2018 Cornelius Transportation System Plan: Volume 2 - Technical Appendix

February 2018

TM #1 – Public Involvement Plan

MEMORANDUM

DATE: November 21, 2016

TO: Cornelius TSP Project Management Team

FROM: Reah Flisakowski, DKS Associates
Julie Sosnovske, DKS Associates

SUBJECT: Cornelius Transportation System Plan Update
Technical Memorandum #1: Public Involvement Plan P09042-048

Cornelius has recognized that citizen involvement is necessary in making wise and legitimate decisions through its Comprehensive Plan. The following strategy reflects the city's Comprehensive Plan policies regarding citizen involvement and provides specific actions for engaging citizens and stakeholders in the Transportation System Plan (TSP) development process.

The city will involve the public and stakeholders primarily through a series of committee meetings, community events, and community presentations, in addition to the distribution of project information through a variety of media, including a project website. The following describes each of these outreach mechanisms.

Project Advisory Committee (PAC)

A project advisory committee will inform and guide the plan. All committee meetings will be held at Cornelius City Hall Council Chambers.

Project Advisory Committee (PAC) – The primary function of the PAC is to provide recommendations for the project, acting as community and technical representatives. They represent a wide array of interests, which may include: freight organizations, businesses, residents, property developers, the active transportation community, Hispanic community representatives, public health officials, affordable housing roups, and environmental and environmental justice communities. The PAC will also include representatives of affected agencies and service providers, potentially from Washington County, Metro, ODOT, ODOT Rail Division, Oregon Department of Land Conservation and Development, TriMet, the school district, Union Pacific Railroad, adjacent city staff and others as identified by the PMT (project management team). PAC Members who have committed so far are listed in Table 1.

Table 1: Cornelius TSP Project Advisory Committee

Name	Affiliation	Phone or Email
Joseph Auth	CPO12C	jauth@vt.edu
Sam Dalrymple	Cornelius Citizen	503-844-7445
Laura Weigel	City of Hillsboro	laura.weigel@hillsboro-oregon.gov
Inna Levin	Oregon Walks	inna@oregonwalks.org
Gracie Garcia	Bienestar	ggarcia@bienestar-or.org
Karen Savage	Washington County	Karen_Savage@co.washington.or.us
Marah Danielson	ODOT Planning	marah.b.danielson@odot.state.or.us
Carrie Martin	ODOT Rail	carrie.a.martin@odot.state.or.us
Tom Mills	Trimet	millst@trimet.org
Jon Holan	City of Forest Grove	jholan@forestgrove-or.gov
Maria Loredo	VG Wellness Center	
Anne Debbaut	DLCD	anne.debbaut@state.or.us
TBD	Fred Meyer	
TBD	Cornelius citizen	
Adam Stewart	Hillsboro School District	stewarta@hsd.k12.or.us
Yvonne Curtis	Forest Grove School District	ycurtis@fgsd.k12.or.us
Caleb Winter	Metro	Caleb.Winter@oregonmetro.gov
Mary Kyle McCurdy	1,000 Friends of Oregon	mkm@friends.org

The PAC will meet three times, as follows:

- **PAC Meeting #1 (February, 2017)** - The first meeting will provide a project orientation and discuss Technical Memos #2 to #5. Information covered will include Plan and Policy Framework, Project Goals, Objectives and Evaluation Criteria, Funding, and Existing and Future Conditions and Needs.
- **PAC Meeting #2 (May, 2017)** - The second meeting will be a review and discussion of Technical Memos #6 and #7. Information covered will include potential TSP and regulatory solutions.
- **PAC Meeting #3 (September, 2017)** - In the third meeting, the PAC will discuss and provide input on Technical Memo #8 (Planned and Financially Constrained Transportation Systems).

PAC meetings will welcome public attendance; however, non-PAC members must hold questions and comments until a designated period at the end of the meeting. Advertisement of meetings will be the City's responsibility through the project website, the city's website, and media notices in the local newspaper.

Community Outreach/Events

The City shall conduct two online surveys, host one community meeting and conduct presentations with up to five community groups over the course of the project.

Community Surveys

The City will conduct two online surveys, which will be accessed through the project website (www.ci.cornelius.or.us/tspupdate). The City will work with local community groups to help publicise the surveys to encourage participation from a broad range of community members. Survey questions will be provided in English and Spanish, with translation services provided by Centro Cultural de Washington County (CCWC). The content of the surveys will be as follows:

- **Community Online Survey #1 (November/December, 2016)** – This survey will ask participants to rate their agreement with or support for transportation planning goals and objectivies identified in Technical Memo #3 and to identify location-specific transportation issues and opportunities in Cornelius.
- **Community Online Survey #2 (May/June, 2017)** – This survey will ask participants their relative support or priorities for the transportation solutions identified in Technical Memo #6 (TSP Solutions). The survey will incorporate project lists, maps and other graphics, as needed to illustrate the proposed solutions.

Community Meeting

The purpose of the meeting is to gather feedback on the recommendations in Technical Memo #6 (TSP Solutions). The meeting will be held in May or June, 2017.

The City shall send meeting notices to residents, property owners, and business owners, as well as media representatives, including residents within the TSP study area. The City will coordinate with Centro Cultural de Washington County to ensure outreach to the Hispanic population in the community. The City will provide an announcement for the meeting and post the announcement on the project website.

The City and CCWC will make presentations in English and Spanish and provide a bilingual graphic, easy to understand handouts, displays and maps. The Consultant will attend the community meeting to answer questions.

Community Presentations

The City will arrange and conduct presentations with up to five community groups in order to provide additional opportunities for citizens to participate in the process, without having to attend a separate project-specific meeting (such as the Community Meeting). Each of these presentations shall occur at a regularly scheduled meeting of a community organization (planned venues include Cornelius Booster Club, CPO 12C, and Centro Cultural de Washington County - translated in Spanish). The City will prepare brief presentations, handouts, maps and short questionnaires, similar to those provided at the Community Meeting.

Community Meeting/Presentation Advertising

The City uses the following key public outreach venues:

- Publication in the News-Times (Pamplin Media Group); submittal deadline is Thursday before 4pm for publication the following Wednesday
- Publication in the Cornelius Gazette (monthly newsletter that is delivered with utility bill); submittal deadline is the 14th of the month prior to the next month's edition.
- Posting flyers at local venues, including: Centro Cultural, City Hall, Cornelius Library, City Development & Operations office; Virginia Garcia Memorial Wellness Center; Fred Meyer; Coastal Farm & Ranch; Wilco
- Verbal announcements at the end of each Planning Commission and City Council meeting. Planning Commission meets the fourth Tuesday of each month. City Council meets first and third Monday of each month. First City Council meeting is televised through Tualatin Valley Community TV.
- Work sessions and public hearings related to plan and policy adoptions are included in posted agendas, which are made available no less than seven days prior to the public hearing.
- The TSP Update is included on the City's website at: www.ci.cornelius.or.us/tspupdate. Announcements, reports, on-line surveys, and other related materials will be promptly posted on the website when made available to City staff.

Elected Officials Work Sessions and Hearings

The City Councilors and Planning Commissioners of Cornelius will engage in the TSP development process through a series of two joint work sessions (June, 2017 and January, 2018).

The first work session will provide the status of the project, results and recommendations, and provide an opportunity for officials to provide input on elements of the TSP completed to date (e.g. goals and objectives, financially constrained and planned transportation systems, and regulatory solutions). The second work session will solicit input on the Draft TSP.

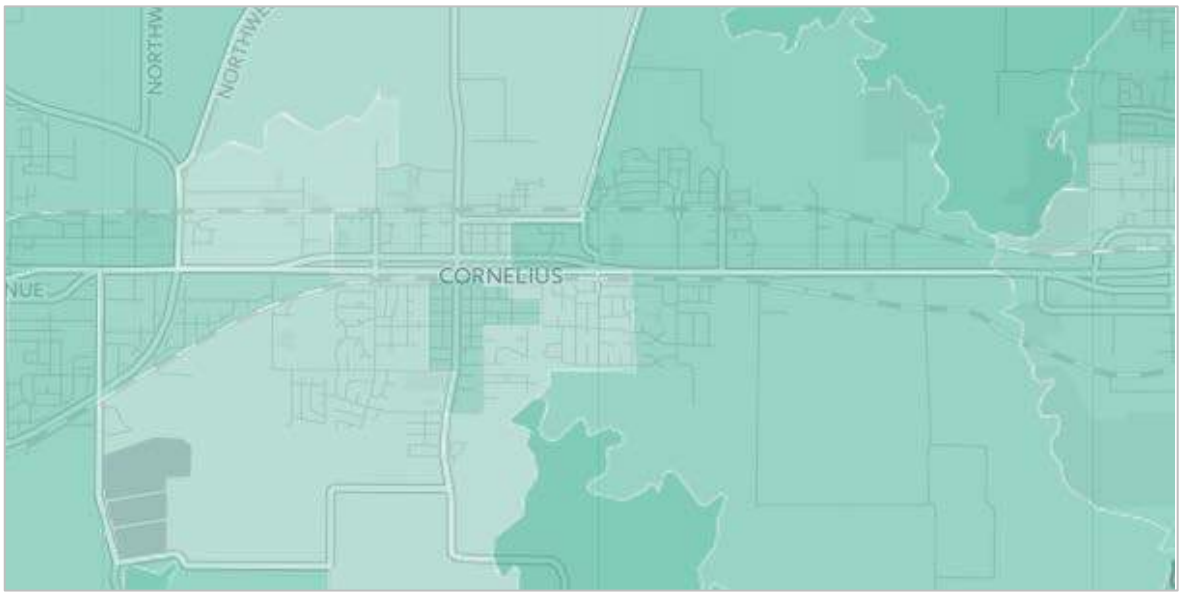
The Planning Commission and City Council will also be involved, separately, in the adoption hearings process. The City will arrange and conduct the Planning Commission and City Council Adoption Hearings for the Recommended TSP, Revised Implementing Ordinances, and Revised Adoption Findings.

Demographic Analysis

As part of the outreach to engage citizens and stakeholders in the TSP project, the city will make special efforts to involve minority and low-income groups. The demographic data summarized below compares Cornelius to Oregon as a whole.

Minority and Non-English Speaking Residents

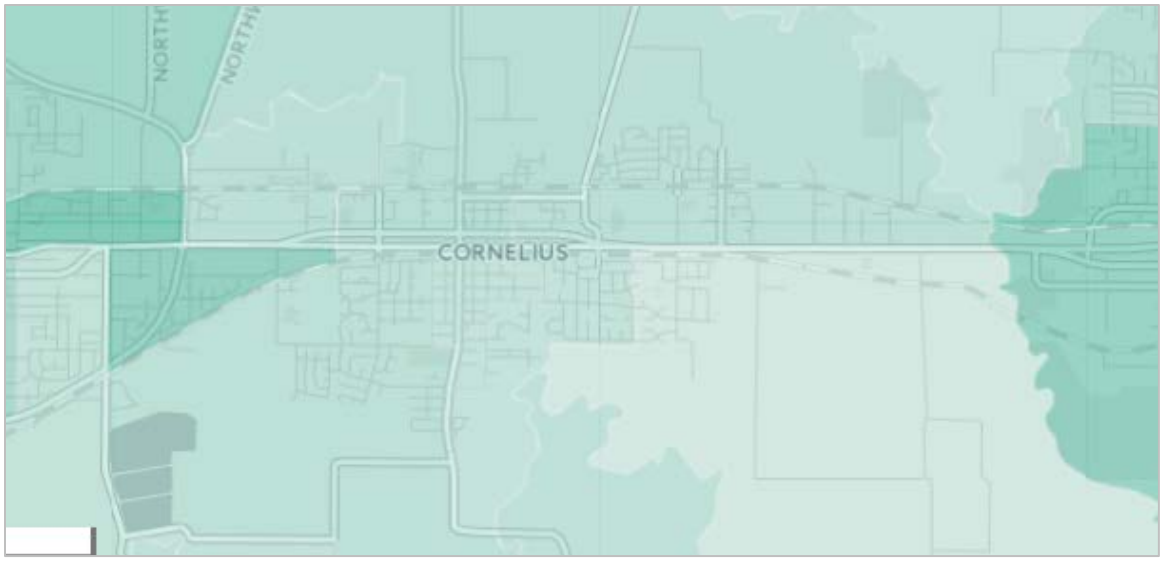
According to the 2014 American Community Survey, nearly 50 percent of the population of Cornelius is Hispanic, compared with 12 percent of the population of Oregon. Non-white ethnicity per capita is shown in the map below (ranging from light green at 66 percent to dark green at 17 percent). Although proficient English is spoken by 77 percent of Cornelius residents, key project documents will be translated into Spanish upon request. No other languages are spoken by a significant number of residents (more than one percent).



Source: U.S. Census Bureau, 2010-2014 American Community Survey (ACS) 5-Year Estimates.

Impoverished Residents

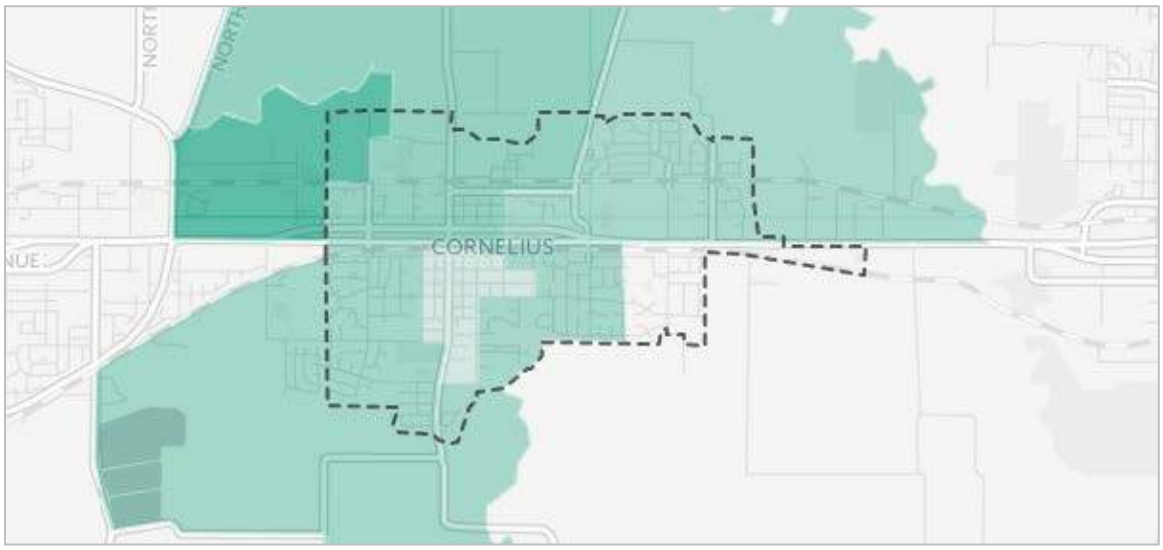
Approximately 13 percent of residents within Cornelius were below the poverty level in 2014. This is below the statewide average of about 17 percent. The median annual household income was around $55,000. This compares to about $50,000 for Oregon as a whole. The percentage of residents below the poverty level are shown in the map below (ranging from light green at 3 percent to dark green at 15 percent).



Source: U.S. Census Bureau, 2010-2014 American Community Survey (ACS) 5-Year Estimates.

Elderly Residents

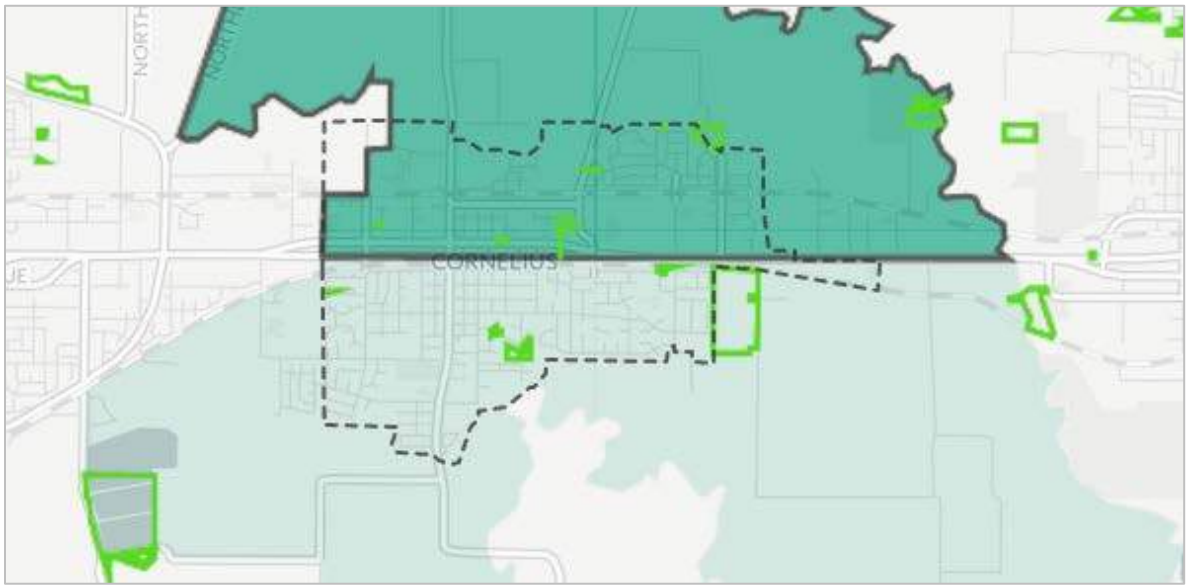
The majority of the residents in Cornelius are between the age of 18 and 64 (61 percent), slightly below that of the statewide average (63 percent). About 30 percent of residents are under the age of 18, significantly above the statewide average (23 percent), and 9 percent are 65 years and older, somewhat below the statewide average (15 percent). The median age of city residents is 30 years old compared to the state median age of 39 years old. The percentage of residents 65 years of age or older are shown in the map below (ranging from light green at 10 percent to dark green at 26 percent).



Source: U.S. Census Bureau, 2010-2014 American Community Survey (ACS) 5-Year Estimates.

Disabled Residents

About 10 percent of city residents have a disability, about four percent lower than the statewide average. The percentage of residents with a disability is fairly constant across the city as shown in the map below (ranging from light green at 9 percent to medium green at 11 percent). The bright green boundaries shown on the map are designated parks and open spaces.



Source: U.S. Census Bureau, 2010-2014 American Community Survey (ACS) 5-Year Estimates.

Distribution and Review of Work Products

The city will email project work products directly to PAC members, and post them to the project website for access by the general public. PAC members will be able to comment directly through regular committee meetings. The general public will be able to comment during the public comment period at the end of PAC meetings, at the community meeting and community presentations, and through the project website and online surveys. The project team will review comments input through the website and include them as part of the project record of public comments.

TM #2 – Plan and Policy Review

MEMORANDUM

DATE: December 12, 2016

TO: Cornelius TSP Project Management Team

FROM: Reah Flisakowski, DKS Associates
Julie Sosnovske, DKS Associates

CC: Darci Rudzinski, Andrew Parish, Angelo Planning Group

SUBJECT: Cornelius Transportation System Plan Update
Technical Memorandum #2: Plan and Policy Review P14180-048

This memorandum summarizes planning documents, policies, and regulations that are applicable to the Cornelius Transportation System Plan (TSP) update (see Attachment A for a complete list). The primary documents for which the City TSP update must be consistent are the Regional Transportation Plan (RTP), the Regional Transportation Function Plan (RTFP),[1] and the Transportation Planning Rule (TPR), OAR 660-012. In addition, consistency with the Washington County TSP is required. The City's current TSP serves as the foundation for the update that will address transportation needs through the year 2040.

Transportation System Planning in Oregon

Transportation system planning in Oregon is required by Statewide Planning Goal 12 – Transportation.[2] The Transportation Planning Rule (TPR), OAR 660-012, describes how to implement Statewide Planning Goal 12.[3]

By implementing Statewide Planning Goal 12 (Transportation), the TPR promotes the development of safe, convenient, and economic transportation systems that are designed to reduce reliance on the automobile. Key elements include direction for preparing TSPs under OAR 660-012-0015 through 0040.

[1] Metro's RTFP directs how cities should implement the RTP through the locally adopted TSP and land use regulations. The RTFP codifies the requirements that local plans must comply with to be consistent with the RTP. The RTFP is reviewed later in this memorandum; also, see Attachment B of this document for an audit of the City's existing policies and development regulations, as they relate to implementing the TSP and complying with the RTFP.

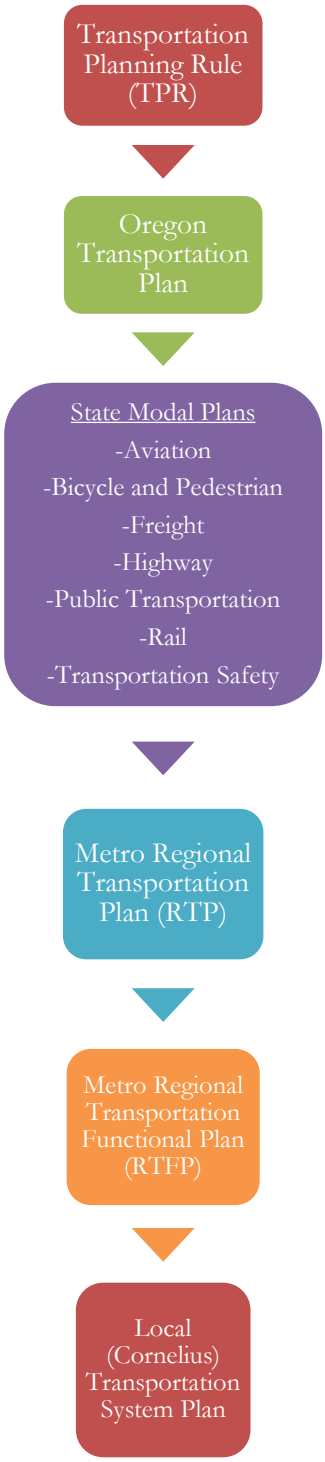
[2] Statewide Planning Goals: http: //www.oregon.gov/LCD/goals.shtml
[3] Transportation Planning Rule:
http://arcweb.sos.state.or.us/rules/OARS_600/OAR_660/660_012.html

OAR 660-012-0045 describes implementation of the TSP. It includes the requirement for each local government to amend its land use regulations to implement the TSP. It also requires local government to adopt land use or subdivision ordinance regulations consistent with applicable federal and state requirements, to protect transportation facilities, corridors and sites for their identified functions. This policy is achieved through a variety of measures, including access control measures, standards to protect future operations of roads, and expanded notice requirements and coordinated review procedures for land use applications. Measures also include a process to apply conditions of approval to development proposals, and regulations assuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities, and performance standards of facilities identified in the TSP.

Specifically, the TPR requires:

- The state to prepare a TSP, referred to as the OTP; and
- Counties and cities to prepare local TSPs that are consistent with the OTP.[4]

As the guiding document for Metro-area local TSPs, the RTP establishes goals, policies, strategies and initiatives that address the core challenges and opportunities facing transportation in the Portland Metro area. The goals and policies are further implemented by Regional Transportation Functional Plan.



[4] See Attachment C (Oregon Transportation Plan Policy Framework) and Attachment D (Oregon Transportation Plan Modal Plans) for more information about the OTP.

What this means for the Cornelius TSP Update: The TSP update will address the recent policy and regulatory changes to the OTP, OHP, TPR and RTP, as described in the TSP Guidelines and the specific policy documents.

Metro's Regional Transportation Functional Plan[7] (RTFP) directs how Cornelius should implement the RTP through the TSP and other land use regulations. The RTFP codifies transportation planning and implementation requirements that local plans must comply with to be consistent with the RTP. If a TSP is consistent with the RTFP, Metro will find it to be consistent with the RTP.[8]

The RTFP provides guidance on several areas including transportation design for various modal facilities, system plans, regional parking management plans and amendments to comprehensive plans. The following directives specifically pertain to updating local TSPs:

- Regional and state transportation needs identified in the 2040 RTP should be included in local plans
- Local needs must be consistent with RTP in terms of land use, system maps and non-SOV modal targets
- When developing solutions, local jurisdictions must consider a variety of strategies, in the following order:
    - TSMO (Transportation System Management Operations)
    - Transit, bicycle and pedestrian projects
    - Traffic calming
    - Land use strategies in OAR 660-012-0035(2)[9]
    - Connectivity, including pedestrian and bicycle facilities
    - Motor vehicle capacity projects
- Local jurisdictions can propose regional projects as part of the RTP process

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[7] Metro Regional Transportation Functional Plan: http://www.oregonmetro.gov/index.cfm/go/by.web/id=274

[8] The 2012 RTFP does not reflect the most recent RTP, adopted July 2014. Metro staff has provided a summary of what is new in the RTP and examples of local plan and policy language that comply with the new requirements. This document will be referenced in updating the Cornelius TSP; potential policy areas that will need to be addressed can be found later in this document, under Actions or Strategies to be considered in Updating the TSP.

[9] This section of the Transportation Planning Rule requires Metro area jurisdictions to evaluate land use designations, densities, and design standards to meet local and regional transportation needs.

- Local jurisdictions can propose alternate performance and mobility standards, however, changes must be consistent with regional and statewide planning goals
- Local parking regulations must be consistent with the RTFP

What this means for the Cornelius TSP Update: The TSP update will address the recent policy and regulatory changes required in the RTFP, as described above, to ensure that Cornelius' TSP is consistent with Metro's RTP.

As a result of the TSP update, amendments to the City's Comprehensive Plan and land development code may be recommended in order to better comply with the RTFP. A checklist with a detailed review of the City's existing development requirements, as they relate to TSP implementation and RTFP compliance, is provided in Attachment B. Key areas of review and potential modifications are summarized below:

- **Chapter 17.05 Land Divisions.** Potential updates to the subdivision ordinance to address street spacing, bicycle/pedestrian accessways, and limitations on cul-de-sacs.
- **Chapter 18.143 – Transportation Facilities** requirements will be further evaluated and possibly amended to reflect the updated TSP, including:
  - "Complete" street design elements, those that accommodate multiple modes
  - Green street design elements, related to stormwater quality
  - Street design standards that can accommodate future "community connector" transit service, as described in the Westside Service Enhancement Plan
  - Sidewalk and pedestrian route placement and construction
  - Transportation demand management, transportation systems management and operations, and parking management programs
  - Street design cross-sections and access standards
  - Transit-supporting requirements, related to planned transit stops and coordination with TriMet.
- **Chapter 18.145 – Off-Street Parking and Loading**. The TSP update will include an evaluation of existing conditions and future transportation needs and, while this may include a discussion about parking, this planning process is not expected to specifically address parking management strategies for the Core Commercial-Employment District and Main Street District. However, if necessary and where consistent with planning recommendations, existing parking and loading requirements may need to be reexamined for consistency with the updated TSP.

Why does Cornelius need an Updated TSP?

The City's current TSP was adopted in 2005. Since then, several regulations and requirements have been integrated or modified in the TPR, OTP, State Modal Plans, and Metro's RTP (Regional Transportation Plan) and RTFP (Regional Transportation Functional Plan). The current effort will develop a TSP for Cornelius that better reflects the multi-

modal, integrated nature of transportation planning and provides relevant guidance, based on updated policy, objectives and modeling, for all modes of travel. In doing so, this TSP update will bring the City's long-range transportation plan into compliance with regional and state requirements (including the RTFP and the TPR) and will ensure that the new TSP will appropriately serve the transportation needs of all citizens.

How is the Transportation System Defined?

The following subsections summarize the state and local roadway classifications and land use designations for areas of Cornelius. This information ultimately informs the adopted standards, regulations, and policies that apply to the multi-modal transportation system in Cornelius.

Cornelius Classification for Roadways

To manage the roadway network, the City classifies roadways based on a hierarchy according to the intended purpose of each road. From highest to lowest intended usage, the classifications are arterials, collectors, neighborhood routes and local streets. Roadways with a higher intended usage generally provide more efficient traffic movement (or mobility) through the City, while roadways with lower intended usage provide greater access for shorter trips to local destinations such as businesses or residences.

- **Arterial Streets** are intended to serve as the main travel route through the City or act as a corridor connecting many parts of the City. These roadways serve the highest volume of motor vehicle traffic and are primarily utilized for longer distance regional trips. In Cornelius, OR 8 (Tualatin-Valley Highway), 10th Avenue and 19th Avenue are classified as arterials.
- **Collector Streets** often connect the neighborhoods to the arterial roadways. These roadways generally provide more direct property access than arterial roadways, while providing efficient through movement for local traffic. In Cornelius, 29th Avenue, 26th Avenue, 14th Avenue, 4th Avenue, Holladay Street/Holladay Drive/Davis Street, Dogwood Street, and Heather Street are classified as collectors.
- **Neighborhood Routes** are similar to collector streets in that they provide greater accessibility to neighborhoods and provide efficient through movement for local traffic. While some may interpret the term "neighborhood" to imply residential land use, this classification refers to a level of connectivity for any land use type, including commercial and/or industrial land uses. Neighborhood routes are not required to provide bicycle facilities. Therefore, routes with relatively low traffic volumes, where bikes could travel comfortably in a shared lane environment, would be designated neighborhood routes. Posted speeds on neighborhood routes are typically 25 to 30 miles per hour. In Cornelius, 12th Avenue and Linden Street are classified as neighborhood routes.
- **Local Streets** provide more direct access to residences without serving through travel in Cornelius. These roadways are often lined with residences and are

designed to serve lower volumes of traffic with a statutory speed limit of 25 miles per hour. All remaining streets in Cornelius are classified as locals.

> What this means for the Cornelius TSP Update: **The functional classification system for the City will be revisited and revised, if necessary, for the TSP update.**

ODOT Classifications for State Highways in Cornelius

OHP Goal 1, Policy 1A (State Highway Classification System) categorizes state highways for planning and management decisions. Within Cornelius, the only state highway is classified as a Statewide Highway (see summary at the end of this section). Statewide Highways typically provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreation areas. A secondary function is to provide connections for intra-urban and intra-regional trips. The management objective is to provide safe and efficient, high-speed, continuous-flow operation. In constrained and urban areas, interruptions to flow should be minimal. Inside Special Transportation Areas (see Special Designations below), local access may be a priority.

Special Designations: OHP Goal 1, Policy 1B identifies special highway segment designations for specific types of land use patterns to foster compact development on state highways in which the need for appropriate local access outweighs the considerations of highway mobility. Within Cornelius, one Special Transportation Area (STA) is designated:

- OR 8 (Tualatin Valley Highway, Hwy. 29, MP 14.88 – 17.22) between 20th Avenue and 10th Avenue

The primary objective of a STA is to provide access to and circulation amongst community activities, businesses, and residences and to accommodate pedestrian, bicycle, and transit movement along and across the highway. While traffic moves through an STA and automobiles may play an important role in accessing an STA, convenience of movement within an STA is focused upon pedestrian, bicycle, and transit modes. STAs look like traditional "Main Streets" and are generally located on both sides of a state highway. Direct street connections and shared on-street parking are encouraged. Local auto, pedestrian, bicycle, and transit movements to the area are generally as important as the through movement of traffic. Because of this, ODOT's mobility targets and design standards in STA's are intended to allow for lower speed operations.

> What this means for the Cornelius TSP Update: **The downtown portion of OR 8 (Tualatin Valley Highway) in Cornelius that has the STA characteristics identified in the OHP is already designated as a STA.**

State Highway Freight System: OHP Goal 1, Policy 1C addresses the need to balance the movement of goods and services with other uses. It states that the timeliness of freight movements should be considered when developing and implementing plans and projects on

freight routes. Within Cornelius, Highway 8 is classified as part of the NHS (National Highway System).

> **What this means for the Cornelius TSP Update: Transportation solutions along highways through Cornelius must be accommodating to the NHS designation.**

Reduction Review Routes: An Administrative Rule was recently adopted to provide clear direction in the implementation of ORS 366.215. The rule requires review of all potential actions that will alter, relocate, change or realign a Reduction Review Route that could result in permanent reductions in vehicle-carrying capacity. Reduction of vehicle-carrying capacity means a permanent reduction in the horizontal or vertical clearance of a highway section, by a permanent physical obstruction to motor vehicles located on useable right-of-way subject to Commission jurisdiction, unless such changes are supported by the Stakeholder Forum. If ODOT identifies that an action may result in a reduction of vehicle-carrying capacity, a Stakeholder Forum will be convened to help advise ODOT regarding the effect of the proposed action on the ability to move motor vehicles through a section of highway. Within Cornelius, OR 8 is classified as a Reduction Review Route.

> **What this means for the Cornelius TSP Update: Transportation improvements recommended on Reduction Review Routes, including OR 8, will include a record of the proposed roadway dimensions and sufficient detail to allow for a review of Vehicle-Carrying Capacity during future design.**

Lifeline Routes: OHP Goal 1, Policy 1E designates routes for emergency response in the event of an earthquake, categorized as Tier 1, 2 and 3. The routes identified as Tier 1 are considered to be the most significant and necessary to ensure a functioning statewide transportation network. A functioning Tier 1 lifeline system provides traffic flow through the state and to each region. The Tier 2 lifeline routes provide additional connectivity and redundancy to the Tier 1 lifeline system. The Tier 2 system allows for direct access to more locations and increased traffic volume capacity, and it provides alternate routes in high-population regions in the event of outages on the Tier 1 system. The Tier 3 lifeline routes provide additional connectivity and redundancy to the lifeline systems provided by Tiers 1 and 2. There are no designated lifeline routes in Cornelius.

> **What this means for the Cornelius TSP Update: The City could use the TSP update to designate local lifeline routes, if necessary, to ensure their intended function is considered in system investment and management decisions.**

Summary of ODOT Classifications

Updates to the TSP will support the existing highway classifications and will enhance the ability of the highways in Cornelius to serve their defined functions. The following summarizes the classifications of state highways in Cornelius:

- **OR 8** (Tualatin Valley Highway, No. 29) is classified as a Statewide Highway, part of the National Highway System (NHS) and a Reduction Review Route. Between 20th Avenue and 10th Avenue, OR 8 is designated as an STA.

How is the Transportation System Managed?

City Mobility Standards: The Cornelius Municipal Code specifies that City street intersections shall maintain a level of service (LOS)[10] of "D" during the p.m. peak hour of the day. LOS of "E" may be accepted for local street approaches or driveway access points that intersect with collector or arterial streets, if these intersections are found to operate safely.[11]

What this means for the Cornelius TSP Update: City street performance will be evaluated in using a mobility standard requiring operation of LOS D during the p.m. peak hour of the day. LOS E may be accepted for some local street or driveway approaches. The City may wish to revisit the mobility standard identified in the 2005 TSP and customize it to meet the City's current needs.

State Highway Mobility Targets: OHP Goal 1, Policy 1F sets mobility targets for ensuring a reliable and acceptable level of mobility on the highway system. Each intersection along state highways has a mobility target requiring that the highway operate at or below a specified volume to capacity (v/c) ratio. The mobility targets shown in Table 1 are applicable to highways in Cornelius (pursuant to Policy 1F, Table 6).

> **Volume to capacity (V/C) ratio.** A decimal representation (between 0.00 and 1.00) of the proportion of capacity that is being used (i.e., the saturation) at a turn movement, approach leg, or intersection. It is determined by dividing the peak hour traffic volume by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. As the ratio approaches 1.00, congestion increases and performance is reduced. If the ratio is greater than 1.00, the turn movement, approach leg, or intersection is oversaturated and will experience excessive queues and long delays.

[10] Level of service measures the operation of an intersection on a scale of A to F, similar to letter grades, with traffic moving freely under LOS A conditions and heavily congested under LOS conditions.

[11] Cornelius Municipal Code Title 18 ZONING, 18.143.020 General provisions (H).

Table 1: Highway Intersection Mobility Targets

Highway (Segment)	Posted Speed / Metro Designation	Highway Signalized Intersections	Unsignalized Intersections	
			Highway Approaches	Side Street Approaches to Highway
OR 8 (from the west UGB to 345th Ave)	50 mph / Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99
OR 8 (from 345th Ave to 29th Ave)	40 mph / Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99
OR 8 (from 29th Ave to 20th Ave)	40 mph / Town Center / Main Street	1.1 / 0.99	1.1 / 0.99	0.99 / 0.99
OR 8 (from 20th Ave to 10th Ave)	30 mph / STA, Town Center / Main Street	1.1 / 0.99	1.1 / 0.99	0.99 / 0.99
OR 8 (from 10th Ave to 7th Ave)	30 mph / Corridor	1.1 / 0.99	1.1 / 0.99	0.99 / 0.99
OR 8 (from 7th Ave to 4th Ave)	30 mph / Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99
OR 8 (from 4th Ave to west city limits / Mountain View Ln)	40 mph / Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99

OHP Action 1F.3, of Policy 1F allows local jurisdictions to consider alternate mobility standards for state highways where it would be infeasible to meet the standards listed in Table 1 above. The alternative standards shall be clear and objective and must be related to v/c ratios. The standards must demonstrate that it would be infeasible to meet the highway mobility standards listed in Table 1 above and must be adopted as part of the local TSP. In addition, the TSP shall include all feasible actions for:

- Providing a network of local streets, collectors and arterials to relieve traffic demand on state highways and to provide convenient pedestrian and bicycle ways;
- Managing access and traffic operations to minimize traffic accidents, avoid traffic backups on freeway ramps, and make the most efficient use of highway capacity;

- Managing traffic demand, where feasible, to manage peak hour traffic loads on state highways;
- Providing alternative modes of transportation; and
- Managing land use to limit vehicular demand on state highways consistent with the Land Use and Transportation Policy (1B).

The TSP shall include a financially feasible implementation program and shall demonstrate strong public and private commitment to carry out the identified improvements and other actions. The alternate highway mobility standards will become effective only after the Transportation Commission has adopted them.

What this means for the Cornelius TSP Update: System performance for OR 8 will be measured, in part, using the adopted mobility targets. The TSP update will evaluate the need for adopting alternate mobility targets for OR 8 if there are no feasible project alternatives identified to meet the existing mobility targets.

Access Management on Local Roadways: Access spacing guidelines in the TSP recommend strategies for consolidating and managing access along streets in the City, and establish minimum spacing standards for driveways or public roadways under their jurisdiction. These access spacing standards are shown in Table 2.

Table 2: City Street Access Spacing Standards

Street Facility	Maximum spacing of roadways and driveways	Minimum spacing of roadways
Arterial	-	530 feet
Collector	530 feet	100 feet
Neighborhood/Local	530 feet	-
All Roads	Require an access report for new access points stating that the driveway/roadway is safe as designed, meeting adequate stacking, sight distance and deceleration requirements as set by ODOT, Washington County and AASHTO.	

What this means for the Cornelius TSP Update: The TSP update will revisit access spacing standards for streets in Cornelius, along with supporting policies that work towards meeting the access spacing standards in Table 2.

Access Management on Highways: The Oregon Access Management Rule[12] (OAR 734-051) attempts to balance the safety and mobility needs of travelers along state highways with the access needs of property and business owners. ODOT's rules manage access to the state's highway facilities in order to maintain highway function, operations, safety, and the preservation of public investment consistent with the policies of the 1999 OHP. Access management rules allow ODOT to control the issuing of permits for access to state highways, state highway rights of way and other properties under the State's jurisdiction.

In addition, the ability to close existing approaches, set access spacing standards and establish a formal appeals process in relation to access issues is identified. These rules enable the State to direct location and spacing of intersections and approaches on state highways, ensuring the relevance of the functional classification system and preserving the efficient operation of state routes.

OHP Goal 3, Policy 3A and OAR 734-051 set access spacing standards for driveways and approaches to the state highway system.[13] The standards are based on state highway classification and differ based on volume and posted speed. The applicable standards for highways in Cornelius are shown in Table 3.

Table 3: Highway Access Spacing Standards (>5,000 AADT)

Highway (Segment)	Posted Speed Limit	Minimum Intersection Spacing
OR 8 (from the east UGB to 345th Avenue)	50 mph	1,100 feet
OR 8 (from 345th Avenue to just west of 20th Avenue)	40 mph	800 feet
OR 8 (from just west of 20th Avenue to just west of 4th Avenue) (14th to 13th is 20 mph School Zone)	30 mph	500 feet
OR 8 (from just west of 4th Avenue to the west City Limits/Mountain View Lane)	40 mph	800 feet

What this means for the Cornelius TSP Update: ODOT access spacing standards for highways should be incorporated into the TSP, along with supporting policies that work towards meeting the access spacing standards in Table 3**.**

[12] Access Management Rule: http://arcweb.sos.state.or.us/rules/OARS_700/OAR_734/734_051.html

[13] ODOT Access Management Standards (Appendix C): www.oregon.gov/ODOT/TD/TP/OHP_AM.shtml

Major Projects: OHP Goal 1, Policy 1G requires maintaining performance and improving safety by improving efficiency and management before adding capacity. The intent of policy 1G and Action 1G.2 is to ensure that major improvement projects to state highway facilities have been through a planning process that involves coordination between state, regional, and local stakeholders and the public, and that there is substantial support for the proposed improvement.

> What this means for the Cornelius TSP Update: **The TSP update will consider project alternatives that improve or manage the existing transportation system before implementing higher cost street capacity enhancement projects.**

Projects off Highways: OHP Goal 2, Policy 2B establishes ODOT's interest in projects on local roads that maintain or improve safety and mobility performance on state roadways, and supports local jurisdictions in adopting land use and access management policies.

> What this means for the Cornelius TSP Update: **The TSP will include sections describing existing and future land use patterns, access management and implementation measures, and will consider solutions that reduce the need for local trips on highways.**

Traffic Safety: OHP Goal 2, Policy 2F identifies the need for projects in the state to improve safety for all users of the state highway system through engineering, education, enforcement, and emergency services. One component of the TSP is to identify existing crash patterns and rates and to develop strategies to address safety issues. Proposed projects will aim to reduce the vehicle crash potential and/or improve bicycle and pedestrian safety by providing upgraded facilities that meet current standards.

> What this means for the Cornelius TSP Update: **The TSP update will develop projects that ensure the transportation system maintains and improves individual safety and security by maximizing the comfort and convenience of walking, biking and transit transportation options, public safety and service access.**

Alternative Passenger Modes: OHP Goal 4, Policy 4B, requires that highway projects encourage the use of alternative passenger modes to reduce local trips. The TSP will also consider ways to support and increase the use of alternative passenger modes to reduce trips on highways and other facilities.

> What this means for the Cornelius TSP Update: **The TSP update will incorporate the recommended improvements from the Transit Plan, and will consider additional solutions that will enhance multi-modal travel in Cornelius.**

Transportation Demand Management: OHP Goal 4, Policy 4D, encourages efficient use of the state transportation system through investment in transportation demand management strategies.

> **What this means for the Cornelius TSP Update: The TSP update will consider transportation demand management strategies to create greater mobility, reduce auto trips, make more efficient use of the roadway system, and minimize air pollution.**

Projects on Highways: The Highway Design Manual[14] (HDM) provides uniform design standards and procedures for ODOT and is in general agreement with the 2011 American Association of State Highway and Transportation Officials (AASHTO) *A Policy on Geometric Design of Highways and Streets*. Some key areas where guidance is provided are the location and design of new construction, major reconstruction, and resurfacing, restoration or rehabilitation (3R) projects. The HDM should be used for all projects on OR 8 in Cornelius to determine design requirements, including the minimum required volume-to-capacity ratios for use in the design of highway projects.

> **What this means for the Cornelius TSP Update: System performance of highway improvement projects will be measured, in part, using the HDM v/c ratios. While HDM standards must be applied to ODOT facilities, design exceptions can be granted to those standards where conditions justify such action in order to balance the policies and objectives of the Oregon Transportation Plan and Cornelius TSP, and with consideration given to the availability of transportation funding.**

County Mobility Standards: Washington County maintains a LOS standard for vehicle operations on County roads as described in Washington County TSP Objective 5.3 and Washington County TSP Table 3.1[15], shown below.

Objective 5.3 Utilize the Interim Washington County Motor Vehicle Performance Measures to manage congestion (please note Interim Washington County Motor Vehicle Performance Measures will be the same as the volume to capacity ratio (V/C) standards adopted in 2002 (see Table 3.1) until an analysis and update of performance standards has been completed and adopted).

- Strategy 5.3.1 Provide a transportation system that accommodates travel demand

[14] ODOT Highway Design Manual: http://www.oregon.gov/ODOT/HWY/ENGSERVICES/hwy_manuals.shtml

[15] Washington County Transportation System Plan, Effective November 27, 2015. Part 3: Transportation Modal Elements.

consistent with applicable performance standards for all modes of travel where feasible.

- Strategy 5.3.2 Provide a roadway system that meets the mobility needs of Washington County residents and businesses, as defined by performance standards identified in Interim Washington County Motor Vehicle Performance Measures of this plan.
- Strategy 5.3.3 Implement Washington County projects necessary to improve performance and reduce system design deficiencies in roadway corridors and segments that are operating or forecasted to operate at less than acceptable standards as identified in the Interim Washington County Motor Vehicle Performance Measures.
- Strategy 5.3.4 Implement Washington County's Comprehensive Plan, including the review of development applications, as defined by the performance standards identified in the Interim Washington County Motor Vehicle Performance Measures of this plan.
- Strategy 5.3.5 Help provide a roadway system that addresses travel demand associated with anticipated new development or redevelopment, by applying appropriate access management standards as defined and required within the Community Development Code (CDC).
- Strategy 5.3.6 Recognize that flexibility is necessary and it may not be desirable or practicable to meet the interim level-of-service standard in all cases.

ADOPTED TEXT

Table 3.1: Interim Washington County Motor Vehicle Performance Measures

Location[2]	Maximum Volume to Capacity (V/C) Ratio Standards			
	AM/PM Peak Two-hour Period			
	Target[1] Performance Measures[3]		Acceptable[1] Performance Measures[3]	
	First Hour[4]	Second Hour[4]	First Hour[4]	Second Hour[4]
Regional Centers Town Centers Main Streets Station Communities	.99 (E)	.9 (D)	.99 (E)	.99 (E)
Other Urban Areas	.9 (D)	.9 (D)	.99 (E)	.9 (D)
Rural Areas	.9 (D)	.9 (D)	.9 (D)	.9 (D)

1 For development review purposes, these performance standards will be used in assessing safety improvements. For plan amendment purposes, if a plan amendment is predicted to exceed the acceptable performance standard, the performance on applicable facilities will not be allowed to deteriorate further, and mitigation may be necessary. For project development purposes, these performance standards will be used to evaluate conditions beyond the transportation plan's planning horizon, as appropriate.
2 For location reference see 2040 Growth Concept Design Types Map.
3 Vehicle performance shall be determined by using volume-to-capacity ratios. Volume-to-Capacity equivalencies to Level of Service (LOS) are as follows: LOS C = V/C of 0.8 or lower; LOS D = V/C of 0.81 to 0.9; LOS E = V/C of 0.91 to 0.99. Further discussion of vehicle performance is provided in the Technical Appendix.
4 First Hour is defined as the highest hour of the day. Second hour is defined as the hour following the first hour.

For the portions of Washington County outside the UGB, ODOT mobility targets identified for rural highways apply. Certain segments may be designated as STA, which are subject to alternative mobility targets. There is an STA in Cornelius:

- OR 8 (Tualatin Valley Highway) from milepost 16.06 to 16.67 in Cornelius.

The alternative mobility target is described previous under "State Highway Mobility Targets".

