth in regional travel demand.

It is estimated that the housing and commercial development anticipated in the proposed Park Place Concept Plan will add approximately 20,700 new trips to the surrounding roadway network, with approximately 2,000 of these occurring in the PM peak hour. Additional improvements to Redland Road intersections, beyond what was described above, will be needed to meet future demands resulting from both regional and Concept Plan growth. The extension of Swan Avenue, as proposed in the Park Place Concept Plan, will eliminate the need to further widen any other corridors (i.e. Holly Lane), in addition to providing enhanced connectivity within the planning area. The greater connectivity provided by the Swan Avenue extension will help support the two mixed-use villages proposed in the Concept Plan by increasing their accessibility, as well as facilitate improved travel throughout the planning area.

TABLE 7
ESTIMATED COST OF MAJOR TRANSPORTATION IMPROVEMENTS

Roadway Improvements	Improvement	Scenario		Total
		No Build	Build	
HWY 213: I-205 Over crossing	Construct new over crossing with 3 SB and 3 NB lanes	$12,000,000		$12,000,000
HWY 213: I-205 Interchange to Washington Street	Widen NB off-ramp and add 2 SB and one NB lanes on HWY 213	$13,000,000		$13,000,000
HWY 213: Washington to Redland	Add one lane in each direction	$4,200,000		$4,200,000
HWY 213: Redland to Beavercreek	Add one lane in each direction	$ 25,000,000		$25,000,000
Redland Road: Abernethy/Holcomb to Swan Ave	Construct five-lane cross section to City standards		$11,500,000	$11,500,000
Holly Lane: Redland to Maplelane	Limited safety improvements	$3,000,000		$3,000,000
Livesay Road: Swan Ext to Holly Ext	Upgrade to neighborhood collector standards		$1,800,000	$1,800,000
Donovan Road: Holly Lane to Ogden Middle School	Upgrade to neighborhood collector standards		$1,200,000	$1,200,000
Swan Ave. Extension: Existing Swan Ave. south of Holcomb Blvd	Upgrade to collector standards		$1,100,000	$1,100,000
Swan Ave. Extension: Livesay canyon to Redland Road	Construct new roadway and bridge across canyon		$9,300,000	$9,300,000
Swan Extension: Redland Rd to Holly Ln	Construct new roadway		$9,300,000	$9,300,000
Holly Lane: Redland to Holcomb Blvd	Construct new roadway		$17,400,000	$17,400,000
Total Roadway Improvements		$57,200,000	$51,600,000	$108,800,000
Intersection Only Improvements	**Improvement**	**No Build**	**Build**	**Total**
Anchor Way/Redland Rd		$2,900,000		$2,900,000
Holly Ln/Redland Rd		$2,000,000		$2,000,000
Holly Ln/Maplelane Rd		$1,600,000		$1,600,000
Swan Ave/Holcomb Blvd			$300,000	$300,000
Total Intersection Improvements		$6,500,000	$300,000	$6,800,000
Grand Totals		$63,700,000	$51,900,000	$115,600,000

References

1. Transportation Research Board. *Highway Capacity Manual.* 2000.

2. Kittelson & Associates, Inc. *Highway 213 Urban Corridor Design Study*. 2000

3. Institute of Transportation Engineers. *7th Edition, Trip Generation Manual.* 2003.

4. Institute of Transportation Engineers. *2nd Edition, Trip Generation Handbook*. June 2004.

Appendix A

Model Base & Future Volumes

INTERSECTION: #1	I-205 Southbound Ramps/OR 213											
1	NB			SB			EB			WB		
Nodes 13842 and 13843	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	618	4			7	8	5		2,325			
METRO EX Model	711	37	0	0	148	15	17	0	3,993	0	0	0
METRO Future Model	1,885	880	0	0	1,443	45	73	0	7,889	0	0	0
Sunrise EX Model	661	94	0	0	56	21	71	0	3,380	0	0	0
Sunrise Future Model	876	1,477	0	0	2,175	96	88	0	5,258	0	0	0
Metro 1 Hr EX Model	377	20	0	0	78	8	9	0	2,116	0	0	0
Metro 1 Hr future Model	999	466	0	0	765	24	39	0	4,181	0	0	0
Sunrise 1 Hr EX Model	345	50	0	0	30	11	38	0	1,901	0	0	0
Sunrise 1 Hr Future Model	464	783	0	0	1,153	51	46	0	2,785	0	0	0
Metro Future Delta (25 Year)	*1,240*	*451*	*0*	*0*	*690*	*24*	*35*	*0*	*4,790*	*0*	*0*	*0*
Metro Future % (25 Year)	*1,636*	*86*	*0*	*0*	*86*	*24*	*21*	*0*	*4,554*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*1,429*	*273*	*0*	*0*	*381*	*24*	*28*	*0*	*4,492*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*821*	*269*	*0*	*0*	*374*	*16*	*21*	*0*	*2,157*	*0*	*0*	*0*
Metro Future Delta (20 Year)	1,116	361	0	0	556	21	29	0	3,977	0	0	0
Metro Future % (20 Year)	1,434	77	0	0	56	21	18	0	4,140	0	0	0
Metro Future Obs (20 Year)	1,275	219	0	0	306	21	23	0	4,058	0	0	0
Metro Net Increase (20 Year)	657	215	0	0	299	13	18	0	1,733	0	0	0
Sun Future Delta (25 Year)	*737*	*737*	*0*	*0*	*1,130*	*48*	*13*	*0*	*3,210*	*0*	*0*	*0*
Sun Future % (25 Year)	*832*	*63*	*0*	*0*	*272*	*37*	*6*	*0*	*3,407*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*784*	*400*	*0*	*0*	*701*	*42*	*10*	*0*	*3,308*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*166*	*396*	*0*	*0*	*694*	*34*	*5*	*0*	*983*	*0*	*0*	*0*
Sun Future Delta (20 Year)	713	590	0	0	905	40	11	0	3,033	0	0	0
Sun Future % (20 Year)	789	51	0	0	219	31	6	0	3,191	0	0	0
Sun Future Obs (20 Year)	751	321	0	0	562	35	9	0	3,112	0	0	0
Sun Net Increase (20 Year)	133	317	0	0	555	27	4	0	787	0	0	0

EX Observed	618	4	0	0	7	8	5	0	2,325	0	0	0
Sunrise EX Model (1 hr.)	345	50			30	11	38		1901			
Sunrise Future Model (1 hr.)	464	783			1153	51	46		2785			
Model Growth	119	733			1123	40	8		885			
80% of Model Growth	95	586			898	32	6		708			
EX Observed + 80% Growth	713	590				40	11		3033			

INTERSECTION: #2	I-205 Northbound Ramps/OR 213											
2	NB			SB			EB			WB		
Node 13844	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed		621	1,667	9	2,323		1		883			
METRO EX Model	0	719	2,926	133	3,948	0	12	0	1,318	0	0	0
METRO Future Model	0	2,645	3,534	58	9,274	0	47	0	3,645	0	0	0
EX Model	0	667	2,863	40	3,892	0	14	0	1,353	0	0	0
Future Model	0	2,214	3,890	88	7,341	0	54	0	2,444	0	0	0
Metro 1 Hr EX Model	0	381	1,551	70	2,092	0	6	0	699	0	0	0
Metro 1 Hr future Model	0	1,402	1,868	31	4,915	0	25	0	1,932	0	0	0
Sunrise 1 Hr EX Model	0	350	1,411	21	1,909	0	7	0	558	0	0	0
Sunrise 1 Hr Future Model	0	1,173	1,638	47	3,891	0	29	0	1,295	0	0	0
Metro Future Delta (25 Year)	*0*	*1,642*	*2,004*	*31*	*5,146*	*0*	*20*	*0*	*2,115*	*0*	*0*	*0*
Metro Future % (25 Year)	*0*	*2,284*	*2,232*	*4*	*5,457*	*0*	*4*	*0*	*2,440*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*0*	*1,963*	*2,019*	*-12*	*5,301*	*0*	*12*	*0*	*2,278*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*0*	*1,342*	*331*	*-27*	*2,978*	*0*	*11*	*0*	*1,196*	*0*	*0*	*0*
Metro Future Delta (20 Year)	0	1,438	1,941	-23	4,581	0	16	0	1,870	0	0	0
Metro Future % (20 Year)	0	1,952	1,963	5	4,830	0	3	0	2,130	0	0	0
Metro Future Obs (20 Year)	0	1,695	1,952	-9	4,706	0	10	0	2,000	0	0	0
Metro Net Increase (20 Year)	0	1,074	285	-18	2,383	0	9	0	1,117	0	0	0
Sun Future Delta (25 Year)	*0*	*1,444*	*1,913*	*35*	*4,305*	*0*	*22*	*0*	*1,620*	*0*	*0*	*0*
Sun Future % (25 Year)	*0*	*2,080*	*1,958*	*20*	*4,734*	*0*	*4*	*0*	*2,049*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*0*	*1,762*	*1,935*	*27*	*4,520*	*0*	*13*	*0*	*1,835*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*0*	*1,141*	*248*	*18*	*2,197*	*0*	*12*	*0*	*952*	*0*	*0*	*0*
Sun Future Delta (20 Year)	0	1,279	1,868	30	3,906	0	18	0	1,473	0	0	0
Sun Future % (20 Year)	0	1,788	1,903	18	4,252	0	3	0	1,816	0	0	0
Sun Future Obs (20 Year)	0	1,534	1,886	24	4,080	0	11	0	1,644	0	0	0
Sun Net Increase (20 Year)	0	913	199	15	1,757	0	10	0	761	0	0	0

EX Observed	0	621	1,667	9	2,323	0	1	0	883	0	0	0
Sunrise EX Model (1 hr.)	0	350	1411	21	1909	0	7	0	558	0	0	0
Sunrise Future Model (1 hr.)	0	1173	1638	47	3891	0	29	0	1295	0	0	0
Model Growth	0	823	226	26	1982	0	21	0	737	0	0	0
80% of Model Growth	0	658	181	21	1585	0	17	0	590	0	0	0
EX Observed + 80% Growth	0	1279	1868	30	3908	0	18	0	1473	0	0	0

INTERSECTION: #3	OR 213/Washington Street											
3	NB			SB			EB			WB		
Node 13710	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	65	1,821	85	160	2,657	389	304	55	135	80	410	183
METRO EX Model	1	2,757	25	1,375	3,867	74	173	181	1	29	135	714
METRO Future Model	5	4,206	72	4,194	7,757	968	369	212	1	19	166	1,794
Sunrise EX Model	1	3,372	14	1,139	3,561	152	136	134	1	0	114	541
Sunrise Future Model	1	3,454	21	2,554	5,101	1,139	696	291	1	0	518	1,154
Metro 1 Hr EX Model	1	1,461	13	702	2,050	39	92	96	1	15	72	378
Metro 1 Hr future Model	3	2,229	38	2,223	4,111	513	90	112	1	10	88	951
Sunrise 1 Hr EX Model	1	1,363	7	603	1,783	81	99	71	1	4	92	301
Sunrise 1 Hr Future Model	1	1,831	11	1,354	3,234	599	369	207	1	4	275	612
Metro Future Delta (25 Year)	*67*	*2,589*	*110*	*1,641*	*4,719*	*863*	*302*	*71*	*133*	*70*	*54*	*730*
Metro Future % (25 Year)	*325*	*2,779*	*245*	*506*	*5,330*	*5,085*	*297*	*64*	*135*	*52*	*49*	*466*
Metro Future Obs (25 Year)	*196*	*2,684*	*177*	*1,094*	*5,024*	*2,974*	*299*	*68*	*135*	*64*	*52*	*598*
Metro Net Increase (25 Year)	*131*	*863*	*92*	*934*	*2,967*	*2,585*	*-5*	*13*	*0*	*-16*	*-17*	*420*
Metro Future Delta (20 Year)	67	2,435	105	1,376	4,306	768	303	68	135	76	53	641
Metro Future % (20 Year)	272	2,587	213	437	4,795	4,149	298	63	135	56	47	404
Metro Future Obs (20 Year)	170	2,511	159	907	4,551	2,458	300	65	135	67	50	523
Metro Net Increase (20 Year)	105	690	74	747	1,894	2,069	-4	10	0	-13	10	340
Sun Future Delta (25 Year)	*65*	*2,288*	*89*	*910*	*4,107*	*907*	*574*	*191*	*135*	*80*	*222*	*494*
Sun Future % (25 Year)	*65*	*2,445*	*128*	*359*	*4,817*	*2,862*	*1,138*	*160*	*135*	*80*	*119*	*372*
Sun Future Obs (25 Year)	*65*	*2,367*	*108*	*635*	*4,462*	*1,900*	*856*	*176*	*135*	*80*	*171*	*433*
Sun Net Increase (25 Year)	*0*	*546*	*23*	*475*	*1,805*	*1,511*	*552*	*121*	*0*	*0*	*131*	*250*
Sun Future Delta (20 Year)	65	2,195	88	760	3,817	804	520	164	135	80	186	432
Sun Future % (20 Year)	65	2,321	119	319	4,385	2,391	971	139	135	80	103	335
Sun Future Obs (20 Year)	65	2,258	103	540	4,101	1,597	746	152	135	80	145	383
Sun Net Increase (20 Year)	0	437	18	380	1,444	1,208	442	97	0	0	105	200

EX Observed	65	1,821	85	160	2,657	389	304	55	135	80	410	183
Sunrise EX Model (1 hr.)	1	1363	7	603	1783	81	99	71	1	4	92	301
Sunrise Future Model (1 hr.)	1	1831	11	1354	3234	599	369	207	1	4	275	612
Model Growth	1	467	4	750	1450	518	270	136	1	0	182	311
80% of Model Growth	0	374	3	600	1160	415	216	109	1	0	146	249
EX Observed + 80% Growth	65	2195	88	760	3817	804	520	164	136	80	186	432

INTERSECTION: #4	OR 213/Redland Road											
4	NB			SB			EB			WB		
Node 13711	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	100	1,632			2,215	657	339		100			
METRO EX Model	330	2,344	0	0	3,019	577	436	0	169			
METRO Future Model	271	2,854	0	0	4,457	3,380	1,429	0	269			
Sunrise EX Model	296	2,178	0	0	2,242	1,590	413	0	463	0	0	0
Sunrise Future Model	397	2,856	0	0	5,100	990	519	0	463	0	0	0
Metro 1 Hr EX Model	175	1,242	0	0	1,600	465	232	0	100	0	0	0
Metro 1 Hr future Model	144	1,513	0	0	2,383	1,738	757	0	143	0	0	0
Sunrise 1 Hr EX Model	157	1,153	0	0	1,210	578	219	0	255	0	0	0
Sunrise 1 Hr Future Model	210	1,567	0	0	2,703	477	275	0	245	0	0	0
Metro Future Delta (25 Year)	*69*	*1,902*	*0*	*0*	*2,998*	*1,801*	*864*	*0*	*142*	*0*	*0*	*0*
Metro Future % (25 Year)	*80*	*1,997*	*0*	*0*	*2,799*	*2,457*	*1,104*	*0*	*142*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*75*	*1,949*	*0*	*0*	*2,149*	*2,194*	*983*	*0*	*142*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*25*	*317*	*0*	*0*	*934*	*1,537*	*646*	*0*	*42*	*0*	*0*	*0*
Metro Future Delta (20 Year)	75	1,848	0	0	2,842	1,676	759	0	134	0	0	0
Metro Future % (20 Year)	86	1,916	0	0	3,083	2,097	953	0	134	0	0	0
Metro Future Obs (20 Year)	80	1,882	0	0	2,962	1,887	856	0	134	0	0	0
Metro Net Increase (20 Year)	-20	250	0	0	747	1,230	517	0	34	0	0	0
Sun Future Delta (25 Year)	*154*	*2,046*	*0*	*0*	*3,708*	*556*	*395*	*0*	*90*	*0*	*0*	*0*
Sun Future % (25 Year)	*134*	*2,218*	*0*	*0*	*4,948*	*542*	*426*	*0*	*96*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*144*	*2,132*	*0*	*0*	*4,328*	*549*	*411*	*0*	*93*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*44*	*500*	*0*	*0*	*2,113*	*-108*	*72*	*0*	*-7*	*0*	*0*	*0*
Sun Future Delta (20 Year)	143	1,963	0	0	3,409	576	384	0	92	0	0	0
Sun Future % (20 Year)	127	2,101	0	0	4,401	565	409	0	97	0	0	0
Sun Future Obs (20 Year)	135	2,032	0	0	3,905	571	396	0	94	0	0	0
Sun Net Increase (20 Year)	35	400	0	0	1,690	-86	57	0	-6	0	0	0

EX Observed	100	1,632	0	0	2,215	657	339	0	100	0	0	0
Sunrise EX Model (1 hr.)	157	1153	0	0	1210	578	219	0	259	0	0	0
Sunrise Future Model (1 hr.)	210	1567	0	0	2703	477	275	0	245	0	0	0
Model Growth	54	414	0	0	1493	-101	56	0	-14	0	0	0
80% of Model Growth	43	331	0	0	1194	-81	45	0	-11	0	0	0
EX Observed + 80% Growth	143	1963	0	0	3409	576	384	0	89	0	0	0

INTERSECTION: #5	OR 213/Beavercreek Road											
5	NB			SB			EB			WB		
Node Ndoe 10372	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	35	769	125	728	1,163	424	493	520	30	130	370	470
METRO EX Model	1	1,219	81	1,436	1,438	334	424	614	1	36	537	1,031
METRO Future Model	6	1,525	106	2,009	2,165	592	439	2,072	6	40	877	1,160
Sunrise EX Model	1	1,328	31	983	1,243	537	702	593	1	25	278	449
Sunrise Future Model	1	1,251	107	1,744	3,065	854	1,013	1,303	1	142	848	1,078
Metro 1 Hr EX Model	1	646	43	761	762	177	225	325	1	20	285	546
Metro 1 Hr future Model	3	808	56	1,065	1,147	314	233	1,098	3	21	465	615
Sunrise 1 Hr EX Model	1	704	16	522	659	285	372	314	1	13	147	233
Sunrise 1 Hr Future Model	1	663	57	924	1,624	453	537	691	1	75	449	571
Metro Future Delta (25 Year)	*36*	*931*	*138*	*1,022*	*1,548*	*561*	*501*	*1,293*	*33*	*131*	*550*	*538*
Metro Future % (25 Year)	*210*	*962*	*164*	*1,016*	*1,751*	*752*	*510*	*1,755*	*150*	*137*	*604*	*529*
Metro Future Obs (25 Year)	*124*	*947*	*151*	*1,005*	*1,650*	*656*	*506*	*1,524*	*106*	*134*	*577*	*534*
Metro Net Increase (25 Year)	*89*	*176*	*26*	*297*	*487*	*232*	*13*	*1,004*	*76*	*4*	*207*	*64*
Metro Future Delta (20 Year)	37	899	136	971	1,471	533	499	1,138	32	131	514	525
Metro Future % (20 Year)	178	923	156	960	1,633	666	507	1,506	150	135	587	517
Metro Future Obs (20 Year)	106	911	146	966	1,552	610	503	1,323	91	133	536	531
Metro Net Increase (20 Year)	71	142	21	238	389	186	10	803	61	3	166	51
Sun Future Delta (25 Year)	*35*	*728*	*165*	*1,130*	*2,129*	*592*	*658*	*896*	*30*	*192*	*672*	*806*
Sun Future % (25 Year)	*35*	*724*	*431*	*1,289*	*2,868*	*674*	*711*	*1,143*	*30*	*738*	*1,129*	*1,152*
Sun Future Obs (25 Year)	*35*	*726*	*298*	*1,210*	*2,498*	*633*	*685*	*1,019*	*30*	*465*	*900*	*980*
Sun Net Increase (25 Year)	*0*	*-43*	*173*	*482*	*1,335*	*209*	*192*	*499*	*0*	*335*	*530*	*519*
Sun Future Delta (20 Year)	35	736	157	1,050	1,936	558	625	821	30	180	612	741
Sun Future % (20 Year)	35	733	370	1,177	2,527	624	668	1,018	30	617	977	1,015
Sun Future Obs (20 Year)	35	735	264	1,113	2,231	591	646	920	30	398	794	878
Sun Net Increase (20 Year)	0	-34	139	385	1,068	167	153	400	0	268	424	408

EX Observed	35	769	125	728	1,163	424	493	520	30	130	370	470
Sunrise EX Model (1 hr.)	1	704	16	522	659	285	372	314	1	13	147	233
Sunrise Future Model (1 hr.)	1	663	57	924	1624	453	537	691	1	75	449	571
Model Growth			40	402	966	168	165	378		62	302	338
80% of Model Growth	0		32	322	773	134	132	301	0	50	242	271
EX Observed + 80% Growth			157	1050	1936	558	625	821		180	612	741

INTERSECTION: #6	OR 213/Molalla Avenue											
6	NB			SB			EB			WB		
Node 14337	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	250	603	60	92	1,101	130	149	85	445	95	115	177
METRO EX Model	1,001	1,132	1	1	1,444	32	168	1	1,134	1	1	1
METRO Future Model	1,479	1,625	1	1	2,202	10	12	1	2,184	1	1	1
Sunrise EX Model	396	863	119	21	1,248	1	1	499	442	214	532	496
Sunrise Future Model	748	1,146	365	289	2,818	1	1	879	1,454	1,206	1,058	214
Metro 1 Hr EX Model	531	600	1	1	765	17	89	1	601	1	1	1
Metro 1 Hr future Model	784	861	1	1	1,167	5	6	1	1,158	1	1	1
Sunrise 1 Hr EX Model	210	457	63	11	661	1	1	264	234	113	293	263
Sunrise 1 Hr Future Model	396	607	193	153	1,547	1	1	466	771	639	561	113
Metro Future Delta (25 Year)	*503*	*864*	*60*	*92*	*1,503*	*118*	*66*	*85*	*1,002*	*95*	*115*	*177*
Metro Future % (25 Year)	*369*	*866*	*60*	*92*	*1,679*	*41*	*11*	*85*	*887*	*95*	*115*	*177*
Metro Future Obs (25 Year)	*436*	*865*	*60*	*92*	*1,591*	*79*	*38*	*85*	*929*	*95*	*115*	*177*
Metro Net Increase (25 Year)	*186*	*262*	*0*	*0*	*490*	*-51*	*-111*	*0*	*484*	*0*	*0*	*0*
Metro Future Delta (20 Year)	453	812	60	92	1,422	121	83	85	890	95	115	177
Metro Future % (20 Year)	346	813	60	92	1,563	59	38	85	775	95	115	177
Metro Future Obs (20 Year)	399	813	60	92	1,493	90	61	85	832	95	115	177
Metro Net Increase (20 Year)	149	210	0	0	392	-40	-88	0	387	0	0	0
Sun Future Delta (25 Year)	*437*	*753*	*190*	*234*	*1,986*	*130*	*149*	*286*	*981*	*621*	*383*	*26*
Sun Future % (25 Year)	*472*	*801*	*184*	*1,266*	*2,574*	*130*	*149*	*150*	*1,464*	*535*	*220*	*76*
Sun Future Obs (25 Year)	*454*	*777*	*187*	*750*	*2,280*	*130*	*149*	*218*	*1,223*	*578*	*302*	*52*
Sun Net Increase (25 Year)	*204*	*174*	*127*	*658*	*1,179*	*0*	*0*	*133*	*778*	*483*	*187*	*-125*
Sun Future Delta (20 Year)	399	723	164	206	1,809	130	149	246	874	516	330	57
Sun Future % (20 Year)	428	761	159	1,031	2,280	130	149	137	1,260	447	199	96
Sun Future Obs (20 Year)	414	742	162	618	2,044	130	149	191	1,067	481	264	77
Sun Net Increase (20 Year)	164	139	102	526	943	0	0	106	622	386	149	-100

EX Observed	250	603	60	92	1,101	130	149	85	445	95	115	177
Sunrise EX Model (1 hr.)	210	457	63	11	661	1	1	264	234	113	293	263
Sunrise Future Model (1 hr.)	396	607	193	153	1547	1	1	466	771	639	561	113
Model Growth	187	150	130	142	885			201	536	526	268	
80% of Model Growth	149	120	104	114	708	0	0	161	429	421	215	
EX Observed + 80% Growth	399	723	164	206	1809			246	874	516	330	

INTERSECTION: #7	OR 213/Glen Oak Road											
7	NB			SB			EB			WB		
Node 27736	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	1	675	12	149	1,365	18	26	2	1	11	1	113
METRO EX Model												
METRO Future Model												
Sunrise EX Model	1	1,126	52	340	1,961	1	1	1	1	53	1	283
Sunrise Future Model	1	1,412	115	1,816	3,428	1	1	1	1	149	1	741
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	1	597	28	180	1,039	1	1	1	1	28	1	150
Sunrise 1 Hr Future Model	1	748	61	962	1,817	1	1	1	1	79	1	393
Metro Future Delta (25 Year)	*1*	*675*	*12*	*149*	*1,365*	*18*	*26*	*2*	*1*	*11*	*1*	*113*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*1*	*338*	*6*	*75*	*683*	*9*	*13*	*1*	*1*	*6*	*1*	*57*
Metro Net Increase (25 Year)	*0*	*-337*	*-6*	*-74*	*-682*	*-9*	*-13*	*-1*	*0*	*-5*	*0*	*-56*
Metro Future Delta (20 Year)	1	675	12	149	1,365	18	26	2	1	11	1	113
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*1*	*827*	*45*	*931*	*2,143*	*18*	*26*	*2*	*1*	*62*	*1*	*356*
Sun Future % (25 Year)	*1*	*846*	*27*	*796*	*2,386*	*18*	*26*	*2*	*1*	*31*	*1*	*296*
Sun Future Obs (25 Year)	*1*	*837*	*36*	*864*	*2,264*	*18*	*26*	*2*	*1*	*46*	*1*	*326*
Sun Net Increase (25 Year)	*0*	*162*	*24*	*715*	*899*	*0*	*0*	*0*	*0*	*35*	*0*	*213*
Sun Future Delta (20 Year)	1	796	39	775	1,987	18	26	2	1	52	1	307
Sun Future % (20 Year)	1	812	24	666	2,182	18	26	2	1	27	1	259
Sun Future Obs (20 Year)	1	804	31	721	2,084	18	26	2	1	39	1	283
Sun Net Increase (20 Year)	0	129	19	572	719	0	0	0	0	28	0	170

EX Observed	1	675	12	149	1,365	18	26	2	1	11	1	113
Sunrise EX Model (1 hr.)	1	597	28	180	1039	1	1	1	1	28	1	150
Sunrise Future Model (1 hr.)	1	748	61	962	1817	1	1	1	1	79	1	393
Model Growth		152	33	782	778					51		243
80% of Model Growth		121	27	626	622					41		194
EX Observed + 80% Growth		796	39	775	1987					52		307

INTERSECTION: #8	OR 213/Henrici Road											
8	NB			SB			EB			WB		
Node 14198	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed		565	17	95	1,117					11		67
METRO EX Model	0	1,684	131	98	2,079	0	0	0	0	42	0	116
METRO Future Model	0	1,877	327	425	2,261	0	0	0	0	42	0	187
Sunrise EX Model	0	1,171	148	98	1,614	0	0	0	0	264	0	31
Sunrise Future Model	0	1,594	283	122	3,444	0	0	0	0	413	0	23
Metro 1 Hr EX Model	0	893	69	52	1,102	0	0	0	0	22	0	61
Metro 1 Hr future Model	0	995	173	225	1,198	0	0	0	0	22	0	99
Sunrise 1 Hr EX Model	0	622	77	50	1,067	0	0	0	0	140	0	3
Sunrise 1 Hr Future Model	0	797	150	70	1,825	0	0	0	0	219	0	12
Metro Future Delta (25 Year)	*0*	*667*	*121*	*268*	*1,273*	*0*	*0*	*0*	*0*	*11*	*0*	*105*
Metro Future % (25 Year)	*0*	*630*	*42*	*412*	*1,315*	*0*	*0*	*0*	*0*	*11*	*0*	*106*
Metro Future Obs (25 Year)	*0*	*649*	*82*	*340*	*1,214*	*0*	*0*	*0*	*0*	*11*	*0*	*106*
Metro Net Increase (25 Year)	*0*	*84*	*65*	*245*	*97*	*0*	*0*	*0*	*0*	*0*	*0*	*39*
Metro Future Delta (20 Year)	0	647	100	234	1,194	0	0	0	0	11	0	97
Metro Future % (20 Year)	0	617	37	349	1,195	0	0	0	0	11	0	100
Metro Future Obs (20 Year)	0	632	69	291	1,195	0	0	0	0	11	0	98
Metro Net Increase (20 Year)	0	67	52	196	78	0	0	0	0	0	0	31
Sun Future Delta (25 Year)	*0*	*740*	*90*	*115*	*1,875*	*0*	*0*	*0*	*0*	*90*	*0*	*77*
Sun Future % (25 Year)	*0*	*724*	*33*	*132*	*1,910*	*0*	*0*	*0*	*0*	*17*	*0*	*308*
Sun Future Obs (25 Year)	*0*	*732*	*61*	*123*	*1,893*	*0*	*0*	*0*	*0*	*54*	*0*	*193*
Sun Net Increase (25 Year)	*0*	*167*	*44*	*28*	*776*	*0*	*0*	*0*	*0*	*43*	*0*	*125*
Sun Future Delta (20 Year)	0	705	75	111	1,723	0	0	0	0	74	0	75
Sun Future % (20 Year)	0	693	30	125	1,751	0	0	0	0	16	0	260
Sun Future Obs (20 Year)	0	699	52	118	1,737	0	0	0	0	45	0	167
Sun Net Increase (20 Year)	0	134	35	23	620	0	0	0	0	34	0	100

EX Observed	0	565	17	95	1,117	0	0	0	0	11	0	67
Sunrise EX Model (1 hr.)	0	622	77	50	1067	0	0	0	0	140	0	3
Sunrise Future Model (1 hr.)	0	797	150	70	1825	0	0	0	0	219	0	12
Model Growth	0	175	73	20	758	0	0	0	0	79	0	10
80% of Model Growth	0	140	58	16	606	0	0	0	0	63	0	8

EX Observed + 80% Growth	0	705	75	111	1723	0	0	0	0	74	0	75

INTERSECTION: #9	Thayer Road / Mapletane Road											
9	NB			SB			EB			WB		
Node 10373	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed		363	79	10	280					51		3
METRO EX Model												
METRO Future Model												
Sunrise EX Model		483	1	1	240					1	0	1
Sunrise Future Model		957	1	1	782					1		1
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	0	245	1	1	127	0	0	0	0	1	0	1
Sunrise 1 Hr Future Model	0	507	1	1	414	0	0	0	0	1	0	1
Metro Future Delta (25 Year)	*0*	*363*	*79*	*10*	*280*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*0*	*182*	*40*	*3*	*140*	*0*	*0*	*0*	*0*	*26*	*0*	*2*
Metro Net Increase (25 Year)	*0*	*131*	*39*	*-3*	*-140*	*0*	*0*	*0*	*0*	*-25*	*0*	*-1*
Metro Future Delta (20 Year)	0	363	79	10	280	0	0	0	0	51	0	3
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*0*	*625*	*79*	*10*	*367*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Sun Future % (25 Year)	*0*	*750*	*79*	*10*	*912*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Sun Future Obs (25 Year)	*0*	*688*	*79*	*10*	*740*	*0*	*0*	*0*	*0*	*51*	*0*	*3*
Sun Net Increase (25 Year)	*0*	*325*	*0*	*0*	*460*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Sun Future Delta (20 Year)	0	572	79	10	510	0	0	0	0	51	0	3
Sun Future % (20 Year)	0	673	79	10	786	0	0	0	0	51	0	3
Sun Future Obs (20 Year)	0	623	79	10	648	0	0	0	0	51	0	3
Sun Net Increase (20 Year)	0	260	0	0	368	0	0	0	0	0	0	0

EX Observed	0	363	79	10	280	0	0	0	0	51	0	3
Sunrise EX Model (1 hr.)	0	245	1	1	127	0	0	0	0	1	0	1
Sunrise Future Model (1 hr.)	0	507	1	1	414	0	0	0	0	1	0	1
Model Growth	0	262			287	0	0	0	0		0	
80% of Model Growth	0	209			230	0	0	0	0		0	
EX Observed + 80% Growth	0	572			510	0	0	0	0		0	

INTERSECTION: #10	Beavercreek Road/Mapletane Road (See Call Comment)											
10	NB			SB			EB			WB		
Node 17122	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	186	79	46	69	45	217	303	731	115	13	473	60
METRO EX Model	1	1	1	277	1	196	302	1,829	1	1	1,468	146
METRO Future Model	1	1	1	277	1	559	2,027	1,739	1	1	1,519	362
Sunrise EX Model	1	1	1	24	1	218	427	1,182	1	1	538	35
Sunrise Future Model	1	1	1	68	1	694	826	2,328	1	1	1,374	133
Metro 1 Hr EX Model	1	1	1	147	1	105	160	969	1	1	746	79
Metro 1 Hr future Model	1	1	1	147	1	296	1,074	922	1	1	805	192
Sunrise 1 Hr EX Model	1	1	1	13	1	114	226	626	1	1	280	19
Sunrise 1 Hr Future Model	1	1	1	47	1	368	438	1,234	1	1	728	70
Metro Future Delta (25 Year)	*186*	*79*	*46*	*69*	*45*	*408*	*1,217*	*683*	*115*	*13*	*532*	*173*
Metro Future % (25 Year)	*186*	*79*	*46*	*69*	*45*	*510*	*2,934*	*695*	*115*	*13*	*570*	*146*
Metro Future Obs (25 Year)	*186*	*79*	*46*	*69*	*45*	*509*	*1,625*	*689*	*115*	*13*	*521*	*159*
Metro Net Increase (25 Year)	*0*	*0*	*0*	*0*	*0*	*292*	*1,302*	*-42*	*0*	*0*	*48*	*99*
Metro Future Delta (20 Year)	186	79	46	69	45	370	1,034	693	115	13	500	150
Metro Future % (20 Year)	186	79	46	69	45	531	1,688	702	115	13	503	129
Metro Future Obs (20 Year)	186	79	46	69	45	450	1,361	698	115	13	511	139
Metro Net Increase (20 Year)	0	0	0	0	0	233	1,058	-33	0	0	38	79
Sun Future Delta (25 Year)	*186*	*79*	*46*	*103*	*45*	*471*	*514*	*1,338*	*115*	*13*	*921*	*112*
Sun Future % (25 Year)	*186*	*79*	*46*	*253*	*45*	*700*	*586*	*1,440*	*115*	*13*	*1,231*	*228*
Sun Future Obs (25 Year)	*186*	*79*	*46*	*178*	*45*	*586*	*550*	*1,389*	*115*	*13*	*1,076*	*170*
Sun Net Increase (25 Year)	*0*	*0*	*0*	*109*	*0*	*369*	*247*	*658*	*0*	*0*	*603*	*110*
Sun Future Delta (20 Year)	186	79	46	96	45	420	472	1,217	115	13	832	102
Sun Future % (20 Year)	186	79	46	216	45	604	530	1,296	115	13	1,079	194
Sun Future Obs (20 Year)	186	79	46	156	45	512	501	1,257	115	13	956	148
Sun Net Increase (20 Year)	0	0	0	87	0	295	198	526	0	0	483	88

EX Observed	186	79	46	69	45	217	303	731	115	13	473	60
Sunrise EX Model (1 hr.)	1	1	1	13	1	114	226	626	1	1	280	19
Sunrise Future Model (1 hr.)	1	1	1	47	1	368	438	1234	1	1	728	70
Model Growth				34		254	211	607			448	52
80% of Model Growth				27		203	169	486			359	42
EX Observed + 80% Growth				96		420	472	1217			832	102

INTERSECTION: #11	Beavercreek Road / Clairemont Drive (East Community College Driveway)											
11	NB			SB			EB			WB		
Node 16013	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	26	442			817	158	84		38			
METRO EX Model												
METRO Future Model												
Sunrise EX Model	111	261			828	372	308		215	0	0	0
Sunrise Future Model	283	736			1,794	623	771		257	0	0	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	59	138	0	0	438	201	163	0	145	0	0	0
Sunrise 1 Hr Future Model	161	390	0	0	951	330	409	0	136	0	0	0
Metro Future Delta (25 Year)	*26*	*442*	*0*	*0*	*817*	*158*	*84*	*0*	*38*	*0*	*0*	*0*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*13*	*221*	*0*	*0*	*409*	*79*	*42*	*0*	*19*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*-12*	*221*	*0*	*0*	*-409*	*-79*	*-42*	*0*	*-19*	*0*	*0*	*0*
Metro Future Delta (20 Year)	26	442	0	0	817	158	84	0	38	0	0	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*128*	*694*	*0*	*0*	*1,330*	*287*	*329*	*0*	*30*	*0*	*0*	*0*
Sun Future % (25 Year)	*71*	*1,246*	*0*	*0*	*1,774*	*250*	*210*	*0*	*36*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*99*	*970*	*0*	*0*	*1,552*	*274*	*270*	*0*	*33*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*73*	*529*	*0*	*0*	*735*	*116*	*186*	*0*	*-5*	*0*	*0*	*0*
Sun Future Delta (20 Year)	107	643	0	0	1,227	261	280	0	31	0	0	0
Sun Future % (20 Year)	62	1,086	0	0	1,563	239	185	0	36	0	0	0
Sun Future Obs (20 Year)	85	864	0	0	1,405	250	233	0	34	0	0	0
Sun Net Increase (20 Year)	59	422	0	0	588	92	149	0	-4	0	0	0

EX Observed	26	442	0	0	817	158	84	0	38	0	0	0
Sunrise EX Model (1 hr.)	59	138	0	0	438	201	163	0	145	0	0	0
Sunrise Future Model (1 hr.)	161	390	0	0	951	330	409	0	136	0	0	0
Model Growth	102	252	0	0	513	129	245	0		0	0	0
80% of Model Growth	81	201	0	0	410	103	196	0		0	0	0
EX Observed + 80% Growth	107	643	0	0	1227	261	280	0		0	0	0

INTERSECTION: #12	Beavercreek Road / Loder Road

This intersection could not be modeled because the TAZs in this area are too large and require dis-aggregation.

INTERSECTION: #13	Beavercreek Road / Meyers Road (High School)

This intersection could not be modeled because the TAZs in this area are too large and require dis-aggregation.

INTERSECTION: #14	Beavercreek Road / Glen Oak											
14	NB			SB			EB			WB		
Node 87100	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	12	369			665	117	64		19			
METRO EX Model												
METRO Future Model												
Sunrise EX Model	46	281			712	354	91		46	0	0	0
Sunrise Future Model	169	731			1,996	49	286		143	0	0	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	24	149	0	0	378	204	48	0	21	0	0	0
Sunrise 1 Hr Future Model	90	398	0	0	1,058	26	153	0	76	0	0	0
Metro Future Delta (25 Year)	*12*	*369*	*0*	*0*	*665*	*117*	*64*	*0*	*19*	*0*	*0*	*0*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*6*	*185*	*0*	*0*	*333*	*59*	*32*	*0*	*10*	*0*	*0*	*0*
Metro Net Increase (25 Year)	*-6*	*-184*	*0*	*0*	*-332*	*-58*	*-32*	*0*	*-9*	*0*	*0*	*0*
Metro Future Delta (20 Year)	12	369	0	0	665	117	64	0	19	0	0	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*77*	*618*	*0*	*0*	*1,345*	*-61*	*168*	*0*	*74*	*0*	*0*	*0*
Sun Future % (25 Year)	*44*	*986*	*0*	*0*	*1,862*	*15*	*203*	*0*	*68*	*0*	*0*	*0*
Sun Future Obs (25 Year)	*61*	*802*	*0*	*0*	*1,603*	*-23*	*185*	*0*	*71*	*0*	*0*	*0*
Sun Net Increase (25 Year)	*49*	*433*	*0*	*0*	*938*	*-140*	*121*	*0*	*52*	*0*	*0*	*0*
Sun Future Delta (20 Year)	64	568	0	0	1,209	-25	148	0	63	0	0	0

Sun Future % (20 Year)	38	863	0	0	1,622	35	175	0	58	0	0	0
Sun Future Obs (20 Year)	51	716	0	0	1,416	5	161	0	60	0	0	0
Sun Net Increase (20 Year)	39	347	0	0	751	-112	97	0	41	0	0	0

EX Observed	12	369	0	0	665	117	64	0	19	0	0	0
Sunrise EX Model (1 hr.)	24	149	0	0	378	204	48	0	21	0	0	0
Sunrise Future Model (1 hr.)	90	398	0	0	1058	29	153	0	76	0	0	0
Model Growth	65	249	0	0	680	-18	104	0	55	0	0	0
80% of Model Growth	52	199	0	0	544	-14	84	0	44	0	0	0
EX Observed + 80% Growth	64	568	0	0	1209	103	148	0	63	0	0	0

INTERSECTION: #15	Beavercreek Road/Henrici Road											
15	NB			SB			EB			WB		
Node # 14197	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	15	234	3	175	460	25	27	52	49	14	22	84
METRO EX Model	38	220	39	344	1,059	2	1	175	54	227	101	184
METRO Future Model	95	249	77	1,586	671	9	1	622	129	131	125	212
Sunrise EX Model	1	196	36	281	417	84	1	146	42	39	185	151
Sunrise Future Model	1	506	72	661	1,478	84	1	337	79	243	435	414
Metro 1 Hr EX Model	30	117	21	182	561	1	1	93	29	120	54	98
Metro 1 Hr future Model	50	132	41	841	356	5	1	330	68	69	66	112
Sunrise 1 Hr EX Model	1	104	16	133	221	45	1	77	26	20	98	69
Sunrise 1 Hr Future Model	1	268	38	350	783	45	1	179	42	129	231	219
Metro Future Delta (25 Year)	*36*	*249*	*23*	*832*	*254*	*29*	*27*	*291*	*88*	*-37*	*35*	*90*
Metro Future % (25 Year)	*25*	*265*	*6*	*927*	*291*	*113*	*27*	*185*	*117*	*8*	*27*	*97*
Metro Future Obs (25 Year)	*31*	*257*	*15*	*820*	*273*	*71*	*27*	*237*	*103*	*14*	*31*	*93*
Metro Net Increase (25 Year)	*16*	*22*	*12*	*645*	*187*	*46*	*0*	*185*	*54*	*-25*	*9*	*14*
Metro Future Delta (20 Year)	33	246	19	702	296	28	27	242	81	-27	32	96
Metro Future % (20 Year)	23	259	5	680	325	95	27	158	103	9	26	93
Metro Future Obs (20 Year)	27	252	12	691	310	61	27	200	92	-9	29	95
Metro Net Increase (20 Year)	12	18	9	516	-150	36	0	148	63	-23	7	11
Sun Future Delta (25 Year)	*15*	*398*	*25*	*392*	*1,022*	*25*	*27*	*153*	*65*	*123*	*155*	*234*
Sun Future % (25 Year)	*15*	*604*	*7*	*461*	*1,630*	*25*	*27*	*120*	*79*	*90*	*52*	*265*
Sun Future Obs (25 Year)	*15*	*501*	*16*	*427*	*1,326*	*25*	*27*	*137*	*72*	*106*	*103*	*250*
Sun Net Increase (25 Year)	*0*	*267*	*13*	*252*	*866*	*0*	*0*	*85*	*23*	*92*	*81*	*166*
Sun Future Delta (20 Year)	15	365	21	349	910	25	27	133	62	101	128	204
Sun Future % (20 Year)	15	530	6	404	1,396	25	27	106	73	74	45	229
Sun Future Obs (20 Year)	15	448	14	376	1,153	25	27	120	67	88	87	217
Sun Net Increase (20 Year)	0	214	11	201	693	0	0	68	18	74	65	133

EX Observed	15	234	3	175	460	25	27	52	49	14	22	84
Sunrise EX Model (1 hr.)	1	104	16	133	221	45	1	77	26	20	98	69
Sunrise Future Model (1 hr.)	1	268	38	350	783	45	1	179	42	129	231	219
Model Growth	1	164	22	217	562	0	0	101	16	109	133	150
80% of Model Growth	1	131	18	174	450	0	0	81	13	87	106	120
EX Observed + 80% Growth	16	365	21	349	910	25	27	133	62	101	128	204

INTERSECTION: #A	Redland Road/Abernethy Road-Holcomb Road											
A	NB			SB			EB			WB		
Node # 15182	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	112	295	63	290	538	42	64	211	233	49	84	145
METRO EX Model												
METRO Future Model												
Sunrise EX Model	261	462	162	212	318	224	432	391	465	135	135	39
Sunrise Future Model	548	407	209	278	659	161	306	819	1,004	312	449	270
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	138	213	86	112	504	119	229	207	246	66	103	31
Sunrise 1 Hr Future Model	290	216	111	147	455	85	162	434	532	165	238	143
Metro Future Delta (25 Year)	*112*	*295*	*63*	*290*	*538*	*42*	*64*	*211*	*233*	*49*	*84*	*145*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*56*	*148*	*32*	*145*	*269*	*21*	*32*	*106*	*117*	*25*	*42*	*73*
Metro Net Increase (25 Year)	*-56*	*-147*	*-31*	*-145*	*-269*	*-21*	*-32*	*-105*	*-116*	*-24*	*-42*	*-72*
Metro Future Delta (20 Year)	112	295	63	290	538	42	64	211	233	49	84	145
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*264*	*298*	*88*	*325*	*490*	*9*	*-3*	*438*	*519*	*148*	*219*	*257*
Sun Future % (25 Year)	*235*	*299*	*81*	*380*	*486*	*30*	*45*	*442*	*503*	*122*	*193*	*664*
Sun Future Obs (25 Year)	*250*	*298*	*85*	*353*	*488*	*19*	*21*	*440*	*511*	*135*	*206*	*460*
Sun Net Increase (25 Year)	*138*	*3*	*22*	*63*	*-50*	*-23*	*-43*	*229*	*278*	*86*	*122*	*315*
Sun Future Delta (20 Year)	234	297	83	318	499	15	11	392	462	128	192	234
Sun Future % (20 Year)	211	298	78	362	497	33	49	396	449	108	172	560
Sun Future Obs (20 Year)	222	298	80	340	498	24	30	394	455	118	182	397
Sun Net Increase (20 Year)	110	3	17	50	-40	-18	-34	183	222	69	98	252

	WB Redland			EB Redland			NB Abernathy			SB Holcomb		
EX Observed	112	295	63	290	538	42	64	211	233	49	84	145
Sunrise EX Model (1 hr.)	138	213	86	112	504	119	229	207	246	66	103	31
Sunrise Future Model (1 hr.)	290	216	111	147	455	85	162	434	532	165	238	143
Model Growth	152	-79	25	35	-83	-43	-67	227	286	99	135	112
80% of Model Growth	122	-63	20	28	-66	-34	-54	181	229	79	108	89
EX Observed + 80% Growth	234	232	83	318	472	8	11	392	462	128	192	234

INTERSECTION: #B	Redland Road/Anchor Way											
B	NB			SB			EB			WB		
EX Observed	115	0	65	0	0	0	0	692	113	36	340	0
METRO EX Model												
METRO Future Model												
Sunrise EX Model	146	0	36	0	0	0	0	1,439	97	43	679	0
Sunrise Future Model	233	0	892	0	0	0	0	1,664	510	419	931	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	77	0	51	0	0	0	0	763	51	23	360	0
Sunrise 1 Hr Future Model	123	0	473	0	0	0	0	882	270	222	493	0
Metro Future Delta (25 Year)	*115*	*0*	*65*	*0*	*0*	*0*	*0*	*692*	*113*	*36*	*340*	*0*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*58*	*0*	*38*	*0*	*0*	*0*	*0*	*346*	*57*	*18*	*170*	*0*
Metro Net Increase (25 Year)	*-57*	*0*	*-32*	*0*	*0*	*0*	*0*	*-346*	*-56*	*-18*	*-170*	*0*
Metro Future Delta (20 Year)	115	0	65	0	0	0	0	692	113	36	340	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*161*	*0*	*487*	*0*	*0*	*0*	*0*	*811*	*332*	*235*	*474*	*0*
Sun Future % (25 Year)	*184*	*0*	*604*	*0*	*0*	*0*	*0*	*800*	*594*	*351*	*466*	*0*
Sun Future Obs (25 Year)	*172*	*0*	*545*	*0*	*0*	*0*	*0*	*806*	*463*	*293*	*470*	*0*
Sun Net Increase (25 Year)	*57*	*0*	*480*	*0*	*0*	*0*	*0*	*114*	*350*	*257*	*130*	*0*
Sun Future Delta (20 Year)	152	0	403	0	0	0	0	787	288	195	447	0
Sun Future % (20 Year)	170	0	496	0	0	0	0	779	498	288	441	0
Sun Future Obs (20 Year)	161	0	449	0	0	0	0	783	393	242	444	0
Sun Net Increase (20 Year)	46	0	384	0	0	0	0	91	280	206	104	0

EX Observed	115	0	65	0	0	0	0	692	113	36	340	0
Sunrise EX Model (1 hr.)	77	0	51	0	0	0	0	763	51	23	360	0
Sunrise Future Model (1 hr.)	123	0	473	0	0	0	0	882	270	222	493	0
Model Growth	46	0	422	0	0	0	0	119	219	199	134	0
80% of Model Growth	37	0	338	0	0	0	0	95	175	159	107	0
EX Observed + 80% Growth	152	0	403	0	0	0	0	787	288	195	447	0

INTERSECTION: #C	Redland Road/Livesay Road (refer to cell comment)

This intersection could not be modeled because the TAZs in this area are too large and require dis-aggregation.