Metro Land Use Designations for Cornelius

Metro's 2040 Growth Concept[16] in the RTP applies land use designations to the Portland region. The 2040 Growth Concept is the region's long range plan for managing growth by integrating land use and transportation. The concept concentrates mixed use and higher density development in areas of the region designated as "Centers", "Station Communities", and "Main Streets". The 2040 Growth Concept land uses are arranged in a hierarchy, with the primary and secondary land uses, referred to as 2040 Target Areas, as the focus of RTP investments. The hierarchy also serves as a framework for prioritizing RTP investments. Metro's 2040 Growth Concept is shown in **Figure 1** for the Cornelius area.

Primary land uses in Cornelius include:

- The "Cornelius Town Center" which is generally located north and south of OR 8 (Baseline/Adair) between approximately 26th Avenue and approximately 4th Avenue.

Secondary land uses in Cornelius include:

- The "OR 8 (Baseline/Adair) Corridor" from approximately 345th Avenue to the west city limits.
- The "Employment Land" in various areas of Cornelius, primarily in the northwest, but also south of OR 8 on the east end of town, west of N 19th Avenue on the north end of town and on the east side of S 10th Avenue on the south end of town.
- The "Parks and Natural Areas" throughout the city.

The remaining areas of Cornelius are designated as Neighborhood land uses. These areas have the lowest priority for RTP investments.

[16] Metro 2040 Growth Concept: http://www.oregonmetro.gov/2040-growth-concept

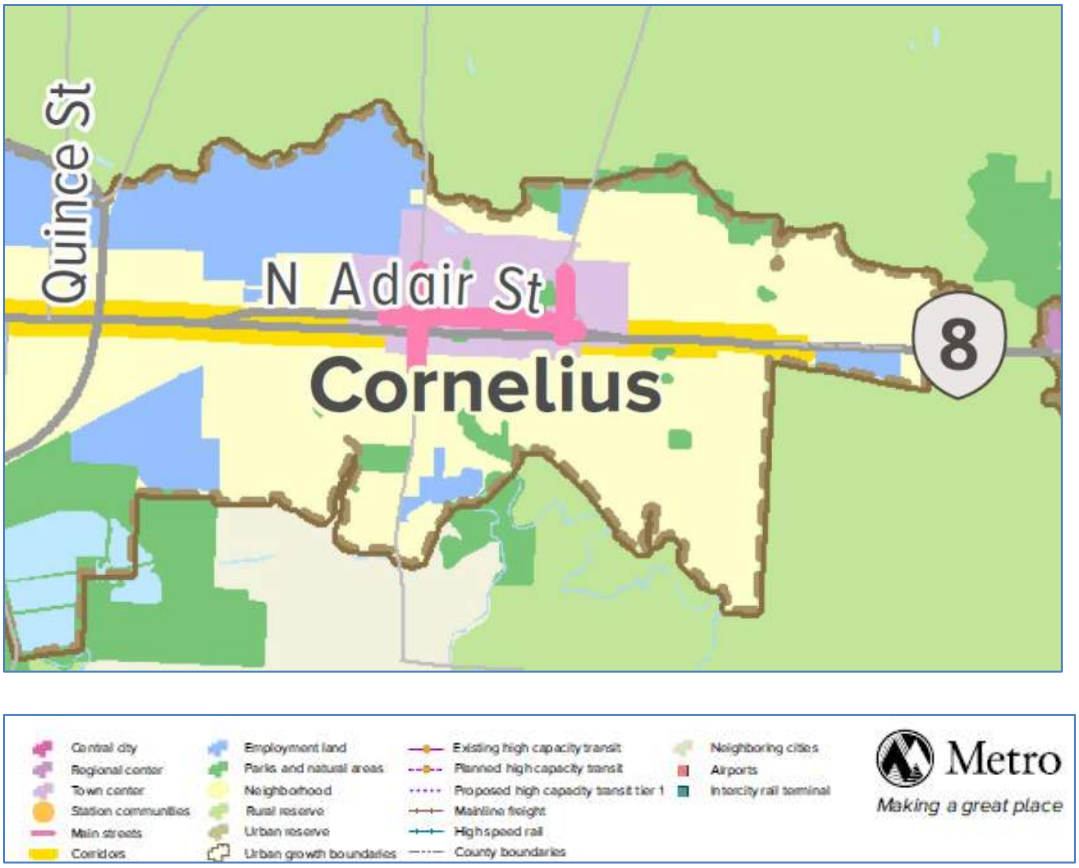

Figure 1: Metro's 2040 Growth Concept Map (Cornelius Area)

RTP Performance targets: The Metro RTP established new performance targets (see Table 4) for safety, congestion, freight reliability, climate change, active transportation, sidewalk/trail/transit infrastructure, clean air, travel, affordability, and access to daily needs. The performance targets are regional goals that the Cornelius TSP should work toward achieving.

Table 4: 2040 RTP Performance Targets

2040 RTP Performance Targets Objective	Target by 2040
Safety	Reduce serious injuries and fatalities in all modes of travel by 50% (vs. 2005)
Congestion	Reduce vehicle hours of delay (VHD) by 10% per person (vs. 2005)
Freight reliability	Reduce VHD per truck trip by 10% (vs. 2005)
Climate change	Reduce transportation greenhouse gas emissions by 40% (vs. 1990)
Active	Triple walking, biking and transit mode share (vs. 2005)

2040 RTP Performance Targets Objective	Target by 2040
transportation	
Basic infrastructure	Increase by 50% access times to sidewalks, trails and transit (vs. 2005)
Clean air	Ensure 0% population exposure to at-risk levels of pollution
Travel	Reduce vehicle miles traveled per person by 10% (vs. 2005)
Affordability	Reduce average household cost of housing and transportation by 25% (vs. 2000)
Access to daily needs	Increase by 50% the number of essential destinations within 30 minutes by bike, transit for low-income, minority, disabled pop. (vs. 2005)

In addition to supporting the performance targets, the TSP will need to incorporate transportation system management and operations (TSMO) into planning. The following RTP policies provide the foundation for TSMO in the region:

- Use advanced technologies, pricing strategies and other tools to actively manage the transportation system
- Provide comprehensive real-time traveler information to people and businesses
- Improve incident detection and clearance times on the region's transit, arterial and throughway networks
- Implement incentives and programs to increase awareness of travel options and incent change

What this means for the Cornelius TSP Update: The Cornelius TSP should work toward achieving the performance targets identified in Table 4 by recommending safety improvements, infrastructure improvements (e.g. connectivity, sidewalks, bicycle facilities), congestion mitigation, etc. In addition, the TSP will need to incorporate TSMO into its planning.

RTP Non-Single Occupancy Vehicle (SOV) Target: The RTP established regional mode share targets that are intended to be goals for cities and counties to work toward during implementation of the 2040 Growth Concept at the local level. Increases in walking, bicycling, ridesharing and transit mode shares will be used to demonstrate compliance with per capita travel reductions required by the state TPR. The following modal targets apply to RTP land uses in Cornelius:

- Regional Centers, Town Centers, Main Streets, and Corridors: Non-drive alone modal target of 45 to 55 percent

- Employment areas and Neighborhoods: Non-drive alone modal target of 40 to 45 percent

As required by the RTP and the TPR, jurisdictions within the Metro region must adopt policies and actions that encourage a shift towards non-SOV modes. The Metro Non-Single Occupancy Vehicle (SOV) Target Actions Study summarizes the required non-SOV strategy requirements for local jurisdictions to implement:

- Adopt 2040 modal targets in TSP policies
- Adopt street connectivity plans and implementing ordinances
- Adopt maximum parking ratios to implement the parking requirements of Title 2 of the Urban Growth Management Functional Plan
- Adopt transit strategies, including planning for adequate transit facilities and service; pedestrian facility planning and infrastructure that support transit use; location and design of buildings in transit zones that encourages transit use; and adoption of a transit system map, consistent with Metro requirements.

The Metro Non-Single Occupancy Vehicle (SOV) Target Actions Study recommends the following measures as additional strategies to be considered in the Cornelius TSP:

- Continue to require transportation-efficient development through efforts to meet density and other land use targets in centers and corridors as part of compliance with Metro Functional Plan and related requirements.
- Construct bicycle and pedestrian projects, consistent with state, federal and local government requirements. Local governments and Metro should prioritize projects that enhance connectivity of the bicycle and pedestrian system and access to transit.
- Continue to support TriMet and other transit agencies in providing frequent, reliable and comprehensive transit service, and local implementation of pedestrian and bicycle infrastructure to improve access to transit. Credit local jurisdictions with efforts to support transit agencies in these efforts.
- Support and encourage efforts to implement employer-based TDM strategies. Coordinate with employers even in areas where the formation of TMAs is not required.
- Encourage and assist in implementing parking cash-out programs or other techniques to eliminate employer subsidies for parking. Consider requiring local governments to eliminate free employee parking and provide informational materials and technical assistance to employers interested in implementing such programs.
- Support and coordinate Safe Routes to School programs and projects. Local jurisdictions and Metro should support and help coordinate these efforts through project funding and technical assistance.

What this means for the Cornelius TSP Update: The Cornelius TSP should adopt policies and actions that encourage a shift towards non-SOV modes, using measures such as those listed above.

Other Background Information for the TSP Update

The following sections summarize additional background information or guidance documents that will be used in updating the Cornelius TSP.

Cornelius Comprehensive Plan, Adopted July, 1978: The Cornelius Comprehensive Plan, most recently amended in 2015, includes a Transportation System Plan element (Chapter VIII), which includes the City's transportation goals and policies. This plan element provides the policy framework for the development and maintenance of the City's streets, transit, bicycle and pedestrian ways. It also discusses two special district plans (a Commercial Employment District and a Main Street District) provides a brief synopsis of key transportation routes in the City.

Overall, there are 10 goal statements in the chapter on transportation, as listed below:

- Provide public street standards that recognize the multi-purpose of the street right-of-way (utilities, vehicles, pedestrians).
- Provide transportation facilities that through design and location enhance the livability of Cornelius.
- Provide connectivity to each area of the City.
- Develop a safe, complete and efficient transportation system that provides multi-modal access.
- Establish rights-of-way at the time of development and where appropriate officially secure them by dedication of the property.
- Continue to coordinate with ODOT, Washington County, and adjacent property owners towards the goal of funding all planned improvements along the highway. Such improvements will not only improve multi-modal circulation, but will also substantially enhance the visual quality of the most visible feature in Cornelius. This in turn will improve the commercial market environment.
- Work for the development of a strong north-to-south transportation link to its primary trade area.
- Continue to explore mechanisms to enhance the multi-modal access and circulation throughout the community.
- Coordinate with Tri-Met to continue enhancements at bus stops to provide a more attractive environment for transit users.
- Update its TSP as needed to comply with the RTP.

What this means for the Cornelius TSP Update: The TSP update process will provide an opportunity to review transportation goals and policies and update them to better represent current state, regional and local practices and objectives. As the transportation element of the Comprehensive Plan, the updated TSP will either inform the update of existing Comprehensive Plan policies, or the TSP will include the City's transportation policies and the Comprehensive Plan will defer to the TSP. Potential policy changes may reflect issues that have been evolving since the TSP was last updated, such as strategies to optimize transportation management and maximizing the efficiency of the existing transportation system, and the role the transportation

City of Cornelius Transportation System Plan, 2005: The City of Cornelius TSP includes a set of goals and master and action plans for each modal plan (pedestrian, bicycle, transit, motor vehicle and other modes). These master and action plans reflect solutions to needs identified in Cornelius through 2025. It also includes a financing and implementation chapter. The TSP projects included in the action plan were prioritized based on the City's goals.

What this means for the Cornelius TSP Update: The current TSP update will review projects recommended in the 2005 TSP to determine whether the projects have been implemented, or are no longer needed. Remaining projects will be considered for solutions in the TSP update. Other elements, such as the functional classification, roadway cross-section standards and access spacing standards will be reviewed and updated as well.

Cornelius Development Code: Title 17 of the Cornelius Municipal Code contains the City's Subdivisions Code, and Title 18 contains the City's Zoning Code. Together, these comprise the City's land development code, and implement portions of the Transportation System Plan through development requirements. Transportation-related requirements can be found in the code as follows:

- Chapter 18.143 – Transportation Facilities, including:
  - 18.143.030 – Traffic Impact Analysis
  - 18.143.040 – Street design cross-sections per transportation system plan
  - 18.143.050 – Access standards
  - 18.143.060 – Transit supportive amenities
  - 18.143.070 – Intelligent transportation systems)
- Chapter 18.145 – Off-Street Parking and Loading
- Chapter 18.147 – Street Vacations

See Attachment B for detailed review of the Cornelius Development Code for RTFP compliance.

What this means for the Cornelius TSP Update: The identified Development Code provisions will inform the TSP update and potentially will need to be updated to reflect outcomes of this process. These provisions may be supplemented or changed to ensure consistency between the updated TSP and the Municipal Code, to strengthen compliance of the Municipal Code with the TPR, to further regional objectives consistent with the RTP and the implementation actions in the RTFP, and to advance other City objectives related to land use and transportation. Recommendations for potential modifications to the Development Code will be detailed in a later memo. Modifications to the Public Works Standards may also be recommended.

City of Cornelius Parks Master Plan, 2009: The City of Cornelius Parks Master Plan focuses on capital development needs and strategies to improve Cornelius's parks and recreation services for a five to ten year-periods (2014 – 2019). The parks master plan is the City's long-term vision and plan of action for the community's parks and contains an inventory of current parks as well as land acquisition, development and renovation/restoration plans for existing and future parks and trails. Implementation strategies were addressed, including volunteer, coordination and funding opportunities.

What this means for the Cornelius TSP Update: The TSP update will consider the findings and recommendations of the Parks Master Plan to ensure connectivity to existing and planned parks facilities. In particular, the existing and proposed bike routes and trails & pathways should be incorporated into the TSP.

Council Creek Trail Master Plan, August, 2015: The Council Creek Trail Master Plan identifies a multiuse pathway for pedestrians, bicyclists, and other non-motorized travelers for both recreational and transportation purposes. It would extend almost 15 miles between the Banks-Vernonia Trail in Banks and the TriMet MAX station in downtown Hillsboro. The Preferred Alternative includes a multiuse rail-with-trail through Cornelius (east-west alignment) on the south side of rail right-of-way. The specific location and design may vary based on possible future transit options sharing the corridor. The trail would have four collector and two arterial roadway crossings and a minor stream crossing (Jobes Ditch) in Cornelius. A new trailhead is proposed on the south side of the rail along N 19th Avenue.

What this means for the Cornelius TSP Update: The TSP update will consider the findings and recommendations to help inform the development of the Plan, including the recommended trail alignment.

2014 Urban Growth Boundary Findings & Summary, Submitted October 5, 2015: The 2014 Urban Growth Boundary Findings & Summary was prepared to ensure that the existing and planned transportation system is adequate to meet the anticipated development of the NE and SE Urban Growth Boundaries (UGB)'s, which had recently been expanded.

Improvements were identified (beyond those previously identified in the TSP) to support the build out of the SE UGB. Development limits were established before construction of the 29th Avenue connection to Tualatin Velley Highway would be required. A development agreement is in effect regarding the construction of the S. 29th extension.

No specific improvements were identified in the NE UGB since the area is mostly built out and relatively low densities are proposed for the area. The proposed commercial area to the south may result in the inability to meet mobility targets. The study recommended that this TSP process evaluate options to address access, capacity and safety needs along the TV Highway corridor. A number of solutions were identified, including, but not limited to, the following:

1. If the proposed development of the property warrants a signal and is approved by ODOT, one could be installed to mitigate the impact of the driveway.
2. If the proposed development does not meet warrants for a signal, the proposed development could be limited to right-in/right-out access or a similar access management solution designed to mitigate the impacts.
3. The proposed development could work with adjacent properties to provide for a frontage connection south of TV Highway and install a signal at the existing Coastal Farms driveway. This option would require ODOT approval and cooperation from Coastal Farms as well as the intervening property owner to have a driveway just to the west of the subject property.

In addition, the study recommends that any development on the property that results in more than 200 vehicular trips per day will trigger the need to complete a Traffic Impact Analysis (TIA) as part of the land use review process.

What this means for the Cornelius TSP Update: The TSP update should reflect the recommendations of the 2014 Urban Growth Boundary study and evaluate options to address access, capacity, and safety needs along the TV Highway Corridor, as recommended in the study.

Washington County Transportation System Plan, Effective November 27, 2015: The Washington County TSP was recently updated and includes general transportation policies, modal elements (e.g. roadway element, freight element, active transportation element and a transportation system management and operations element), and an implementation and funding section. The following are identified in Cornelius:

- Proposed collector routes or extensions are identified, as follows:
    - N. Holladay Drive extension (Between Cornelius-Schefflin Road and N 19th Avenue and west of 4th Avenue to Forest Grove)
    - N. Davis Street extension (west from 10th Avenue to 4th Avenue and west of 29th Avenue)
    - 29th Avenue south of OR 8/TV Highway
- Planned cross-sections (number of lanes) are identified, as follows:
    - OR 8/TV Highway is planned for 4/5 lanes east of 20th Avenue
    - OR 8/TV Highway is planned for 2/3 lanes west of 20th Avenue
    - 20th/9th Avenue is planned for 2/3 lanes
    - 10th Avenue is planned for 2/3 lanes
    - Holladay Street is planned for 2/3 lanes
- Planned Freight Routes are identified, as follows:
    - OR 8/TV Highway is classified as an Over-Dimensional Truck Route
    - 10th Avenue/Cornelius-Schefflin Road is classified as a Truck Route
- Pedestrian Designations on OR 8/TV Highway are identified as follows:
    - A Pedestrian Crossing Study Corridor between 10th Avenue/Cornelius-Schefflin Road and 19th/20th Avenue
    - A Regional Trail Refinement Area (entire length)
    - A Streetscape Overlay (between 10th Avenue and 20th Avenue)
    - A Pedestrian/Bicycle District (entire length)
    - A Rural Pedestrian Activity Area (between Cornelius and Hillsboro)
- Bicycle Designations are identified as follows:
    - A number of streets in Cornelius are identified as Major Street Bikeways or Proposed Major Street Bikeways
    - 10th Avenue is proposed to connect to the Tualatin Valley Scenic Bikeway, which is a significant route in western Washington County
- Transit Designations are identified as follows:
    - Most of Cornelius is identified as "Well Served" or "Appropriately Served" by Transit
    - Some areas, at the north and south ends of town are "Under Served" by Transit, with "No Service"
    - OR 8/TV Highway north to the Railroad Tracks are considered a High Capacity Transit Study Corridor

- The following projects are listed on the County's Capital Project Candidate List:[18]
    - TV Highway HCT Study (RTP #11449) – High Capacity Transit Study between Forest Grove and Beaverton Transit Center, including Alternatives Analysis [$1,000,000 – Near Term]
    - Council Creek Trail (RTP #11479) – Multi-use trail connecting Hillsboro, Cornelius, Forest Grove, Unincorporated Washington County [$20,100,000 – Medium Term]

What this means for the Cornelius TSP Update: The TSP update should reflect and be consistent with the recommendations included in the Washington County TSP. Coordination with Washington County is important in the development of the Cornelius TSP Update process to ensure consistency between plans.

Hillsboro TSP, January 2004: The Hillsboro TSP was adopted in 1999. However, the City updated the TSP shortly thereafter, in 2004, to reflect the adopted Metro 2040 Urban Growth Management Concept Plan, the TriMet Westside Light Rail extension and the City of Hillsboro's population growth. The TSP also updated the planning horizon from 2015 to 2020. It is currently in the process of being updated again. Cornelius and Hillsboro are linked by OR 8 (Tualatin Valley Highway). The following designations in the Hillsboro TSP are relevant to Cornelius:

- The Pedestrian Master Plan designates OR 8 (Tualatin Valley Highway) as having "Planned Sidewalks"
- The Bicycle Master Plan designates OR 8 (Tualatin Valley Highway) as having "Existing Bike Lanes"
- The Transit Master Plan designates OR 8 (Tualatin Valley Highway) as having and RTP Designation of "Frequent Bus"
- The Future Streets Where Right of Way is Planned for Two or More Lanes indicates that OR 8 (Tualatin Valley Highway) is planned for 4/5 lanes

What this means for the Cornelius TSP Update: The TSP update will make sure that the Cornelius TSP is consistent with the designations in the Hillsboro TSP or pursue coordination where Cornelius' plans differ with Hillsboro's, if necessary.

[18] Washington County TSP, Effective November 27, 2015, Appendix C-1: Capital Project Candidate List.

Forest Grove TSP, 2014: The Forest Grove TSP was adopted in February, 2014. The Forest Grove Financially-Constrained Plan Projects include the following two projects, which could directly affect Cornelius:

- Yew Street/Adair Street Intersection Improvements – construct improvements (e.g. traffic signal) – ODOT jurisdiction [6-10 year time frame]
- Holladay Street Extension (Cornelius to Quince Street) – construct new roadway to city standards [11-20 year time frame]

In addition, the following project is listed on the "Preferred" Roadway Projects and Programs list:

- High Capacity Transit Expansion – Analysis for proposed extension of light rail service from Hillsboro to Forest Grove – Metro RTP (ID – 10771)

No time frame is provided for this project.

What this means for the Cornelius TSP Update: The TSP update will consider the recommended improvements from the Forest Grove TSP, particularly as they directly impact the City of Cornelius. The Cornelius section of the Holladay Street Extension may be included in the Cornelius TSP project list, or the City should pursue coordination with Forest Grove if Cornelius' plans differ with those of Forest Grove.

TriMet Transit Investment Plan (2011)[19]**:** The TIP details the investments TriMet will make in the region to expand transit service. The following projects are applicable to Cornelius.

- Expand frequent bus service between Beaverton Regional Center, Hillsboro Town Center, Cornelius Town Center and Forest Grove Town Center

What this means for the Cornelius TSP Update: The transit element of the TSP update will consider the potential opportunities from the plan for addressing transit needs.

Projects to be considered in Future Transportation Analysis

Several of the documents reviewed identified transportation improvement projects that will be considered in future transportation analysis in Cornelius. The project review included:

[19] TriMet Transit Investment Plan: http://trimet.orghttp://trimet.org/tip/index.htm/pdftip/tip.pdf

2015-2018 Statewide Transportation Improvement Program[20] (STIP) projects:

- Bicycle/Pedestrian, Safety improvements on OR 8 between N 10th Avenue (Cornelius) and SW 110th Avenue (Beaverton)

Metro RTP[21]: Metro RTP projects in the TSP study area include:

Near-term (1-4 years)

- Improve 10th Avenue between Holladay Street and Golf Course Road

Medium-term (5-10 years)

- Construct Holladay Street Extension as new collector from 4th Avenue (Cornelius) to Yew Street (Forest Grove)
- Sign and strip about 50 blocks of collector roadways for bike lanes

Long-term (10-25 years)

- Construct Holladay Street Extension as new collector between 10th Avenue and Gray Street
- Construct Holladay Street Extension as new collector between Gray Street and 19th Avenue
- Construct Davis Street Extension as new collector between 4th Avenue and 10th Avenue
- Construct Davis Street Extension as new collector between 19th Avenue and 29th Avenue
- Construct intersection improvements at 29th Avenue/OR 8/TV Highway
- Build out sidewalk gaps on TV Highway in Cornelius

Metro Regional Trails and Greenways Plan[22]: This Plan identifies one regional trail in the vicinity of Cornelius.

Proposed Trail

- Council Creek Trail – runs east-west through Cornelius (north of OR 8/Tualatin Valley Highway) to connect the cities of Banks, Forest Grove, Cornelius and Hillsboro. It is a 16 mile trail

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[20] ODOT STIP: http://www.oregon.gov/ODOT/HWY/STIP/

[21] Metro Regional Transportation Plan, Adopted July 17, 2014. http://www.oregonmetro.gov/regional-transportation-plan

[22] Metro Regional Trails and Greenways: http://www.oregonmetro.gov/regional-trails-and-greenways-system, September, 2014.

Washington County Transportation Futures Study

- Includes a critical proposed extension of Evergreen Road from Hillsboro to Cornelius/Forest Grove. While outside of our jurisdictional boundary, it does model the volume changes on our roadways as a result of the construction of this extension.

Attachment A: Applicable Plans and Policies

The following plans and policies were reviewed for the Cornelius TSP Update:

City of Cornelius

- City of Cornelius Transportation System Plan, 2005
- Cornelius Comprehensive Plan, 1978, Amended 2015
- Cornelius Municipal Code (Title 17 Subdivisions and Title 18 Zoning)
- Council Creek Trail Master Plan
- City of Cornelius Parks Master Plan
- 2014 Urban Growth Boundary Findings & Summary, 2015

Washington County/Metro/Regional

- Washington County TSP
- Metro 2014 RTP
- Metro RTFP
- Hillsboro TSP
- Forest Grove TSP
- TriMet Transit Investment Plan

State of Oregon

- Oregon Transportation Plan, 2006
- Oregon Highway Plan (1999 and subsequent amendments)
- Oregon Transportation Planning Rule (OAR Chapter 660, Division 12)
- Oregon Access Management Rules
- 2008 ODOT Transportation System Planning Guidelines
- Oregon Bicycle and Pedestrian Mode Plan, 2016
- Oregon Rail Plan, 2014
- Oregon Transportation Options Plan, 2015
- ORS 366.215 No Reduction of Vehicle Carrying Capacity
- Oregon Public Transportation Plan, 1997
- Oregon Public Transit Plan, (adoption is after TSP is finished)
- Oregon Transportation Safety Action Plan (expected adoption fall 2016)
- Oregon Freight Plan, 2011
- Statewide Transportation Improvement Program (STIP 2015-18)

City of Cornelius Code Audit for Regional Transportation Functional Plan Compliance

Introduction

The City of Cornelius kicked off the update to the City's Transportation System Plan (TSP) in Fall of 2016. Preliminary steps in this update process are underway, including this audit of the City's land development code and comprehensive plan to determine the scope of the planning process.

This memorandum provides an evaluation of the adopted City of Cornelius Development Code, given regional requirements set out in the Regional Transportation Functional Plan (RTFP) for compliance with the Regional Transportation Plan (RTP). If a TSP is consistent with the RTFP, Metro will find it to be consistent with the RTP. Metro has provided public agencies and consultants with a draft "checklist" for reviewing local transportation system plans, codes, and comprehensive plans for compliance with the RTFP. This memorandum uses the checklist for presenting compliance findings for City code, and in some instances for the comprehensive plan, with RTFP requirements.

Title 17 of the Cornelius Municipal Code contains the City's Subdivisions Code, and Title 18 contains the City's Zoning Code. Together, these comprise the City's land development code, and implement portions of the Transportation System Plan through development requirements. Transportation-related requirements can be found in the code as follows:

- Chapter 17.05 Land Divisions
  - 17.05.040 - Subdivisions.
- Chapter 18.143 – Transportation Facilities
  - 18.143.030 – Traffic Impact Analysis
  - 18.143.040 – Street design cross-sections per transportation system plan
  - 18.143.050 – Access standards
  - 18.143.060 – Transit supportive amenities
  - 18.143.070 – Intelligent transportation systems
- Chapter 18.145 – Off-Street Parking and Loading
- Chapter 18.147 – Street Vacations

Additionally, specific zones within Title 18 and policies within the Comprehensive Plan address RTFP requirements. The following table includes the RTFP requirement and a "compliance" column that indicates how the requirement is addressed, and what amendments may be needed in order to better comply with the RTP.

In summary, the audit in this memorandum is intended to identify potential amendments to adopted policy and code requirements that will support the recommendations of a future TSP update. It is intended to compliment and inform the scope of work for the TSP update and to help ensure that future amendments to the TSP and supporting implementing ordinances are compliant with the RTP. The recommendations are code chapter- and section-specific, enabling actual draft code language to be developed in association with the implementation phase of the TSP update.

Cornelius Code Audit for Regional Functional Plan Compliance

Regional Transportation Functional Plan Requirement	Compliance
Allow complete street designs consistent with regional street design policies **(Title 1, Street System Design Sec 3.08.110A(1))**	In Metro's *Creating Livable Streets: Street Design Guidelines for 2040*, regional streets are defined as major and minor arterial streets and some collectors of regional significance. Regional street design concepts are intended to serve all modes of travel in a manner that supports the needs of the 2040 design types. "Complete Street" elements include: • Safe and comfortable pedestrian facilities such as sidewalks, crosswalks, median islands, curb cuts. • Traffic calming measures • Safe and comfortable bicycle facilities such as bike lanes or grade-separated facilities • Transit accommodations such as bus pullouts, shelters, or dedicated lanes • Vehicle lanes Chapter 18.143 contains the City's regulations regarding street design; it largely refers to the TSP for design of streets. **Recommendation:** The TSP update will reevaluate Cornelius' arterial and collector street design requirements and confirm that they are consistent with regional street design policies and complete street designs. Modifications to code provisions in Chapter 18.143 will be required to implement changes to the TSP, or code language can be updated to refer to the TSP itself for matters of facility design.
Allow green street designs consistent with federal regulations for stream protection **(Title 1, Street System Design Sec 3.08.110A(2))**	A key component of green street design is the integration of stormwater management within the right of way. Characteristics of green street system design include maximizing tree canopy coverage and biofiltration (swales). With regards to stream crossings or other

Regional Transportation Functional Plan Requirement	Compliance
	sensitive areas, "green" streets are located and designed to ensure the least impact on its surroundings. The street design standards in Chapter 18.143 do not directly address "green" streets. Section 17.05.040 requires street trees on new streets resulting from subdivisions, but does not address stormwater management within the right of way. **Recommendation:** The TSP should be updated with cross-sections that incorporate or consider bio-filtration and other green features in street design so that this type of treatment may be allowed in appropriate locations, and under prescribed circumstances. The development code can be updated with these diagrams or refer to the TSP itself.
Allow transit-supportive street designs that facilitate existing and planned transit service pursuant 3.08.120B **(Title 1, Street System Design Sec 3.08.110A(3))**	Transit-supportive street design attributes include streets and buildings that encourage pedestrian movement., streets that can accommodate 40-foot buses, and street connectivity with good pedestrian and bike paths to extend the effective coverage of bus service (see 2014 RTP p. 2-44). OR 8/TV Highway is a State facility. Major bus stops along Baseline Road through Cornelius are part of the Regional Transportation System; future planned improvements to this roadway will need to be consistent with its identification as a regional, frequent bus route. In the Westside Service Enhancement Plan (2013), TriMet has also identified OR8/TV Highway through Cornelius as a High Capacity Transit Route. In addition, this plan notes that areas with limited ridership potential in Cornelius may benefit from a new type of transit service called "Community Connector Service." Connector Service is expected to be tailored to the community served and, as stated in the plan, could range from low-cost fixed route bus service to flexible

Regional Transportation Functional Plan Requirement	Compliance
	shuttle services. **Recommendation**: The need for expanded local transit service will not be considered in detail as part of the update of the TSP. The TSP update will revisit City street design standards to ensure that they can accommodate future community connector service, as described in the Westside Service Enhancement Plan. Resulting changes to cross-sections or policies may require updates to the development code.
Allow implementation of: • narrow streets (<28 ft curb to curb); • wide sidewalks (at least five feet of through zone); • landscaped pedestrian buffer strips or paved furnishing zones of at least five feet, that include street trees; • Traffic calming to discourage traffic infiltration and excessive speeds; • short and direct right-of-way routes and shared-use paths to connect residences with commercial services, parks, schools, hospitals, institutions, transit corridors, regional trails and other neighborhood activity centers; • opportunities to extend streets in an incremental fashion, including posted notification on streets to be extended. **(Title 1, Street System Design Sec 3.08.110B)**	Chapter 18.143 includes cross sections containing: • Local streets and Constrained Local Streets < 28 ft curb to curb • Sidewalks of greater than five feet for all street cross-sections • Most cross sections contain landscaped buffer strips greater than five feet. • Traffic calming may be approved or required per 18.143.020 – General Provisions The City's subdivision standards (17.05.040 Subdivisions) require that streets extend to the boundary of the land division, where necessary to give access to or permit a "satisfactory" future subdivision of adjoining land. **Recommendations**: • Consider specifying in section 18.143 requirements that sidewalks must be constructed free of impediments within the required minimum width.

Regional Transportation Functional Plan Requirement	Compliance
	• Evaluate a provision for short and direct right-of-way routes to connect residents with services, transit, schools, etc. This could take the form of policy language or code requirements. • To ensure that there are "opportunities to extend streets in an incremental fashion." amend 17.05.040(3)(d) (Future Extension of Streets) to specify that posted notification regarding street extensions is required.
Require new residential or mixed-use development (of five or more acres) that proposes or is required to construct or extend street(s) to provide a site plan (consistent with the conceptual new streets map required by Title 1, Sec 3.08.110D) that: • provides full street connections with spacing of no more than 530 feet between connections except where prevented by barriers • Provides a crossing every 800 to 1,200 feet if streets must cross water features protected pursuant to Title 3 UGMFP (unless habitat quality or the length of the crossing prevents a full street connection) • provides bike and pedestrian accessways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers • limits use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections • includes no closed-end street longer than 220 feet or having no more than 25 dwelling units **(Title 1, Street System Design Sec 3.08.110E)**	Section 17.05.040 addresses subdivisions, and subsection (D)(4) states that block length shall not exceed 530 feet except where physical or natural constraints preclude a connection. No maximum spacing of pedestrian accessways is provided. No specific regulation for crossing of water features is provided. Cul-de-sacs are permitted and, while not limited to situations where barriers prevent full street connections as required by the RTFP, are required to be "as short as possible" and may not exceed 200 feet (17.05.040(3)(h)) and the City may require accessways between cul-de-sacs and public streets (17.05.040(6). ***Note that section 17.05.040(D)(6) (Accessways), which includes a provision that block lengths cannot exceed 1,200 feet, should be verified for consistency with other subdivision requirements.*** **Recommendations**: • Revise Chapter 17 to refine requirements for new residential or mixed-use development of five or more acres. To be consistent with the RTFP, new residential or mixed use development of five or more acres that results in the extension or construction of new streets should: o provide a crossing every 800 to 1,200 feet if streets

Regional Transportation Functional Plan Requirement	Compliance
	must cross water features protected pursuant to Title 3 UGMFP (unless habitat quality or the length of the crossing prevents a full street connection) o provide bike and pedestrian accessways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers o limit use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections o restrict the number of dwelling units on a cult-de-sac to 25 dwelling units
Establish city/county standards for local street connectivity, consistent with Title 1, Sec 3.08.110E, that applies to new residential or mixed-use development (of less than five acres) that proposes or is required to construct or extend street(s). **(Title 1, Street System Design Sec 3.08.110F)**	As noted above, the City's local street connectivity standards have been established and are found in Chapter 17 Subdivisions. This RTFP subsection confirms that local development requirements must also ensure local street connectivity when permitting residential or mixed-use development in areas less than five acres in size, where construction of new streets is required. **Recommendation:** Review and consider revising Chapter 17 requirements as discussed in the recommendation above.
(Applicable to both Development Code and TSP) To the extent feasible, restrict driveway and street access in the vicinity of interchange ramp terminals, consistent with Oregon Highway Plan Access Management Standards, and accommodate local circulation on the local system. Public street connections, consistent with regional street design and spacing standards, shall be encouraged and shall supersede this access restriction. Multimodal street design features including pedestrian crossings and on-street parking shall be allowed where appropriate. **(Title 1, Street System Design Sec 3.08.110G)**	This section of Title 1 addresses how local jurisdictions can help protect the capacity, function and safe operation of existing and planned state highway interchanges or planned improvements to interchanges. This RTFP requirement is not applicable, as there are no interchange ramp terminals in the City of Cornelius.
Include Site design standards for new retail, office, multi-family and institutional buildings located near or at major transit stops shown in Figure	OR 8/TV Highway through Cornelius has several major bus stops and

Regional Transportation Functional Plan Requirement	Compliance
2.15 in the RTP: • Provide reasonably direct pedestrian connections between transit stops and building entrances and between building entrances and streets adjoining transit stops; • Provide safe, direct and logical pedestrian crossings at all transit stops where practicable At major transit stops, require the following: • Locate buildings within 20 feet of the transit stop, a transit street or an intersection street, or a pedestrian plaza at the stop or a street intersections; • Transit passenger landing pads accessible to disabled persons to transit agency standards; • An easement or dedication for a passenger shelter and an underground utility connection to a major transit stop if requested by the public transit provider; • Lighting to transit agency standards at the major transit stop; • Intersection and mid-block traffic management improvements as needed and practicable to enable marked crossings at major transit stops. **(Title 1, Transit System Design Sec 3.08.120B(2))**	is a Future High Capacity Transit corridor pursuant to the 2014 RTP. Transit-supportive site design is required within the Core Commercial-Employment District (18.50.050(B)(2)), including "direct pedestrian linkages from transit stops to store entries" and "pedestrian sidewalks or pathways shall be provided to each building with direct and convenient access from the nearest street and/or transit stop." The CE zone also calls for "a good mix of complementary pedestrian oriented commercial uses oriented to and clustered near (within 500 feet) transit stops" as a design criteria for site design review. In addition, design review approval criteria (section 18.100.040(B)(1), applicable to new development and major renovations) requires buildings within 500' of a transit stop to be located as close as possible to the stop. Section 18.143.060, Transit supportive amenities, requires new commercial, industrial, and institutional buildings adjacent to major transit stops provide: 1) An ADA accessible transit passenger landing pad, if one does not exist; and (2) An easement or dedication for the passenger shelter and underground utility connection from the new development to the shelter; and (3) Lighting at the transit stop, if it does not currently exist. Uses where at least 10 off-street parking spaces are required may be reduced by 10 percent through the provision of a transit pedestrian

Regional Transportation Functional Plan Requirement	Compliance
	plaza and connection. **Recommendations:** • Add a definition of "major bus stop," consistent with the updated transit system element of the TSP, to the development code. Add text in the definitions section to clarify what is considered "at" a major transit stop. The State Transportation Planning Rule includes the following definition: *"At" means a parcel or ownership which is adjacent to or includes a major transit stop generally including portions of such parcels or ownerships that are within 200 feet of a transit stop.* • The Cornelius development code does not require that multi-family development include transit supportive site design, which is a requirement of the RTFP. Section 18.143.060 should be amended to require transit-supportive amenities in new multifamily developments. • To better provide transit-supportive street and site design, the City should also consider requiring the applicant to coordinate with TriMet when a subject site potentially impacts transit streets as identified in the City TSP.
(Could be in Comprehensive plan or TSP as well) As an alternative to implementing site design standards at major transit stops (section 3.08.120B(2), a city or county may establish pedestrian districts with the following elements: • A connected street and pedestrian network for the district; • An inventory of existing facilities, gaps and deficiencies in the network of pedestrian routes; • Interconnection of pedestrian, transit and bicycle systems; • Parking management strategies;	The Main Street District contains pedestrian-oriented subdistricts (section 18.60-18.85) that provide design elements consistent with the 2002 Cornelius Main Street Plan. The development code includes required elements pertaining to building orientation, glazing and active frontage. **Recommendation**: The TSP update will inventory deficiencies in the pedestrian network of the Main Street district, access management strategies, and other elements of facility design within the pedestrian districts. TSP project recommendations may result in modifications to

Regional Transportation Functional Plan Requirement	Compliance
• Access management strategies; • Sidewalk and accessway location and width; • Landscaped or paved pedestrian buffer strip location and width; • Street tree location and spacing; • Pedestrian street crossing and intersection design; • Street lighting and furniture for pedestrians; • A mix of types and densities of land uses that will support a high level of pedestrian activity. **(Title 1, Pedestrian System Design Sec 3.08.130B)**	the Main Street District and Zones (section 18.60) in order to enhance pedestrian access to transit.
Require new development to provide on-site streets and accessways that offer reasonably direct routes for pedestrian travel. **(Title 1, Pedestrian System Design Sec 3.08.130C)**	The development code requires "internal sidewalks or pathways…to ensure safe and convenient pedestrian circulation throughout the development" in the Multi-Family Residential Zone A-2 (section 18.35), Highway Commercial Zone C-2 (section 18.45), Core Commercial Employment District CE (section 18.50), Light Industrial Zone LI (section 18.54), and General Industrial Zone M-1 (section 18.55). The Main Street Design Overlay (MSDO) area (section 18.85) requires that plazas and open spaces work well with the pedestrian circulation system. Other residential zones (R-10, R-7, MHP) have a provision stating that the reviewing body may require a buffer with pedestrian connections to separate the development from adjacent nonresidential uses. The Main Street District and Zones (MS – 18.60) and the Main Street Retail Commercial Zone (MSR – 18.65) contain regulations related to pedestrian design on specific streets within the city. In addition, projects which undergo design review are subject to the following approval criteria: "developments shall provide a safe and reasonably direct pedestrian connection from the main entrance to the public right-of-way and/or

Regional Transportation Functional Plan Requirement	Compliance
	the pedestrian system or both. The pedestrian connection shall be reasonably free of hazards from automobile traffic, so as to help encourage pedestrian and bicycle travel; " (section 18.100.040(A)(4)) **Recommendation:** Consider adding subdivision requirements that address on-site non-motorized connectivity, including single-family subdivisions.
Establish parking ratios, consistent with the following: • No minimum ratios higher than those shown on Table 3.08-3. • Mo maximum ratios higher than those shown on Table 3.08-3 and illustrated in the Parking Maximum Map. If 20-minute peak hour transit service has become available to an area within a one-quarter mile walking distance from bus transit one-half mile walking distance from a high capacity transit station, that area shall be removed from Zone A. Cities and counties should designate Zone A parking ratios in areas with good pedestrian access to commercial or employment areas (within one-third mile walk) from adjacent residential areas. Establish a process for variances from minimum and maximum parking ratios that include criteria for a variance. Require that free surface parking be consistent with the regional parking maximums for Zones A and B in Table 3.08-3. Following an adopted exemption process and criteria, cities and counties may exempt parking structures; fleet parking; vehicle parking for sale, lease, or rent; employee car pool parking; dedicated valet parking; user-paid parking; market rate parking; and other high-efficiency parking management alternatives from maximum parking standards. Reductions associated with redevelopment may be done in phases. Where mixed-use development is proposed, cities and counties shall provide for blended parking rates. Cities	Parking Ratios - Section 18.145 Off-Street Parking and Loading addresses minimum and maximum parking ratios in Table 1. These requirements are largely in compliance with the RTFP, however there appear to be a number of anomalies in the table (potentially typos). These include: • Bicycle parking standards included under "maximum" but no minimum established • No entry for maximum parking standards for duplexes under either Zone A or Zone B • No entry for maximum parking standards under Zone B for multi-family units, manufactured units, mobile home parks, group living, transitional housing, or home occupation. • Bicycle parking for Indoor entertainment set at a maximum of "1.0/1.0 seats" while similar uses are set at "1.0/10 seats" • No denominator given for "Waste Related" parking requirements • Wholesale sales under Zone A at a maximum of "1.2/100" where all others are per thousand SF Zone A and Zone B are shown on Map 1 in development code, but they are difficult to interpret from the graphic provided. Variances - Section 18.115.020 lists variance procedures. Approval

Regional Transportation Functional Plan Requirement	Compliance
and counties may count adjacent on-street parking spaces, nearby public parking and shared parking toward required parking minimum standards. Use categories or standards other than those in Table 3.08-3 upon demonstration that the effect will be substantially the same as the application of the ratios in the table. Provide for the designation of residential parking districts in local comprehensive plans or implementing ordinances. Require that parking lots more than three acres in size provide street-like features along major driveways, including curbs, sidewalks and street trees or planting strips. Major driveways in new residential and mixed-use areas shall meet the connectivity standards for full street connections in section 3.08.110, and should line up with surrounding streets except where prevented by topography, rail lines, freeways, pre-existing development or leases, easements or covenants that existed prior to May 1, 1995, or the requirements of Titles 3 and 13 of the UGMFP. Require on-street freight loading and unloading areas at appropriate locations in centers. Establish short-term and long-term bicycle parking minimums for: • New multi-family residential developments of four units or more; • New retail, office and institutional developments; • Transit centers, high capacity transit stations, inter-city bus and rail passenger terminals; and • Bicycle facilities at transit stops and park-and-ride lots. **(Title 4, Parking Management Sec 3.08.410)**	criteria are listed in (B). Free Surface Parking - No provisions for free surface parking are within Chapter 18.45. Exemptions - No exemptions found for these uses. Parking Districts - Currently, neither the Comprehensive Plan nor development code address provisions for establishing residential parking districts. Parking lots more than three acres in size – Section 18.145.070 (Parking lot design standards) – subsection (D)(2) states that Parking lots that are more than three acres in size shall provide street features along major drive aisles. These features must include at a minimum curbs, sidewalks and street trees and/or planter strips or both. This requirement is met. New residential and mixed use areas – These standards are not addressed in the code. On-street freight loading – Section 18.145.040 addresses off-street loading requirements, but does not provide for on-street loading in centers. Bicycle parking - Maximum (not minimum) Bicycle parking requirements included in Table 1. No distinction between "Short-Term" and "Long-Term". **Recommendations**: • Review Table 1 for errors and address bicycle parking as a minimum requirement.