INTERSECTION: #D	Redland Road/Holly Lane											
D	NB			SB			EB			WB		
Node # 15268	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
	PM Peak Period											
EX Observed	79	0	19	0	0	0	0	514	221	22	291	0
METRO EX Model												
METRO Future Model												
Sunrise EX Model	181	0	72	0	0	0	0	1,174	360	39	542	0
Sunrise Future Model	413	0	482	0	0	0	0	1,757	799	189	937	0
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	96	0	38	0	0	0	0	622	191	21	287	0
Sunrise 1 Hr Future Model	219	0	255	0	0	0	0	931	423	100	497	0
Metro Future Delta (25 Year)	*79*	*0*	*19*	*0*	*0*	*0*	*0*	*514*	*221*	*22*	*291*	*0*
Metro Future % (25 Year)	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Metro Future Obs (25 Year)	*40*	*0*	*10*	*0*	*0*	*0*	*0*	*257*	*111*	*11*	*146*	*0*
Metro Net Increase (25 Year)	*-39*	*0*	*-9*	*0*	*0*	*0*	*0*	*-257*	*-110*	*-11*	*-145*	*0*
Metro Future Delta (20 Year)	79	0	19	0	0	0	0	514	221	22	291	0
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	*202*	*0*	*236*	*0*	*0*	*0*	*0*	*823*	*454*	*102*	*500*	*0*
Sun Future % (25 Year)	*180*	*0*	*127*	*0*	*0*	*0*	*0*	*769*	*490*	*107*	*503*	*0*

Sun Future Obs (25 Year)	191	0	182	0	0	0	0	796	472	104	502	0
Sun Net Increase (25 Year)	112	0	153	0	0	0	0	282	251	82	211	0
Sun Future Delta (20 Year)	177	0	193	0	0	0	0	761	407	86	458	0
Sun Future % (20 Year)	160	0	106	0	0	0	0	718	437	90	461	0
Sun Future Obs (20 Year)	169	0	149	0	0	0	0	740	422	88	460	0
Sun Net Increase (20 Year)	90	0	130	0	0	0	0	226	201	66	169	0

EX Observed	79	0	19	0	0	0	0	514	221	22	291	0
Sunrise EX Model (1 hr.)	96	0	38	0	0	0	0	622	191	21	287	0
Sunrise Future Model (1 hr.)	219	0	255	0	0	0	0	931	423	100	497	0
Model Growth	123	0	217	0	0	0	0	309	233	80	209	0
80% of Model Growth	98	0	174	0	0	0	0	247	186	64	167	0
EX Observed + 80% Growth	177	0	193	0	0	0	0	761	407	86	458	0

INTERSECTION: #E	Maplelane Road/Holly Lane											
E	NB			SB			EB			WB		
Node # 14073	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	0	0	0	79	0	106	65	290	0	0	194	21
METRO EX Model												
METRO Future Model												
Sunrise EX Model	0	0	0	1	0	53	91	373	0	0	187	1
Sunrise Future Model				1		162	404	555			620	1
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	0	0	0	1	0	28	48	197	0	0	99	1
Sunrise 1 Hr Future Model	0	0	0	1	0	86	214	294	0	0	329	1
Metro Future Delta (25 Year)	0	0	0	79	0	106	65	290	0	0	194	21
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	0	0	0	46	0	53	39	145	0	0	97	11
Metro Net Increase (25 Year)	0	0	0	-39	0	-53	-32	-145	0	0	-97	-10
Metro Future Delta (20 Year)	0	0	0	79	0	106	65	290	0	0	194	21
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	0	0	0	79	0	164	231	388	0	0	423	21
Sun Future % (25 Year)	0	0	0	79	0	324	289	434	0	0	643	21
Sun Future Obs (25 Year)	0	0	0	79	0	244	260	411	0	0	533	21
Sun Net Increase (25 Year)	0	0	0	0	0	138	195	121	0	0	339	0
Sun Future Delta (20 Year)	0	0	0	79	0	152	198	368	0	0	378	21
Sun Future % (20 Year)	0	0	0	79	0	280	244	405	0	0	553	21
Sun Future Obs (20 Year)	0	0	0	79	0	216	221	387	0	0	465	21
Sun Net Increase (20 Year)	0	0	0	0	0	110	156	97	0	0	271	0

EX Observed	0	0	0	79	0	106	65	290	0	0	194	21
Sunrise EX Model (1 hr.)	0	0	0	1	0	28	48	197	0	0	99	1
Sunrise Future Model (1 hr.)	0	0	0	1	0	86	214	294	0	0	329	1
Model Growth	0	0	0	0	0	58	166	98	0	0	229	0
80% of Model Growth	0	0	0	0	0	46	133	78	0	0	184	0
EX Observed + 80% Growth	0	0	0	0	0	152	198	368	0	0	378	21

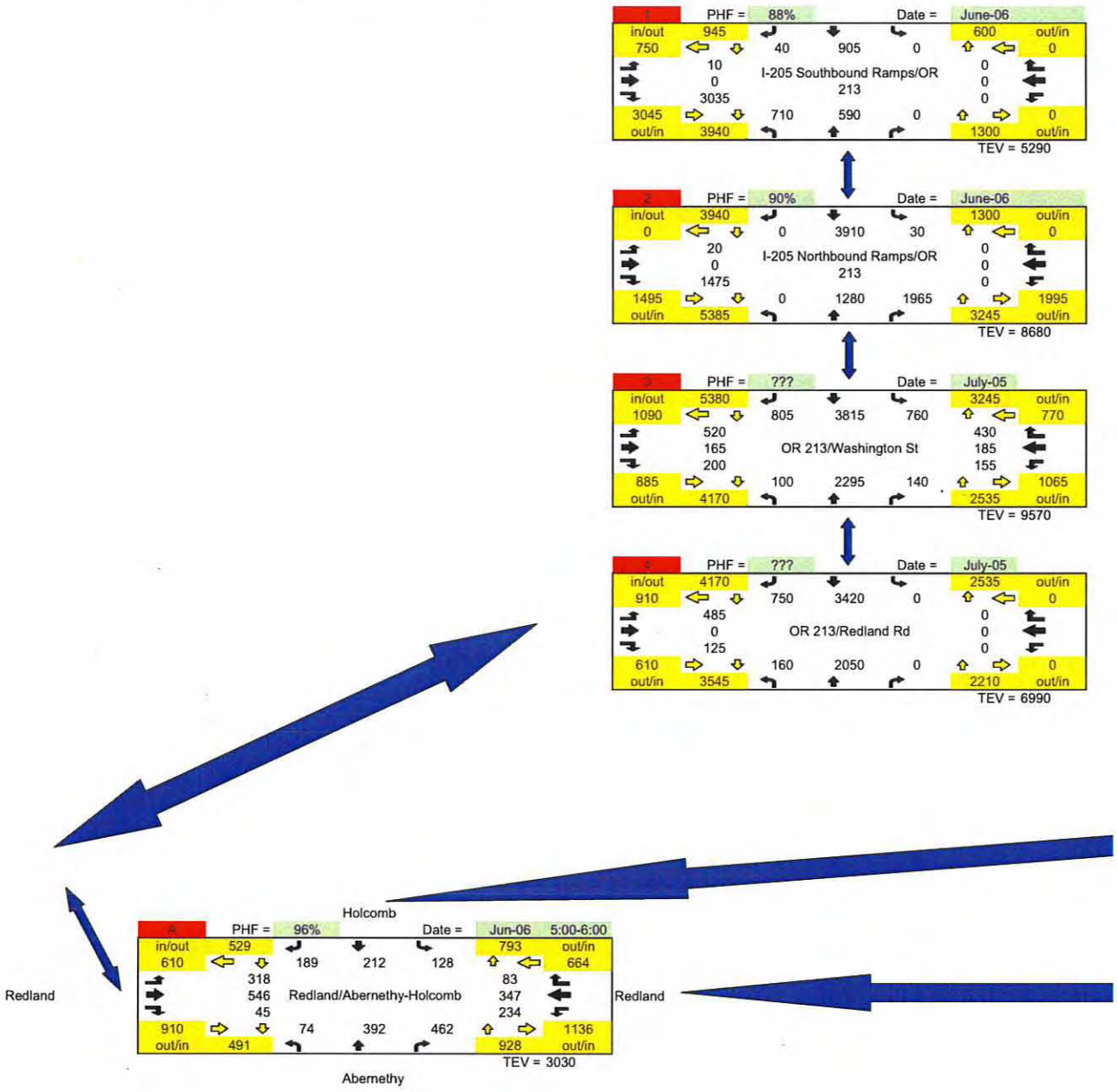
INTERSECTION: #F	Holcomb Boulevard/Front Street											
F	NB			SB			EB			WB		
Node # 14327	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	0	0	0	11	0	29	41	470	0	0	236	5
METRO EX Model												
METRO Future Model												
Sunrise EX Model	0	0	0	179	0	29	1	769	0	0	379	15
Sunrise Future Model				222		88	1	1,307			941	8
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	0	0	0	95	0	15	1	407	0	0	201	8
Sunrise 1 Hr Future Model	0	0	0	118	0	47	1	693	0	0	499	8
Metro Future Delta (25 Year)	0	0	0	11	0	29	41	470	0	0	236	5
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	0	0	0	6	0	15	21	235	0	0	118	3
Metro Net Increase (25 Year)	0	0	0	-5	0	-14	-20	-235	0	0	-118	-2
Metro Future Delta (20 Year)	0	0	0	11	0	29	41	470	0	0	236	5
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	0	0	0	34	0	60	41	756	0	0	534	5
Sun Future % (25 Year)	0	0	0	14	0	88	41	800	0	0	586	5
Sun Future Obs (25 Year)	0	0	0	24	0	74	41	778	0	0	560	5
Sun Net Increase (25 Year)	0	0	0	13	0	45	0	308	0	0	324	0
Sun Future Delta (20 Year)	0	0	0	29	0	54	41	699	0	0	474	5
Sun Future % (20 Year)	0	0	0	13	0	76	41	734	0	0	516	5
Sun Future Obs (20 Year)	0	0	0	21	0	65	41	716	0	0	495	5
Sun Net Increase (20 Year)	0	0	0	10	0	36	0	246	0	0	259	0

EX Observed	0	0	0	11	0	29	41	470	0	0	236	5
Sunrise EX Model (1 hr.)	0	0	0	95	0	15	1	407	0	0	201	8
Sunrise Future Model (1 hr.)	0	0	0	118	0	47	1	693	0	0	499	8
Model Growth	0	0	0	23	0	31	0	286	0	0	298	3
80% of Model Growth	0	0	0	18	0	25	0	229	0	0	238	2
EX Observed + 80% Growth	0	0	0	29	0	54	41	699	0	0	474	5

INTERSECTION: #G	Holcomb Boulevard/Swan Avenue											
G	NB			SB			EB			WB		
Node # 14082	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
PM Peak Period												
EX Observed	11	1	2	3	2	28	43	345	23	1	143	3
METRO EX Model												
METRO Future Model												
Sunrise EX Model	1	1	1	374	1	27	35	732	1	1	221	221
Sunrise Future Model	1	1	1	406	1	128	136	1,241	1	1	575	275
Metro 1 Hr EX Model	0	0	0	0	0	0	0	0	0	0	0	0
Metro 1 Hr future Model	0	0	0	0	0	0	0	0	0	0	0	0
Sunrise 1 Hr EX Model	1	1	1	198	1	14	19	388	1	1	117	117
Sunrise 1 Hr Future Model	1	1	1	215	1	68	72	658	1	1	305	146
Metro Future Delta (25 Year)	11	1	2	3	2	28	43	345	23	1	143	3
Metro Future % (25 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (25 Year)	6	1	1	2	1	14	22	173	12	1	72	2
Metro Net Increase (25 Year)	-5	0	-1	-1	-1	-14	-21	-172	-11	0	-71	-1
Metro Future Delta (20 Year)	11	1	2	3	2	28	43	345	23	1	143	3
Metro Future % (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Future Obs (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Metro Net Increase (20 Year)	0	0	0	0	0	0	0	0	0	0	0	0
Sun Future Delta (25 Year)	11	1	2	20	2	82	97	615	23	1	331	32
Sun Future % (25 Year)	11	1	2	3	2	133	167	585	23	1	372	4
Sun Future Obs (25 Year)	11	1	2	12	2	107	132	600	23	1	351	18
Sun Net Increase (25 Year)	0	0	0	9	0	79	89	255	0	0	208	15
Sun Future Delta (20 Year)	11	1	2	17	2	71	86	561	23	1	293	26
Sun Future % (20 Year)	11	1	2	3	2	112	142	537	23	-1	326	4
Sun Future Obs (20 Year)	11	1	2	10	2	91	114	549	23	1	310	15
Sun Net Increase (20 Year)	0	0	0	7	0	63	71	204	0	0	167	12

EX Observed	11	1	2	3	2	28	43	345	23	1	143	3
Sunrise EX Model (1 hr.)	1	1	1	198	1	14	19	388	1	1	117	117
Sunrise Future Model (1 hr.)	1	1	1	215	1	68	72	658	1	1	305	146
Model Growth	0	0	0	17	0	54	54	270	0	0	188	29
80% of Model Growth	0	0	0	14	0	43	43	216	0	0	150	23
EX Observed + 80% Growth	11	1	2	17	2	71	86	561	23	1	293	26

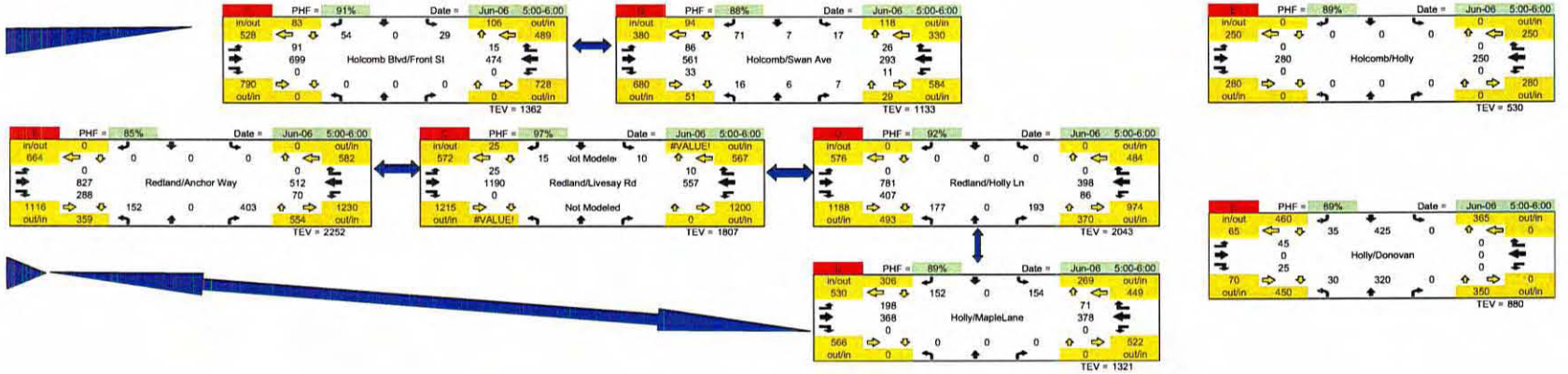
Kittelson and Associates, Inc Intersection Volume Summary 5/16/2007
7938 - Park Place Concept Plan 2027 Volumes



Kittelson and Associates, Inc
7938 - Park Place Concept Plan

Intersection Volume Summary
2027 Volumes

5/16/2007



Appendix B

Description of Level-of-Service Methods & Criteria

Appendix B

LEVEL OF SERVICE CONCEPT

Level of service (level of service) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from A to F.[1]

SIGNALIZED INTERSECTIONS

The six level of service grades are described qualitatively for signalized intersections in Table B1. Additionally, Table B2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, level of service D is generally considered to represent the minimum acceptable design standard.

Table B1
Level of Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

1 Most of the material in this appendix is adapted from the Transportation Research Board, *Highway Capacity Manual*, 2000.

Table B2
Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and ≤20
C	>20 and ≤35
D	>35 and ≤55
E	>55 and ≤80
F	>80

UNSIGNALIZED INTERSECTIONS

Unsignalized intersections include two way stop controlled (TWSC) and all way stop controlled (AWSC) intersections. The 2000 Highway Capacity Manual provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table B3. A quantitative definition of level of service for unsignalized intersections is presented in Table B4. Using this definition, level of service E is generally considered to represent the minimum acceptable design standard.

Table B3
Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	• Many times there is more than one vehicle in queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. • There is almost always more than one vehicle in queue. • Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table B4
Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and #15.0
C	>15.0 and #25.0
D	>25.0 and #35.0
E	>35.0 and #50.0
F	>50.0

It should be noted that the level of service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level-of-service is only calculated for each minor street lane.

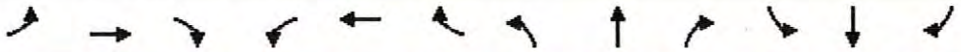
In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOE's) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

Appendix C

2027 No-Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis
100: Washington Street & Cascade Hwy South

2027 Background Conditions
5/18/2007



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.91	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1677		1736	1827	1553	1736	3471	1553	1736	4988	1553
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3367	1677		1736	1827	1553	1736	3471	1553	1736	4988	1553
Volume (vph)	520	165	200	155	185	430	100	2295	140	760	3815	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	2416	147	800	4016	847
Lane Group Flow (vph)	520	365	0	155	185	430	105	2416	147	800	4016	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Split			Split		pt+ov	Prot		Perm	Prot		pm+ov
Protected Phases	8	8		7	7	7 5	1	6		5	2	8
Permitted Phases									6			2
Actuated Green, G (s)	19.0	19.0		25.2	25.2	55.2	5.0	56.8	56.8	30.0	81.8	100.8
Effective Green, g (s)	21.0	21.0		26.2	26.2	57.2	6.0	59.8	59.8	31.0	84.8	105.8
Actuated g/C Ratio	0.14	0.14		0.17	0.17	0.38	0.04	0.40	0.40	0.21	0.57	0.71
Clearance Time (s)	5.0	5.0		4.0	4.0		4.0	6.0	6.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	471	235		303	319	592	69	1384	619	359	2820	1126
v/s Ratio Prot	0.15	c0.22		0.09	0.10	c0.28	0.06	c0.70		c0.46	0.81	0.11
v/s Ratio Perm									0.09			0.44
v/c Ratio	1.10	1.55		0.51	0.58	0.73	1.52	1.75	0.24	2.23	1.42	0.75
Uniform Delay, d1	64.5	64.5		56.1	56.8	39.7	72.0	45.1	30.0	59.5	32.6	13.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.97	0.96	0.85	1.00	1.00	1.00
Incremental Delay, d2	72.9	268.8		1.5	2.6	4.4	269.3	337.1	0.5	561.7	193.0	2.9
Delay (s)	137.4	333.3		57.6	59.4	44.1	339.4	380.5	25.8	621.2	225.6	16.8
Level of Service	F	F		E	E	D	F	F	C	F	F	B
Approach Delay (s)		218.2			50.5			359.3			250.2	
Approach LOS		F			D			F			F	

Intersection Summary			
HCM Average Control Delay	261.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.63		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	154.0%	ICU Level of Service	H

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Hwy160 N (Wash-Redland) 3/17/2003 PM-150" Plan
NMF
KITTELPOR6-FF51

Synchro 5 Report
Page 1

HCM Signalized Intersection Capacity Analysis
200: Redland Road & Cascade Hwy South

2027 Background Conditions
5/18/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	0.95	0.95	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3369		1736	3471	3471	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3369		1736	3471	3471	1553
Volume (vph)	485	125	160	2050	3420	750
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	485	125	168	2158	3600	789
Lane Group Flow (vph)	610	0	168	2158	3600	789
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	21.0		10.0	121.0	107.0	128.0
Effective Green, g (s)	22.0		11.0	122.0	108.0	130.0
Actuated g/C Ratio	0.15		0.07	0.81	0.72	0.87
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	494		127	2823	2499	1377
v/s Ratio Prot	c0.18		c0.10	0.62	c1.04	0.08
v/s Ratio Perm						0.42
v/c Ratio	1.23		1.32	0.76	1.44	0.57
Uniform Delay, d1	64.0		69.5	6.9	21.0	2.6
Progression Factor	1.00		1.00	1.00	0.69	0.13
Incremental Delay, d2	122.2		189.7	2.0	198.5	0.1
Delay (s)	186.2		259.2	8.9	212.9	0.4
Level of Service	F		F	A	F	A
Approach Delay (s)	186.2			27.0	174.7	
Approach LOS	F			C	F	

Intersection Summary			
HCM Average Control Delay	128.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	136.6%	ICU Level of Service	H

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PM Wed Mar 28, 2007 14:19:22 Page 1-1

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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PM Wed Mar 28, 2007 14:19:23 Page 2-1

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
# 1 205 SB Ramps/213 (North Part)	F	OVRFL	0.000	F	OVRFL	0.000	+ 0.000 D/V
# 2 205 NB Ramps/213	F	OVRFL	0.000	F	OVRFL	0.000	+ 0.000 D/V
# 23 205 SB Ramps/213 (South Part)	F	OVRFL	0.000	F	OVRFL	0.000	+ 0.000 D/V
#101 Redland Rd/Abernathy Rd-Holcom	F	122.2	1.173	F	122.2	1.173	+ 0.000 D/V
#102 Redland Rd/Anchor Way	F	782.3	0.000	F	782.3	0.000	+ 0.000 D/V
#103 Redland Rd/Livesay Rd	D	29.1	0.000	D	29.1	0.000	+ 0.000 D/V
#104 Redland Rd/Holly Ln	F	619.0	0.000	F	619.0	0.000	+ 0.000 D/V
#105 Holly Lane/Donovan Road	A	8.9	0.000	A	8.9	0.000	+ 0.000 D/V
#106 Holly Ln/Maplelane Rd	F	127.2	0.000	F	127.2	0.000	+ 0.000 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	C	21.9	0.000	+ 0.000 D/V
#108 Holcomb Blvd/Swan Ave	D	26.5	0.000	D	26.5	0.000	+ 0.000 D/V

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PM Wed Mar 28, 2007 14:19:23 Page 3-1

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #1 205 SB Ramps/213 (North Part)

Average Delay (sec/veh): OVERFLOW Worst Case Level Of Service: F[xxxxx]

Street Name:	213						205 SB					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	1 0	1 0	0	0 0	1 0	0	0 0	1 0	0	1 0	1 0	1
Volume Module: 4:30-5:30												
Base Vol:	0	710	0	0	0	0	0	905	0	10	0	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	710	0	0	0	0	0	905	0	10	0	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	710	0	0	0	0	0	905	0	10	0	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	710	0	0	0	0	0	905	0	10	0	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	710	0	0	0	0	0	905	0	10	0	40
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	6.5	xxxxx	7.1	6.5	6.2
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.0	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	710	xxxxx	1163	710	710
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	357	xxxxx	171	357	432
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	357	xxxxx	0	357	432
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	2.53	xxxx	xxxx	0.00	0.09
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	73.1	xxxxx	xxxx	xxxx	0.3
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	721	xxxxx	xxxxx	xxxx	14.2
LOS by Move:	*	*	*	*	*	*	*	F	*	*	*	B
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			720.9			xxxxxx		
ApproachLOS:	*			*			F			F		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #2 205 NB Ramps/213

Average Delay (sec/veh): 139.7 Worst Case Level Of Service: F[36590.6]

Street Name:	213						205 NB					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Ignore			Include			Ignore			Include		
Lanes:	0 0	0 1	1	1 0	2 0	0	1 0	0 0	1	0 0	0 0	0
Volume Module: 4:30-5:30 PM												
Base Vol:	0	1280	1965	30	3910	0	20	0	1475	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1280	1965	30	3910	0	20	0	1475	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1280	1965	30	3910	0	20	0	1475	0	0	0
User Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
PHF Volume:	0	1280	0	30	3910	0	20	0	0	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1280	0	30	3910	0	20	0	0	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx	6.4	xxxx	6.3	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1280	xxxx	xxxxx	5250	xxxx	1955	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	539	xxxx	xxxxx	0	xxxx	78	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	539	xxxx	xxxxx	0	xxxx	78	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.06	xxxx	xxxx	48.12	xxxx	0.00	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	4.2	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	12.1	xxxx	xxxxx	36591	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	B	*	*	F	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	*			*			F			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HM Unsignalized Method (Future Volume Alternative)

Intersection #23 205 SB Ramps/213 (South Part)

Average Delay (sec/veh): 474.0 Worst Case Level Of Service: F[1869.6]

Street Name:	213						205 ramps					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1	0	0	0 0 1	0	0	0 0 0	0	1	0 0 0	0	0
Volume Module:												
Base Vol:	0	1300	0	0	1365	0	0	0	905	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	1300	0	0	1365	0	0	0	905	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	1300	0	0	1365	0	0	0	905	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	1300	0	0	1365	0	0	0	905	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	1300	0	0	1365	0	0	0	905	0	0	0
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	1365	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	179	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	179	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	5.04	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	94.3	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	1870	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	F	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			1869.6			xxxxxx		
ApproachLOS:	*			*			F			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HM Operations Method (Future Volume Alternative)

Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd

Cycle (sec): 100 Critical Vol./Cap.(X): 1.173
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 122.2
Optimal Cycle: 180 Level Of Service: F

Street Name:	Abernathy-Holcomb						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1	0	1	1 0	0'	1 0	1	0	1
Volume Module: 5:00-6:00												
Base Vol:	234	347	83	318	546	45	74	392	462	128	212	189
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	347	83	318	546	45	74	392	462	128	212	189
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	234	347	83	318	546	45	74	392	462	128	212	189
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	234	347	83	318	546	45	74	392	462	128	212	189
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	234	347	83	318	546	45	74	392	462	128	212	189
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	234	347	83	318	546	45	74	392	462	128	212	189
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.94	0.96	0.96	0.94	0.99	0.84	0.93	0.90	0.90	0.92	0.97	0.83
Lanes:	1.00	0.81	0.19	1.00	1.00	1.00	1.00	0.46	0.54	1.00	1.00	1.00
Final Sat.:	1787	1474	353	1787	1881	1599	1769	785	926	1753	1845	1568
Capacity Analysis Module:												
Vol/Sat:	0.13	0.24	0.24	0.18	0.29	0.03	0.04	0.50	0.50	0.07	0.11	0.12
Crit Moves:		****		****				****		****		
Green/Cycle:	0.11	0.20	0.20	0.15	0.24	0.24	0.13	0.43	0.43	0.06	0.36	0.36
Volume/Cap:	1.20	1.17	1.17	1.17	1.20	0.12	0.33	1.17	1.17	1.17	0.32	0.33
Delay/Veh:	171.4	143	143.1	152.3	146	29.6	40.8	121	120.8	187.0	23.3	23.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	171.4	143	143.1	152.3	146	29.6	40.8	121	120.8	187.0	23.3	23.5
LOS by Move:	F	F	F	F	F	C	D	F	F	F	C	C
HCM2kAvgQ:	15	24	24	19	31	1	2	45	45	9	5	4

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Average Delay (sec/veh): 193.1 Worst Case Level Of Service: F[782.3]

Street Name:	Anchor Way						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	152	0	403	0	0	0	0	827	288	70	512	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	152	0	403	0	0	0	0	827	288	70	512	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	152	0	403	0	0	0	0	827	288	70	512	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	152	0	403	0	0	0	0	827	288	70	512	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	152	0	403	0	0	0	0	827	288	70	512	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1623	1623	971	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1115	xxxx	xxxxx
Potent Cap.:	114	104	309	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	623	xxxx	xxxxx
Move Cap.:	104	92	309	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	623	xxxx	xxxxx
Volume/Cap:	1.46	0.00	1.30	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.11	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.5	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	211	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	47.4	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.4	xxxx	xxxxx
Shrd ConDel:	xxxxx	782	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.5	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	B	*	*
ApproachDel:	782.3			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: D[29.1]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	15	25	1190	0	0	557	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	10	0	15	25	1190	0	0	557	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	10	0	15	25	1190	0	0	557	10
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1802	1802	562	567	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	89	80	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	87	78	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.12	0.00	0.03	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	174	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.5	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	29.1	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	D	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			29.1			xxxxxx			xxxxxx		
ApproachLOS:	*			D			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Average Delay (sec/veh): 112.7 Worst Case Level Of Service: F[619.0]

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	177	0	193	0	0	0	0	781	407	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	177	0	193	0	0	0	0	781	407	86	398	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	177	0	193	0	0	0	0	781	407	86	398	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	177	0	193	0	0	0	0	781	407	86	398	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	177	0	193	0	0	0	0	781	407	86	398	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1555	1555	985	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1188	xxxx	xxxxx
Potent Cap.:	126	114	304	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	577	xxxx	xxxxx
Move Cap.:	111	96	304	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	577	xxxx	xxxxx
Volume/Cap:	1.60	0.00	0.64	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.15	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.5	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	12.3	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	166	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	30.2	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.5	xxxx	xxxxx
Shrd ConDel:	xxxxx	619	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	12.3	xxxx	xxxxx
Shared LOS:	*	F	*	*	*	*	*	*	*	B	*	*
ApproachDel:	619.0			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	F			*			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: A[8.9]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1 0 0 0			0 0 0 1 0			0 0 1! 0 0			0 0 0 0 0		
Volume Module:												
Base Vol:	30	320	0	0	425	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	320	0	0	425	35	45	0	25	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	30	320	0	0	425	35	45	0	25	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	30	320	0	0	425	35	45	0	25	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	30	320	0	0	425	35	45	0	25	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	460	xxxx	xxxxx	xxxx	xxxx	xxxxx	823	823	443	xxxx	xxxx	xxxxx
Potent Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	343	309	615	xxxx	xxxx	xxxxx
Move Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	336	300	615	xxxx	xxxx	xxxxx
Volume/Cap:	0.03	xxxx	xxxx	xxxx	xxxx	xxxx	0.13	0.00	0.04	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	990	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.9	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.9			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Average Delay (sec/veh): 30.8 Worst Case Level Of Service: F[127.2]

Street Name:	Holly Ln						Maplelane Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0	0	0 0 1!	0	0	0 1	0	0	0	0 1	0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	154	0	152	198	368	0	0	378	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	154	0	152	198	368	0	0	378	71
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	154	0	152	198	368	0	0	378	71
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	154	0	152	198	368	0	0	378	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	154	0	152	198	368	0	0	378	71
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1178	1178	414	449	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	209	189	634	1117	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	177	152	634	1117	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.87	0.00	0.24	0.18	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.6	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	276	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	12.8	xxxxx	0.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	127	xxxxx	8.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			127.2			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 1.9 Worst Case Level Of Service: C[21.9]

Street Name:	Front St						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0	0	0 0 1!	0	0	0 1	0	0	0	0 1	0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	29	0	54	91	699	0	0	474	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	54	91	699	0	0	474	15
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	29	0	54	91	699	0	0	474	15
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	29	0	54	91	699	0	0	474	15
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	29	0	54	91	699	0	0	474	15
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1363	1363	482	489	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	165	149	589	1079	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	153	136	589	1079	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.19	0.00	0.09	0.08	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	296	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	1.1	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	21.9	xxxxx	8.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			21.9			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

****

Intersection #108 Holcomb Blvd/Swan Ave

****

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: D[26.5]

****

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	16	6	7	17	7	71	86	561	33	11	293	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	6	7	17	7	71	86	561	33	11	293	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	16	6	7	17	7	71	86	561	33	11	293	26
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1117	1091	578	1084	1094	306	319	xxxx	xxxxx	594	xxxx	xxxxx
Potent Cap.:	186	217	520	196	216	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Move Cap.:	154	199	520	177	198	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Volume/Cap:	0.10	0.03	0.01	0.10	0.04	0.10	0.07	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	196	xxxxx	xxxx	418	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.5	xxxxx	xxxxx	0.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	26.5	xxxxx	xxxxx	16.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	D	*	*	C	*	*	*	*	*	*	*
ApproachDel:		26.5			16.1			xxxxxx			xxxxxx	
ApproachLOS:		D			C			*			*	

****

Note: Queue reported is the number of cars per lane.

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Appendix D

2027 Mitigated No-Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis 2027 Mitigated Background Traffic Conditions
150: Washington Street & Cascade Hwy South 5/18/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1827	1553	1736	1827	1553	1736	1827	1553	3367	3471	1553
Flt Permitted	0.29	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1025	1827	1553	889	1827	1553	1736	1827	1553	3367	3471	1553
Volume (vph)	520	165	200	155	185	430	100	685	140	760	945	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	721	147	800	995	847
Lane Group Flow (vph)	520	165	200	155	185	430	105	721	147	800	995	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	pm+pt		pm+ov	pm+pt		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)	33.4	18.4	31.4	30.4	16.9	38.9	13.0	47.1	60.6	22.0	56.1	71.1
Effective Green, g (s)	37.4	20.4	34.4	32.4	17.9	40.9	14.0	50.1	64.6	23.0	59.1	76.1
Actuated g/C Ratio	0.31	0.17	0.29	0.27	0.15	0.34	0.12	0.42	0.54	0.19	0.49	0.63
Clearance Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	651	311	445	342	273	568	203	763	875	645	1709	985
v/s Ratio Prot	c0.11	0.09	0.05	0.05	0.10	0.15	0.06	c0.39	0.02	c0.24	0.29	c0.12
v/s Ratio Perm	c0.14		0.08	0.07		0.13			0.07			0.42
v/c Ratio	0.80	0.53	0.45	0.45	0.68	0.76	0.52	0.94	0.17	1.24	0.58	0.86
Uniform Delay, d1	34.3	45.4	35.0	35.2	48.3	35.1	49.8	33.6	14.1	48.5	21.7	17.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	1.31	3.31	1.00	1.00	1.00
Incremental Delay, d2	6.8	1.7	0.7	1.0	6.5	5.7	2.0	20.2	0.1	121.0	1.5	7.6
Delay (s)	41.1	47.2	35.8	36.2	54.8	40.9	61.2	64.1	46.7	169.5	23.1	25.3
Level of Service	D	D	D	D	D	D	E	E	D	F	C	C
Approach Delay (s)		41.0			43.3			61.2			68.1	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	58.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.7%	ICU Level of Service	E

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 2027 Mitigated Background Traffic Conditions
250: Redland Road & Cascade Hwy South 5/18/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3369		1736	1827	1827	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3369		1736	1827	1827	1553
Volume (vph)	485	125	160	440	550	750
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	485	125	168	463	579	789
Lane Group Flow (vph)	610	0	168	463	579	789
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	25.7		16.0	86.3	66.3	92.0
Effective Green, g (s)	26.7		17.0	87.3	67.3	94.0
Actuated g/C Ratio	0.22		0.14	0.73	0.56	0.78
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	750		246	1329	1025	1255
v/s Ratio Prot	c0.18		c0.10	0.25	0.32	c0.14
v/s Ratio Perm						0.37
v/c Ratio	0.81		0.68	0.35	0.56	0.63
Uniform Delay, d1	44.3		48.9	6.0	16.9	5.5
Progression Factor	1.00		1.00	1.00	0.46	1.68
Incremental Delay, d2	6.7		7.6	0.7	2.0	0.9
Delay (s)	51.0		56.5	6.7	9.8	10.2
Level of Service	D		E	A	A	B
Approach Delay (s)	51.0			20.0	10.0	
Approach LOS	D			B	B	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	B

c Critical Lane Group

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#101 Redland Rd/Abernathy Rd-Holcom	D	43.1	0.830	D	43.1	0.830	+ 0.000 D/V
#102 Redland Rd/Anchor Way	D	38.1	0.982	D	38.1	0.982	+ 0.000 D/V
#103 Redland Rd/Livesay Rd	D	29.1	0.000	D	29.1	0.000	+ 0.000 D/V
#104 Redland Rd/Holly Ln	C	26.4	0.900	C	26.4	0.900	+ 0.000 D/V
#105 Holly Lane/Donovan Road	A	8.9	0.000	A	8.9	0.000	+ 0.000 D/V
#106 Holly Ln/Maplelane Rd	C	21.1	0.612	C	21.1	0.612	+ 0.000 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	C	21.9	0.000	+ 0.000 D/V
#108 Holcomb Blvd/Swan Ave	D	26.5	0.000	D	26.5	0.000	+ 0.000 D/V

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	0.830
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	43.1
Optimal Cycle:	94	Level Of Service:	D

Street Name:	Abernathy-Holcomb									Redland Rd								
Approach:	North Bound				South Bound				East Bound				West Bound					
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Protected				Protected				Protected				Protected					
Rights:	Include				Include				Ovl				Include					
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0			
Lanes:	1	0	0	1	0	1	0	1	0	1	0	1	1	0	1	0	1	
Volume Module: 5:00-6:00																		
Base Vol:	234	347		83		318	546		45		74	392	462		128	212		189
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
Initial Bse:	234	347		83		318	546		45		74	392	462		128	212		189
Added Vol:	0	0		0		0	0		0		0	0	0		0	0		0
PasserByVol:	0	0		0		0	0		0		0	0	0		0	0		0
Initial Fut:	234	347		83		318	546		45		74	392	462		128	212		189
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
PHF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
PHF Volume:	234	347		83		318	546		45		74	392	462		128	212		189
Reduct Vol:	0	0		0		0	0		0		0	0	0		0	0		0
Reduced Vol:	234	347		83		318	546		45		74	392	462		128	212		189
PCE Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
MLF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
Final Vol.:	234	347		83		318	546		45		74	392	462		128	212		189
Saturation Flow Module:																		
Sat/Lane:	1900	1900		1900		1900	1900		1900		1900	1900	1900		1900	1900		1900
Adjustment:	0.94	0.96		0.96		0.94	0.99		0.84		0.93	0.98	0.83		0.92	0.97		0.83
Lanes:	1.00	0.81		0.19		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
Final Sat.:	1787	1474		353		1787	1881		1599		1769	1862	1583		1753	1845		1568
Capacity Analysis Module:																		
Vol/Sat:	0.13	0.24		0.24		0.18	0.29		0.03		0.04	0.21	0.29		0.07	0.11		0.12
Crit Moves:		****				****						****			****			
Green/Cycle:	0.15	0.28		0.28		0.21	0.34		0.34		0.09	0.25	0.41		0.09	0.25		0.25
Volume/Cap:	0.85	0.83		0.83		0.83	0.85		0.08		0.48	0.83	0.71		0.83	0.45		0.48
Delay/Veh:	61.7	44.3		44.3		51.6	40.4		22.2		45.7	47.0	28.5		74.6	32.2		32.6
User DelAdj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
AdjDel/Veh:	61.7	44.3		44.3		51.6	40.4		22.2		45.7	47.0	28.5		74.6	32.2		32.6
LOS by Move:	E	D		D		D	D		C		D	D	C		E	C		C
HCM2kAvgQ:	10	15		15		12	18		1		3	14	13		6	6		5

Note: Queue reported is the number of cars per lane.

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Cycle (sec):	100	Critical Vol./Cap.(X):	0.982
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	38.1
Optimal Cycle:	167	Level Of Service:	D

Street Name:	Anchor Way									Redland Rd								
Approach:	North Bound				South Bound				East Bound				West Bound					
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Split Phase				Split Phase				Permitted				Prot+Permit					
Rights:	Ovl				Include				Include				Include					
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0			
Lanes:	1	0	0	0	1	0	0	0	0	0	0	1	0	1	0	1	0	
Volume Module: 5:00-6:00 PM																		
Base Vol:	152	0		403		0	0		0		0	827	288		70	512		0
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
Initial Bse:	152	0		403		0	0		0		0	827	288		70	512		0
Added Vol:	0	0		0		0	0		0		0	0	0		0	0		0
PasserByVol:	0	0		0		0	0		0		0	0	0		0	0		0
Initial Fut:	152	0		403		0	0		0		0	827	288		70	512		0
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
PHF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
PHF Volume:	152	0		403		0	0		0		0	827	288		70	512		0
Reduct Vol:	0	0		0		0	0		0		0	0	0		0	0		0
Reduced Vol:	152	0		403		0	0		0		0	827	288		70	512		0
PCE Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
MLF Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
Final Vol.:	152	0		403		0	0		0		0	827	288		70	512		0
Saturation Flow Module:																		
Sat/Lane:	1900	1900		1900		1900	1900		1900		1900	1900	1900		1900	1900		1900
Adjustment:	0.95	1.00		0.85		1.00	1.00		1.00		1.00	0.96	0.96		0.92	0.97		1.00
Lanes:	1.00	0.00		1.00		0.00	0.00		0.00		0.00	0.74	0.26		1.00	1.00		0.00
Final Sat.:	1805	0		1615		0	0		0		0	1346	469		1753	1845		0
Capacity Analysis Module:																		
Vol/Sat:	0.08	0.00		0.25		0.00	0.00		0.00		0.00	0.61	0.61		0.04	0.28		0.00
Crit Moves:				****								****			****			
Green/Cycle:	0.21	0.00		0.25		0.00	0.00		0.00		0.00	0.63	0.63		0.67	0.67		0.00
Volume/Cap:	0.39	0.00		0.98		0.00	0.00		0.00		0.00	0.98	0.98		0.10	0.42		0.00
Delay/Veh:	34.4	0.0		76.5		0.0	0.0		0.0		0.0	40.4	40.4		8.8	7.9		0.0
User DelAdj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00		1.00
AdjDel/Veh:	34.4	0.0		76.5		0.0	0.0		0.0		0.0	40.4	40.4		8.8	7.9		0.0
LOS by Move:	C	A		E		A	A		A		A	D	D		A	A		A
HCM2kAvgQ:	4	0		18		0	0		0		0	41	41		1	7		0

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 0.5 Worst Case Level Of Service: D[29.1]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0	0	1! 0 0	0	1 0	0 0	0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	10	0	15	25	1190	0	0	557	10
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	10	0	15	25	1190	0	0	557	10
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	10	0	15	25	1190	0	0	557	10
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1802	1802	562	567	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	89	80	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	87	78	530	1000	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.12	0.00	0.03	0.02	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	174	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.5	xxxxx	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	29.1	xxxxx	8.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	D	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			29.1			xxxxxx			xxxxxx		
ApproachLOS:	*			D			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec): 120 Critical Vol./Cap.(X): 0.900
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 26.4
Optimal Cycle: 120 Level Of Service: C

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Prot+Permit		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	0 1	0	0	0 0	0	0	0 1	0	1	0 0
Volume Module: 5:00-6:00 PM												
Base Vol:	177	0	193	0	0	0	0	781	407	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	177	0	193	0	0	0	0	781	407	86	398	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	177	0	193	0	0	0	0	781	407	86	398	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	177	0	193	0	0	0	0	781	407	86	398	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	177	0	193	0	0	0	0	781	407	86	398	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	177	0	193	0	0	0	0	781	407	86	398	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	0.94	0.94	0.90	0.95	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.66	0.34	1.00	1.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	1180	615	1718	1809	0
Capacity Analysis Module:												
Vol/Sat:	0.10	0.00	0.12	0.00	0.00	0.00	0.00	0.66	0.66	0.05	0.22	0.00
Crit Moves:	****							****		****		
Green/Cycle:	0.11	0.00	0.16	0.00	0.00	0.00	0.00	0.74	0.74	0.79	0.79	0.00
Volume/Cap:	0.90	0.00	0.73	0.00	0.00	0.00	0.00	0.90	0.90	0.13	0.28	0.00
Delay/Veh:	90.5	0.0	57.2	0.0	0.0	0.0	0.0	21.1	21.1	4.7	3.5	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	90.5	0.0	57.2	0.0	0.0	0.0	0.0	21.1	21.1	4.7	3.5	0.0
LOS by Move:	F	A	E	A	A	A	A	C	C	A	A	A
HCM2kAvgQ:	9	0	8	0	0	0	0	37	37	1	4	0

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
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Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: A[8.9]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0	0 0	1 0	0	0 1!	0 0	0	0 0	0 0
Volume Module:												
Base Vol:	30	320	0	0	425	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	320	0	0	425	35	45	0	25	0	0	0
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	30	320	0	0	425	35	45	0	25	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	30	320	0	0	425	35	45	0	25	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	30	320	0	0	425	35	45	0	25	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	460	xxxx	xxxxx	xxxx	xxxx	xxxxx	823	823	443	xxxx	xxxx	xxxxx
Potent Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	343	309	615	xxxx	xxxx	xxxxx
Move Cap.:	1106	xxxx	xxxxx	xxxx	xxxx	xxxxx	336	300	615	xxxx	xxxx	xxxxx
Volume/Cap:	0.03	xxxx	xxxx	xxxx	xxxx	xxxx	0.13	0.00	0.04	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	990	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.9	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.9			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Cycle (sec): 100 Critical Vol./Cap.(X): 0.612
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 21.1
Optimal Cycle: 49 Level Of Service: C

Street Name:	Holly Ln						Maplelane Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Prot+Permit			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0	0 1!	0 0	1 0	1	0 0	0	0 0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	154	0	152	198	368	0	0	378	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	154	0	152	198	368	0	0	378	71
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	154	0	152	198	368	0	0	378	71
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	154	0	152	198	368	0	0	378	71
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	154	0	152	198	368	0	0	378	71
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	154	0	152	198	368	0	0	378	71
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.88	1.00	0.88	0.94	0.99	1.00	1.00	0.97	0.97
Lanes:	0.00	0.00	0.00	0.50	0.00	0.50	1.00	1.00	0.00	0.00	0.84	0.16
Final Sat.:	0	0	0	837	0	826	1787	1881	0	0	1550	291
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.18	0.00	0.18	0.11	0.20	0.00	0.00	0.24	0.24
Crit Moves:						****	****				****	
Green/Cycle:	0.00	0.00	0.00	0.30	0.00	0.30	0.58	0.58	0.00	0.00	0.40	0.40
Volume/Cap:	0.00	0.00	0.00	0.61	0.00	0.61	0.22	0.34	0.00	0.00	0.61	0.61
Delay/Veh:	0.0	0.0	0.0	32.2	0.0	32.2	12.2	11.2	0.0	0.0	25.5	25.5
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	32.2	0.0	32.2	12.2	11.2	0.0	0.0	25.5	25.5
LOS by Move:	A	A	A	C	A	C	B	B	A	A	C	C
HCM2kAvgQ:	0	0	0	9	0	9	3	6	0	0	11	11

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 1.9 Worst Case Level Of Service: C[21.9]

Street Name:	Front St						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0	0	0 0	1! 0	0	0 1	0	0 0	0 0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	29	0	54	91	699	0	0	474	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	54	91	699	0	0	474	15
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	29	0	54	91	699	0	0	474	15
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	29	0	54	91	699	0	0	474	15
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	29	0	54	91	699	0	0	474	15
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1363	1363	482	489	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	165	149	589	1079	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	153	136	589	1079	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.19	0.00	0.09	0.08	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	296	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	1.1	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	21.9	xxxxx	8.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			21.9			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Background Traffic Conditions, Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #108 Holcomb Blvd/Swan Ave

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: D[26.5]

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	16	6	7	17	7	71	86	561	33	11	293	26
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	16	6	7	17	7	71	86	561	33	11	293	26
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	16	6	7	17	7	71	86	561	33	11	293	26
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1117	1091	578	1084	1094	306	319	xxxx	xxxxx	594	xxxx	xxxxx
Potent Cap.:	186	217	520	196	216	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Move Cap.:	154	199	520	177	198	739	1247	xxxx	xxxxx	982	xxxx	xxxxx
Volume/Cap:	0.10	0.03	0.01	0.10	0.04	0.10	0.07	xxxx	xxxx	0.01	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	0.0	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx	8.7	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	196	xxxxx	xxxx	418	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.5	xxxxx	xxxxx	0.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	26.5	xxxxx	xxxxx	16.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	D	*	*	C	*	*	*	*	*	*	*
ApproachDel:	26.5			16.1			xxxxxx			xxxxxx		
ApproachLOS:	D			C			*			*		

Note: Queue reported is the number of cars per lane.