Regional Transportation Functional Plan Requirement	Compliance
	• Provided updated map 1 that shows Zone A and Zone B more clearly • Include free surface parking within Table 1, along with the appropriate maximum allowances. • An outcome of the TSP update may be recommendations related to opportunities to use parking resources more efficiently, particularly in the CE and Main Street designations, and addressing specific land uses and geographic areas where parking management strategies, such as parking districts, could be employed. Implementing policy language for new parking strategies may be an outcome of the TSP update, depending on the plan's recommendations. • Update Comprehensive Plan policies to include TSP recommendations pertaining to residential parking districts to better manage on-street supply of parking. • Modify section 18.143 (Transportation Facilities) to address connectivity standards for new residential and mixed use areas, consistent with this RTFP requirement. • Amend section 18.145.040 (Off-street loading) to allow for exemptions from off-street loading requirements within the Town Center. Criteria for the exemption(s) and whether these will be site specific within the Town Center will need to determined • Amend Table 1 to address both short-term and long-term bicycle parking minimums. • Add definitions of short-term and long-term bicycle parking to this section and potentially to Chapter 18.195, "Definitions" as

Regional Transportation Functional Plan Requirement	Compliance
	well.
(Could be located in Development code or Comprehensive Plan) As an alternative to implementing site design standards at major transit stops (section 3.08.120B(2)), a city or county may establish pedestrian districts with the following elements: • A connected street and pedestrian network for the district; • An inventory of existing facilities, gaps and deficiencies in the network of pedestrian routes; • Interconnection of pedestrian, transit and bicycle systems; • Parking management strategies; • Access management strategies; • Sidewalk and accessway location and width; • Landscaped or paved pedestrian buffer strip location and width; • Street tree location and spacing; • Pedestrian street crossing and intersection design; • Street lighting and furniture for pedestrians; • A mix of types and densities of land uses that will support a high level of pedestrian activity. **(Title 1, Pedestrian System Design Sec 3.08.130B)**	The City has site design standards for major transit stops (section 18.143.060). The Main Street District is comprised of pedestrian-oriented subdistricts (section 18.60-18.85) that are consistent with the 2002 Cornelius Main Street Plan and that address some of the RTFP design elements. **Recommendation**: The CE and Main Street districts are envisioned as comfortable pedestrian-friendly environments, pursuant to the Comprehensive Plan. The City may wish to re-evaluate these land use districts to ensure consistency with updated policies as part of the TSP. Updated TSP recommendations may require corresponding modifications to Comprehensive Plan and Development Code.
When proposing an amendment to the comprehensive plan or to a zoning designation, consider the strategies in subsection 3.08.220A as part of the analysis required by OAR 660-012-0060. If a city or county adopts the actions set forth in 3.08.230E (parking ratios, designs for street, transit, bicycle, pedestrian, freight systems, TSMO projects and strategies, and land use actions) and section 3.07.630.B of Title 6 of the UGMFP, it shall be eligible for an automatic reduction of 30 percent below the vehicular trip generation rates recommended by the Institute of Transportation Engineers when analyzing the traffic impacts, pursuant to	Section 18.143.030 describes the transportation impact analysis requirements for development proposals as part of land use changes. **Recommendations:** • City direction regarding pursuing transportation demand, transportation systems management and operations, and parking management programs will be reflected in the updated TSP and in new and revised policy language. The recommendations resulting from the TSP update will determine whether or not it is necessary to draft new code

Regional Transportation Functional Plan Requirement	Compliance
OAR 660-012-0060, of a plan amendment in a Center, Main Street, Corridor or Station Community. **(Title 5, Amendments of City and County Comprehensive and Transportation System Plans Sec 3.08.510A,B)**	language for this requirement.
(Could be located in TSP or other adopted policy document) Adopt parking policies, management plans and regulations for Centers and Station Communities. Plans may be adopted in TSPs or other adopted policy documents and may focus on sub-areas of Centers. Plans shall include an inventory of parking supply and usage, an evaluation of bicycle parking needs with consideration of *TriMet Bicycle Parking Guidelines*. Policies shall be adopted in the TSP. Policies, plans and regulations must consider and may include the following range of strategies: • By-right exemptions from minimum parking requirements; • Parking districts; • Shared parking; • Structured parking; • Bicycle parking; • Timed parking; • Differentiation between employee parking and parking for customers, visitors and patients; • Real-time parking information; • Priced parking; • Parking enforcement. **(Title 4, Parking Management Sec 3.08.410I)**	Existing code language provides flexibility for shared automobile parking in the CE zone (18.50.020) and the Main Street zones (18.60.020). The Off-street Parking section of the code (18.145.020) provides for a 10% reduction where several uses occupy a single parcel of land to account for cross-patronage and shared parking benefits. Structured parking is mentioned as a possibility within the Core Commercial-Employment (CE) zone (18.50.050) Bicycle parking standards are included in 18.145.030 Table 1 – Required off-street vehicle and parking requirements, and their design is addressed in 18.045.050. However, they are included under the "Maximum" column, rather than minimum. A separate provision for bicycle parking is included in 18.50.050 for the CE zone. Additionally, The Cornelius Main Street Plan (2002) contains an evaluation of parking needs and many of these strategies. **Recommendations:** Evaluate the recommended strategies in this RTFP requirement as part of the TSP update. The planning process will consider existing conditions and future transportation needs and may identify and recommend viable parking management strategies for the Core Commercial-Employment District and Main Street District. This process will evaluate how well these strategies are being implemented and, based on the TSP recommendations, new or

Regional Transportation Functional Plan Requirement	Compliance
	modified code language or Main Street Policies may be warranted. Clarify Table 1 to indicate minimum bicycle parking standards. Evaluate the different bicycle parking requirements in the CE zone and Table 1 to ensure they are in agreement

Attachment C: Oregon Transportation Plan, Policy Framework

Informs RTP.

OTP Goal 1, Mobility and Accessibility, aims to enhance Oregon's quality of life and economic vitality by providing a balanced, efficient, cost-effective and integrated multimodal transportation system that ensures appropriate access to all areas of the state, the nation and the world, with connectivity among modes and places.

What this means for the Cornelius TSP Update: **The TSP update will promote the growth of existing and future centers of economic activity, routes and modes connecting passenger facilities and freight facilities, intermodal facilities and industrial land, and major intercity and intra-city transportation corridors and supporting transportation networks. It will also promote the most cost-effective modes and solutions over the long term that are easy to use, reliable and accessible to all potential users, including the transportation disadvantaged.**

OTP Goal 2, Management of the System, aims to improve the efficiency of the transportation system by optimizing the existing transportation infrastructure capacity with improved operations and management.

What this means for the Cornelius TSP Update: **The TSP update will prioritize travel demand management and transportation system operations techniques that fine tune existing systems and policies over costly major roadway capacity improvements.**

OTP Goal 3, Economic Vitality, promotes the expansion and diversification of Oregon's economy through the efficient and effective movement of people, goods, services and information in a safe, energy-efficient and environmentally sound manner.

What this means for the Cornelius TSP Update: **The TSP update will identify projects that support a prosperous and competitive economy by preserving and enhancing business opportunities, and ensuring the efficient movement of people and goods to recreational, employment, housing and other destinations in Cornelius.**

OTP Goal 4, Sustainability, seeks to provide a transportation system that meets present needs without compromising the ability of future generations to meet their needs from the joint perspective of environmental, economic and community objectives. This system is consistent with, yet recognizes differences in, local and regional land use and economic development plans. It is efficient and offers choices

among transportation modes. It distributes benefits and burdens fairly and is operated, maintained and improved to be sensitive to both the natural and built environments.

What this means for the Cornelius TSP Update: The TSP update will identify solutions that support the movement of people over vehicles, and that reduce transportation barriers to daily activities for walkers, bikers and public transportation users. The solutions will be environmentally responsible and should fit the physical setting and context of the surrounding land use.

OTP Goal 5, Safety and Security, aims to plan, build, operate and maintain the transportation system so that it is safe and secure.

What this means for the Cornelius TSP Update: The TSP update will develop projects that ensure the transportation system maintains and improves individual safety and security and maximizes public safety and service access.

OTP Goal 6, Funding the Transportation System, seeks to create a transportation funding structure that will support a viable transportation system to achieve state and local goals today and in the future.

What this means for the Cornelius TSP Update: The TSP update will include an assessment of the level of transportation funding projected to be available through the 20-year planning horizon in comparison to the cost of developing a transportation system that is able to meet the City's needs. Opportunities to establish stable funding sources will be discussed and project prioritization will consider the feasibility of funding.

OTP Goal 7, Coordination, Communication and Cooperation, ensures coordination, communication and cooperation among transportation users, providers and those most affected by transportation activities to align interests, remove barriers and bring innovative solutions so the transportation system functions as one system.

What this means for the Cornelius TSP Update: The TSP update process will offer public involvement opportunities to all stakeholders and residents, and will coordinate with other jurisdictions and agencies to ensure the transportation system limits barriers and functions as one system.

2008 ODOT's Transportation System Plan Guidelines[22] direct TSP updates to address recent policy and regulatory changes, and calls out recent changes to the OTP, OHP, TPR, and federal changes implemented into the RTP. Since adoption of the 2005 Cornelius TSP, the OTP was updated to emphasize maintaining assets in place, optimizing existing system performance through technology and better system integration, creating sustainable funding, and investing in strategic capacity enhancements. Policy 1F (Mobility Standards) of the OHP was amended to allow for the adoption of alternative mobility standards where "practical difficulties make conformance with the highway mobility standards infeasible."

What this means for the Cornelius TSP Update: The TSP update will address the recent policy and regulatory changes to the OTP, OHP, TPR and RTP, as described in the TSP Guidelines and the specific policy documents.

[22] ODOT Transportation System Plan Guidelines: http://www.oregon.gov/ODOT/TD/TP/TSP.shtml

Attachment D: Oregon Transportation Plan, Modal Plans

Oregon Bicycle and Pedestrian Plan (2016): The Oregon Bicycle and Pedestrian Plan (OBPP) creates a policy foundation for the state, supporting decision-making for walking and biking investments, strategies, and programs. It is a modal plan under the OTP and the direction in this plan helps to bring about an interconnected, robust, efficient, and safe transportation system in Oregon, building on the infrastructure and culture Oregon has built. The plan identifies a vision and establishes nine goal areas that support that vision, as follows:

The Vision

"In Oregon, people of all ages, incomes, and abilities can access destinations in urban and rural areas on safe, well-connected biking and walking routes. People can enjoy Oregon's scenic beauty by walking and biking on a transportation system that respects the needs of its users and their sense of safety. Bicycle and pedestrian networks are recognized as integral, interconnected elements of the Oregon transportation system that contribute to our diverse and vibrant communities and the health and quality of life enjoyed by Oregonians."

- Safety
- Accessibility and Connectivity
- Mobility and Efficiency
- Equity
- Health
- Sustainability
- Strategic Investment
- Coordination, Cooperation, and Collaboration

The OBPP provides direction for what needs to be achieved, including policies and associated strategies designed to help develop, sustain, and improve walking and biking networks. It identifies nine goals based upon the broader goals of the OTP that reflect statewide values and desired accomplishments relating to walking and biking

The policies and design guidance provided in the OBPP apply to Highway 8. In addition, the OBPP outlines the role that local jurisdictions play in implementation of the Plan, including the development of local pedestrian and bicycle plans as stand-alone documents or within TSPs.

[Note: The OBPP was adopted on May 19, 2016, and is currently being edited to reflect adopted changes.]

What this means for the Cornelius TSP Update: The OBPP serves as the guiding policy for bicycle and pedestrian planning for regional and local TSPs. The Cornelius TSP should apply and refine policies of the OBPP to Cornelius, to help achieve the statewide vision of the OBPP as well as meeting Cornelius' bicycle and pedestrian needs.

Oregon Public Transit Plan, 1997 (Update Currently In Process). The Oregon Public Transportation Plan is a modal plan of the OHP, and was adopted in April, 1977. An updated version is currently under development and is not expected to be adopted until after the Cornelius TSP process is complete.

The new OPTP will provide a statewide vision for the public transportation system, and describe the role of public transit in contributing to the transportation system overall. Initial ODOT objectives for the new OPTP include[26]:

- Provide a long-range vision for public transportation and a policy framework to help shape the public transportation system over the next 20 or more years.
- Discuss methods to improve and enhance public transportation services consistent with state and federal planning goals and guidance and in light of current fiscal realities.
- Address how transit can serve goals such as accessibility, availability, connectivity, economic development and social equity.
- Address the state's publicly funded transportation system including rural and urban transit, special needs transportation, intercity bus services, connections between public transportation system elements, and the transportation system overall.
- Describe the existing public transportation system and present a strategic approach to improving public transportation in the future.

What this means for the Cornelius TSP Update: The Oregon Public Transportation Plan will serve as the guiding policy for public transportation planning for regional and local TSPs. The Cornelius TSP should work toward consistency with the preliminary objectives listed above.

Oregon State Rail Plan, Adopted September 18, 2014. The State Rail Plan (OSRP) creates a policy foundation for the state, supporting decision-making for freight and passenger rail investments, strategies, and programs. It is a modal plan under the OTP and the direction in this plan helps address current challenges and opportunities. The plan demonstrates rail's importance to Oregon, while acknowledging that it is predominantly owned by private railroads. The Plan identifies a vision and establishes nine goal areas that support that vision, as follows:

The Vision

"Oregon will have a safe, efficient, and commercially viable rail system that serves its businesses, travelers and communities through private resources leveraged as needed, by strategic public investments."

- Partnership, Collaboration and Communication
- Connected System

[26] Per ODOT website https://www.oregon.gov/ODOT/TD/TP/Pages/optp.aspx, October 24, 2016.

- System Investments and Preservation
- Funding, Finance and Investment Principles
- System Safety
- Preserving and Enhancing Quality of Life
- Economic Development

A "Non-Class I" railroad traverses Cornelius, which serves only freight (not passenger rail). Non-Class I railroads typically have a variety of needs including speed, weight and vertical clearance restrictions, often caused by bridges and tunnels.

What this means for the Cornelius TSP Update: The Oregon State Rail Plan serves as the guiding policy for rail planning for regional and local TSPs. The Cornelius TSP should determine whether there are public-private cooperation opportunities in Cornelius, to help achieve the statewide vision of the OSRP as well as helping to meet Cornelius' transportation needs.

Oregon Freight Plan, August, 2011. The purpose of the Oregon Freight Plan (OFP) is to "improve freight connections to local, state, regional, national and global markets in order to increase trade-related jobs and income for Oregon workers and businesses." A number of challenges were identified:

- System Operation and Development
- Safety
- Communications
- Environmental Considerations
- Funding

In order for the OFP to be successfully implemented, it must be coordinated with the rest of the OTP and modal plans, including seeking input at a local level, coordination with federal, state and local agencies and development of coordinated transportation system plans on a state and local level.

What this means for the Cornelius TSP Update: The Oregon Freight Plan serves as the guiding policy for freight planning for regional and local TSPs. The Cornelius TSP should determine where there are opportunities to improve freight in Cornelius, to help achieve the statewide vision of the OFP as well as helping to meet Cornelius' transportation needs.

Oregon Transportation Safety Action Plan, October 2011. "The Oregon Transportation Safety Action Plan (OTSAP) envisions a future where Oregon's transportation-related death and injury rate continues to decline. We envision a day when days, then weeks and months pass with not a single fatal or debilitating injury occurs. Someday we see a level of zero annual fatalities and few injuries as the norm."

The new OTP elevates the standing of safety issues to better reflect ODOT's position that Safety is our number one priority. The OTSAP identified 112 actions, which can be considered Oregon's transportation safety agenda for the next 20 years. The Oregon Transportation Safety Commission (OTSC) has identified three emphasis areas for priority effort, with the top action items listed for each:

- Priority 1 – Action 109 – Develop strategies to assure the recruitment and retention of EMS volunteers
- Priority 2 – Action 23 – Improve Key Infrastructure Safety Emphasis Areas
- Priority 3 – Action 72 - Expand driver education in Oregon

What this means for the Cornelius TSP Update: The Oregon Transportation Safety Action Plan reinforces the OTP's number one priority, Safety. The Cornelius TSP should also consider safety a top priority and seek opportunities to improve safety in Cornelius, to help achieve the statewide vision of the OTP.

Oregon Transportation Options Plan, Adopted April 16, 2016. "The Oregon Transportation Options Plan (OTOP) provides policy guidance for state and local partners to enhance and expand transportation access for all Oregonians while ensuring that transportation investments are efficient and support broader community goals such as growing the economy and improving personal and environmental health."

Historically, the purpose of transportation options programs (also referred to as "transportation demand management") has focused on reducing reliance on single-occupancy vehicle travel through strategies such as carpooling, high-occupancy vehicle (HOV) lanes, and other congestion mitigation strategies. This plan extends beyond those traditional definitions and is intended to affect how Oregonians in all regions of the state travel, where they choose to live, and their overall health, by providing transportation choices.

What this means for the Cornelius TSP Update: As a local implementation partner, the Cornelius TSP should support transportation options to help prioritize transportation options programs (e.g. marketing campaigns to expand awareness of transportation options, rideshare resources, bicycle parking, workplace on-site showers, incentive programs, safe route to school, etc.)

TM #3 – Goals, Objectives and Evaluation Criteria

MEMORANDUM

DATE: January 4, 2017

TO: Cornelius TSP Project Management Team

FROM: Reah Flisakowski, PE, DKS Associates
Julie Sosnovske, PE, DKS Associates

SUBJECT: Cornelius Transportation System Plan Update Technical Memorandum #3: Draft Goals, Objectives and Evaluation Criteria P14180-012

The purpose of this memorandum is to recommend draft transportation-related goals, objectives, and evaluation criteria that will help guide the Transportation System Plan (TSP) update. A review of the 2005 TSP and 2015 Comprehensive Plan were used as a starting point, with additions and revisions made to reflect current regional transportation plans and regulations. This effort will continue through the early planning process, shaped by input received from the first Project Advisory Committee (PAC) meeting. Once final, following committee review, the goals, objectives and specifically, the evaluation criteria and scoring methodology will be used as a tool to help prioritize potential solutions.

Setting Direction for Transportation Planning

Goals and objectives reflect Cornelius's values and guide how the TSP will be developed and implemented. **Goals** are somewhat general in nature and should be challenging, but not unreasonable, to achieve. Each goal must be supported by more finite **objectives**. In contrast to goals, objectives should be specific and measurable. Where feasible, a timeframe should be established to help prioritize and achieve the objective.

The solutions identified in the TSP must be consistent with the goals and objectives. To accomplish this, **evaluation criteria** based on the goals and objectives have also been developed to assess and screen transportation system alternatives and prioritize TSP actions.

Later in the TSP process, when solutions are identified, policy statements to guide decision-making along with specific code amendments to implement the new TSP will be developed. The final goals and policies will replace the transportation section of the Cornelius Comprehensive Plan.

Review of Prior Transportation Planning Efforts

The goals and objectives from the 2005 Cornelius Transportation System Plan and the 2015 Cornelius Comprehensive Plan, summarized below, were used as a starting point for this update. These are provided to help understand the direction the community has previously established for transportation decisions and to provide ideas to facilitate the process of developing a new vision with goals and objectives that reflect current interests.

2005 Cornelius TSP

Roadway Network

Provide a supportive transportation network to the land use plan that provides opportunities for transportation choices and the use of alternative modes serving all residential and commercial areas.

- The City will ensure that public roads and streets are planned to provide safe, convenient, efficient and economic movement of persons, goods and services between and within the major land use activities. Existing rights of way should be classified and improved and new streets built based on the type, origin, destination and volume of current and future traffic.
- Through traffic should be provided with routes that do not congest local streets and impact residential areas. Outside traffic destined for Cornelius commercial areas should provide convenient and efficient access without the need to use residential streets.
- Local traffic routes should be planned to provide convenient circulation between home, school, work, recreation and shopping. Convenient access to major out-of-town routes should be provided from all areas of the city.

Traffic Operations

Adopt an acceptable level of service for the roadway network that is consistent with regional transportation policies.

- LOS for signalized intersections
- LOS for unsignalized intersections
- ODOT V/C ratios apply to TV Highway based on roadway designation

Pedestrians and Bicycles

Develop complementary infrastructure for bicycles and pedestrian facilities to provide a diverse range of transportation choices for city residents.

- Sidewalk gaps shall be filled in to complete the pedestrian network. Priority to sidewalks connecting to schools, parks, libraries and transit stops.
- Sidewalks and bikeways shall be provided on all arterial and collector streets.
- Development of a local trail system with connections to regional trail facilities.
- The preferred spacing of signalized or unsignalized crossings of TV Highway.

- Bicycle parking on large commercial, industrial and multi-family residential projects.

Transit

Provide reliable convenient transit service to Cornelius residents and businesses as well as special-transit options for the city's elderly and disabled residents.

- Expand transit services with more frequent service, and transit oriented street improvements.
- Park and ride facilities should be located with convenient access to the arterial system to facilitate rider transfer to transit and car pools and should be sited for the maximum convenience of commuters and transit riders.
- Transit stop amenities such as bus shelters, curb extensions, bench, etc.
- Paratransit (i.e., van pools, or car pools, dial-a-ride, etc.) by Tri Met and community-based service providers.
- Special transportation services to the elderly and handicapped by Tri-Met and community-based service providers.

Safety

- The safety impacts of excessive vehicle speeds on roadways within Cornelius. Traffic calming measures and traffic control changes may be appropriate.
- The significant number of at-grade rail crossings within Cornelius should be evaluated as vehicle, bicycle and pedestrian volumes increase.

Environmental

Roadway improvements will limit impact to environmentally sensitive areas.

The City will encourage the use of more energy efficient and environmentally sound alternatives to the automobile by:

- The designation and construction of bike paths and pedestrian ways.
- The scheduling and routing of existing mass transit systems and the development of new systems to meet local resident needs.
- Encouraging the development of self-contained neighborhoods, providing a wide range of land use activities within a single area.
- Ensure the transportation system is developed in a manner consistent with state and federal standards for the protection of air, land and water quality, including the State Implementation Plan for complying with the Clean Air Act and the Clean Water Act.

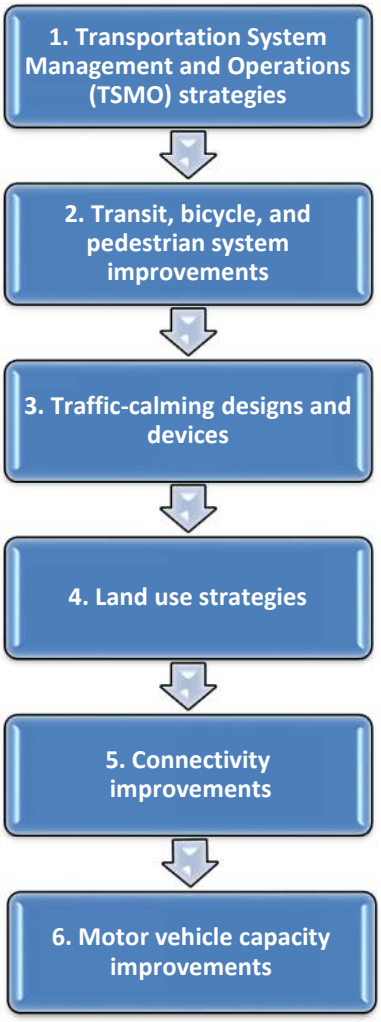
1978 Cornelius Comprehensive Plan (Amended November 16, 2015)

The Cornelius Comprehensive Plan includes the following transportation related goals:

- Provide public street standards that recognize the multi-purpose nature of the street right-of-way (utilities, vehicles, pedestrians).
- Provide transportation facilities that through design and location enhance the livability of Cornelius.
- Provide connectivity to each area of the City.
- Develop a safe, complete and efficient transportation system that provides multi-modal access.
- Establish rights-of-way at the time of development and where appropriate officially secure them by dedication of the property.
- Continue to coordinate with ODOT, Washington County, and adjacent property owners towards the goal of funding all planned improvements along the highway. Such improvements will not only improve multi-modal circulation, but will also substantially enhance the visual quality of the most visible feature in Cornelius. This in turn will improve the commercial market environment.
- Work for the development of a strong north-to-south transportation link to its primary trade area.
- Continue to explore mechanism to enhance the multi-modal access and circulation throughout the community.
- Coordinate with TriMet to continue enhancements at bus stops to provide a more attractive environment for transit users.
- Update its Transportation System Plan (TSP) as needed to comply with the Regional Transportation Plan (RTP).

Regional Transportation Functional Plan Strategies

The recommended draft goals and objectives stem from the Portland Metro Regional Transportation Plan (RTP) including the Regional Transportation Functional Plan (RTFP)[1]. The RTP and RFTP include carefully crafted policy and performance measures that call for investments to be considered in the order below[2]. These prioritized strategies have been demonstrated to help reduce vehicle miles traveled (VMT), expand travel options and be cost-effective. The recommended evaluation criteria, developed later in this memorandum, will be weighted to help support these RTFP strategies.



This includes Transportation Demand Management (TDM), safety, operational, and access management improvements.

Improving connectivity and providing better amenities for pedestrians, bicyclists, and transit users presents motorists with an attractive alternative to driving.

Improving safety (or perceived safety) for bicyclists and pedestrians through traffic calming techniques may increase non-motorized travel.

These land use strategies—set forth in the Oregon Administrative Rules (OAR), section 660-012-0035 (2)—are designed to reduce trip distances and to promote walking, biking, and transit use.

Connectivity improvements to provide parallel routes, including pedestrian and bicycle facilities. This includes connectivity improvements for roadways of all functional classifications.

These improvements will only be considered if it is determined that other strategies are not appropriate or cannot adequately address identified transportation needs.

[1] See *Cornelius Transportation System Plan Update Technical Memorandum #2: Plan and Policy Review.*

[2] Portland Regional Transportation Functional Plan, section 3.08.022.A.

Draft Goals and Objectives for the TSP Update

Draft goals and objectives have been developed to reflect the vision of the community and support regional transportation plans and regulations[3]. Current local transportation goals were reorganized and updated to reflect these modern policy needs. Feedback from the Project Management Team and from the first PAC meeting will inform changes to the goals and objectives. PAC members consist of public agency staff to help ensure coordination and plan consistency. Once final, the goals, and evaluation criteria will be applied to select the best projects and investments.

The draft goals and objectives are provided below:

Goal 1: Safety

Develop a transportation system that maintains and improves individual health and safety by maximizing pedestrian and bicycle transportation options, public safety and service access, and safe and smooth connections.

Goal 1 Objectives

A. Provide safe connections for walking, biking and driving trips
B. Identify locations in the city where enhanced street crossings for walking and biking users are needed
C. Identify improvements to address high-collision locations
D. Install amenities (e.g., directional ramps) at marked pedestrian crossings to improve safety of underserved and vulnerable populations when warranted
E. Identify programs that encourage safe walking and bicycling, and educate good traffic behavior and consideration for all users
F. Increase the transportation system's ability to support emergency response

Goal 2: Transportation System Management

Emphasize effective and efficient management of the transportation system for all users.

Goal 2 Objectives

A. Identify opportunities to improve vehicle travel reliability and safety with system management operation strategies (e.g. signal timing, driver feedback signs)
B. Seek to shift vehicular travel to off-peak periods
C. Strive to meet City's mobility standards
D. Promote and implement transportation demand management programs, such as carpool/vanpool programs, aimed at reducing commuter vehicular travel demand

[3] Cornelius Transportation System Plan Update Technical Memorandum #2: Plan and Policy Review, December 12, 2016 provides a summary of state and regional policies.

E. Reduce single-occupant vehicle trips by supporting travel options
F. Support alternative vehicle types by identifying potential electric vehicle plug-in stations and developing implementing code provisions
G. Support new technologies and/or trends related to new mobility options (e.g. car-sharing, connected and autonomous vehicles, etc.)

Goal 3: Travel Choices and Livability

Develop and maintain a well-connected transportation system that offers convenient and available pedestrian, bicycle and transit trips, facilitates access to daily needs and services, and enhances livability.

Goal 3 Objectives

A. Provide safe, comfortable and convenient transportation options
B. Incorporate amenities in the system such as street lighting, bike parking, bus shelters that better meet the needs of the walking, biking and transit user
C. Improve walking and biking connections to community destinations and continue to address deficiencies and gaps in the pedestrian and bicycle systems
D. Enhance wayfinding signage for those walking and biking, directing them to bus stops, trails, and key routes and destinations
E. Support efforts and cooperate with regional partners to develop trails
F. Work with TriMet to establish and maintain transit stops in locations that are safe and convenient for users and that are consistent with the TriMet Transit Investment Plan[4]
G. Coordinate with TriMet (and other transit providers) to improve the coverage, quality and frequency of services as needed in areas where existing and planned land uses support transit services
H. Enhance transportation connections between community destinations and neighborhoods by implementing the City's local street connectivity plan as opportunities arise

Goal 4: Economic Vitality

Support the development and revitalization efforts of the City, Region, and State economies and ensure the efficient movement of people and goods.

Goal 4 Objectives

A. Improve the freight system's efficiency, access, safety and travel reliability
B. Manage parking demands efficiently and provide access to community destinations such as businesses and scenic/recreation areas
C. Balance local access with the need to serve regional traffic on Highway 8
D. Enhance the vitality of the downtown area by incorporating roadway design elements for all modes
E. Designate truck-freight corridors on current and future truck-trip demand and the need to maintain

[4] TriMet Transit Investment Plan, FY 2012.

connectivity between land uses that generate or receive significant truck trips, and the state's strategic freight corridors.

Goal 5: Fiscal Responsibility

Sustain an economically viable transportation system for existing and future users that protects and improves existing transportation assets while cost-effectively enhancing the total system.

Goal 5 Objectives

A. Plan for an economically viable and cost-effective transportation system
B. Identify and develop diverse and stable funding sources to implement recommended projects in a timely fashion and ensure sustained funding for transportation projects and maintenance
C. Make maintenance of the transportation system a priority
D. Maintain existing facilities to preserve their intended function and useful life
E. Consider costs (construction and maintenance) and benefits when identifying project solutions and prioritizing public investments
F. Prioritize funding of projects that are most effective at meeting the goals and objectives of the Transportation System Plan
G. Implement street cross-sections with narrow pavement widths to reduce future maintenance costs

Goal 6: Equitable Transportation System

Provide a transportation system that is accessible to all users regardless of age, income, and health.

Goal 6 Objectives

A. Ensure that the transportation system provides equitable access to underserved and vulnerable populations
B. Ensure that the transportation system supports users with a range of age, income and health
C. Provide facilities for all modes that meet applicable Americans with Disabilities Act (ADA) standards

Recommended Evaluation Criteria and Scoring Methodology

The recommended evaluation criteria were developed based on the draft goals and objectives. A point-based scoring methodology will be used to measure how each transportation solution aligns with local objectives. By weighting the evaluation criteria by importance and summing the scores, TSP projects can be compared to set an initial prioritization. Each of the evaluation criteria was assigned an initial weight factor determined by how effectively it implements the RTFP preferred order of investments and factors important to the community. These weight factors will be refined based on input from the Project Management Team and from the first PAC meeting.

The evaluation criteria were assigned the following weighs to support the RTFP preferred order of investments (shown on page 5):

Weighted by 2.0 to emphasize importance in scoring

- Transportation System Management and Operation
- Transit, Bicycle and Pedestrian System Improvements

Weighted by 1.5 to emphasize importance in scoring

- Traffic Calming Design and Devices
- Land Use Strategies

Weighted by 0.5 to de-emphasize importance in scoring

- Connectivity Improvements
- Motor Vehicle Capacity Improvements

Evaluation criteria that do not directly correlate to the RTFP order of investments were assigned a weight of 1.0 to neither factor them up or down. Table 1 lists the recommended evaluation criteria and initial weighting that will be used to assess potential improvements.

Table 1: Cornelius TSP Evaluation Criteria and Scoring

Evaluation Criteria	Scoring		Weight
Goal 1: Safety			
Improves safety of the transportation system for all users	+1	Improves overall safety of system	2.0
	0	No change	
	-1	Reduces overall safety of system	
Reduces emergency vehicle response times	+1	Reduces response times	0.5
	0	No change	
	-1	Increases response times	
Goal 2: Transportation System Management			
Manages transportation system	+1	Improves system management	2.0
	0	No change	
	-1	Reduces system management	

Evaluation Criteria	Scoring		Weight
Enhances travel for local trips off the state highway system	+1	Reduces reliance on Highway 8	2.0
	0	No change	
	-1	Increases reliance on Highway 8	
Emphasizes the movement of people over vehicles, which reduces the citywide vehicle-miles-travelled (VMT)	+1	Reduces citywide VMT	2.0
	0	No change	
	-1	Increases citywide VMT	
Goal 3: Travel Choices and Livability			
Adds bikeways and walkways to fill system gaps and provide access to community amenities and between neighborhoods	+1	Improves access and travel choices	2.0
	0	No change	
	-1	Reduces access and travel choices	
Improves access to transit facilities and promotes transit as a viable travel choice	+1	Improves access to transit	2.0
	0	No change	
	-1	Reduces access to transit	
Goal 4: Economic Vitality			
Implements strategies to provide stable and reliable truck traffic flows on major facilities	+1	Improves roadway reliability for freight	0.5
	0	No change	
	-1	Negative impact on roadway reliability for freight	
Improves freight access and travel reliability	+1	Improves freight facilities	0.5
	0	No change	
	-1	Negative impact on freight facilities	
Goal 5: Fiscal Responsibility			
Maximizes use of existing facilities, reduce need for investment in new facilities	+1	Maximize use of existing facilities	2.0
	0	No change	
	-1	Increase need for new investments	
Reduces City capital and maintenance costs per capita	+1	Reduces costs	1.0
	0	No change	
	-1	Increases costs	
Goal 6: Equitable Transportation System			
Improves access and mobility to underserved or vulnerable populations	+1	Increases access to underserved or vulnerable populations	1.0
	0	No change	
	-1	Decreases access to underserved or vulnerable populations	

TM #4 – Finance Program

DRAFT MEMORANDUM

DATE: December 16, 2016

TO: Cornelius TSP Project Management Team

FROM: Reah Flisakowski, PE, DKS Associates
Kevin Chuwek, PE, DKS Associates

SUBJECT: Cornelius Transportation System Plan Update Technical Memorandum #4: Finance Program P14180-012

The purpose of this memorandum is to present the draft finance program for the Cornelius TSP. This information is presented in the attached draft TSP Chapter 10: Finance. Draft Chapter 10 includes a few sections (highlighted in yellow) that will be completed later in the TSP update process as project lists and cost estimates are available.

10. Financing

This chapter outlines the funding sources that can be used to meet the needs of the transportation system. The costs for the elements of the transportation system plan are outlined and compared to the potential revenue sources. Options are discussed regarding how the costs of the plan and revenues can be balanced.

Current Funding Strategies

Transportation funding is commonly viewed as a user fee system where the users of the system pay for infrastructure through motor vehicle fees (such as gas tax and registration fees) or transit fares. However, a great share of motor vehicle user fees goes to road maintenance, operations, and preservation of the system rather than construction of new system capacity. Much of what the public views as new construction is commonly funded (partially or fully) through local improvement districts (LIDs) and frontage or off-site improvements required as mitigation for land development.

The City of Cornelius currently utilizes three sources to fund construction and maintenance of its transportation infrastructure as described below. Each source collects revenue each year that is used to repair street facilities or construct new streets, with some restrictions on the type and location of projects.

State Fuel Tax and Vehicle License Fee

The State of Oregon Highway Trust Fund collects various taxes and fees on fuel, vehicle licenses, and permits. A portion is paid to cities annually on a per capita basis. By statute, the money may be used for any road-related purpose. Cornelius uses it for street operating needs such as street maintenance and repaving, street lighting costs, pothole repair, street sign maintenance, winter sanding, and completing sidewalk gaps.

Oregon gas taxes are collected as a fixed amount per gallon of gasoline served. Gas tax in Oregon is currently 30 cents per gallon, and this tax does not vary with changes in gasoline prices. There is no adjustment for inflation tied to the gas tax, and there was no change in the gas tax from 1992 until 2011, which means that the net revenue collected has gradually eroded over time as the cost to construct and repair transport systems increase. Fuel efficiency in new vehicles has further reduced the total dollars collected through this system.

Oregon vehicle registration fees are collected as a fixed amount at the time a vehicle is registered with the Department of Motor Vehicles. Vehicle registration fees in Oregon have recently increased from $27 per vehicle per year to $86 per vehicle per year for passenger cars, with similar increases for other vehicle types. There is no adjustment for inflation tied to vehicle registration fees. Cornelius gets about $696,000 per year in State gas tax and vehicle license fee

revenue for streets, bikeways and sidewalks. The City of Cornelius can expect to receive $15.3 million over the next 22 years, by 2040. Essentially all of these funds are spent on surface restoration of local streets. Because there is no index for cost inflation, this revenue level will increase only proportionate with the city's population growth relative to the rest of the county, which is expected to be substantial over the planning period.

Washington County Gas Tax

In addition to the State of Oregon gas tax, Washington County collects a one-cent per gallon tax that is distributed to jurisdictions in the County. Distribution of Washington County gas tax revenue parallels the state model in that jurisdictions receive a portion of the county revenue based on population. For the fiscal year 2015/2016, the estimated Washington County gas tax revenue for the City of Cornelius is $44,000. Assuming that the current tax will not increase, and since it is not pegged to inflation, the City of Cornelius can expect to receive $968,000 over the next 22 years, by 2040. These funds have historically been used for roadway maintenance of local streets.

Washington County Conditional Vehicle Registration Fee

An ordinance establishing a conditional $30 vehicle registration fee (VRF) to offset some of the maintenance funding shortfall and to improve transportation safety was adopted on Sept. 20, 2016, by the Washington County Board of Commissioners.[1]

Under the provisions of the ordinance, the fee will only go into effect on the condition that the state Legislature fails to pass a 2017 transportation funding package that provides additional County revenue equal to or greater than $8.1 million annually –the County's share of revenue generated by a $30 VRF – in the first year.

If implemented, the County VRF will be collected by the state Department of Motor Vehicles, in conjunction with state registration fees, starting July 1, 2018. The fee would be $30 per year, or $2.50 per month, for most vehicle owners. The fee for motorcycles/mopeds will be $17 per year. Owners of trailers eligible for permanent registration will pay a one-time fee of $10.

If implemented, the VRF would generate an estimated $13.5 million in revenue. This revenue would be split 60/40 between the County ($8.1 million) and the cities within the County ($5.4 million) as required by state statute. All funds received by the County would be used only for local maintenance to improve the safety and condition of County roads, bridges and culverts.

The cities' portion would be allocated based on population and Cornelius would be entitled to an estimated $190,000 annually, which would be equivalent to about $4.2 million over the 22 year planning horizon (by 2040).

[1] www.co.washington.or.us/lut/transportationfunding/2016-vehicle-registration-fee.cfm

City of Cornelius Gas Tax

The City of Cornelius collects a two-center per gallon tax, which was approved by voters in 2009. The estimated annual City gas tax revenue is $192,000. These funds are used solely for maintenance of local streets. Based on forecasted trip growth from 2018 to 2040, the City is expected to collect approximately $4,224,000 in City gas tax over the next 22 years, by 2040.

Washington County Transportation Development Tax (TDT)

Washington County adopted a Transportation Development Tax (TDT) in 2009. New development is required to pay the TDT based on the type of development that is planned in Cornelius (e.g. residential, commercial, employment, etc.). Cities within Washington County are eligible to use TDT money for roadway improvements identified within the City of Cornelius if it has been identified as a potential improvement that is listed on the TDT list. The City keeps TDT money and must obtain approval from the Washington County Coordinating Committee (WCCC), however, for projects on the TDT list, approval is typically a formality. Based on information provided by the City of Cornelius, the City collects approximately $100,000 annually, based on the past historical trends over the past seven years.

Later, as part of the TSP update, additional TDT revenues will be estimated based on the amount of proposed trip generation based on Metro's regional travel demand forecast model.

MSTIP and Grants

Federal and County monies have provided extensive funding over the past 15 years to construct major street improvements in Cornelius. All of these improvements included a heavy emphasis on improving non-motor vehicle connections.

The Washington County MSTIP program provided funding from property taxes. This funding is used to construct regionally important transportation projects. MSTIP monies funded the reconstruction of the 19th/20th/Hwy 8 intersection at the east end of downtown Cornelius in approximately 2004-2006. In 2016-17, $5.5M in MSTIP funds are being used to reconstruct 10th Avenue from Baseline to Holladay in Cornelius.

Federal grants from the Federal Highway Administration are another source funding for capital projects. In 2006-08, $4M in federal funds paid for reconstruction of Adair St. (Hwy 8 westbound) from 11th to 19th through downtown Cornelius. Then in 2013-16, federal funds helped pay for reconstruction of Baseline (Hwy 8 eastbound) from 11th to 19th, including a new pedestrian crossing of the railroad tracks south of Baseline.

Community Development Block Grants (CDBG) are another source the City has used extensively to construct transportation improvements, especially related to improving pedestrian connections. Projects over the past 15 years funded by CDBG include:

- 2005 - Davis Street sidewalk, 13th to 20th
- 2007 - Dogwood and 12th Sidewalks, Dogwood (12th to 14th), 12th (Dogwood to Ginger)
- 2009-11 - Downtown Connecting Street Sidewalks, 11th, 12th, 13th, and 14th (Adair to Baseline)
- 2013 - Signalization of 14th/Adair and 14th/Baseline intersections for pedestrians
- 2016-17 - Dogwood pedestrian corridor (14th to 20th)

Finally, ODOT Rail provided funding in conjunction with the signalization project at 14th/Baseline which improved and gated the railroad crossing at 14th, just south of Baseline. This new crossing includes an 8' sidewalk across the railroad tracks.

Future funding of projects from non-City sources such as MSTIP and CDBG is not guaranteed and is awarded through a competitive application and review process, but these do provide an opportunity for securing funding for important capital projects that do not have sufficient city funds to complete.

Summary

Under the above funding programs, the City of Cornelius will collect approximately $1,222,000 for street construction and repair each year, with the previously noted restrictions. Total revenues collected over 22 years, by 2040, would be $26.9 million with the current sources. This assumes a funding level equivalent to that provided by the Washington County Conditional Vehicle Registration Fee, which could be provided either by the state legislature or the conditional registration fee.

Table 10-1 summarizes the current funding sources. If the City spends more than the above revenues collected for transportation purposes, the funding will most likely have to be taken from City reserve funds. Therefore, it is reasonable to expect that adding more capital or maintenance responsibilities to the city will require new or expanded revenue sources.

Table 10-1: Current Transportation Revenues for Cornelius

Funding Category	Annual Amount	Estimated 22 Year Revenues (2018-2040)
State Fuel Apportionment & Vehicle License Fee	$696,000	$15,312,000
Washington County Gas Tax	$44,000	$968,000
Washington County Conditional Vehicle Registration Fee	$190,000	$4,180,000
City Gas Tax	$192,000	$4,224,000
Washington County TDT	$100,000	$2,200,000
Total Revenues	**$1,222,000**	**$26,884,000**

Source: City of Cornelius, Adopted Budget, Fiscal Year 2016-2017.

Table 10-2: Cornelius Operations & Maintenance (O&M) versus Capital Projects

Operation &Maintenance vs. Capital/Other Projects	Annual Amount	Estimated 22 Year Revenues (2018 – 2040)
Revenue	$1,222,000	$26,884,000
O&M Percentage	92%	92%
O&M Amount	$1,122,000	$24,684,000
Capital/Other Projects Percentage	8%	8%
Capital/Other Projects Amount	$100,000	$2,200,000

Notes:

1. Operations and Maintenance (O&M) costs relate to any program revenue supporting or dedicated to the operations and maintenance of any and all existing roads within the agency's street network. Capital/Other costs are those funds committed to new capacity road projects, road expansion projects, or any other type of transportation improvement project that does not fit into the normal logic costs associated with the operations and maintenance of the existing road system for the agency.
2. The O&M vs. Capital/Other ratio comparison is intended to illustrate the significant investment the agency commits annually to maintain their existing roads.
3. State Fuel Tax/Vehicle License Fees, County and City Gas Tax revenues, and the County's conditional registration fee were assumed at 92% for O&M and not capital. The TDT program revenues were assumed at 8% for capital/other transportation needs. Overall, this results in the logic of 92% for O&M.

Highlighted sections to completed later in the TSP update process

Projects and Programs

This section presents the recommended projects and programs developed for the City of Cornelius to serve local travel for the coming 20 years. The Pedestrian, Bicycle Transit, and Motor Vehicle projects were identified in the Action Plan for each mode, and represent those projects that have the highest short-term need for implementation to satisfy performance standards, or other policies established for the Cornelius Transportation System Plan. The costs for the remaining motor vehicle projects noted in the Motor Vehicle Master Plan are identified, but these have not been included in the funding needs analysis for the city because the Action Plan is limited to projects most likely to be funded within the planning horizon. Other projects on the Master Plan list require additional funding, and they are expected to be built beyond the 20-year horizon.

Project Cost Estimates

Cost estimates (general, order of magnitude) were developed for the projects identified in the motor vehicle, bicycle, transit, and pedestrian elements. Cost estimates from the existing RTP, County and/or City projects in Cornelius were used in this study, if available. Other projects were estimated using general unit costs for transportation improvements, but do not reflect the unique project elements that can significantly add to project costs[2]. Development of more detailed project costs can be prepared in the future with more refined financial analysis. Since many of the projects overlap elements of various modes, the costs were developed at a project level incorporating all modes, as appropriate. It may be desirable to break project mode elements out

[2] General plan level cost estimates do not reflect specific project construction costs, but represent an average estimate. Further preliminary engineering evaluation is required to determine impacts to right-of-way, environmental mitigation and/or utilities. Experience has shown that individual projects costs can increase by 25 to 75 percent as a result of the above factors.

separately, however, in most cases, there are greater cost efficiencies of undertaking a combined, overall project. Each of these project costs will need further refinement to detail right-of-way requirements and costs associated with special design details as projects are pursued.

All cost estimates are based on 2004 dollars. Historical construction costs price index has increased by 2.5 to 2.75 percent per year according to Engineering News Record research[3] . Construction costs have increased 100 percent in the 20 years from 1979 to 1999.

Roadway Maintenance

The annual cost of maintaining the streets within Cornelius is in the $3-4 million per year range, well beyond the City's revenue. Recent funding availability was estimated at $1,122,000 annually, a portion of which is paid for by gas tax revenues from the city, county and state. Over 22 years, the City's ability to fund road maintenance is about $24.7 million, far short of its need of about $65 to $90 million. Current funding levels allow the City to maintain its system on a 75-80 year cycle, far short of the desired 20 year cycle. Roadway maintenance is the highest cost component of the transportation plan. Additional funding sources are desperately needed for this critical system element.

Other Transportation Programs and Services

In addition to the physical system improvements identified in the previous section, the transportation facilities will require on-going operation and maintenance improvements across a variety of areas. These other transportation programs are recommended to respond to the specific policies and needs in maintaining roadway pavement quality[4], supporting safe routes to schools programs, allocations for implementing neighborhood traffic management, and on-going update and support of related planning documents.

New Funding Sources and Opportunities

The new transportation improvement projects and recommended programs will require funding beyond the levels currently collected by the City. There are several potential funding sources for transportation improvements. This section summarizes several funding options available for transportation improvements. These are sources that have been used in the past by agencies in Oregon. In most cases, these funding sources, when used collectively, are sufficient to fund transportation improvements for local communities. Due to the complexity of today's transportation projects, it is necessary to seek several avenues of funding projects. Unique or hybrid funding of projects generally will include these funding sources combined in a new package.

Within the Portland region, funding for major transportation projects often is brought to a vote of the public for approval. This is usually for a large project or list of projects. Examples of this public funding include the Westside Light Rail Project. Because of the need to gain public approval for transportation funding, it is important to develop a consensus in the community that supports needed transportation improvements. That is the value of the Transportation System

[3] Engineering News Record Construction Cost Index as reported for the past ten years for 20 cities around the United States. Reference: http://www.enr.com/features/conEco/costIndexes/constIndexHist.asp

Plan. In most communities where time is taken to build a consensus regarding a transportation plan, funding sources can be developed to meet the needs of the community.

Transportation program funding options range from local taxes, assessments, and charges to state and federal appropriations, grants, and loans. All of these resources can be constrained based on a variety of factors, including the willingness of local leadership and the electorate to burden citizens and businesses; the availability of local funds to be dedicated or diverted to transportation issues from other competing City programs; and the availability and competitiveness of state and federal funds. Nonetheless, it is important for the City to consider all of its options and understand where its power may exist to provide and enhance funding for its Transportation programs.

The following funding sources have been used by cities to fund the capital and maintenance aspects of their transportation programs. There may be means to begin to or further utilize these sources, as described below, to address new needs identified in the Transportation System Plan.

General Fund Revenues

At the discretion of the City Council, the City can allocate General Fund revenues to pay for its Transportation program. (General Fund revenues primarily include property taxes, use taxes, and any other miscellaneous taxes and fees imposed by the City.) This allocation is completed as a part of the City's annual budget process, but the funding potential of this approach is constrained by competing community priorities set by the City Council. General Fund resources can fund any aspect of the program, from capital improvements to operations, maintenance, and administration. Additional revenues available from this source to fund new aspects of the Transportation program are only available to the extent that either General Fund revenues are increased or City Council directs and diverts funding from other City programs.

Voter-Approved Local Gas Tax

As mentioned previously, Cornelius collects a two-cent per gallon gas tax, which was approved by voters in 2009. The local gas tax provides annual revenue of approximately $192,000. Based on this, each one-cent per gallon added to the local gas tax could generate almost $100,000 annually. In 2016, a measure proposing an increase to the gas tax of $0.02/gallon was rejected. However, it could still be considered as a potential future funding source.