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Appendix E

2030 Sunrise Model TAZ Land Use Estimates for Park Place Planning Area

TAZ1358	H1I1A1	H1I1A2	H1I1A3	H1I1A4	H1I2A1	H1I2A2	H1I2A3	H1I2A4	H1I3A1	H1I3A2	H1I3A3	H1I3A4	H1I4A1	H1I4A2	H1I4A3	H1I4A4	H2I1A1	H2I1A2	H2I1A3	H2I1A4	H2I2A1	H2I2A2	H2I2A3	H2I2A4	H2I3A1	H2I3A2	H2I3A3	H2I3A4	H2I4A1	H2I4A2
505	49.96881	42.25767		24.65094	230.74896	5.49781	40.75423	14.51878	69.91433	6.16041	78.98986	20.41003	43.26026	0.83754	38.62288	17.24696	27.51909	13.49336	24.40874	8.48837	19.98896	9.82381	25.05910	8.79728	35.09638	21.37333	74.67487	41.19387	93.27718	5.72075	150.19310
506	32.71182	27.66376		16.13761	151.05861	3.59911	26.67954	9.50464	45.76905	4.03288	51.71030	13.36132	28.32011	0.54829	25.28427	11.29063	18.01523	8.83336	15.97906	5.55687	13.08567	6.43110	16.40481	5.75909	22.97566	13.99194	48.88552	26.96735	61.06342	3.74506	98.32313
507	18.08371	15.29305		8.92117	83.50804	1.98966	14.74895	5.25434	25.30199	2.22945	28.58642	7.38639	15.65589	0.30311	13.97762	6.24167	9.95916	4.88325	8.83352	3.07194	7.23401	3.55524	9.06889	3.18374	12.70138	7.73501	27.02483	14.90806	33.75701	2.07034	54.35487
508	7.88166	6.66537		3.88823	36.39640	0.86718	6.42823	2.29007	11.02770	0.97169	12.45920	3.21931	6.82351	0.13211	6.09205	2.72039	4.34063	2.12833	3.85033	1.33888	3.15289	1.54952	3.95261	1.38761	5.53581	3.37125	11.77859	6.49757	14.71276	0.90234	23.69020

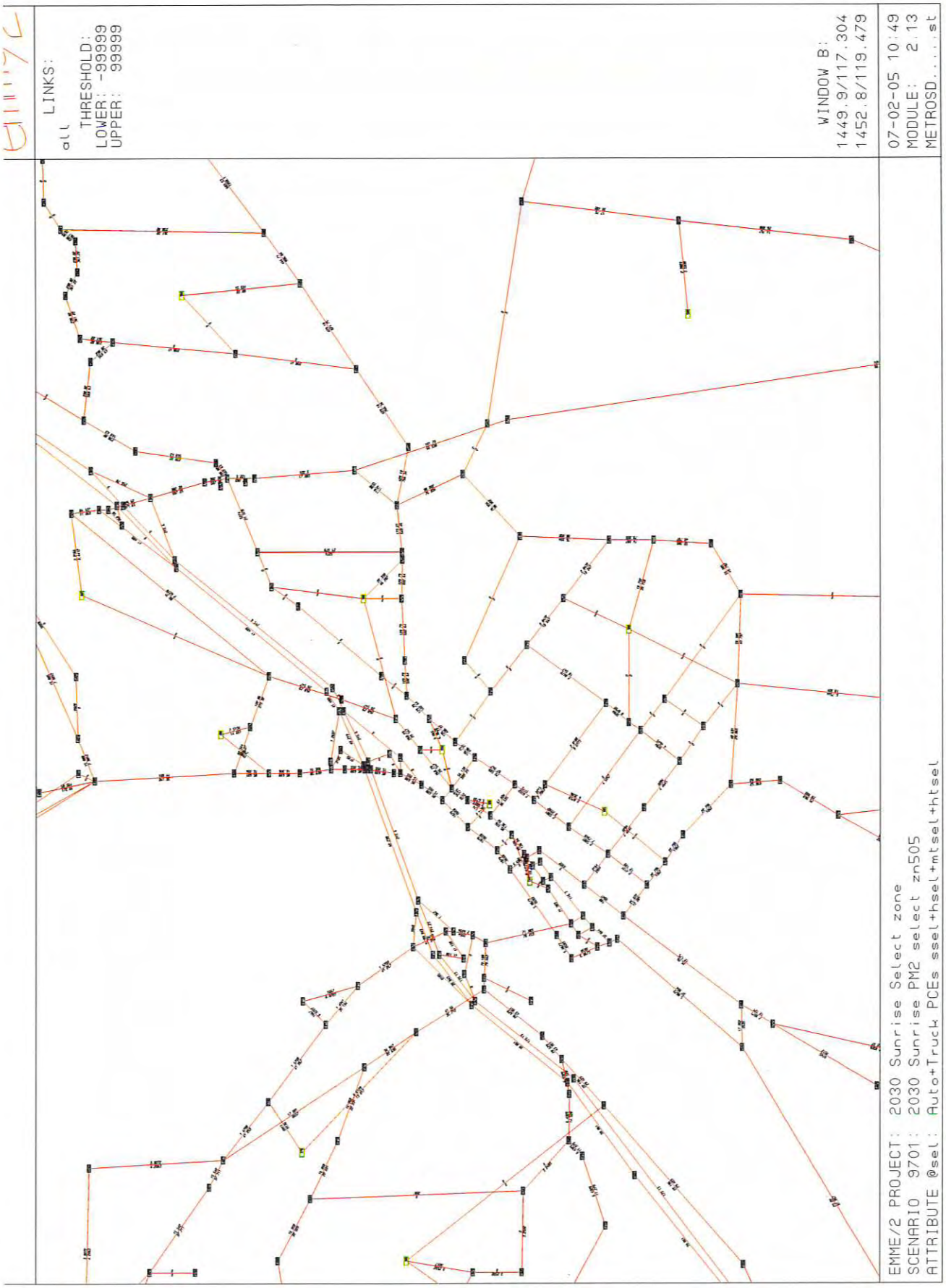
Y2030 BEA Employment TAZ 1260 -- Jurisdiction Reviewed, Corrected BEA Conversion

38831	1	2	7	9	3	6	8	4	5	
TAZ1358	Agriculture,timber 0 - 14	Construction 15 - 17	Finance, insurance, real estate 60-67	GOV	MFG	Retail trade 52-59	SER	TPU	Wholesale trade 50,51	Total
505	0.246324111	146.489753	26.08851456	43.723905	27.72759	8.414874	44.75745	7.808273	10.82867023	316.0854
506	0.338536612	53.2762109	23.12760629	38.761474	28.99391	18.918029	58.31566	6.922075	5.968068914	234.6216
507	0.663784187	133.387578	89.65204722	117.8254	78.98471	138.60353	229.6447	21.04142	29.18065975	838.9839
508	0.253342311	50.909193	12.57350838	44.969675	30.14559	2.1567467	44.25868	8.030744	11.13719779	204.4347

H2I4A3	H2I4A4	H3I1A1	H3I1A2	H3I1A3	H3I1A4	H3I2A1	H3I2A2	H3I2A3	H3I2A4	H3I3A1	H3I3A2	H3I3A3	H3I3A4	H3I4A1	H3I4A2	H3I4A3	H3I4A4	H4I1A1	H4I1A2	H4I1A3	H4I1A4	H4I2A1	H4I2A2	H4I2A3	H4I2A4	H4I3A1	H4I3A2	H4I3A3	H4I3A4	H4I4A1	H4I4A2	H4I4A3	H4I4A4	Total
98.38593	107.10431	10.94727	22.96094	1.39600	2.43483	13.93051	30.84273	2.89964	3.97407	13.33788	78.93549	13.51307	12.69738	6.20154	176.06358	45.60814	21.21397	4.42227	30.76273	1.27284	1.38513	12.82888	47.16184	2.34084	1.50506	7.23819	155.72569	8.57339	5.55342	2.40997	333.05072	33.24104	11.37758	2564
64.40784	70.11528	7.16657	15.03126	0.91389	1.59395	9.11954	20.19103	1.89824	2.60160	8.73157	51.67471	8.84626	8.31228	4.05981	115.25911	29.85713	13.88762	2.89502	20.13866	0.83326	0.90677	8.39836	30.87425	1.53242	0.98528	4.73845	101.94501	5.61253	3.63552	1.57768	218.02993	21.76108	7.44827	1679
35.60586	38.76104	3.96182	8.30956	0.50521	0.88117	5.04145	11.16198	1.04938	1.43822	4.82698	28.56675	4.89038	4.59518	2.24434	63.71740	16.50558	7.67733	1.60042	11.13303	0.46064	0.50128	4.64277	17.06787	0.84715	0.54468	2.61950	56.35712	3.10271	2.00978	0.87217	120.53104	12.02993	4.11754	928
15.51857	16.89373	1.72673	3.62167	0.22019	0.38405	2.19728	4.86487	0.45737	0.62684	2.10381	12.45062	2.13144	2.00278	0.97818	27.77079	7.19384	3.34611	0.69753	4.85225	0.20077	0.21848	2.02352	7.43891	0.36922	0.23740	1.14169	24.56286	1.35230	0.87595	0.38013	52.53263	5.24316	1.79460	404

Appendix F

2030 Sunrise Model Select Zone Analyses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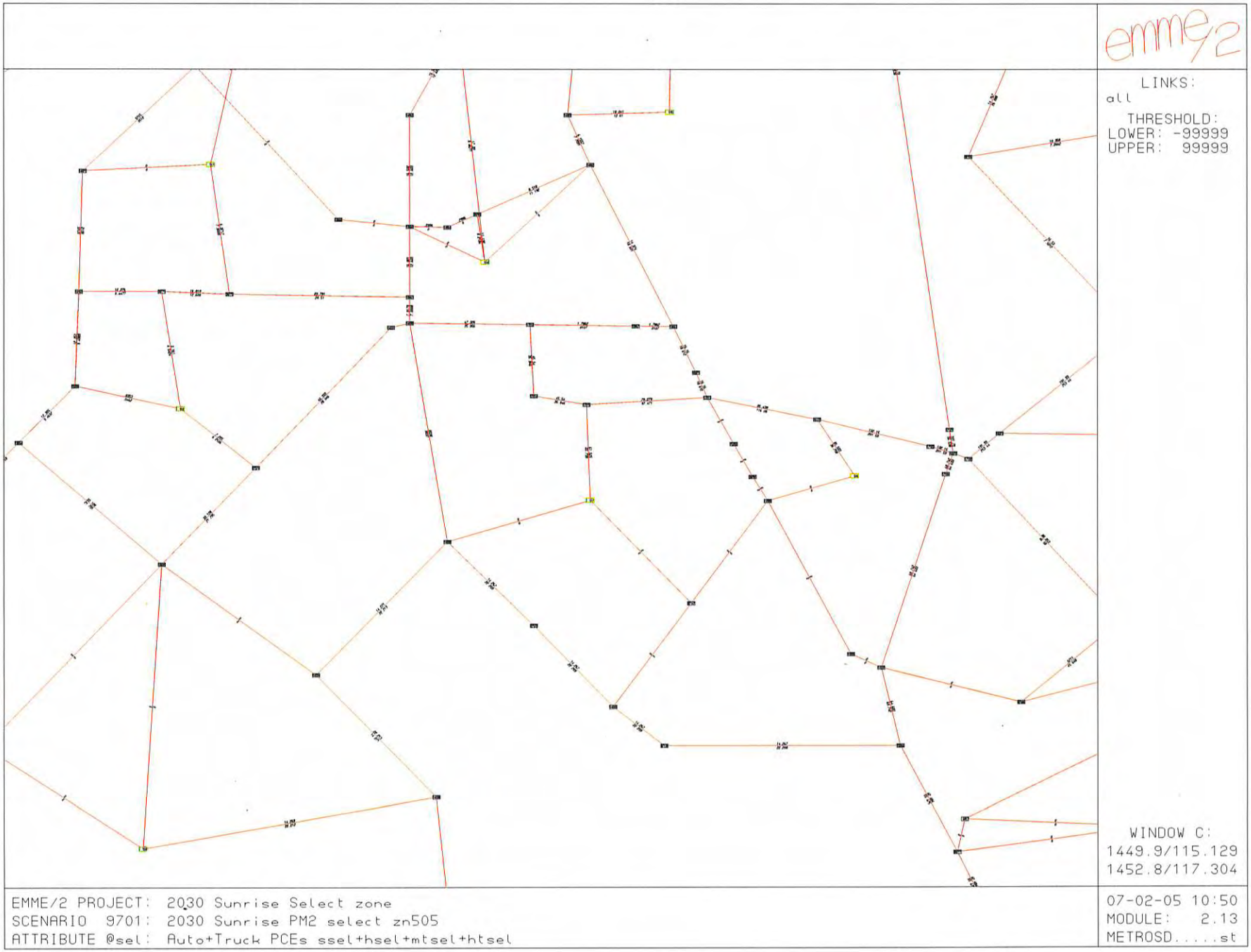
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW B:
1449.9/117.304
1452.8/119.479
07-02-05 10:49
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9701: 2030 Sunrise PM2 select zn505
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel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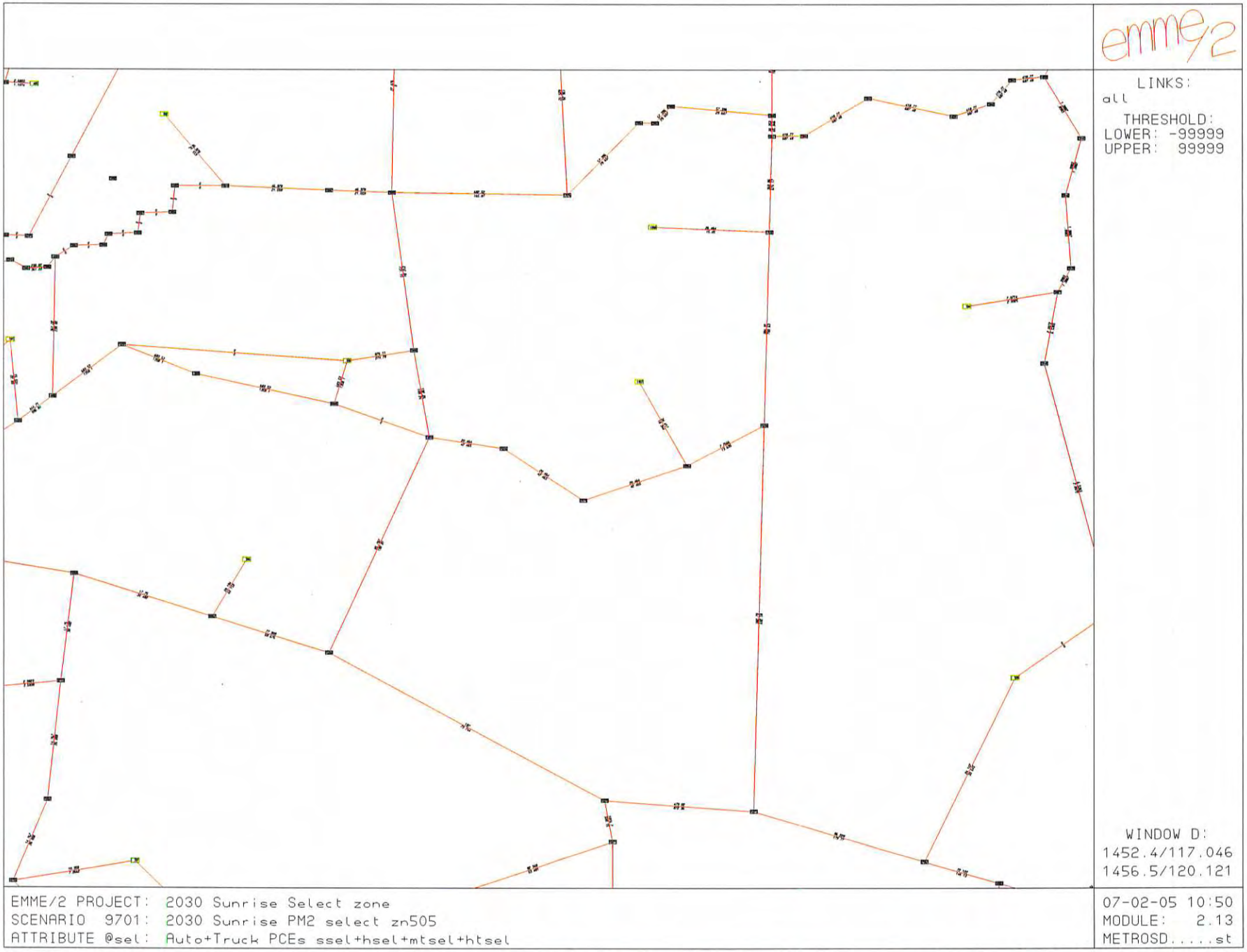
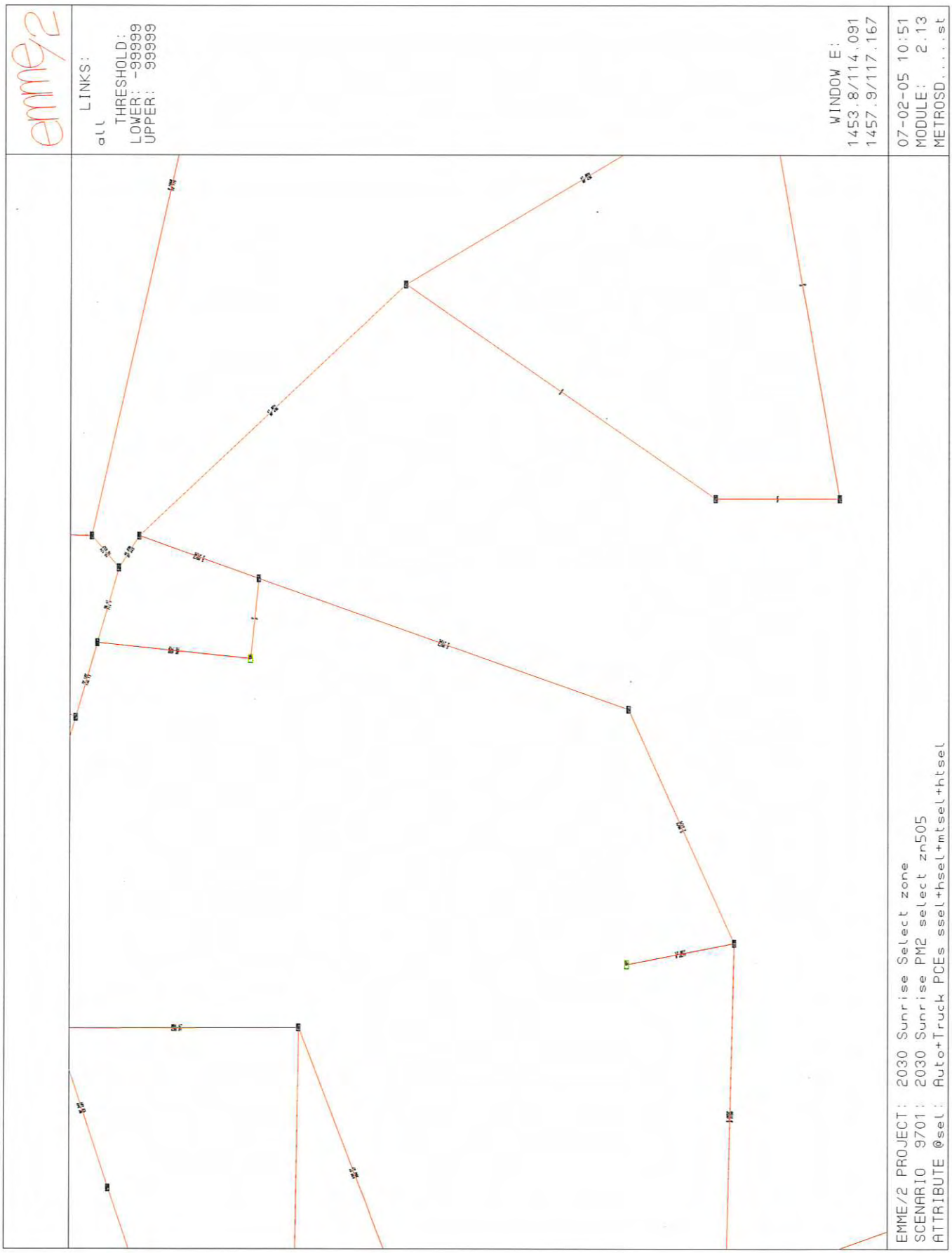
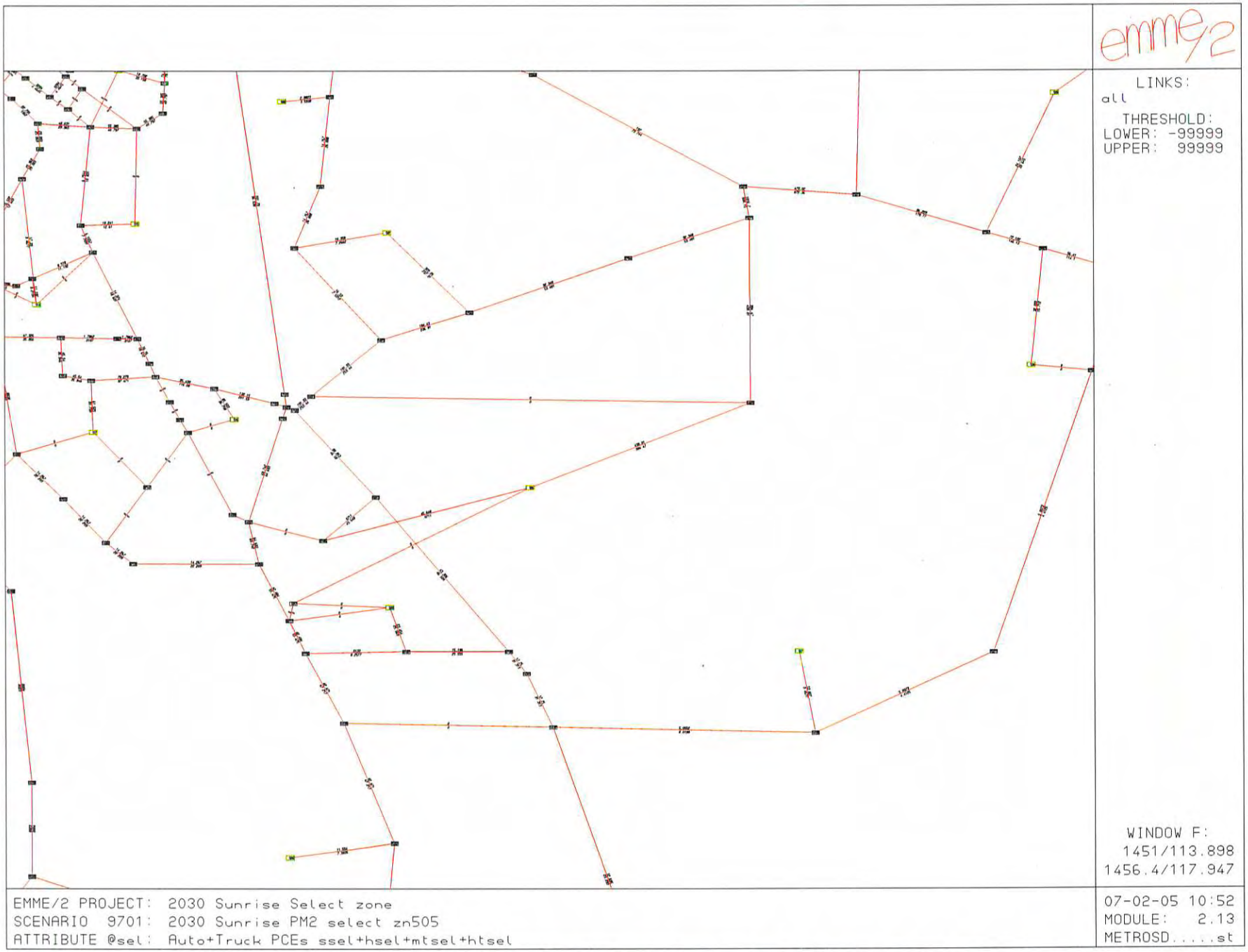
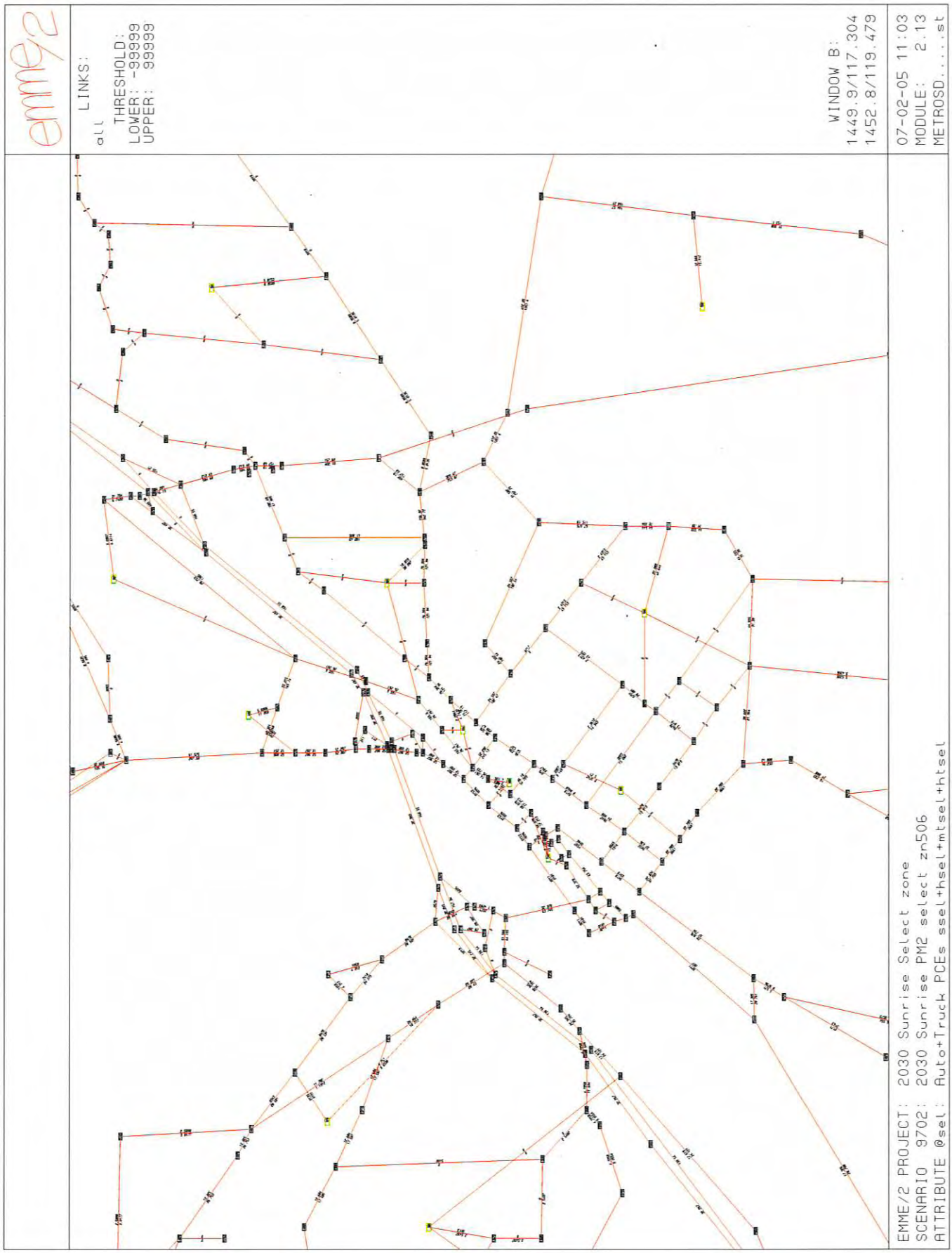
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW C:
1449.9/115.129
1452.8/117.304
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9701: 2030 Sunrise PM2 select zn505
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel
07-02-05 10:50
MODULE: 2.13
METROSD.....st


emme/2
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW D:
1452.4/117.046
1456.5/120.121
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9701: 2030 Sunrise PM2 select zn505
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel
07-02-05 10:50
MODULE: 2.13
METROSD.....st


emme/2
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW E:
1453.8/114.091
1457.9/117.167
07-02-05 10:51
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9701: 2030 Sunrise PM2 select zn505
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel


emme/2
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW F:
1451/113.898
1456.4/117.947
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9701: 2030 Sunrise PM2 select zn505
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel
07-02-05 10:52
MODULE: 2.13
METROSD.....st


emme/2
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW B:
1449.9/117.304
1452.8/119.479
07-02-05 11:03
MODULE: 2.13
METROSD.....st
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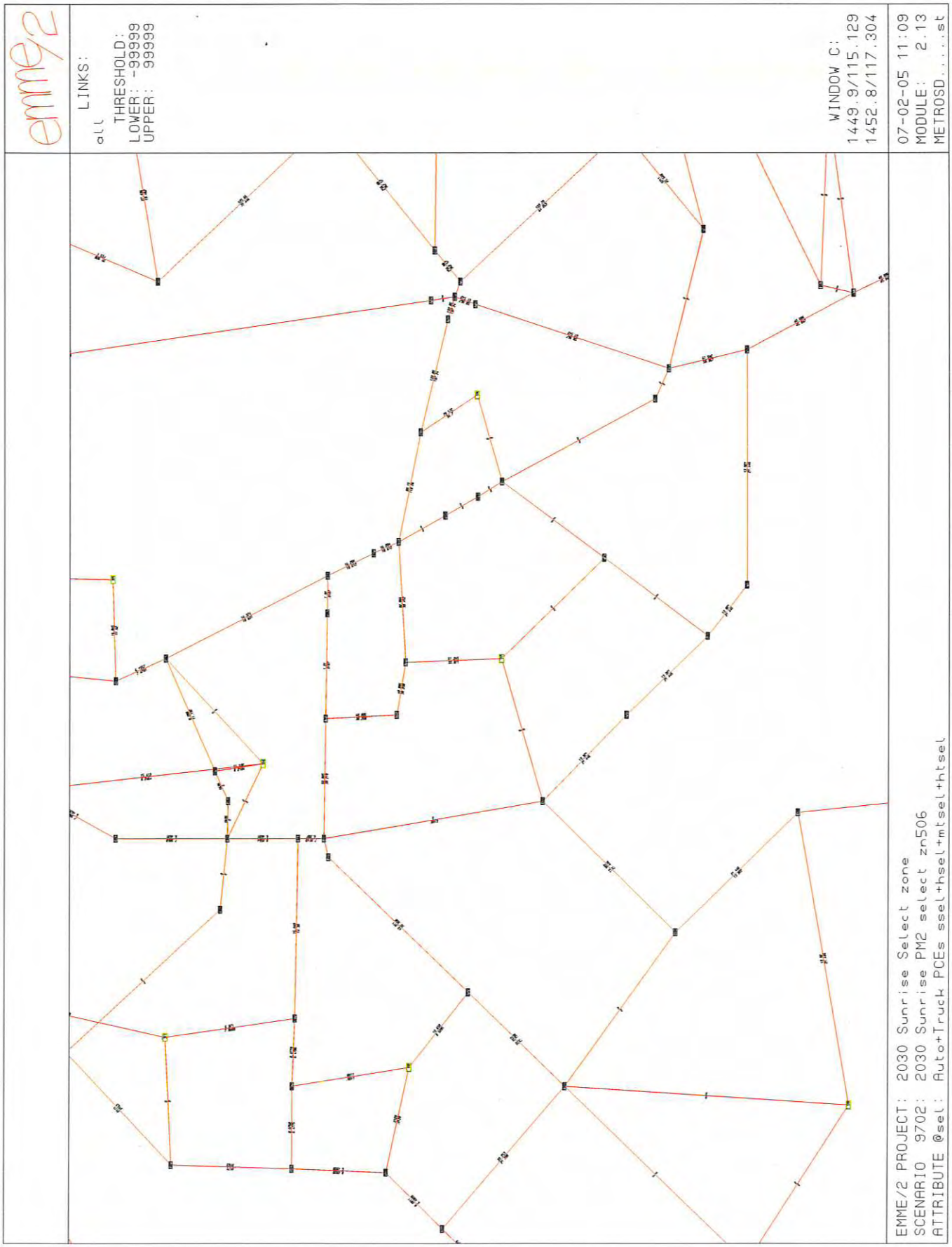
SCENARIO 9702: 2030 Sunrise PM2 select zn506
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel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1452.8/117.304
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SCENARIO 9702: 2030 Sunrise PM2 select zn506
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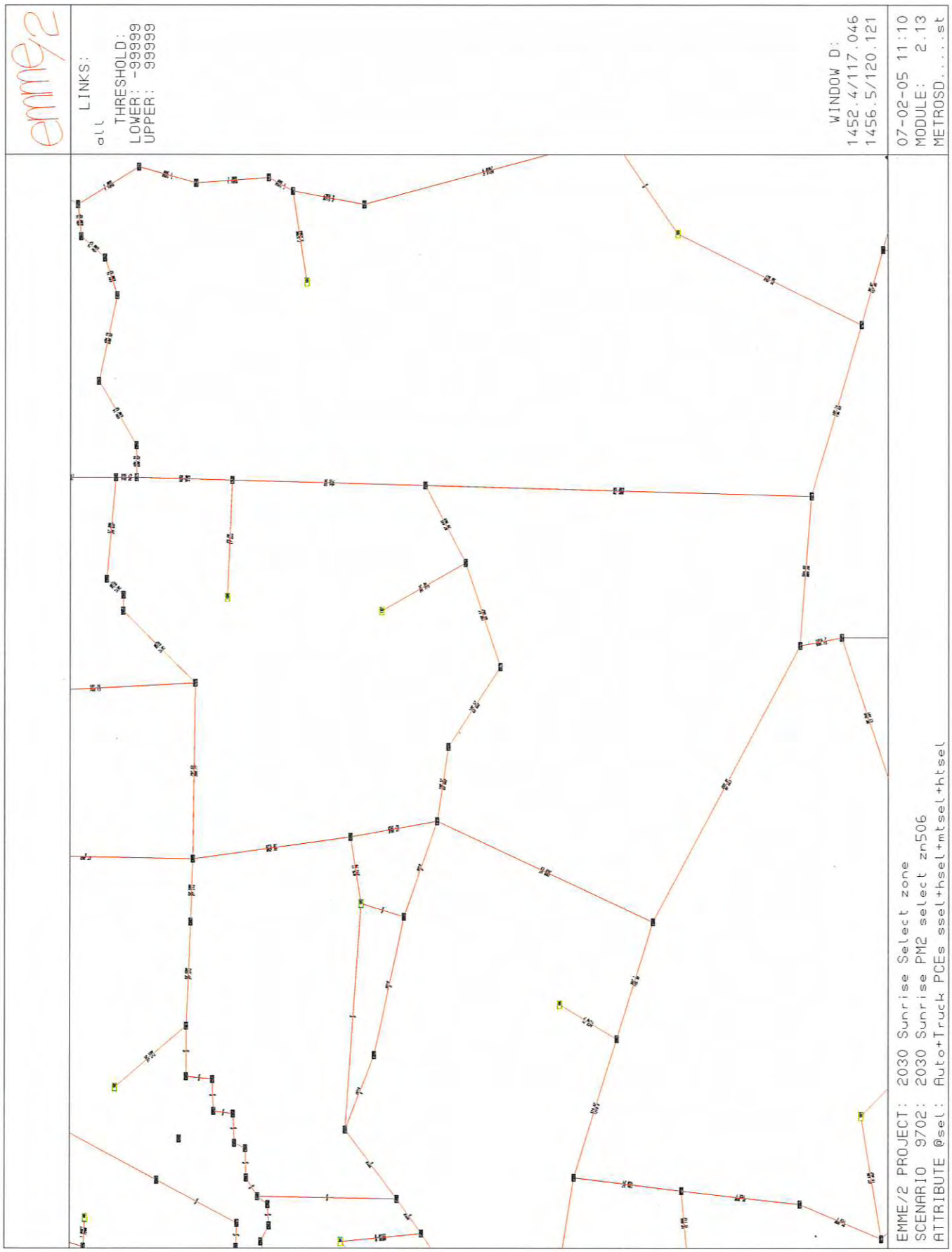
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1456.5/120.121
07-02-05 11:10
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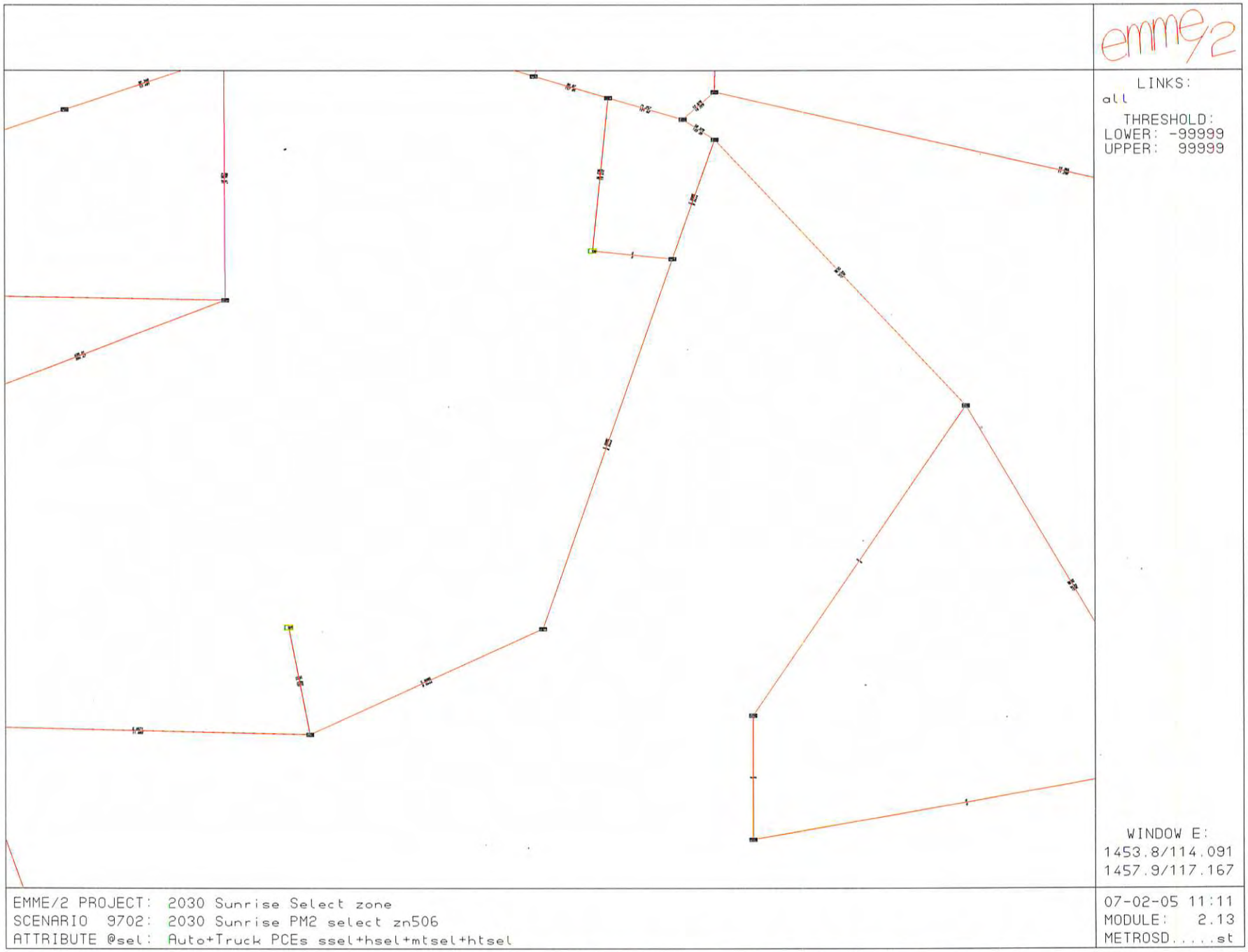
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UPPER: 99999
WINDOW E:
1453.8/114.091
1457.9/117.167
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9702: 2030 Sunrise PM2 select zn506
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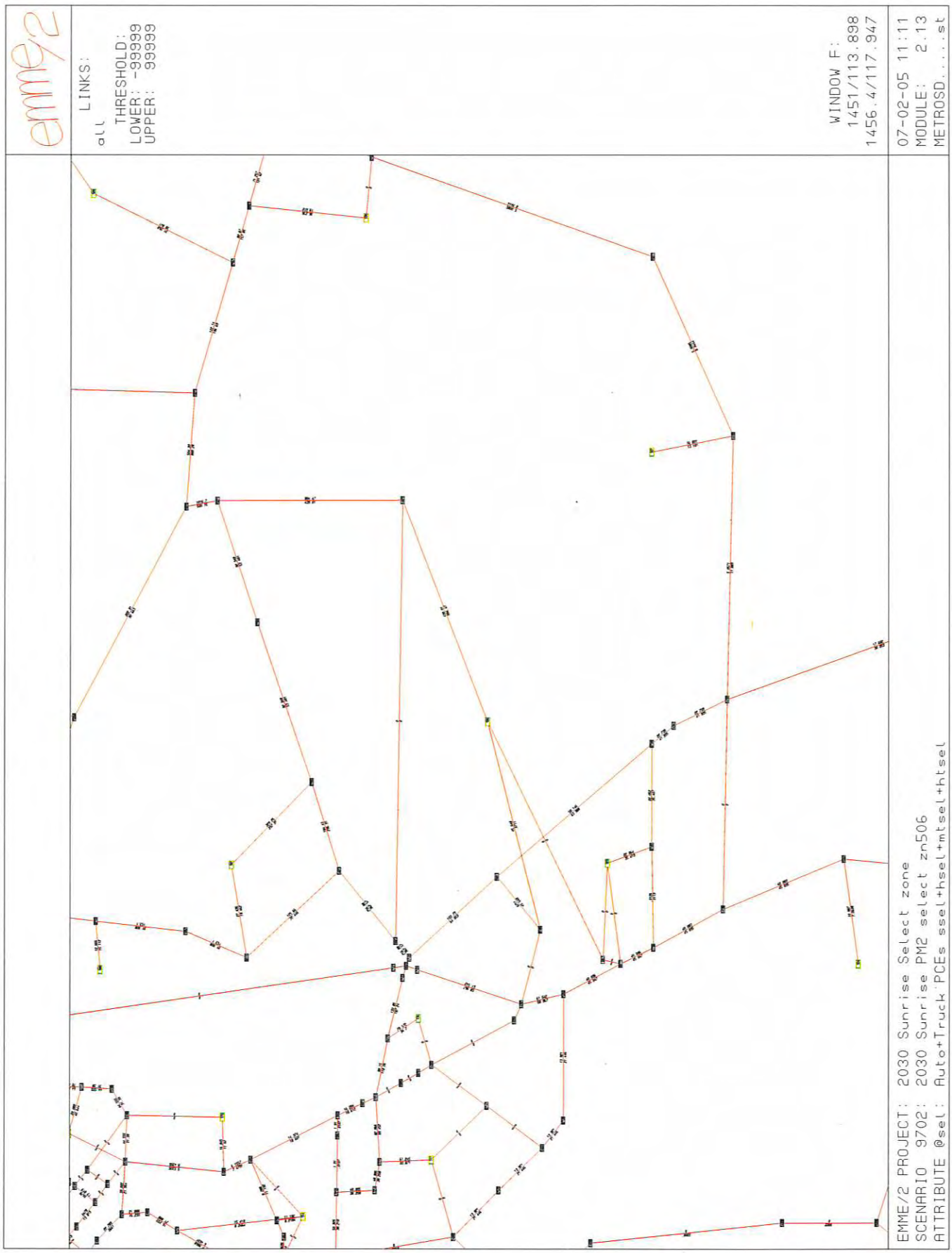
07-02-05 11:11
MODULE: 2.13
METROSD.....st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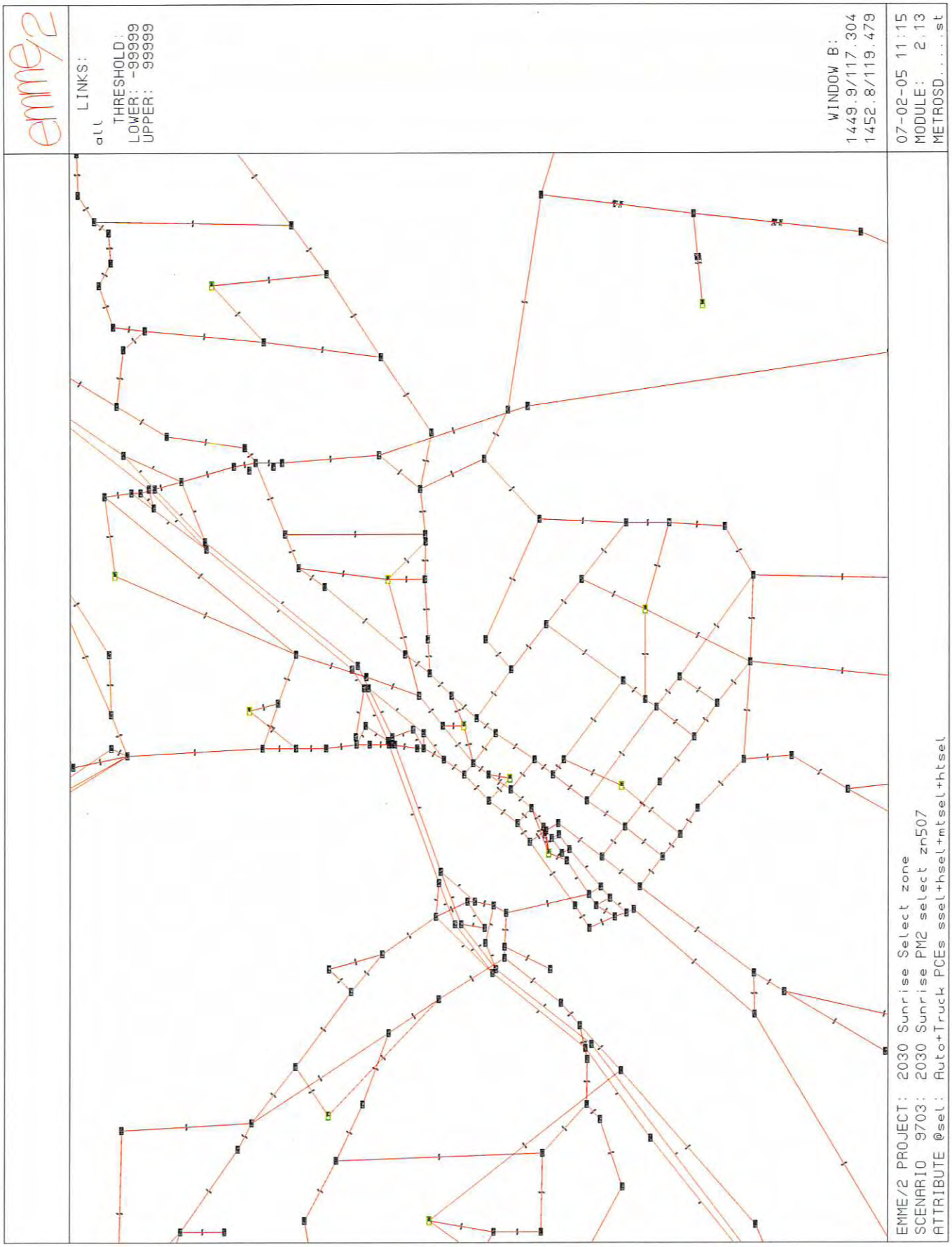
UPPER: 99999
WINDOW F:
1451/113.898
1456.4/117.947
07-02-05 11:11
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9702: 2030 Sunrise PM2 select zn506
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel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WINDOW B:
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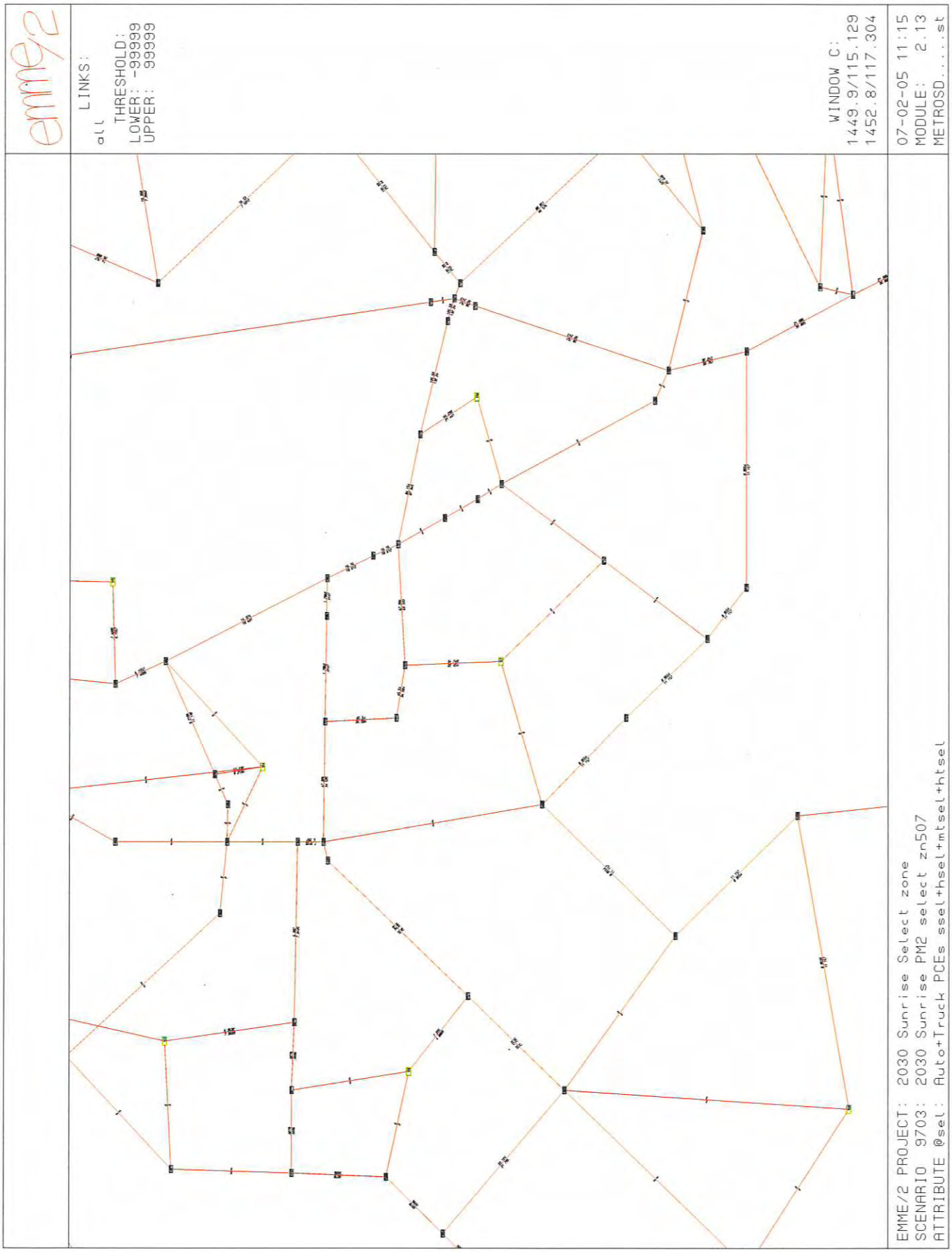
1452.8/119.479
07-02-05 11:15
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9703: 2030 Sunrise PM2 select zn507
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel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UPPER: 99999
WINDOW C:
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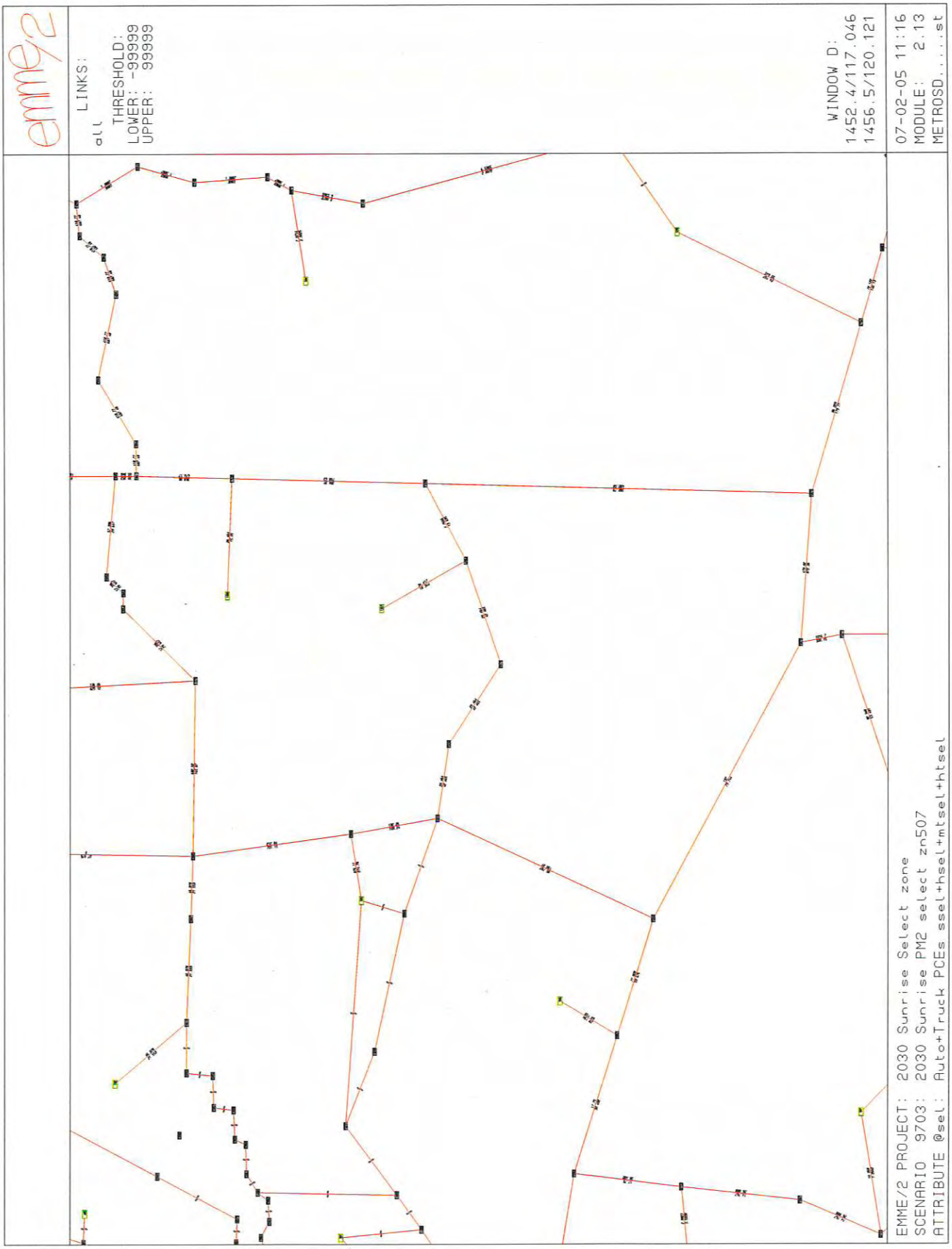
1452.8/117.304
07-02-05 11:15
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9703: 2030 Sunrise PM2 select zn507
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel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LINKS:
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UPPER: 99999
WINDOW D:
1452.4/117.046
1456.5/120.121
07-02-05 11:16
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9703: 2030 Sunrise PM2 select zn507
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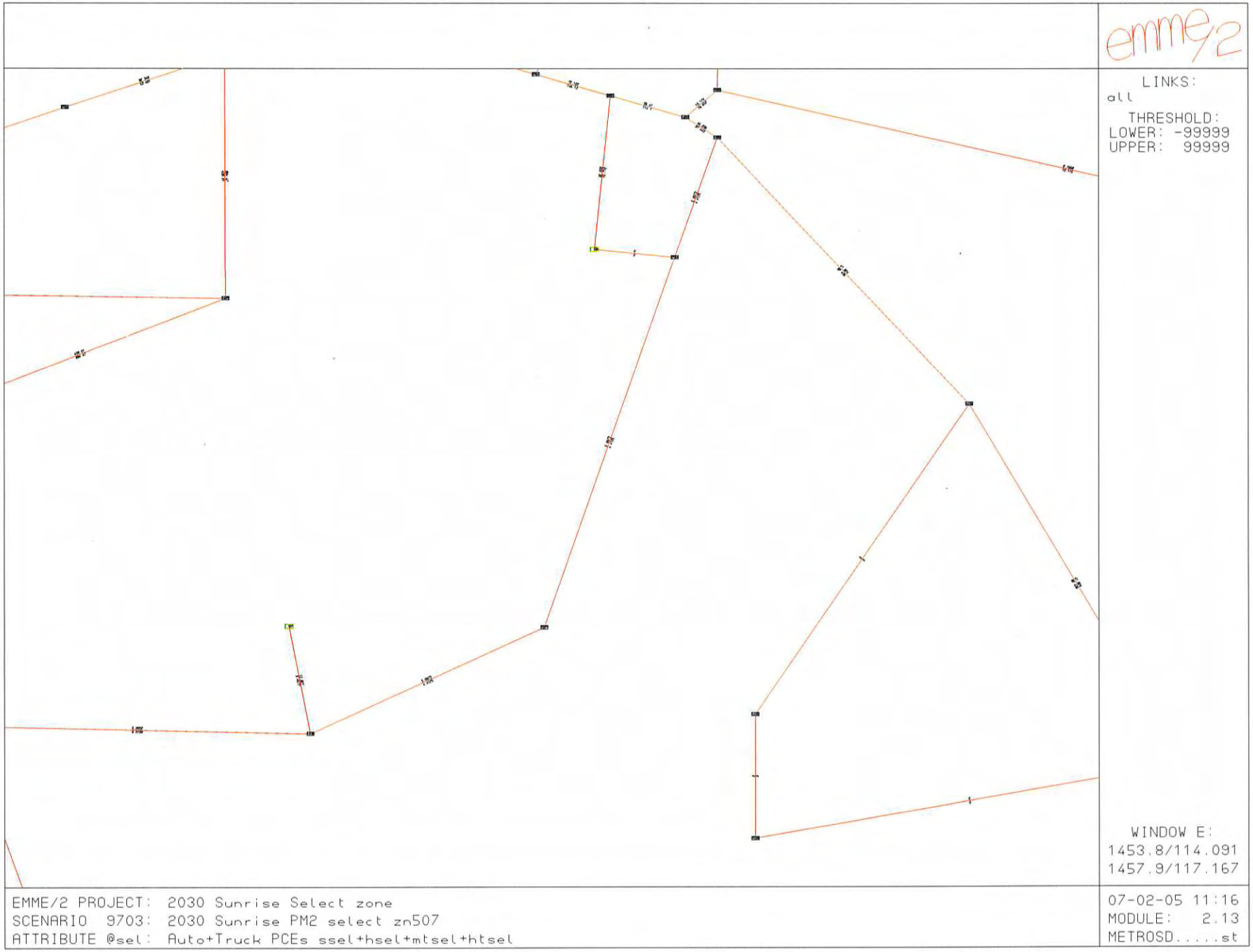
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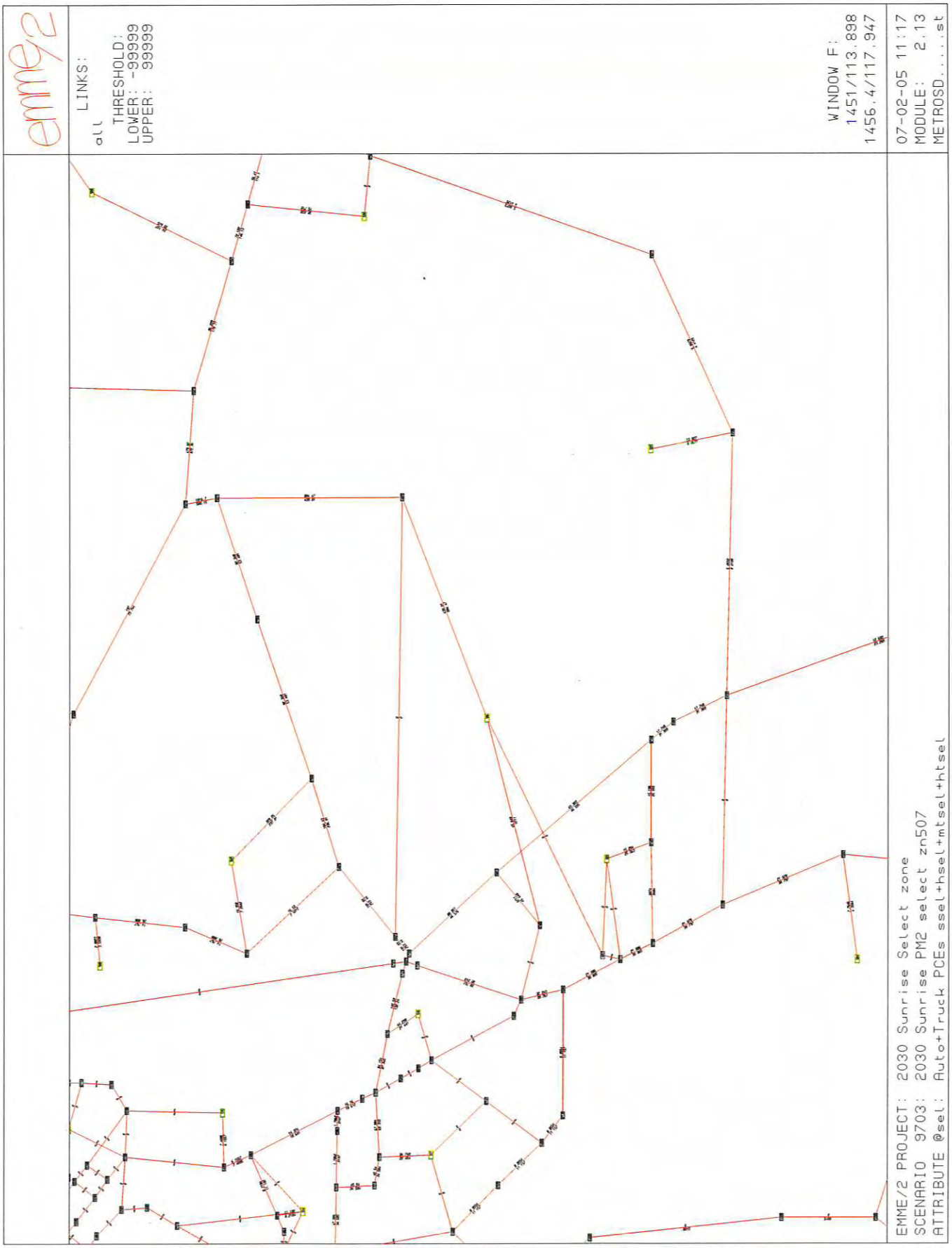
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW E:
1453.8/114.091
1457.9/117.167
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9703: 2030 Sunrise PM2 select zn507
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel
07-02-05 11:16
MODULE: 2.13
METROSD.....st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WINDOW F:
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1456.4/117.947
07-02-05 11:17
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METROSD.....st
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SCENARIO 9703: 2030 Sunrise PM2 select zn507
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel


emme/2
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW B:
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1452.8/119.479
07-02-05 11:20
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9704: 2030 Sunrise PM2 select zn508
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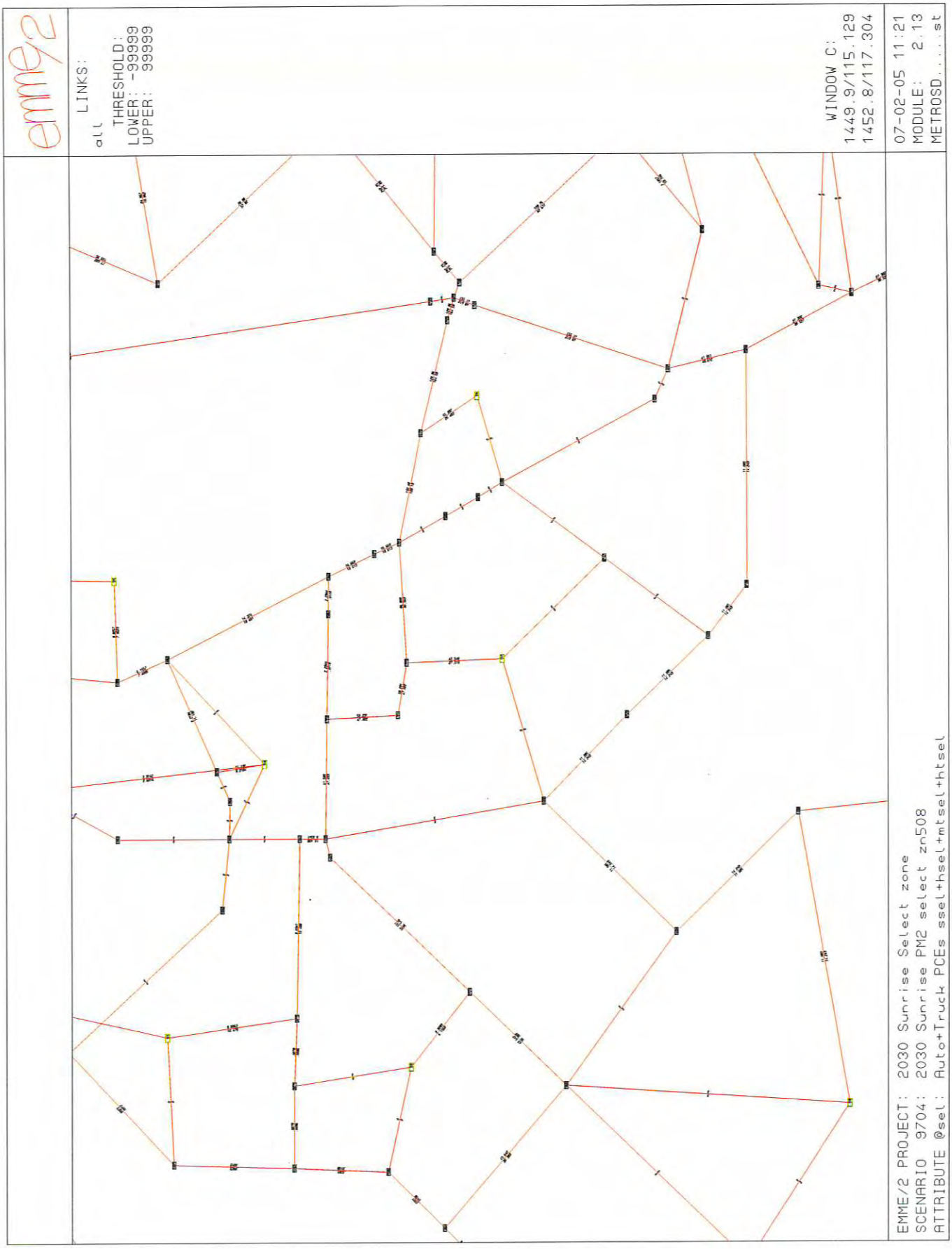
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UPPER: 99999
WINDOW C:
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1452.8/117.304
07-02-05 11:21
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9704: 2030 Sunrise PM2 select zn508
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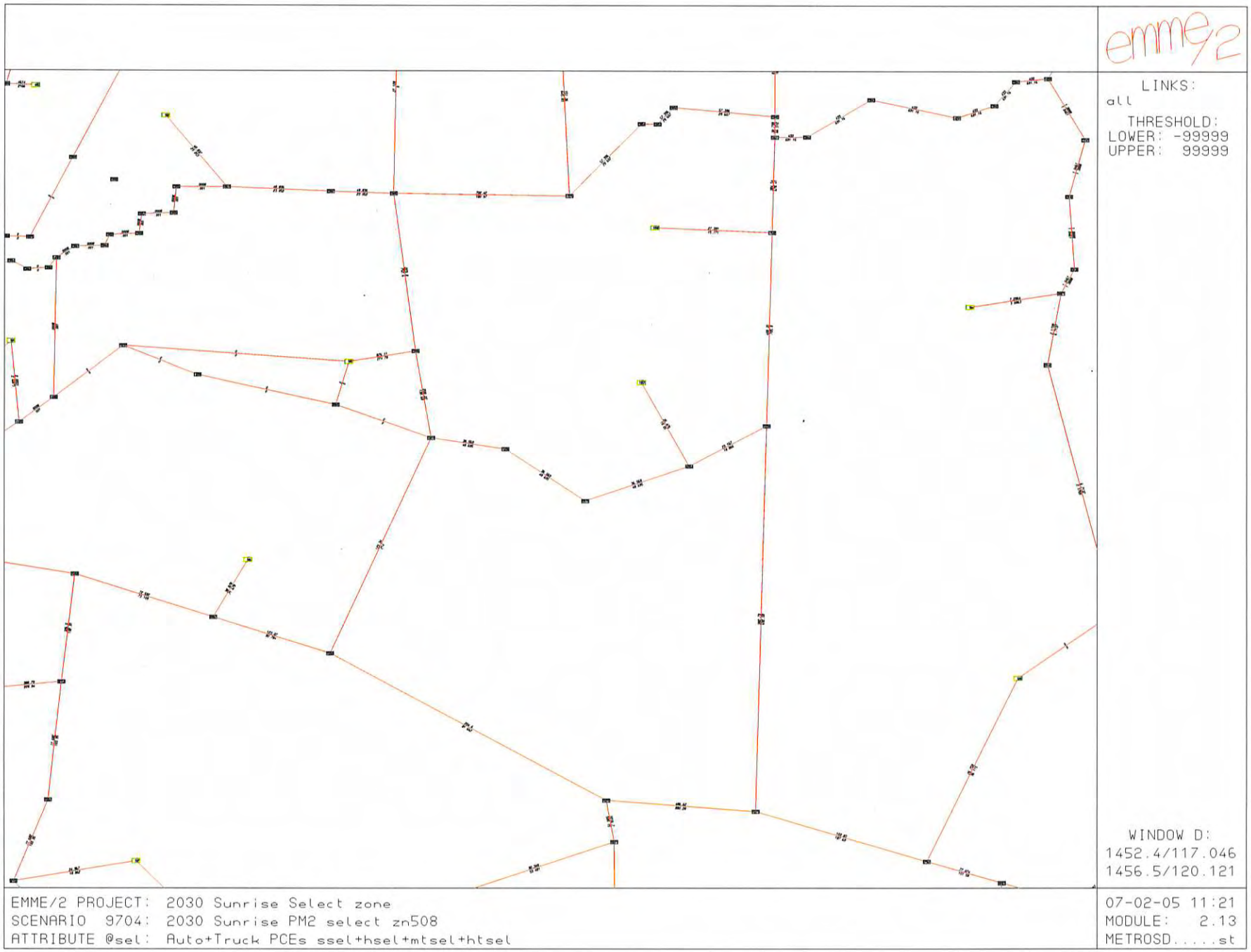
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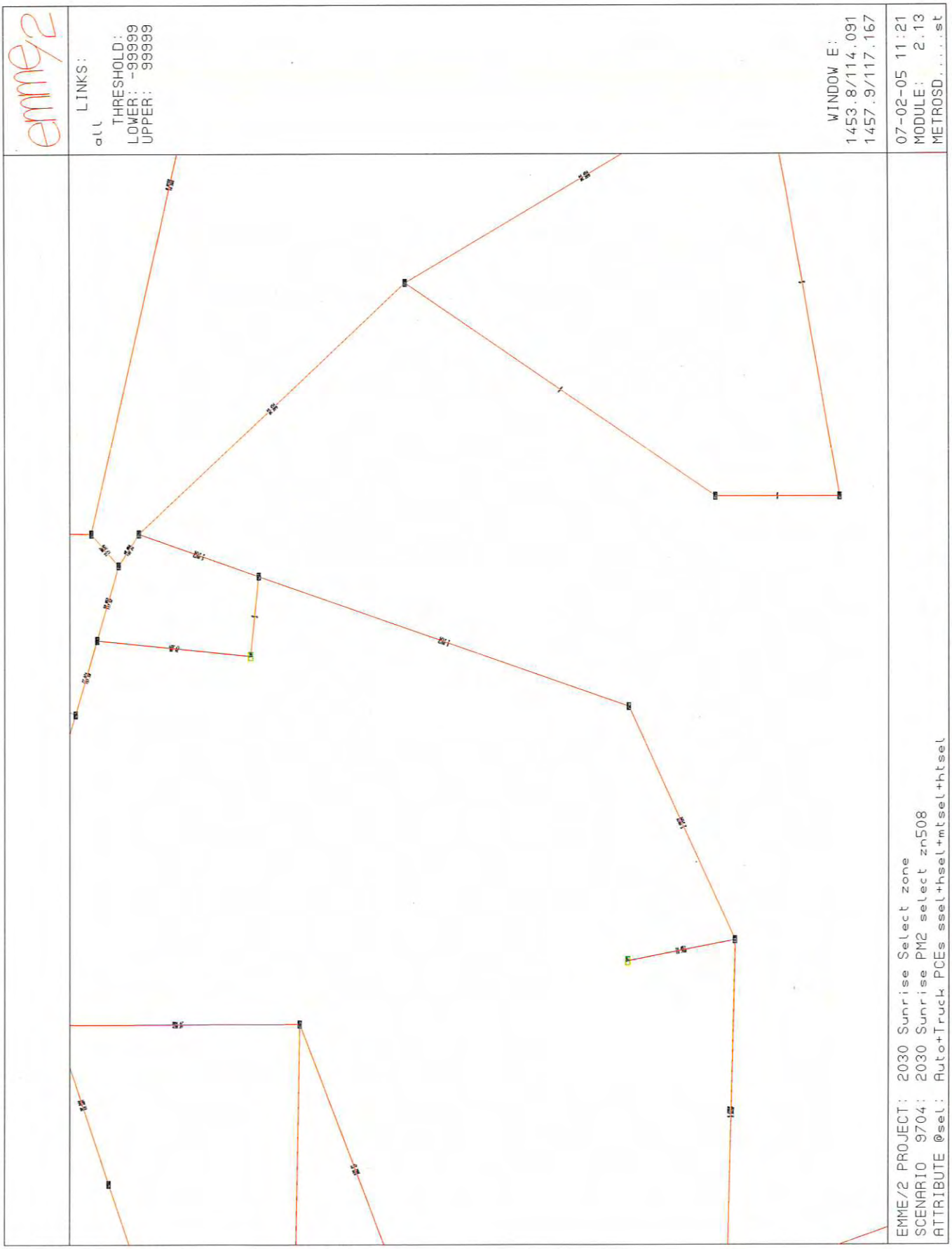
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW D:
1452.4/117.046
1456.5/120.121
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9704: 2030 Sunrise PM2 select zn508
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel
07-02-05 11:21
MODULE: 2.13
METROSD.....st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LINKS:
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THRESHOLD:
LOWER: -99999
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WINDOW E:
1453.8/114.091
1457.9/117.167
07-02-05 11:21
MODULE: 2.13
METROSD.....st
EMME/2 PROJECT: 2030 Sunrise Select zone
SCENARIO 9704: 2030 Sunrise PM2 select zn508
ATTRIBUTE @sel: Auto+Truck PCEs ssel+hsel+mtsel+htsel


emme/2
LINKS:
all
THRESHOLD:
LOWER: -99999
UPPER: 99999
WINDOW F:
1451/113.898
1456.4/117.947
07-02-05 11:22
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EMME/2 PROJECT: 2030 Sunrise Select zone
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Appendix G

Preferred Alternative Concept Plan

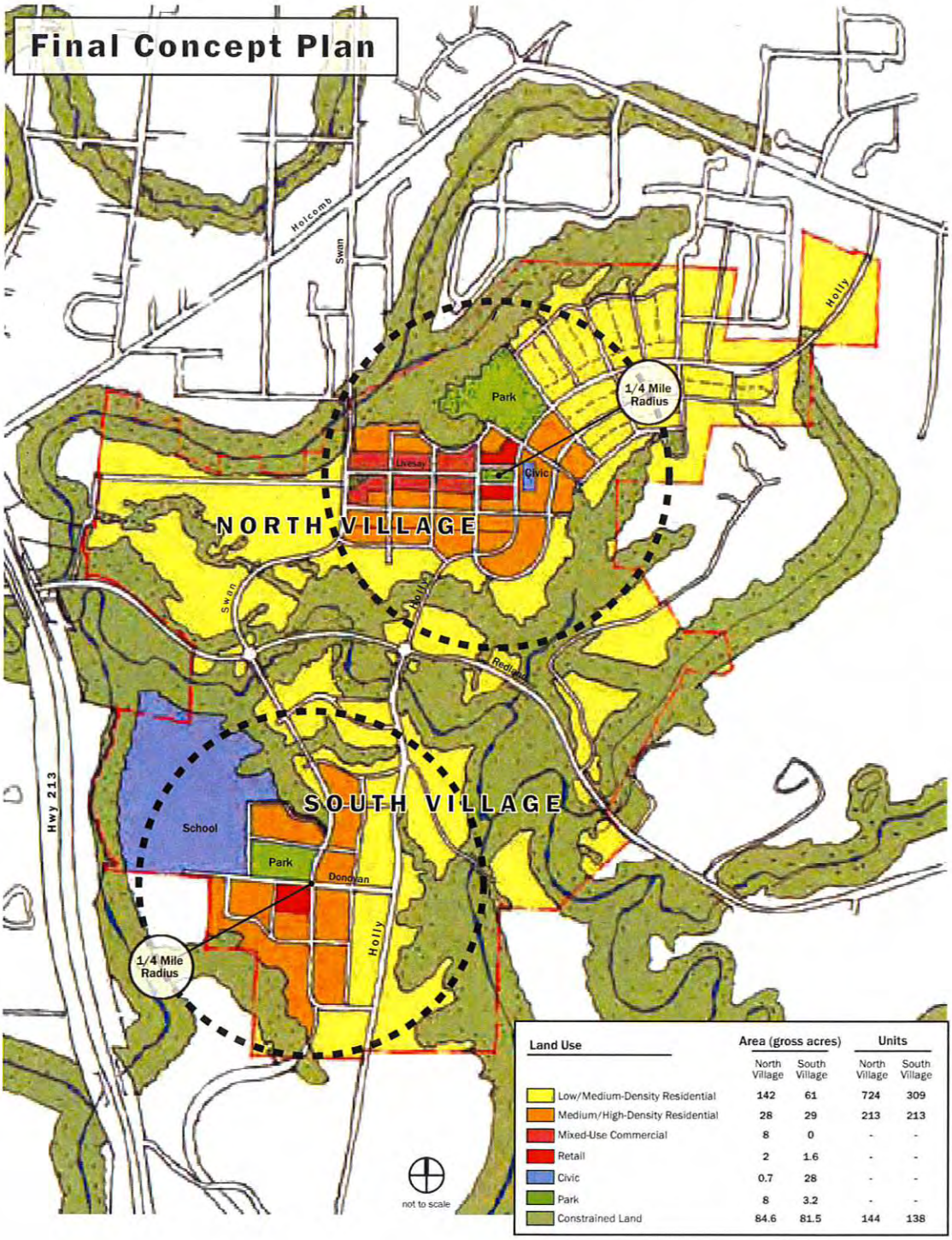

Figure 1-1. Park Place Concept Plan Urban Growth Diagram

Appendix H

Redland Rd./Holly Ln. Intersection
2027 Build Conditions
Level-of-Service Worksheets
without
Swan Avenue Extension

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions (no Swan Ave Ext), Weekday PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions (no Swan Ave Ext), Weekday PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#104 Redland Rd/Holly Ln	D	37.5	0.858	D	37.5	0.858	+ 0.000 D/V

PM Wed Apr 4, 2007 15:01:57 Page 3-1

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions (no Swan Ave Ext), Weekday PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec):	120	Critical Vol./Cap.(X):	0.858
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	37.5
Optimal Cycle:	111	Level Of Service:	D

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Permitted			Prot+Permit		
Rights:	Include			Ovl			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	2	0	0 1	0	1	0 1	1	0	1 0 1	1	0	0 1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	320	95	225	75	105	315	290	830	605	125	450	40
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	320	95	225	75	105	315	290	830	605	125	450	40
Added Vol:	0	0	0	0	0	0	0	0	0	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	320	95	225	75	105	315	290	830	605	125	450	40
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	320	95	225	75	105	315	290	830	605	125	450	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	320	95	225	75	105	315	290	830	605	125	450	40
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	320	95	225	75	105	315	290	830	605	125	450	40
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.92	0.90	0.90	0.95	1.00	0.85	0.94	0.99	0.84	0.90	0.94	0.94
Lanes:	2.00	0.30	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.08
Final Sat.:	3502	505	1196	1805	1900	1615	1787	1881	1599	1718	1641	146
Capacity Analysis Module:												
Vol/Sat:	0.09	0.19	0.19	0.04	0.06	0.20	0.16	0.44	0.38	0.07	0.27	0.27
Crit Moves:		****		****				****		****		
Green/Cycle:	0.17	0.22	0.22	0.05	0.10	0.32	0.22	0.51	0.68	0.38	0.38	0.38
Volume/Cap:	0.55	0.86	0.86	0.86	0.55	0.60	0.73	0.86	0.56	0.61	0.73	0.73
Delay/Veh:	46.9	62.7	62.7	109.4	54.7	36.1	50.0	33.1	10.5	30.3	36.2	36.2
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	46.9	62.7	62.7	109.4	54.7	36.1	50.0	33.1	10.5	30.3	36.2	36.2
LOS by Move:	D	E	E	F	D	D	D	C	B	C	D	D
HCM2kAvgQ:	6	14	14	5	4	10	11	29	12	5	16	16

Note: Queue reported is the number of cars per lane.

Traffix 7.8.0115 (c) 2007 Dowling Assoc. Licensed to KITTELSON, BOISE

Appendix I

2027 Unmitigated Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis
150: Washington Street & Cascade Hwy South

2027 Total Traffic Conditions
5/21/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1827	1553	1736	1827	1553	1736	1827	1553	3367	3471	1553
Flt Permitted	0.29	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1025	1827	1553	889	1827	1553	1736	1827	1553	3367	3471	1553
Volume (vph)	520	165	200	155	185	430	100	1001	140	760	1288	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Lane Group Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	pm+pt		pm+ov	pm+pt		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)	33.4	18.4	27.4	30.4	16.9	31.9	9.0	54.1	67.6	15.0	60.1	75.1
Effective Green, g (s)	37.4	20.4	30.4	32.4	17.9	33.9	10.0	57.1	71.6	16.0	63.1	80.1
Actuated g/C Ratio	0.31	0.17	0.25	0.27	0.15	0.28	0.08	0.48	0.60	0.13	0.53	0.67
Clearance Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	651	311	393	342	273	478	145	869	965	449	1825	1037
v/s Ratio Prot	c0.11	0.09	0.04	0.05	0.10	c0.12	0.06	c0.58	0.02	c0.24	0.39	c0.12
v/s Ratio Perm	0.14		0.09	0.07		0.16			0.08			0.43
v/c Ratio	0.80	0.53	0.51	0.45	0.68	0.90	0.72	1.21	0.15	1.78	0.74	0.82
Uniform Delay, d1	34.3	45.4	38.4	35.2	48.3	41.4	53.7	31.4	10.7	52.0	22.1	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.15	3.14	1.00	1.00	1.00
Incremental Delay, d2	6.8	1.7	1.0	1.0	6.5	19.4	13.0	104.2	0.1	360.7	2.8	5.1
Delay (s)	41.1	47.2	39.4	36.2	54.8	60.8	70.2	140.4	33.8	412.7	24.9	19.7
Level of Service	D	D	D	D	D	E	E	F	C	F	C	B
Approach Delay (s)		41.9			54.4			122.7			126.7	
Approach LOS		D			D			F			F	

Intersection Summary			
HCM Average Control Delay	103.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.22		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	116.2%	ICU Level of Service	G

c Critical Lane Group

Hwy160 N (Wash-Redland) 3/17/2003 PM-150" Plan
NMF
KITTELPOR6-FF51

Synchro 5 Report
Page 1

HCM Signalized Intersection Capacity Analysis
250: Redland Road & Cascade Hwy South

2027 Total Traffic Conditions
5/21/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3360		1736	1827	1827	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3360		1736	1827	1827	1553
Volume (vph)	801	237	271	440	550	1093
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	801	237	285	463	579	1151
Lane Group Flow (vph)	1038	0	285	463	579	1151
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	43.3		20.0	68.7	44.7	88.0
Effective Green, g (s)	44.3		21.0	69.7	45.7	90.0
Actuated g/C Ratio	0.37		0.18	0.58	0.38	0.75
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1240		304	1061	696	1204
v/s Ratio Prot	0.31		c0.16	0.25	0.32	c0.35
v/s Ratio Perm						0.39
v/c Ratio	0.84		0.94	0.44	0.83	0.96
Uniform Delay, d1	34.6		48.9	14.1	33.7	13.3
Progression Factor	1.00		1.00	1.00	0.61	1.54
Incremental Delay, d2	5.1		35.1	1.3	8.6	13.3
Delay (s)	39.6		83.9	15.4	29.0	33.8
Level of Service	D		F	B	C	C
Approach Delay (s)	39.6			41.5	32.2	
Approach LOS	D			D	C	

Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	E

c Critical Lane Group

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

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PM Thu Mar 29, 2007 08:43:00 Page 2-1

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#101 Redland Rd/Abernathy Rd-Holcom	D	43.1	0.830	F	107.3	1.174	+64.216 D/V
#102 Redland Rd/Anchor Way	D	38.1	0.982	F	121.5	1.323	+83.433 D/V
#103 Redland Rd/Livesay Rd	D	29.1	0.000	F	170.9	0.000	+141.789 D/V
#104 Redland Rd/Holly Ln	E	72.5	1.011	F	211.8	1.399	+139.319 D/V
#105 Holly Lane/Donovan Road	A	7.8	0.000	A	8.2	0.000	+ 0.377 D/V
#106 Holly Ln/Maplelane Rd	B	16.6	0.642	D	35.4	0.938	+18.883 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	E	38.1	0.000	+16.234 D/V
#108 Holcomb Blvd/Swan Ave	D	26.5	0.000	F	134.3	0.000	+107.843 D/V
#300 Holcomb Blvd/Holly Ln	A	0.0	0.000	B	14.3	0.000	+14.296 D/V
#301 Livesay Rd/Swan Ave		0.0	0.000	B	11.9	0.000	+11.936 D/V
#302 Livesay Rd/Holly Ln		0.0	0.000	A	9.3	0.000	+ 9.345 D/V
#303 Redland Rd/Swan Ave	F	112.6	1.135	F	401.1	1.816	+288.487 D/V
#304 Swan Ave/Donovan Rd	B	11.2	0.000	C	15.1	0.000	+ 3.939 D/V

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd

Cycle (sec):	100	Critical Vol./Cap.(X):	1.174
Loss Time (sec):	16 (Y+R=4.0 sec)	Average Delay (sec/veh):	107.3
Optimal Cycle:	180	Level Of Service:	F

Street Name:	Abernathy-Holcomb									Redland Rd		
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 1	0	1	0 1	1	0	1 0 1	1	0	1 0 1
Volume Module: 5:00-6:00												
Base Vol:	234	347	83	318	546	45	74	392	462	128	212	189
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	347	83	318	546	45	74	392	462	128	212	189
Added Vol:	118	344	5	81	373	0	0	29	137	3	36	84
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	352	691	88	399	919	45	74	421	599	131	248	273
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	352	691	88	399	919	45	74	421	599	131	248	273
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	352	691	88	399	919	45	74	421	599	131	248	273
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	352	691	88	399	919	45	74	421	599	131	248	273
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.94	0.97	0.97	0.94	0.99	0.84	0.93	0.98	0.83	0.92	0.97	0.83
Lanes:	1.00	0.89	0.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1787	1640	209	1787	1881	1599	1769	1862	1583	1753	1845	1568
Capacity Analysis Module:												
Vol/Sat:	0.20	0.42	0.42	0.22	0.49	0.03	0.04	0.23	0.38	0.07	0.13	0.17
Crit Moves:	****				****			****		****		
Green/Cycle:	0.17	0.38	0.38	0.20	0.42	0.42	0.05	0.19	0.36	0.06	0.21	0.21
Volume/Cap:	1.17	1.10	1.10	1.10	1.17	0.07	0.84	1.17	1.05	1.17	0.65	0.84
Delay/Veh:	149.5	97.0	97.0	118.3	121	17.6	95.8	144	83.6	186.4	40.3	55.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	149.5	97.0	97.0	118.3	121	17.6	95.8	144	83.6	186.4	40.3	55.9
LOS by Move:	F	F	F	F	F	B	F	F	F	F	D	E
HCM2kAvgQ:	20	37	37	21	48	1	4	24	27	9	8	11

Note: Queue reported is the number of cars per lane.