Several other communities in Oregon have also adopted local gas taxes by public vote. The taxes are paid to the city monthly by distributors of fuel. The process for presenting such a tax to voters must be consistent with Oregon State law as well as the laws of the City of Cornelius. Table 10-3 summarizes the cities in Oregon that collect a local gas tax.

Table 10-3: Local Gas Taxes in Oregon

City	Vote Passage Date	Tax Rate
Astoria	2007	3 cents/gallon
Brookings	2015	4 cents/gallon
Canby	2008	3 cents/gallon
Coburg	2007	3 cents/gallon
Coquille	2007	3 cents/gallon
Cornelius	2009	2 cents/gallon

City	Vote Passage Date	Tax Rate
Cottage Grove	2003	3 cents/gallon
Dundee	2004	2 cents/gallon
Eugene	2003	5 cents/gallon
Hood River	2009	3 cents/gallon
Milwaukie	2007	2 cents/gallon
Newport	2009	1 cent/gallon(Nov-May)
		3 cents/gallon (June-Oct)
Oakridge	2004	3 cents/gallon
Phoenix	2015	2 cents/gallon
Sandy	2002	1 cent/gallon
Sisters	2009	3 cents/gallon
Springfield	2003	3 cents/gallon
The Dalles	1980	3 cents/gallon
Tigard	2006	3 cents/gallon
Troutdale	2015	3 cents/gallon
Tillamook	1982	1.5 cents/gallon
Veneta	2004	3 cents/gallon
Warrenton	2007	3 cents/gallon
Woodburn	1989	1 cent/gallon

Source: League of Oregon Cities' website (http://www.orcities.org/MemberServices/AZIndex/tabid/810/itemid/180/), Local Gas Tax Information, November, 2016.

Street Utility Fee Revenue

A number of Oregon cities supplement their street funds with transportation utility fees. Local cities with adopted street utility fees include Corvallis, La Grande, Milwaukie, North Plains, Philomath, Hillsboro and Tualatin.[5] Establishing user fees to fund applicable transportation activities and/or capital construction ensures that those who create the demand for service pay for it proportionate to their use. The street utility fees are recurring monthly or bi-monthly charges that are paid by all residential, commercial, industrial, and institutional users. The fees are charged proportionate with the amount of traffic generated, so a retail commercial user pays a higher rate than a residential user. Typically, there are provisions for reduced fees for those that can demonstrate they use less than the average rate implies, for example, a resident that does not own an automobile or truck or has an income below a predetermined eligibility level.

From a system health perspective, forming a utility fee program also helps to support the ongoing viability of the program by establishing a source of reliable, dedicated funding for that specific function. Fee revenues can be used to secure revenue bond debt used to finance capital construction. A street utility can be formed by Council action and does not require a public vote.

A preliminary estimate for street utility fee revenue in Cornelius ranges between $75,000 to $250,000 annually, based on the average rates charged around the state. A specific fee study would be required to establish a fee program for the City of Cornelius to determine specific allocations to its residents and merchants.

[5] League of Oregon Cities, TUF Solutions for Local Street Funding: A Survey on Transportation Utility Fees (TUF's), January, 2008.

Other Funding Sources

Urban Renewal District

An Urban Renewal District (URD) would be a tax-funded district within the City. The URD would be funded with the incremental increases in property taxes that result from construction of applicable improvements. This type of tax increment financing has been used in Oregon since 1960. Uses of the funding include, but are not limited to, transportation. It is tax-increment funded rather than fee funded and the URD could provide for renewal projects such as streetscape, water, sewer, wastewater, undergrounding utilities, or parking to support downtown businesses.

Local Improvement District Assessment Revenue

The City may set up Local Improvement Districts (LIDs) to fund specific capital improvement projects within defined geographic areas, or zones of benefit. LIDs impose assessments on properties within its boundaries. LIDs may not fund ongoing maintenance costs. They require separate accounting, and the assessments collected may only be spent on capital projects within the geographic area. Citizens representing 33% of the assessment can terminate a LID and overturn the planned projects so projects and costs of a LID must be met with broad approval of those within the boundaries of the LID.

Direct Appropriations

The City can seek direct appropriations from the State Legislature and/or U.S. Congress for transportation capital improvements. There may be projects identified in the Plan for which the City may want to pursue these special, one-time appropriations.

Special Assessments

A variety of special assessments are available in Oregon to defray costs of sidewalks, curbs, gutters, street lighting, parking and CBD or commercial zone transportation improvements. These assessments would likely fall within the Measure 50 limitations. A regional example would be the Westside LRT where the local share of funding was voter approved as an addition to property tax.

Employment Taxes

TriMet collects a tax for transit operations in the Portland region through payroll and self-employment taxes.

Debt Financing

While not a direct funding source, debt financing can be used to mitigate the immediate impacts of significant capital improvement projects and spread costs over the useful life of a project. Though interest costs are incurred, the use of debt financing can serve not only as a practical means of funding major improvements, but is also viewed as an equitable funding strategy, spreading the burden of repayment over existing and future customers who will benefit from the projects. The obvious caution in relying on debt service is that a funding source must still be identified to fulfill annual repayment obligations.

Voter-Approved General Obligation Bond Proceeds: Subject to voter approval, the City can issue General Obligation (G.O.) bonds to debt finance capital improvement projects. G.O. bonds are backed by the increased taxing authority of the City, and the annual principal and interest repayment is funded through a new, voter-approved assessment on property City-wide (a property tax increase). Depending on the critical nature of any projects identified in the

Transportation Plan, and the willingness of the electorate to accept increased taxation for transportation improvements, voter-approved G.O. bonds may be a feasible funding option for specific projects. Proceeds may not be used for ongoing maintenance.

Revenue Bonds*:* Revenue bonds are debt instruments secured by rate revenue. In order for the City to issue revenue bonds for transportation projects, it would need to identify a stable source of ongoing rate funding. Interest costs for revenue bonds are slightly higher than for general obligation bonds, due to the perceived stability offered by the "full faith and credit" of a jurisdiction.

Oregon Transportation Infrastructure Bank Loans: A statewide revolving loan fund designed to promote innovative transportation funding solutions. State support for the program is provided by the Financial Services Branch of ODOT. In general, eligible projects include highway, transit, bikeway and pedestrian access projects. Projects are rated on established criteria and recommended based on the rankings. Repayment of loans must begin within five years of project completion and must be complete within 30 years or at the end of the useful life of the project.

Recommendations for New Transportation Funds

It is recommended that the City continue to pursue an increase in the local gas tax. We estimate that a two-cent per gallon local gas tax could generate roughly $200,000 per year, or $4.4 million over the next 22 years, and shown in Table 10-4 below. These additional funds would not be expected to generate sufficient revenues to fully capitalize the Action Plan projects and maintenance programs.

Table 10-4: Recommended New Transportation Funding Sources for Cornelius

Transportation Funding Source	Estimated Additional Annual Revenues
Local Gas Tax ($0.02/gallon)	$200,000
Annual New Revenues	**$200,000**
22 YEAR TOTAL	**$4,400,000**

In addition, the City should actively pursue grant and other special program funding in order to mitigate the costs to its citizens of transportation capital construction. Urban Renewal District funding should also be considered, which could include transportation and other infrastructure projects such as streetscape, water, sewer, wastewater, undergrounding utilities or parking to support downtown businesses.

The estimated revenue from the City TDT ($2.2 million) combined with revenue from the recommended new transportation funding sources ($6.6 million) over the next 22 years would provide adequate funding for the capital project costs identified in the TSP action plans ($XX million). However, the estimated $24.7 million for roadway maintenance costs over the next 22-years would likely be significantly underfunded.

TM #5 – Existing and Future Conditions

MEMORANDUM

DATE: April 5, 2017

TO: Cornelius TSP Project Management Team

FROM: Reah Flisakowski, PE, DKS Associates
Kevin Chuwek, PE, DKS Associates

SUBJECT: Cornelius Transportation System Plan Update Technical Memorandum #5: Existing and Future Transportation Systems P14180-012

The purpose of this memorandum is to present the existing and future transportation conditions for the Cornelius TSP corresponding to Task 3.1 in the project scope of work. This information is presented in the attached draft TSP chapters summarized below.

Draft TSP Chapter 3: Existing Conditions

Draft TSP Chapter 4: Demand and Land Use

Draft TSP Chapter 5: Pedestrians

Draft TSP Chapter 6: Bicycles

Draft TSP Chapter 7: Transit

Draft TSP Chapter 8: Motor Vehicles

Draft TSP Chapter 3 and Chapter 4 are a complete update to the previously adopted chapters. Draft TSP chapters 5 through 8 have updates to selection sections only, and will be completed later in the TSP update process as additional findings and project lists are available.

3. Existing Conditions

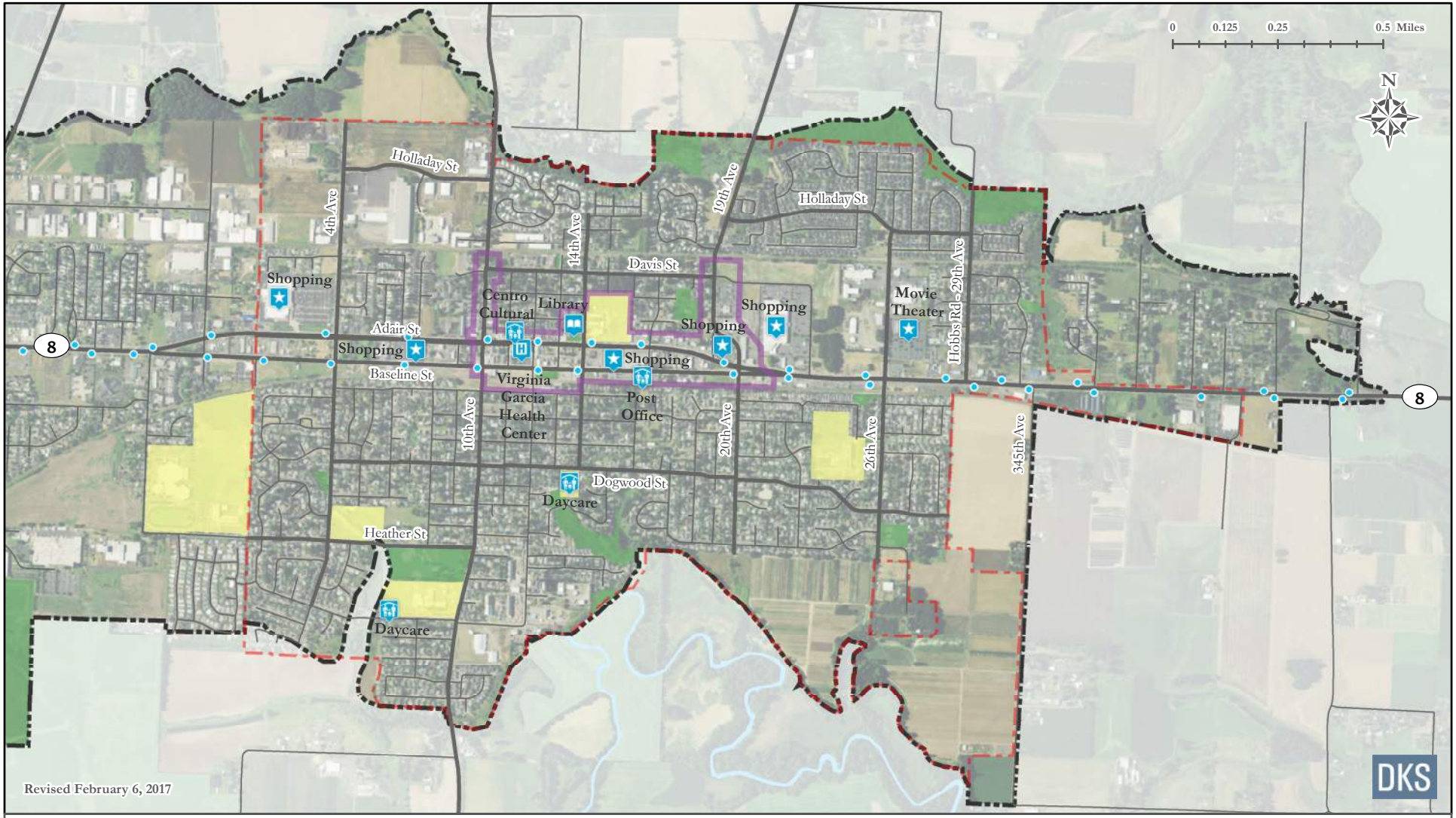
Overview

Existing transportation conditions were evaluated as part of the City of Cornelius TSP Update. An analysis of current conditions provides an understanding of facility development, service and performance. This memorandum summarizes existing transportation operation in the City for all travel modes including pedestrians, bicycles, transit, motor vehicles, freight, water and air. To understand existing travel patterns and conditions, multiple aspects of the city's transportation system were considered. An inventory was conducted in fall and winter 2016 to establish base year conditions for the TSP. Much of this data provides a basis of comparison for future assessment of transportation performance in Cornelius relative to desired policies. The City recently conducted an online survey[1] to gather community views on the current state of the transportation system and identify issues that are most important. Highlights from the survey responses are provided throughout this chapter.

The study area includes the City of Cornelius and the surrounding area transportation system network within the urban growth boundary. The study area which will serve as the focus for this TSP update is shown in Figure 3-1. This figure also shows key destinations and the Cornelius Main Street District to highlight locations that generate demand on the transportation system. Fifteen intersections within the study area were selected for traffic operational and safety analysis. The following sections review the existing transportation systems including pedestrian, bicycle, transit, motor vehicle and other modes (such as rail, marine, etc.) and their performance in the City of Cornelius. Based on this review of existing conditions and input provided by the community, the TSP plans for each mode (Chapters 5 through 8) present recommendations to address system deficiencies and needs.

[1] Cornelius TSP Community Survey #1, online November 28 to December 23, 2016.

3-1 Activity Generators



Legend:

Major Activity Generators:

- Shopping
- Health Center
- Library
- Other Community Amenity

- Bus Stop
- Parks and/or Natural Areas
- School

Main Street District

- Cornelius Main Street District

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

Pedestrian System

In Cornelius, walking plays a key role in the transportation network. Planning for pedestrians not only helps the city provide a complete, multi-modal transportation system, it supports healthy lifestyles and ensures that the young, the elderly, and those not financially able to afford motorized transport have access to goods, services, employment, parks, and transit. Continuous sidewalk connections between all activity generators and arterial/collector roadways are desirable to allow for safe and attractive non-motorized travel options.

Existing Pedestrian Infrastructure

Although sidewalks are the basic infrastructure of the citywide pedestrian network, various other connections and trails provide vital layers of infrastructure that allow efficient pedestrian movement. The walking network is composed of sidewalks, roadway shoulders, trails and marked pedestrian crossings. Existing pedestrian facilities are shown in Figure 3-2.

Sidewalks are located along roadways, often separated from the roadway with a curb and/or planting strip, and have a hard, smooth surface, such as concrete. In general, most arterial and collector streets in Cornelius have sidewalks on at least one side of the street. There are several locations within the downtown area and the neighborhoods and on rural sections of OR 8 where sidewalks are not well connected. Sidewalks on Baseline and Adair Street between 10th and 20th Avenue and the connecting avenues are at least eight feet wide. Sidewalks outside the downtown area are typically four to five feet wide, some sections with poor surface quality.

Roadway shoulders serve as pedestrian routes in many rural Oregon communities. On roadways with low traffic volumes (i.e., less than 3,000 vehicles per day), shoulders may be adequate for pedestrian travel. These shoulders must be wide enough so that both pedestrians and bicyclists can use them, usually six feet or wider. OR 8 east of East Lane provides roadway shoulders for walking that are also used by cyclists.

Trails serve recreational and daily trip needs for residents in Cornelius. There are several trails within the City providing connections to neighborhoods and through parks. Key trails include the Council Creek HOA Trail and pathways in Harleman Park and Arboretum Park.

Marked pedestrian crossings provide critical linkages that connect downtown Cornelius, commercial areas, neighborhoods and bus stops separated by OR 8. There are numerous enhancements that can be provided to increase driver awareness and pedestrian visibility. The effectiveness of crossing treatments can be influenced by factors such as the number of lanes being crossed, number of pedestrians wanting to cross and vehicle speeds.

Marked and signalized pedestrian crosswalks are provided at traffic signals on Baseline Street and Adair Street at 4th, 10th and 14th Avenue and on OR 8 at 20th Avenue, Fred Meyer Access, and 26th Avenue. The traffic signals provide crossing locations for pedestrians traveling between the north and south portions of Cornelius. The traffic signals improve pedestrian access to the library, schools, Walmart, Fred Meyer and downtown businesses.

There are a few marked (non-signalized) locations on city arterial and collector streets. Crosswalk pavement markings (no signs) are provided at the 14th Avenue/Barlow Street intersection to serve the Cornelius Elementary School main entrance. Heather Street provides a crosswalk (pavement markings and signs) at the west entrance to Harleman Park which connects to Echo Shaw Elementary School. Crosswalks are provided on all legs of the 4th Avenue/Heather Street intersection to serve demand from the Swallowtail Waldorf School.

The downtown area has the highest density of major activity generators. The signalized pedestrian crosswalks at 10th and 14th Avenue on Baseline and Adair Street are about 1,200 feet apart which may encourage people to cross at 11th, 12th and 13th Avenues. Each of these intersections has recently been improved to provide curb extensions, ADA ramps, stop bars on the side streets and pedestrian level lighting. These crossing average 26 feet wide and require a pedestrian to cross two vehicle lanes (both same direction) and a bike lane. Enhancements, such as marked and signed crosswalks, can be considered to increase driver awareness of potential pedestrian. Typically, enhanced crosswalks are not warranted until pedestrian crossing volumes reach moderate to high levels or a safety deficiency is identified. A review of available crash data for these segments did not reveal a pedestrian safety issue. Further enhancements on Baseline and Adair Street at 11th, 12th and 13th Avenues require detailed analysis and approval by ODOT.

Pedestrian Volumes

Pedestrian counts were conducted during the PM peak hour at the study intersections. These counts represent a sample of the existing pedestrian activity based on data collected on weekdays in 2010 through 2016. Pedestrian activity is influenced by several factors such as time of year and weather. Variations in pedestrian activity at the study intersections would be expected with data collection over extended periods of time. The pedestrian crossing volumes are shown on Figure 3-2.

The most significant pedestrian movements for study intersections occur at Baseline Street and Adair Street at the 10th, 14th and 20th Avenue signals. These pedestrian trips are likely generated by adjacent retail and school land uses and close proximity to bus stops. Dogwood Street at 10th, 14thand 20th Avenue and Davis Street at 19th Avenue experienced moderate pedestrian volumes.

Qualitative Pedestrian Assessment

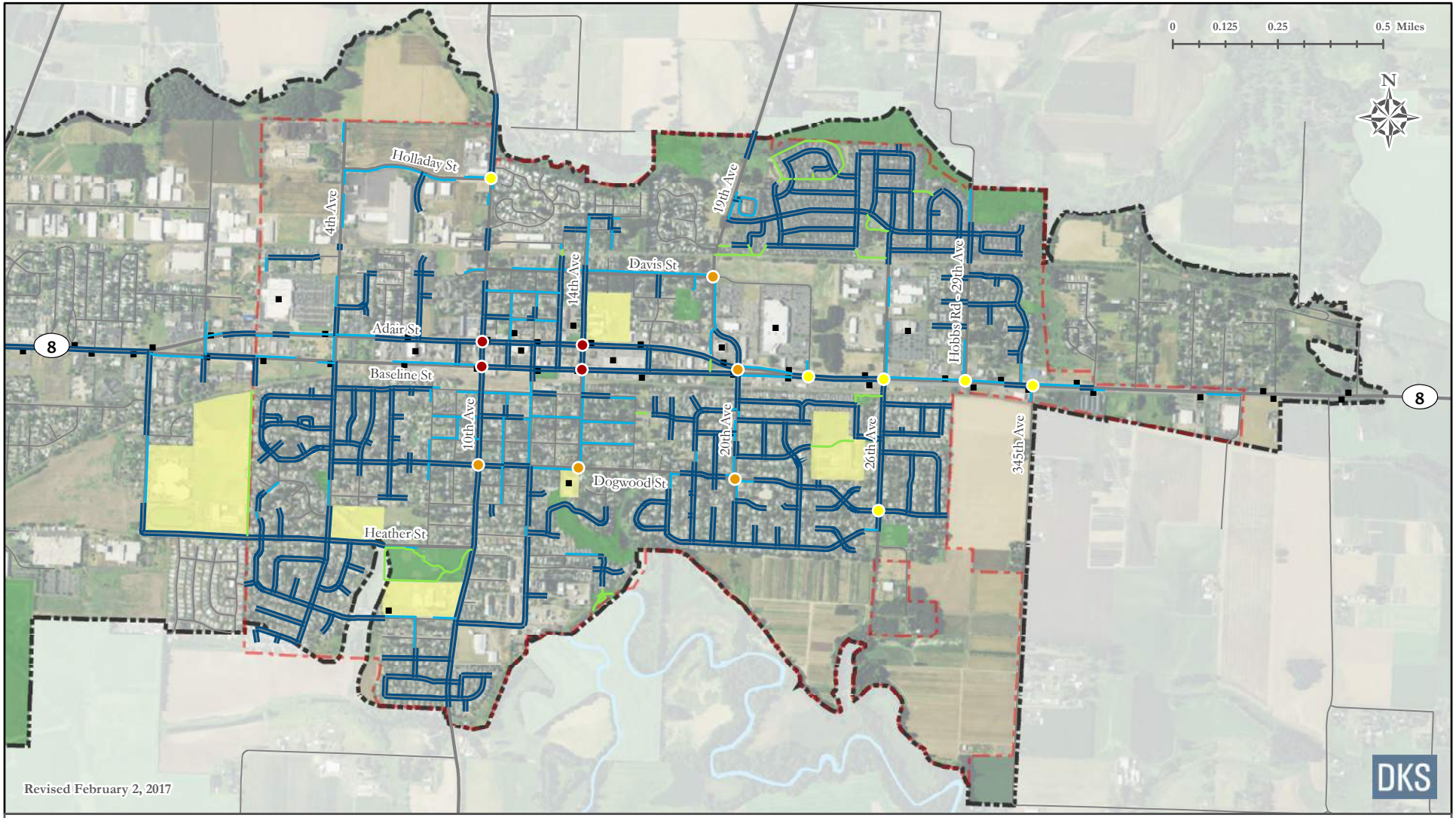
The method for assessing pedestrian network conditions at a citywide planning level relies on a qualitative analysis of walkways based on the ODOT Multimodal Analysis Methodology[2]. The quality and availability of various characteristics are rated system-wide as “Excellent”, “Good”, “Fair”, or “Poor”. For the pedestrian network evaluation, consideration is given to the presence of a sidewalk or path, a buffer zone (i.e., bike lane, shoulder, landscape strip, or on-street parking) and street lighting, and traffic volumes, number of travel lanes and travel speeds along the adjacent roadway. The intent of the analysis is to show the extent to which the pedestrian network provides a level of comfort and safety for users. The analysis will be used to inform, create, and confirm recommendations for pedestrian projects.

In Cornelius, an “Excellent” rating requires sidewalks on both sides of the roadway, along with a desirable buffer zone given the roadway characteristics. A “Good” rating requires sidewalks on both sides of the roadway and a buffer zone, but without the desirable features or widths given the roadway characteristics. A “Fair” rating is given to a roadway with sidewalks on both sides, but without an adequate buffer zone, or a low volume, low speed roadway with a sidewalk on one side. A “Poor” rating denotes gaps within the sidewalks along that corridor.

Figure 3-3 summarizes the pedestrian network conditions in Cornelius. Overall, the network rates relatively high in the downtown area east of 10th Avenue and poor towards the edges of the City.

[2] Analysis Procedures Manual Version 2, Oregon Department of Transportation, March 2016.

3-2 Existing Pedestrian Facilities



Legend:

Pedestrian Facilities

- Sidewalk on Both Sides
- Sidewalk on One Side
- Trails

Pedestrian Volumes (PM Peak):

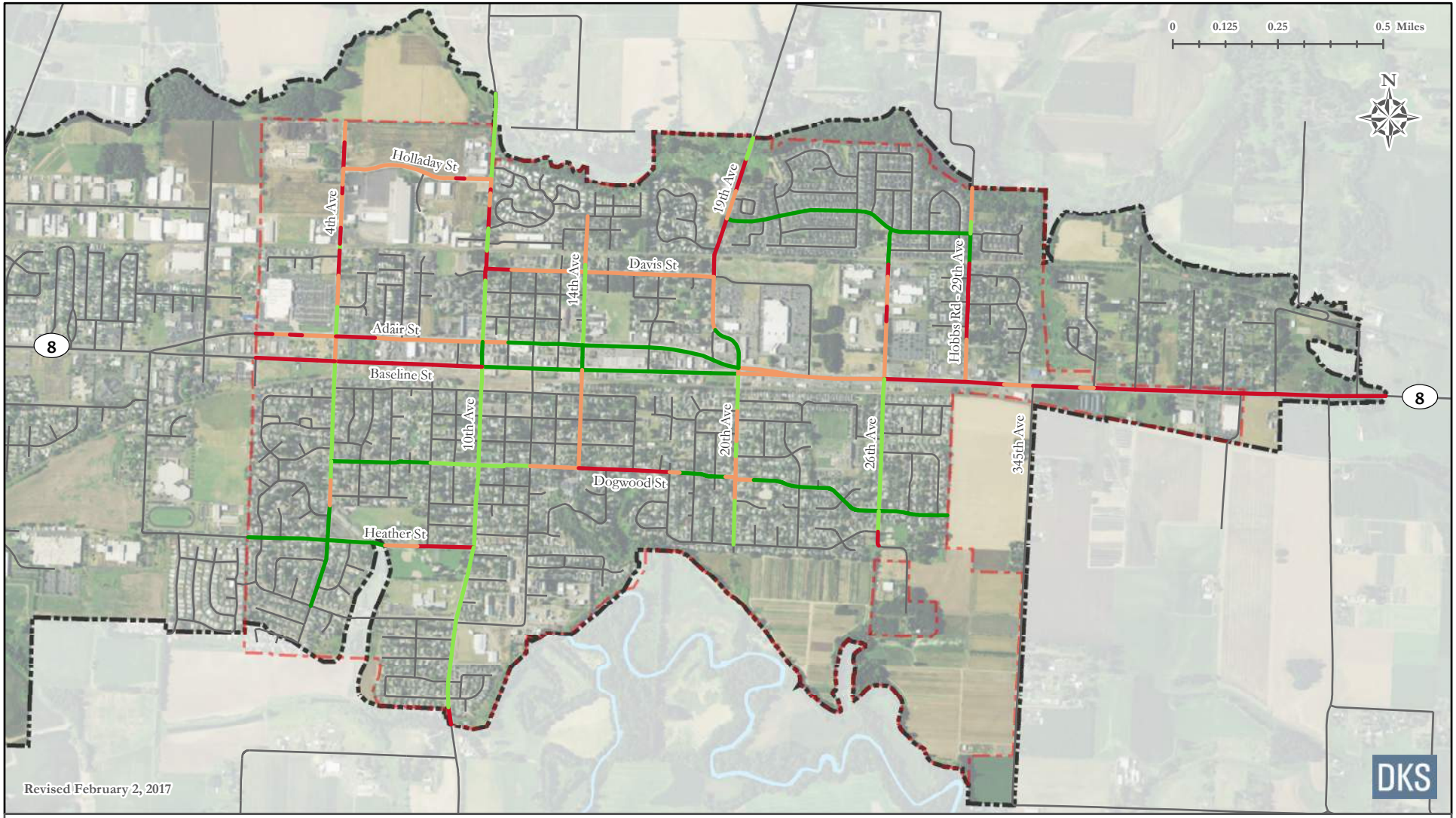
- 0 - 10 Pedestrians
- 11 - 20 Pedestrians
- 21 - 35 Pedestrians

Activity Generators

- Parks and/or Natural Areas
- School
- Other Major Activity Generator (see Figure 3-1)

- Urban Growth Boundary
- Cornelius City Limit

3-3 Qualitative Pedestrian Assessment



Legend:

Qualitative Pedestrian Assessment:

- Excellent
- Good
- Fair
- Poor

Note:
Rating is based on a combination of sidewalk presence, speed limit, presence of buffers, roadway volume, number of lanes, shoulder widths and presence of lighting. Rating calculated on Collectors and Arterials.

- Urban Growth Boundary
- Cornelius City Limit

Community Survey

The TSP Community Survey found citizens are interested in improving the pedestrian network. Specific responses were related to lack of sidewalks and trails, concerns about sidewalk conditions (lifting causing tripping hazard), and better street lighting.

Deficiencies in the Pedestrian System

The pedestrian system has several deficiencies, which make walking difficult and potentially unsafe. One of the most pressing mobility issues facing Cornelius is the need to expand sidewalk coverage on arterials and provide opportunities to safely cross OR 8 at key locations. While some improvements are requirements, such as infill of sidewalks gaps to meet agency design standards, others such as pedestrian crossings, can be more helpful in improving the overall connectivity of the system.

Sidewalk gaps along OR 8: Cornelius has a relatively well-built out sidewalk network along OR 8 in the developed portion of the city. There are several priority locations for sidewalk infill needs based on the Qualitative Pedestrian Assessment ("Poor" segments shown in Figure 3-3):

- East of East Lane is absent of sidewalks on both sides of the highway requiring pedestrians to walk in the shoulder area. This highway segment connects to rural single family neighborhoods. Highway traffic volumes are over 33,000 vehicles per day.
- There are no sidewalks on the south side of OR 8 between 26th Avenue and East Lane. Walking trips on this highway segment are likely related to nearby bus stops.
- Baseline Street west of 10th Avenue and Adair Street near 4th Avenue have large sidewalk gaps.

Sidewalk gaps along city streets: While Figure 3-2 does not include an inventory of existing pedestrian facilities for local streets, only a small portion of the local streets have sidewalks. Priority locations for sidewalk infill needs on the arterial and collector network from the Qualitative Pedestrian Assessment ("Poor" segments shown in Figure 3-3) include:

- Heather Street along Harleman Park, west of 10th Avenue
- Dogwood Street between 14th and 18th Avenue
- 4th Avenue north of Davis Street, includes at railroad crossing
- 10th Avenue north of Davis Street, includes at railroad crossing
- 19th Avenue north of Davis Street, includes at railroad crossing
- Davis Street east of 10th Avenue
- Sections of 26th and 29th Avenue north of OR 8

Pedestrian crossings along OR 8: The number of marked crossings can be improved in the downtown area with 11th, 12th and 13th Avenue as primary candidates for further evaluation. Other key locations for highway crossings to support bus stops are identified in the Deficiencies in the Transit System section of this chapter.

Pedestrian needs in the Cornelius Main Street District: Improvements to support walking trips in this area are important to complete the grid system and connect to retail centers, Cornelius

Elementary School, Veterans Memorial Park, public library and other key destinations. Priority needs include:

- Sidewalk gap on west side of 14th Avenue south of Baseline Street
- Sidewalk gaps on west side of 11th Avenue near Centro Cultural
- Sidewalk gaps on both sides of 17th Avenue north of Adair Street
- Crosswalks at the 14th Avenue/Barlow Street intersection lack pedestrian crossing signs

Substandard facilities: Existing non-ADA (American Disabilities Act) compliant curb ramps and pedestrian throughway obstacles (e.g., shrubbery, utilities poles) present barriers to those with visual or mobility impairments, and are present throughout the existing sidewalk system.

Bicycle System

The bicycle system provides a non-motorized travel option for trips that are longer than a comfortable walking distance. A well-developed bicycle system promotes a healthy and active lifestyle for its residents, and promotes activity for its visitors.

Existing Bicycle Infrastructure

The bicycling network, shown in Figure 3-4, consists of bike lanes, shared bike routes (designated Metro bicycle friendly street) and trails. Bicycle parking is a fundamental component of a bicycle network.

Bike lanes are portions of the roadway designated specifically for bicycle travel by a striped lane and pavement stencils. Bike lanes are not required, and are often not appropriate, on local streets. OR 8 provides bike lanes along the entire corridor. The south side of Baseline Street and the north side of Adair Street provide bike lanes that are primarily against on-street parking. Baseline Street from 9th to 10th Avenue is currently under construction, filling in the bike lane gap and removing the separate eastbound right turn lane at 10th Avenue.

The majority of the collector routes in Cornelius do not provide bike lanes. There are several Metro designated bike friendly routes in the City which do not provide standard striped bike lanes but are low volume and low speed routes for cyclists to use.

Shoulder bikeways exist when paved roadways have striped shoulders wide enough for bicycle travel. ODOT recommends a six-foot paved shoulder to adequately provide for bicyclists, and a four-foot minimum width in constrained areas. Some shoulder bikeways are signed to alert motorists to expect bicycle travel along the roadway. OR 8 east of 331st Avenue provides unsigned wide shoulders (five feet or more) on both sides that can be used by cyclists.

Shared roads include roadways on which bicyclists and motorists share the same travel lane. The most suitable roadways for shared bicycle use are those with low speeds (25 mph or less) and low traffic volumes (3,000 vehicles or fewer per day). Shared roadways are often signed as bicycle routes, serve to provide continuity to other bicycle facilities (e.g., bicycle lanes) or can be designated as a preferred route through the community. Shared roadways can have signs that highlight a special route or provide directional information in bicycle minutes or distance. Most local roadways in the city are considered shared roadways, but do not have signs or pavement markings. Metro designated Bicycle Friendly Streets, shown in Figure 3-4, are considered to operate as shared roads, however no signage or pavement markings are provided.

Bicycle parking provides essential end-of-trip facilities. Lack of safe and secure facilities for either short-term or long-term parking can be an obstacle to promoting bicycle riding. Short-term parking accommodates visitors, customers, and messengers. It requires a standard rack, appropriate location and placement, and weather protection. Long-term parking accommodates employees, residents, commuters, and others who park for long periods. This parking requires a secure, weather-protected location. Bike racks are provided at upgraded bus stops on Baseline Street at 12th and 14th Avenue.

Bicycle Volumes

Bicycle counts were conducted during the PM peak hour at the study intersections. The bicycle volumes observed are summarized in Figure 3-4. The highest bicycle volumes were observed on 10th Avenue and the Baseline Street/Adair Street couplet. These counts represent a sample of the bicycle activity based on evening peak hour data collected on weekdays in 2010 through 2016. The level of bicycle ridership is influences by several factors such as time of year and weather. Variations in bicycle activity is expected with data collected over extended periods of time.

Qualitative Bicycle Assessment

The method for assessing bicycle network conditions at a citywide planning level relies on a qualitative analysis of bikeways based on the ODOT Multimodal Analysis Methodology[3]. The quality and availability of various characteristics are rated system-wide as "Excellent", "Good", "Fair", or "Poor". Consideration is given to the presence and width of bike facilities (i.e., bike lane, shoulder, path, shared lane markings), grade and pavement conditions of the roadway, and the number of travel lanes, vehicle volumes, and travel speeds along the adjacent roadway. The analysis shows the extent to which the bicycle network provides a level of comfort and safety for users. The analysis will be used to inform, create, and confirm recommendations for projects.

An "Excellent" rating requires separated bicycle facilities on high volume or speed roads, or adequate bike facilities given the segment characteristics on a low volume and low speed road. A "Good" rating is given to a high volume or speed road with adequate bicycle facilities and width, or a low volume and low speed road without the preferred facility type or widths given the roadway characteristics. A "Fair" rating is given to a high volume or speed road with bicycle facilities, but without the preferred facility type or width, or a low volume and speed road without bicycle facilities. A "Poor" rating denotes gaps within the bike network along that corridor.

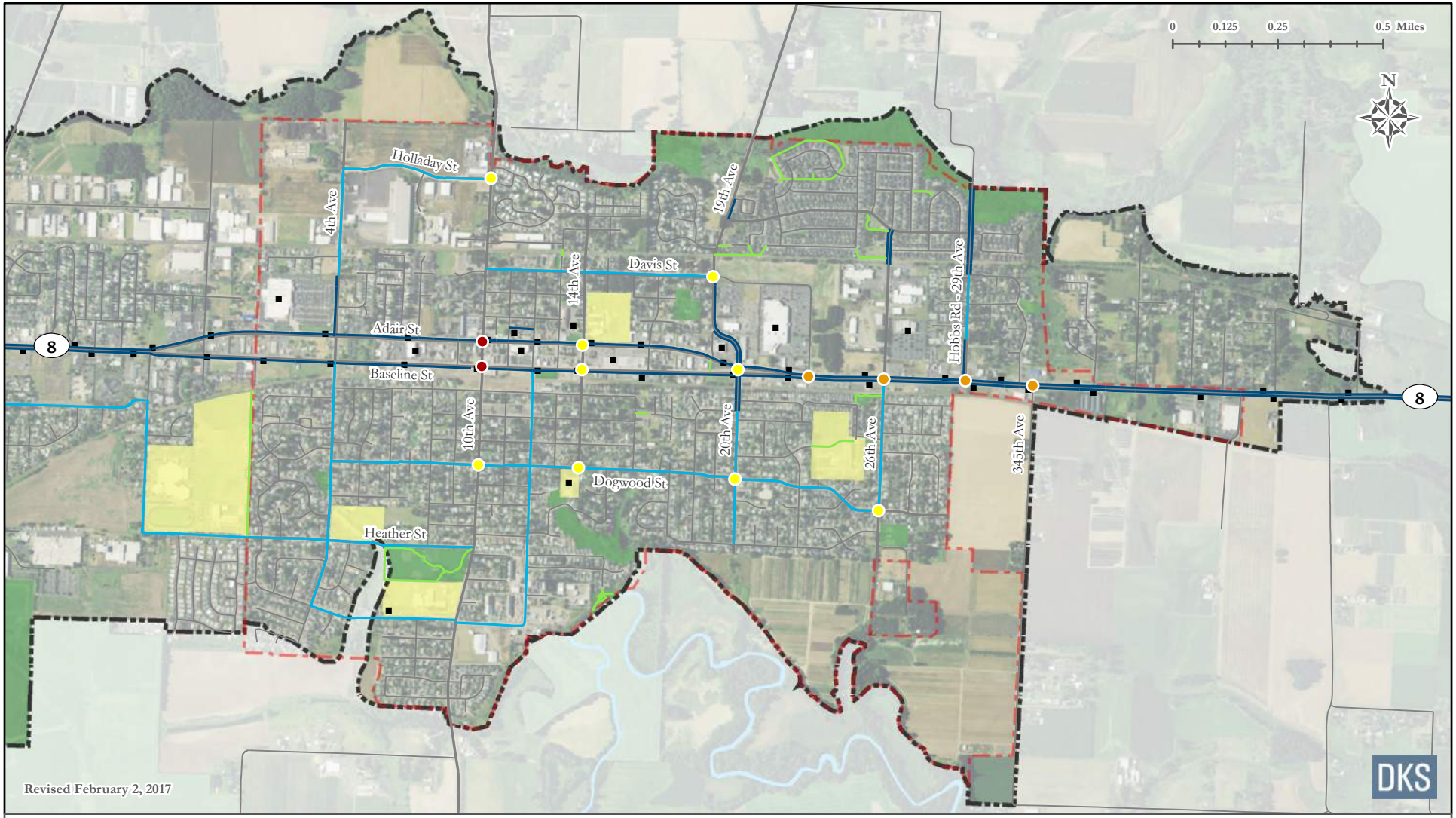
Figure 3-5 summarizes the bicycle network conditions in Cornelius. Overall, the network rates relatively high near downtown, and on most collectors but poor on OR 8 outside downtown.

Community Survey

The TSP Community Survey found citizens are interested in more trails in natural areas.

[3] Analysis Procedures Manual Version 2, Oregon Department of Transportation, March 2016.

3-4 Existing Bicycle Facilities



Legend:

Bicycle Facilities

- Bike Lane
- Metro Bicycle Friendly Street
- Trails

Bicycle Volumes (PM Peak):

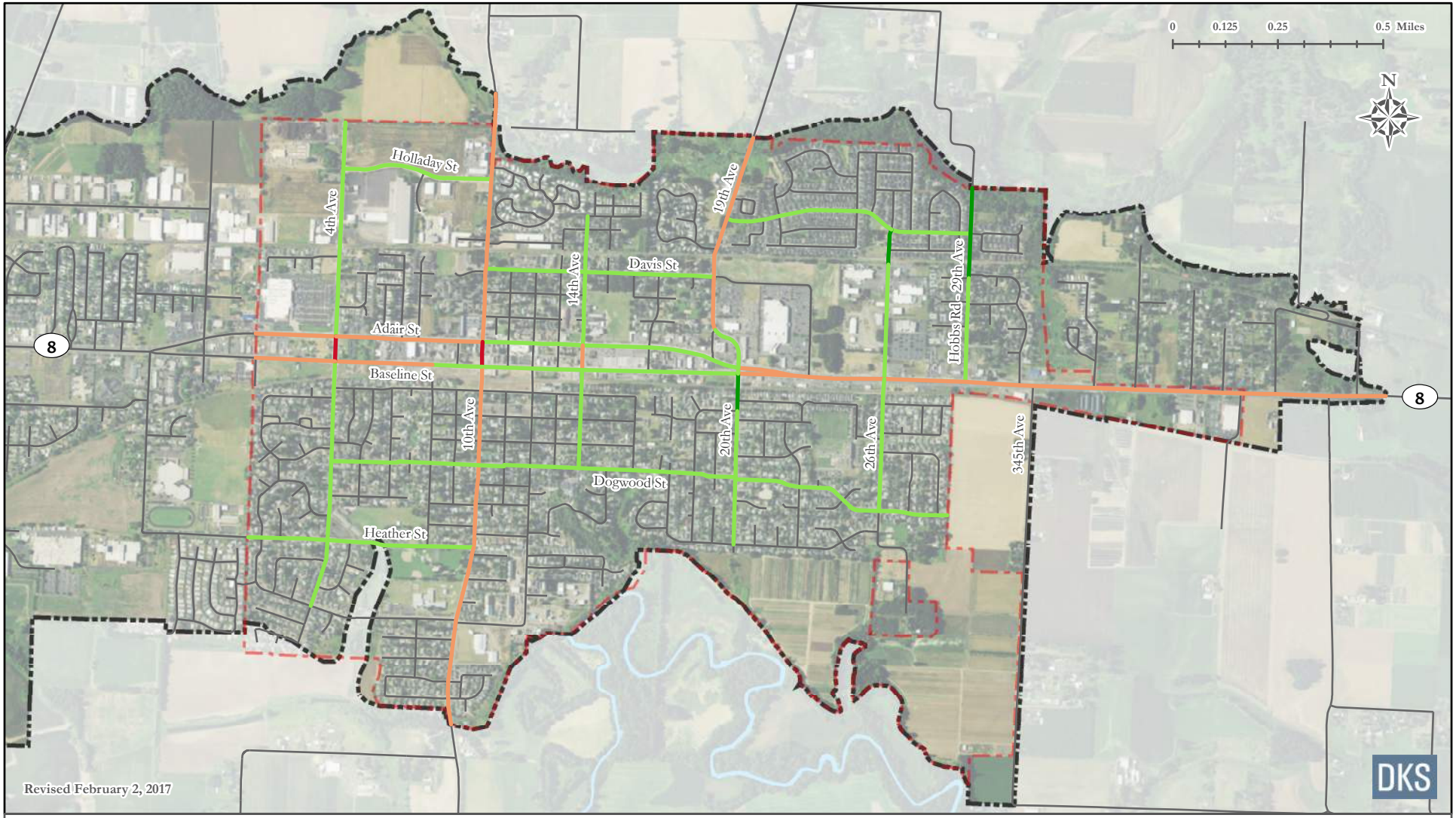
- 0 - 2 Bicyclists
- 3 - 5 Bicyclists
- 6 - 7 Bicyclists

Activity Generators

- Parks and/or Natural Areas
- School
- Other Major Activity Generator (see Figure 3-1)

- Urban Growth Boundary
- Cornelius City Limit

3-5 Qualitative Bicycle Assessment



Legend:

Qualitative Bicycle Assessment:

- Excellent
- Good
- Fair
- Poor

Note:
Rating is based on a combination of speed limit, presence of bicycle facilities, presence of buffers, on-street parking, access, grade and pavement conditions of the roadway and other street characteristics. Rating calculated on Collectors and Arterials.

- Urban Growth Boundary
- Cornelius City Limit

Deficiencies in the Bicycle System

The bicycle system has several deficiencies, meeting the needs below are recommended to encourage system use.

Bicycle facilities along OR 8: There are complete bike facilities on OR 8 through Cornelius. The shoulder bikeways on OR 8, east of 331st Avenue, would benefit from signs to alert drivers to expect bicycle travel along the roadway.

Bicycle facilities along City roadways: There are several priority locations for bicycle facility needs based on the Qualitative Bicycle Assessment ("Poor" and "Fair" segments shown in Figure 3-5):

- 19th Avenue north of OR 8 and 10th Avenue through the City.
- 4th Avenue between Baseline and Adair Street
- 10 Avenue between Baseline and Adair Street (improvements planned in 2017)
- Bike lane gaps on collector facilities were rated as "Good" condition based on lower traffic volumes and speeds suggesting no improvements are needed.

Bicycle parking: Available bicycle parking in Cornelius is quite low. Provision of bicycle parking are needed to support and promote bicycling as a mode of transportation. Priority locations for bike parking in the Cornelius Main Street District include Cornelius Elementary School, parks and larger commercial and office buildings.

Transit System

The transit system provides an important travel option for the young, the elderly, and those not financially able to afford motorized transport. It also provides an alternative travel option for those who own motorized transport but choose not to drive or pay for parking. Public transportation is critical to our region's transportation system and is essential to the economic and social quality of life of our citizens.