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Cycle (sec):	100	Critical Vol./Cap.(X):	1.323
Loss Time (sec):	12 (Y+R=4.0 sec)	Average Delay (sec/veh):	121.5
Optimal Cycle:	180	Level Of Service:	F

Street Name:	Anchor Way									Redland Rd		
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Prot+Permit		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1	0	0 0 1	0	0	0 0 0	0	0	0 1 0	1	0	1 0 0
Volume Module: 5:00-6:00 PM												
Base Vol:	152	0	403	0	0	0	0	827	288	70	512	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	152	0	403	0	0	0	0	827	288	70	512	0
Added Vol:	5	0	79	0	0	0	0	510	3	74	462	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	157	0	482	0	0	0	0	1337	291	144	974	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	157	0	482	0	0	0	0	1337	291	144	974	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	157	0	482	0	0	0	0	1337	291	144	974	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	157	0	482	0	0	0	0	1337	291	144	974	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	0.97	0.97	0.77	0.97	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.82	0.18	1.00	1.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	1508	328	1457	1845	0
Capacity Analysis Module:												
Vol/Sat:	0.09	0.00	0.30	0.00	0.00	0.00	0.00	0.89	0.89	0.10	0.53	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.16	0.00	0.22	0.00	0.00	0.00	0.00	0.66	0.66	0.72	0.72	0.00
Volume/Cap:	0.54	0.00	1.35	0.00	0.00	0.00	0.00	1.35	1.35	0.19	0.73	0.00
Delay/Veh:	40.7	0.0	212.6	0.0	0.0	0.0	0.0	179	178.7	9.0	10.5	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	40.7	0.0	212.6	0.0	0.0	0.0	0.0	179	178.7	9.0	10.5	0.0
LOS by Move:	D	A	F	A	A	A	A	F	F	A	B	A
HCM2kAvgQ:	5	0	32	0	0	0	0	101	101	2	19	0

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 5.1 Worst Case Level Of Service: F[170.9]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	1	0	56	49	540	0	0	480	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	11	0	71	74	1730	0	0	1037	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	11	0	71	74	1730	0	0	1037	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	11	0	71	74	1730	0	0	1037	12
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2921	2921	1043	1049	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	17	16	281	660	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	16	14	281	660	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.70	0.00	0.25	0.11	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT	LT	- LTR	- RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	86	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	5.3	xxxxx	0.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	171	xxxxx	11.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	F	*	B	*	*	*	*	*
ApproachDel:	xxxxxx			170.9			xxxxxx			xxxxxx		
ApproachLOS:	*			F			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec): 120 Critical Vol./Cap.(X): 1.399
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 211.8
Optimal Cycle: 180 Level Of Service: F

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1 0	0	1 0	0 0	1!	0 0	1 0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	137	0	153	0	0	0	0	821	207	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	137	0	153	0	0	0	0	821	207	86	398	0
Added Vol:	46	67	21	46	73	133	149	91	74	22	67	42
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	183	67	174	46	73	133	149	912	281	108	465	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	183	67	174	46	73	133	149	912	281	108	465	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	183	67	174	46	73	133	149	912	281	108	465	42
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	183	67	174	46	73	133	149	912	281	108	465	42
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.56	0.89	0.89	0.86	0.90	0.90	0.96	0.96	0.96	0.90	0.94	0.94
Lanes:	1.00	0.28	0.72	1.00	0.35	0.65	0.11	0.68	0.21	1.00	0.92	0.08
Final Sat.:	1057	471	1224	1626	608	1108	202	1235	381	1718	1639	148
Capacity Analysis Module:												
Vol/Sat:	0.17	0.14	0.14	0.03	0.12	0.12	0.74	0.74	0.74	0.06	0.28	0.28
Crit Moves:	****				****		****					****
Green/Cycle:	0.19	0.13	0.13	0.11	0.08	0.08	0.51	0.51	0.51	0.20	0.20	0.20
Volume/Cap:	0.96	1.09	1.09	0.44	1.43	1.43	1.43	1.43	1.43	0.32	1.43	1.43
Delay/Veh:	94.8	138	137.5	52.1	286	285.8	231.0	231	231.0	41.8	259	259.4
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	94.8	138	137.5	52.1	286	285.8	231.0	231	231.0	41.8	259	259.4
LOS by Move:	F	F	F	D	F	F	F	F	F	D	F	F
HCM2kAvgQ:	10	15	15	2	17	17	99	99	99	4	39	39

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: A[8.2]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0 0	0	1 0	0 0	1!	0 0	0 0	0	0 0
Volume Module:												
Base Vol:	30	240	0	0	225	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	240	0	0	225	35	45	0	25	0	0	0
Added Vol:	23	112	0	0	118	4	2	0	20	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	53	352	0	0	343	39	47	0	45	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	53	352	0	0	343	39	47	0	45	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	53	352	0	0	343	39	47	0	45	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	382	xxxx	xxxxx	xxxx	xxxx	xxxxx	821	821	363	xxxx	xxxx	xxxxx
Potent Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	344	310	682	xxxx	xxxx	xxxxx
Move Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	332	295	682	xxxx	xxxx	xxxxx
Volume/Cap:	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	0.14	0.00	0.07	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1228	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.2	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx				8.2			xxxxxx	
ApproachLOS:	*			*				A			*	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Cycle (sec): 100 Critical Vol./Cap.(X): 0.938
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 35.4
Optimal Cycle: 125 Level Of Service: D

Street Name:	Holly Ln						Maplelane Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Split Phase			Split Phase			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0 0	1	0 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	154	0	152	198	368	0	0	378	71
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	154	0	152	198	368	0	0	378	71
Added Vol:	0	0	0	10	0	147	169	0	0	0	0	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	164	0	299	367	368	0	0	378	81
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	164	0	299	367	368	0	0	378	81
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	0	0	0	164	0	299	367	368	0	0	378	81
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	0	0	0	164	0	299	367	368	0	0	378	81
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	1.00	1.00	1.00	0.86	1.00	0.86	0.67	0.67	1.00	1.00	0.97	0.97
Lanes:	0.00	0.00	0.00	0.35	0.00	0.65	0.50	0.50	0.00	0.00	0.82	0.18
Final Sat.:	0	0	0	581	0	1059	632	634	0	0	1512	324
Capacity Analysis Module:												
Vol/Sat:	0.00	0.00	0.00	0.28	0.00	0.28	0.58	0.58	0.00	0.00	0.25	0.25
Crit Moves:				****				****				
Green/Cycle:	0.00	0.00	0.00	0.30	0.00	0.30	0.62	0.62	0.00	0.00	0.62	0.62
Volume/Cap:	0.00	0.00	0.00	0.94	0.00	0.94	0.94	0.94	0.00	0.00	0.40	0.40
Delay/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9
LOS by Move:	A	A	A	E	A	E	D	D	A	A	A	A
HCM2kAvgQ:	0	0	0	18	0	18	26	26	0	0	7	7

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: E[38.1]

Street Name:	Front St						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0	0	0	0 0 1!	0	0	0 1	0	0	0 0	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	29	0	54	91	699	0	0	474	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	54	91	699	0	0	474	15
Added Vol:	0	0	0	10	0	0	0	114	0	0	122	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	39	0	54	91	813	0	0	596	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	39	0	54	91	813	0	0	596	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	39	0	54	91	813	0	0	596	25
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1604	1604	609	621	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	117	107	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	108	96	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.36	0.00	0.11	0.09	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	199	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	2.3	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	38.1	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	E	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			38.1			xxxxxx			xxxxxx		
ApproachLOS:	*			E			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #108 Holcomb Blvd/Swan Ave

Average Delay (sec/veh): 13.5 Worst Case Level Of Service: F[134.3]

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1!	0	0	0 0 1!	0	0	0 0	1!	0 0	0 0	1!	0 0
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	67	9	13	1	9	0	0	79	46	13	65	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	83	15	20	18	16	71	86	640	79	24	358	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	83	15	20	18	16	71	86	640	79	24	358	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	83	15	20	18	16	71	86	640	79	24	358	27
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1315	1285	680	1289	1311	372	385	xxxx	xxxxx	719	xxxx	xxxxx
Potent Cap.:	136	166	455	142	160	679	1179	xxxx	xxxxx	882	xxxx	xxxxx
Move Cap.:	103	149	455	116	144	679	1179	xxxx	xxxxx	882	xxxx	xxxxx
Volume/Cap:	0.80	0.10	0.04	0.16	0.11	0.10	0.07	xxxx	xxxx	0.03	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.2	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.3	xxxx	xxxxx	9.2	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	A	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	124	xxxxx	xxxx	283	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	6.3	xxxxx	xxxxx	1.6	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	134	xxxxx	xxxxx	25.1	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	*	D	*	*	*	*	*	*	*
ApproachDel:	134.3			25.1			xxxxxx			xxxxxx		
ApproachLOS:	F			D			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #300 Holcomb Blvd/Holly Ln

Average Delay (sec/veh): 2.0 Worst Case Level Of Service: B[14.3]

Street Name:	Holly Ln						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	280	0	0	250	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	280	0	0	250	0
Added Vol:	66	0	26	0	0	0	0	13	80	28	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	66	0	26	0	0	0	0	293	80	28	263	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	66	0	26	0	0	0	0	293	80	28	263	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	66	0	26	0	0	0	0	293	80	28	263	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	652	652	333	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	373	xxxx	xxxxx
Potent Cap.:	433	387	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Move Cap.:	425	378	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Volume/Cap:	0.16	0.00	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	479	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.7	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd ConDel:	xxxxx	14.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	A	*	*
ApproachDel:	14.3			xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:	B			*			*			*		

Note: Queue reported is the number of cars per lane.

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #301 Livesay Rd/Swan Ave

Average Delay (sec/veh): 7.4 Worst Case Level Of Service: B[11.9]

Street Name:	Swan Ave						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	40	27	55	24	40	11	7	28	23	95	43	37
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	27	55	24	40	11	7	28	23	95	43	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	27	55	24	40	11	7	28	23	95	43	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	40	27	55	24	40	11	7	28	23	95	43	37
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	51	xxxx	xxxxx	82	xxxx	xxxxx	268	256	46	254	234	55
Potent Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	685	648	1024	700	667	1012
Move Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	606	621	1024	639	639	1012
Volume/Cap:	0.03	xxxx	xxxx	0.02	xxxx	xxxx	0.01	0.05	0.02	0.15	0.07	0.04
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.4	xxxx	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT	LT	LTR	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	733	xxxxx	xxxx	693	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	1.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.3	xxxxx	xxxxx	11.9	xxxxx
Shared LOS:	*	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			10.3			11.9		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #302 Livesay Rd/Holly Ln

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[9.3]

Street Name:	Holly Ln						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0	0	0 0	1	0 0	0	0	0	0 1!	0 0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	37	133	0	0	98	6	10	0	65	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	133	0	0	98	6	10	0	65	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	37	133	0	0	98	6	10	0	65	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	37	133	0	0	98	6	10	0	65	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	104	xxxx	xxxxx	xxxx	xxxx	xxxxx	308	308	101	341	311	133
Potent Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	684	606	954	613	604	916
Move Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	671	591	954	561	588	916
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	0.00	0.07	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	903	xxxxx	xxxx	0	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.3	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			9.3			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #303 Redland Rd/Swan Ave

Cycle (sec): 120 Critical Vol./Cap.(X): 1.816
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 401.1
Optimal Cycle: 180 Level Of Service: F

Street Name:	Swan Ave						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Split Phase			Split Phase		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1	0	1 0	0	1	0	0	0	0 1!	0 0
Volume Module:												
Base Vol:	40	0	40	0	0	0	0	988	200	0	536	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	0	40	0	0	0	0	988	200	0	536	0
Added Vol:	97	30	11	29	30	178	142	273	126	13	207	25
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	137	30	51	29	30	178	142	1261	326	13	743	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	137	30	51	29	30	178	142	1261	326	13	743	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	137	30	51	29	30	178	142	1261	326	13	743	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	137	30	51	29	30	178	142	1261	326	13	743	25
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.49	0.89	0.89	0.93	0.85	0.85	0.94	0.94	0.94	0.94	0.94	0.94
Lanes:	1.00	0.37	0.63	1.00	0.14	0.86	0.08	0.73	0.19	0.02	0.95	0.03
Final Sat.:	939	625	1062	1769	234	1389	147	1305	337	30	1696	57
Capacity Analysis Module:												
Vol/Sat:	0.15	0.05	0.05	0.02	0.13	0.13	0.97	0.97	0.97	0.44	0.44	0.44
Crit Moves:	****				****				****	****		
Green/Cycle:	0.14	0.08	0.08	0.10	0.07	0.07	0.52	0.52	0.52	0.24	0.24	0.24
Volume/Cap:	1.01	0.58	0.58	0.21	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86
Delay/Veh:	119.0	59.2	59.2	50.5	474	473.8	418.7	419	418.7	440.7	441	440.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	119.0	59.2	59.2	50.5	474	473.8	418.7	419	418.7	440.7	441	440.7
LOS by Move:	F	E	E	D	F	F	F	F	F	F	F	F
HCM2kAvgQ:	9	4	4	1	21	21	160	160	160	73	73	73

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #304 Swan Ave/Donovan Rd

Average Delay (sec/veh): 10.6 Worst Case Level Of Service: C[15.1]

Street Name:	Swan Ave									Donovan Rd								
Approach:	North Bound				South Bound					East Bound					West Bound			
Movement:	L	-	T	- R	L	-	T	- R		L	-	T	- R		L	-	T	- R
Control:	Stop Sign				Stop Sign					Uncontrolled					Uncontrolled			
Rights:	Include				Include					Include					Include			
Lanes:	0	0	1	0 0	0	0	1!	0 0		0	1	0	0 0		0	0	0	1 0
Volume Module:																		
Base Vol:	0	80	0		0	200	0			0	60	0			0	50	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00	
Initial Bse:	0	80	0		0	200	0			0	60	0			0	50	0	
Added Vol:	0	75	0		20	72	35			35	15	0			0	15	13	
PasserByVol:	0	0	0		0	0	0			0	0	0			0	0	0	
Initial Fut:	0	155	0		20	272	35			35	75	0			0	65	13	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00	
PHF Adj:	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00	1.00			1.00	1.00	1.00	
PHF Volume:	0	155	0		20	272	35			35	75	0			0	65	13	
Reduct Vol:	0	0	0		0	0	0			0	0	0			0	0	0	
Final Vol.:	0	155	0		20	272	35			35	75	0			0	65	13	
Critical Gap Module:																		
Critical Gp:	xxxxx	6.5	xxxxx		7.1	6.5	6.2			4.1	xxxx	xxxxx	xxxxx		xxxx	xxxxx	xxxxx	
FollowUpTim:	xxxxx	4.0	xxxxx		3.5	4.0	3.3			2.2	xxxx	xxxxx	xxxxx		xxxx	xxxxx	xxxxx	
Capacity Module:																		
Cnflict Vol:	xxxx	223	xxxxx		294	217	72			78	xxxx	xxxxx			xxxx	xxxx	xxxxx	
Potent Cap.:	xxxx	676	xxxxx		658	681	991			1520	xxxx	xxxxx			xxxx	xxxx	xxxxx	
Move Cap.:	xxxx	660	xxxxx		530	665	991			1520	xxxx	xxxxx			xxxx	xxxx	xxxxx	
Volume/Cap:	xxxx	0.23	xxxx		0.04	0.41	0.04			0.02	xxxx	xxxx			xxxx	xxxx	xxxx	
Level Of Service Module:																		
2Way95thQ:	xxxx	0.9	xxxxx		xxxx	xxxx	xxxxx			0.1	xxxx	xxxxx			xxxx	xxxx	xxxxx	
Control Del:	xxxxx	12.1	xxxxx		xxxxx	xxxx	xxxxx			7.4	xxxx	xxxxx			xxxxx	xxxx	xxxxx	
LOS by Move:	*	B	*		*	*	*			A	*	*			*	*	*	
Movement:	LT -	LTR -	RT		LT -	LTR -	RT			LT -	LTR -	RT			LT -	LTR -	RT	
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx	679	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	2.6	xxxxx			0.1	xxxx	xxxxx			xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	15.1	xxxxx			7.4	xxxx	xxxxx			xxxxx	xxxx	xxxxx	
Shared LOS:	*	*	*		*	C	*			A	*	*			*	*	*	
ApproachDel:	12.1				15.1					xxxxxx					xxxxxx			
ApproachLOS:	B				C					*					*			

Note: Queue reported is the number of cars per lane.

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Appendix J

2027 Mitigated Build Traffic Conditions Level-of-Service Worksheets

HCM Signalized Intersection Capacity Analysis
150: Washington Street & Cascade Hwy South

2027 Mitigated Total Traffic Conditions
5/18/2007

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3367	1827	1553	1736	1827	1553	1736	3471	1553	3367	3471	1553
Flt Permitted	0.29	1.00	1.00	0.49	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1025	1827	1553	889	1827	1553	1736	3471	1553	3367	3471	1553
Volume (vph)	520	165	200	155	185	430	100	1001	140	760	1288	805
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Lane Group Flow (vph)	520	165	200	155	185	430	105	1054	147	800	1356	847
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	pm+pt		pm+ov	pm+pt		pm+ov	Prot		pm+ov	Prot		pm+ov
Protected Phases	3	8	1	7	4	5	1	6	7	5	2	3
Permitted Phases	8		8	4		4			6			2
Actuated Green, G (s)	33.4	18.4	27.4	30.4	16.9	43.9	9.0	42.1	55.6	27.0	60.1	75.1
Effective Green, g (s)	37.4	20.4	30.4	32.4	17.9	45.9	10.0	45.1	59.6	28.0	63.1	80.1
Actuated g/C Ratio	0.31	0.17	0.25	0.27	0.15	0.38	0.08	0.38	0.50	0.23	0.53	0.67
Clearance Time (s)	5.0	5.0	4.0	4.0	4.0	4.0	4.0	6.0	4.0	4.0	6.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	651	311	393	342	273	633	145	1305	810	786	1825	1037
v/s Ratio Prot	c0.11	0.09	0.04	0.05	0.10	0.16	0.06	c0.30	0.02	c0.24	0.39	c0.12
v/s Ratio Perm	c0.14		0.09	0.07		0.12			0.07			0.43
v/c Ratio	0.80	0.53	0.51	0.45	0.68	0.68	0.72	0.81	0.18	1.02	0.74	0.82
Uniform Delay, d1	34.3	45.4	38.4	35.2	48.3	30.9	53.7	33.6	16.7	46.0	22.1	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.11	2.28	1.00	1.00	1.00
Incremental Delay, d2	6.8	1.7	1.0	1.0	6.5	2.9	13.0	4.3	0.1	36.6	2.8	5.1
Delay (s)	41.1	47.2	39.4	36.2	54.8	33.8	70.2	41.6	38.2	82.6	24.9	19.7
Level of Service	D	D	D	D	D	C	E	D	D	F	C	B
Approach Delay (s)		41.9			39.3			43.5			38.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	89.9%	ICU Level of Service	D

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
250: Redland Road & Cascade Hwy South

2027 Mitigated Total Traffic Conditions
5/18/2007

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0		3.0	3.0	3.0	3.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3360		1736	1827	1827	1553
Flt Permitted	0.96		0.95	1.00	1.00	1.00
Satd. Flow (perm)	3360		1736	1827	1827	1553
Volume (vph)	801	237	271	440	550	1093
Peak-hour factor, PHF	1.00	1.00	0.95	0.95	0.95	0.95
Adj. Flow (vph)	801	237	285	463	579	1151
Lane Group Flow (vph)	1038	0	285	463	579	1151
Heavy Vehicles (%)	2%	2%	4%	4%	4%	4%
Turn Type			Prot			pm+ov
Protected Phases	8		1	6	2	8
Permitted Phases						2
Actuated Green, G (s)	43.3		20.0	68.7	44.7	88.0
Effective Green, g (s)	44.3		21.0	69.7	45.7	90.0
Actuated g/C Ratio	0.37		0.18	0.58	0.38	0.75
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1240		304	1061	696	1204
v/s Ratio Prot	0.31		c0.16	0.25	0.32	c0.35
v/s Ratio Perm						0.39
v/c Ratio	0.84		0.94	0.44	0.83	0.96
Uniform Delay, d1	34.6		48.9	14.1	33.7	13.3
Progression Factor	1.00		1.00	1.00	0.61	1.54
Incremental Delay, d2	5.1		35.1	1.3	8.6	13.3
Delay (s)	39.6		83.9	15.4	29.0	33.8
Level of Service	D		F	B	C	C
Approach Delay (s)	39.6			41.5	32.2	
Approach LOS	D			D	C	

Intersection Summary			
HCM Average Control Delay	36.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	6.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	E

c Critical Lane Group

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Scenario Report

Scenario:	PM
Command:	PM
Volume:	PM
Geometry:	PM
Impact Fee:	Default Impact Fee
Trip Generation:	PM
Trip Distribution:	Default Trip Distribution
Paths:	Default Paths
Routes:	Default Routes
Configuration:	Default Configuration

Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Impact Analysis Report
Level Of Service

Intersection	Base LOS	Base Del/ Veh	Base V/ C	Future LOS	Future Del/ Veh	Future V/ C	Change in
#101 Redland Rd/Abernathy Rd-Holcom	C	34.6	0.697	D	46.2	0.899	+11.593 D/V
#102 Redland Rd/Anchor Way	C	22.2	0.698	C	32.9	0.965	+10.742 D/V
#103 Redland Rd/Livesay Rd	B	13.1	0.000	C	16.8	0.000	+ 3.787 D/V
#104 Redland Rd/Holly Ln	C	20.4	0.671	D	39.6	0.887	+19.171 D/V
#105 Holly Lane/Donovan Road	A	7.8	0.000	A	8.2	0.000	+ 0.377 D/V
#106 Holly Ln/Maplelane Rd	B	16.6	0.642	D	35.4	0.938	+18.883 D/V
#107 Holcomb Blvd/Front St	C	21.9	0.000	E	38.1	0.000	+16.234 D/V
#108 Holcomb Blvd/Swan Ave	A	7.5	0.498	B	11.2	0.623	+ 3.700 D/V
#300 Holcomb Blvd/Holly Ln	A	0.0	0.000	B	14.3	0.000	+14.296 D/V
#301 Livesay Rd/Swan Ave		0.0	0.000	B	11.9	0.000	+11.936 D/V
#302 Livesay Rd/Holly Ln		0.0	0.000	A	9.3	0.000	+ 9.345 D/V
#303 Redland Rd/Swan Ave	A	5.6	0.430	C	27.8	0.785	+22.226 D/V
#304 Swan Ave/Donovan Rd	B	11.2	0.000	C	15.1	0.000	+ 3.939 D/V

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #101 Redland Rd/Abernathy Rd-Holcomb Blvd

Cycle (sec): 100 Critical Vol./Cap.(X): 0.899
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 46.2
Optimal Cycle: 116 Level Of Service: D

Street Name:	Abernathy-Holcomb						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Protected			Protected			Protected			Protected		
Rights:	Include			Include			Ovl			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	1 1	0	1 0	2 0	1	1 0	1 0	1	1 0	1 0	1
Volume Module: 5:00-6:00												
Base Vol:	234	347	83	318	546	45	74	392	462	128	212	189
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	234	347	83	318	546	45	74	392	462	128	212	189
Added Vol:	118	344	5	81	373	0	0	29	137	3	36	84
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	352	691	88	399	919	45	74	421	599	131	248	273
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	352	691	88	399	919	45	74	421	599	131	248	273
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	352	691	88	399	919	45	74	421	599	131	248	273
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	352	691	88	399	919	45	74	421	599	131	248	273
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.94	0.92	0.92	0.94	0.94	0.84	0.93	0.98	0.83	0.92	0.97	0.83
Lanes:	1.00	1.77	0.23	1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Sat.:	1787	3116	397	1787	3574	1599	1769	1862	1583	1753	1845	1568
Capacity Analysis Module:												
Vol/Sat:	0.20	0.22	0.22	0.22	0.26	0.03	0.04	0.23	0.38	0.07	0.13	0.17
Crit Moves:	****				****			****		****		
Green/Cycle:	0.22	0.25	0.25	0.25	0.29	0.29	0.06	0.25	0.47	0.08	0.27	0.27
Volume/Cap:	0.90	0.88	0.88	0.88	0.90	0.10	0.65	0.90	0.80	0.90	0.50	0.65
Delay/Veh:	60.8	46.2	46.2	53.7	44.9	26.3	57.6	56.1	28.9	91.2	31.6	35.7
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	60.8	46.2	46.2	53.7	44.9	26.3	57.6	56.1	28.9	91.2	31.6	35.7
LOS by Move:	E	D	D	D	D	C	E	E	C	F	C	D
HCM2kAvgQ:	14	15	15	15	18	1	3	16	18	7	7	8

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #102 Redland Rd/Anchor Way

Cycle (sec): 100 Critical Vol./Cap.(X): 0.965
Loss Time (sec): 12 (Y+R=4.0 sec) Average Delay (sec/veh): 32.9
Optimal Cycle: 151 Level Of Service: C

Street Name:	Anchor Way						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Split Phase			Split Phase			Permitted			Protected		
Rights:	Ovl			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0 0	1	0 0	0 0	0	0 0	1 1	0	1 0	2 0	0
Volume Module: 5:00-6:00 PM												
Base Vol:	152	0	403	0	0	0	0	827	288	70	512	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	152	0	403	0	0	0	0	827	288	70	512	0
Added Vol:	5	0	79	0	0	0	0	510	3	74	462	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	157	0	482	0	0	0	0	1337	291	144	974	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	157	0	482	0	0	0	0	1337	291	144	974	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	157	0	482	0	0	0	0	1337	291	144	974	0
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	157	0	482	0	0	0	0	1337	291	144	974	0
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	1.00	0.85	1.00	1.00	1.00	1.00	0.92	0.92	0.92	0.92	1.00
Lanes:	1.00	0.00	1.00	0.00	0.00	0.00	0.00	1.64	0.36	1.00	2.00	0.00
Final Sat.:	1805	0	1615	0	0	0	0	2856	622	1753	3505	0
Capacity Analysis Module:												
Vol/Sat:	0.09	0.00	0.30	0.00	0.00	0.00	0.00	0.47	0.47	0.08	0.28	0.00
Crit Moves:			****					****		****		
Green/Cycle:	0.31	0.00	0.39	0.00	0.00	0.00	0.00	0.49	0.49	0.09	0.57	0.00
Volume/Cap:	0.28	0.00	0.76	0.00	0.00	0.00	0.00	0.96	0.96	0.96	0.49	0.00
Delay/Veh:	26.4	0.0	31.3	0.0	0.0	0.0	0.0	39.3	39.3	108.3	13.0	0.0
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	26.4	0.0	31.3	0.0	0.0	0.0	0.0	39.3	39.3	108.3	13.0	0.0
LOS by Move:	C	A	C	A	A	A	A	D	D	F	B	A
HCM2kAvgQ:	4	0	14	0	0	0	0	32	32	8	9	0

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #103 Redland Rd/Livesay Rd

Average Delay (sec/veh): 0.8 Worst Case Level Of Service: C[16.8]

Street Name:	Livesay Rd						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			1 0 2 0 0			0 0 1 1 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	10	0	15	25	1190	0	0	557	10
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	10	0	15	25	1190	0	0	557	10
Added Vol:	0	0	0	1	0	56	49	540	0	0	480	2
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	11	0	71	74	1730	0	0	1037	12
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	11	0	71	74	1730	0	0	1037	12
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	11	0	71	74	1730	0	0	1037	12
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.8	6.5	6.9	4.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	2056	2921	525	1049	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	49	16	503	653	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	45	14	503	653	xxxx	xxxxx	xxxx	xxxx	xxxxx
Total Cap:	55	73	xxxxx	154	78	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.07	0.00	0.14	0.11	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.4	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	11.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	B	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	385	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	0.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	16.8	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	C	*	*	*	*	*	*	*
ApproachDel:	xxxxxx			16.8			xxxxxx			xxxxxx		
ApproachLOS:	*			C			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #104 Redland Rd/Holly Ln

Cycle (sec): 120 Critical Vol./Cap.(X): 0.887
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 39.6
Optimal Cycle: 123 Level Of Service: D

Street Name:	Holly Ln						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1 0	0	1 0	1	0	1 0	1	0	1 0
Volume Module: 5:00-6:00 PM												
Base Vol:	137	0	153	0	0	0	0	821	207	86	398	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	137	0	153	0	0	0	0	821	207	86	398	0
Added Vol:	46	67	21	46	73	133	149	91	74	22	67	42
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	183	67	174	46	73	133	149	912	281	108	465	42
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	183	67	174	46	73	133	149	912	281	108	465	42
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	183	67	174	46	73	133	149	912	281	108	465	42
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	183	67	174	46	73	133	149	912	281	108	465	42
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.95	0.89	0.89	0.95	0.90	0.90	0.94	0.99	0.84	0.90	0.94	0.94
Lanes:	1.00	0.28	0.72	1.00	0.35	0.65	1.00	1.00	1.00	1.00	0.92	0.08
Final Sat.:	1805	471	1224	1805	608	1108	1787	1881	1599	1718	1639	148
Capacity Analysis Module:												
Vol/Sat:	0.10	0.14	0.14	0.03	0.12	0.12	0.08	0.48	0.18	0.06	0.28	0.28
Crit Moves:	****				****			****			****	
Green/Cycle:	0.28	0.21	0.21	0.17	0.14	0.14	0.14	0.55	0.55	0.07	0.48	0.48
Volume/Cap:	0.67	0.67	0.67	0.22	0.89	0.89	0.59	0.89	0.32	0.89	0.59	0.59
Delay/Veh:	41.5	48.4	48.4	42.6	82.1	82.1	52.2	33.5	15.2	104.0	24.1	24.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	41.5	48.4	48.4	42.6	82.1	82.1	52.2	33.5	15.2	104.0	24.1	24.1
LOS by Move:	D	D	D	D	F	F	D	C	B	F	C	C
HCM2kAvgQ:	7	9	9	2	10	10	6	32	6	6	14	14

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #105 Holly Lane/Donovan Road

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: A[8.2]

Street Name:	Holly Lane						Donovan Road					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0	0 1	0	0 0	1! 0	0	0	0 0	0 0
Volume Module:												
Base Vol:	30	240	0	0	225	35	45	0	25	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	30	240	0	0	225	35	45	0	25	0	0	0
Added Vol:	23	112	0	0	118	4	2	0	20	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	53	352	0	0	343	39	47	0	45	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	53	352	0	0	343	39	47	0	45	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	53	352	0	0	343	39	47	0	45	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	xxxxx	xxxx	xxxxx
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	382	xxxx	xxxxx	xxxx	xxxx	xxxxx	821	821	363	xxxx	xxxx	xxxxx
Potent Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	344	310	682	xxxx	xxxx	xxxxx
Move Cap.:	1182	xxxx	xxxxx	xxxx	xxxx	xxxxx	332	295	682	xxxx	xxxx	xxxxx
Volume/Cap:	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	0.14	0.00	0.07	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	1228	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.2	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	8.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	8.2	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx			8.2			xxxxxx		
ApproachLOS:	*			*			A			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #106 Holly Ln/Maplelane Rd

Cycle (sec): 100 Critical Vol./Cap.(X): 0.938
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 35.4
Optimal Cycle: 125 Level Of Service: D

Street Name:	Holly Ln									Maplelane Rd					
Approach:	North Bound			South Bound			East Bound			West Bound					
Movement:	L	-	T - R	L	-	T - R	L	-	T - R	L	-	T - R			
Control:	Split Phase			Split Phase			Permitted			Permitted					
Rights:	Include			Include			Include			Include					
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	0	0 0	0 0	1!	0 0	0 1	0	0 0	0	0	0 0	0	1	0
Volume Module: 5:00-6:00 PM															
Base Vol:	0	0	0	154	0	152	198	368	0	0	378	71			
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Initial Bse:	0	0	0	154	0	152	198	368	0	0	378	71			
Added Vol:	0	0	0	10	0	147	169	0	0	0	0	10			
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0			
Initial Fut:	0	0	0	164	0	299	367	368	0	0	378	81			
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
PHF Volume:	0	0	0	164	0	299	367	368	0	0	378	81			
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0			
Reduced Vol:	0	0	0	164	0	299	367	368	0	0	378	81			
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Final Vol.:	0	0	0	164	0	299	367	368	0	0	378	81			
Saturation Flow Module:															
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Adjustment:	1.00	1.00	1.00	0.86	1.00	0.86	0.67	0.67	1.00	1.00	0.97	0.97			
Lanes:	0.00	0.00	0.00	0.35	0.00	0.65	0.50	0.50	0.00	0.00	0.82	0.18			
Final Sat.:	0	0	0	581	0	1059	632	634	0	0	1512	324			
Capacity Analysis Module:															
Vol/Sat:	0.00	0.00	0.00	0.28	0.00	0.28	0.58	0.58	0.00	0.00	0.25	0.25			
Crit Moves:				****				****							
Green/Cycle:	0.00	0.00	0.00	0.30	0.00	0.30	0.62	0.62	0.00	0.00	0.62	0.62			
Volume/Cap:	0.00	0.00	0.00	0.94	0.00	0.94	0.94	0.94	0.00	0.00	0.40	0.40			
Delay/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9			
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
AdjDel/Veh:	0.0	0.0	0.0	59.8	0.0	59.8	36.0	36.0	0.0	0.0	9.9	9.9			
LOS by Move:	A	A	A	E	A	E	D	D	A	A	A	A			
HCM2kAvgQ:	0	0	0	18	0	18	26	26	0	0	7	7			

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #107 Holcomb Blvd/Front St

Average Delay (sec/veh): 2.7 Worst Case Level Of Service: E[38.1]

Street Name:	Front St						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 0 0 0			0 0 1! 0 0			0 1 0 0 0			0 0 0 1 0		
Volume Module: 5:00-6:00 PM												
Base Vol:	0	0	0	29	0	54	91	699	0	0	474	15
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	29	0	54	91	699	0	0	474	15
Added Vol:	0	0	0	10	0	0	0	114	0	0	122	10
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	0	0	0	39	0	54	91	813	0	0	596	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	0	0	0	39	0	54	91	813	0	0	596	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	0	0	0	39	0	54	91	813	0	0	596	25
Critical Gap Module:												
Critical Gp:	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
FollowUpTim:	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	xxxx	xxxx	xxxxx	1604	1604	609	621	xxxx	xxxxx	xxxx	xxxx	xxxxx
Potent Cap.:	xxxx	xxxx	xxxxx	117	107	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Move Cap.:	xxxx	xxxx	xxxxx	108	96	499	965	xxxx	xxxxx	xxxx	xxxx	xxxxx
Volume/Cap:	xxxx	xxxx	xxxx	0.36	0.00	0.11	0.09	xxxx	xxxx	xxxx	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	199	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	2.3	xxxxx	0.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	38.1	xxxxx	9.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	*	*	*	E	*	A	*	*	*	*	*
ApproachDel:	xxxxxx			38.1			xxxxxx			xxxxxx		
ApproachLOS:	*			E			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #108 Holcomb Blvd/Swan Ave

Cycle (sec): 100 Critical Vol./Cap.(X): 0.623
Loss Time (sec): 8 (Y+R=4.0 sec) Average Delay (sec/veh): 11.2
Optimal Cycle: 40 Level Of Service: B

Street Name:	Swan Ave						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Permitted			Permitted			Permitted			Permitted		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module: 5:00-6:00 PM												
Base Vol:	16	6	7	17	7	71	86	561	33	11	293	26
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	16	6	7	17	7	71	86	561	33	11	293	26
Added Vol:	67	9	13	1	9	0	0	79	46	13	65	1
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	83	15	20	18	16	71	86	640	79	24	358	27
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	83	15	20	18	16	71	86	640	79	24	358	27
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	83	15	20	18	16	71	86	640	79	24	358	27
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	83	15	20	18	16	71	86	640	79	24	358	27
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.64	0.64	0.64	0.86	0.86	0.86	0.89	0.89	0.89	0.91	0.91	0.91
Lanes:	0.70	0.13	0.17	0.17	0.15	0.68	0.11	0.79	0.10	0.06	0.87	0.07
Final Sat.:	851	154	205	280	249	1105	181	1346	166	102	1518	115
Capacity Analysis Module:												
Vol/Sat:	0.10	0.10	0.10	0.06	0.06	0.06	0.48	0.48	0.48	0.24	0.24	0.24
Crit Moves:		****						****				
Green/Cycle:	0.16	0.16	0.16	0.16	0.16	0.16	0.76	0.76	0.76	0.76	0.76	0.76
Volume/Cap:	0.62	0.62	0.62	0.41	0.41	0.41	0.62	0.62	0.62	0.31	0.31	0.31
Delay/Veh:	45.7	45.7	45.7	39.1	39.1	39.1	6.3	6.3	6.3	3.8	3.8	3.8
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	45.7	45.7	45.7	39.1	39.1	39.1	6.3	6.3	6.3	3.8	3.8	3.8
LOS by Move:	D	D	D	D	D	D	A	A	A	A	A	A
HCM2kAvgQ:	4	4	4	3	3	3	12	12	12	4	4	4

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #300 Holcomb Blvd/Holly Ln

Average Delay (sec/veh): 2.0 Worst Case Level Of Service: B[14.3]

Street Name:	Holly Ln						Holcomb Blvd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 0 0 0			0 0 0 1 0			0 1 0 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	280	0	0	250	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	280	0	0	250	0
Added Vol:	66	0	26	0	0	0	0	13	80	28	13	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	66	0	26	0	0	0	0	293	80	28	263	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	66	0	26	0	0	0	0	293	80	28	263	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	66	0	26	0	0	0	0	293	80	28	263	0
Critical Gap Module:												
Critical Gp:	6.4	6.5	6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	4.1	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	2.2	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	652	652	333	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	373	xxxx	xxxxx
Potent Cap.:	433	387	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Move Cap.:	425	378	709	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	1185	xxxx	xxxxx
Volume/Cap:	0.16	0.00	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	*	*	*	A	*	*
Movement:	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT
Shared Cap.:	xxxx	479	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	0.7	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	0.1	xxxx	xxxxx
Shrd ConDel:	xxxxx	14.3	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	8.1	xxxx	xxxxx
Shared LOS:	*	B	*	*	*	*	*	*	*	A	*	*
ApproachDel:		14.3		xxxxxx			xxxxxx			xxxxxx		
ApproachLOS:		B		*			*			*		

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #301 Livesay Rd/Swan Ave

Average Delay (sec/veh): 7.4 Worst Case Level Of Service: B[11.9]

Street Name:	Swan Ave						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	40	27	55	24	40	11	7	28	23	95	43	37
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	40	27	55	24	40	11	7	28	23	95	43	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	40	27	55	24	40	11	7	28	23	95	43	37
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	40	27	55	24	40	11	7	28	23	95	43	37
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	51	xxxx	xxxxx	82	xxxx	xxxxx	268	256	46	254	234	55
Potent Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	685	648	1024	700	667	1012
Move Cap.:	1555	xxxx	xxxxx	1515	xxxx	xxxxx	606	621	1024	639	639	1012
Volume/Cap:	0.03	xxxx	xxxx	0.02	xxxx	xxxx	0.01	0.05	0.02	0.15	0.07	0.04
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.4	xxxx	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT	LT	-	LTR - RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	733	xxxxx	xxxx	693	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	1.0	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	10.3	xxxxx	xxxxx	11.9	xxxxx
Shared LOS:	*	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:		xxxxxx			xxxxxx			10.3			11.9	
ApproachLOS:		*			*			B			B	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Unsignalized Method (Future Volume Alternative)

Intersection #302 Livesay Rd/Holly Ln

Average Delay (sec/veh): 2.8 Worst Case Level Of Service: A[9.3]

Street Name:	Holly Ln						Livesay Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 1	0	0 0	0	0 1	0	0	0 1!	0 0	0	0 1!	0 0
Volume Module:												
Base Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	0	0	0	0	0	0	0	0	0	0	0	0
Added Vol:	37	133	0	0	98	6	10	0	65	0	0	0
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	37	133	0	0	98	6	10	0	65	0	0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	37	133	0	0	98	6	10	0	65	0	0	0
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Final Vol.:	37	133	0	0	98	6	10	0	65	0	0	0
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	104	xxxx	xxxxx	xxxx	xxxx	xxxxx	308	308	101	341	311	133
Potent Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	684	606	954	613	604	916
Move Cap.:	1488	xxxx	xxxxx	xxxx	xxxx	xxxxx	671	591	954	561	588	916
Volume/Cap:	0.02	xxxx	xxxx	xxxx	xxxx	xxxx	0.01	0.00	0.07	0.00	0.00	0.00
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	903	xxxxx	xxxx	0	xxxxx
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.3	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	9.3	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	A	*	*	*	*	*	*	A	*	*	*	*
ApproachDel:	xxxxxx			xxxxxx				9.3			xxxxxx	
ApproachLOS:	*			*				A			*	

Note: Queue reported is the number of cars per lane.

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Kittelson & Associates, Inc. #7938
Park Place Concept Plan - Oregon City, OR
2027 Mitigated Total Traffic Conditions, PM Peak Hour

Level Of Service Computation Report
2000 HCM Operations Method (Future Volume Alternative)

Intersection #303 Redland Rd/Swan Ave

Cycle (sec): 120 Critical Vol./Cap.(X): 0.785
Loss Time (sec): 16 (Y+R=4.0 sec) Average Delay (sec/veh): 27.8
Optimal Cycle: 89 Level Of Service: C

Street Name:	Swan Ave						Redland Rd					
Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L	T	R	L	T	R	L	T	R	L	T	R
Control:	Prot+Permit			Prot+Permit			Protected			Protected		
Rights:	Include			Include			Include			Include		
Min. Green:	0	0	0	0	0	0	0	0	0	0	0	0
Lanes:	1 0	0	1 0	1	0	1 0	0	1	0	1 0	1	1 0
Volume Module:												
Base Vol:	40	0	40	0	0	0	0	988	200	0	536	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	40	0	40	0	0	0	0	988	200	0	536	0
Added Vol:	97	30	11	29	30	178	142	273	126	13	207	25
PasserByVol:	0	0	0	0	0	0	0	0	0	0	0	0
Initial Fut:	137	30	51	29	30	178	142	1261	326	13	743	25
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Volume:	137	30	51	29	30	178	142	1261	326	13	743	25
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
Reduced Vol:	137	30	51	29	30	178	142	1261	326	13	743	25
PCE Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
MLF Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Final Vol.:	137	30	51	29	30	178	142	1261	326	13	743	25
Saturation Flow Module:												
Sat/Lane:	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Adjustment:	0.93	0.89	0.89	0.93	0.85	0.85	0.92	0.89	0.89	0.90	0.89	0.89
Lanes:	1.00	0.37	0.63	1.00	0.14	0.86	1.00	1.59	0.41	1.00	1.93	0.07
Final Sat.:	1769	625	1062	1769	234	1389	1753	2699	698	1702	3277	110
Capacity Analysis Module:												
Vol/Sat:	0.08	0.05	0.05	0.02	0.13	0.13	0.08	0.47	0.47	0.01	0.23	0.23
Crit Moves:	****				****			****			****	
Green/Cycle:	0.30	0.20	0.20	0.23	0.16	0.16	0.16	0.60	0.60	0.01	0.45	0.45
Volume/Cap:	0.50	0.25	0.25	0.09	0.79	0.79	0.51	0.79	0.79	0.79	0.51	0.51
Delay/Veh:	34.5	41.2	41.2	36.3	62.4	62.4	47.7	20.6	20.6	177.2	24.1	24.1
User DelAdj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
AdjDel/Veh:	34.5	41.2	41.2	36.3	62.4	62.4	47.7	20.6	20.6	177.2	24.1	24.1
LOS by Move:	C	D	D	D	E	E	D	C	C	F	C	C
HCM2kAvgQ:	5	3	3	1	9	9	5	24	24	2	11	11

Note: Queue reported is the number of cars per lane.

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------------------------------------------------------------------------------
                    Kittelson & Associates, Inc. #7938
                  Park Place Concept Plan - Oregon City, OR
              2027 Mitigated Total Traffic Conditions, PM Peak Hour
------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Future Volume Alternative)
******************************************************************************
Intersection #304 Swan Ave/Donovan Rd
******************************************************************************
Average Delay (sec/veh):     10.6       Worst Case Level Of Service: C[ 15.1]
******************************************************************************
Street Name:                Swan Ave                    Donovan Rd
Approach:       North Bound      South Bound      East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:        Stop Sign        Stop Sign        Uncontrolled     Uncontrolled
Rights:           Include          Include          Include          Include
Lanes:        0  0  1  0  0    0  0  1! 0  0    0  1  0  0  0    0  0  0  1  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   80    0     0  200    0     0   60    0     0   50    0
Growth Adj:  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
Initial Bse:    0   80    0     0  200    0     0   60    0     0   50    0
Added Vol:      0   75    0    20   72   35    35   15    0     0   15   13
PasserByVol:    0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:    0  155    0    20  272   35    35   75    0     0   65   13
User Adj:    1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Adj:     1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00  1.00 1.00 1.00
PHF Volume:     0  155    0    20  272   35    35   75    0     0   65   13
Reduct Vol:     0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:     0  155    0    20  272   35    35   75    0     0   65   13
Critical Gap Module:
Critical Gp:xxxxx  6.5 xxxxx   7.1  6.5  6.2   4.1 xxxx xxxxx xxxxx xxxx xxxxx
FollowUpTim:xxxxx  4.0 xxxxx   3.5  4.0  3.3   2.2 xxxx xxxxx xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx  223 xxxxx   294  217   72    78 xxxx xxxxx  xxxx xxxx xxxxx
Potent Cap.: xxxx  676 xxxxx   658  681  991  1520 xxxx xxxxx  xxxx xxxx xxxxx
Move Cap.:   xxxx  660 xxxxx   530  665  991  1520 xxxx xxxxx  xxxx xxxx xxxxx
Volume/Cap:  xxxx 0.23  xxxx  0.04 0.41 0.04  0.02 xxxx  xxxx  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
2Way95thQ:   xxxx  0.9 xxxxx  xxxx xxxx xxxxx   0.1 xxxx xxxxx  xxxx xxxx xxxxx
Control Del:xxxxx 12.1 xxxxx xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    B     *     *    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx  679 xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx  2.6 xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd ConDel:xxxxx xxxx xxxxx xxxxx 15.1 xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     *    C     *     A    *     *     *    *     *
ApproachDel:       12.1             15.1            xxxxxx           xxxxxx
ApproachLOS:         B                C                 *                *
******************************************************************************
Note: Queue reported is the number of cars per lane.
******************************************************************************


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I. Land Use: Implementation

I. Land Use: Implementation

Angelo planning group LAND USE PLANNING • TRANSPORTATION PLANNING • PROJECT MANAGEMENT

Memorandum

Date:	May 25, 2007
To:	David Berniker, LEED AP, Project Manager, SERA Architects
From:	Shayna Rehberg, AICP, Planner, Angelo Planning Group
cc:	Frank Angelo, Principal, Angelo Planning Group
Re:	Implementation of the Park Place Concept Plan – Development Code Amendments (**DRAFT**)

Introduction

The Park Place Concept Plan ("Concept Plan") will be implemented by updating, supplementing, and being referenced in City comprehensive planning documents and by amending associated implementing documents. Changes to comprehensive planning documents such as City public facility master plans are recommended in sets of policies and implementation strategies included in Chapter 4 (Implementation) of the Concept Plan. These sets of goals, policies, and strategies serve to supplement goals, policies, and strategies established in the City's existing Comprehensive Plan. Given the comprehensive planning document updates and supplements provided elsewhere in the Concept Plan, this memorandum focuses on the types of amendments that are recommended for the City's development code, the primary implementing document for land use in the City.

Development Code Amendments

The Park Place Concept Plan envisions vibrant, mixed-use neighborhoods and neighborhood centers that also respect existing neighborhoods and environmentally sensitive lands and meet minimum regional housing requirements. In order to address these objectives in a way that will be reasonable for an applicant to use and the City to administer, it is recommended that following types of revisions be made to the base zones, standards, and procedures found in the City's development code. Some of these revisions would apply citywide while others will apply only to Park Place.

I. Residential District Code Amendments

- A. New R-5 zone
- B. Modifications to R-3.5 zone
- C. New standards for attached single-family dwellings
- D. Additional standards for multi-family dwellings
- E. New land division requirements and architectural standards for residential development
- F. Modified master planning requirements

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II. Commercial/Mixed-Use District Code Amendments

A. Modified standards for Neighborhood Commercial (NC) zone

B. Modified standards for Medium-Density Mixed Use Corridor (MUC-1) zone

C. New "main street" standards for NC and MUC-1 zones

D. New definitions and standards for live/work units

III. Transportation-Related Code Amendments

A. Modified parking standards

B. New requirements in R-3.5, NC, and MUC-1 zones

IV. Natural Resource Code Amendments

A. Integration of regional Nature in Neighborhoods Best Management Practices into development code

B. New density transfer provisions in Floodplain/Flood Management Overlay Zone and Geologic Hazards Overlay Zone

The following sections address each element of the outline in greater detail. These code amendments and other implementation measures are also presented in the implementation matrix at the end of Chapter 4 (Implementation) of the Concept Plan.

I. Residential District Code Amendments

Residential zones depicted in the Park Place Concept Plan diagram were created assuming an average of 7 units/acre for low/medium-density housing and 12 units/acre for medium/high-density housing. These densities correspond to the yellow and orange shading on the Concept Plan diagram, respectively (Appendix A). These densities are critical in providing a vibrant, more urban environment in Park Place while satisfying Title 11 minimum density requirements.

Existing residential base zones in Oregon City come close to these density requirements, but do not necessarily provide sufficient density or housing variety to fulfill Title 11 housing requirements. It is recommended that a new residential zone be adopted citywide and modifications to an existing residential zone be adopted for Park Place. These new and modified zones are intended not only to achieve target housing densities, but to conform to more historical platting patterns and to include standards that foster a more vibrant pedestrian environment and seek compatibility with existing development. This new residential zone (the R-5 zone) and modified existing residential zone (R-3.5 zone) are intended to implement the low/medium-density and medium/high-density housing (yellow and orange shading) depicted in the Concept Plan diagram (Appendix A).

Further, there are new standards recommended for attached single-family dwelling units and modified standards for multi-family dwelling units that will support development flexibility as well as compatibility with the surrounding neighborhood. At the City's request, potential modifications to existing land division standards, residential design standards, and master planning requirements are also discussed.

The full set of existing lot and use standards that apply to the zones referenced in the following sections are included in this report as Appendix E.

A. Low/Medium-Density Residential Zone (R-5)

The proposed new R-5 zone is based largely on the City's existing R-6 zone, but reflects historical platting patterns present elsewhere in the city. It is recommended that if the R-5 zone is adopted, the City consider phasing out the R-6 zone over time and replacing it with the R-5 zone.

The following is a summary of how proposed standards for the new R-5 zone vary from standards in the existing R-6 zone.