Service

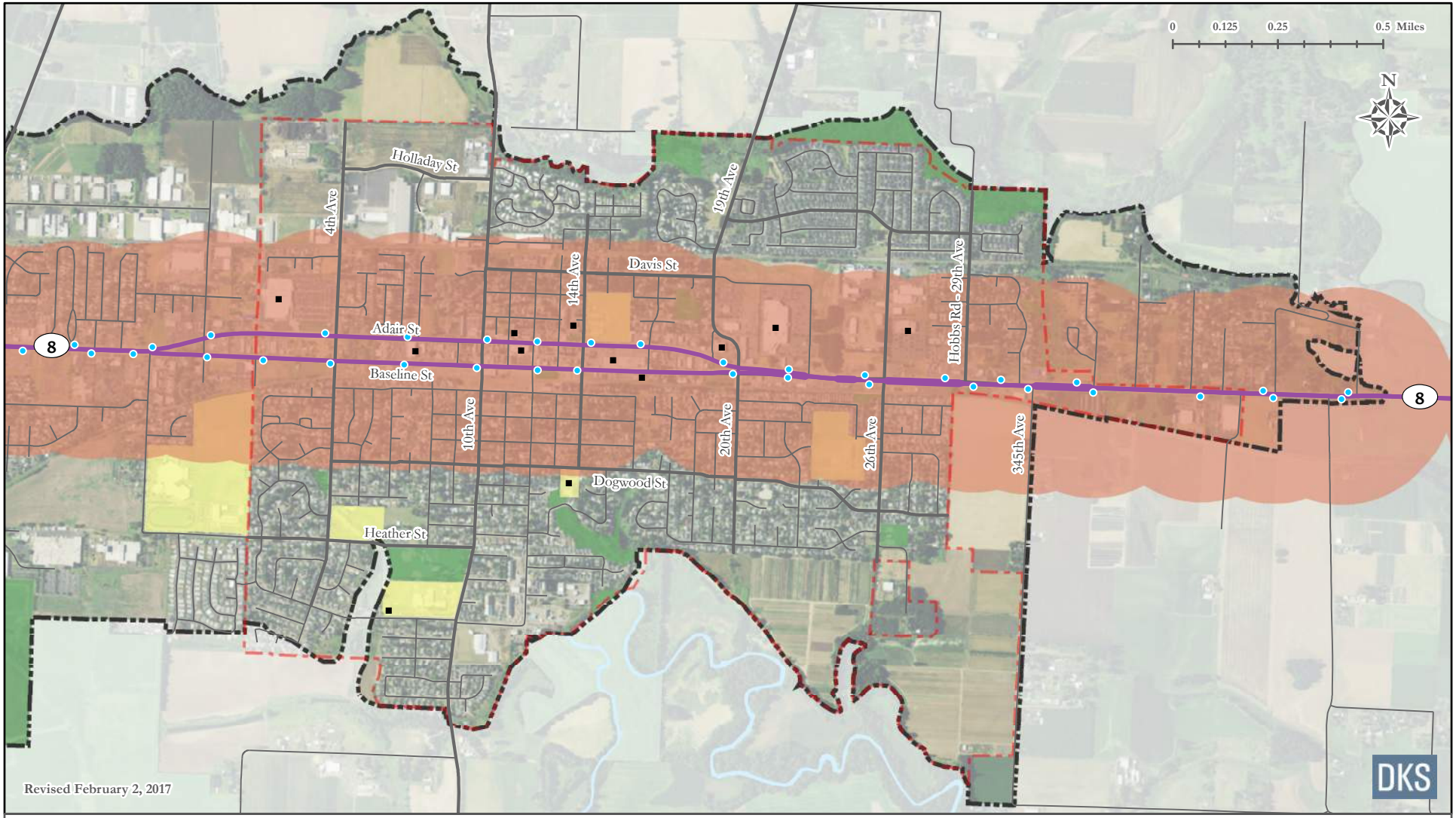
The transit system provides a public travel option for trips that are longer than a comfortable walking distance. Transit service is provided in Cornelius by TriMet. Bus route 57 connects Cornelius, Forest Grove, Hillsboro and Aloha to the Beaverton Transit Center. Bus route 57 provides frequent service with buses at stops every 15-minutes or better during the day (weekdays, weekends and holidays). During off peak periods, bus service frequency is reduced to every 20 to 60-minutes. Bus services is not provided from 3 AM to 5 AM. No designated park and ride lots are provided along bus route 57 in Cornelius.

Figure 3-6 shows bus route 57 and stop locations serving Cornelius. The 2016 weekday ridership volumes for bus stops within Cornelius are summarized in Table 3-1. This data represents the number of passengers that get on and get off at each bus stop during an average weekday (24-hour period). The 4th Avenue and Fred Meyer bus stops serve the highest number of riders. The downtown area, Cornelius Public Library, Virginia Garcia Health Center and Centro Cultural are also transit trip generators.

Table 3-1: TriMet Bus Route 57 Weekday Ridership (Fall 2016)

Bus Stop	Direction	Ons	Offs	Total
331st Avenue/OR 8	Westbound	1	2	3
331st Avenue/OR 8	Eastbound	3	2	5
334th Avenue/OR 8	Westbound	4	9	13
334th Avenue/OR 8	Eastbound	5	2	7
338th Avenue/OR 8	Eastbound	3	4	7
Valley View/OR 8	Westbound	3	14	17
Valley View/OR 8	Eastbound	8	2	10
31st Avenue/OR 8	Westbound	2	6	8
345th Avenue/OR 8	Eastbound	11	5	16
29th Avenue/OR 8	Westbound	7	18	25
29th Avenue/OR 8	Eastbound	13	5	18
26th Avenue/OR 8	Westbound	7	36	43
26th Avenue/OR 8	Eastbound	45	13	58
Fred Meyer Access/OR 8	Westbound	51	85	136
Fred Meyer Access/OR 8	Eastbound	54	29	83
19th Avenue/Adair Street	Westbound	22	41	63
19th Avenue/Baseline Street	Eastbound	55	36	91
17th Avenue/Adair Street	Westbound	8	15	23
14th Avenue/Adair Street (Public Library)	Westbound	24	48	72
14th Avenue/Baseline Street (Public Library)	Eastbound	43	29	72
12th Avenue/Adair Street (Hispanic Centro Cultural)	Westbound	17	49	66
12th Avenue/Baseline Street	Eastbound	64	25	89
10th Avenue/Adair Street	Westbound	32	65	97
10th Avenue/Baseline Street	Eastbound	70	30	100
7th Avenue/Adair Street	Westbound	4	20	24
7th Avenue/Baseline Street	Eastbound	14	4	18
4th Avenue/Adair Street	Westbound	51	138	189
4th Avenue/Baseline Street	Eastbound	109	33	142
West City Limits/Adair Street	Westbound	21	95	116
1st Avenue/Baseline Street	Eastbound	17	17	34
Total		**768**	**877**	**1,645**

3-6 Existing Transit Facilities



Legend:

Transit Facilities
- Bus Stop
- TriMet Route 57

Transit Buffer
- Within 0.25 mile of Transit Stop

Activity Generators
- Parks and/or Natural Areas
- School
- Other Major Activity Generator (see Figure 3-1)

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

Table 3-2 summarizes the average route headways (time increment between buses at a stop) and corresponding level of service (based on the *Highway Capacity Manual* methodology[4]) for bus route 57 in Cornelius. The performance of the service is rated as LOS C throughout the day which corresponds to existing headways of 15 minutes or better.

Table 3-2: TriMet Service Routes and Weekday Peak Period Level of Service

	Average Headways (minutes)			Level of Service		
Route	**AM**	**Midday**	**PM**	**AM**	**Midday**	**PM**
#57 OR 8/Forest Grove	15	15	15	C	C	C

Note: AM Period = 06:00-08:30, Midday Period = 08:30-16:00, PM Period = 16:00-18:00
Level of Service for transit service based on headway: less than 10 minutes = LOS A; 10-14 minutes = LOS B; 14-19 minutes = LOS C; 20-29 minutes = LOS D; 30-60 minutes = LOS E; and greater than 60 minutes = LOS F.

TriMet's LIFT Program is a shared-ride public transportation service provided for people who are unable to use buses or MAX due to a disability or disabling health condition. The LIFT service area boundary is three-fourths of a mile beyond the outermost portions of TriMet's Bus and MAX lines, which includes all of Cornelius. LIFT service operates during the same hours as bus and MAX services. All rides are by advance reservation only.

Ride Connection is a private, non-profit organization based on Portland, Oregon that provides rides for medical, shopping, social and recreation, and other purposes in Washington, Clackamas and Multnomah counties. Ride Connection is made up of agencies who offer a variety of transportation options to older adults and people with disabilities. Services include door-to-door rides, transit travel training and regional transportation option information. Reservations must be made at least four days in advance. No fee is charged but a donation is suggested. .

Access and Amenities

Access to transit should be a comfortable experience for passengers and those considering riding transit. Lack of sidewalk coverage and crosswalk facilities can create uncomfortable conditions for transit passengers seeking to access their bus stop or final destination. It is also a deterrent for some potential transit users, including elderly users and persons with disabilities. In addition, during winter months when the sun sets earlier, some passengers may not feel comfortable returning home from the bus due to the lack of lighting at bus stops.

Pedestrian access to several bus stops is difficult due to the lack of sidewalks and street connectivity. The east and west ends of OR 8 in the rural areas provide limited sidewalks. Many roadways connecting to OR 8 also lack sidewalks for riders to access bus stops. Existing sidewalks and bus stop locations are shown in Figure 3-2. Neighborhoods south of OR 8 require long walking distances to bus stops due to poor street connectivity. There are large blocks south of OR 8, between 4th and 10th Avenue, 14th and 20th Avenue and 20th and 26th Avenue, created by infrequent rail line crossings.

Attractive stops with clear signage, user information and amenities help promote transit as an easy, comfortable way to get around. Rider amenities are provided at many bus stops in Cornelius. All bus stops that serve a moderate number of boardings (greater than 35 per day, see

[4] *2000 Highway Capacity Manual*, Transportation Research Board, 2000, Chapter 27.

Table 3-1) provide a bus shelter, except the Baseline Street/19th Avenue stop (provides a bench) and Baseline Street/14th Avenue stop (provides sign only). The Baseline Street and Adair Street intersections between 11th and 20th Avenue provide curb extensions at crosswalks and pedestrian level street lighting to support access to transit stops. Street lighting is also provided along OR 8 between the west city limits and 11th Avenue, between 20th Avenue and 26th Avenue and at the 29th and 31st Avenue intersections.

Transit level of service can also be analyzed based on the area of service coverage and route reliability. Transit service coverage is typically measured as a quarter-mile walking distance buffer around transit stops. As shown in Figure 3-6, about half of the neighborhoods are outside the coverage area requiring more than a quarter-mile walk to a bus stop. Transit service reliability is primarily measured by the ability for buses to maintain schedules along corridors. On-time performance data specifically for bus route 57 is not available, however TriMet reports that system-wide bus service was about 80 percent in 2016.

Community Survey

The TSP Community Survey found citizens are interested in improvement of transit facilities. Specific responses requested extending bus routes off highway, more bus shelters, better walking connections to bus stops, street lighting and extending MAX light rail service from Hillsboro.

Deficiencies in the Transit System

The transit system has several deficiencies, below are needs and recommendations to encourage potential riders.

Transit Access: Near bus stops on OR 8, west of 10th Avenue and east of 26th Avenue, the streets lack sidewalk coverage, bus stop pads and crosswalk facilities. A review of recent ridership data (see Table 3-1) identified the need for sidewalk infill to improve bus stop access at key locations:

- South side of Baseline Street between 1st and 10th Avenue
- South side of OR 8 between 26th and 345th Avenue

High use bus stops on OR 8 that would benefit from a marked pedestrian crossing include:

- West city limit and 1st Avenue bus stops
- 12th Avenue bus stops
- 29th Avenue bus stops

Transit Amenities: TriMet bus shelters are needed at the Baseline Street/19th Avenue and Baseline Street/14th Avenue bus stops based on the number of daily boardings.

Park and Ride Lots: The addition of a Park and Ride Lot along OR 8 is recommended to serve potential bus riders that are not well connected to bus route 57 due to either distance or ability to walk or bike to bus stop.

Motor Vehicle System

In Cornelius, driving a personal automobile is the primary mode within the transportation network. Planning for motor vehicles supports future needs to efficiently and safely move people and goods to destinations.

City Functional Classification

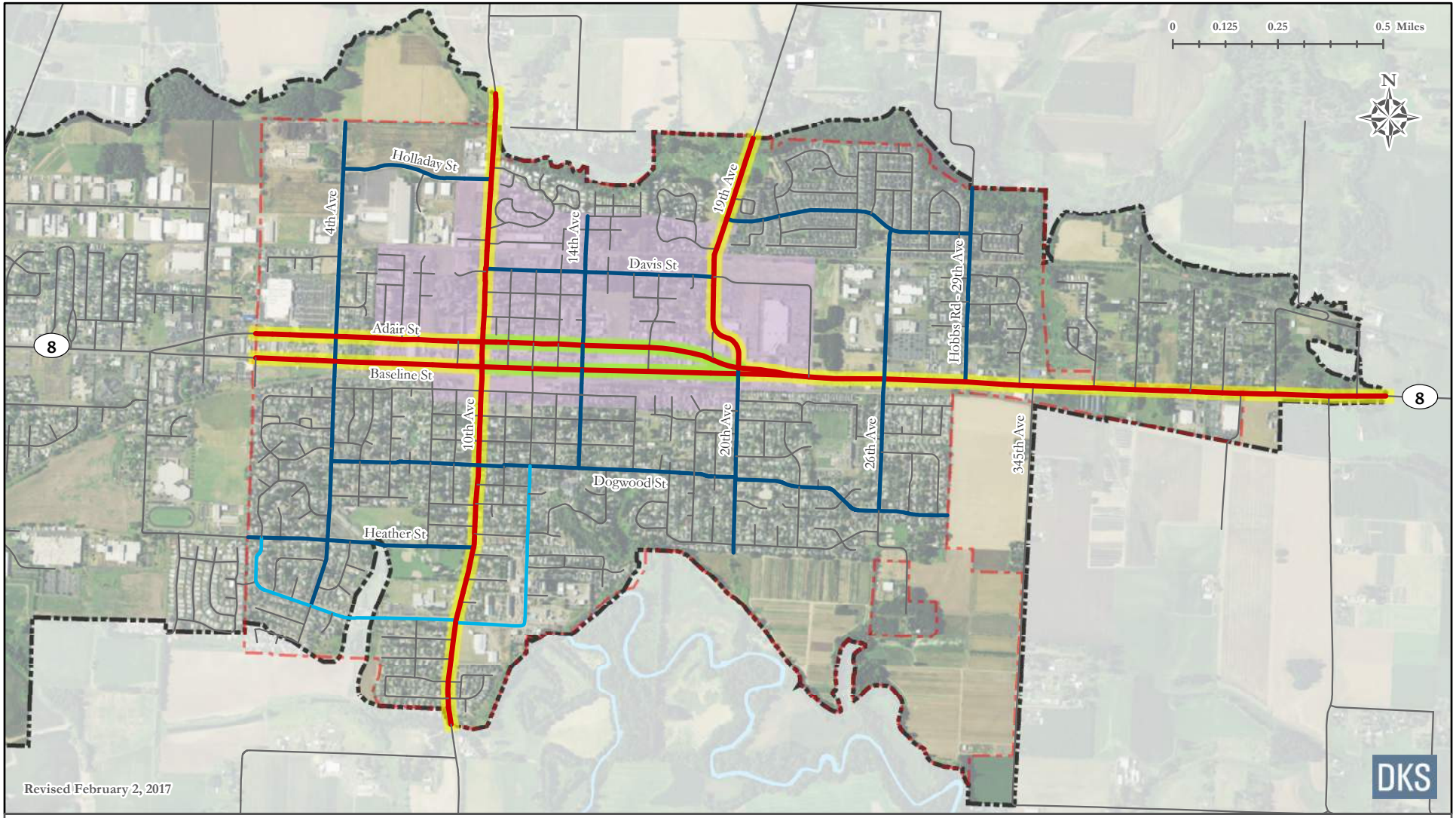
To manage the roadway network, the City classifies roadways based on a hierarchy according to the intended purpose of each road. The functional classifications from the 2005 TSP are shown in Figure 3-7. From highest to lowest intended usage, the classifications are arterials, collectors, neighborhood routes and local streets. Roadways with a higher intended usage generally provide more efficient traffic movement (or mobility) through the City, while roadways with lower intended usage provide greater access for shorter trips to local destinations such as businesses or residences.

- **Arterial Streets** are intended to serve as the main travel route through the City or act as a corridor connecting many parts of the City. These roadways serve the highest volume of motor vehicle traffic and are primarily utilized for longer distance regional trips.
- **Collector Streets** often connect the neighborhoods to the arterial roadways. These roadways generally provide more direct property access than arterial roadways, while providing efficient through movement for local traffic.
- **Neighborhood Routes** are similar to collector streets in that they provide greater accessibility to neighborhoods and provide efficient through movement for local traffic. While some may interpret the term "neighborhood" to imply residential land use, this classification refers to a level of connectivity for any land use type, including commercial and/or industrial land uses. Neighborhood routes are not required to provide bicycle facilities. Therefore, routes with relatively low traffic volumes, where bikes could travel comfortably in a shared lane environment, would be designated neighborhood routes. Posted speeds on neighborhood routes are typically 25 to 30 miles per hour.
- **Local Streets** provide more direct access to residences without serving through travel in Cornelius. These roadways are often lined with residences and are designed to serve lower volumes of traffic with a statutory speed limit of 25 miles per hour.

City Public Works Standards[5] further categorizes facilities into "street types" for specific design and cross section guidelines. Street cross section standards are provided in Chapter 8.

[5] City of Cornelius Public Works Standards, draft February 6, 2017.

3-7 2005 Functional Classification



Legend:

Functional Classification:

- Arterial
- Collector
- Neighborhood Route
- Local Streets

Special Designation

- Regional Arterial and Throughway Network
- Special Transportation Area
- Regional Town Center

- Urban Growth Boundary
- Cornelius City Limit

State and Regional Classifications

Within Cornelius, several streets have regional and state designations for their role in the transportation system, as shown in Figure 3-7. These designations are used to guide future planning and design decisions and ultimately inform the adopted standards, regulations, and policies that apply to the multi-modal transportation system in Cornelius. A complete summary of planning documents, designations, policies, and regulations that are applicable to the Cornelius TSP is provided in the appendix (see Technical Memo #2).

Statewide Highway

OR 8 is designated as a Statewide Highway in the Oregon Highway Plan (OHP)[6]. From the OHP, Statewide Highways typically provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreation areas. A secondary function is to provide connections for intra-urban and intra-regional trips. The management objective is to provide safe and efficient, high-speed, continuous-flow operation. In constrained and urban areas, interruptions to flow should be minimal. Inside Special Transportation Areas (see Special Designations below), local access may be a priority.

Special Transportation Area

Adair Street and Baseline Street from 10th Avenue to 20th Avenue are designated as a Special Transportation Area (STA). The primary objective of a STA is to provide access to and circulation amongst community activities, businesses, and residences and to accommodate pedestrian, bicycle, and transit movement along and across the highway. While traffic moves through an STA and automobiles may play an important role in accessing an STA, convenience of movement within an STA is focused upon pedestrian, bicycle, and transit modes. STAs look like traditional "Main Streets" and are generally located on both sides of a state highway. Direct street connections and shared on-street parking are encouraged. Local auto, pedestrian, bicycle, and transit movements to the area are generally as important as the through movement of traffic. Because of this, ODOT's mobility targets and design standards in STA's are intended to allow for lower speed operations.

State Highway Freight System

OR 8 is classified as part of the NHS (National Highway System) in the OHP[7]. This designation indicates a need to balance the movement of goods and services with other uses and states that the timeliness of freight movements should be considered when developing and implementing plans and projects on freight routes.

[6] Oregon Highway Plan, Oregon Department of Transportation, State Highway Classification System map.

[7] Oregon Highway Plan, Oregon Department of Transportation, State Highway Freight System**,** Goal 1, Policy 1C.

Reduction Review Routes

OR 8 is classified as a Reduction Review Route[8] in Cornelius which requires review of all potential actions that will alter, relocate, change or realign a Reduction Review Route that could result in permanent reductions in vehicle-carrying capacity. Reduction of vehicle-carrying capacity means a permanent reduction in the horizontal or vertical clearance of a highway section, by a permanent physical obstruction to motor vehicles located on useable right-of-way subject to Commission jurisdiction, unless such changes are supported by the Stakeholder Forum.

Regional Transportation Plan

OR 8 is designated as a Major Arterial, and 10th Avenue and 19th Avenue are designated as Minor Arterials on the Regional Transportation Plan (RTP) Arterial and Throughway Network. The Metro Regional Transportation Plan Arterial and Throughway Network designates streets of regional significance for vehicular circulation as either Throughways or Arterials. Within Cornelius, only the Arterial classification applies. Arterial Streets are intended to serve as primary links to the principal arterial system. Major Arterial streets accommodate longer distance through trips and serve more of a regional traffic function. Minor arterial streets serve shorter trips that are localized within a community. As a result, major arterial streets usually carry more traffic than minor arterial streets.

Metro's 2040 Growth Concept[9] in the RTP applies land use designations to the Portland region. The 2040 Growth Concept is the region's long range plan for managing growth by integrating land use and transportation. The concept concentrates mixed use and higher density development in areas of the region designated as "Centers", "Station Communities", and "Main Streets". The 2040 Growth Concept land uses are arranged in a hierarchy, with the primary and secondary land uses, referred to as 2040 Target Areas, as the focus of RTP investments. The hierarchy also serves as a framework for prioritizing RTP investments.

There are no Primary land uses in Cornelius. Secondary land uses in Cornelius include:

- The "Cornelius Town Center" which generally includes the area bounded by Holladay Street to the north, Alpine Street to the south, 20th Avenue to the east and 5th Avenue to the west.
- The Adair Street "Main Street" from 20th Avenue to 10th Avenue.
- The 10th Avenue "Main Street" from Davis Street to Cherry Street.
- The 19th Avenue-20th Avenue "Main Street" from Davis Street to OR 8.
- The OR 8 "Corridor" from 20th Avenue to 341st Avenue.
- The Adair Street-Baseline Street "Corridor" from 10th Avenue to the west end of the City.
- The "Employment Land" in the northwest portion of Cornelius.

The remaining areas of Cornelius are designated as Neighborhood land uses. These areas have the lowest priority for RTP investments.

[8] Administrative Rule ORS 366.215

[9] Metro 2040 Growth Concept: http://www.oregonmetro.gov/index.cfm/go/by.web/id=29882

The RTP identifies Mobility Corridor #24 – Beaverton to Forest Grove[10] as part of a coordinated network of planned transportation facilities. The corridor extends from OR 217 west to Forest Grove and Farmington Road south to Baseline Road to the north. A Corridor Refinement Plan has been developed for the Beaverton to Hillsboro segment with recommended strategies ranging from a variety of capacity and transit improvements, updated street design classifications, and transportation system management. Future corridor improvements to the west may improve overall mobility for trips to and from Cornelius.

Connectivity

The existing street network within Cornelius is made up of a grid configuration for several blocks north and south of TV Highway (Adair Street and Baseline Street) between 10th Avenue and 14th Avenue. The remaining street network is made up of small developed areas that are not adequately linked to each other. There are a number of locations in Cornelius where, due to the lack of alternative routes, the majority of neighborhood traffic is funneled onto a single street. This type of street network results in an imbalance of traffic volumes that impacts residential neighborhoods and out-of-direction travel for motorists, bicycles and pedestrians.

Future roadway connections will be constrained by the rail lines which pass through Cornelius approximately one-half block south of OR 8 and five blocks north of OR 8. Street connectivity needs to be coordinated with public rail crossings. The multi-modal connectivity needs are shown in Figure 3-8.

Arterial and Collector Connectivity

The functional classifications of streets in Cornelius were reviewed to determine the appropriateness of the local classification and connectivity. The Metro Regional Transportation Functional Plan requires that, to the extent possible, arterials be spaced at one-mile intervals and collectors to be spaced at half-mile intervals[12]. Overall, most areas in Cornelius comply with the spacing standards to the extent possible. Existing development, environmental areas, the Urban Growth Boundary, and rail lines each pose a significant constraint in further improving the arterial and collector connectivity in Cornelius. The functional classifications of several roadways throughout the City may need to be modified to address the connectivity gaps identified in Figure 3-8 and summarized below.

Arterial Connectivity gaps were identified in the following areas (see Figure 3-8):

1. A north to south gap at the east end of the City, near 338th Avenue. Connectivity improvements in this area are hindered by existing development and limited railroad crossing opportunities.

East to west Arterial gaps also exist at the north and south end of the City. However, these alignments would be outside of the urban growth boundary (UGB).

Collector Connectivity gaps were identified in the following areas (see Figure 3-8):

2. An east to west gap west of 4th Avenue, near Holladay Street. Connectivity could be improved by extending Holladay Street to the west.

[10] Metro Regional Transportation Plan, Section 5.3.1.5, adopted July 17, 2014.
[12] Metro Regional Transportation Functional Plan, Section 3.08.110 Street System Design Requirements

3. An east to west gap between 10th Avenue and 19th Avenue. Connectivity improvements in this area are hindered by existing development, and environmental areas.
4. An east to west gap at the east end of the City, north of OR 8. Connectivity improvements in this area are hindered by existing development, environmental areas and alignment outside the UGB.
5. An east to west gap between Dogwood Street and 345th Avenue. Connectivity could be improved by extending Dogwood Street to the east.
6. A north to south gap at the east end the City, south of OR 8. Consideration should be given to designating 345th Avenue as a Collector to help satisfy the regional connectivity requirements.

Local Street and Trail Connectivity

The aggregate effect of local street design impacts the effectiveness of the regional system when local travel is restricted by a lack of connecting routes, and local trips are forced onto the regional network. Therefore, streets should be designed to keep through motor vehicle trips on arterial streets and provide local trips with alternative routes. Street system connectivity is critical because roadway networks provide the backbone for bicycle and pedestrian travel in the region. Metro's local street connectivity principle encourages communities to develop a connected network of local streets to provide a high level of access, comfort, and convenience for bicyclists and walkers that travel to and among centers.

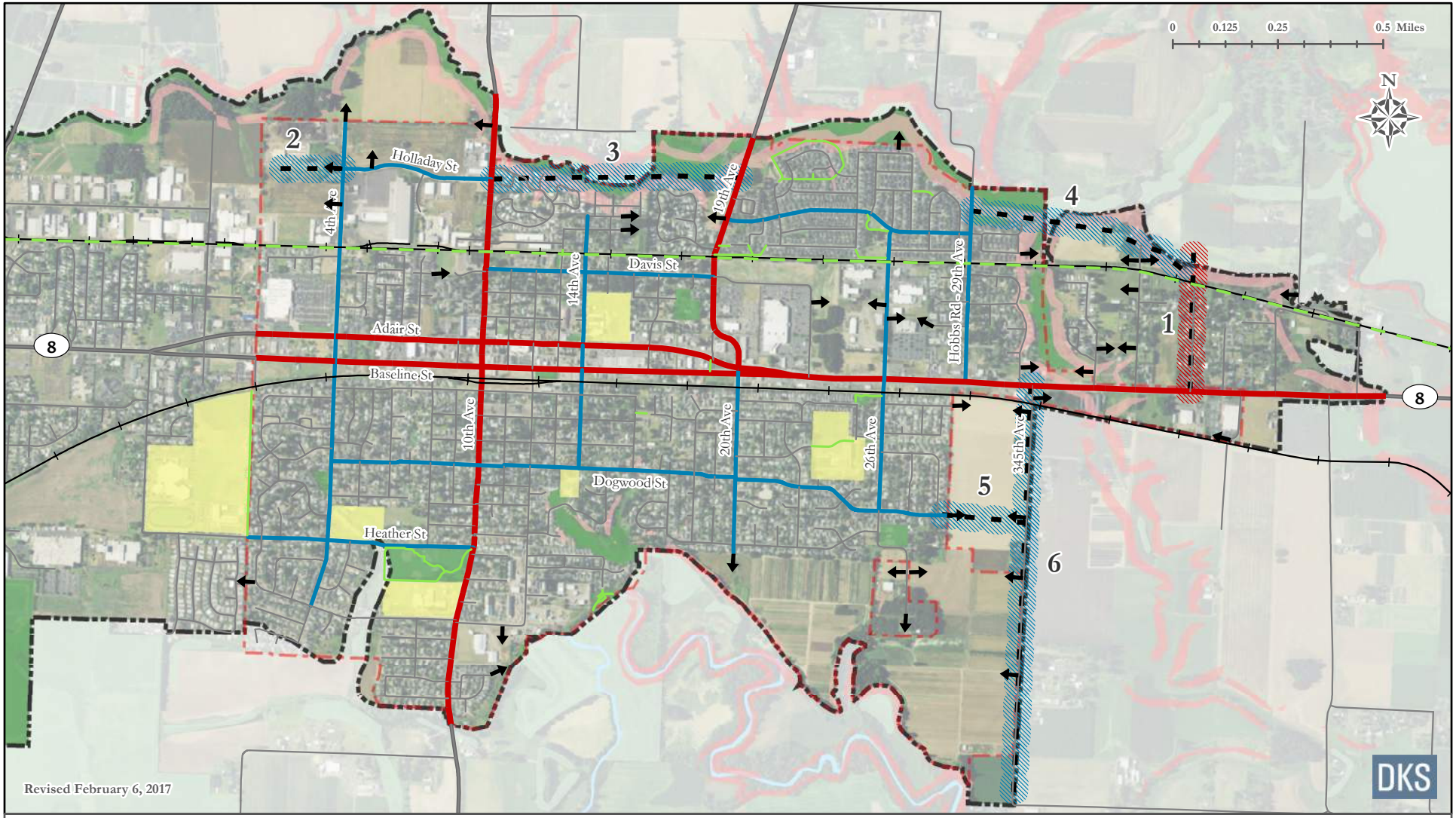
Connectivity of the existing transportation system was reviewed to identify current deficiencies. These locations will be further addressed in the pedestrian, bicycle and motor vehicle plans. Topography, environmental constraints, railroads and existing development may be limiting the connectivity in areas of Cornelius. These factors may not stop the possible connections from being made in the noted areas lacking connectivity, but will affect what modes could be accommodated and the financial viability. The major areas lacking connectivity include:

- East to west connectivity between local streets at the east end of the City, north of OR 8.
- East to west connectivity between 19th Avenue and 29th Avenue, between OR 8 and the railroad track.
- East to west connectivity between Dogwood Street and 345th Avenue.

A multi-modal connectivity plan for Cornelius is shown in Figure 3-8. It specifies the general location where new streets or shared-use paths could potentially be installed as nearby areas are developed or as the opportunity arises. The planned regional Council Creek Trail alignment is shown along the railroad right-of-way north of OR 8. The purpose of the plan is to ensure that new developments accommodate circulation between adjacent neighborhoods to improve connectivity for all modes of transportation. The criteria used for providing connections are as follows (as required in the Metro Regional Transportation Functional Plan):

- Provide a full local street connection at least every 530 feet (or 1/10 of a mile), if possible
- Provide a pedestrian and bicycle connection every 330 feet if a full-street connection is not possible

3-8 Multi-Modal Connectivity



Legend:

Existing Arterial and Collector Streets:

- Arterial
- Collector

Arterial and Collector Connectivity Gaps:

- Arterial Gap of over 1 mile
- Collector Gap of over 1/2 mile
- # Connectivity Gap Reference Number (See Chapter 3)

Local Street and Trail Connectivity:

- Existing Local Streets
- Potential Local Street or Trail Extension
- Existing Trails
- Planned Shared-Use Path (Conceptual Alignment)

- Urban Growth Boundary
- Cornelius City Limit
- Parks and/or Natural Areas
- School

Roadway Characteristics

Field inventories were conducted to determine characteristics of major roadways in the study area. Data collected included roadway jurisdiction, posted speed limits, roadway cross-section, intersection geometry and controls and access spacing. These characteristics define roadway capacity and operating speeds through the street system, which affects travel path choices for drivers in Cornelius.

Roadway Jurisdiction

Roadway ownership and maintenance responsibilities of the various roads in the City of Cornelius are identified in Figure 3-9. TV Highway and the Baseline Street/Adair Street couplet are under state jurisdiction. The remaining roadways are owned and operated by the City of Cornelius. Washington County does not have jurisdiction over any roads in Cornelius.

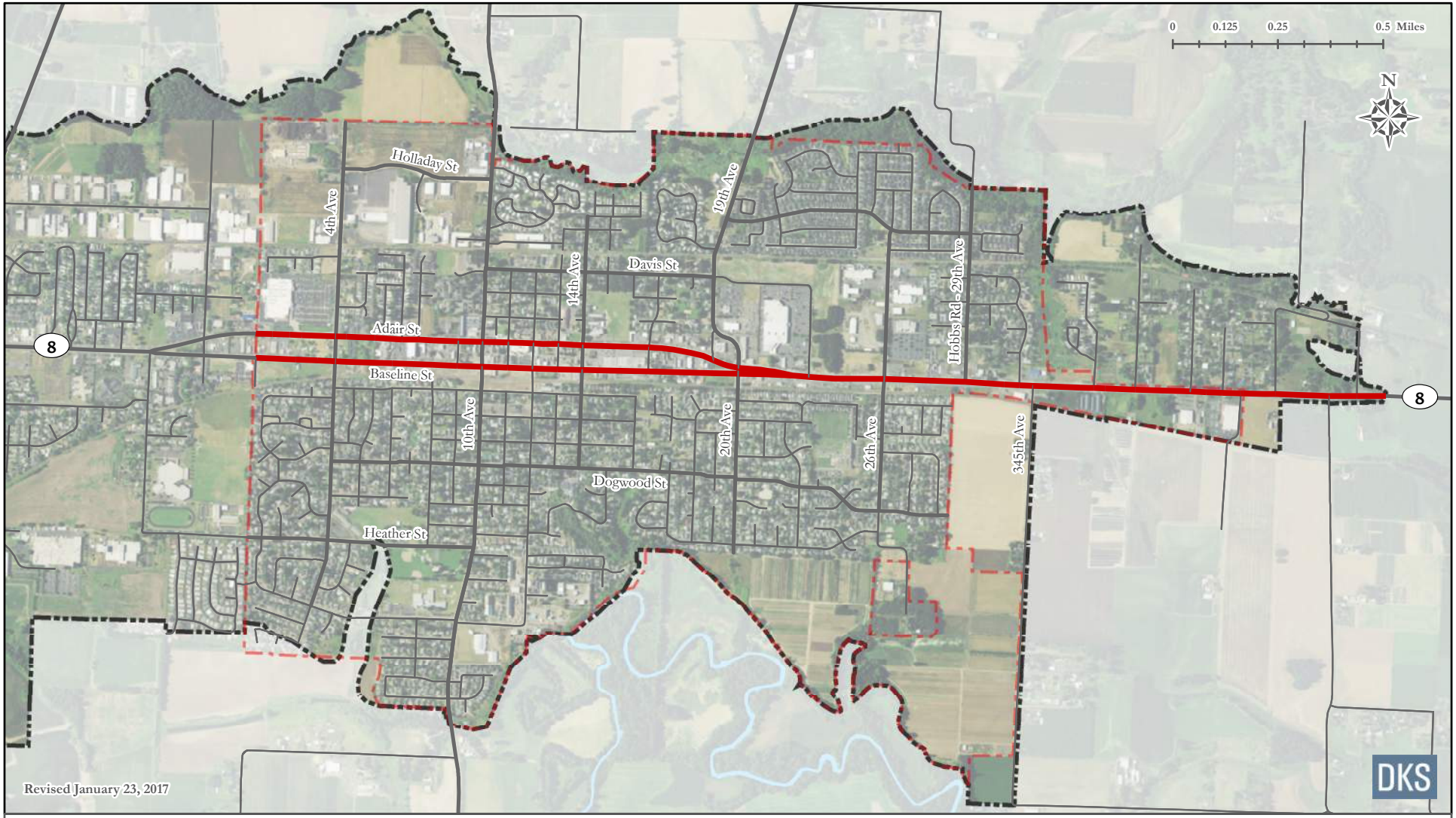
Vehicle Speed Limits

Speed limit zones are set by the Oregon Department of Transportation and the local road authority. ODOT has the responsibility to investigate roads for establishing new speed zones or changing posted speeds of existing speed zones based on many factors such as roadway width, surface, lanes, shoulders, signals, intersections, roadside development, parking, accidents and 85th percentile speed. The 85th percentile speed is commonly used to establish the reasonable and prudent speed for a roadway. Figure 3-10 shows a select inventory of the posted speeds in Cornelius. Adair Street and Baseline Street are posted at 30 miles per hour (mph) on the couplet, 40 mph west and east of the couplet and 50 mph east of 345th Avenue. In general, local, neighborhood route and collector roadways are posted (or statutory) at 25 mph.

Average Daily Traffic Volumes

Average daily traffic volumes (ADTs) on select roadways are shown in Figure 3-10. These ADT volumes are estimated based on the PM peak hour count data at study intersections and available ODOT volume data for OR 8. As shown, daily volumes on OR 8 reach almost 34,000 vehicles east of the city limits and 31,000 vehicles west of 10th Avenue (Adair and Baseline Street combined). Daily volumes on 10th and 19th Avenue are similar with about 4,700 vehicles north of OR 8.

3-9 Roadway Jurisdiction



Legend:

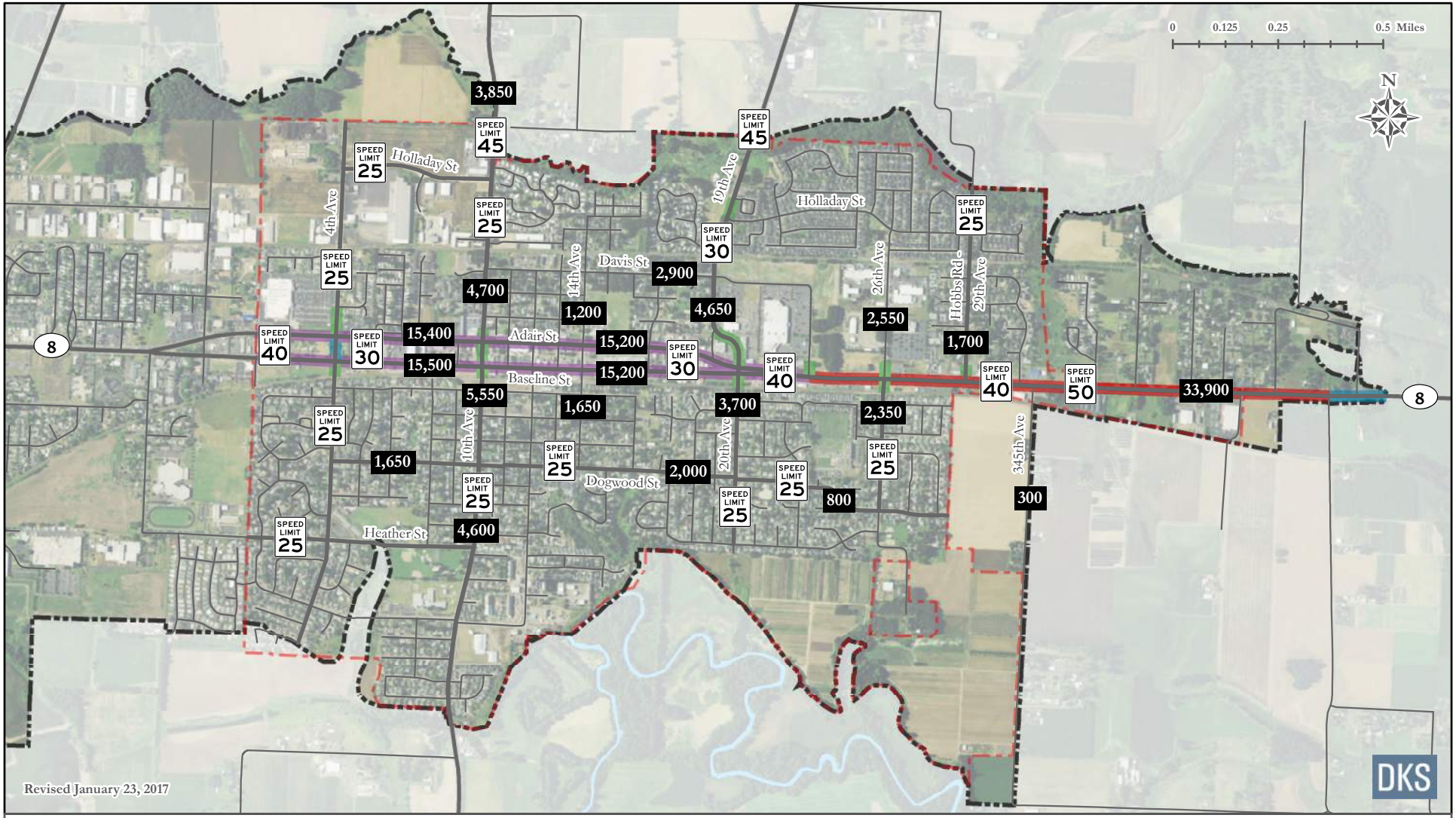
Roadway Jurisdiction:

- State of Oregon
- City of Cornelius

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

3-10

Travel Lanes, Speed Limits and Average Daily Traffic Volumes



Legend:

Travel Lanes:

- 1 travel lane in each direction (2 lanes)
- 2 travel lanes (one-way)
- 1 travel lane in each direction, with a turn lane/median (3 lanes)
- 2 travel lanes in each direction (4 lanes)
- 2 travel lanes in each direction, with a center turn lane/median (5 lanes)

Traffic Volumes:

- # Average Daily Traffic Volumes

- Urban Growth Boundary
- Cornelius City Limit

Roadway Cross-section

The existing number of lanes on each major roadway in Cornelius is also shown in Figure 3-10. OR 8 outside of the couplet operates as a four to five lane roadway. The remaining roads in the City of Cornelius operate as two to three lane roadways. A facility designated with a three and/or five lane roadway width indicates the presence of a center median or two-way left-turn lane. The major roadways in Cornelius were measured to determine typical cross-section widths and right-of-way available. Table 3-3 summarizes the findings.

Table 3-3: Study Roadway Cross-sections

Roadway	Location	Roadway Width*	Right of Way Width**
10th Avenue	south of Holladay Street	33’	40’
10th Avenue/Golf Course Rd	south of Linden Street	40’	56’
Dogwood Street	west of 16th Avenue	34’	40’
Holladay Street	west of 10th Avenue	38’	60’
19th Avenue	north of Davis Street	32’	50’
Adair Street	east of 4th Avenue	45’	60’
Baseline Street	east of 4th Avenue	44’	60’
Adair Street	east of 17th Avenue	40’	60’
Baseline Street	east of 17th Avenue	40’	100’
345th Avenue	north of railroad tracks south of railroad tracks	29’ 20’	50’
336th Avenue	north of OR 8	20’	40’

* Roadway width measured curb to curb or from edge of pavement.
** Right of way width measured between tax lots.

Access Spacing

Access management is a broad set of techniques that balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual destinations. Appropriate access spacing standards and techniques will reduce congestion and accident rates, and may lessen the need for constructing additional roadway capacity. ODOT aims to balance the safety and mobility needs of travelers along state highways with the access needs of property and business owners.

An access inventory was conducted for OR 8 on the east side of Cornelius, comparing the number of driveways against ODOT spacing standards[13]. The standards, shown in Table 3-4, are based on state highway classification, volume and speed. The purpose of this inventory is to document deficient locations so when a property elects to redevelop, alternative access options will be explored.

[13] Oregon Highway Plan Goal 3, Policy 3A and OAR 734-051

Table 3-4: Highway Access Spacing Standards (>5,000 AADT)

Highway (Segment)	Posted Speed Limit	Minimum Intersection Spacing
OR 8 (from the east UGB to 345th Avenue)	50 mph	1,100 feet
OR 8 (from 345th Avenue to just west of 20th Avenue)	40 mph	800 feet
OR 8 (from just west of 20th Avenue to just west of 4th Avenue) (14th to 13th is 20 mph School Zone)	30 mph	500 feet
OR 8 (from just west of 4th Avenue to the west City Limits/Mountain View Lane)	40 mph	800 feet

The north side of OR 8 from west of East Lane to the east UGB covers about 3,300 feet which would allow three access points based on the standard. In this section, there are six public street intersections and eight private driveways.

The south side of OR 8 from west of 26th Avenue to the east UGB covers about 5,800 feet which would allow six access points (two between 26th and 345th Avenue, four further east) based on the standard. In this section, there are three public intersections and 14 private driveways. Several parcels have multiple driveways which could be consolidated.

Broader access management strategies should be considered on OR 8 in the east side of Cornelius to work towards meeting ODOT spacing standard. Improvements may include developing the local street network to allow driveway closure, consolidation of multiple driveways or restricting access with a raised center median.

The City of Cornelius and ODOT recently conducted an extensive access management study of Adair Street and Baseline Street from 10th to 20th Avenue. The outcome was the closure and consolidation of several accesses onto the highway as part of the construction of the roadway improvement project.

Motor Vehicle Volumes

An inventory of evening peak hour traffic conditions was performed in the fall of 2016 as part of the Cornelius TSP update. The traffic turn movement counts provide the basis for analyzing existing problem areas as well as establishing a base condition for future monitoring. Study intersections were chosen in coordination with the City of Cornelius staff in order to address major roadways and noted areas of concern.

Turn movement counts were conducted at 15 intersections during the weekday evening peak period (4 – 6 PM) to determine existing operating conditions. The intersection counts used for the analysis were a mix of new 2016 data and available data from prior traffic studies. Older count data was factored based on calculated annual growth rates and traffic volumes between study intersections were balanced. The PM peak hour in Cornelius occurs before 6:00 PM, therefore the peak period for the data collection was appropriate to capture the evening commute peak.

The study intersection PM peak hour volumes, lane configurations and existing intersection controls are shown in Figures 3-11a and 11b. Traffic signals are only located along OR 8 (Baseline Street/Adair Street) and are under ODOT jurisdiction. The remaining study intersections are stop sign controlled.

Traffic Levels of Service

The TSP compares intersections in Cornelius to mobility targets and standards intended to maintain a minimum level of efficiency for motor vehicle travel. Two methods to gauge intersection operations include volume-to-capacity (v/c) ratios and level of service (LOS).

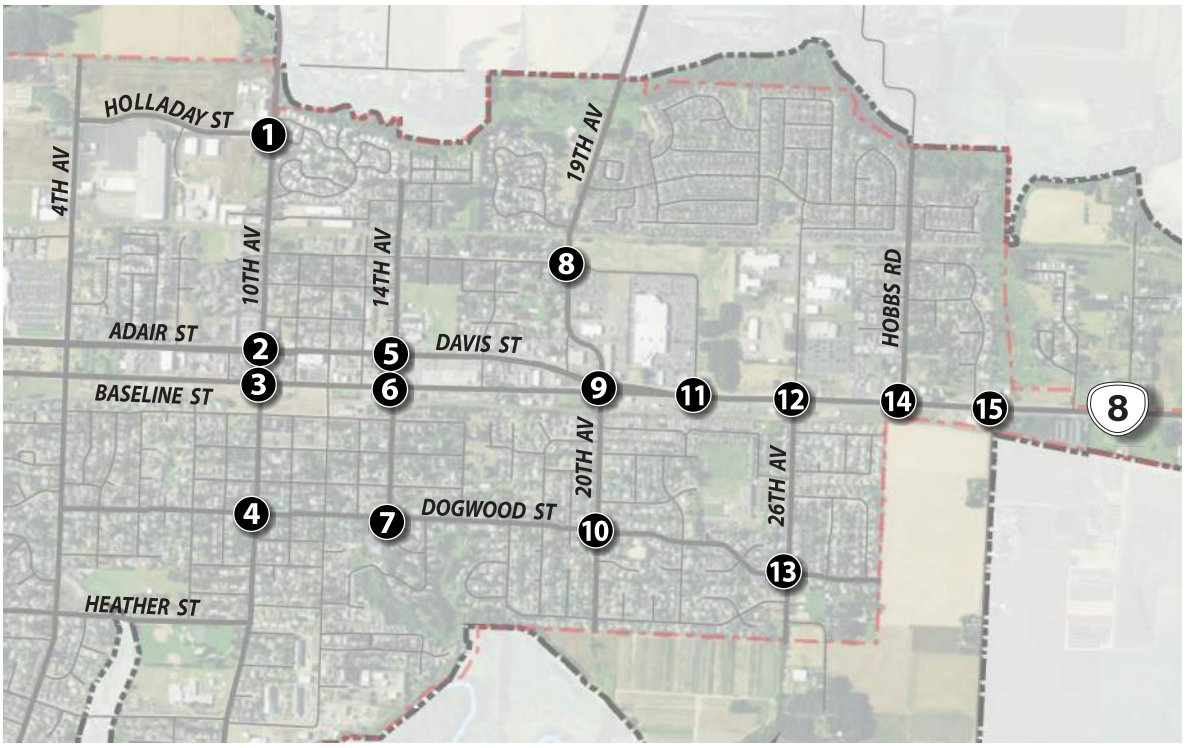
- **Volume-to-capacity (v/c) ratio:** A decimal representation (between 0.00 and 1.00) of the proportion of occupied capacity (capacity defined as the theoretical maximum vehicle throughput in a given time frame) at a turn movement, approach leg, or intersection. It is the peak hour traffic volume divided by the hourly capacity of a given intersection or movement. A lower ratio indicates smooth operations and minimal delays. A ratio approaching 1.00 indicates increased congestion and reduced performance. A ratio greater than 1.00 indicates the turn movement, approach leg, or intersection is oversaturated, which usually results in excessive queues and long delays.
- **Level of service (LOS):** A "report card" rating (A through F) based on the average delay experienced by vehicles at the intersection. LOS A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. LOS D and E are progressively worse operating conditions. LOS F represents conditions where average vehicle delay has become excessive and traffic is highly congested.

Intersection mobility targets vary by jurisdiction of the roadways. All intersections under state jurisdiction in Cornelius must comply with the v/c ratios in the Oregon Highway Plan (OHP). The ODOT v/c targets are based on highway classification and posted speeds shown in Table 3-4. These operating standards apply to all study intersections located on OR 8 (Adair Street and Baseline Street). LOS D is the minimum performance standard during the peak-hour operations at intersections under City jurisdiction.

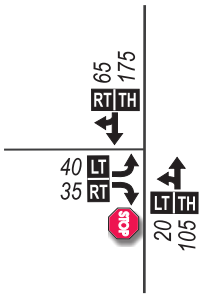
Table 3-4: Highway Intersection Mobility Targets

Highway (Segment)	Posted Speed / Metro Designation	Highway Signalized Intersections	Unsignalized Intersections	
			Highway Approaches	Side Street Approaches to Highway
OR 8 (west UGB to 345th Ave)	50 mph/Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99
OR 8 (345th Ave to 29th Ave)	40 mph Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99
OR 8 (29th Ave to 20th Ave)	40 mph/TC	1.1 / 0.99	1.1 / 0.99	0.99 / 0.99
OR 8 (20th Ave to 10th Ave)	30 mph/STA, TC	1.1 / 0.99	1.1 / 0.99	0.99 / 0.99
OR 8 (10th Ave to 7th Ave)	30 mph/Corridor	1.1 / 0.99	1.1 / 0.99	0.99 / 0.99
OR 8 (7th Ave to 4th Ave)	30 mph/Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99
OR 8 (4th Ave to west city limits/Mountain View Ln)	40 mph/Corridor	0.99 / 0.99	0.99 / 0.99	0.99 / 0.99

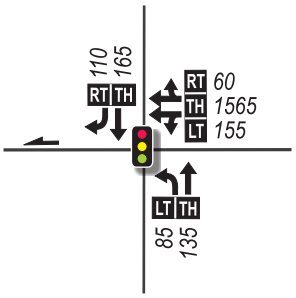
Notes: STA – Special Transportation Area, TC – Town Center



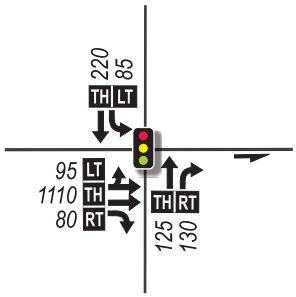
1. Holladay St. @ 10th Ave.



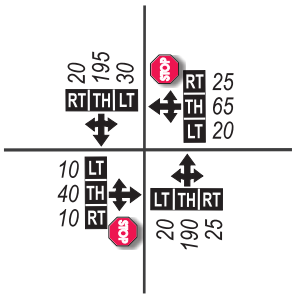
2. Adair St. @ 10th Ave.



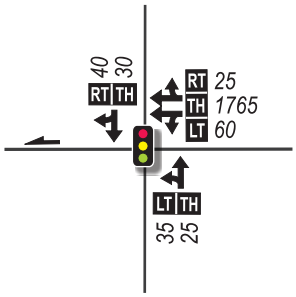
3. Baseline St. @ 10th Ave.



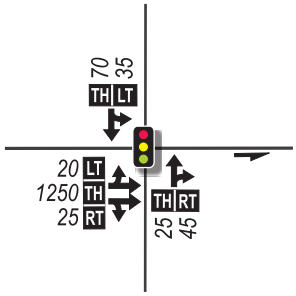
4. Dogwood St. @ 10th Ave.



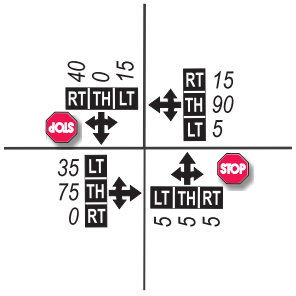
5. Adair St. @ 14th Ave.



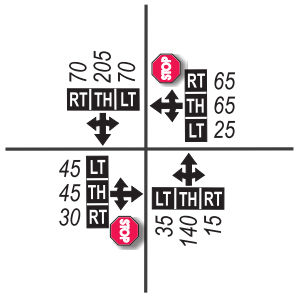
6. Baseline St. @ 14th Ave.



7. Dogwood St. @ 14th Ave.



8. Davis St. @ 19th Ave.



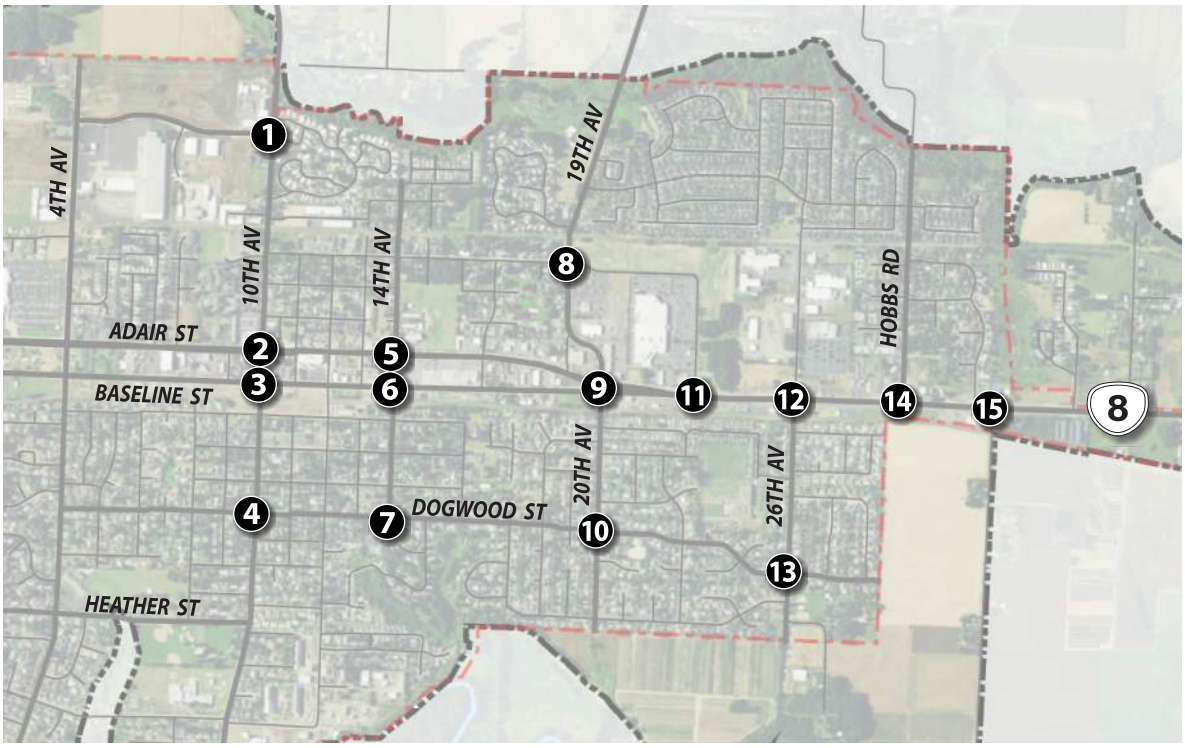
LEGEND

- # - Study Intersection
- STOP - Stop Sign
- Traffic Signal
- ← - Lane Configuration
- 000 - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

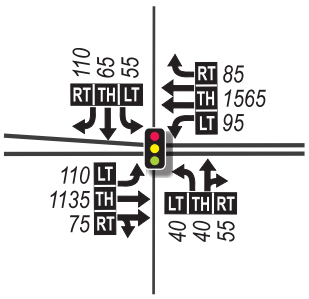
No Scale

Figure **3-11a**

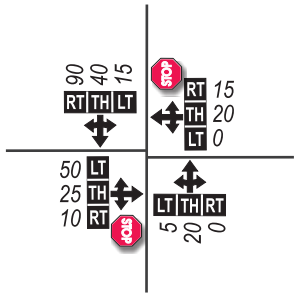
Existing PM Peak Hour Traffic Volumes & Intersection Control



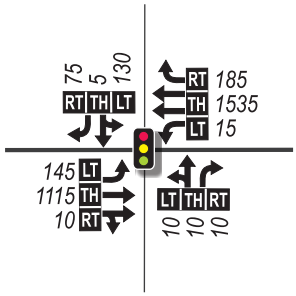
9. *OR 8 (Adair St./Baseline St.) @ 20th Ave.*



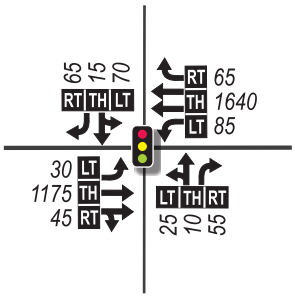
10. *Dogwood St. @ 20th Ave.*



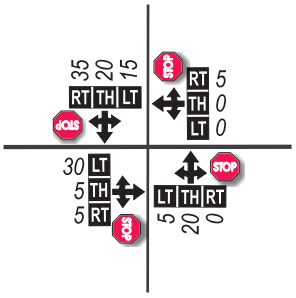
11. *OR 8 (TV Highway) @ Fred Meyer Dwy.*



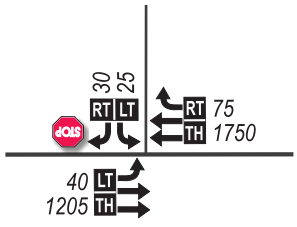
12. *OR 8 (TV Highway) @ 26th Ave.*



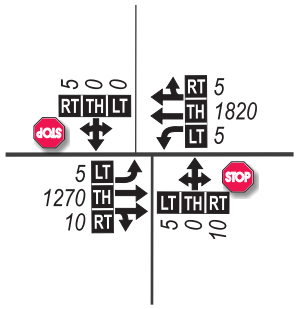
13. *Dogwood St. @ 26th Ave.*



14. *OR 8 (TV Highway) @ 29th Ave.*



15. *OR 8 (TV Highway) @ 345th Ave.*



LEGEND

- # - Study Intersection
- STOP - Stop Sign
- Traffic Signal
- ← - Lane Configuration
- 000 - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

No Scale

Figure **3-11b**

Existing PM Peak Hour Traffic Volumes & Intersection Control

The PM peak hour intersection counts were used to determine the existing level of service based on the *2000 and 2010 Highway Capacity Manual* methodology[14]. Traffic counts and level of service calculation sheets will be provided in the TSP appendix. Table 3-5 summarizes the existing weekday PM peak hour study intersection operation conditions.

The signalized study intersections (all located on OR 8) meet the ODOT minimum performance standard during the PM peak hour. Several unsignalized study intersection operate with significant minor street delay, however they are located on OR 8 and meet ODOT minimum performance standards.

Table 3-5: Existing Weekday Intersection Level of Service (PM Peak Hour)

Intersection	Level of Service	Delay	Volume/ Capacity
Unsignalized Intersections			
Dogwood Street/10th Avenue	A/C	16	0.27
Dogwood Street/14th Avenue	A/B	10.5	0.08
Dogwood Street/ 20th Avenue	A/B	10.6	0.13
Dogwood Street/26th Avenue	A/A	7.4	0.08
Holladay Street/10th Avenue	A/B	11.6	0.08
Davis Street/19th Avenue	A/C	24.9	0.43
OR 8/29th Avenue	C/F	62	0.29
OR 8/345th Avenue	C/F	172.4	0.46
Signalized Intersections			
Adair Street/10th Avenue	C	21.0	0.66
Baseline Street/10th Avenue	B	15.0	0.56
Adair Street/14th Avenue	A	7.2	0.68
Baseline Street/14th Avenue	A	6.5	0.52
OR 8/20 Avenue	D	51.7	0.76
OR 8/Fred Meyer Access	B	15.3	0.71
OR 8/26th Avenue	B	16.1	0.71

Signalized intersections:
LOS = Level of Service of Intersection
V/C = Volume-to-Capacity Ratio of Intersection
Delay = Average Delay of Intersection

Stop Controlled intersections:
LOS = Level of Service of Major Street/Minor Street
V/C = Volume-to-Capacity Ratio of Worst Movement
Delay = Delay of Worst Movement

[14] *2000 Highway Capacity Manual*, Transportation Research Board, 2000 and *2010 Highway Capacity Manual*, Transportation Research Board, 2010.

Community Survey

The TSP Community Survey found citizens are interested in improving the vehicle network. Specific responses requested alternative east and west travel options north and south of the highway and more street connections to improve through traffic.

The TSP Community Survey also found citizens are interested in improving traffic operations. A specific response requested fixing bottlenecks at intersections.

Motor Vehicle System Deficiencies

The motor vehicle system has several deficiencies that contribute to a poorly connected street system and congested driving conditions.

Connectivity: Consideration should be given the following street extensions to help satisfy regional connectivity guidelines (shown in Figure 3-8):

- Designate 345th Avenue south of OR 8 as Collector facility. Extend Dogwood Street east of 345th Avenue as a Collector Facility.
- Extend Holladay Street west of 4th Avenue and east of 10th Avenue as a Collector facility.

Access Spacing: OR 8 on the east side of Cornelius has a significant number of public street intersections and private driveways not compliant with ODOT spacing standards. There is a need for alternative access options and management strategies along the highway.

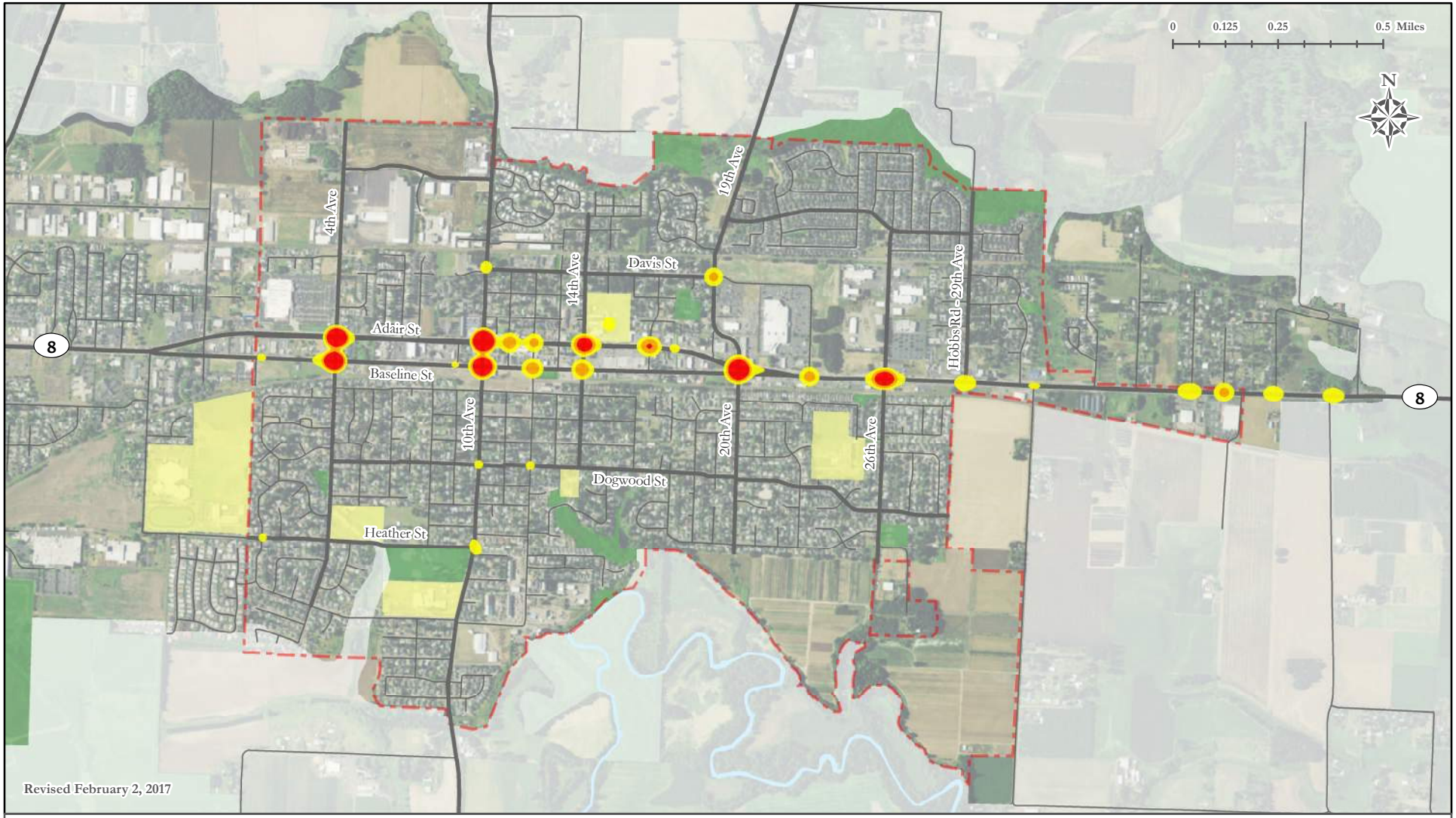
Intersection Operations: The OR 8/345th Avenue and OR 8/29th Avenue intersections operate below standard at LOS F with significant minor street delay experienced by a low volume of traffic. These operational deficiencies may warrant capacity improvements to meet performance standards.

Safety

A review of motor vehicle, pedestrian, and bicyclist reported crashes was conducted based on ODOT data[15] from January 2010 through December 2014 (the most recent five years of available data) within the TSP study area. Data collected for the entire TSP study area showed a total of 498 crashes (an average of about 100 crashes a year). A summary of the high crash locations from low to high frequency is shown in Figure 3-12. The high collision locations cluster around intersections which experience increased vehicle conflicts, and primarily along the OR 8 corridor which serves higher vehicle volumes.

[15] ODOT crash data includes crashes with pedestrians and bicyclists, but only if a motor vehicle was involved. Crash reports are the responsibility of individual drivers, and are only required in the event of death, bodily injury, or damage exceeding $1,500. As such, low-severity crashes are generally underreported.

3-12 High Crash Locations



Legend:

Crash Density

- Low
- High

Parks and Schools

- Parks and/or Natural Areas
- School

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

For the TSP study area, there were eight pedestrian-involved crashes over the past five years. They occurred most frequently along OR 8 between 10th Avenue and 20th Avenue (six crashes involving a pedestrian on the segment). There were 14 bicycle-involved crashes over the past five years. The majority of the bicycle-involved crashes occurred at intersections along OR 8 between 4th Avenue and 20th Avenue (12 crashes involving a bike on the segment).

Study Intersection Safety Analysis

Collision data specific for the study intersections is summarized in Table 3-6. There were no fatal crashes and 19 serious injury crashes during this period. The high-severity crashes are a small portion of all crashes, making up only four percent of all reported crashes. However, the overall severity of crashes in Cornelius over the past five years is generally low, with 85 percent involving only property damage (no injuries) or minor injuries.

Table 3-6: Intersection Collision Severity and Type (2010 – 2014)

Intersection	Total Collisions	Collision Severity			Collision Type				
		Fatality	Injury	Personal Damage Only	Angle	Rear-end	Turn	Bike	Ped
Dogwood St/10th Ave	4	0	2	2	2	2	-	-	-
Dogwood St/14th Ave	1	0	0	1	-	-	-	-	-
Dogwood St/20th Ave	1	0	0	1	-	-	1	-	-
Dogwood St/26th Ave	1	0	0	1	-	-	-	-	-
Holiday St/10th Ave	2	0	0	2	-	-	1	-	-
Davis St/19th Ave	8	0	2	6	4	-	1	-	-
Adair St/10th Ave	31	0	18	13	14	10	5	2	-
Baseline St/10th Ave	26	0	16	10	5	11	6	1	3
Adair St/14th Ave*	20	0	12	8	3	12	1	-	-
Baseline St/14th Ave*	12	0	6	6	1	6	5	-	-
OR 8/20th Ave	42	0	20	22	5	20	10	2	1
OR 8/Fred Meyer	9	0	3	6	-	8	1	-	-
OR 8/26th Ave	26	0	14	12	2	17	1	-	-
OR 8/29th Ave	13	0	9	4	-	7	4	-	-
OR 8/345th Ave	8	0	3	5	-	7	-	-	-

* Baseline and Adair Street at 14th Avenue underwent a major construction project during the five-year analysis period (2010-2014) which may have contributed to the number and type of collisions. The construction project was completed in 2014.

Crash rates provide an additional perspective on intersection safety and identify locations where people have a higher risk of being involved in a crash. Crash frequencies (the number of crashes in a period of time) tend to increase with higher vehicle traffic. With more exposure to vehicles, there are more opportunities for crashes to occur. Crash rates consider the amount of crashes relative to the traffic volume at the intersection, and are expressed in units of crashes per million entering vehicles. Study intersections are divided into groups of similar intersections for this analysis, called “Intersection Populations.”

Crash rates for the study intersections were calculated and evaluated using two methods: the critical crash rate method from the Highway Safety Manual; and by comparison to statewide 90th percentile crash rates published by ODOT. The critical crash rate method compares an intersection's crash history to that of other similar intersections in Cornelius, adjusting for volume at the intersection. The 90th percentile crash rate compares an intersection's crash history to that of other similar intersections across Oregon. Where an intersection's crash rate is greater than either of these two thresholds, it is an indication that a problem might exist and that further study is warranted.

The Excess Proportion of Specific Crash Types method from the Highway Safety Manual was used as an additional analysis at locations with high crash rates. This method identifies the types of crashes that are over-represented at an intersection, when compared to other similar intersections.

There were four intersections with high crash rates that exceeded either the critical crash rate or 90th percentile crash rate as shown in Table 3-7. These intersections are identified as high crash locations.

Table 3-7: Intersection Crash Rates (2010 – 2014)

Intersection	Total Crashes	Observed Crash Rate (per MEV)	Critical Crash Rate (per MEV)	Over Critical Crash Rate?	90th Percentile Rate (per MEV)	Over 90th Percentile Rate	Excess Proportion Crash Types*
Dogwood St/10th Ave	4	0.34	0.51	Under	0.41	Under	-
Dogwood St/14th Ave	1	0.19	0.68	Under	0.41	Under	-
Dogwood St/20th Ave	1	0.19	0.68	Under	0.41	Under	-
Dogwood St/26th Ave	1	0.39	0.93	Under	0.41	Under	-
Holiday St/10th Ave	2	0.25	0.40	Under	0.29	Under	-
Davis St/19th Ave	8	0.54	0.48	**Over**	0.41	**Over**	None
Adair St/10th Ave	31	0.75	0.71	**Over**	0.86	Under	Angle
Baseline St/10th Ave	26	0.77	0.74	**Over**	0.86	Under	Turn
Adair St/14th Ave	20	0.55	0.73	Under	0.86	Under	-
Baseline St/14th Ave	12	0.45	0.77	Under	0.86	Under	-
OR 8/20th Ave	42	0.67	0.68	Under	0.86	Under	-
OR 8/Fred Meyer	9	0.15	0.68	Under	0.86	Under	-
OR 8/26th Ave	26	0.43	0.68	Under	0.86	Under	-
OR 8/29th Ave	13	0.23	0.22	**Over**	0.29	Under	N/A
OR 8/345th Ave	8	0.14	0.35	Under	0.41	Under	-

Per MEV = Crashes per million entering vehicles
* Excess Proportion analysis presented for high crash rate locations only. Parameters used: 90% minimum probability, 10% minimum excess proportion.

Each intersection with a high crash rate is discussed below.

- **Davis St/19th Ave (stop controlled):** This four-leg intersection with stop control on Davis Street, had eight collisions. The crash rate exceeds both the critical crash rate and the 90th percentile statewide rate. Of the eight collisions, four were angle collisions and three involved a fixed-object. The majority of the crashes resulted in property damages only (6 of 8). There was not a specific crash type identified in excess proportion analysis.

- **Adair St/10th Ave (signalized):** Angle crashes (14 of 31) were the most prominent here. Disregarding traffic controls was the most common cause of crashes. The majority of the crashes resulted in injuries (18 of 31).
- **Baseline St/10th Ave (signalized):** Rear-end crashes were the most common collision types observed at this site. Following too closely was the major cause of rear-end crashes. Turning crashes were identified in the excess proportion analysis. Failing to yield right-of-way and making improper turn were the major causes to turning crashes. More than half of the collisions resulted in injuries (16 of 26). A major construction project was completed on Baseline Street between 10th and 19th Avenue from 2013 to 2015 and may have contributed to the number and type of collisions.
- **OR 8/29th Ave (stop controlled):** This three-leg intersection with stop control on 29th Avenue, had thirteen collisions over the past five years. Rear-end crashes were the most prominent at this intersection, largely due to following too closely.

Safety Priority Index System (SPIS) Assessment

The Safety Priority Index System (SPIS) is a method developed by ODOT for identifying hazardous locations on and off state highways. The score for each 0.10-mile segment of highway is based on three years of crash data, considering crash frequency, rate, and severity. SPIS ranks all segments throughout the state by score and identifies the top 5 percent and top 10 percent segments. According to the ODOT 2015 SPIS ratings (data reported between 2012 and 2014), several locations in the Cornelius TSP study area rank among the top most hazardous sections of highways in Oregon. The identified locations are listed and discussed below.

- **OR 8 around the 336th Avenue intersection (top five percent segment):** 13 crashes occurred from 2012 to 2014, the majority of the crashes (8 of 13) were injury crashes including two resulting in serious injury. The majority of the crashes were rear-end crashes, and following too closely was the prominent cause. The close spacing of intersections in this segment possibly contributes to the high crash rate.
- **OR 8 around the 14th Avenue intersection (top five percent segment):** 18 crashes occurred here from 2012 to 2014, more than half of which were injury crashes including three resulting in serious injury. Rear-end crashes were most common, and following too close was a prominent cause. A major construction project at this location was completed in 2014 and may have contributed to the number and type of collisions.
- **OR 8 between 9th Avenue and 11th Avenue (top five percent segment; high crash rate intersection):** see prior section discussion of Adair Street/10th Avenue and Baseline Street/10th Avenue
- **OR 8 around 29th Avenue intersection (top 10 percent segment; high crash rate intersection):** see prior section discussion of OR 8/29th Avenue
- **OR 8 between 9th Avenue and 11th Avenue (top 10 percent segment; high crash rate intersection):** see prior section discussion of Adair Street/10th Avenue and Baseline Street/10th Avenue
- **OR 8 around the 4th Avenue intersection (top 10 percent segment):** 16 crashes occurred from 2012 to 2014, more than half of the crashes resulted in injuries including one

serious injury. Rear-end and turning crashes were the most common at this site. A prominent cause of the crashes was inattention.

Safety Deficiencies

Potential needs and recommendations from the safety analysis include:

- The collision data indicated that actions focusing on motorist behaviors (inattention and following too closely) may be effective, including targeted enforcement and education.
- The most common cause of crashes at Adair Street/10th Avenue was disregarding traffic controls. Improvements to increase compliance include reflective tape on signal backplates, larger stop signs, and photo-enforced red-light running cameras.
- The most common type and cause of crashes on OR 8 near 14th Avenue, 29th Avenue, and 336th Avenue were rear-end crashes from following too close. Improvements may include police enforcement of safe following distances.
- Baseline and Adair Street at 14th Avenue should be monitored to determine if the identified safety issue continues after construction was complete in 2014.
- Baseline Street at 10th Avenue should be evaluated after construction of the 2017 planned improvements to determine if the identified safety issues remain.

Truck Freight System

Efficient truck movement plays a vital role in the economical movements of raw materials and finished products. The designation of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. Washington County identifies OR 8, Baseline Street and Adair Street through Cornelius as an Over-Dimensional Truck Route and 10th Avenue north of Baseline Street as a Truck Route. Metro has designated OR 8, Baseline Street and Adair Street as a Reginal Freight Road Connector defined as a road that connects freight facilities and freight generation areas to the main roadway route. OR 8 is not a designated State Freight Route.

ODOT reports bridge conditions on major routes. The bridge on 29th Avenue-Hobbs Road over Council Creek is identified as functionally obsolete due to its narrow width and posted weight restriction. Freight access to the area is provided by Hobbs Road via 19th Avenue-Susbauer Road. Current freight routes and bridge conditions are shown in Figure 3-13.

The Adair Street and Baseline Street intersections at 10th Avenue do not provide adequate turning radius for heavy vehicles. Freight traffic has a difficult time traveling through the intersections and remaining in the appropriate travel lane. Improvements are planned for these intersections in 2017 that will allow adequate movements for freight.

Truck Freight Deficiencies

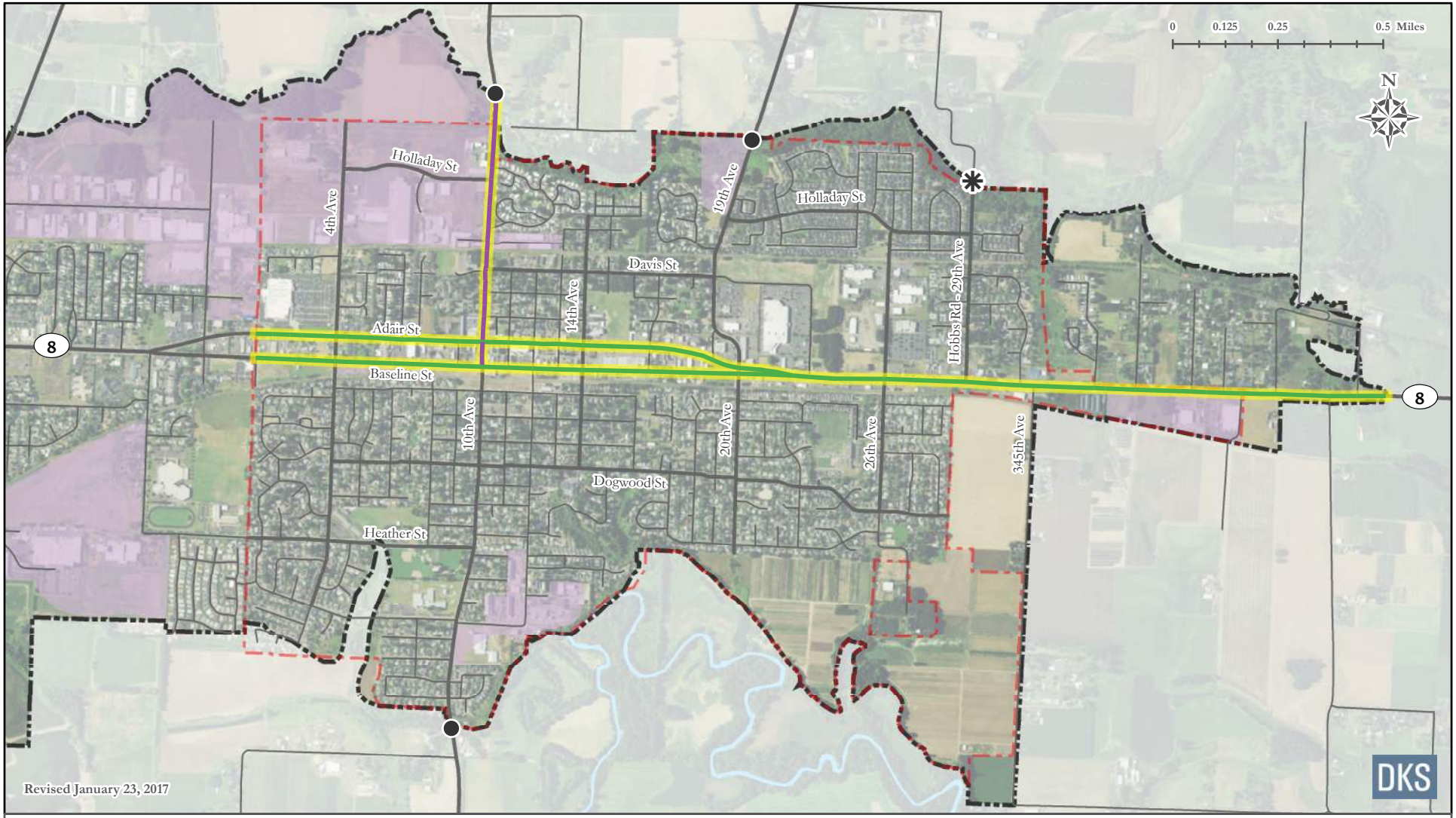
The truck freight system has several deficiencies:

Bridges: The 29th Avenue-Hobbs Road bridge over Council Creek is identified as functionally obsolete due to its narrow width and posted weight restriction.

Geometrics: The Adair Street and Baseline Street intersections at 10th Avenue do not provide adequate turning radius for heavy vehicles. Planned improvements will remove this deficiency.

3-13

Freight and Trucking Routes With Bridge Condition



Legend:

Bridge Condition:

- ● Not Deficient
- ✱ Functionally Obsolete

Freight Routes

- Washington County Over-Dimensional Truck Route
- Washington County Truck Route
- Regional Freight Road Connector

Land Use

- Employment Land

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

Rail Freight System

Portland & Western Railroad (PNWR) has two freight lines that pass through Cornelius, the Seghers District (the FAA Line) and Forest Grove District (the 3F line). The FAA line passes through Cornelius one-half block south of OR 8. The 3F line passes through Cornelius approximately five blocks north of OR 8 and one block north of Davis Street.

The FAA line is owned by Union Pacific Railroad and is operated and maintained by PNWR under lease. The 3F line track and appurtenances are owned by PNWR but the land beneath the railroad is owned by the State of Oregon and administered by the Department of Transportation, Rail and Public Transit Division. There are one to two trains a day at maximum speed of 25 mph on the FAA Line, and less than one train a day at 5 mph on the 3F Line. Within the study area, the FAA Line has seven at-grade crossings and the 3F Line has eight at-grade crossings. There are no passenger trains running through Cornelius at this time. PNWR handles less than 1 million gross tons of freight through Cornelius annually. Figure 3-14 shows the existing rail freight lines and type of control at each crossing. The 11th and 12th Avenue crossings on the FAA Line were recently closed to motor vehicles, the 12th Avenue crossing was replaced with a pedestrian and bicycle only crossing. The FAA Line crossings from 4th to 26th Avenue are equipped with flashing lights, bells and gate arms that lower when a train approaches.

Public crossing incident data from 1965 to the present was obtained from the Federal Railroad Association for both rail lines in the study area. Nine public crossing incidents have occurred over the last 50 years with one total injury and no fatalities. The public crossing incident data is shown in Table 3-8.

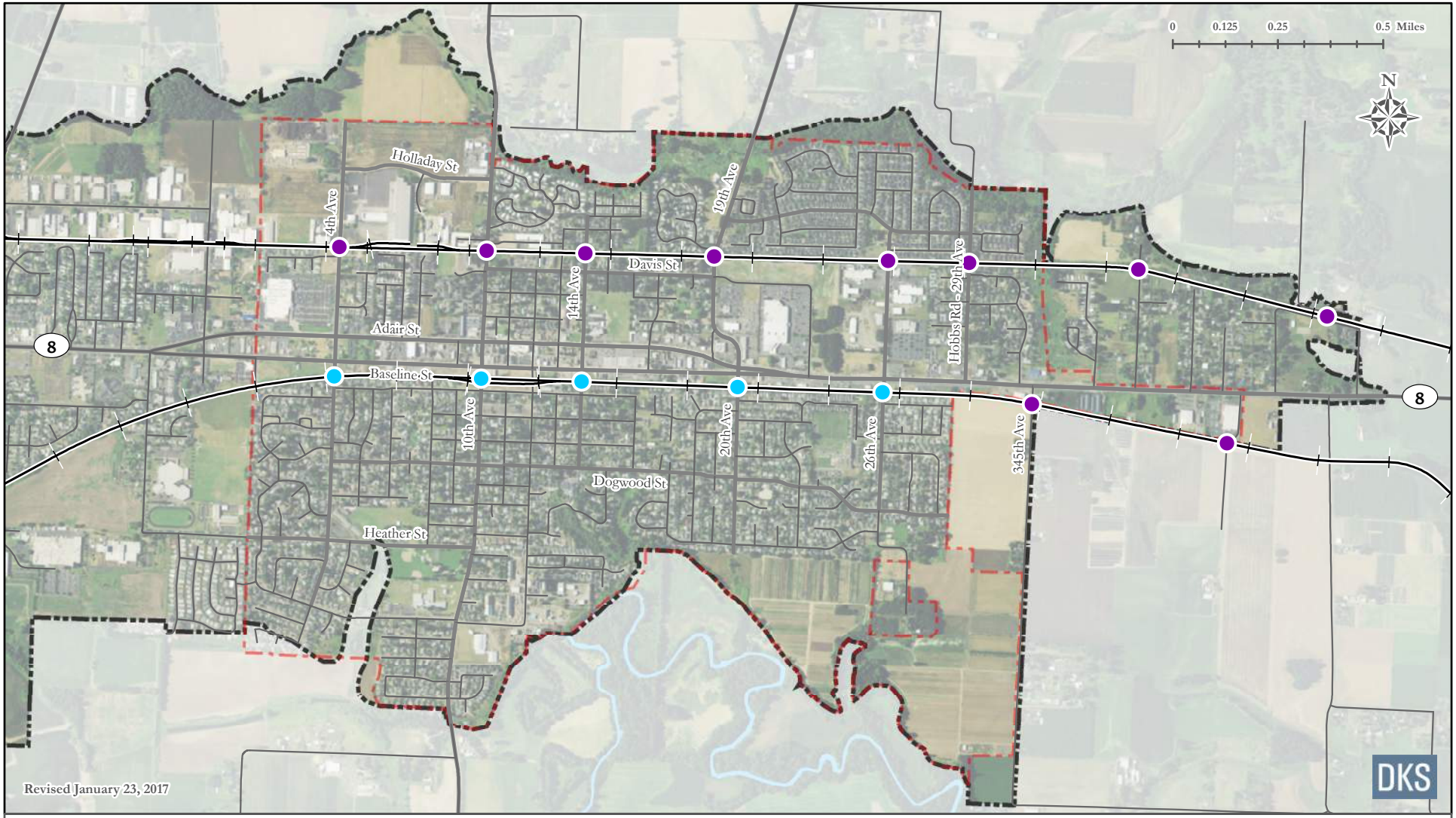
Table 3-8: Public Rail Crossing Incident Data (1965 to Present)

Public Crossing Location	Number of Incidents	Injuries	Fatalities
N 4th Avenue	1	0	0
N 14th Avenue	1	0	0
N 19th Avenue (Susbauer Road)	1	0	0
S 12th Avenue	3	0	0
S 26th Avenue (Webb Road)	3	1	0

Rail Freight Deficiencies

At-Grade Crossings: The at-grade rail crossings on the FAA Line east of 26th Avenue provide signage only, no gates or flashing lights. Safety controls may be warranted as vehicle, bicycle and pedestrian volumes increase with urban development.

3-14 Rail Lines and Crossings



Legend:

Rail:

- At-Grade Crossing, gated
- At-Grade Crossing, ungated
- Railroad

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

Other Modes and Strategies

Air

There are no designated airports or heliports in the Cornelius TSP study area. The Skyport Airport is a private aviation facility with a turf runway located on Salzwedal Road approximately four miles north of the Cornelius city limits. The Hillsboro Airport, located at Cornell Road and Brookwood Parkway, is an 870-acre executive airport which supports all facets of general aviation activity. The airport facility is owned and operated by the Port of Portland as part of the Port's general aviation reliever system of airports.

Water

There are no navigable waterways within the vicinity of Cornelius that support commercial use. The Tualatin River, to the south of Cornelius is used for recreational purposes. No policies or recommendations in this area of transportation are provided.

Pipeline

There are several major pipeline facilities located within the Cornelius study area. The Joint Water Commission/City of Hillsboro operates a 72-inch water supply pipeline that connects through Cornelius from Heather Street at the western city limits to Baseline Street at the eastern city limits. Clean Water Services operates two major pressure sewer lines through Cornelius that generally follow the FAA rail line one block south of OR 8.

Transportation System Management and Operations (TSMO)

Transportation System Management and Operations (TSMO) is a set of integrated transportation solutions for improving the performance of existing transportation infrastructure through a combination of system and demand management strategies and programs.

Transportation System Management (TSM): TSM solutions attempt to better manage the flow of traffic to achieve maximum efficiency of the current roadway system, possibly resulting in an increase in facility capacity. The regional roadway system in Cornelius benefits from existing TSM infrastructure, as described below:

- Communications and Coordinated Traffic Signal Control – As part of the 10th Avenue improvements planned for 2017, the traffic signals on OR 8 at 4th, 10th and 14th Avenue will be interconnected to provide coordinated and managed signal control for better corridor operations.

Transportation Demand Management (TDM): TDM solutions encourage travelers to choose alternatives to driving alone in their car by providing services, incentives, supportive infrastructure and awareness of travel options. These strategies improve the performance of the existing infrastructure and services, and may result in fewer vehicles on the roadway system. TDM measures in use in Cornelius include:

- TriMet provides transportation options for commuters in the Portland Metro Region.
- Investment in pedestrian/bicycle facilities.

4. Future Demand and Land Use

Travel Demand and Land Use

The Cornelius Transportation System Plan (TSP) Update addresses existing system needs and additional facilities that are required to serve future growth beyond the 2025 forecast year of the existing TSP. Metro's urban area transportation forecast model was used to determine future traffic volumes in Cornelius. This forecast model translates assumed land uses into person travel, selects travel modes and assigns motor vehicles to the roadway network. These traffic volume projections form the basis for identifying potential roadway deficiencies and for evaluating alternative circulation improvements. This section describes the forecasting process including key assumptions and the land use scenario developed from the existing Comprehensive Plan designations and allowed densities.

Projected Land Use Growth

Land use is a key factor in developing a functional transportation system. The amount of land that is planned to be developed, the type of land uses and how the land uses are mixed together have a direct relationship to expected demands on the transportation system. Understanding the amount and type of land use is critical to taking actions to maintain or enhance transportation system operation. The City's Zoning and Comprehensive Plan land use designations are shown in Figures 4-1 and 4-2.

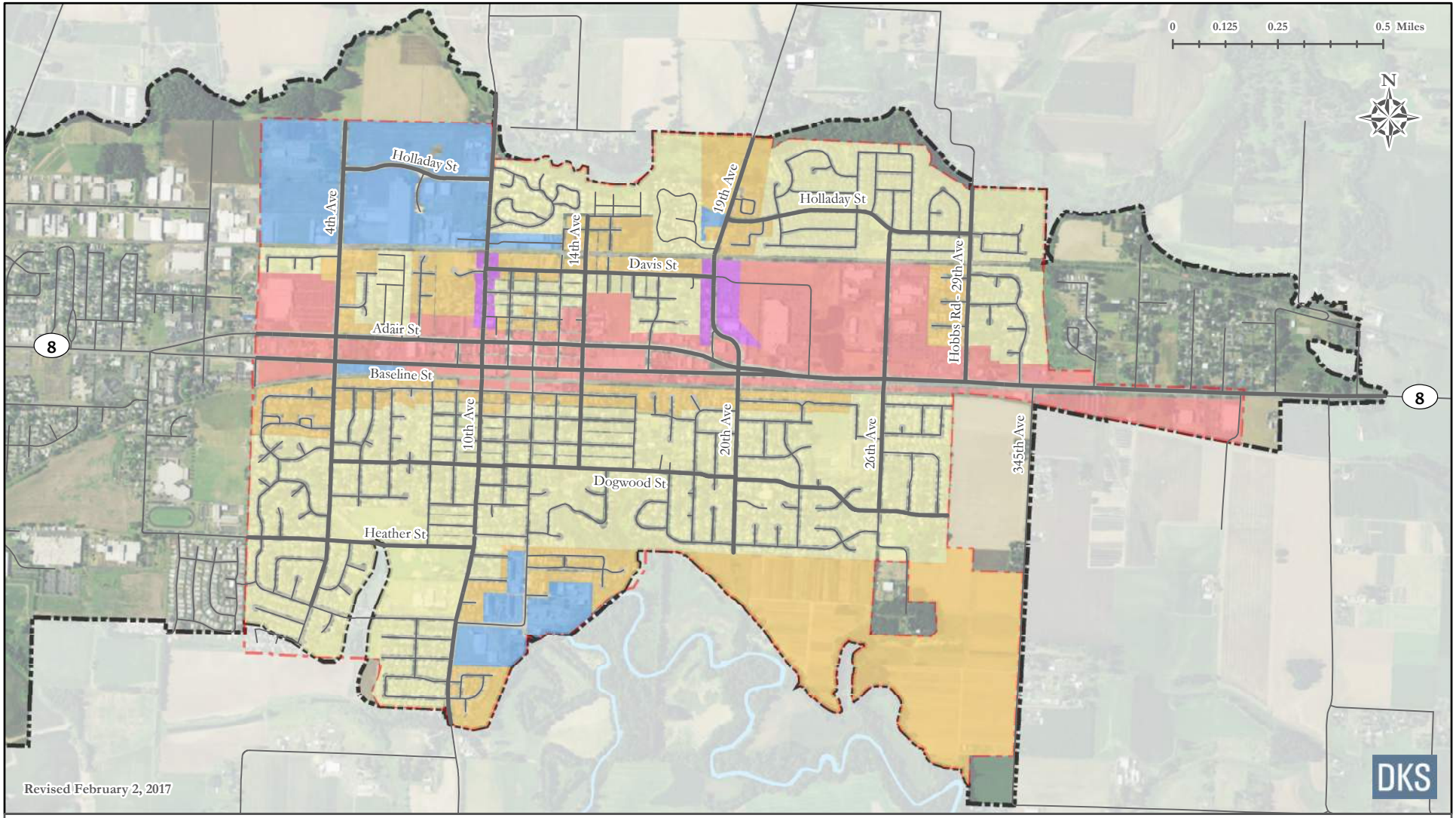
Projected land uses were developed for the study area and reflect the Comprehensive Plan and Metro's land use assumptions for the year 2040. The future land use projections were deemed acceptable as part of the City's recent urban growth boundary expansion study[1]. Complete land use data sets were developed for the following conditions.

- Existing 2010 Conditions (base travel forecast for the region)
- Future 2040 Conditions

The following sections summarize the forecasted growth that will influence travel within Cornelius.

[1] Cornelius Urban Growth Boundary Expansion Transportation Report, DKS Associates, August 2015.