- Decrease minimum lot size
- Increase minimum and maximum density[1]
- Increase maximum lot coverage
- Add more housing types as permitted uses

All the other standards established in the R-6 zone would apply to the new R-5 zone. (See Appendix E for standards in the R-6 zone.) The proposed standards differ in order to meet housing targets, make more efficient use of land, concentrate housing outside of environmentally sensitive areas, create more housing choices and affordability, and encourage compatibility with existing development. The specific proposed standards are presented in Table 1.

Table 1: Lot Standards and Use Standards in Low/Medium-Density Single-Family Residential (R-5) Zone

Proposed R-5 Zone	Proposed Standard
Minimum Lot Size	5,000 sq. ft. (*note: 6,000 sq. ft. in R-6 zone)*
Maximum Building Lot Coverage	50% (*note: 40% in R-6 zone*)
Minimum Density	7 units/acre
Maximum Density	8 units/acre
Minimum setbacks (subject to solar standards, OCMC Section 17.54.070)	Rear yard adjacent to existing development – 40 ft. (*note: 20ft. in R-6 zone)*
Permitted Uses	Add attached single-family units, duplexes, and accessory

[1] It is a City standard to calculate the minimum density as 80% of the maximum density. Maximum density can be derived from minimum lot size. For example, a minimum lot size of 10,000 square feet corresponds to 4 units/acre. Conversely, the maximum density may be calculated as 120% of the minimum density.

Chapter 16.12 (Minimum Improvements and Design Requirements for Land Divisions), Section -235, allows for lot sizes up to 10% less than the minimum lot size specified for the underlying base zone, given that the average lot size for the entire subdivision meets the minimum lot size requirement. ADUs and non-dwelling tracts (e.g. storm water, natural resources, open space, or access) are not included in lot size averaging calculations.

The City's Site Plan and Design Review standards reinforce these exceptions and methods for determining minimum density: *For a residential development, site layout shall achieve at least 80% of the maximum density of the base zone for the net developable area. Net developable area excludes all areas for required right-of-way dedication, land protected from development through water resource and steep slopes, and required open space or park dedication.* (OCMC Section 17.62.050)

[2] According to the supplemental standards in OCMC Section 17.54.090, accessory dwelling units (ADUs) are allowed in all single-family residential zones, subject to special development and occupancy standards.

Proposed R-5 Zone	Proposed Standard
	dwelling units (ADUs)[2] to list of explicitly permitted uses *(note: attached single-family units and duplexes are not allowed uses in the R-6 zone)*

B. Medium/High-Density Residential Zone (R-3.5)

Modifications to the existing medium/high-density residential base zone (R-3.5 zone) are recommended to be made within the base zone code section, with language specifying that these modifications would apply only to the zone as it is used in Park Place. The modifications presented in Table 2 are intended to foster a more pedestrian-oriented environment and assist in achieving the mix of housing types needed in Park Place.

Table 2: Design Standards and Use Standards in Medium/High-Density Residential (R-3.5) Zone

Modified R-3.5 Zone	Proposed Standard
Design Standards	Add alley requirement
Permitted Uses	Add multi-family residential uses (subject to existing and amended design standards)

C. Attached Single-Family Housing Standards

Allowing attached single-family housing and establishing standards for this type of housing supports the following objectives.

- Greater variety of housing types
- Housing that can be developed more densely and make more efficient use of the land
- Design that is compatible with surrounding development and with the Concept Plan diagram

It is recommended that the City adopt specific standards for attached single-family housing (townhouses and rowhouses) that could be applied in Park Place and citywide by incorporating them into the City's Site Plan and Design Review regulations (OCMC Section 17.62).

Attached single-family housing standards address building orientation, garages, alleys, and common areas. These standards can be added to site plan and design review regulations to apply to townhouse and rowhouse development in Park Place or citywide. An example of these standards is provided in Appendix F – Attached Single-Family Housing Standards.

D. Multi-Family Housing Standards

The City already has development standards for multi-family housing addressing building design, parking, and open space. The City may choose to augment its existing standards with those recommended by the State's Model Code to improve the quality of multi-family housing Park Place. Similar to the proposed attached single-family housing standards, these standards can be added to site plan and design review requirements to apply to townhouse and rowhouse development either in Park Place only or citywide. The elements addressed in the Model Code and that are not currently in the City's code include:

- Building mass;
- Type of open space;
- Open space dimensions; and
- Trash receptacles.

However, ADUs are not explicitly listed as allowed uses in the R-6 zone, and for clarity it is recommended that they be listed.

The template language from the Model Code is excerpted below.

Multi-family Housing Development Standards

Where multi-family housing is allowed, it shall conform to all of the following standards, which are intended to promote livability for residents and compatibility with nearby uses. Figure 2.2.200.H provides a conceptual illustration of the requirements listed below.

1. Building mass. The maximum width or length of a multiple family building shall not exceed [80-160] feet from end-wall to end-wall, not including outdoor living areas (e.g., porches, balconies, patios, and similar unenclosed spaces).

2. Common open space. A minimum of [10] percent of the site area shall be designated and permanently reserved as common open space in [all multiple family developments / multiple family developments with more than [20] dwellings], in accordance with all of the following criteria:

a. The site area is defined as the lot or parcel on which the development to be located, after subtracting any required dedication of street right-of-way and other land for public purposes (e.g., public park or school grounds, etc.);

b. In meeting the common open space standard, the multiple family development shall contain one or more of the following: outdoor recreation area, protection of sensitive lands (e.g., trees preserved), play fields, outdoor playgrounds, outdoor sports courts, swim pools, walking fitness courses, pedestrian amenities, or similar open space amenities for residents.

c. Historic buildings or landmarks that are open to the public may count toward meeting the common open space requirements when approved by the [planning commission/historic resource commission];

d. To receive credit under Section 2.2.200.H, a common open space area shall have an average width that is not less than 20 feet and an average length that is not less than 20 feet;

e. Projects in the Residential-Commercial District that provide pedestrian amenities between primary building entrance(s) and adjoining street(s) are required to provide a minimum of [5] percent of the site in common open space;

f. The approval body may waive the common open space requirement for the first [20-50] dwelling units in a multiple family project that is located within one-quarter mile (measured walking distance) of a public park, and there is a direct, accessible (i.e., Americans With Disabilities Act-compliant), lighted pedestrian walkway or multi-use pathway connecting the site to the park. If the park is not developed, or only partially developed, the approval body may require the multiple family housing developer to improve park land in an amount comparable to that which he or she would otherwise be required to provide in his or her development.

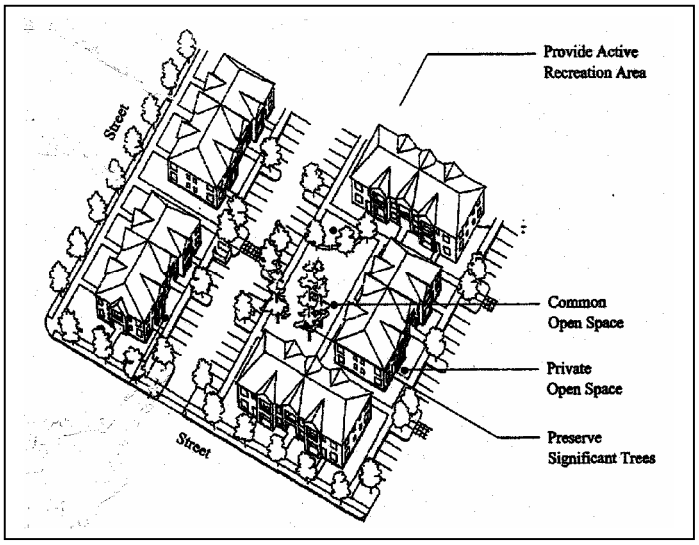
3. Private open space. Private open space areas shall be required for ground-floor and upper-floor housing units based on all of the following criteria:

a. [A minimum of [40-60] percent of all] ground-floor housing units shall have front or rear patios or decks measuring at least [48] square feet. Ground-floor housing means the housing unit entrance (front or rear) is within 5 feet of the finished ground elevation (i.e., after grading and landscaping);

b. [A minimum of [40-60] percent of all] upper-floor housing units shall have balconies or porches measuring at least [48]] square feet. Upper-floor housing means housing units that are more than 5 feet above the finished grade; and

c. In the Residential-Commercial District, multiple family dwellings are exempt from the private open space standard where the development contains pedestrian amenities located between primary building entrance(s) and adjoining streets

Figure 2.2.200H – Examples of Multiple Family Open Space



4. Trash receptacles. Trash receptacles shall be oriented away from building entrances, setback at least ten (10) feet from any public right-of-way and adjacent residences and shall be screened with an evergreen hedge or solid fence or wall of not less than 6 feet in height. Receptacles must be accessible to trash pick-up trucks.

E. Land Division and Residential Design Standards

The City has expressed interest in allowing for development flexibility, given certain performance standards, and more architectural variety in residential development in the city and Park Place. The following are code concepts the City may wish to pursue in implementing the Park Place Concept Plan.

Lot size averaging and open space

The City's existing code already allows for lot size averaging in residential subdivisions.[3] However, for even greater flexibility in lot size averaging, the City may wish to consider increasing the percentage that a lot can be less than the minimum lot size for that district. Currently, the City's code would allow a lot to be up to 10% less than the minimum lot size, and it is recommended that this allowance be increased to 20%. While the City's existing lot size averaging allow for tracts to be created for open space and natural resource protection, it is recommended that these provisions be amended to ***require*** open space tracts within residential subdivisions.

Planned unit development, cluster development, and cottage development

Planned unit development (PUDs), cluster development, and cottage development are code concepts that allow flexibility in residential development on different scales, while assuring density, open space, and other performance standards are met. The City of Redmond provides an example of planned unit, cluster, and

[3] Chapter 16.12 addresses minimum improvements and design standards for land divisions and OCMC Section 16.12.235 (Calculations of Lot Area) specifically addresses lot size averaging. According to the code, ADUs and tracts created for non-dwelling unit purposes such as open space, natural resources and hazards, storm water tracts, or access ways are not included in these calculations.

cottage development regulations in its zoning code, Redmond Development Code (RDC) Sections 8.0275-8.0287.[4]

Architectural integrity and variety

For architectural integrity and variety, the City may consider increasing the number of residential design elements currently required of single-family dwellings and two-family dwelling (duplexes). Similarly, the City could revise the standards to require certain elements for all applicable development, and then leave other elements to be selected from a menu-style method already used by the City.

As an example, the State Transportation Growth Management (TGM) Program's Model Development Code for Small Cities, 2nd Edition, ("Model Code") regulates the building length, articulation, and presence of building entries, windows, porches, and balconies for all residential development. The applicant must choose a minimum number of design details from amongst a list. The following is an excerpt of the architectural elements regulated for all development.

1. Building Length. The continuous horizontal distance, as measured from end-wall to end-wall, of individual buildings shall not exceed [80-160] feet.

2. Articulation. All buildings shall incorporate design features such as varying roof lines, offsets, balconies, projections (e.g., overhangs, porches, or similar features), recessed or covered entrances, window reveals, or similar elements to break up large expanses of uninterrupted building surfaces (blank walls). Along the vertical face of a structure, and on all building stories, such elements shall occur at a minimum interval of [30-40] feet, and each floor shall contain at least two elements, as generally shown in Figure 2.2.190C(2):

a. Recess (e.g., deck, patio, courtyard, entrance or similar feature) that has a minimum depth of [4-6] feet;

b. Extension (e.g., floor area, deck, patio, entrance, overhang, or similar feature) that projects a minimum of 2 feet and runs horizontally for a minimum length of 4 feet; and/or

c. Offsets or breaks in roof elevation of 2 feet or greater in height;

3. Eyes on the Street. All building elevations visible from a street right of way shall provide prominent defined entrances, and a combination of windows, porches, and/or balconies. A minimum of [40-60] percent of front (i.e., street-facing) elevations [(30% for manufactured homes that also conform to Section 2.2.200.D)], and a minimum of [30] percent of side and rear building elevations shall meet this standard, as generally shown in Figure 2.2.190C(2), above. "Percent of elevation" is measured as the horizontal plane (lineal feet) containing doors, porches, balconies, terraces and/or windows. The standard applies to each full and partial building story.

Appendix D presents an excerpt of the architectural variety standards required by the City of Battle Ground, Washington. For a thorough assessment and update of the City's code, it is recommended that the City pursue a code assistance grant administered by the State's Transportation Growth Management (TGM) program.

Solar Orientation

Supplemental zoning regulations in the City's existing code (OCMC Section 17.54.070) already establish solar access standards (maximum shade point heights and maximum shade height on solar features) for single-family residential development. In order to maximize passive solar heating of homes proposed as part of a PUD or subdivision and to reinforce the street layout proposed for Park Place, it is recommended that solar orientation standards be added to this existing set of solar regulations. The following is sample solar orientation regulation language from the Oregon Department of Energy and Boulder, Colorado.

[4] The City of Redmond's zoning code can be viewed at: http://doc.ci.redmond.or.us/Community_Development/Development_Code/Zoning_Updated_101006.pdf.

3. Siting Requirements: All planned unit developments and subdivisions shall be designed and constructed in compliance with the following solar siting requirements:

A. All new residential units shall have a roof surface that meets all of the following criteria:

i. Is oriented within 30 degrees of a true east-west direction;

ii. Is flat or not sloped towards true north; 100 square feet of un-shaded solar collectors for each individual dwelling unit in the building; and

iv. Has unimpeded solar access consistent with the requirements of Section 8.0370.2 or through easements, covenants, or other private agreements among affected landowners that the city manager finds are adequate to protect continued solar access for such roof surface.

4. Street Orientation Requirement:

A. New residential streets in planned unit developments and subdivisions, shall be predominantly oriented within thirty degrees of true east-west in order to maximize the number of homes with the major walls and windows facing south.

F. Modified Master Planning Requirements

The City has expressed interest in modifying its master planning requirements to accommodate more residential development. In doing so, the City would need to set a threshold acreage above which master planning would be required. Thresholds in the two to ten acre range should be considered. These modifications may be made in the City's development code (OCMC 17.65) to apply citywide or specifically to Park Place. It is critical that clear and explicit reference be made to the Park Place Concept Plan in modifying master planning requirements so that principles and policies included in the plan are implemented in master planned development.

II. Commercial/Mixed-Use District Code Amendments

The neighborhood centers – North Village and South Village – in Park Place are key components of the Park Place Concept Plan. These centers combine commercial uses, civic uses, higher-density residential uses, and public open spaces for residents to live, recreate, gather, and access everyday services. These uses are reflected in the mix of land use designations proposed in the Village Center. (See Appendix A.)

Figure 1: Examples of Neighborhood Commercial and Mixed-Use Development

Source: SERA Architects

The following sections address recommended standards for the commercial and mixed-use districts proposed in Park Place. In particular, modifications to the City's existing Neighborhood Commercial (NC) and Medium-Density Mixed-Used Corridor (MUC-1) are proposed, including "main street" standards, , in addition to provisions for live/work uses. Figure 1 presents examples of the kind of neighborhood-scale commercial and mixed uses that could be allowed in the proposed North and South Village NC and MUC-1 zones.

A. Neighborhood Commercial (NC) Zone Standards

The City's existing Neighborhood Commercial (NC) base zone includes many of the use and development standards that will enable the type of development envisioned in the Park Place Concept Plan.

Existing standards in the NC zone already prescribe a maximum front setback of 5 feet that creates a more active, pedestrian-oriented environment, with provisions for more of a setback if public space and pedestrian amenities are proposed in the setback. Minimum building height and landscaping also contribute to the pedestrian orientation of the environment. Similarly, a higher maximum building height provides opportunities for more density and mixed uses and creates a unique identity for the Village Centers. A wider range of allowed uses will support the provision of everyday services to residents so that the do not need to travel outside of Park Place to meet these needs. Therefore, it is recommended that the following provisions be amended in the Neighborhood Commercial (NC) base zone with specifications that they apply to Park Place.

- Provide incentives for minimum building height
- Increase maximum building height
- Add minimum landscaping requirement
- Add permitted uses

The specific standards recommended for addition to or modification of the existing NC zone are presented in Table 3.

Table 3: Lot Standards and Use Standards in the Neighborhood Commercial (NC) District in the Park Place Overlay Zone

	Existing Standards	Proposed Standards
Minimum Building Height	-	▪ *Note: A minimum height requirement is not generally recommended because it can be too restrictive and discouraging to development. However, to encourage mixed uses and a sense of enclosure that multi-story buildings can provide, it is suggested that the City discuss provisions that would offer public investments in streetscape amenities or parking in exchange for construction of multi-story buildings*
Maximum Building Height	35 ft.	▪ 45 ft.
Minimum Landscaping	-	▪ 20% including parking lot landscaping (*note: same as required in MUC-1 zone*)
Permitted Uses	Antique Shops; Apparel shop; Art gallery, store, supplies; Bakery, retail; Banks without a drive-through; Barbershop; Beauty parlor; Bicycle sales, service, rental; Bookstore; Candy store; Coffee shop without a drive-through; Computer or audio equipment sales Craft store; Custom dressmaking and tailoring; Dry cleaners; Dry cleaners, self-service; Dry cleaning agencies; Delicatessen store; Drug stores; Dry good stores; Florist shops; Gift shops; Grocery, fruit or vegetable store; Hardware store; Ice-cream store; Interior decoration, including drapery and upholstery;	▪ Add professional services (e.g. insurance, real estate, medical/dental) to permitted uses.

	Existing Standards	Proposed Standards
	Jewelry store; Laundromat, self-service; Laundry agencies; Locksmith; Music store; Plant or garden shop; Printing and copy service (no audible sounds beyond the premises); Restaurants without a drive-through; Seasonal sales, subject to the provisions of OCMC Section 17.54.060; Shoe sales, repair; Stationery store; Studio for art, dance, music, photo; and Watch and clock repair shop.	
Conditional Uses	Any permitted use more than 10,000 square feet in floor area	▪ Allow vehicle fuel sales in NC zone conditionally (*note: currently allowed conditionally in MUC zones and prohibited in NC zone*)

B. Medium-Density Mixed-Use Corridor (MUC-1) Zone Standards

Similar to modifications proposed for the NC zone, it is recommended that the following provisions for the MUC-1 zone be made in the base zone and specified for use in Park Place in order to support housing targets and foster a pedestrian-oriented urban environment in the Park Place North Village.

- Minimum building height for live/work units
- Allow additional mixed uses
- Prohibit auto-oriented uses

Currently, attached single- and two-family housing and multi-family housing is allowed in the MUC-1 zone (see Table 4). It is recommended that flexible "live/work units" also be allowed in the MUC-1 zone within the Park Place. Live/work units are those in which up to 50% of the ground floor can be in commercial use, while the remaining building area is in residential use. "Main street" development standards, such as requiring entrances to be at sidewalk level, will allow the conversion of ground floor uses from residential to commercial use as needed. Standards for live/work units and main streets are addressed in more detail in following sections of this memorandum.

Unlike the NC zone where development is expected to be largely commercial with limited secondary residential uses, development in the MUC-1 zone in Park Place is expected to be primarily residential, for which multi-story building requirements are generally less prohibitive. In particular, a minimum building height requirement is recommended for live/work units. To further encourage density, multi-story building, and a pedestrian environment, it is recommended that a minimum lot coverage requirement be added the MUC-1 zone for Park Place. These and other recommended standards are presented in Table 4.

Table 4: Lot Standards and Use Standards in the Medium-Density Mixed Use Corridor (MUC-1) District in the Park Place Overlay Zone

	Existing Standards	**Proposed Standards**
Minimum Height (subject to solar standards, OCMC Section 17.54.070)	-	▪ Require minimum of 2-story buildings for live/work units (*note: definition and standards for live/work units provided in following section*)
Minimum Lot Coverage	-	▪ 50% (*note: there is currently no minimum requirement, but the existing maximum lot coverage standard in the MUC-1 zone is 80%)*
Permitted Uses	A. Banquet, conference facilities and meeting rooms; B. Bed and breakfast and other lodging facilities for up to ten guests per night; C. Child care facilities; D. Health and fitness clubs; E. Medical and dental clinics, outpatient; infirmary services; F. Museums, libraries and cultural facilities; G. Offices, including finance, insurance, real estate and government; H. Outdoor markets, such as produce stands, craft markets and farmers markets that are operated on the weekends and after six p.m. during the weekday; I. Postal services; J. Publicly-owned parks, playgrounds, play fields and community or neighborhood centers; K. Repair shops, for radio and television, office equipment, bicycles, electronic equipment, shoes and small appliances and equipment; L. Residential units, single-family detached residential existing prior to adoption of this chapter; M. Residential units, single-family and two-family attached; N. Residential units, multi-family; O. Restaurants, eating and drinking establishments without a drive through; P. Retail services, including personal, professional, educational and financial services; laundry and dry-cleaning; Q. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use	▪ Allow live/work townhomes (attached single-family units) and apartments (multi-family units) (*note: see the definitions and standards in the following section on live/work units*)

	Existing Standards	Proposed Standards
	permitted in the neighborhood commercial, historic commercial or limited commercial districts, provided the maximum footprint for a stand alone building with a single store does not exceed 60,000 sq. ft.; R. Senior housing, including congregate care, residential care and assisted living facilities; nursing homes and other types of group homes; S. Studios and galleries, including dance, art, photography, music and other arts; T. Utilities: basic and linear facilities, such as water, sewer, power, telephone, cable, electrical and natural gas lines, not including major facilities such as sewage and water treatment plants, pump stations, water tanks, telephone exchanges and cell towers. U. Veterinary clinics or pet hospitals, pet day care.	
Conditional Uses	A. Clubs/lodges; B. Car washes; C. Drive-in or drive-through facilities for a permitted or conditional use; D. Emergency and ambulance services; E. Motor vehicle service, parts sales, repair, or equipment rental; F. Museums and cultural facilities; G. Outdoor markets that do not meet the criteria of OCMC Section 17.29.020(H); H. Public utilities and services such as pump stations and sub stations; I. Religious institutions; J. Retail trade, including gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the neighborhood, historic or limited commercial districts that have a footprint for a stand alone building with a single store in excess of 60,000 sq. ft. in the MUC-1 or MUC-2 zone; K. Schools, including trade schools and technical institutes; and L. Vehicle fuel sales.	Allow conditionally: ▪ retail trade over 30,000 sq. ft. in floor area (*note: lowers the threshold for conditional review from 60,000 sq. ft. established in subsection J*). Prohibit: ▪ car washes (*note: currently conditionally allowed by subsection B)*; ▪ drive-in or drive-through facilities (*note: currently allowed by subsection C*); ▪ motor vehicle service, parts sales and equipment rental (*note: currently allowed by subsection E*); ▪ vehicle fuel sales (*note: currently allowed by subsection L and proposed to be allowed conditionally in NC zone in Park Place Overlay Zone*)

C. "Main Street" Standards

There are Site Plan and Design Review standards[5] that currently apply to commercial development in Oregon City that should be expanded to apply to mixed-use and live/work development in Park Place. In particular, these standards will encourage an active and pedestrian-oriented environment in the Village Centers. It is recommended that these standards be added to the MUC-1 zone with specifications that they apply to the MUC-1 zone in Park Place.[6] These existing design review standards include the following:

Maximum front yard setbacks of 5 feet, with exceptions for cases in which the applicant provides additional public space and pedestrian amenities within the setback.

- Primary building entrances oriented to the main street, accessed by a public sidewalk, and featuring some sort of weather protection.
- Parking areas located below, to the sides, or behind the building.
- Façade transparency for at least 60% of the ground floor facing the street and for at least 30% of the side elevations.

The City's existing Site Plan and Design Review standards for commercial development also address roof treatments, entryways, lighting, and building massing. It is recommended that all of these design review standards be added to the MUC-1 zone in Park Place as well.

In order to further support the pedestrian orientation of the Village Center and the quality of development in the centers, it is recommended that the following code concepts be developed for adoption as main street standards

1. Building entrances

In addition to requiring a primary entrance along the main street adjacent to the building and providing weather protection, additional standards regarding the level of the entrance and the entrances of buildings at the corners of intersections are recommended. These standards will support the conversion between residential and commercial uses in live/work units in the mixed-use zone and will create a stronger pedestrian orientation and visual interest at intersections.

It is recommended that building entrances be required to be at sidewalk level and that stairs and stoops to the entrance be prohibited.

For buildings located at the corner of intersections, it is recommended that one of the three treatments be required. This sample language is based on design standards proposed for downtown Redmond, Oregon.

> *1. Locate the primary entry to the building at the corner of the building or within 25 feet of the corner of the building.*
>
> *2. Incorporate prominent architectural elements, such as increased building height or massing, a cupola, a turret, or a pitched roof, at the corner of the building or within 25 feet of the corner of the building.*

[5] OCMC Chapter 17.62, Sections –050 and –055

[6] The City may wish to further specify that these standards apply to the first 50 feet of depth of property in these zones. This specification avoids applying the standards to flaglots or lots that do no otherwise have a building frontage and presence on the main streets.

3. Chamfer the corner of the building (i.e. cut the corner at a 45-degree angle and a minimum of 10 feet from the corner) and incorporate include extended weather protection (arcade or awning), special paving materials, street furnishings, or plantings in the cut.

2. Architectural standards

While the City currently requires some façade and entryway treatments as part of its existing Site Plan and Design Review standards, it is recommended that the City consider requiring that development along the Village Center main streets in Park Place incorporate two of the following standards. These standards are intended to create more transparency and visual interest of buildings, particularly for pedestrians at the street level. These examples are taken from standards proposed for downtown Redmond, Oregon.

• Canopies or overhangs (5'-0" minimum, measured from either the face of the column or the street-facing elevation) for the width of the building

• Transom window

• Storefront frieze, horizontal sign band, or a belt course above the transom window or mezzanine level

• Window plant box (minimum of one per window)

• Projected window sill (12" to 24" above grade)

3. Materials

Related to additional architectural standards, the City may wish to consider regulating building materials in order to achieve a higher quality of development in Park Place, especially along the main streets in the NC and MUC-1 zones in Park Place. The City may choose either to require certain exterior building materials, to limit and prohibit other kinds of building materials, or to combine these methods. Below is sample language from the City of Milwaukie, which chose to prohibit certain building materials in its downtown zones.

b. The following wall materials are prohibited at the street level of the building:

i. EIFS or other synthetic stucco panels;

ii. Split-face or other masonry block.

c. The following wall materials are prohibited at all levels of the building in all downtown zones:

i. Plywood paneling;

ii. Brick with dimensions larger than four by eight by two inches;

iii. Spandrel glazing/curtain wall;

iv. Vinyl or metal cladding;

v. Composite wood fiberboard or composite cement-based siding, except as permitted in the downtown residential zone in subsection (C)(2)(d)(iii);

4. Streetscape

While the previous sets of development and design standards applied mainly to the building architecture along Park Place main streets, the following sets of standards related to street trees, lighting, seating, signs, and awnings can be classified as "streetscape" standards. These standards affect the quality of the space between the building and the street.

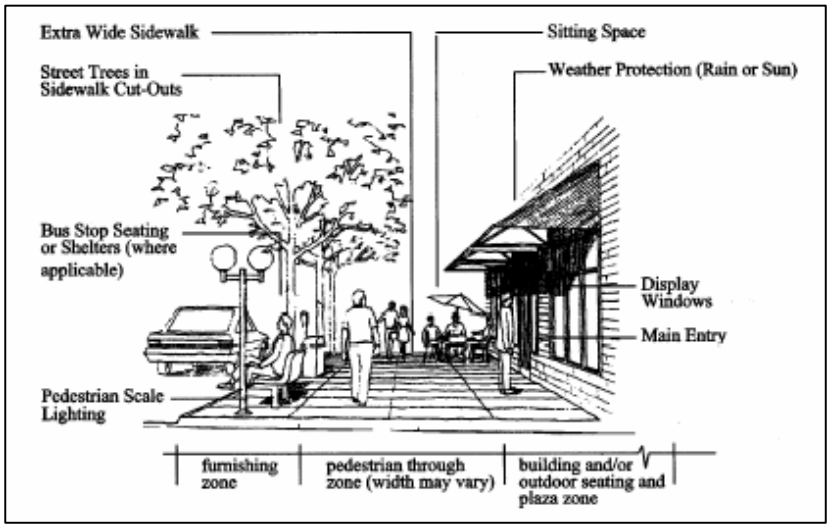
The State's Model Code recommends code language addressing the streetscape and offers the diagram in Figure 2 to illustrate elements of an active and pedestrian-oriented streetscape, which is recommended for main streets in Park Place.

5. Street Trees

As shown in Figure 2, street trees are a crucial streetscape element. They are depicted as part of urban design drawings of the Livesay Main Street in the North Village in the Park Place Concept Plan (Figure 3-2 in the Concept Plan). The City's existing Site Plan and Design Review standards address landscaping standards, minimum percentage of landscaping, protection of existing trees and vegetation, and replacement requirements. Landscaping is also specifically required for off-street parking, and interior landscaping for parking cannot be counted as part of the required minimum landscaping for the site.

Planting street trees in the "furnishing zone" or planting strip are an additional recommended standard for the main streets in Park Place. The City is responsible for maintaining a list of appropriate trees for landscaping, and street trees should be selected from this list.

Figure 2: Examples of Pedestrian and Transit Amenities



5. Lighting

In addition to basic existing lighting requirements, it is recommended that the City require pedestrian-scale and certain types of lighting along Village Center main streets in Park Place. The following is sample lighting regulation language proposed in a code update for the City of Oakridge, Oregon.

> *Lighting shall be provided at all building entrances, pathways and other pedestrian areas, and be lit to two-foot candles with pedestrian-scale lighting (e.g., wall mounted, sidewalk*

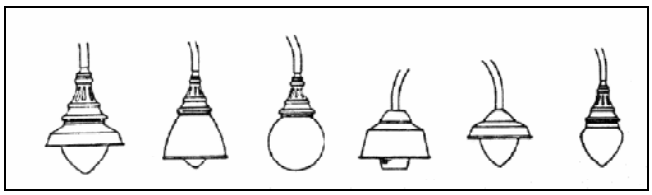
lamps, bollards, landscape up lighting, etc.). Alternative lighting to meet the intent of the design guidelines may be approved through site design review.

As another example, the following language is part of design guidelines for the Gateway Overlay District in Astoria, Oregon.

1. *Exterior lighting shall consist of at least one of the following lighting types.*

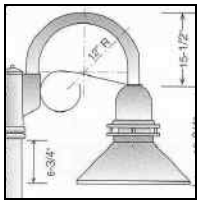
   a. *Decorative lighting integrated with architecture.*
   b. *Metal halide or incandescent.*
   c. *Pedestrian and traffic signals combined with street lamps.*
   d. *Light fixtures that direct light downward and eliminate glare.*

Figure N.1.c



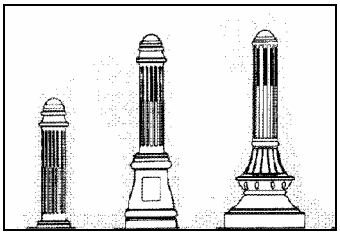
   e. *Historic street lamps along walks and parking lots.*
   f. *Industrial pan light with goose neck.*

Figure N.2.a



   g. *Low bollard lighting.*

Figure N.2.b



2. *The following types of exterior lighting are prohibited.*

   a. *Sodium vapor (amber).*

b. *Fluorescent tube.*
c. *Cobra head street lamps or other contemporary fixtures.*
d. *Fixtures with undiffused, undirected light that do not focus the light to the ground.*

6. Seating

The following sample language is provided by the State's Model Code, which recommends that various streetscape elements be required for commercial development. In order to encourage residents to gather and customers to relax and linger, it is suggested that the City consider requiring one of the seating elements below.

1. A plaza, courtyard, square or extra-wide sidewalk next to the building entrance (minimum width of [6] feet);
2. Sitting space (i.e., dining area, benches, garden wall or ledges between the building entrance and sidewalk) with a minimum of 16 inches in height and 30 inches in width;
3. Building canopy, awning, pergola, or similar weather protection (minimum projection of 4 feet over a sidewalk or other pedestrian space);
4. Public art that incorporates seating (e.g., fountain, sculpture).
5. Transit amenity, such as bus shelter, per the standards of the [name of transit district.

7. Signs and Awnings

In order to establish the main streets as special places within Park Place, the City should consider additional sign standards for businesses along the Village Center main streets. Further, while weather protection may already be required for commercial development in the City, it may be helpful to specify and illustrate the kind of weather protection permitted, particularly in regards to awnings.

The sample language below addresses sign and awning standards in a special plan district in Astoria, Oregon.

1. *Signs shall incorporate at least one of the following elements.*
   a. *Hanging blade signs. (See Figure L.1.a.)*
   b. *Signs painted on building facade.*
   c. *Signs applied to building facade.*
   d. *Front lit.*
   e. *Graphics historic in character.*
   f. *Exterior neon. (See Figure L.2.)*

Figure L.1.a. Blade Sign

Source: City of Astoria

Figure L.2. Neon Sign

Source: City of Astoria

2. The following types of signs are prohibited.

a. Pole mounted freestanding signs.
b. Plastic or internal and back lit plastic.

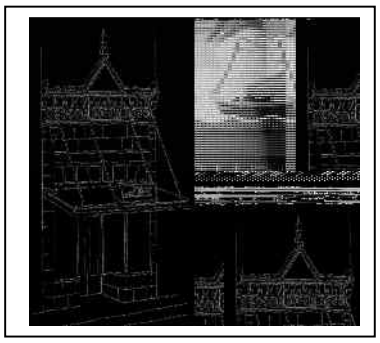
1. The following type of awning shall be used for commercial buildings.

a. Canvas awnings or fixed canopies for rain protection. (See Figure 14.090.E.1.)
b. Vinyl awnings.

2. The following type of awning is prohibited.

a. Back lit awnings.

Figure 14.090.E.1. Commercial Awning



Source: City of Astoria

8. Driveways and Alleys

As a final consideration for the streetscape environment on Village Center main streets, it is recommended that the City consider restricting driveways and access onto the main streets themselves in the NC and MUC-1 zones in Park Place, requiring instead access from a side street or alley. If it is deemed too excessive to restrict this access on all parts of Swan, Donovan, and Livesay in the North and South Villages, it is recommended that

the City consider restricting driveways at least in the mixed-use zone (MUC-1) along Livesay in the North Village.

C. Live/work Units

Allowing live/work units in the mixed-use zone proposed in the Park Place Village Centers is important for the flexibility it provides in combining residential and commercial uses and allowing for commercial uses on the ground floor when the market is ready to support them.

The following definitions of live/work units and standards governing them are examples from the City of Bend's NorthWest Crossing Overlay Zone.[7]

E. Live/work Dwelling. A dwelling in which a business may be operated on the ground floor. The ground floor commercial or office space has visibility, signage and access from the primary street.

To preserve the pedestrian orientation of the commercial or office space, alley access is required to provide trash service and residential parking. A live/work dwelling is allowed instead of, or in addition to, home occupation as defined by this Code. The location of lots where live/work dwellings may be sited shall be specified on the subdivision plat. The permitted live/work housing types are defined below:

a. Live/work House: A single-family detached house with no more than 50 percent of the round floor of the building available as commercial or office space.

b. Live/work Townhome: A residential, fee simple townhome unit in which a business may be operated. The commercial or office portion of the building shall be limited to the ground floor and may not exceed 50 percent of the square footage of the entire building, excluding the garage.

c. Live/work Apartment: A primarily residential multi-story, multi-unit building with a maximum of 50 percent of the building ground floor square footage used as commercial or office space. Residential units may be for rent or for sale in condominium or cooperative ownership.

G. Primary Street Frontage. The location along a street in the Residential Mixed-use District where live/work housing or community commercial uses may be located. Table 2.7.320 of this Chapter identifies areas and limits the maximum lot frontage along the Primary Street Frontage that may be used for live/work housing or community commercial uses in each area. The primary entrance to the office or commercial portion of live/work housing or a community commercial building must be located on the Primary Street Frontage.

9. Platting Lots for Live/work Housing and Community Commercial Uses.

a. The final plat for a subdivision in the Residential Mixed-use Overlay District shall specify the lots where live/work housing or community commercial uses will be permitted.

b. A deed restriction shall be recorded with each lot identified on the final plat as a live/work housing or community commercial.

[7] Section 2.7.300 of Chapter 2.7, Special Planned Districts, in the City of Bend's Development Code

c. The number of lots in the Residential Mixed-use Overlay District shall be limited to a maximum amount of linear primary street frontage.

10. Sign Standards.

a. Each live/work house or live/work townhome may have non-illuminated sign(s) not exceeding a combined maximum area of 16 square feet. Signs shall be attached to the building.

b. Each live/work apartment or community commercial building may have one non-illuminated monument sign and/or one building mounted sign not exceeding a combined maximum area of 32 square feet.

c. Individual businesses in live/work apartment buildings may have additional non-illuminated sign(s) mounted on the building not exceeding a combined maximum of 8 square feet in size.

11. Off-street Parking Standards.

a. Each live/work house or live/work townhome may have no more than two off-street spaces in addition to the two spaces required by Chapter 3.3, Vehicle Parking, Loading and Bicycle Parking of this code.

b. The off-street parking standards in Chapter 3.3, Vehicle Parking, Loading and Bicycle Parking shall apply to a work use in a live/work apartment building.

12. Special Standards For Live/work Townhomes and Live/work Houses.

a. The area dedicated to the work use in the live/work unit shall not exceed the size requirement in the applicable definition of live/work house or live/work townhome in Section 2.7.310.

b. The work use shall not generate noise exceeding 55-decibel level as measured at the lot line of the lot containing the live/work house or live/work townhome.

c. No outside storage of materials or goods related to the work occupation or business shall be permitted.

d. No dust or noxious odor shall be evident off the premises.

e. Employees of the work occupation or business may not occupy more than 2 on-street parking spaces at any time.

f. If the business is open to the public, public access must be through the front door and the business may not be open to clients or the public before 7:00 a.m. or after 7:00 p.m.

III. Transportation-Related Code Amendments

A generalized street plan and updates to the City's Transportation System Plan, including proposed new street cross-sections and projects, are included in Chapter 3 (Plan Elements) and Appendix H of the Park Place Concept Plan. Further, "green street" standards for natural stormwater management in roadway right-of-way are addressed as part of the Stormwater Infrastructure System Improvements in Chapter 3 and Appendix J of

the Concept Plan. In addition to these transportation elements of the Concept Plan, there are a few minor transportation-related code amendments that are recommended that are described below.

A. Parking Standards

In order to make efficient use of land and foster a more urban environment, it is recommended that parking standards be reviewed. However, the City has essentially adopted Metro parking standards, and these standards are both more prescriptive in instituting parking maximums and less regulatory in not requiring minimums for many land uses as compared to other standards around the region and the state.

The City may wish to adopt on-street parking credits to reduce the need for off-street parking and make more efficient use of land. These credits typically occur at a one-to-one ratio, for each space of on-street parking along the street frontage of the proposed building. These standards can be adopted as part of the parking standards for application either citywide or just in Park Place. The following is sample language from the State's Model Code regulating on-street parking credits.

> ***C. On-Street Parking.*** *On-street parking shall conform to the following standards:*
>
> *1. Dimensions. The following constitutes one on-street parking space:*
>
> *a. Parallel parking, each [22] feet of uninterrupted curb;*
>
> *b. [45/60] degree diagonal, each with [12] feet of curb;*
>
> *c. 90 degree (perpendicular) parking, each with [12] feet of curb.*
>
> *2. Location. Parking may be counted toward the minimum standards in Table 3.3.300A when it is on the block face abutting the subject land use. An on-street parking space must not obstruct a required clear vision area and its must not violate any law or street standard.*
>
> *3. Public Use Required for Credit. On-street parking spaces counted toward meeting the parking requirements of a specific use may not be used exclusively by that use, but shall be available for general public use at all times. Signs or other actions that limit general public use of on-street spaces are prohibited.*

B. Driveways and Alleys

As addressed in previous sections of this memo, it is recommended that the City consider regulations related to driveways and alleys to support the pedestrian orientation of neighborhoods in Park Place. In particular, the City should consider prohibiting curb cuts and driveways in the NC and MUC-1 zones (which include frontage on the Livesay, Donovan, and Swan main streets) in Park Place. At the very least, some form of restriction of driveways should be considered for the MUC-1 zone in Park Place. Related to these driveway and access provisions, alleys should be required in the NC and MUC-1 zones in Park Place. In addition, alleys should be provided for medium/high-density housing in the R-3.5 zone in Park Place.

IV. Natural Resources Code Amendments

The City currently has the following overlay zones to help protect environmentally sensitive and constrained areas, which can be applied in Park Place.

- Water resource overlay zone
- Flood management overlay zone
- Geologic hazards (steep slopes) overlay zone.

The City has been developing a composite environmental overlay zone based on the existing environmental overlay zones, with updated information and requirements regarding steep slopes and potential landslide hazards that have been developed as part of the Park Place Concept Plan. (See Appendix K – Preliminary Geologic and Geotechnical Evaluation.)

A. Nature in Neighborhoods Best Management Practices

According to mapping of Goal 5 resources and Habitat Conservation Areas (HCAs) included in the Park Place Existing Conditions Report (Figure 2-2 in the Concept Plan), there are areas of Class A and B upland wildlife habitat in Park Place that are not classified as HCAs or subject to Metro HCA regulations.

Instead of recommending that a new environmental overlay zone be created to regulate this upland habitat, David Evans and Associates is recommending that best management practices (BMPs) developed for the regulation of non-Habitat Conservation Areas (HCAs) be applied to development throughout the Park Place. These BMPs are included in ordinances adopted by Metro as part of their Nature in Neighborhoods program, implemented by Title 13 of their Urban Growth Management Functional Plan. A table of the BMPs included in Title 13, and the sections of Oregon City code (OCMC) or other planning and engineering documents into which they could potentially be incorporated, are presented below in Table 5.

Table 5: Best Management Practices for Habitat Conservation Areas[8]

Part (a): Design and Construction Practices to Minimize Hydrologic Impacts Potential amendments to: Building Construction Standards (OCMC 15.04 Building Code and OCMC 15.12 Housing Code), Transportation System Plan and Street Design Manual, OCMC 16.12 Minimum Improvements and Design Standards for Land Divisions, OCMC 17.62 Site Plan and Design Review, OCMC 17.52 Off-Street Parking and Loading
1. Amend disturbed soils to original or higher level of porosity to regain infiltration and stormwater storage capacity.
2. Use pervious paving materials for residential driveways, parking lots, walkways, and within centers of cul-de-sacs.
3. Incorporate stormwater management in road right-of-ways.
4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.
5. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
6. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.
7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.
8. Use multi-functional open drainage systems in lieu of more conventional curb-and-gutter systems.
9. Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.
10. Apply a treatment train approach to provide multiple opportunities for storm water treatment and reduce the

[8] Table 3.07-13c in Exhibit C of Ordinance No. 05-1077C, Title 13 (Nature in Neighborhoods) of the Urban Growth Management Functional Plan (Metro Code Chapter 3.07)

possibility of system failure.

11. Reduce sidewalk width and grade them such that they drain to the front yard of a residential lot or retention area.

12. Reduce impervious impacts of residential driveways by narrowing widths and moving access to the rear of the site.

13. Use shared driveways.

14. Reduce width of residential streets, depending on traffic and parking needs.

15. Reduce street length, primarily in residential areas, by encouraging clustering and using curvilinear designs.

16. Reduce cul-de-sac radii and use pervious vegetated islands in center to minimize impervious effects, and allow them to be utilized for truck maneuvering/loading to reduce need for wide loading areas on site.

17. Eliminate redundant non-ADA sidewalks within a site (i.e., sidewalk to all entryways and/or to truck loading areas may be unnecessary for industrial developments).

18. Minimize car spaces and stall dimensions, reduce parking ratios, and use shared parking facilities and structured parking.

19. Minimize the number of stream crossings and place crossing perpendicular to stream channel if possible.

20. Allow narrow street right-of-ways through stream corridors whenever possible to reduce adverse impacts of transportation corridors.

Part (b): Design and Construction Practices to Minimize Impacts on Wildlife Corridors and Fish Passage

Potential amendments to: Transportation System Plan and Street Design Manual, OCMC 16.12 Minimum Improvements and Design Standards for Land Divisions, OCMC 17.62 Site Plan and Design Review

1. Carefully integrate fencing into the landscape to guide animals toward animal crossings under, over, or around transportation corridors.

2. Use bridge crossings rather than culverts wherever possible.

3. If culverts are utilized, install slab, arch or box type culverts, preferably using bottomless designs that more closely mimic stream bottom habitat.

4. Design stream crossings for fish passage with shelves and other design features to facilitate terrestrial wildlife passage.

5. Extend vegetative cover through the wildlife crossing in the migratory route, along with sheltering areas.

Part (c): Miscellaneous Other Habitat-Friendly Design and Construction Practices Potential amendments to: OCMC 16.12 Minimum Improvements and Design Standards for Land Divisions and OCMC 17.62 Site Plan and Design Review
1. Use native plants throughout the development (not just in HCA). 2. Locate landscaping (required by other sections of the code) adjacent to HCA. 3. Reduce light-spill off into HCAs from development. 4. Preserve and maintain existing trees and tree canopy coverage, and plant trees, where appropriate, to maximize future tree canopy coverage.

Excerpts of Title 13 that address implementing ordinances required for Cities and Counties are included as Appendix G. Metro also developed a model ordinance for implementation of Title 13. The model ordinance was developed to apply to all HCAs and to provide application criteria, development standards, and measures for development flexibility and mitigation within HCAs. The complete Title 13 Model Ordinance can be viewed online at: http://www.metro-region.org/article.cfm?ArticleID=15311.

B. Density Transfers

Most of the "green fingers" associated with stream corridors and steep slopes in Park Place – and generally designated as open space in the Concept Plan diagram (Appendix A) – will be zoned with the City's lowest-density residential (R-10) district. The R-10 zone has an established 10,000 square foot minimum lot size or, in essence, a maximum density of 4 units/acre.

Natural resource and natural hazard areas in Park Place, zoned primarily R-10, will be overlaid with a combination of existing City environmental overlay zones or a composite of these zones. Excerpts of existing code addressing applicability and standards for environmentally sensitive areas of the City are included at the end of this memorandum as Appendix H. Parts of these zones preclude development or would limit housing density to 2 units/acre.

Existing City Code allows density transfers in association with the City's water resource overlay zone. In order to protect other natural resources in Park Place and allow for needed housing, it is recommended that these density transfer provisions be extended to flood management and geologic hazards (steep slope) overlay zones and any other new composite environmental zones that are developed. The following is a template for density transfer provisions based on existing language in the City's water resource overlay zoning code.

Density transfers.

A. The purpose of this section is to allow density accruing to portions of a property within the R-10 zone to be transferred outside the R-10 zone to other areas of the Park Place Overlay District.