4-1 Zoning Designations



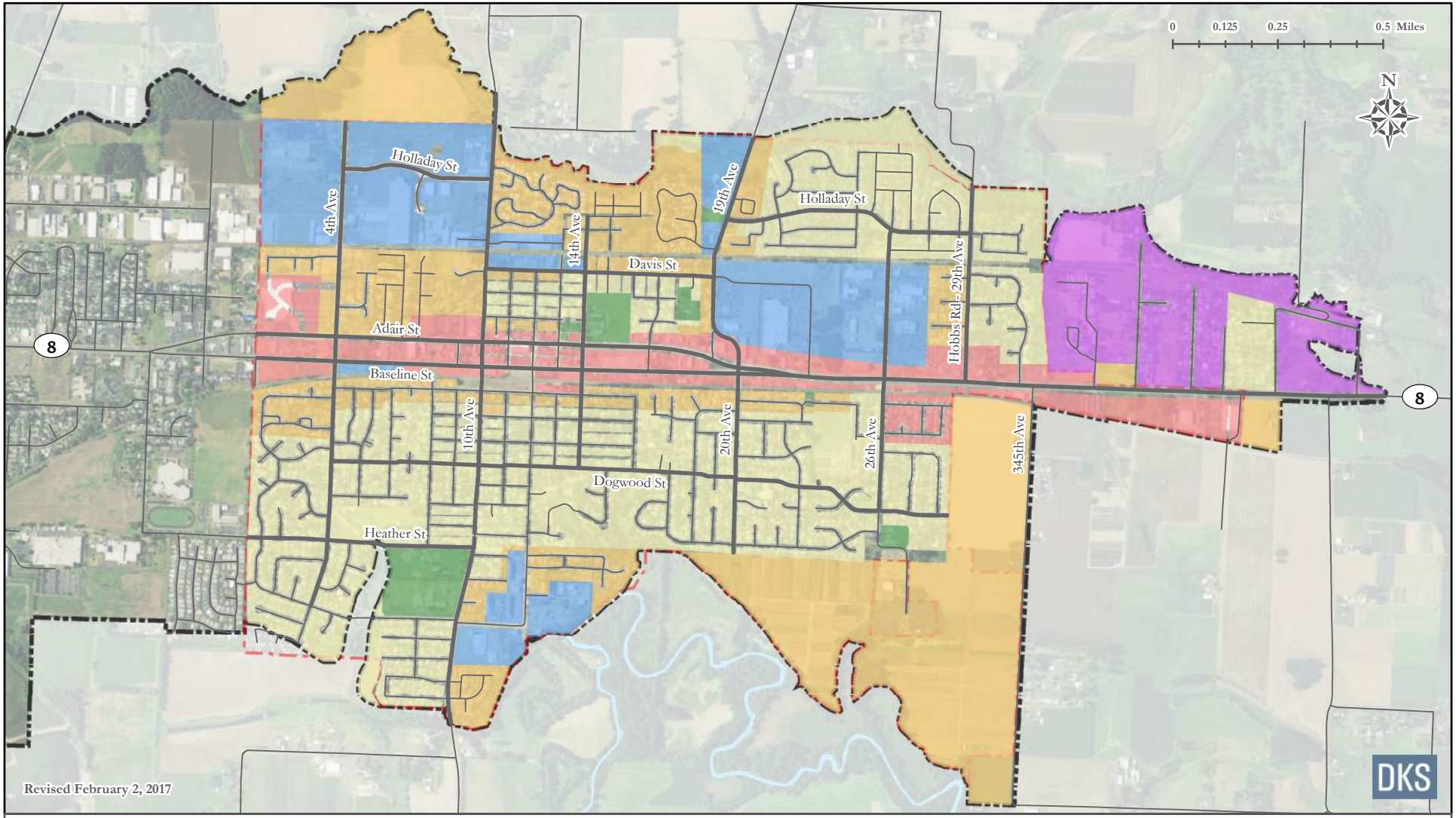
Legend:

Cornelius Zoning Designations

- Commercial
- Mixed-Use
- Industrial
- Single-Family Residential
- Multi-Family Residential

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

4-2 Comprehensive Plan Designations



Legend:

Comprehensive Plan Designations

- Commercial
- Industrial
- Agricultural
- Low Density Residential
- Medium Density Residential
- Public Facilities

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

Growth within Cornelius

For this study effort, the available base model provided by Metro was for 2010. This land use database includes the number of dwelling units, retail employees and other employees. Table 4-1 summarizes the population and land uses for the 2010 base and future 2040 scenarios within the Cornelius TSP Update study area. These land use projections are significantly higher than the previous 2025 forecasts, reflecting the urban growth boundary expansion area development potential. A detailed summary of the uses for each Transportation Analysis Zone (TAZ) within the Cornelius study area is provided in the technical appendix.

Table 4-1: Cornelius TSP Study Area Land Use Summary

Land Use	Year 2010	Year 2040	30-year Growth	Percent Increase
Population	11,875	17,407	5,532	47%
Households	3,518	5,805	2,287	65%
Retail Employees	693	1,767	1,074	155%
Service Employees	712	2,086	1,374	194%
Other Employees	1,679	4,958	3,279	395%

Year 2010 population estimate from Portland State University, Population Research Center
Year 2040 population estimate and growth from Cornelius Economic Opportunities Analysis[2]
Land use data from Metro 2010 and 2040 Gamma travel demand models

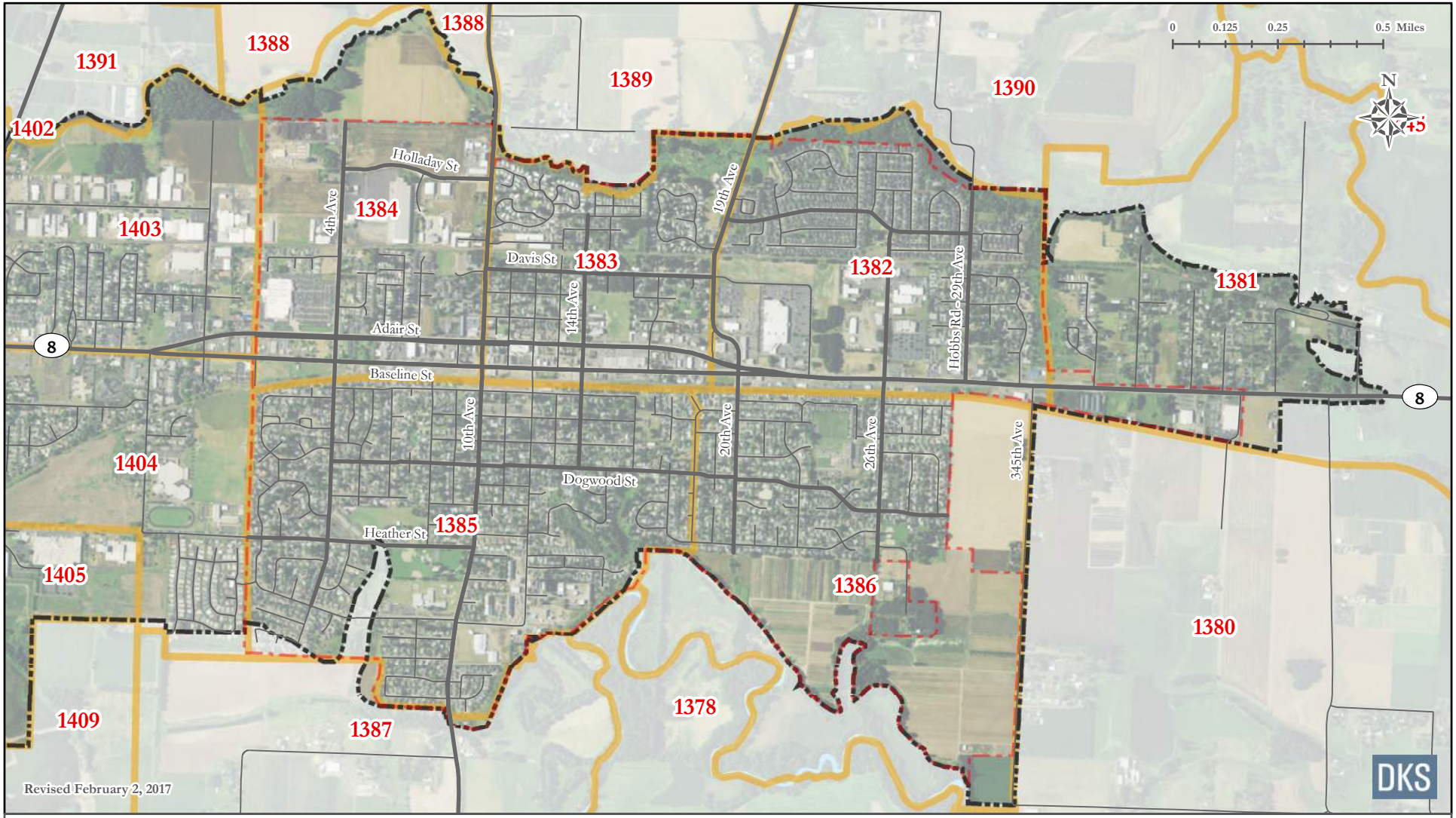
At the existing level of land development, the transportation system generally operates without significant deficiencies in the study area. As land uses are changed in proportion to each other (i.e. there is a significant increase in employment relative to household growth), there will be a shift in the overall operation of the transportation system. Retail land uses generate higher amounts of trips per acre of land than households do and other land uses. The location and design of retail land uses in a community can greatly affect transportation system operation. Additionally, if a community is homogeneous in land use character (i.e. all employment or residential), the transportation system must support significant trips coming to or from the community rather than within the community. Typically, there should be a mix of residential, commercial, and employment type land uses so that some residents may work and shop locally, reducing the need for residents to travel long distances.

Table 4-1 indicates that significant employment growth (about 4,700 jobs) is expected in Cornelius in the coming decades. The transportation system should be monitored to make sure that land uses in the plan are balanced with transportation system capacity. This TSP balances needs with the forecasted 2040 land uses.

For transportation forecasting, the land use data is stratified into geographical areas called transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. There are approximately six Metro TAZs within the Cornelius TSP Update study area. The TAZ structure was reviewed and found to be appropriate for the development study intersection future volume forecasts. The model zone boundaries are shown in Figure 4-2. The projected growth for each land use category (households, retail employees and other employees) within each TAZ is shown in Figures 4-4 through 4-6.

[2] DRAFT Economic Opportunities Analysis, City of Cornelius, PNW Economics LLC, October 20, 2016

4-3 Transportation Analysis Zones

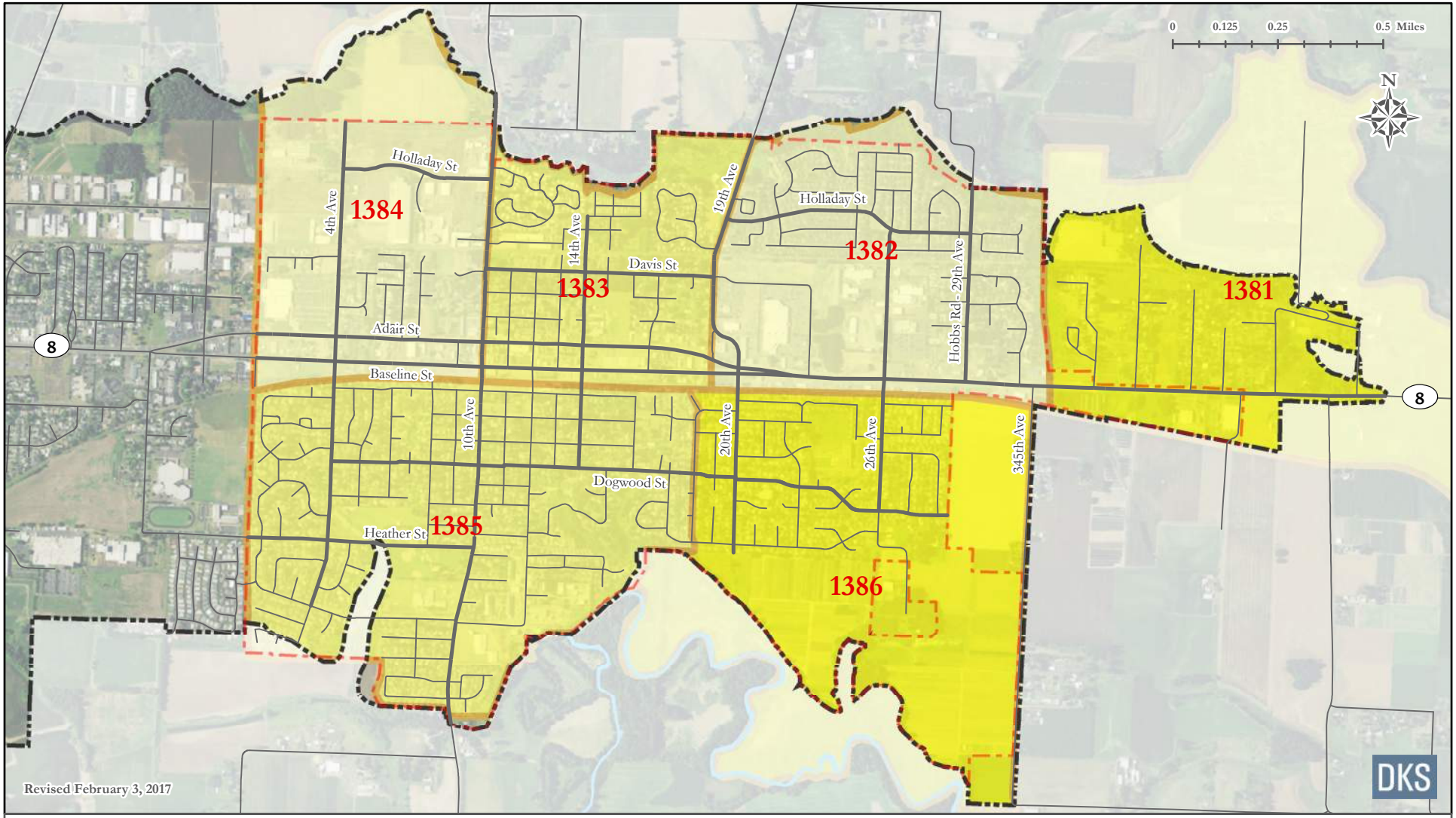


Legend:

Transportation Analysis Zones

- Transportation Analysis Zone (TAZ)
- # TAZ Number
- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

4-4 Projected Growth by TAZ – Households



Legend:

Projected Household Growth by TAZ between 2010 and 2040

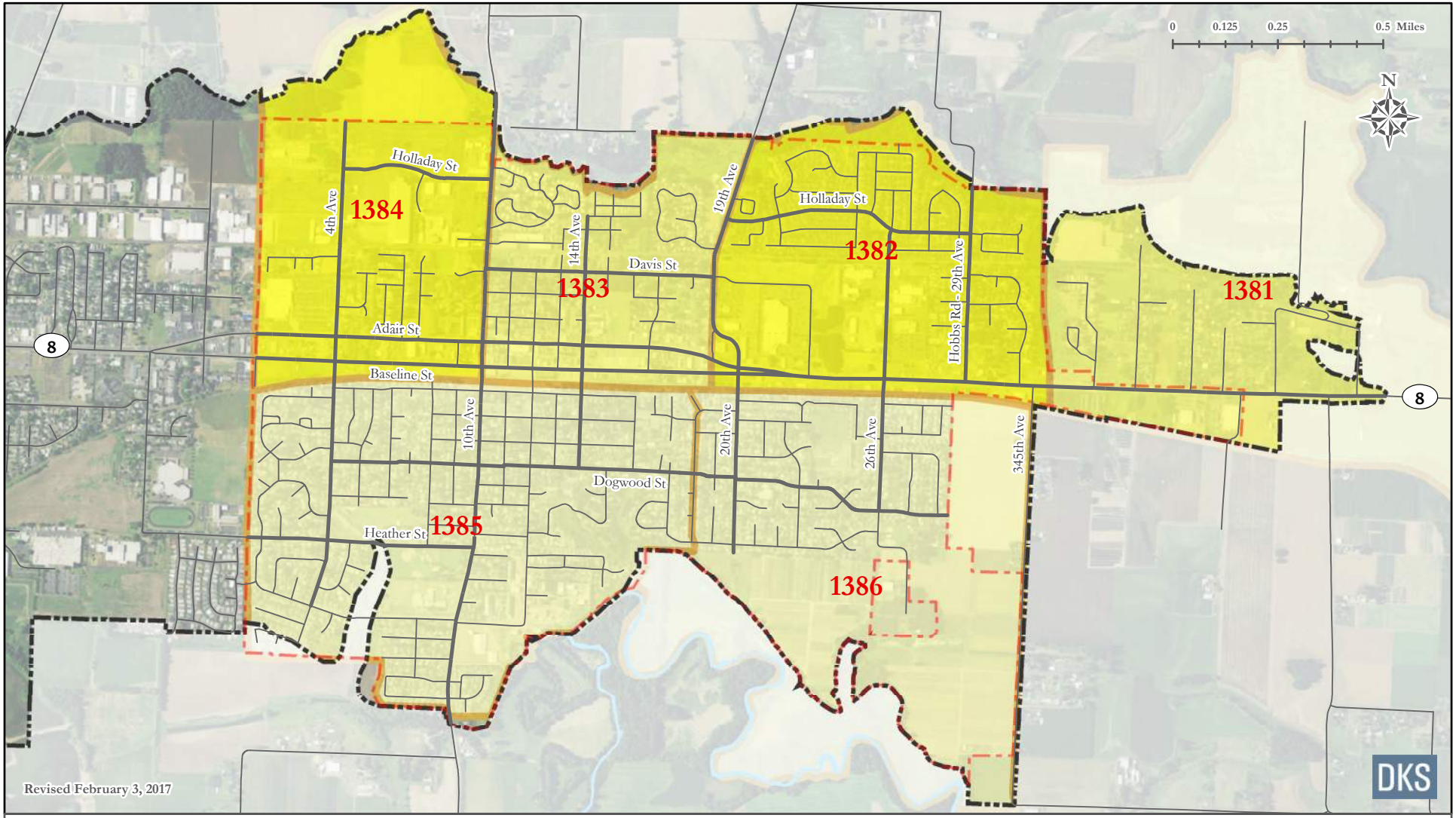
- Less than 55 Households
- 55 to 300 Households
- More than 300 Households

Transportation Analysis Zones

- Transportation Analysis Zone (TAZ)
- # TAZ Number

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

4-5 Projected Growth by TAZ – Retail Employment



Legend:

Projected Retail Employment Growth by TAZ between 2010 and 2040

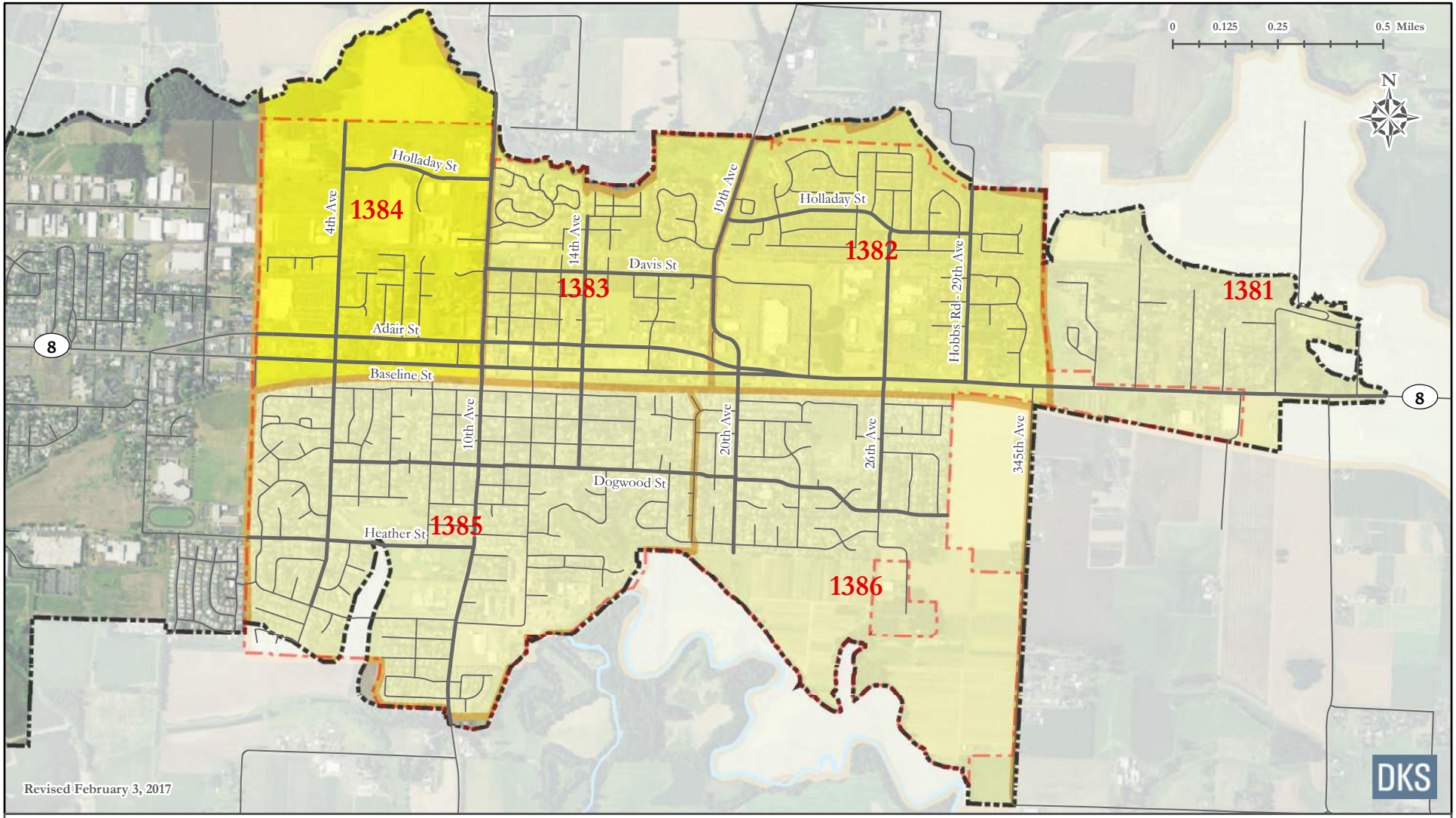
- Less than 75 Employees
- 75 to 200 Employees
- More than 200 Employees

Transportation Analysis Zones

- Transportation Analysis Zone (TAZ)
- # TAZ Number

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

4-6 Projected Growth by TAZ – Service and Other Employment



Legend:

Projected Service and Other Employment Growth by TAZ between 2010 and 2040

- Less than 350 Employees
- 350 to 850 Employees
- More than 850 Employees

Transportation Analysis Zones

- Transportation Analysis Zone (TAZ)
- # TAZ Number

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

Metro Area Transportation Model

A determination of future traffic system needs in Cornelius requires the ability to accurately forecast travel demand resulting from estimates of future population and employment for the City. The objective of the transportation planning process is to provide the information necessary for making decisions on when and where improvements should be made to the transportation system to meet travel demand as developed in an urban area travel demand model as part of the Regional Transportation Plan update process. Metro uses Visum, a computer based program for transportation planning, to process the large amounts of data for the Portland Metropolitan area. For the Cornelius TSP Update, the regional 2040 model used for the 2014 RTP update was used to develop future forecasts.

Traffic forecasting can be divided into several distinct but integrated components that represent the logical sequence of travel behavior (see Figure 4-7). These components and their general order in the traffic forecasting process are as follows:

- Trip Generation
- Trip Distribution
- Mode Choice
- Traffic Assignment

The initial roadway network used in the traffic model was the existing streets and roadways. Future 2040 land use scenarios were tested and roadway improvements were added to mitigate the impacts of motor vehicle traffic growth, using the RTP Priority System as a starting basis. Improvements in the RTP were validated in the study process. Forecasts of PM peak period traffic flows were produced for every major roadway segment within Cornelius. Traffic volumes were projected on all arterials and collector streets. Some local streets were included in the model, but many are represented by centroid connectors in the model process.

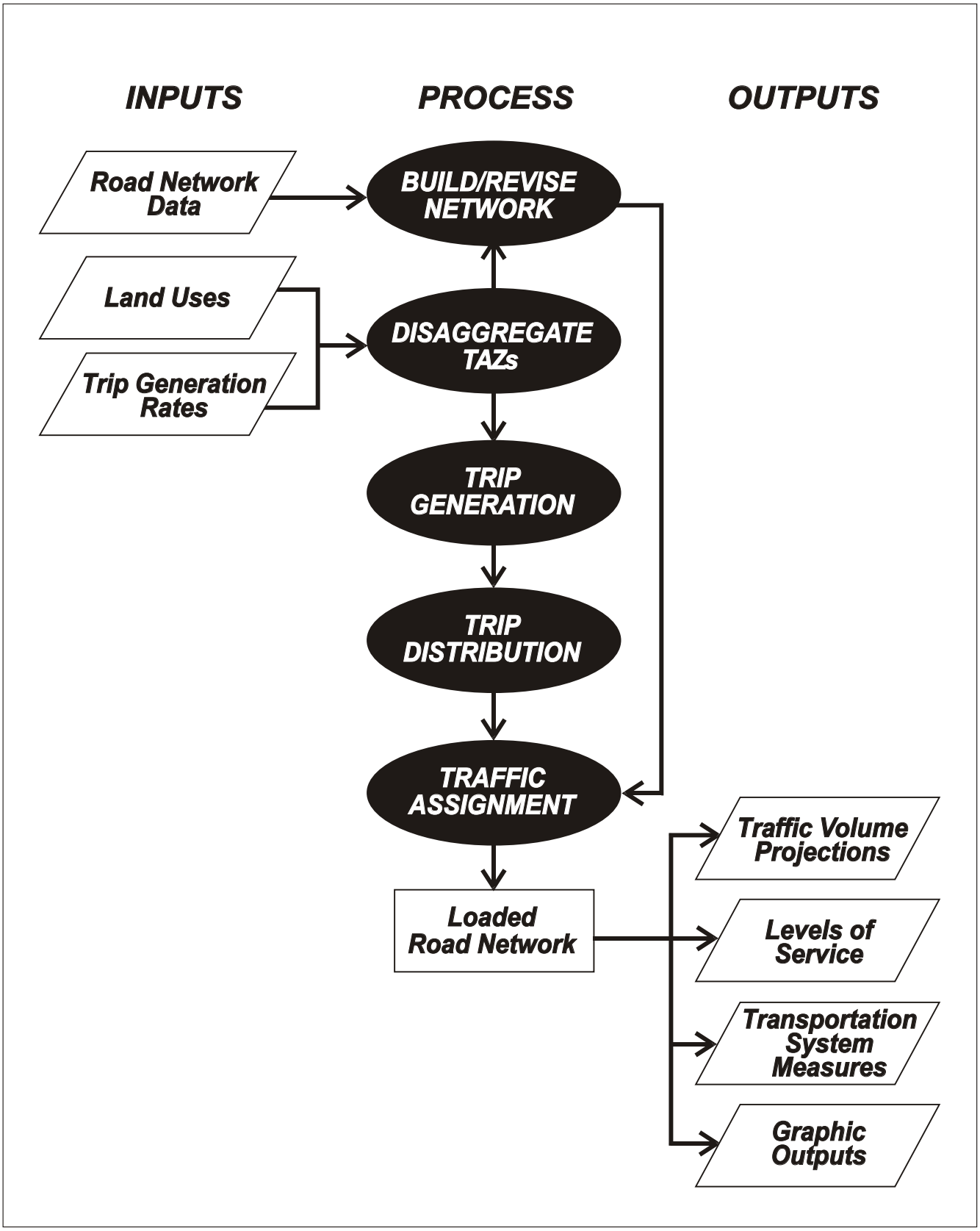


Figure 4-7
MODEL PROCESS

Trip Generation

The trip generation process translates land use quantities (number of dwelling units, retail, and other employment) into vehicle trip ends (number of vehicles entering or leaving a TAZ or sub-TAZ) using trip generation rates established during the model verification process. The Metro trip generation process is elaborate, entailing detailed trip characteristics for various types of housing, retail employment, non-retail employment, and special activities. Typically, most traffic impact studies rely on the Institute of Transportation Engineers (ITE) research for analysis[3]. The model process is tailored to variations in travel characteristics and activities in the region. For reference, Table 4-2 provides a summary of the approximate average evening peak hour trip rates used in the Metro model. These are averaged over a broad area and thus, are different than driveway counts represented by ITE. This data provides a reference for the trip generation process used in the model.

Table 4-2: Approximate Average PM Peak Period Trip Rates Used in Metro Model

	Average Trip Rate/Unit		
Unit	**In**	**Out**	**Total**
Household (HH)	0.40	0.20	0.60
Retail Employee (RET)	0.56	0.76	1.32
Other Employee (OTH)	0.09	0.28	0.38

Source: DKS Associates/Metro

Table 4-3 summarizes the estimated growth in vehicle trips generated within the Cornelius study area during the PM peak period (2-hr peak) between 2010 and 2040. It indicates that vehicle trips in Cornelius would grow by approximately 93 percent between 2010 and 2040 if the land develops according to Metro's 2040 land use assumptions. Assuming a 30-year horizon to the 2040 scenario, this represents annualized growth rate of approximately 3.1 percent per year.

Table 4-3: Cornelius Vehicle Trip Generation (2-Hour PM Period)

	2010 Trips	**2040 Trips**	**Percent Increase**
Cornelius TSP Update Study Area	4,764	9,175	93%

Trip Distribution

This step estimates how many trips travel from one zone in the model to any other zone. Distribution is based on the number of trip ends generated in each zone pair and on factors that relate the likelihood of travel between any two zones to the travel time between zones. In projecting long-range future traffic volumes, it is important to consider potential changes in regional travel patterns. Although the locations and amounts of traffic generation in Cornelius are essentially a function of future land use in the city, the distribution of trips is influenced by regional growth, particularly in neighboring areas such as Hillsboro and Forest Grove as well as the unincorporated Washington County areas. External trips (trips that have either an origin and not a destination in Cornelius or have a destination but not an origin in Cornelius) and through trips (trips that pass through Cornelius and have neither an origin nor a destination in Cornelius) were projected using trip distribution patterns based upon census data and traffic counts performed at gateways into the Metro Urban Growth Boundary (UGB) calibration.

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

Mode Choice

This step determined how many trips will be by various modes (single-occupant vehicle, transit, carpool, pedestrian, bicycle, etc.). The 2010 mode splits are incorporated into the base model and adjustments to that mode split may be made for the future scenario, depending on any expected changes in transit or carpool use. These considerations are built into the forecasts used for 2040.

Based upon analysis of the forecasted mode choice in 2040, an analysis was performed to determine the level of non-single occupant vehicle (SOV) mode share. The travel model provides estimates of the various modes of travel that can be generally assessed at the transportation analysis zone level. Figure 4-8 summarizes the level of non-SOV mode share estimated for 2040 using the regional travel demand forecast model in comparison to the modal targets established in Table 3.08-1 of the Regional Transportation Functional Plan (RTFP). Generally, the areas served by bus service have the highest levels of non-SOV mode use.

Traffic Assignment

In this process, trips from one zone to another are assigned to specific travel routes in the network, and resulting trip volumes are accumulated on links of the network until all trips are assigned.

Network travel times are updated to reflect the congestion effects of the traffic assigned through an equilibrium process. Congested travel times are estimated using what are called “volume-delay functions” in Visum. There are different forms of volume/delay functions, all of which attempt to simulate the impact of congestion on travel times (greater delay) as traffic volume increases. The volume-delay functions take into account the specific characteristics of each roadway link, such as capacity, speed and facility type. This allows the model to reflect conditions somewhat similar to driver behavior.

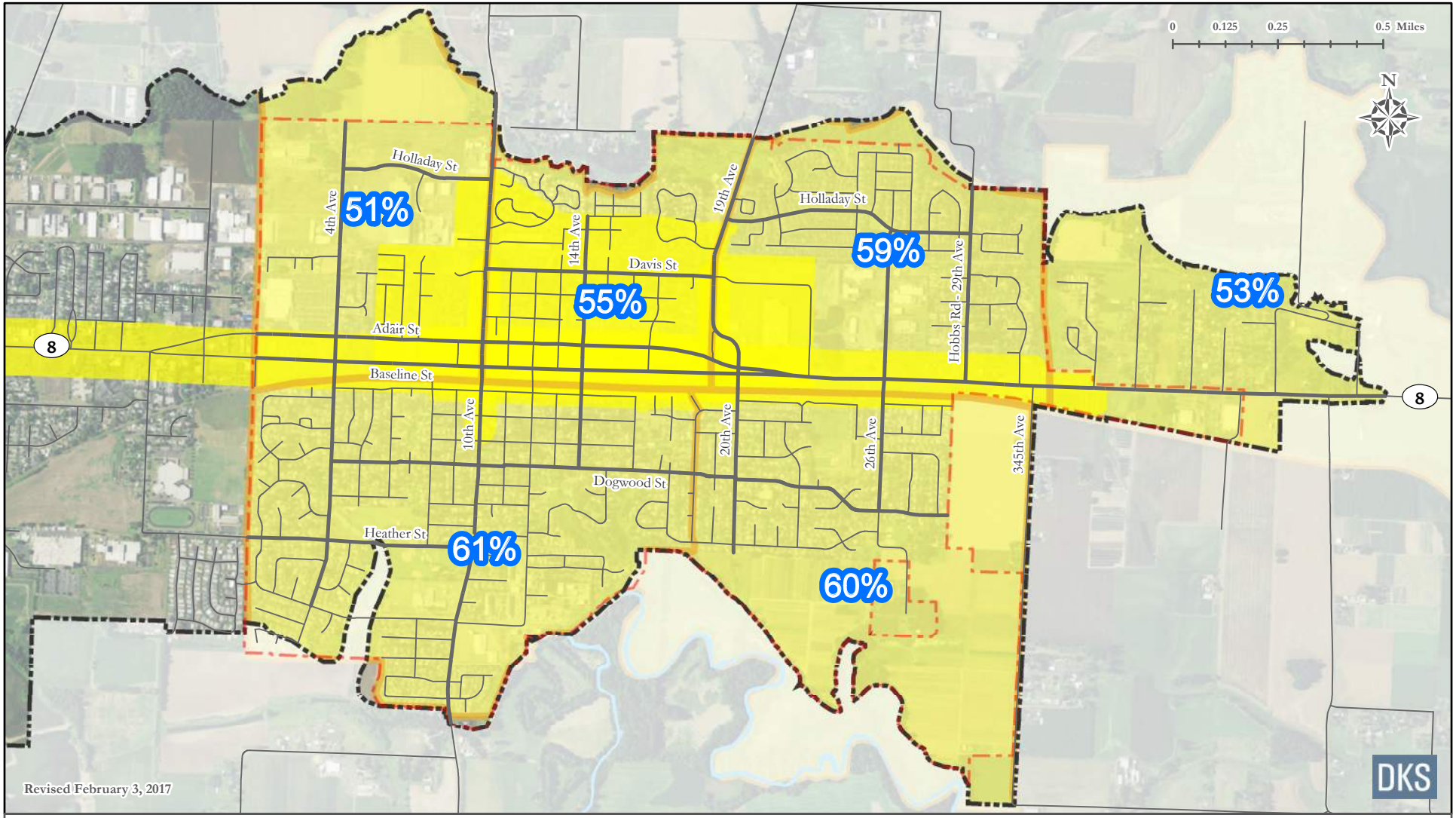
Model Verification

The base 2010 modeled traffic volumes were compared against actual traffic volume counts across screenlines, on key arterials and at key intersections. Most arterial traffic volumes meet screenline tolerances for forecast adequacy. Based on this performance, the model was used for future forecasting and assessment of circulation change.

Model Application to Cornelius

Intersection turn movements were extracted from the model at key intersections for both the base year 2010 and forecast year 2040 scenarios. These intersection turn movements were not used directly, but a portion of the increment of the year 2040 turn movements over the 2010 turn movements was applied (added) to existing (actual 2016) turn movement counts in Cornelius. A post processing technique is utilized to refine model travel forecasts to the volume forecasts utilized for 2040 intersection analysis. The turn movement volumes used for future year intersection analysis can be found in the technical appendix.

4-8 2040 Non-Single Occupancy Vehicle Analysis



Legend:

Regional Non-SOV Mode Share Targets

- Non-SOV Target 40-45% (Employment Areas, Neighborhoods)
- Non-SOV Target 45-55% (Town Centers, Corridors)

Transportation Analysis Zones

- Transportation Analysis Zone (TAZ)
- XX% 2040 Non-SOV Mode Share Percentage

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street

5. Pedestrian Plan

This chapter summarizes existing and future pedestrian needs in the City of Cornelius and outlines strategies and a recommended Pedestrian Master Plan. The criteria used in evaluating pedestrian needs and the strategies for addressing needs were identified through work with the TSP Project Management Team and the Project Advisory Committee.

Criteria

A set of goals to guide transportation system development in Cornelius has been developed as part of this TSP as shown in Chapter 2. Several goals pertain specifically to pedestrian facilities and represent the criteria that all pedestrian improvements or changes should be measured against to determine if they align with local objectives.

- Improves safety of the transportation system for all users
- Emphasizes the movement of people over vehicles, which reduces the citywide vehicle-miles-travelled (VMT)
- Adds walkways to fill system gaps and provide access to community amenities and between neighborhoods
- Improves access to transit facilities
- Reduces City capital and maintenance costs per capita
- Improves access and mobility to underserved or vulnerable populations

Needs

An important pedestrian need in Cornelius is providing sidewalks on both sides of all arterial roadways and at least one side of the street on all collector roadways and gap infill on local streets to connect residential areas with bus stops, schools, parks and retail centers. This includes the need for safe, well lighted arterials and collector streets with suitable pedestrian amenities for on-street and crossing facilities to reduce the barriers for pedestrian travel. Pedestrian facility needs in Cornelius must consider the three most prevalent trip types:

- Residential based trips – home to school, home to home, home to retail, home to park, home to transit, home to entertainment, home to church and home to library
- Service based trips – multi-stop retail trips, work to restaurant, work to services, work/shop to transit
- Recreational based trips – home to park, exercise trips, casual walking trips

Residential trips need a set of interconnected sidewalks radiating out from homes to destinations

within one-half to one mile. Beyond these distances, walking trips of this type become substantially less common (over 20 minutes). Service based trips require direct, conflict-free connectivity between uses (for example, a shopping mall with its central spine walkway that connects multiple destinations). Service based trips need a clear definition of connectivity. This requires mixed use developments to locate front doors which relate directly to the public right-of-way and provide walking links between uses within one-half mile. Recreational walking trips have different needs. Off-street trails, well landscaped sidewalks and relationships to unique environment (creeks, trees, farmland) are important.

An inventory of pedestrian facilities and an assessment of network conditions (see Figures 3-2 and 3-3) show the sidewalk system rates relatively high in the downtown area east of 10th Avenue and poor towards the edges of the City. Pedestrian system deficiencies and needs are summarized in Chapter 3. These needs are expected to grow as vehicle and walking trips increase within the City. Because all of these needs are different, there is no one pedestrian solution. The most common need is to provide a safe and interconnected system that affords the opportunity to consider the walking mode of travel, especially for trips less than one mile in length.

6. Bicycle Plan

This chapter summarizes existing and future facility needs for bicycles in the City of Cornelius. The following sections evaluate needs, provide a number of strategies for implementing a bikeway plan and recommend a bikeway plan for the City of Cornelius. The strategies used in evaluating bicycle needs were identified through work with the TSP Project Management Team and Project Advisory Committee.

Criteria

A set of goals to guide transportation system development in Cornelius has been developed as part of this TSP as shown in Chapter 2. Several goals pertain specifically to bicycle facilities and represent the criteria that all bicycle improvements or changes should be measured against to determine if they align with local objectives.

Develop complementary infrastructure for bicycles and pedestrian facilities to provide a diverse range of transportation choices for city residents.

- Emphasizes the movement of people over vehicles, which reduces the citywide vehicle-miles-travelled (VMT)
- Adds bikeways to fill system gaps and provide access to community amenities and between neighborhoods
- Improves access to transit facilities
- Reduces City capital and maintenance costs per capita
- Improves access and mobility to underserved or vulnerable populations

Needs

The existing bike lane system on arterial and collector streets does not provide complete connections from neighborhoods to schools, parks, retail centers, or transit stops. Continuity and connectivity are key issues for bicyclists and the lack of facilities (or gaps) cause significant problems for bicyclists in Cornelius. Without connectivity of the bicycle system, this mode of travel is severely limited. Local streets do not require dedicated bike facilities since the lower motor vehicle volumes and speeds typically allow for both autos and bikes to share the roadway. Cyclists desiring to travel through the City can use bike lanes on OR 8 or find alternate routes on lower volume local streets. There are designated on-street bike facilities (striped bike lane or wide shoulder) along Adair Street, Baseline Street and OR 8 within the Cornelius City limits. However, these facilities are substandard along some sections and should be improved to meet ODOT bike lane standards.

Bicycle trips are different from pedestrian and motor vehicle trips. Common bicycle trips are longer than walking trips and generally shorter than motor vehicle trips. Where walking trips are attractive at lengths of a quarter mile (generally not more than a mile), bicycle trips are attractive

up to three miles. Bicycle trips can generally fall into three groups: commuting, activity-based and recreational. Commuter trips are typically home/work/home (sometimes linking to transit) and are made on direct, major connecting roadways and/or local streets. Bicycle lanes provide good accommodations for these trips. Activity based trips can be home-to-school, home-to-park, home-to-neighborhood commercial or home-to-home. Many of these trips are made on local streets with some connections to arterials and collectors. Their needs are for lower volume/speed traffic streets, safety and connectivity.

An inventory of bicycle facilities and an assessment of network conditions (see Figures 3-4 and 3-5) show the bicycle system rates relatively high near downtown, and on most collectors but poor on OR 8 outside downtown. Bicycle system deficiencies and needs are summarized in Chapter 3. These needs are expected to grow as vehicle and biking trips increase within the City. Recreational bicycle trips share many of the needs of both the commuter and activity-based trips, but create greater needs for off-street routes, connections to rural routes and safety. Typically, recreational bike trips will exceed the normal bike trip length.

7. Transit Plan

This chapter summarizes existing and future transit needs in the City of Cornelius. The following sections outline the criteria used to evaluate needs, strategies for implementing a transit plan and the recommended transit plan for the City of Cornelius. The strategies used in evaluating transit needs were identified through work with the TSP Project Management Team and Project Advisory Committee which included TriMet staff.

Criteria

A set of goals to guide transportation system development in Cornelius has been developed as part of this TSP as shown in Chapter 2. Several goals pertain specifically to transit facilities and represent the criteria that all transit improvements or changes should be measured against to determine if they align with local objectives.

- Emphasizes the movement of people over vehicles, which reduces the citywide vehicle-miles-travelled (VMT)
- Improves access to transit facilities
- Reduces City capital and maintenance costs per capita
- Improves access and mobility to underserved or vulnerable populations

Needs

TriMet is the regional transit provider for the Portland metro area and operates one bus route within Cornelius, #57 – TV Highway/Forest Grove route. This bus route travels on Adair Street, Baseline Street and TV Highway in Cornelius and connects to Forest Grove, Hillsboro, Aloha and the Beaverton Transit Center. Existing transit needs are provided in Chapter 3. Future transit coverage, frequency and reliability needs will be determined through TriMet led planning efforts in coordination with local agencies.

There is a need for the City to work jointly with Trimet to provide and maintain transit stop amenities to improve the convenience and attractiveness of using the system. Potential overall system needs include:

- Bus shelters – The convenience of using the transit system should be improved by providing a comfortable place to wait for the bus.
- Bus bulb-outs– The extension of the sidewalk area into the parking lane provides a more convenience and comfortable pedestrian connection to a stopped bus.
- Street lighting – Bus stops should be highly visible locations so pedestrians can easily identify the locations and good security can be provided.
- Information kiosks at bus stops – This amenity provides transit riders information such as forecasts for next bus arrival times.
- Sidewalk infill and pedestrian crossing enhancements – Transit stops located on high volume roadways benefit from complete sidewalks and improved pedestrian crossing locations.

Regional Transit Network

The Cornelius TSP needs to consider the planned regional transit network for consistency. The RTP identifies OR 8 between downtown Hillsboro and Forest Grove with the following transit service types[3].

- High Capacity Transit (HCT)– HCT service carries high volumes of passengers quickly and efficiently with relatively long trip lengths to provide a viable alternative to the automobile in terms of convenience and travel time. Types of HCT service include Light Rail Transit (MAX), Bus Rapid Transit and Commuter Rail (WES).
- Major transit stops – Intended to provide a high degree of transit passenger comfort and access. Major transit stops shall provide real-time schedule information, special lighting, benches, shelters, bicycle parking and trash cans.

[3] *2014 Regional Transportation Plan*, Metro, Figure 2.10, July 17, 2014.

8. Motor Vehicle Plan

This chapter summarizes needs for the motor vehicle system for future conditions in the City of Cornelius. It also outlines the strategies to be used in evaluating needs and recommends plans for motor vehicles (automobiles, trucks, buses and other vehicles). The Motor Vehicle modal plan is intended to be consistent with other jurisdictional plans including Metro's Regional Transportation System Plan (RTP) and Regional Transportation Functional Plan (RTFP), Washington County's Transportation System Plan (TSP) and ODOT's Oregon Highway Plan (OHP).

Criteria

A set of goals to guide transportation system development in Cornelius has been developed as part of this TSP as shown in Chapter 2. Many of these goals pertain specifically to motor vehicles and represent the criteria that all motor vehicle improvements or changes should be measured against to determine if they align with local objectives.

- Improves safety of the transportation system for all users
- Reduces emergency vehicle response times
- Manages transportation system
- Enhances travel for local trips off the state highway system
- Emphasizes the movement of people over vehicles, which reduces the citywide vehicle-miles-travelled (VMT)
- Implements strategies to provide stable and reliable truck traffic flows on major facilities
- Improves freight access and travel reliability
- Maximizes use of existing facilities, reduce need for investment in new facilities
- Reduces City capital and maintenance costs per capita

Capacity and Circulation

The motor vehicle capacity and circulation needs in Cornelius were determined for future conditions over the next 20 years. The process used for analysis is outlined below, followed by the findings and recommendations of the analysis. The extent and nature of the street improvements for Cornelius are moderate. Several of the improvements discussed in this section were previously identified in the Cornelius TSP, Washington County TSP and the RTP. The 2040 capacity analysis conducted through the city's Transportation System Plan confirmed the need for investments.

This section outlines street improvements that would be necessary as part of a long-range master plan for motor vehicles. Phasing of implementation of the projects will be necessary since not all the improvements can be done at once. This will require prioritization of projects and periodic updating to reflect current needs. It should be understood that the motor vehicle improvements outlined in the following section are a guide to defining the types of right-of-way and street needs that will be required as development occurs.