B. Development applications for partitions that request a density transfer shall:

1. Provide a map showing the net buildable area to which the density will be transferred;

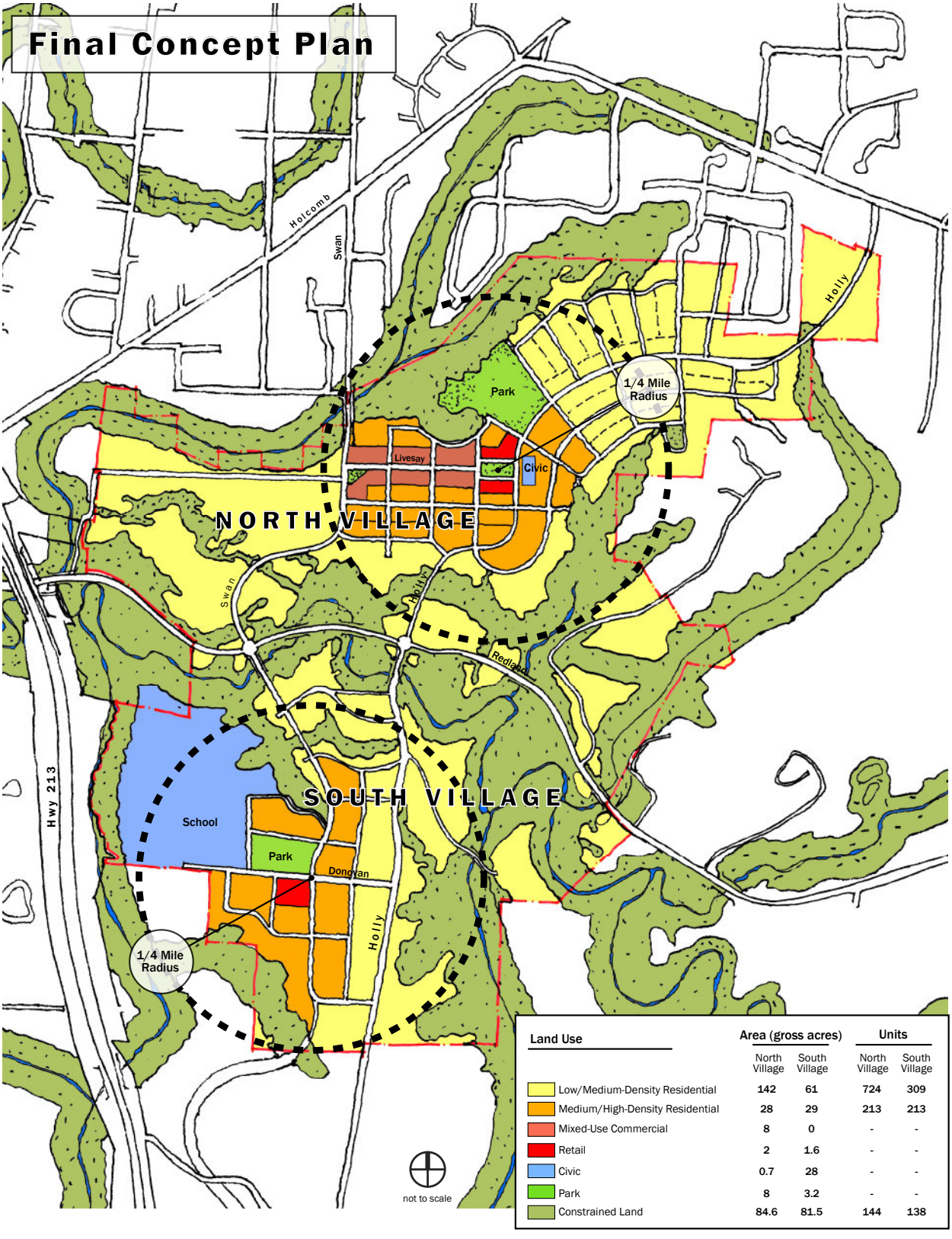
2. Provide calculations justifying the requested density increase;

3. Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the [water quality resource area tract] created pursuant to Section 17.49.060, and that no residential lot created is less than ten thousand square feet;

4. Demonstrate that, with the exception of the [water quality resource area parcel] created pursuant to Section 17.49.060, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;

5. Meet all other standards of the base zone.

C. The area of land contained in a [water quality resource area] may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code. (Ord. 99-1013 §10(part), 1999)



Land Use	Area (gross acres)		Units	
	North Village	South Village	North Village	South Village
Low/Medium-Density Residential	142	61	724	309
Medium/High-Density Residential	28	29	213	213
Mixed-Use Commercial	8	0	-	-
Retail	2	1.6	-	-
Civic	0.7	28	-	-
Park	8	3.2	-	-
Constrained Land	84.6	81.5	144	138

Appendix B: Land Use Areas

Land Use	Area (gross acres)		Units	
	North Village	South Village	North Village	South Village
Low/Medium-Density Residential	142	61	724	309
Medium/High-Density Residential	28	29	213	213
Mixed-Use Commercial	8	0	-	-
Retail	2	1.6	-	-
Civic	0.7	28	-	-
Park	8	3.2	-	-
Constrained Land	84.6	81.5	144	138

Appendix C: Conditional Uses in Existing Oregon City Code

The following uses are permitted conditionally in zones throughout the City except as otherwise specified.

Conditional Uses

17.56.030 Uses requiring conditional use permit.
Uses requiring conditional use permit are:
A. Ambulance services in C and GI districts;
B. Boarding, lodging houses and bed and breakfast inns;
C. Boat repair, for boats not exceeding twenty-five feet in length, in the C district;
D. Cemeteries, crematories, mausoleums and columbariums;
E. Child care centers and nursery schools;
F. Churches;
G. Colleges and universities, excluding residential districts;
H. Correctional facilities, in the GI district;
I. Emergency service facilities (police and fire), excluding correctional facilities;
J. Government and public service buildings;
K. Helipad in conjunction with a permitted use, excluding residential districts;
L. Hospitals, excluding residential districts;
M. Houseboats;
N. Hydroelectric generating facilities in GI district only;
O. Motor vehicle towing and temporary storage in the GI district; recreational vehicle storage in C and GI districts;
P. Museums;
Q. Nursing homes;
R. Parking lots not in conjunction with a primary use;
S. Private and public schools;
T. Private clubs and lodges, excluding residential districts;
U. Public utilities, including sub-stations (such as buildings, plants and other structures);
V. Sales and service establishments of manufactured homes and recreational vehicles in C and GI districts;
W. Stadiums, arenas and auditoriums, excluding residential districts; and
X. Welfare institutions and social service organizations, excluding residential districts. (Ord. 03-1014, Att. B3 (part), 2003: Ord. 98-1004 §§1, 2, 1998; Ord. 91-1025 §2, 1991)

Appendix D: Architectural Variety Standards from the City of Battle Ground, Washington Development Code

The following design standards, referred to as the City of Battle Ground's "legacy standards", were adopted by the City in 1999 and apply to all new residential development in the city.

17.106.040 Neighborhood design standards.
A. Applicability. The provisions of this section shall apply to all new residential development projects within the city of Battle Ground.
B. Development Compatibility and Continuity. Development within residential districts shall be designed to the following standards to assure compatibility and continuity between and within developments:
The provisions of this subsection shall apply only to developments with a density equivalent to that of an R3 zone or greater. Directly abutting residential uses, either within a single proposal or between a proposed and existing or preliminarily approved development, shall be designed to assure that there is a maximum twenty-five percent density differential to transition between housing types or densities. When separated by a street, facing housing types shall be of the same type and densities of facing residential uses shall be within ten percent of each other. The director or examiner may modify the provisions of this section upon finding that physical site constraints require development to be designed with a separation of more than three hundred feet between building envelopes or to accommodate unique designs that address compatibility between housing types and densities. Where adjacent properties are undeveloped or developed at densities substantially less than what is permitted by the zone, the minimum average lot size allowed in the zone shall be used to determine what the density of the abutting property is for the purposes of compliance with this section.
C. Architectural Variety. To assure variety in architecture and to reduce the dominance of garages on the streetscape, the following provisions shall apply to new residential development:
1. In single-family detached or duplex residential developments, no five or fewer linearly contiguous lots shall have repetitious facades. Facades shall be substantially different beyond simple mirrored plans, garage or window relocation, and shall include combinations of architectural variety such as: front porches, dormers, gables, bay windows, hipped or pitched roofs or other such architectural features that substantially differentiate house facades.
2. Garages with entry doors facing the street in single-family or duplex residential development shall be set back from the front face of the residential structure, including covered porches, by at least four feet. To qualify as a porch under this subsection, the porch must extend the full length of the street fronting building facade that is not devoted to the garage. Garage doors may be located forward of the front face of the residential structure and located in the front yard setback, if placed so their entrance doors are perpendicular to the right-of-way; and provided, that they have windows, doors or other architectural treatments covering at least thirty percent of the wall facing the street.
3. Where houses are served by alleys, all garages and on-site parking shall be accessible from the alley and the facade of the house facing the public street shall be designed as the front of the house including, but not limited to, a primary building entrance consisting of inward swinging door(s), porches, windows and pathways to the public sidewalks.
4. Applicants for building permits shall demonstrate compliance with the provisions of this section.
5. All single-family residences shall be constructed with a roof of nominal 6:12 pitch or steeper for the main portion of the roof and containing eaves of a minimum of six inches. Roofs with a lower pitch are acceptable if they contain multiple roof lines, gables, dormers or other features that serve to reduce the visual impact of the lesser pitched roof. Hipped,

gambrel, saltbox and shed roofs are also permitted. Roofs not meeting these specific standards may be approved by the planning director if they are found to be consistent with the overall intent of this section.
6. Each single-family residence shall contain a porch or covered entry area for the primary entrance facing or accessible from the public or private street serving the residence.
7. Each single-family residence shall contain at least three of the following features:
a. An attached or detached garage;
b. Bay window(s) facing the street;
c. Cross gable roof;
d. Roof dormers;
e. Trim a minimum of two inches wide around the windows facing a public street;
f. Varied roof line with at least one intersecting plane. (Ord. 05-014 § 3, 2005: Ord. 04-024 § 16 (part), 2004: Ord. 01-006 § 1, 2001: Ord. 99-004 § 4 (part), 1999)

Appendix E: Existing Use and Development Standards in Oregon City Zones

Tables A-1 through A-5 present existing lot, use, and some development standards for development in R-10, R-6, R-3.5, NC, and MUC-1 zones proposed for use in Park Place.

Table A-1: Existing Lot Standards and Use Standards in Single-Family Residential (R-10) District

Minimum Lot Size	10,000 sq. ft.
Minimum Lot Width	65 ft.
Minimum Lot Depth	80 ft.
Maximum Height	2.5 stories (35 ft.)
Maximum Building Lot Coverage	40%
Minimum Density	3 units/acre
Maximum Density	4 units/acre
Minimum Setbacks	Front yard – 20 ft. Rear yard – 20 ft. Interior side yard – 10 ft. one side, 8 ft. other side Corner side yard – 15 ft. Attached garage – 20 ft. (plus residential design standards)
Design Standards	(OCMC Section 17.20; addresses façade and garage options, and architectural elements including dormers, porches, window coverage, door orientation and entry, building face offsets; applies to all new single-family and two-family (duplex) dwelling units)
Permitted Uses	A. Single-family detached residential units; B. Publicly-owned parks, playgrounds, playfields and community or neighborhood centers; C. Home occupations; D. Farms, commercial or truck gardening and horticultural nurseries on a lot not less than 20,000 sq. ft. in area (retail sales of materials grown on site is permitted); E. Temporary real estate offices in model homes located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed; F. Accessory uses, buildings and dwellings; G. Family day care provider, subject to the provisions of OCMC Section 17.54.050.
Conditional Uses	A. Golf courses, except miniature golf courses, driving ranges or similar commercial enterprises; B. Uses listed in OCMC Section 17.56.030 (Appendix C).

Table A-2: Existing Lot Standards and Use Standards in Single-Family Residential (R-6) District

Minimum Lot Size	6,000 sq. ft.
Minimum Lot Width	50 ft.

Minimum Lot Depth	70 ft.
Maximum Height	2.5 stories (35 ft.)
Maximum Building Lot Coverage	40%
Minimum Density	5 units/acre
Maximum Density	7 units/acre
Minimum Setbacks	Front yard – 10 ft. Rear yard – 20 ft. Interior side yard – 9 ft. one side, 5 ft. other side Corner side yard – 15 ft. Attached garage – 20 ft. (plus residential design standards)
Design Standards	(OCMC Section 17.20; addresses façade and garage options, and architectural elements including dormers, porches, window coverage, door orientation and entry, building face offsets; applies to all new single-family and two-family (duplex) dwelling units)
Permitted Uses	A. Single-family detached residential units; B. Publicly-owned parks, playgrounds, playfields and community or neighborhood centers; C. Home occupations; D. Farms, commercial or truck gardening and horticultural nurseries on a lot not less than 20,000 sq. ft. in area (retail sales of materials grown on site is permitted); E. Temporary real estate offices in model homes located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed; F. Accessory uses, buildings and dwellings; G. Family day care provider, subject to the provisions of OCMC Section 17.54.050.
Conditional Uses	A. Golf courses, except miniature golf courses, driving ranges or similar commercial enterprises; B. Uses listed in OCMC Section 17.56.030 (Appendix C).

Table A-3: Lot Standards and Use Standards in the Medium and High-Density Residential (R-3.5 and R-2) Districts

Minimum Lot Size	3,500 sq. ft.
Minimum Lot Width	25 ft. in R-3.5 20 ft. in R-2
Minimum Lot Depth	70 ft.
Maximum Height (subject to solar standards, OCMC Section 17.54.070)	2.5 stories (35 ft.) in R-3.5 4 stories (55 ft.) in R-2
Maximum Building	NA

Lot Coverage	
Minimum Density	9 units/acre in R-3.5 16 units/acre in R-2
Maximum Density	12 units/acre 21 units/acre in R-2
Minimum setbacks (subject to solar standards, OCMC Section 17.54.070)	Front yard – 5 ft. Rear yard – 15 ft. Interior side yard, detached unit – 5 ft. Interior side yard, attached unit (not common property line) – 7 ft. Garage – 20 ft.
Design Standards	(OCMC Section 17.20; addresses façade and garage options, and architectural elements including dormers, porches, window coverage, door orientation and entry, building face offsets; applies to all new single-family and two-family (duplex) dwelling units)
Permitted Uses	A. Two-family dwellings (duplexes); B. Single-family detached residential units; C. Single-family attached residential units (Row houses with no more than 6 dwelling units may be attached in a row in R-3.5); D. Publicly owned parks, playgrounds, playfields and community or neighborhood centers; E. Home occupations; F. Temporary real estate offices in model homes located on and limited to sales of real estate on a single piece of platted property upon which new residential buildings are being constructed; G. Accessory uses, buildings, and dwellings; H. Family day care provider, subject to the provisions of OCMC Section 17.54.050.
Conditional Uses	A. Golf courses, except miniature golf courses, driving ranges or similar commercial enterprises; B. Uses listed in OCMC Section 17.56.030 (Appendix C).

Table A-4: Existing Lot Standards and Use Standards in the Neighborhood Commercial (NC) District

Maximum Height (subject to solar standards, OCMC Section 17.54.070)	2.5 stories (35 ft.)
Maximum Lot Coverage	Building footprint – 10,000 sq. ft.
Minimum setbacks (subject to solar standards, OCMC Section 17.54.070)	Interior side and rear yard (if abutting residential zone) – 10 ft. None if not abutting a residential zone
Minimum Landscaping	None (note: versus MUC-1 zone: 20% including parking lot landscaping)
Maximum Setbacks	Front yard – 5 ft. (exceptions through Site Plan and Design Review, OCMC Section 17.62.055)

	Rear yard – none Interior side yard – none Corner side yard – 30 ft. (given Site Plan and Design Review requirements met)
Permitted Uses	Antique Shops; Apparel shop; Art gallery, store, supplies; Bakery, retail; Banks without a drive thru; Barbershop; Beauty parlor; Bicycle sales, service, rental; Bookstore; Candy store; Coffee shop without a drive thru; Computer or audio equipment sales Craft store; Custom dressmaking and tailoring; Dry cleaners; Dry cleaners, self-service; Dry cleaning agencies; Delicatessen store; Drug stores; Dry good stores; Florist shops; Gift shops; Grocery, fruit or vegetable store; Hardware store; Ice-cream store; Interior decoration, including drapery and upholstery; Jewelry store; Laundromat, self-service; Laundry agencies; Locksmith; Music store; Plant or garden shop; Printing and copy service (no audible sounds beyond the premises); Restaurants without a drive thru; Seasonal sales, subject to the provisions of OCMC Section 17.54.060; Shoe sales, repair; Stationery store; Studio for art, dance, music, photo; and Watch and clock repair shop.
Conditional Uses	A. Any use permitted in the Neighborhood Commercial District that has a building footprint in excess of 10,000 square feet.
Limited Uses	Dwelling units are permitted above the ground floor if in conjunction with a permitted use as identified in OCMC Section 17.24.020 or conditional use as identified in OCMC Section 17.24.025. [two sections above]

Table A-5: Existing Lot Standards and Use Standards in the Medium-Density Mixed Use Corridor (MUC-1) and High-Density Mixed Use Corridor (MUC-2) Districts

Minimum Lot Area	None
Maximum Height	3 stories (45 ft.) in MUC-1 60 ft. in MUC-2 (Minimum Height: 2 stories/25 ft.)
Maximum Lot Coverage	Building and parking lot – 80% in MUC-1 Building and parking lot – 90% in MUC-2
Minimum Setbacks (MUC-1)	Rear and interior side yard (if abutting a residential zone) – 20 ft. plus 1 ft. for every foot of building height over 35 ft. None if not abutting residential zone
Maximum Setbacks (MUC-1)	Front yard – 5 ft. (exceptions through Site Plan and Design Review, OCMC Section 17.62.055) Rear yard – none Interior side yard – none Corner side yard – 30 ft. (given Site Plan and Design Review requirements met)
Minimum Landscaping	20% (including parking lot landscaping)
Permitted Uses	A. Banquet, conference facilities and meeting rooms; B. Bed and breakfast and other lodging facilities for up to ten guests per night; C. Child care facilities; D. Health and fitness clubs; E. Medical and dental clinics, outpatient; infirmary services; F. Museums, libraries and cultural facilities; G. Offices, including finance, insurance, real estate and government; H. Outdoor markets, such as produce stands, craft markets and farmers markets that are operated on the weekends and after six p.m. during the weekday; I. Postal services; J. Publicly-owned parks, playgrounds, play fields and community or neighborhood centers; K. Repair shops, for radio and television, office equipment, bicycles, electronic equipment, shoes and small appliances and equipment; L. Residential units, single-family detached residential existing prior to adoption of this chapter; M. Residential units, single-family and two-family attached; N. Residential units, multi-family; O. Restaurants, eating and drinking establishments without a drive through; P. Retail services, including personal, professional, educational and financial services; laundry and dry-cleaning; Q. Retail trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the neighborhood commercial, historic commercial or limited commercial districts, provided the maximum footprint for a stand alone building with a single store does not exceed 60,000 sq. ft.; R. Senior housing, including congregate care, residential care and assisted living facilities; nursing homes and other types of group homes;

	S. Studios and galleries, including dance, art, photography, music and other arts; T. Utilities: basic and linear facilities, such as water, sewer, power, telephone, cable, electrical and natural gas lines, not including major facilities such as sewage and water treatment plants, pump stations, water tanks, telephone exchanges and cell towers. U. Veterinary clinics or pet hospitals, pet day care. V. Those uses allowed in 17.29.020 with the following exception: Retail Trade, including grocery, hardware and gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the Neighborhood, Historic or Limited Commercial Districts, provided the maximum footprint for a stand alone building with a single store does not exceed 60,000 square feet in MUC-2.
Conditional Uses	A. Clubs/lodges; B. Car washes; C. Drive-in or drive-through facilities for a permitted or conditional use; D. Emergency and ambulance services; E. Motor vehicle service, parts sales, repair, or equipment rental; F. Museums and cultural facilities; G. Outdoor markets that do not meet the criteria of OCMC Section 17.29.020(H); H. Public utilities and services such as pump stations and sub stations; I. Religious institutions; J. Retail trade, including gift shops, bakeries, delicatessens, florists, pharmacies, specialty stores and any other use permitted in the neighborhood, historic or limited commercial districts that have a footprint for a stand alone building with a single store in excess of 60,000 sq. ft. in the MUC-1 or MUC-2 zone; K. Schools, including trade schools and technical institutes; and L. Vehicle fuel sales.
Prohibited Uses	A. Bulk retail or wholesale uses B. Commercial or industrial laundry C. Contractor's equipment yard D. Foundry casting lightweight nonferrous metals E. Frozen food lockers F. Heavy equipment service, repair, sales, storage or rental. G. Hotels and motels, commercial lodging H. Hospitals I. Ice or cold storage plant J. Kennels K. Motor vehicle sales or storage L. Outdoor sales or storage (except secured areas for overnight parking or temporary parking of vehicles used in the business) M. Retail feed, fuel or lumber yard N. Self-service storage facilities

1 Except secured areas for overnight parking or temporary parking of vehicles used in the business

2 Heavy equipment includes but is not limited to construction equipment and machinery and farming equipment

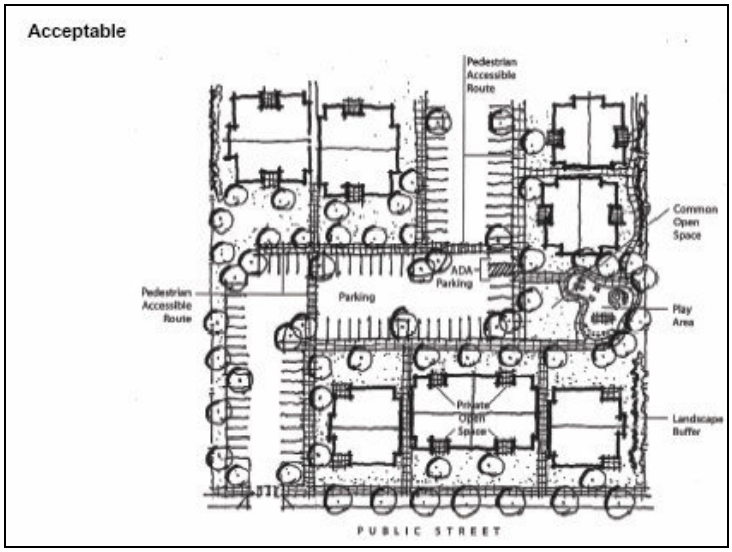
Appendix F: Proposed Attached Single-Family Housing Standards

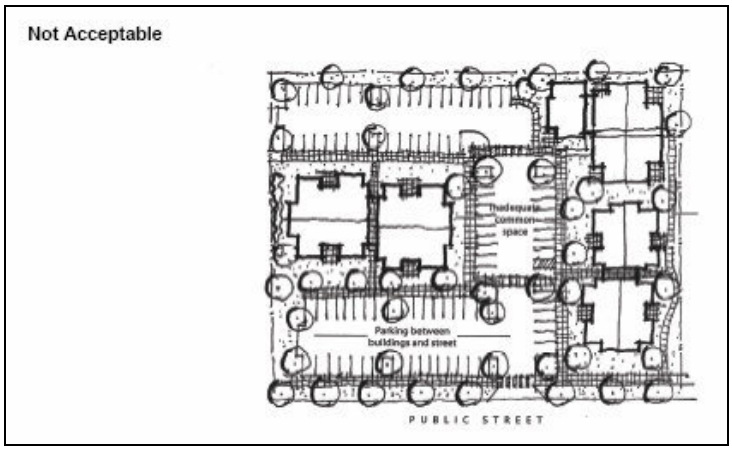
The following template language for attached single-family housing (townhouse and rowhouse) standards is provided by the Oregon Transportation and Growth Management (TGM) Model Development Code and User's Guide for Small Cities, 2nd Edition. An example of vehicle access and circulation standards is also included in this appendix because they are referenced in the housing standards.

Orientation

b. Attached single family housing developments (townhomes) with street-facing garages may have one driveway access located between the street and the primary building entrance for every two dwelling units, provided they meet the following criteria, as generally shown in Figure 2.2.180C(2):
1) Where two abutting townhomes have street-facing garages, they shall share one driveway access that does not exceed 16 feet in width where it crosses the sidewalk and intersects the street;
2) All primary building entrances shall be connected to a driveway (and sidewalk) via a pedestrian walkway that is not less than three (3) feet wide;
3) The maximum number consecutively attached townhomes with garages facing the same street is four (4) (two driveways); and
4) Street-facing garages shall be setback at least 20 feet from the street; where a building is placed less than 20 feet from the street, the 20-foot garage setback may be accomplished recessing the garage behind the front building elevation.

Figure 2.2.180.C(1) – Townhome Building Orientation





Special Use Standards

B. Attached Single Family (Townhouses and Rowhouses) and Duplexes. *Single-family attached housing with three or more dwellings (lots), and attached duplex housing (two or more consecutively attached duplexes), shall comply with the standards in sections 1-2, below, which are intended to control development scale; avoid or minimize impacts associated with traffic, parking, and design compatibility; and ensure management and maintenance of common areas.*

1. Alley Access Required for Subdivisions Principally Containing Townhomes or Duplexes. Subdivisions, or phases of subdivisions, proposed to contain three (3) or more consecutively attached single family dwellings, and developments with two (2) or more attached duplexes (4+ dwelling units), shall provide vehicle access to all such lots and units from an alley or parking court, as described in Chapter 3.1.2. Alley(s) and parking court(s) shall be created at the time of subdivision approval, and may be contained in private tracts or, if approved by the City, in public right-of-way, in accordance with Chapter 3.4.1, Transportation Standards, and Chapter 4.3, Land Divisions.

2. Common Areas. Any common areas (e.g., landscaping, private tracts, common driveways, private alleys, building exteriors, and/or similar common areas) shall be owned and maintained by a homeowners association or other legal entity. A copy of any applicable covenants, restrictions and conditions shall be recorded and provided to the city prior to building permit approval.

Appendix G: Excerpts of Metro Urban Growth Management Functional Plan, Title 13 (Metro Ordinance No. 05-1077C)

Section 3. Implementation Alternatives for Cities and Counties

B. Each city and county in the region shall either:

1. Amend its comprehensive plan and implementing ordinances to adopt the Title 13 Model Ordinance and the Metro Habitat Conservation Areas Map, and demonstrate compliance with the provisions of (a) subsection 4(A)(5) of this title, related to enhanced fish and wildlife protection and management of publicly-owned parks and open spaces that have been designated as natural areas and are not intended for future urban development, and (b) subsection 4(A)(8) of this title, related to the restoration of Habitat Conservation Areas when developed property is undergoing significant redevelopment; or

2. Demonstrate that its existing or amended comprehensive plan and existing, amended, or new implementing ordinances substantially comply with the performance standards and best management practices described in Section 4, and that maps that it has adopted and uses substantially comply with the Metro Habitat Conservation Areas Map; or

3. Demonstrate that it has implemented a program based on alternative approaches that will achieve protection and enhancement of Class I and II riparian habitat areas, and of Class A and B upland wildlife habitat areas in territory added to the Metro UGB after the effective date of Ordinance No. 05-1077, substantially comparable with the protection and restoration that would result from the application of a program that complied with subsections 3(B)(1) or 3(B)(2) of this title. [program criteria]

C. The comprehensive plan and implementing ordinances relied upon by a city or county to comply with this title shall contain clear and objective standards. A standard shall be considered clear and objective if it meets any one of the following criteria:

1. It is a fixed numerical standard, such as fixed distance (e.g. "50 feet") or land area (e.g. "1 acre");

2. It is a nondiscretionary requirement, such as a requirement that grading not occur beneath the dripline of a protected tree; or

3. It is a performance standard that describes the outcome to be achieved, specifies the objective criteria to be used in evaluating outcome or performance, and provides a process for application of the performance standard, such as a conditional use or design review process.

D. In addition to complying with subsection 3(C) of this section, the comprehensive plan and implementing ordinances that a city or county relies upon to satisfy the requirements of this title may include an alternative, discretionary approval process that is not clear and objective provided that the comprehensive plan and implementing ordinance provisions of such a process:

1. Specify that property owners have the choice of proceeding under either the clear and objective approval process, which each city or county must have pursuant to subsection 3(D) of this section, or under the alternative, discretionary approval process; and

2. Require a level of protection for, or enhancement of, the fish and wildlife habitat that meets or exceeds the level of protection or enhancement that would be achieved by following the clear and objective standards described in Section 3(D) of this title.

Section 4. Performance Standards and Best Management Practices for Habitat Conservation Areas

B. City and county comprehensive plans and implementing ordinances shall contain review standards applicable to development in all Habitat Conservation Areas that include:

1. Clear and objective development approval standards consistent with subsection 3(C) of this title that protect Habitat Conservation Areas but which allow limited development within High Habitat Conservation Areas, slightly more development in Moderate Habitat Conservation Areas, and even more development in Low Habitat Conservation Areas…. Standards that meet the requirements of this subsection and subsection 3(C) of this title are provided in Section 7 of the Metro Title 13 Model Ordinance; and

2. Discretionary development approval standards consistent with subsection 3(D) of this title that comply with subsections (a), (b), and (c) of this subsection. Standards that meet the requirements of this subsection and subsection 3(D) of this title are provided in Section 8 of the Metro Title 13 Model Ordinance.

a. Avoid Habitat Conservation Areas.

i. Development may occur within a Habitat Conservation Area only if a property owner demonstrates that no practicable alternatives to the requested development exist which will not disturb the Habitat Conservation Area;

ii. When implementing this requirement to determine whether a practicable alternative exists, cities and counties shall include consideration of the type of Habitat Conservation Area that will be affected by the proposed development. For example, High Habitat Conservation Areas have been so designated because they are areas that have been identified as having lower urban development value and higher-valued habitat, while Low Habitat Conservation Areas have been so designated because they are areas that have been identified as having higher urban development value and lower-valued habitat; and

iii. Cities and counties shall allow flexibility in the application of local code requirements that may limit a property owner's ability to avoid development in Habitat Conservation Areas, such as setback and landscaping requirements or limits on clustering and the transfer of development rights on-site. Property owners shall also consider reduced building footprints and use of minimal excavation foundation systems (e.g., pier, post or piling foundation). The use of the techniques described in this paragraph shall be part of the alternatives analysis to determine whether any alternative to development within the Habitat Conservation Area is practicable; and

b. Minimize Impacts on Habitat Conservation Areas and Water Quality.

i. If there is no practicable alternative, limit the development to minimize, to the extent practicable, the detrimental impacts on Habitat Conservation Areas associated with the proposed development;

ii. When implementing this requirement to determine whether development has been minimized to the extent practicable, cities and counties shall include consideration of the type of Habitat Conservation Area that will be affected by the proposed development. For example, High Habitat Conservation Areas have been so designated because they are areas that have been identified as having lower urban development value and higher-valued habitat, while Low Habitat Conservation Areas have been so designated because they are areas that have been identified as having higher urban development value and lower-valued habitat; and

iii. The techniques described in subsection 4(B)(2)(a)(iii) shall be used to demonstrate that development within a Habitat Conservation Area has been minimized. In addition, the magnitude of the impact of development within

Habitat Conservation Areas also shall be minimized, such as by use of the habitat-friendly development practices described in Table 3.07-13c, unless the use of such practices is prohibited by an applicable and required State or Federal permit issued to a unit of local government having jurisdiction in the area, such as a permit required under the Clean Water Act, 33 U.S.C. §§1251 et seq., or the Safe Drinking Water Act, 42 U.S.C. §§300f et seq., and including conditions or plans required by such permit; and

c. Mitigate Impacts on Habitat Conservation Areas and Water Quality.

When development occurs, require mitigation to restore the ecological functions that were lost or damaged as a result of the development, after taking into consideration the property owner's efforts to minimize the magnitude of the detrimental impacts through the use of the techniques described in Table 3.07-13c and through any additional or innovative techniques.

C. City and county comprehensive plans and implementing ordinances shall include procedures to consider claims of hardship and to grant hardship variances for any property demonstrated to be converted to an unbuildable lot by application of any provisions implemented to comply with the requirements of this title.

Appendix H: Excerpts from Natural Resource Overlay Zones in Existing Oregon City Code

The following three natural resource overlay zones apply to areas of Park Place.

Water Resource Overlay
Flood Management Overlay
Geologic Hazards (Steep Slopes) Overlay

The excerpts of existing code sections for these zones address how they may affect residential density and development in Park Place.

In Water Resource Overlay Zone:

E. Provisional Uses. The following uses are allowed in the water quality resource area subject to compliance with the application requirements and development standards of subsections G and H of this section:

1. Any use allowed in the base zone, other than those listed in subsection C and D of this section [stream and wetland uses, maintenance and repair or minor alterations of existing structures]*;*

17.49.060 Subdivisions and partitions.

C. Prior to preliminary plat approval, the water quality resource Area shall be shown either as a separate tract or part of a larger tract that meets the requirements of subsection (D) of this section, which shall not be a part of any parcel used for construction of a dwelling unit.

D. Prior to final plat approval, ownership of the water quality resource area tract shall be identified to distinguish it from lots intended for sale. The tract may be identified as any one of the following:

1. Private open space held by the owner or a homeowners association; or

2. For residential land divisions, private open space subject to an easement conveying stormwater and surface water management rights to the city and preventing the owner of the tract from activities and uses inconsistent with the purpose of this document; or

3. At the owners option, public open space where the tract has been dedicated to the city or other governmental unit; or

4. Any other ownership proposed by the owner and approved by the city manager. (Ord. 99-1013 §10(part), 1999)

17.49.070 Density transfers.

A. The purpose of this section is to allow density accruing to portions of a property within the water quality resource area to be transferred outside the water quality resource area.

B. Development applications for partitions that request a density transfer shall:

1. Provide a map showing the net buildable area to which the density will be transferred;

2. Provide calculations justifying the requested density increase;

3. Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the water quality resource area tract created pursuant to Section 17.49.060, and that no residential lot created is less than five thousand square feet;

4. Demonstrate that, with the exception of the water quality resource area parcel created pursuant to Section 17.49.060, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;

5. Meet all other standards of the base zone.

C. The area of land contained in a water quality resource area may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code. (Ord. 99-1013 §10(part), 1999)

In Geologic Hazards Overlay Zone:

17.44.030 Applicability and procedures.

The provisions of this chapter shall apply to all applications for new development and for the expansion of existing development on landslide areas, hillsides or unstable slopes.

17.44.020 Definitions.

"Hillside" refers to any area with a slope of twenty-five percent or more.

"Landslide areas" means those areas identified as known or potential landslide or mass movement geological hazard areas:

1. By the State of Oregon Department of Geology and Mineral Industries (DOGAMI) in Bulletin 99, Geology and Geological Hazards of North Clackamas County, Oregon (1979), or in any subsequent DOGAMI mapping for the Oregon City area; or

2. By Portland State University in a study entitled "Environmental Assessment of Newell Creek Canyon, Oregon City, Oregon" (1992).

"Unstable slopes" or "unstable soils" includes:

1. Any area identified on the city's Steep Slope map;

2. Any other area that is identified on official city, county or federal or state agency maps as being subject to soil instability, slumping or earth flow, high ground water level, landslide or erosion, seismic activity or for which field investigation, performed by a suitably qualified geotechnical engineer or engineering geologist who is licensed in Oregon and derives his or her livelihood principally from that profession, confirm the existence of or potential for a severe hazard. (Ord. 94-1001 §2(part), 1994)

17.44.060 Development standards.

H. Density shall be determined as follows:

1. For those areas with slopes less than twenty-five percent between grade breaks, the allowed density shall be that permitted by the underlying zoning district;

2. For those areas with slopes of twenty-five to thirty-five percent between grade breaks, the density shall not exceed two dwelling units per acre except as otherwise provided in subsection I of this section;

3. For those areas with slopes over thirty-five percent between grade breaks, development shall be prohibited except as otherwise provided in subsection J of this section.

In the Flood Management Overlay Zone:

17.42.020 Definitions.

"Flood management areas" means all lands contained within the one-hundred-year floodplain, flood area and floodway as shown on the Federal Emergency Management Agency flood insurance rate maps, floodway maps and the area of inundation for the February 1996 flood.

"Floodplain" means the land area identified and designated by the United States Army Corps of Engineers, the Oregon Division of State Lands, FEMA, or city of Oregon City that has been or may be covered temporarily by water as a result of a storm event of identified frequency. It is usually the flat area of land adjacent to a stream or river formed by floods.

17.42.170 Flood management area standards.

A. Uses Permitted Outright:

1. Excavation and fill required to plant any new trees or vegetation;

2. Restoration or enhancement of floodplains, riparian areas, wetland, upland and streams that meet federal and state standards provided that any restoration project which encroaches on the floodway complies with the requirements of Section 17.42.200 (Floodways).

B. Provisional Uses. All uses allowed in the base zone or existing flood hazard overlay zone are allowed in the Flood Management Overlay District subject to compliance with the Development Standards of this section.

D. Site Development Standards.

4. Residential Construction.

a. New construction and substantial improvements of any residential structure shall have the lowest floor, including basement, elevated to at least one foot above the design flood elevation.

b. Fully enclosed areas below the lowest floor that are subject to flooding are prohibited unless they are designed to automatically equalize hydrostatic flood forces on exterior wails by allowing for the entry and exit of floodwaters.

17.42.190 Subdivision standards.

B. The purpose of this section is to allow density accruing to portions of a property within the flood management overlay district to be transferred outside the overlay district.

1. Development applications shall comply with the submittal requirements of Chapter 17.64, Planned Unit Development, if the applicant wishes to transfer density.

2. Density transfers shall be allowed if the applicant demonstrates compliance with the following standards:

a. The density transfer is proposed as part of a planned unit development and meets the requirements of Section 17.64.050.

b. Minimum density standards will not increase due to the density transfers.

c. The area of land contained in a flood management area may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code.

J. Water Infrastructure and Natural Resources

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: February 13, 2007
TO: David Berniker
FROM: Tom Puttman, PE, AICP, LEED AP
SUBJECT: **90% Concept Plan Sections - Water Infrastructure and Natural Resources (preliminary)**
PROJECT: City of Oregon City Park Place UGB Concept Plan
PROJECT NO: SSER0000-0011
COPIES:

A. Water Infrastructure System Improvements

General Findings and Recommendations:

As described in the existing conditions report, water infrastructure is limited within the concept plan area. Of the water infrastructure that does exist, there are two systems. The water system located in the area of the future North Village is owned and operated by the City of Oregon City. The water system located in the area of the future South Village is owned and operated by Clackamas River Water (CRW). The CRW system primarily provides water transmission to areas outside of the concept plan area.

Based on these existing conditions, it is recommended that the existing City of Oregon City water system be expanded to serve the entire concept plan area. This system should be constructed, owned and operated by the City of Oregon City. The existing CRW system should be preserved to continue to provide water transmission.

Concept Plan Water System Summary:

Water Supply Improvements

Based on the existing conditions review, adequate supply capacity exists in the current City of Oregon City water system to serve the development anticipated for the concept plan area.

According to the Oregon City Water Master plan the current water demand in the Park Place Lower Zone is split between Barlow Crest Reservoir and Mountainview Reservoir. While Mountainview has ample storage capacity (10.5 million gallons) to satisfy both existing and future demand, Barlow Crest reservoir (1.75 mg) will ultimately require expansion. According to the master plan, complete buildout of the whole area will require 3.23 million gallons of capacity at Barlow Crest. As development may occur outside the concept plan area, additional reservoir capacity may be needed. A potential location for this reservoir has been shown on the water system concept plan; however, it is for reference only and has not been included in design and cost estimate activities. The location of this reservoir is consisted with the City's Water Master Plan.

Distribution Improvements

2100 SW River Parkway Portland Oregon 97201 Phone: 503.223.6663 Facsimile: 503.223.2701

The proposed water system improvements are based on future system improvements assumed in the City of Oregon City Water Master Plan and modified to fit the concept plan. The Water Master Plan shows the future system as an expansion of the City water system the currently exists to the north of the concept plan area.

The proposed water main system improvements are shown ____ (*see water system map*). Water main improvements consist of new water mains ranging from 8-inches to 16-inches. Four connections are recommended to the existing water system to provide sufficient system looping and redundancy. A new 16-inch water main should be provided along Redland Road. A new water main, with pipe sizes varying from 10-16-inches, should be provided along Holly Lane and the Holly Lane Extension. A new 16-inch water main should be provided along the new Swan Road. A new water main, with pipe sizes ranging from 10- to 12-inches, should be provided along Livesay Road. Smaller water mains will be needed to serve development within each Village. These pipes are generally anticipated to be a minimum of 8-inches, as established by City of Oregon City standards, however larger sizes may be required to meet fire flow requirements.

Preliminary pipe size estimates were developed based on fire flow requirements and demand flows. The fire flows used were 3,000 gpm for 3 hours applied to both new and existing buildings. The existing school was assumed to require the new school fire flow rate of 5,000 gpm for 4 hours. In most cases pipe sizes are controlled by the sum of Maximum Daily Demand (MDD) and fire flow. MDD was determined based on housing densities shown on the "Preferred Alternative" dated 10/19/06 showing the Swan Avenue Extension. All pipe size estimates below are preliminary and should be revised with detailed flow modeling. Size calculations assume that flow velocities should be kept at or below 10 ft per second. *These sizes are to be verified by West Yost and Associates (DEA to coordinate).*

A summary of water demand information has been provided at the end of this memo.

The grid network created by this new system should alleviate existing system pressure issues. As such, the existing pump station located along Livesay Road should be able to be removed. The existing CRW water transmission mains, located along Holly Lane and Redland Road, should remain as the concept plan area develops in order to provide continued water service to CRW customers.

Recommended Next Steps:

The following next steps are recommended for the development of the water system:

- ***Water Master Plan –*** Once the concept plan is adopted, prepare a water master plan. The objective of this master plan is to further refine the sanitary sewer system outlined in the Concept Plan. The objective of this master plan is to further refine the water system outlined in the Concept Plan.

B. Sanitary Sewer Infrastructure System Improvements

General Findings and Recommendations:

Existing public sanitary sewer services within the concept plan area is very limited. As such, a new sanitary sewer system will need to be developed to service future development within the concept plan area. A new 36-inch sanitary sewer should be constructed along Redland Road to service the entire concept plan area. This sewer shall serve both the concept plan area and the existing areas currently managed by the existing TCSD system.

Additional sanitary sewers will need to be constructed to serve future development within the North and South Villages.

Ownership of the new 36-inch pipe should remain with TCSD as it conveys sanitary sewerage from both the concept plan area and areas outside the concept plan area. The existing TCSD sanitary system should remain and continue to provide sanitary conveyance to areas outside of the concept plan area. For areas inside the concept plan area boundary, these areas should be transitioned to the new City of Oregon City sanitary sewer system.

Concept Plan Sanitary Sewer System Summary:

Sanitary Treatment Improvements

Improvements to the existing TCSD treatment plant shall not be required as the capacity of the existing plant is adequate to meet additional flows generated by future development within the concept plan area. In addition, adequate capacity exists in the TCSD conveyance system to convey sanitary sewerage from the concept plan area to the treatment plan.

Sanitary Sewer Improvements

The proposed sanitary sewer system improvements are shown ____ (*see sanitary system map*). Due to the topography of the concept plan area, the future areas of the North Village and South Village should be easily conveyed to Redland Road. The existing 12-inch sanitary sewer, currently owned and operated by the Tri-City Sewer District (TCSD), should be upgraded to a 36-inch pipe. This upgrade should occur from the existing point of connection at Redland and Highway 213 and continue to the eastern edge of the concept plan area. The upgraded pipe shall serve both the concept plan area and the existing areas currently managed by the existing 12-inch pipe.

The North Village shall be served with three sanitary sewer mains. A new 10-inch sewer shall be provided along Livesay Road and connect to the new 36-inch Redland Road sanitary sewer at the intersection of Redland Road and Livesay Road. A new 12-inch sewer shall be provided from the North Village main street down the Swan Avenue extension to the new 36-inch Redland Road sanitary sewer. A new sewer, ranging from 10- to 12-inches, should be provided along the Holly Lane extension to convey sanitary sewerage from the upper reaches of the North Village.

The South Village shall be served with two sanitary sewer mains. A new 12-inch sewer shall be provided from the South Village down the Swan Avenue extension to the new 36-inch Redland Road sanitary sewer. The existing Holly Lane sewer should be upgraded to a 10- to 12-inch sewer to convey sanitary sewerage from the South Village.

A summary of sanitary flows information has been provided at the end of this memo.

Recommended Next Steps:

The following next steps are recommended for the development of the sanitary sewer system:

- ***Sanitary Sewer Master Plan –*** Once the concept plan is adopted, prepare a sanitary sewer master plan. The objective of this master plan is to further refine the sanitary sewer system outlined in the Concept Plan.

C. Stormwater Infrastructure System Improvements

General Findings and Recommendations:

The area is comprised three watersheds: Abernethy Creek, Newell Creek and Livesay Creek. As noted in the existing conditions, no major stormwater infrastructure exists within the concept plan area other than roadside ditches and natural drainage channels.

It is recommended that a low-impact stormwater approach to developed with a goal of mimicing the natural hydrological conditions of the three watersheds of the concept plan area. These three watersheds shall be used to delineate the stormwater approach for the concept plan.

Concept Plan Stormwater System Summary:

Stormwater Management Approach

The general approach of the stormwater management system for the concept plan is to establish a system that mimics the natural hydrology of the site to the extent practicable. In pursuing this design goal, the concept plan area has been separated into three distinct systems based on the boundaries of the existing watersheds. The stormwater system within each watershed shall utilize the combination of centralized and decentralized low-impact stormwater best management practices to manage stormwater generated from the concept plan area.

Central to stormwater approach of the Concept Plan, is a stormwater hierarchy focused on managing stormwater in a naturalistic manner at three separate scales: site, street and neighborhood (vs. a one-size fits all approach). This hierarchy is described as follows:

- ***Tier 1 – Site Specific Stormwater Management Facilities (Site)*** – All private property within the study area shall utilize site specific (or on-site) low-impact stormwater facilities to manage stormwater on-site to the extent practicable. The objective of these facilities is to reduce the quantity (flow and volume) through detention and retention/infiltration of stormwater generated from private property as well as improve the water quality of stormwater.

  These facilities are comprised of three types: impervious area reduction facilities, stormwater management facilities, and infiltration only facilities. Impervious area reduction facilities are focused on preventing the generation of stormwater in the first place and include porous pavement and ecoroofs. Stormwater management facilities are focused on managing the stormwater in a manner to , stormwater planters, stormwater swales, and vegetated infiltration basins. See Appendix ___ for images of these facilities. These facilities may be used for single-family residential, multi-family residential, commercial, and open space. Most site specific facilities shall be privately owned and maintained except facilities located within public open space.

- ***Tier 2 – Greenstreets Stormwater Management Facilities (Street)*** – In urban environments, much of the stormwater quantity and pollution issues are attributed to streets. An innovative, low-impact

manner in which to address this reality is through the use of greenstreets. Greenstreets are streets that integrate the management of stormwater into the street design itself to provide a stormwater management benefit as well as an urban design element and they may potentially reduce the need for downstream stormwater facilities such as large stormwater ponds.

They can serve as both stormwater management facilities and stormwater conveyance facilities. As a stormwater management facility, their objective is to manage stormwater runoff generated from streets. As a stormwater conveyance facility, their objective is to convey stormwater from both private property and streets to regional stormwater management facilities. Greenstreets typically take the form of vegetated swales located along the street with curb cuts to allow street runoff to enter them. In more urban areas, stormwater planter boxes mimicing the look of street tree wells may be used. Most greenstreet stormwater facilities shall be publicly owned and maintained.

- ***Tier 3 – Regional Stormwater Management Facilities (Neighborhood)*** – Regional stormwater management facilities are facilities focused on managing large stormwater flows and volumes that may be pasted through Tier 1 and Tier 2 facilities. Moreover, they are to provide additional water quality benefits prior to discharging stormwater to the existing creeks. These stormwater facilities are typically to be located adjacent to the existing streams and should take on a more naturalistic form such as a wetland pond. Most greenstreet stormwater facilities shall be publicly owned and maintained.

The stormwater system concept plan, see _____ , shows generally how this stormwater approach should be implemented for the concept plan area.

Stormwater Conveyance Approach

Surface conveyance, in the form of swales and ditches, should be provided as a means to conveying stormwater via gravity from private property and streets to the existing creeks to the extent practicable. Piped conveyance will be required but should be kept to a minimum if possible.

Recommended Next Steps:

The following next steps are recommended for the development of the sanitary sewer system:

- ***Stormwater Master Plan –*** Once the concept plan is adopted, prepare a stormwater master plan. The objective of this master plan is to further refine the stormwater approach outlined in the Concept Plan.
- ***Infiltration and Slope Stability Hazards –*** Further study should be performed to identify areas with the concept plan boundaries in which infiltration of stormwater should be allowed, limited or restricted.

D. Natural Resources

General Findings and Recommendations:

Significant natural resources exist within the concept plan area and generally located adjacent or near Abernethy Creek, Livesay Creek and Newell Creek. In order to protect these natural resources, an inventory map, which delineates natural resource areas of greatest significance (including riparian areas, wildlife habitat, and parks and open spaces) and a habitat conservation area map, which identifies the highest value riparian areas, were utilized

to help determine where to build, where to build with restrictions, and where not to build within the Concept Plan area.

The Concept Plan was significantly shaped by the existing natural resources of the concept plan area. Development within the concept plan area is targeted outside all habitat conservation areas (HCA) except for infrastructure improvements such as roads. As such, regulations and restrictions associated with development within HCAs may be avoided. Voluntary best management practices have been identified however to help guide development in a manner that further protects existing natural resources within the study area.

Concept Plan Summary:

As noted before, the Concept Plan was significantly shaped by the existing natural resources. Approximately __% (__-acres) of the Concept Plan area has been preserved to protect existing natural resources. For all Concept Plan development, Metro's Nature in Neighborhood design guidelines were followed. These guidelines, though voluntary, are very applicable to achieving the environmental protection goals of the Concept Plan.

The Nature in Neighborhoods program is an effort to protect clean water and health natural areas for fish, wildlife and people. Much of the Concept Plan has been developed to meet Nature in Neighborhood design goals including:

- Conserving and improving streamside, wetland and floodplain habitat and their connections
- Conserve large areas of contiguous habitat and avoid habitat fragmentation
- Conserve and improve connections between riparian corridors and upland habitat
- Conserve and improve unique and at-risk habitats
- Promote habitat-friendly development practices

As the Concept Plan developments, the table below provides a list of best development practices that should be considered:

Table 10: Best Management Practices for Habitat Conservation Areas[1]

Part (a): Design and Construction Practices to Minimize Hydrologic Impacts
1. Amend disturbed soils to original or higher level of porosity to regain infiltration and stormwater storage capacity.
2. Use pervious paving materials for residential driveways, parking lots, walkways, and within centers of cul-de-sacs.
3. Incorporate stormwater management in road right-of-ways.
4. Landscape with rain gardens to provide on-lot detention, filtering of rainwater, and groundwater recharge.

[1] Table 3.07-13c in Exhibit C of Ordinance No. 05-1077C, Title 13 (Nature in Neighborhoods) of the Urban Growth Management Functional Plan (Metro Code Chapter 3.07)

5. Use green roofs for runoff reduction, energy savings, improved air quality, and enhanced aesthetics.
6. Disconnect downspouts from roofs and direct the flow to vegetated infiltration/filtration areas such as rain gardens.
7. Retain rooftop runoff in a rain barrel for later on-lot use in lawn and garden watering.
8. Use multi-functional open drainage systems in lieu of more conventional curb-and-gutter systems.
9. Use bioretention cells as rain gardens in landscaped parking lot islands to reduce runoff volume and filter pollutants.
10. Apply a treatment train approach to provide multiple opportunities for storm water treatment and reduce the possibility of system failure.
11. Reduce sidewalk width and grade them such that they drain to the front yard of a residential lot or retention area.
12. Reduce impervious impacts of residential driveways by narrowing widths and moving access to the rear of the site.
13. Use shared driveways.
14. Reduce width of residential streets, depending on traffic and parking needs.
15. Reduce street length, primarily in residential areas, by encouraging clustering and using curvilinear designs.
16. Reduce cul-de-sac radii and use pervious vegetated islands in center to minimize impervious effects, and allow them to be utilized for truck maneuvering/loading to reduce need for wide loading areas on site.
17. Eliminate redundant non-ADA sidewalks within a site (i.e., sidewalk to all entryways and/or to truck loading areas may be unnecessary for industrial developments).
18. Minimize car spaces and stall dimensions, reduce parking ratios, and use shared parking facilities and structured parking.
19. Minimize the number of stream crossings and place crossing perpendicular to stream channel if possible.
20. Allow narrow street right-of-ways through stream corridors whenever possible to reduce adverse impacts of transportation corridors.
Part (b): Design and Construction Practices to Minimize Impacts on Wildlife Corridors and Fish Passage
1. Carefully integrate fencing into the landscape to guide animals toward animal crossings under, over, or around transportation corridors.
2. Use bridge crossings rather than culverts wherever possible.
3. If culverts are utilized, install slab, arch or box type culverts, preferably using bottomless designs that more closely mimic stream bottom habitat.

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4. Design stream crossings for fish passage with shelves and other design features to facilitate terrestrial wildlife passage. 5. Extend vegetative cover through the wildlife crossing in the migratory route, along with sheltering areas.
Part (c): Miscellaneous Other Habitat-Friendly Design and Construction Practices
1. Use native plants throughout the development (not just in HCA). 2. Locate landscaping (required by other sections of the code) adjacent to HCA. 3. Reduce light-spill off into HCAs from development. 4. Preserve and maintain existing trees and tree canopy coverage, and plant trees, where appropriate, to maximize future tree canopy coverage.

Although Concept Plan development is currently not targeted within existing HCAs, development is not precluded from these areas. Development could occur within existing HCAs but it will be subject to regulatory performance standards and best management practices. See existing conditions memo.

Recommended Next Steps:

The following next steps are recommended related to natural resources within the concept plan area:

- ***Refine Buildable Areas Map –*** Perform a GIS evaluation of the City of Oregon City water quality overlay zone with existing topography. The result of this evaluation may necessitate the modification of no-build areas which could increase or decrease buildable lands within the concept plan area.
- ***Field Verify Existing Natural Resouces(?) –*** Field verifying existing natural resources would aid in further refinement of the buildable areas map which could increase or decrease buildable lands within the concept plan area.
- ***Identify Regulations and/or Restrictions Associated with Infrastructure Impacts on HCAs***

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D. Regulatory Compliance (Title 11)

Title 11 Standard:

Provide a conceptual public facilities and services plan for the provision of sanitary sewer, water and storm drainage. The plan shall, consistent with OAR Chapter 660, Division 11, include preliminary cost estimates and funding strategies, including likely financing approaches.

Title 11 Response:

Conceptual public facility plans have be developed for the provision of sanitary sewer, water and storm drainage. These plans have been developed to comply with goals of the local community, City of Oregon City, Metro and the following documents:

- City of Oregon City Water Master Plan
- City of Oregon City Sanitary Sewer Master Plan
- City of Oregon City Drainage Master Plan
- City of Oregon City Draft Stormwater Management Plan
- City of Oregon City Stormwater and Grading Design Standards

The City of Oregon City Water Master Plan was referenced to determined anticipated water demands within the concept plan area. Average daily demand as well as peak demand and fire demand were evaluated at a preliminary level. *Insert Yost West findings…* In general, water demand from planned development within the concept plan area is consistent with demands anticipated in the Water Master Plan.

The City of Oregon City Sanitary Sewer Master Plan was referenced to determined anticipated sanitary sewer generation within the concept plan area. In general, similar sanitary flows were developed. As a result, sanitary flows generated by development within the concept plan area are consistent with those found in the Sanitary Sewer Master Plan.

All three stormwater documents emphasize minimizing the amount of post-development stormwater runoff to pre-development conditions and reducing pollution loads. The Concept Plan stormwater approach was developed to meet these goals.

Attachments: Concept cost estimates
Stormwater Photographs
Sanitary and Water Design Flow Assumptions

Initials: TJP
File Name: P:\S\SSER00000011\0800REC\0830Deliverables\Concept Plan - Draft\90% Concept Plan - DEA sections 02-01-07.doc
Project Number: SSER0000-0011

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Park Place Concept Plan - Water Line Cost Estimate

	Size	Length (Ft)	Cost/ft	Total Cost
North Village:				
Livesay Rd - E of Swan	12"	1,500	$106	$159,000
Swan Ave - Livesay Rd to Redland Rd.	12"	1,969	$106	$208,714
Livesay Rd W of Swan	10"	1,888	$90	$169,920
Livesay Rd W. to Holcomb Rd.	10"	784	$90	$70,560
North Village to Redland Rd.	16"	1,981	$126	$249,606
North Village to Holcomb Rd.	10"	3,576	$90	$321,840
subtotals		11,698		$1,179,640
Redland Road:				
SFWB connection to Swan Ave	16"	2,805	$126	$353,430
Swan Ave to Holly Lane	16"	1,245	$126	$156,870
Holly Lane to UGB Boundary	16"	2,448	$126	$308,448
subtotals				$818,748
South Village:				
Swan Ave - Redland Rd to Donovan Lane	16"	1,962	$126	$247,212
Swan Ave - Donovan Lane to UGB Bndry	10"	1,353	$90	$121,770
Holly Lane - Redland Rd to Donovan Lane	12"	1,906	$106	$202,036
Holly Lane - Donovan Lane to UGB Bndry	10"	1,244	$90	$111,960
Donovan Lane - Swan Ave to Holly Lane	16"	610	$126	$76,860
Donovan Lane - Swan Ave to School	16"	1,035	$126	$130,410
subtotals				$759,838

Construction Cost	**2,758,226**
Design Costs (20% of construction cost)	**551,645**
Construction + Design Cost	**3,309,871**
Contingency (15%)	**496,481**
Total Cost	**3,806,352**

Costs are based roughly on the 2004 Oregon City Water Master Plan inflated at 3% over 3 years

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Park Place Concept Plan - Sanitary Cost Estimate

	Size	Number	Length (Ft)	Cost/ft	Total Cost
North Village:					
Livesay Rd - E of Swan	12"		1,500	$100	$150,000
Manholes	4'	5		$4,000	$19,000
Swan Ave - Livesay Rd to Redland Rd.	12"		1,947	$100	$194,700
Manholes	4'	6		$4,000	$23,470
Livesay Rd - W of Swan	10"		1,894	$95	$179,930
Manholes	4'	6		$4,000	$22,940
Livesay Rd - W to Redland Rd.	8"		839	$90	$75,510
Manholes	4'	3		$4,000	$12,390
North Village to Redland Rd	12"		1,964	$100	$196,400
Manholes	4'	6		$4,000	$23,640
North Village to Hilltop	10"		3,568	$95	$338,960
Manholes	4'	10		$4,000	$39,680
subtotals		25	11,712		$1,236,940
Redland Road: *					
48" connection to Swan Ave	36" DI		1891	$335	$633,485
Manholes	6'	6		$7,200	$41,238
Swan Ave to Holly Lane	36" DI		1245	$335	$417,075
Manholes	6'	4		$7,200	$29,610
Holly Lane to UGB Boundary	36" DI		2448	$335	$820,080
Manholes	6'	7		$7,200	$51,264
subtotal					$1,941,488
South Village:					
Swan Ave - Redland Rd to Donovan Lane	12"		1995	$100	$199,500
Manholes	4'	6		$4,000	$23,950
Swan Ave - Donovan Lane to UGB Bndry	10"		1353	$95	$128,535
Manholes	4'	4		$4,000	$17,530
Holly Lane - Redland Rd to Donovan Lane	12"		1910	$100	$191,000
Manholes	4'	6		$4,000	$23,100
Holly Lane - Donovan Lane to UGB Bndry	10"		1244	$95	$118,180
Manholes	4'	4		$4,000	$16,440
Donovan Lane - Swan Ave to Holly Lane	8"		610	$90	Use Extg
Manholes	4'	3		$4,000	$10,100
subtotal					$718,235

Construction Cost **$3,896,663**

Design Costs (20% of construction cost)	**$779,333**
Construction + Design Cost	**$4,675,996**
Contingency (15%)	**$701,399**
Total Cost	**$5,377,395**

* Unit costs for 36-inch pipe in Redland Road are based partly on numbers provided by Tri-Cities Sewer District for recent 30-inch sewer pipe; increased assuming 36-inch ductile iron.

All othe unit coses are based on numbers from recent ODOT projects.

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Park Place Concept Plan - Storm System Cost Estimate

	Quantity	Units	Cost/ft	Total Cost
Livesay Creek Basin				
Ponds - Assumed approx 10,000 cu ft	5	EACH	$15,000	$75,000
Pipe - Assumed 12"	1,200	LF	$68	$81,600
subtotals				$156,600
Holcomb Creek Basin				
Ponds - Assumed approx 10,000 cu ft	1	EACH	$15,000	$15,000
Pipe - Assumed 12"	260	LF	$68	$17,680
subtotals				$32,680
Abernethy Creek Basin				
Ponds - Assumed approx 10,000 cu ft	13	EACH	$15,000	$195,000
Pipe - Assumed 12"	2,510	LF	$68	$170,680
subtotals				$365,680
Total Ponds	19			
Total Pipe	3,970			
Construction Cost				**$554,960**
Design Costs (20% of construction cost)				**110,992**
Construction + Design Cost				**665,952**
Contingency (15%)				**99,893**
Total Cost				**765,845**

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Summary of Flows:

Sanitary

South Village Flow Estimate: 1.3 cfs

North Village Flow Estimate: 2.3 cfs

Population	2.3 people/lot	Oregon City Sanitary Master Plan
Industrial Flow:	3,000 gpad	Oregon City Sanitary Master Plan
School Flow:	1,200 gpad	Web Search
Infiltration & Inflow	3,300 gpad	Oregon City Sanitary Master Plan
Per Capita Flow	80 gpcd	Oregon City Sanitary Master Plan
Peaking Factor	3	Oregon City Sanitary Master Plan

Water

South Village Flow Estimate: 1.8 cfs

North Village Flow Estimate: 3.9 cfs

Population	2.3 people/lot	From Oregon City Sanitary Master Plan
Industrial Flow:	2,500 gpad	Estimated Based on number for sanitary.
School Flow:	1,000 gpad	Estimated Based on number for sanitary.
Per Capita Flow	144 gpcd	From Oregon City Water Master Plan
Peaking Factor	4	From Oregon City Water Master Plan
Fire Flow - Res.	3,000 gpm/3hrs	From Oregon City Water Master Plan
Fire Flow - School	5,000 gpm/4hrs	From Oregon City Water Master Plan

K. Preliminary Geologic and Geotechnical Evaluations

GRI Geotechnical & Environmental Consultants
9725 SW Beaverton Hillsdale Hwy, Ste 140
Portland, Oregon 97005-3364
PHONE 503/641/3478 FAX 503/644/8034

February 7, 2007

4584 PRELIM GEOTECH EVALUATION
(ISSUED 3-28-07)

SERA Architects
338 NW 5th Avenue
Portland, OR 97209

Attention: David Berniker

SUBJECT: Preliminary Geologic and Geotechnical Evaluation
Park Place Concept Plan
Oregon City, Oregon

At your request, GRI has completed a preliminary geologic and geotechnical evaluation for the proposed Park Place Concept Plan project in Oregon City, Oregon. This evaluation addressed the Park Place study area, which is shown on the Vicinity Map, Figure 1. The Park Place Concept Plan is being developed to identify the preferred long-term land use of the study area. The Concept Plan was developed by the design team and local community during a design charrette and series of community meetings.

The purpose of the evaluation was to identify, on a preliminary basis, the potential geologic hazards within the study area and provide geotechnical considerations for future development, to be included in the Concept Plan document for the City of Oregon City (City). This includes recommendations for site-specific geotechnical evaluations prior to development and general slope hazard management. The conclusions and recommendations provided in this report are based on a review of the previous work completed in the study area by others and other sources of information described herein.

The evaluation consisted of limited field reconnaissance; review of published geologic reports and maps, readily available geotechnical reports and subsurface information, and water well records on file with the Oregon Water Resources Department (OWRD); and examination of aerial photographs. The intent of this document is to serve as a practical guide to assist the City in their understanding and management of the short- and long-term geologic risks associated with future development in the Park Place Concept Plan study area.

PROJECT DESCRIPTION

The study area is located in Clackamas County, Oregon, east of Highway 213 and south of Redland and Holcomb roads. The total study area is approximately 470 acres; 180 acres of the study area are located immediately adjacent to Oregon City limits in the vicinity of Livesay Road, but have not been annexed as part of the City, and 300 acres were brought into the Urban Growth Boundary in 2002. The study area is composed of 138 individual property owners. The largest property under one ownership is approximately 48 acres, and nearly half the parcels in the study area are 1 acre or less.

The Park Place Concept Plan was developed to identify the preferred long-term land use of the study area. The Concept Plan identifies the general areas of different housing densities, commercial and industrial land uses, parks, open spaces, and schools.

The study area includes existing residential developments and a public middle school, but is generally rural and distinguished by steep slopes, several creeks, marsh areas, and wooded areas. The general topography of the study area is shown on the Slope Map, Figure 2, and the Landslide Geomorphology Map, Figure 3. The long-term development outlined in the proposed Concept Plan includes new mixed-use and residential development, new roads between Holly Lane and Highway 213 and Redland and Holcomb roads, and improvements to existing roadways. We understand the proposed Concept Plan has identified open space areas located in conjunction with environmentally constrained and natural areas, which will serve as undeveloped parks and natural resource areas for the study area. These open spaces include all areas with slopes of 25% or steeper within the Concept Plan study area.

GEOLOGIC SETTING

The study area is located in the Abernathy Creek drainage of the Willamette Valley. The Abernathy Creek drainage consists of a narrow meandering creek, fed by Newell and Holcomb creeks, which flows directly into the Willamette River immediately northwest of the study area. The drainage is characterized by steep canyons subject to ongoing slope processes. The local geology is dominated by the fine-grained facies of the Missoula Flood deposits (Madin, in press) primarily comprised of silt, sand, and gravel of late Pleistocene age, as shown on the Geologic Map, Figure 4. These deposits generally form terraces at the lower extent of the local creeks and mantle slopes up to about elevation 200 to 250 ft. In the low-lying areas within the floodplain of Abernathy Creek is alluvium and Pleistocene-age Willamette Silt, which consists of fine-grained sands, silt and clay with scattered lenses of fine- to medium-grained sand. At the north edge of the study area (along Holcomb Road, at the south end along Holly Lane and at the southwest edge, adjacent to Newell Creek Canyon), mudstone, claystone, and sandstone of the Troutdale Formation are present, typically in steep canyons and ridges. Geomorphic and geologic evidence indicates these tributary canyons of Abernathy Creek have been modified by ongoing, large-scale landslides. The Oregon Department of Geology and Mineral Industries' (DOGAMI) preliminary geologic map of the area indicates an inferred trace of the Oatfield Fault may extend into the northwest portion of the study area; however there is no direct evidence that the fault exists in this area (Madin, in press).

PREVIOUS WORK

Due to the presence of landslides in the Oregon City area, a number of geologic maps and geotechnical studies have been completed in the vicinity of the Concept Plan study area. DOGAMI Bulletin 99, "Geology and Geologic Hazards of Northwestern Clackamas County, Oregon," documents the initial study focusing on the geology and geologic hazards of the area (Schlicker & Finlayson, 1979). This report identified slopes of 10 to more than 50% within the study area. The report also identified hazards associated with flooding along Abernathy Creek and the potential for a high water table near Ogden Middle School, west of Holly Lane. Bulletin 99 did not identify landslide-specific hazards within the Concept Plan study area, but identified landslide topography, local slumping, earthflow, mudflow, and debris flow in Newell Creek Canyon, immediately west of the study area, and in canyons on both sides of Holly Lane, south and east of the study area.

Subsequent to Bulletin 99, Portland State University (PSU) evaluated geologic constraints for future development of Newell Creek Canyon (Burns and others, 1993). The study area included in this report is immediately adjacent to the Concept Plan study area, to the west. The report included evaluation of geologic, soil, and groundwater conditions within the canyon and included a landslide susceptibility map for the canyon, which identified existing landslides as high risk, and exposures of Troutdale Formation with slopes of 14% (8°) or more as having a moderate risk of landslides. The report identified over 50 existing landslides in Newell Creek Canyon and noted that 73% of the project area was at moderate risk for landslides. Several other site-specific geologic and geotechnical investigations have been conducted within Newell Creek Canyon to assess landslide hazards associated with residential development. In addition, two studies have been published following storm-induced landslides in 1996 and 1997, documenting landslides immediately adjacent to the study area (Burns and others, 1998; Hofmeister, 2000).

In 2006, DOGAMI developed a map identifying landslide geomorphology in the vicinity of Oregon City, including the Concept Plan study area, using light detection and ranging (LIDAR) surveys and air photos (Madin and Burns, 2006). This map identifies over 35 existing landslides and debris fans within the Concept Plan study area, as shown in Figure 3. DOGAMI is currently completing a geologic map of the Oregon City vicinity (Madin, in press). A draft version of this map is shown on Figure 4. At this time, the 2006 map is the most up-to-date source of information concerning landslides in the study area.

SITE RECONNAISSANCE

Methodology

A certified engineering geologist (CEG) and registered geologist (RG) from GRI conducted a general reconnaissance of the study area on November 29, 2006. The ground-level reconnaissance consisted of viewing the majority of the study area from roadway rights-of-way. Visual reconnaissance was limited to areas and facilities that were readily observable from streets or other public areas.

Study Area Observations

The study area lies on both sides of Redland Road, extending north toward Holcomb Road and south toward Maple Lane, primarily along adjacent creek canyons. Redland Road bisects the study area from east to west, and Holly Lane extends from Redland to the south end of the study area. There are no north-south connecting roads from Redland Road to Holcomb Boulevard. Between Redland Road and Holcomb Boulevard there are a number of separate residential developments with discontinuous streets. Significant portions of the study area include steep, wooded creek canyons and generally rural property.

Redland Road is a two-lane, minor arterial linking Highway 213 to residential areas to the east of Oregon City. Redland Road transects the Abernathy Creek valley and crosses Abernathy Creek four times within the study area. As shown on Figure 2, the slopes at creek crossings are typically steeper than 25%. We observed localized slumping and raveling along these stream banks. In addition, slopes greater than 25% were observed along much of Redland Road, as road cuts on the north side of the road and sloping toward the creek on the south side of the road. Several small roads intersect Redland Road and extend northward into residential developments. These residential developments are generally low density and established on slopes of 5 to 15%. Readily apparent and obvious indications of recent large-scale, deep seated slope instability were not observed in these developments.

Holly Lane is a local street that runs south from Redland Road to Maplelane Road and has steep grades and very narrow shoulders. There is a steep canyon to the east of Holly Lane and steep slopes (greater than 25%) along Holly Lane between Redland Road and Donovan Lane. Based on personal communication with property owners, GRI understands that localized slope failures have occurred at residential properties on the south east side of Holly Lane, just outside the Concept Plan study area (Moxley, personal communication, 2006).

There are no connecting roads between Redland Road and Holcomb Boulevard in the north portion of the study area. Development in this area is composed of isolated residential developments that have been constructed over the past 50 years. Swan Avenue and Livesay Road are residential streets that extend east-west through this portion of the study area. These residential developments occur on the relatively flat plateau above Redland Road. We did not observe any development adjacent to the canyon at the north edge of the study area; however, development has occurred immediately outside the study area, in the Oak Valley area. Evidence of soil creep observed during the reconnaissance includes tilted and bowed trees around the perimeter slopes of the development.

SUBSURFACE CONDITIONS

To provide a preliminary characterization of subsurface materials and conditions within the study area, GRI reviewed water well logs available through OWRD and available boring logs for sites adjacent to the project area. There are limited well logs available for the study area, as shown on Figures 2 through 4. Review of well logs indicates the study area is generally mantled with silt, which is underlain by weathered sedimentary rocks. This characterization is consistent with the conditions described in boring logs included in the study by PSU (1993) and in the preliminary mapping by Madin (in press).

Groundwater

It is anticipated that the groundwater level in low-lying areas of the study area, in the Abernathy Creek drainage, will fluctuate according to seasonal rainfall and may occur near the ground surface during wet, winter and spring months and during periods of prolonged or intense rainfall, and within several feet of the ground surface during drier months.

It is anticipated the regional water table occurs at depth in areas of higher elevation; however, shallow perched water can occur in and over the weathered sedimentary rock and fine-grained soil, particularly following intense and/or prolonged precipitation.

CONCLUSIONS AND RECOMMENDATIONS

Landslides have occurred within the study area and in adjacent areas with similar topography, geology, and groundwater conditions. With regard to slope instability, most of the known slope instability has occurred on the steeper slopes on ravines along streams and drainages. We understand the recommended Concept Plan developed by the design team identifies areas with slopes of 25% or more as open space that will remain undeveloped. Limiting development in these areas is an appropriate measure to limit the risk of slope instability and landslides impacting future development. In addition, for the purpose of this Concept Plan, GRI recommends further site-specific study be conducted for future developments, in accordance with the City's municipal code Chapter 17.44, for managing geologic hazards and in accordance with following recommendations.

It would be prudent for the City to expand the definitions included in the City of Oregon City Municipal Code, Chapter 17.44.020, to include the Portland State University study, "Landslides in the Portland, Oregon, Metropolitan Area Resulting from the Storm of February 1996: Inventory Map, Database and Evaluation" (Burns and others, 1998); the DOGAMI Open File Report O-06-27, "Map of Landslide Geomorphology of Oregon City, Oregon, and Vicinity Interpreted from LIDAR Imagery and Aerial Photographs" (Madin and Burns, 2006); and the upcoming "Preliminary Geologic Map of the Oregon City Quadrangle, Clackamas County, Oregon" (Madin, in press), as references for identifying mapped landslides and landslide materials, "landslide areas," "unstable slopes," "unstable soils," and debris fans. We also recommend that the City require a geotechnical evaluation/investigation as part of any future development in areas with slopes of 25% or steeper and within a 200-ft setback of the crest and toe of these slopes, and in areas previously mapped as landslides. This would include all new construction, including additions to existing homes such as swimming pools and retaining walls, installation of underground utilities, new access driveways and/or roadways, and similar types of projects that require significant earthwork. The geotechnical evaluation/investigation should address the slope hazards in the development and specifically address how the proposed development will limit the risk of future slope instability, prior to issuing a building permit. The geotechnical evaluation/investigation should also address setbacks from existing slopes and recommendations for cut and fill and on-site stormwater management, as described in more detail below. In addition, the City should require special inspection by the geotechnical engineer during construction of soil- and foundation-related elements and a summary letter of compliance upon completion of the work.

The actual scope of the geotechnical evaluation/investigation will depend somewhat on the location within the study area and the proposed development. For example, for development in areas that will likely require little if any earthwork, a reconnaissance-level site evaluation may be adequate prior to issuing a building permit. However, if the new development requires cuts deeper than about 5 ft into the existing hillsides, the geotechnical engineer may need to consider performing subsurface explorations, such as test pit excavations and/or shallow borings, as part of their evaluation/investigation. For any development within or adjacent to mapped landslide areas or debris fans, or any development that requires excavations deeper than about 10 ft into the existing hillside, it would be prudent to perform a more-detailed, comprehensive geotechnical investigation prior to issuing a building permit. An engineering geologist should provide site-specific geologic input for any development with proposed cuts deeper than about 10 ft and all evaluations within the limits of mapped landslide areas and debris fans.

To assist the City, GRI has prepared the following geotechnical-related considerations for future development in the Park Place Concept Plan area.

1) Require a development- and/or lot-specific evaluation/investigation and report by a Professional Engineer, registered in the State of Oregon, who by training, education, and experience is qualified in the practice of geotechnical engineering. The engineer should be assisted in the evaluation of mapped landslide areas and debris fans by a Certified Engineering Geologist (CEG) certified in the State of Oregon. The evaluation/investigation and report should include, but not be limited to, the following type of considerations, as appropriate for the type of proposed development:

General earthwork considerations, including recommendations for temporary and permanent cut and fill slopes and placement of structural fill,

Location of residence on lot,

Building setbacks from slopes,

Subdrainage and/or management of groundwater seepage,

Foundations,

Embedded/retaining walls,

Management of surface water and irrigation water, and

Impact of the development on the slope stability of the lot and the adjacent properties

2) The geotechnical engineer of record should review final grading, drainage, and foundation plans and specifications and confirm in writing that they are in conformance with the recommendations provided in their report.

3) For large complex developments on sites with challenging conditions, at the City's discretion, it may be appropriate to obtain a peer review of the geotechnical evaluation/investigation report for the development and/or lot plans. The peer reviewer should be selected by the City. tThe applicant's geotechnical engineer will need to respond to written comments provided by the City's peer review prior to issuance of building permit.

4 The applicant's geotechnical engineer should provide special inspection during construction to confirm that the subsurface conditions/assumptions made as part of their geotechnical evaluation/investigation are appropriate. This will allow for timely design changes if site conditions are encountered that are different from those anticipated. In addition, prior to issuing an occupancy permit, the City should require the geotechnical engineer to prepare a summary letter stating that the soils- and foundation-related project elements were accomplished in substantial conformance with their recommendations.

Concluding Remarks and Limitations

This report has been prepared to identify geologic hazards and geotechnical considerations associated with future development in the Park Place Concept Plan study area.

The opinions and recommendations stated in this report are based on a review of the previous work completed in the study area by others and other sources of information described herein. With respect to the work performed by others, GRI did not participate in the implementation of the work and did not independently verify the accuracy or completeness of the information provided. GRI makes no representations or warranty regarding instruments of service completed by others. The information presented in this report was developed by GRI in a manner consistent with that level of care and skill

ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty, expressed or implied, is made.

It is important to note that GRI's work evaluated the study area as a whole and did not address individual properties. For this reason, property owners/developers should retain qualified engineers and geologists to assist in the evaluation of specific properties and to prepare associated development plans and designs.

This evaluation has been prepared to aid SERA Architects and the City in the completion of the Park Place Concept Plan. The scope is limited by the fact that the actual plans for the study area are indefinite; hence, only preliminary opinions are presented.

Submitted for GRI,

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Principal

George A. Freitag, RG, CEG
Associate

Tova R. Peltz, PE, RG
Project Engineer/Geologist

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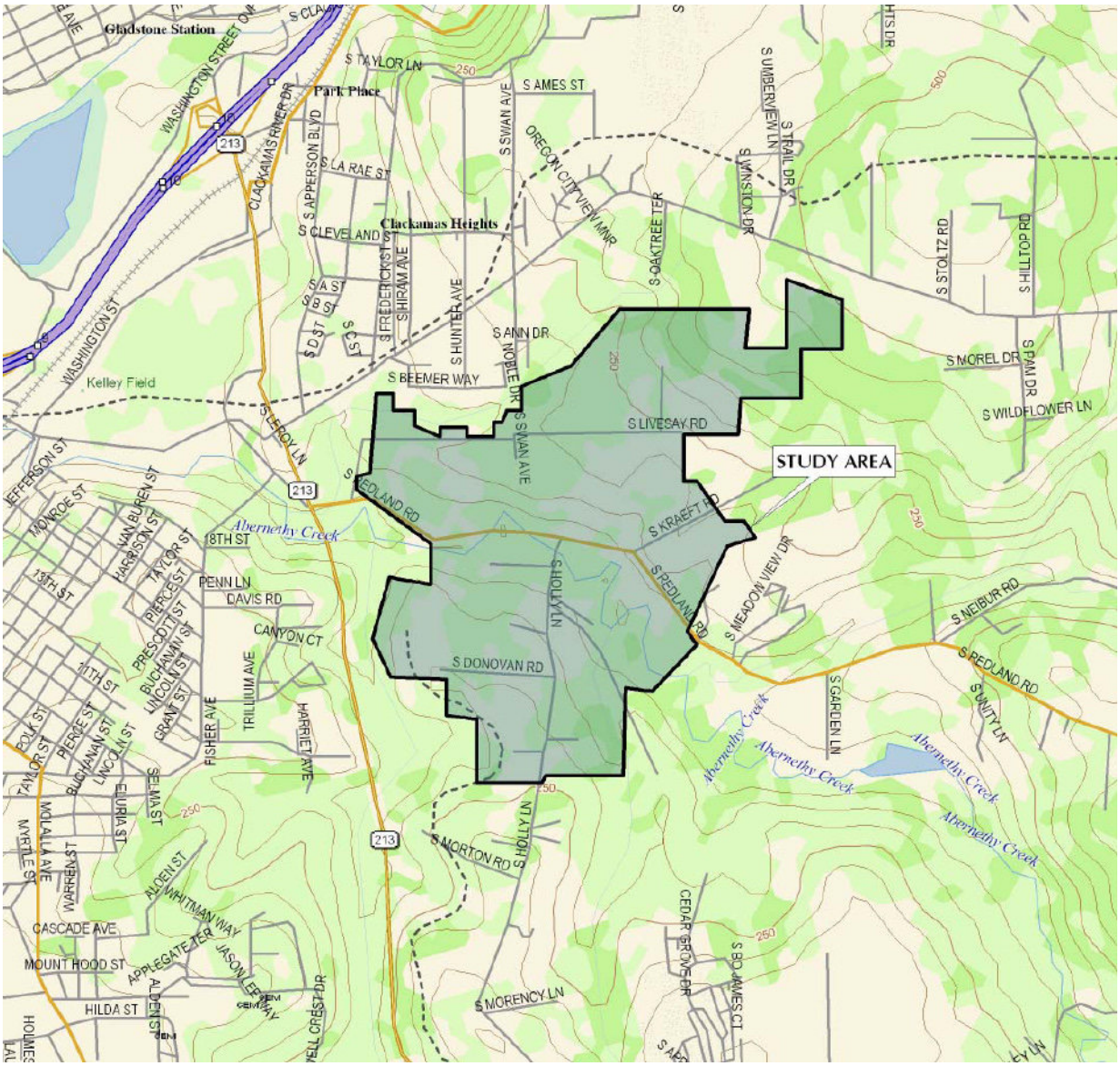


DELORME 3-D TOPOQUADS, OREGON
OREGON CITY, OREG. (1bb, 2aa, & 2ad) 2004

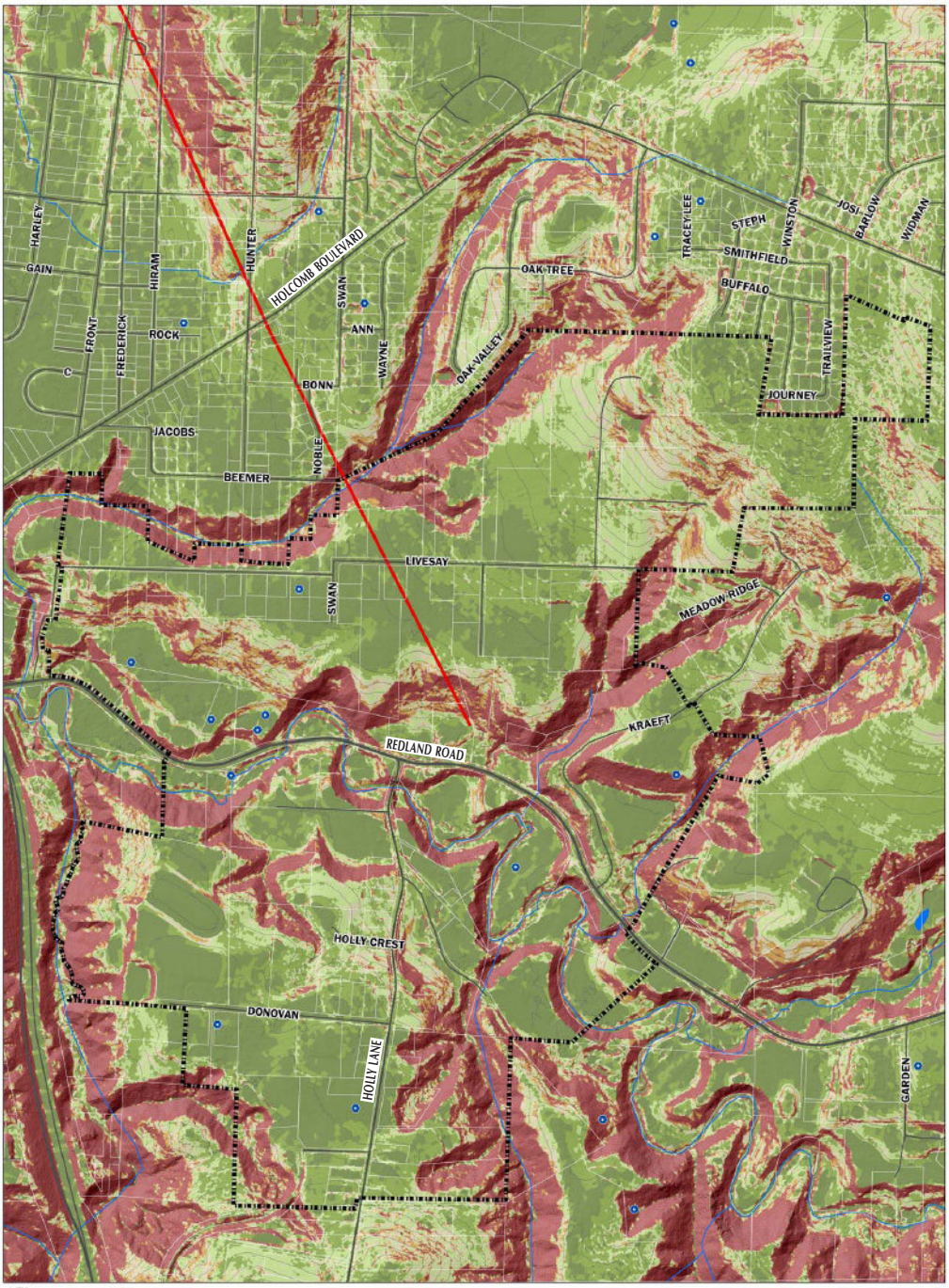
North

0 1/2 1 MILE

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

VICINITY MAP

FEB. 2007 JOB NO. 4584 FIG. 1



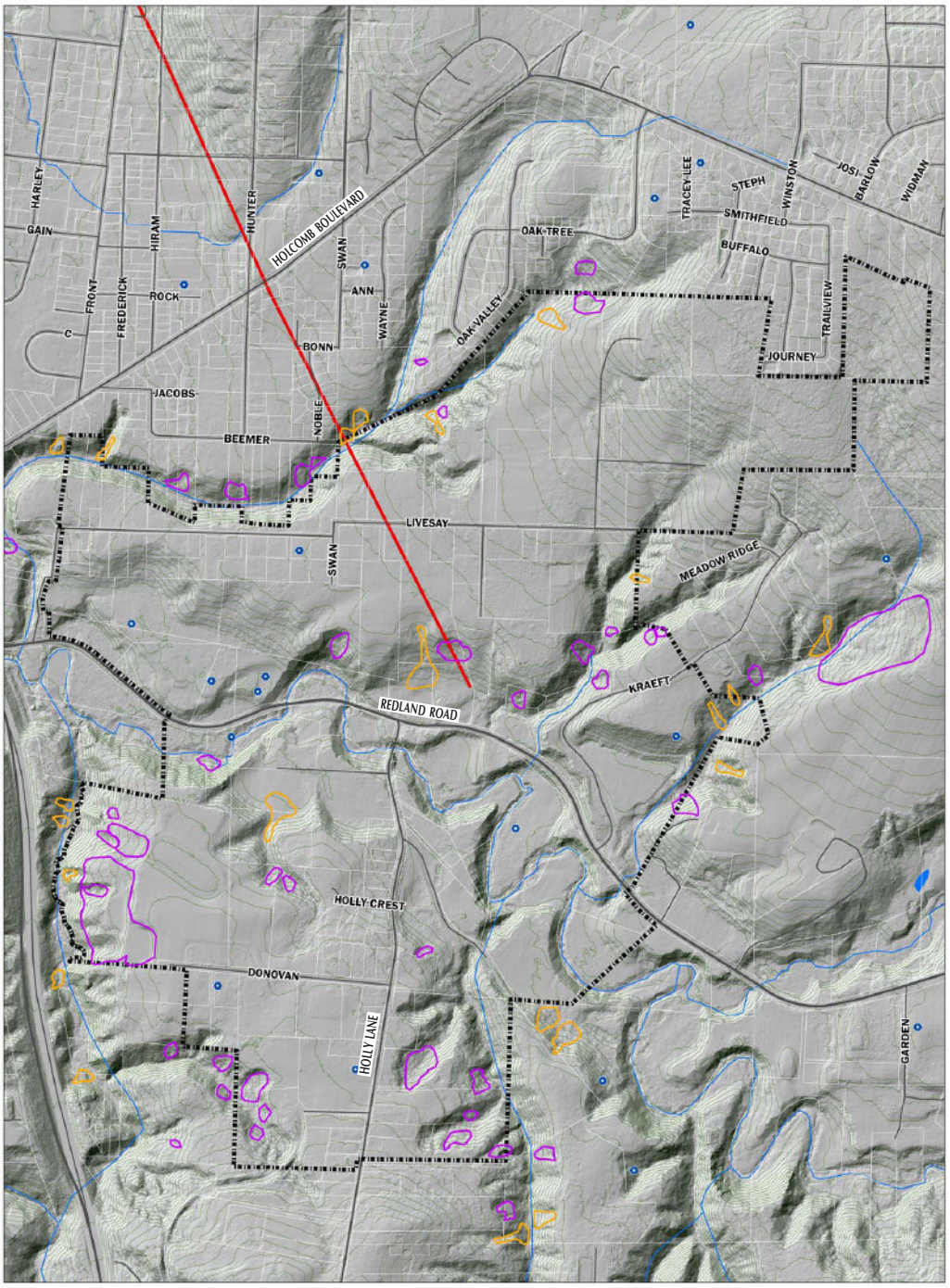
Park Place Concept Plan

Slope

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

SLOPE MAP

FEB. 2007 JOB NO. 4584 FIG. 2

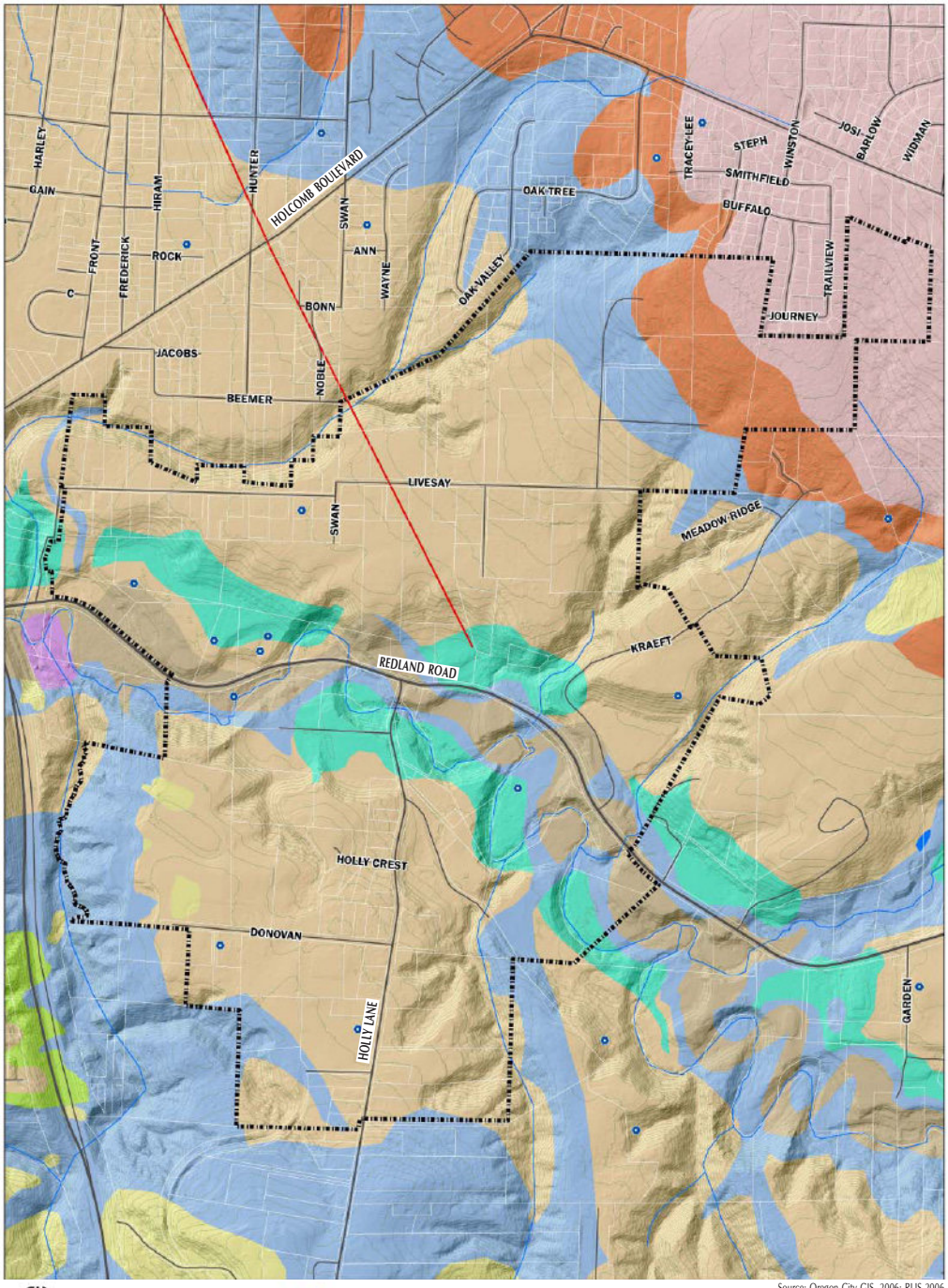


Park Place Concept Plan
Landslide Geomorphology

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

LANDSLIDE GEOMORPHOLOGY

FEB. 2007 JOB NO. 4584 FIG. 3



Source: Oregon City GIS, 2006; RLIS 2006
(Based on Madin, in press)

Study Area
Located Wells
Road
Fault Line
Waterway
Contour = 10'

Geologic Map Unit

af
Tt
Qt
Qls
Qff
Qbo
Qbc
Qal
QTs

af	Artificial Fill (Recent)
Qal	Alluvium (Late Pleistocene-Holocene)
Qt	Terrace Deposits (Late Pleistocene-Holocene)
Qff	Fine-grained Facies of Missoula Flood deposits (Latest Pleistocene)
Qls	Quaternary Landslides (Pleistocene-Recent)
Qbc	Boring Volcanic Field-Basalt of Canemah (Pleistocene)
Qbo	Boring Volcanic Field-Basalt andesite of Outlook (Pleistocene)
QTs	Springwater Formation (Pliocene to Pleistocene)
Tt	Troutdale Formation (Miocene to Pliocene)

Park Place Concept Plan
Geology

North

0 700 1,400 FT

GRI SERA ARCHITECTS
PARK PLACE CONCEPT PLAN, CITY OF OREGON CITY

GEOLOGY MAP

FEB. 2007 JOB NO. 4584 FIG. 4

L. Preliminary Costs

* See Section 5 (Funding and Finance) of Park Place Concept Plan Draft: May 30, 2007 - Version 1.2 Redline.