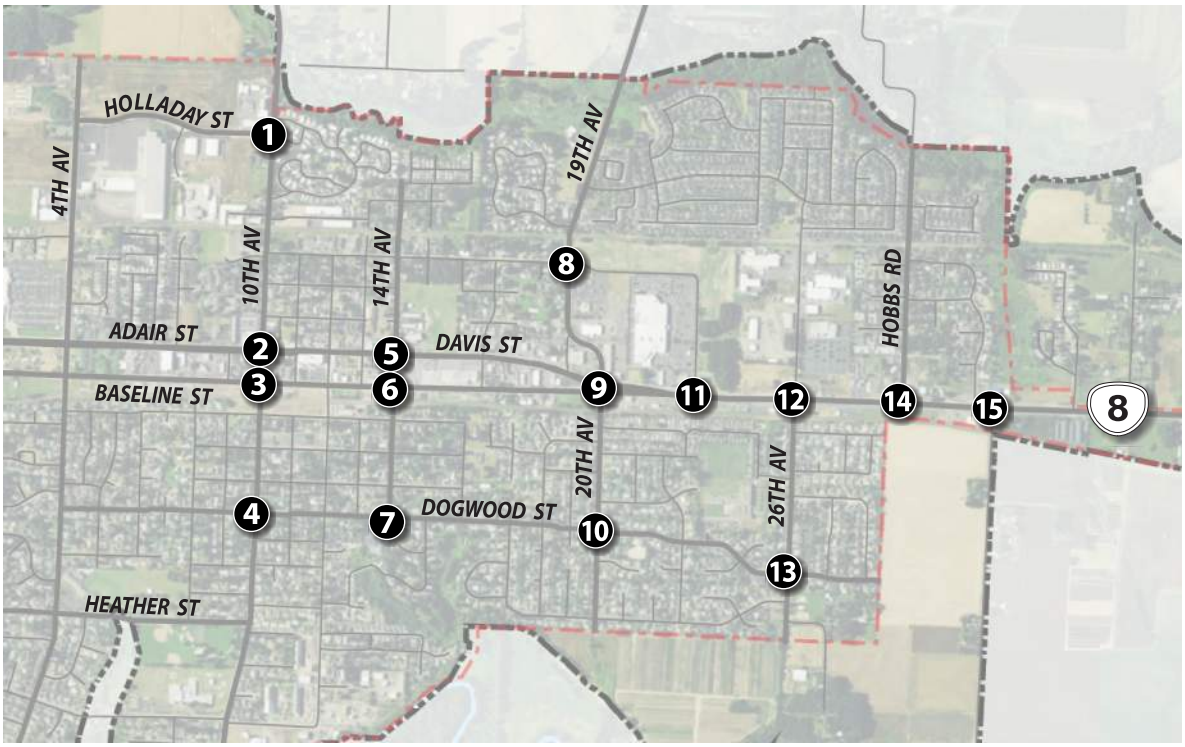
Future Mobility Needs

The baseline analysis for the forecasted 2040 growth was based on the RTP financially constrained funding scenario. This scenario includes transportation system improvements that are expected to be constructed/implemented with the current funding levels. Figure 8-4 shows the modeled demand/capacity on roadways within the Cornelius 2040 TSP study area for the Financially Constrained funding scenario. The model output was used as a screening tool to assess future year 2040 conditions and identify locations that may require additional operational or capacity improvements. As shown in the figure, the future financially constrained scenario has no roadways that exceed ODOT mobility target (see Table 3-4) or operate with congested conditions.

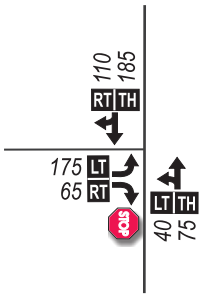
Year 2040 traffic volume forecasts at the TSP study intersections were analyzed to identify potential locations where evening peak hour performance may drop below mobility targets. Future 4. The future study intersection PM peak hour volumes, lane configurations and intersection controls are shown in Figures 8-5a and 8-5b. The value in reviewing the motor vehicle system performance is that it highlights where the planned system fails to meet performance standards. These locations will be reviewed to consider street improvements alternatives that could better serve planned growth.

The 2040 Financially Constrained funding scenario includes several capacity project in the TSP study area. The identified RTP projects for Cornelius are shown in Table 8-5.

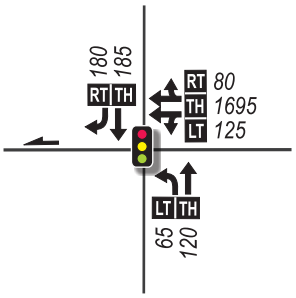
8-4 2040 Financially Constrained Traffic Conditions



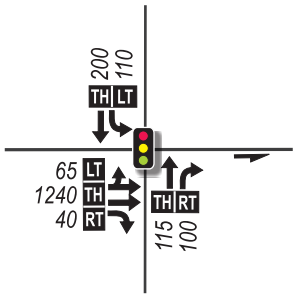
1. Holladay St. @ 10th Ave.



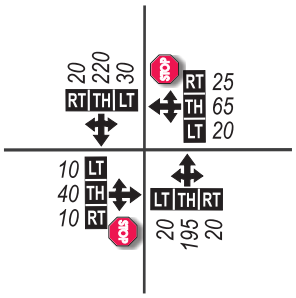
2. Adair St. @ 10th Ave.



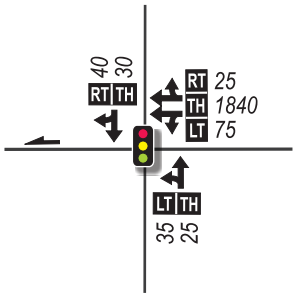
3. Baseline St. @ 10th Ave.



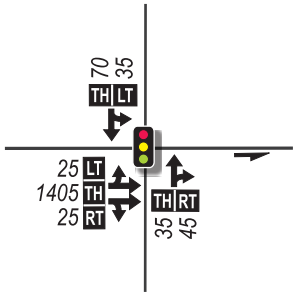
4. Dogwood St. @ 10th Ave.



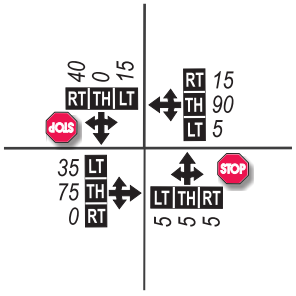
5. Adair St. @ 14th Ave.



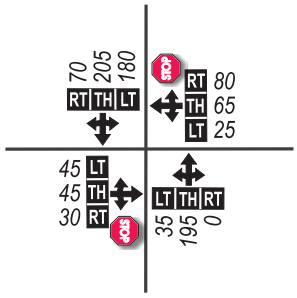
6. Baseline St. @ 14th Ave.



7. Dogwood St. @ 14th Ave.



8. Davis St. @ 19th Ave.



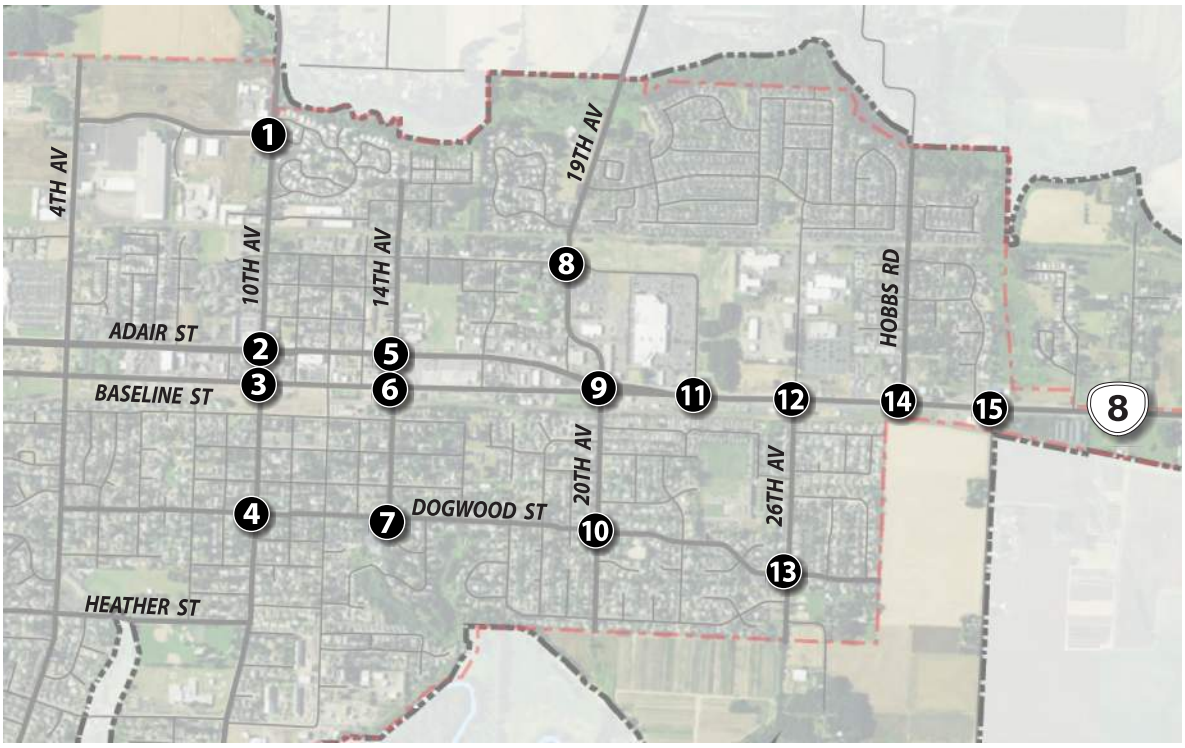
LEGEND

- # - Study Intersection
- STOP - Stop Sign
- Traffic Signal
- ← - Lane Configuration
- 000 - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

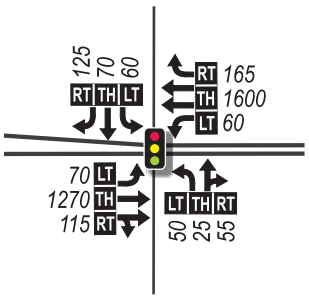
No Scale

Figure **8-5a**

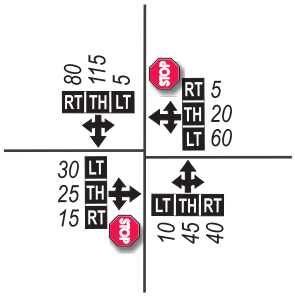
2040 PM Peak Hour Traffic Volumes & Intersection Control



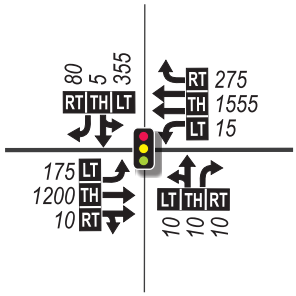
9. ***OR 8 (Adair St./Baseline St.) @ 20th Ave.***



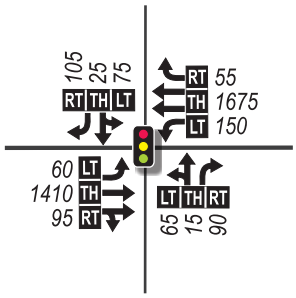
10. ***Dogwood St. @ 20th Ave.***



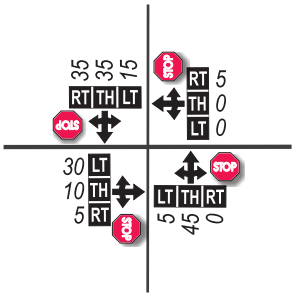
11. ***OR 8 (TV Highway) @ Fred Meyer Dwy.***



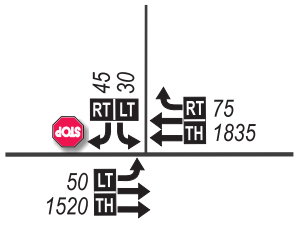
12. ***OR 8 (TV Highway) @ 26th Ave.***



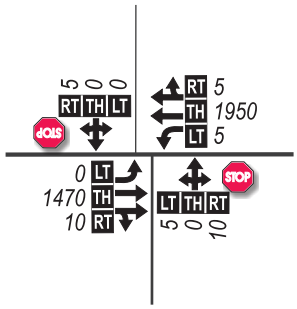
13. ***Dogwood St. @ 26th Ave.***



14. ***OR 8 (TV Highway) @ 29th Ave.***



15. ***OR 8 (TV Highway) @ 345th Ave.***



LEGEND

- # - Study Intersection
- STOP - Stop Sign
- Traffic Signal
- ← - Lane Configuration
- 000 - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left•Thru•Right)

No Scale

Figure **8-5b**

2040 PM Peak Hour Traffic Volumes & Intersection Control

Table 8-5: 2014RTP Motor Vehicle Capacity Improvements (Financially Constrained Funding)

RTP #	Location	Improvement	Jurisdiction	Time-Line	Cost ($1,000s)
10788	10th Avenue - Holladay St to Golf Course Rd	Improve to urban standards (sidewalks and bike lanes) in City, widen rural road with shoulder bike lane, increase turning radius at Adair Street	Cornelius/ ODOT	2014-2017	$5,300
10795	Holladay Street Extension from 4th Ave to Yew St	Construct new collector	Cornelius	2018-2024	$2,500
10796	Holladay Street Extension from 10th Ave to Gray St	Construct new collector	Cornelius	2033-2040	$3,000
10797	Holladay Street Extension from Gray St to 19th Ave	Construct new collector	Cornelius	2033-2040	$3,200
10798	Davis Street Extension from 4th Ave to 10th Ave	Construct new collector	Cornelius	2033-2040	$3,900
10799	Davis Street Extension from 19th Ave to 29th Ave	Construct new collector	Cornelius	2033-2040	$9,900
10802	29th Ave/TV Highway	Intersection improvements	Cornelius	2033-2040	$600
11245	Davis St/10th Ave	Widen street and add sidewalks	Cornelius	2033-2040	$3,100
11249	19th/20th Avenue from North City Limits to South City Limits	Improve to collector standards	Cornelius	2025-2032	$4,700
11251	29th Ave from 3F Railroad to Baseline St	Improve to collector standards	Cornelius	2025-2032	$4,200

* Based on *2014 Federal Regional Transportation Plan Update* and includes Financially Constrained Motor Vehicle System projects.

City staff provided further input on the description and timing of these RTP projects.

- RTP# 10788 – An MSTIP project now under construction, anticipated completion in 2017.
- RTP# 10802 – Should be moved to 2018-2024 timeframe.
- RTP# 11245 – Part of 10788 project, anticipated completion in 2017.
- RTP# 11249 – Project should improve to arterial standards.

Table 8-6 summarizes the study intersection performance for the 2040 Financially Constrained funding scenario. Based on the analysis, the majority of the study intersections would meet operating standards. The signalized study intersections operate at a LOS of D or better and meet the ODOT minimum performance standard during the PM peak hour. An exception is the OR 8/20th Avenue intersection which operates at LOS E due to high vehicle delays. Several unsignalized study intersection operate with LOS F conditions on the minor street approach; OR 8/345th Avenue, OR 8/29th Avenue and Davis Street/19th Avenue intersections. Under these conditions, the minor street approach at the intersection experiences moderate to long delays. The major street movements generally are not impeded and typically only a handful of minor street vehicles experience delay.

Table 8-6: 2040 Financially Constrained Intersection Level of Service (PM Peak Hour)

Intersection	Level of Service	Delay	Volume/ Capacity
Unsignalized Intersections			
Dogwood Street/10th Avenue	A/C	16.5	0.28
Dogwood Street/14th Avenue	A/B	10.5	0.08
Dogwood Street/ 20th Avenue	A/B	12.1	0.16
Dogwood Street/26th Avenue*	A/A	7.4	0.09
Holladay Street/10th Avenue	A/C	15.4	0.37
Davis Street/19th Avenue	A/F	84.7	0.82
OR 8/29th Avenue	C/F	83.2	0.41
OR 8/345th Avenue	C/F	278.2	0.83
Signalized Intersections			
Adair Street/10th Avenue	C	23.8	0.72
Baseline Street/10th Avenue	B	14.8	0.58
Adair Street/14th Avenue	A	7.5	0.71
Baseline Street/14th Avenue	A	6.3	0.57
OR 8/20th Avenue	E	55.6	0.79
OR 8/Fred Meyer Access	D	51.2	0.93
OR 8/26th Avenue	B	18.7	0.77

Notes: A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
Unsignalized delay = highest minor street approach delay
*All-way stop control intersection

Preliminary Traffic Signal Warrants

Preliminary signal warrants[1] were evaluated at unsignalized study intersections operating below the mobility target under year 2040 Financially Constrained traffic volume conditions. The analysis found none of the unsignalized intersections with LOS F operations on the side street meet peak hour signal warrants. The side street volumes would need to be significantly higher to consider the installation of a traffic signal. Meeting signal warrants does not guarantee that a signal will be installed. Before a signal can be installed on a state highway, a traffic signal investigation must be conducted or reviewed by the Oregon Department of Transportation. Traffic signal warrants must be met and the State Highway Engineer approval obtained before a signal will be placed on a state highway. Signals on non-state facilities need to be reviewed and approved by appropriate local officials.

[1] Preliminary Signal Warrants, Transportation Planning Analysis Unit, Analysis Procedures Manual, February 2009.

TM #6 – Solutions

MEMORANDUM

DATE: June 30, 2017

TO: Cornelius TSP Project Management Team

FROM: Reah Flisakowski, PE, DKS Associates
Kevin Chewuk, DKS Associates

SUBJECT: Cornelius Transportation System Plan Update
Technical Memorandum #6: Solutions

This document details the transportation system investments recommended to serve travel in Cornelius. Included is a summary of the process utilized to develop and analyze the solutions and a description of the projects and programs identified to improve the transportation system in the city.

Approach to Developing Projects

Transportation funding is limited in Cornelius so we need to recognize the importance in being fiscally responsible when enhancing the transportation system. In the past, a typical response to congestion was to expand streets, creating significant barriers to walking and biking and detracting from the livability, health, safety and fiscal well-being of the community.

Cornelius' approach to developing a recommended list of projects to address the needs of the future transportation system emphasized improved system efficiency and management over adding capacity. The approach, as required by the Metro Regional Transportation Functional Plan (RTFP), considered five categories of solutions from top to bottom that included:

- **Manage** the performance of congested locations with strategies that reduce traffic conflicts, increase safety, and encourage more efficient usage of the transportation system.
- **Reduce** the driving demand at congested locations by improving walking, biking and transit options.
- **Revisit** land uses and congestion thresholds to encourage shorter driving trips or modified travel decisions.

Figure 1: Solutions Identification Process

- **Extend** streets to create parallel routes that will reduce the driving demand on the congested facility.
- **Expand** existing streets or intersections to increase the driving capacity of the facility.

The project team recommended higher category solution types to address identified needs unless a lower category solution was clearly more cost-effective or better supported the goals and objectives of the city. This process allowed the city to maximize use of available funds, minimize impacts to the natural and built environments, and balance investments across all modes of travel.

Measurable evaluation criteria were used (see Technical Memorandum #3: Goals, Objectives, and Evaluation Criteria) based on the goals and objectives to screen and prioritize transportation solutions (see Figure 2). Projects deemed to contribute more towards achieving the transportation goals of Cornelius ranked higher, and the plan assigned higher priority to their implementation. Solutions recommended in the project list, consequently, are consistent with the goals and objectives.

Figure 2: Reflecting the Vision in the Plan

Recommended Projects

The recommended projects include all identified projects for improving Cornelius' transportation system, regardless of their primary funding source, and priority. The preliminary list of projects attempt to address the gaps and deficiencies identified in the Existing Transportation System Conditions and Future Transportation Conditions and Needs analysis, and was developed by following the process detailed earlier in this document. The set includes projects for all of the major modes of travel in the city (motor vehicle, pedestrian, bicycle, and transit). The full list of recommended projects considered those proposed in previous plans and studies as well as those added through this TSP planning process. All projects recommended in the 2005 Cornelius TSP and the 2014 Urban Growth Boundary Study that have not been constructed were carried forward to the updated project list. The TSP planning process eliminates any project that may not be feasible for reasons other than financial (such as environmental or existing development limitations).

The full list includes 95 projects, totaling an estimated $67 million worth of investments. A prioritized list of "city" projects (where the city is assumed to be the primary contributor of funding) that is constrained to a 20-year funding estimate will be provided in Technical Memorandum #8 (Planned and Financially Constrained Transportation Systems). Technical Memorandum #8 will also provide a prioritized list of "State" projects that the city could use to make decisions for applying for grants or other funding mechanisms. The city can, however, choose to provide funds to help support State projects—thus, expediting the timeline on those projects the city would like prioritized. The following sections summarize the development of the transportation investments using the five solution categories detailed earlier in this document.

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Category 1: Manage the transportation system

The first scenario evaluated the existing transportation system with a set of solutions and strategies that attempts to manage the performance of congested or high crash locations by reducing traffic conflicts, increasing safety, and encouraging more efficient usage of the transportation system. This scenario assumes the following:

- **Access spacing** on the street system will be managed to provide efficient, safe, and timely travel.
- **Truck routes** will be designated to ensure trucks can efficiently travel through and access major destinations in the city.
- The **functional classification** of roadways will be used to manage the system and provide for each facility's intended purpose.
- **Transportation Systems Management and Operations** strategies and programs will be applied to improve the performance of the existing transportation infrastructure.
- **Pavement management** strategies will be used to reduce long-term infrastructure costs.
- **Intersection safety improvements** will be implemented to manage the safety performance of the system.
- **Intersection operational deficiency improvements** will be implemented that support the efficient use of existing infrastructure.

Access Spacing

Cornelius streets will be managed through access spacing standards. Access management is a broad set of techniques that balance the need to provide efficient, safe, and timely travel with the ability to allow access to individual destinations. Proper implementation of access management techniques will promote reduced congestion and accident rates, and may lessen the need for additional highway capacity.

Table 1 identifies the minimum and maximum street intersection and minimum driveway spacing standards for streets in Cornelius. Within developed areas of the city, streets not complying with these standards could be improved with strategies that include shared access points, access restrictions (medians or channelization islands) or closed access points as feasible. New streets or redeveloping properties must comply with these standards, to the extent practical (as determined by the city).

Table 1: Access Spacing Standards

Facility	Maximum Access Spacing	Minimum Intersection Spacing with Full Access	Minimum Driveway Spacing with Full Access	Minimum Driveway Spacing with Limited Access*
Principal Arterial	See Oregon Highway Plan			
Arterial	-	800 feet	400 feet	200 feet
Collector	530 feet	500 feet	250 feet	150 feet
Local	530 feet	200 feet	-	-

Note: Intersection and driveway spacing measured from centerline to centerline.
* Limited Access – Vehicles are restricted to right-in/right-out turn movements. In some cases, left-in turn movements may be permitted.

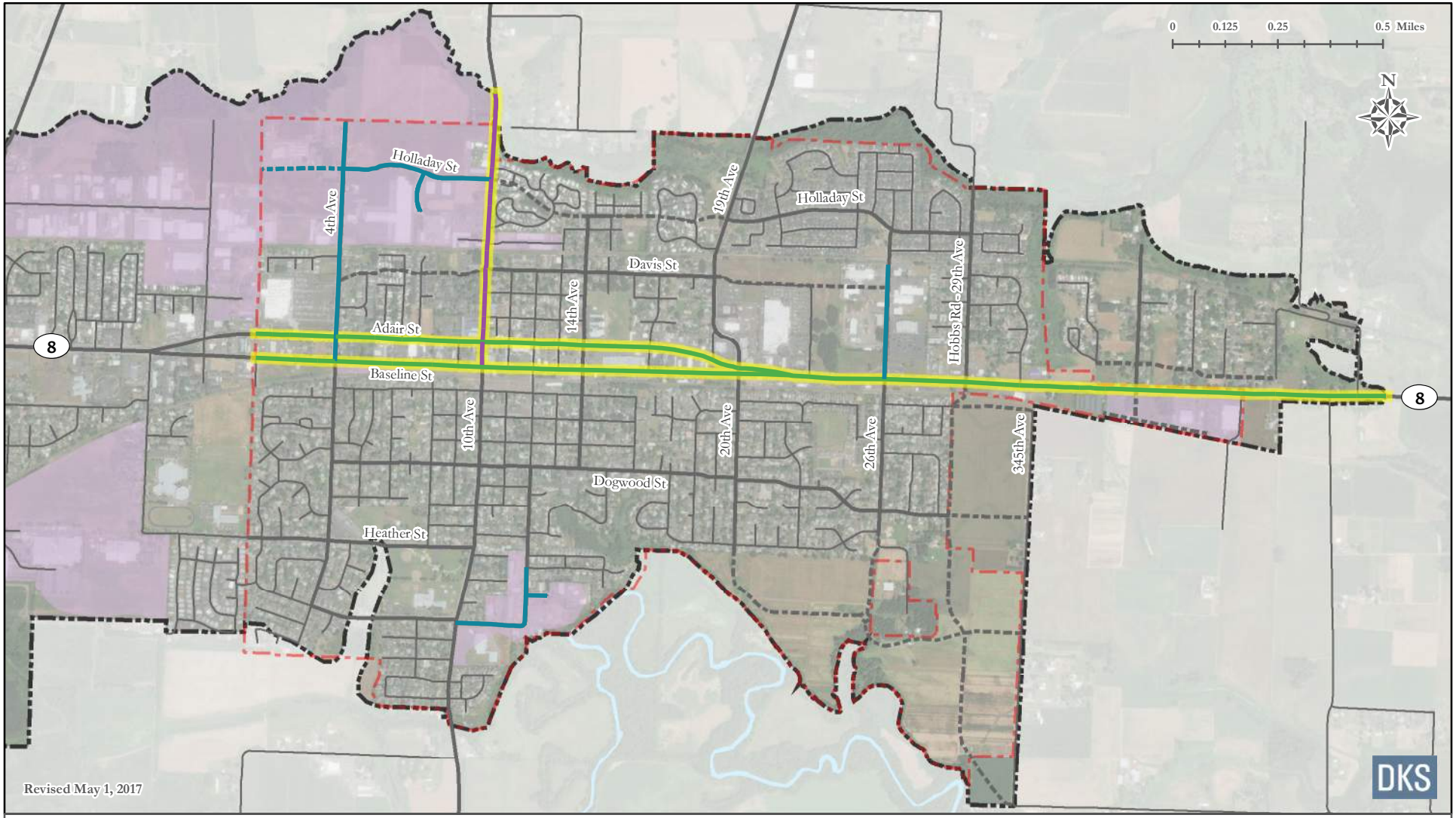
The rural segment of OR 8 on the east side of Cornelius has a significant number of public street intersections and private driveways not compliant with ODOT spacing standards. An access management strategy to implement a local frontage roadway on the north and south side of OR 8 was developed to consolidate access to the highway at 341st Avenue. As development/redevelopment occurs over time along OR 8, the local frontage road would provide new access to properties and non-compliant public street intersections and private driveways would close to vehicle use but retain access for pedestrians, cyclists and emergency vehicles.

Truck Routes

Truck routes were designated in Cornelius to ensure trucks can efficiently travel through and access major destinations in the city. Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement, while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system.

Much of the freight activity in Cornelius will be related to the Metro designated employment land. Designated employment land is located primarily in the northwest (including along Holladay Street between 4th Avenue and 10th Avenue), but also south of OR 8 at the east end of town, and along 12th Avenue and Flax Plant Road at the south end of town. Freight activity is also generated within the Metro designated Cornelius Town Center. To allow for efficient movement between these designated areas and regional freight routes, Metro has classified OR 8, Baseline Street and Adair Street, and 10th Avenue north of Baseline Street in the city as freight connectors. Washington County identifies OR 8, Baseline Street and Adair Street through Cornelius as an Over-Dimensional Truck Route and 10th Avenue north of Baseline Street as a Truck Route. The Cornelius truck routes can be seen in Figure 3.

3 Truck Routes



Legend:

Freight Routes

- Cornelius Industrial Street
- Washington County Over-Dimensional Truck Route
- Washington County Truck Route
- Regional Freight Road Connector

Land Use

- Employment Land

- Urban Growth Boundary
- Cornelius City Limit
- Arterial or Collector Street
- Planned Street Extension (Conceptual alignment)

Functional Classification

Traditionally, roadways are classified based on the type of vehicular travel they are intended to serve (local versus through traffic). In Cornelius, the functional classification of a roadway (shown in Figure 4) determines the level of mobility for all travel modes, level of access, and use. The roadway functional classification system recognizes that individual roadways do not act independently, but instead form a network that serves travel needs on a local and regional level. From highest to lowest intended use, the classifications are principal arterial, arterial, collector, and local roadways. The city also classifies collector and local streets in industrial areas as Industrial Collectors or Industrial Locals. Roadways with higher intended usage generally limit access to adjacent property in favor of more efficient motor vehicle traffic movement (i.e., mobility). Local roadways with lower intended usage have more driveway access and intersections, and generally accommodate shorter trips to nearby destinations.

Functional Classification Changes

341st Avenue, north of OR 8, was reclassified as a collector street. It provides one of the only railroad crossings at the east end of the city and will serve as the main intersection to OR 8 as the future frontage road is constructed and other accesses closed. Streets previously designated as Neighborhood Routes were reclassified as collector streets. Collector facilities within industrial areas were reclassified as Industrial Collectors and match the segments designated in the city's Public Works Standards. Local facilities within industrial areas were reclassified as Industrial Locals.

Transportation System Management and Operations

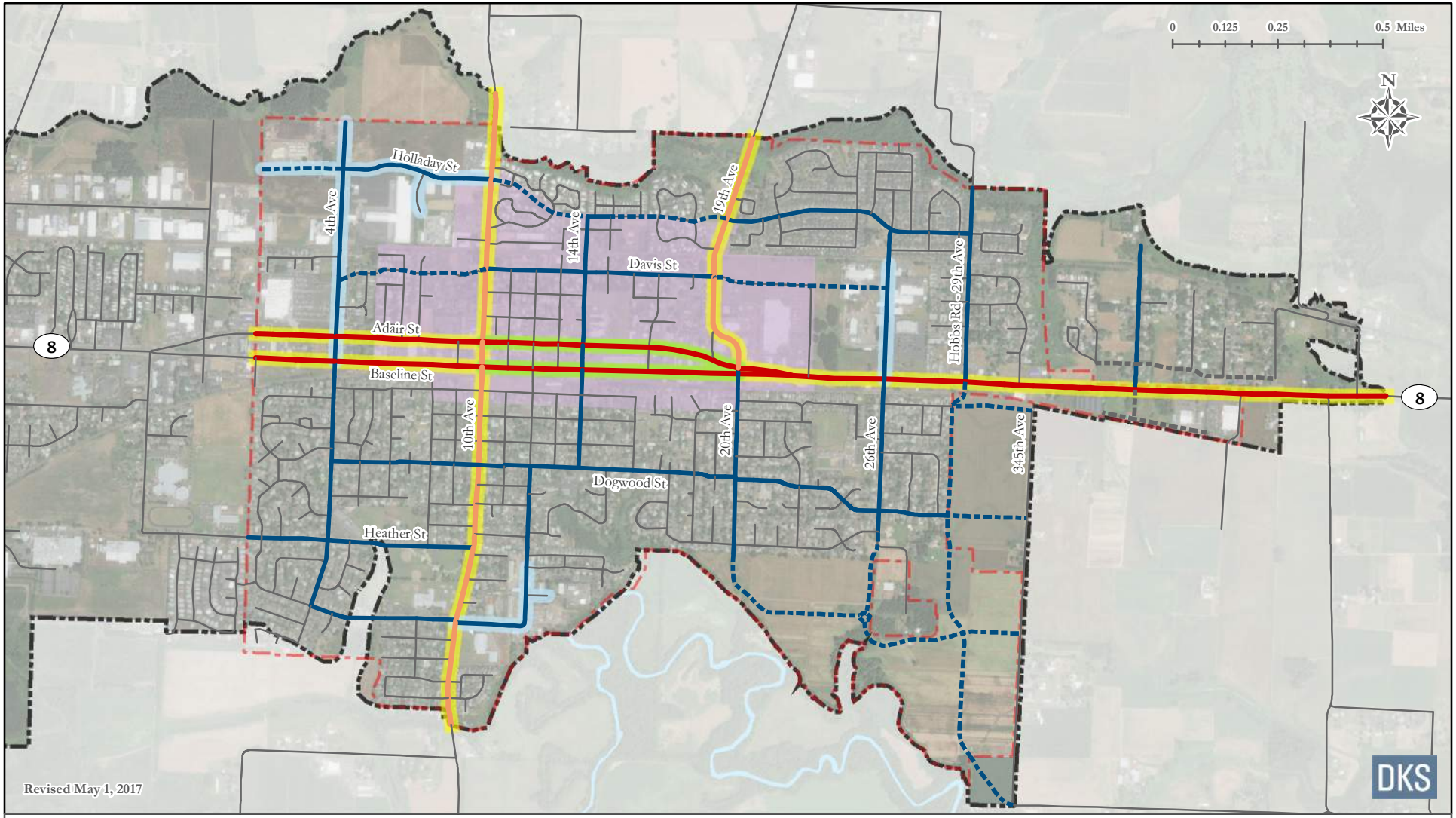
Transportation System Management and Operations will be applied to improve the performance of the existing transportation infrastructure through a combination of transportation system management (TSM) and transportation demand management (TDM) strategies and programs.

TSM strategies could be implemented to improve the efficiency of the transportation system in Cornelius. Traffic signal timings on OR 8 within Cornelius are planned to be optimized in 2017 to reduce vehicle delay and improve freight and motor vehicle travel times along the corridor. The addition of next-generation transit signal priority (e.g., vehicle-to-center or connected vehicle) would help maintain bus service reliability.

Opportunities to expand TDM measures in Cornelius include:

- Support Metro's Regional Travel Options (RTO) program, which assists partners such as the Westside Transportation Alliance (WTA) to serve the commute needs of residents throughout urbanized Washington County.
- Develop requirements for long-term (over 4 hours) bicycle parking for major employment centers, major bus stops, park and ride facilities and multi-family residential uses. Long-term bike parking options include:
    - Lockers for multiple bicycles
    - Racks in an enclosed, lockable room
    - Racks or lockers in an area always visible to employees
- Improved street connectivity (see Category 4 projects)
- Investing in pedestrian/bicycle facilities (see Category 2 projects)
- Improved amenities and access for transit stops (see Category 2 projects)

4 Functional Classification



Legend:

Functional Classification:

Existing	Planned (Conceptual Alignments)	
		Principal Arterial Streets
		Arterial Streets
		Collector Streets
		Local Streets

Special Designation

- Cornelius Industrial Street
- Regional Arterial and Throughway Network
- Special Transportation Area
- Regional Town Center

- Urban Growth Boundary
- Cornelius City Limit

Pavement Management

The City of Cornelius street system infrastructure is a significant asset which should be maintained in the most cost-effective manner. The street system is the largest single asset the City owns; more than the value of all City owned buildings and parks. The Cornelius Public Works Department is responsible for maintaining the City's street system with the mission to maintain pavements to the optimum level within the funding that is available. All streets deteriorate over time. The street infrastructure is currently deteriorating faster than it is being maintained. Timely intervention with appropriate maintenance will result in the lowest life-cycle costs.

Pavement management and design strategies should be considered to reduce the cost of roadway project construction and long-term maintenance in Cornelius. Opportunities include:

- Implement a pro-active asset management approach to roadway construction and maintenance.
- Select pavement maintenance projects based on the financial consequences of delaying a project rather than the condition of the pavement. This concept shifts the emphasis from pavement reconstruction of the worst conditions to preserving good pavements, keeping them in good condition while dealing with the backlog of poor pavements.
- Develop a Pavement Management System that provides a toolbox of pavement treatments and updated design standards, process for prioritizing projects and short-term implementation plan.
- Update roadway cross-section standards to find opportunities to narrow pavement widths. The recommended cross-sections are shown under the Category 3 solutions (Figures 7 to 12).
- Update roadway pavement structure standards to reduce long-term maintenance requirements.

Intersection Safety and Operational Improvements

Intersection improvements for safety and operational deficiencies will be implemented that support the efficient use of existing streets and intersections. The intersections in the city identified as high collision locations or congested locations by 2040 include:

- Davis Street/19th Avenue
- OR 8/345th Avenue
- OR 8/29th Avenue

The conceptual improvement for the OR 8/29th Avenue intersection[1] would include traffic signal control with interconnect to the rail crossing. The five-lane section on OR 8 will provide separate eastbound and westbound left-turn lanes. A three-lane section with separate northbound and southbound left turn lanes, and a shared through/right turn-lane is planned on both the north and south approaches to OR 8.

[1] Improvements previously identified in 2005 TSP, 2014 UGB study and recent development agreements.

Category 1 Projects

The solutions recommended for Category 1 are summarized in Table 2 and illustrated in Figure 12 later in this document. The street projects numbered on Figure 12 correspond with the project numbers in Table 2. The project numbers are denoted with a "D" to represent driving improvements.

Table 2: Summary of Category 1 Solutions to Manage the Transportation System

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
Transportation System Management and Operations Solutions						
D9	Baseline Street frontage road (north side) between East Lane and 334th Avenue.	Create a frontage road on the north side of Baseline Street between East Lane and 334th Avenue as properties redevelop. This street should be constructed as a Local street, with sidewalks. Close the East Lane, 338th Avenue, 336th Avenue and 334th Avenue connections to Baseline Street to general motor vehicle traffic but maintain access for pedestrians, bicycles and emergency vehicles.	Access management; motor vehicle safety	Motor Vehicle	$2,080,000	Low
D18	Baseline Street frontage road (south side) connecting to 341st Avenue	Create a frontage road on the south side of Baseline Street connecting to 341st Avenue as properties redevelop. This street should be constructed as a Local street, with sidewalks.	Access management; motor vehicle safety	Motor Vehicle	$1,545,000	Low
D19	Baseline Street Access Management Plan	Study for access management improvements along Baseline Street at the east end of the city.	Access management; motor vehicle safety	Motor Vehicle	$50,000	Low
Intersection Safety and Operational Solutions						
D20	Baseline Street/ 341st Avenue Intersection Improvements	Intersection improvements (e.g., possible installation of a traffic signal, if warranted).	Motor vehicle safety; pedestrian and bicycle highway crossing	Motor Vehicle (Pedestrian / Bicycle)	$455,000	Medium
D21	Baseline Street/ Hobbs Road-29th Avenue Intersection Improvements	Intersection improvements (e.g., possible installation of a traffic signal, if warranted).	Motor vehicle safety; pedestrian and bicycle highway crossing	Motor Vehicle (Pedestrian / Bicycle)	$445,000	Medium
D22	Hobbs Road-29th Avenue extension/ Alpine Street	Intersection improvements (e.g., installation of a mini-roundabout).	Motor vehicle safety	Motor Vehicle	$430,000	Medium

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
	extension Avenue Intersection Improvement					
D23	20th Avenue extension/ 26th Avenue extension Intersection Improvement	Intersection improvements (e.g., installation of a roundabout).	Motor vehicle safety	Motor Vehicle	Funded	N/A

Category 2: Reduce driving demand

Category 2 evaluated the existing transportation system with solutions that will help decrease driving demand. This includes the following solutions:

- **Sidewalks**: Sidewalks are located along roadways, are separated from the roadway with a curb and/or planting strip, and have a hard, smooth surface, such as concrete. The unobstructed travelway for pedestrians should be clear of utility poles, sign posts, fire hydrants, vegetation and other site furnishings.
- **Bike Lanes**: Bike lanes are portions of the roadway designated specifically for bicycle travel via a striped lane and pavement stencils. Bike lanes are most appropriate on arterials and some collectors, where high traffic volumes and speeds necessitate greater separation.
- **Bike Routes**: A network of bike routes can provide comfortable, low-stress routes off the main street system to attract less experienced bikers. These routes are shared use roadways with existing low volumes and low speed that prioritize the through movement of bicyclists while maintaining local access for automobiles. Bike routes typically include signage and pavement markings, as well as traffic calming features that reduce motor vehicle speeds and volumes. Where these facilities cross major roadways, it is important to provide safe and comfortable bicycle crossings.
- **Shared-Use Paths**: Shared-use paths are used by a variety of non-motorized users, including pedestrians, cyclists, skaters, and joggers. Shared use paths may be paved or unpaved, but should always be constructed with ADA compliant surfacing. The recently approved Laurel Woods subdivision includes a shared-use path system near the Tualatin River. The Cornelius Parks Master Plan[2] and Council Creek Regional Trail Master Plan[3] provide additional shared-use path projects to be incorporated in the TSP.
- **Street Crossing Improvements**: Solutions include incorporating marked crosswalks, high visibility crossings and curb extensions to improve the safety and convenience of street crossings.
- **Transit:** Solutions include bus stop amenities and park and ride lots to encourage more transit ridership and to support future high capacity transit.

Walking Solutions

The 2005 Cornelius TSP identified a connected network of routes to facilitate walking trips throughout the city, including routes to key destinations such as commercial activity, schools, parks and transit. Some of the 2005 pedestrian network has been constructed, with sidewalks and pedestrian crossings added as a part of

[2] City of Cornelius Parks Master Plan, October 2009.

[3] Council Creek Trail Master Plan, Parametrix, August 2015.

roadway projects, residential or commercial development projects and stand-alone pedestrian improvement projects. The evaluation of the existing pedestrian system revealed that the following gaps still remain:

- Gaps in the sidewalk network in the Main Street District
- Lack of sidewalks connecting neighborhoods to downtown
- Lack of pedestrian crossings across major roadways (e.g. rural portion of OR 8)
- Lack of pedestrian facilities at existing railroad crossings
- Lack of sidewalks/crossings along portions of transit routes (e.g. rural portion of OR 8)
- Lack of transit service to neighborhoods

To address these gaps, the evaluation criteria emphasize completing gaps to key pedestrian attractors such as schools, parks, transit stops and commercial areas. Additional walking routes and crossing improvements (including near transit stops) have been added to the pedestrian network identified in Figure 5. The walking projects numbered on Figure 5 correspond with the project numbers in Table 3. The project numbers are denoted with a "P" to represent pedestrian improvements.

Several other types of deficiencies were also identified during the review of the existing pedestrian network. These deficiencies are summarized below, with detailed solutions included in Table 3, unless otherwise noted:

- Difficulties for Pedestrians with Mobility Impairments – An ADA/Curb Ramp Upgrade Program would facilitate universal access.
- Lack of pedestrian crossings on major roadways – Pedestrian crossing improvements on major roadways are addressed through projects on OR 8.
- Lack of wayfinding tools – A lack of wayfinding guidance can be improved by developing a wayfinding signage program to identify walking routes to different parts of town and to key destinations.
- Limited street connectivity in some areas – Proposed connections that provide for more direct walking routes are identified in Category 4 later in this document.

Improvements to the pedestrian network include sidewalk infill along key arterial and collector street corridors. Proposed priority sidewalk infill projects are listed in Table 3, and can be viewed in Figure 5. These improvements will help the city achieve their regional non-SOV targets (see TM #5 Existing and Future Conditions and Needs). Construction of new roadways identified in the motor vehicle sections of this document are not included in Table 3, but, as a matter of policy, will include construction of sidewalks or pedestrian facilities appropriate to the street classification of the new roadway. The recommended project list assumes that sidewalks will be included on both sides of newly constructed collector and arterial roadways.

Many other pedestrian projects also benefit bicycle transportation, such as intersection and crossing improvements, and shared-use paths. These shared pedestrian and bicycle improvement projects are included in the Shared Pedestrian and Bicycle Solutions section, but affect both modes.

Bicycle Solutions

Several deficiencies, summarized below, were identified during the review of the existing bicycle network. Solutions are aimed to provide a connected network to facilitate bicycling trips throughout the city, including routes to key destinations such as commercial activity, schools, parks and transit.

- Gaps in the bicycle route network
- Lack of bike facilities on city arterial and collector streets

Proposed bicycle projects can be viewed in Figure 6, and are listed in Table 3 below. The projects include an integrated network of bicycle lanes, marked on-street routes and shared-use paths to facilitate safe and convenient travel citywide. These improvements will help the city achieve their regional non-SOV targets (see TM #5 Existing and Future Conditions and Needs). Construction of new roadways identified in the motor vehicle sections of this document are not included in Table 3, but will include construction of bicycle facilities appropriate to the street classification of the new roadway. The biking projects numbered on Figure 6 correspond with the project numbers in Table 3. The project numbers are denoted with a "B" to represent biking improvements.

Many other bicycle improvement projects also benefit pedestrian transportation, such as intersection and crossing improvements, and multi-use paths. These shared pedestrian and bicycle improvement concepts are included in the Shared Pedestrian and Bicycle Solutions section.

Shared Pedestrian and Bicycle Solutions

Shared walking and biking solutions include shared-use paths, and street crossing improvements that will provide benefit to both bicycle and pedestrian travel in Cornelius. Intersection improvements that reduce crossing distances and increase visibility can make crossing busy streets easier for all non-motorized modes. In addition to intersection improvements, shared-use paths and trails can create both efficient commuter routes and recreational opportunities for bicycling and walking users. Shared improvements that benefit both bicyclists and pedestrians are listed in Table 3 and can be seen on Figure 5 and Figure 6. The shared projects numbered on Figure 5 and Figure 6 correspond with the project numbers in Table 3. The project numbers are denoted as either a shared-use path ("S"), or a street crossing ("C"). These improvements will help the city achieve their regional non-SOV targets (see TM #5 Existing and Future Conditions and Needs).

Transit Solutions

Transit solutions are recommended to enhance the quality and convenience for passengers and support the potential for future high capacity transit service. Transit projects are shown in Table 3. These improvements will help the city achieve their regional non-SOV targets (see TM #5 Existing and Future Conditions and Needs).

Table 3: Summary of Category 2 Solutions to Reduce Driving Demand

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
Citywide Policy and Programmatic Solutions						
A	ADA/Curb Ramp Upgrade Program	Upgrade curb ramps and eliminate gaps in ADA access along pedestrian routes near key destinations.	ADA access	Pedestrian	$500,000	High
B	Bike Parking Program	Install new bike parking throughout the city.	Bike parking	Bicycle	$50,000	High
C	Bicycle/Pedestrian Connections to Transit	Coordinate infrastructure upgrades on streets connecting to OR 8, near transit stops.	Transit access	Pedestrian (Bicycle)	$2,300,000	High
Pedestrian Solutions						
P1	Holladay Street Pedestrian Improvements between 4th Avenue and 10th Avenue	Add pedestrian improvements to Holladay Street between 4th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$580,000	Low
P2	4th Avenue Pedestrian Improvements between Barlow Court and the northern terminus of the street	Add pedestrian improvements to 4th Avenue between Barlow Court and the northern terminus of the street (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$925,000	Low
P3	4th Avenue Pedestrian Improvements between Adair Street and Baseline Street	Add pedestrian improvements to 4th Avenue between Adair Street and Baseline Street (e.g., complete pedestrian facility gaps on east side).	Walking facility gap	Pedestrian	$95,000	High
P4	Adair Street Pedestrian Improvements between 1st Avenue and 7th Avenue	Add pedestrian improvements to Adair Street between 1st Avenue and 7th Avenue (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$635,000	Medium
P5	Baseline Street Pedestrian Improvements between 1st Avenue and 4th Avenue	Add pedestrian improvements to Baseline Street between 1st Avenue and 4th Avenue (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$625,000	Low
P6a	Baseline Street Pedestrian Improvements between 4th Avenue and 10th Avenue	Add pedestrian improvements to Baseline Street between 4th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on the north side).	Walking facility gap	Pedestrian	$910,000	High
P6b	Baseline Street Pedestrian Improvements between 4th Avenue and 10th Avenue	Add pedestrian improvements to Baseline Street between 4th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on the south side).	Walking facility gap	Pedestrian	$355,000	Low

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
P7	10th Avenue Pedestrian Improvements between Clark Street and Holladay Street	Add pedestrian improvements to 10th Avenue between Clark Street and Holladay Street (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	Funded	N/A
P8	14th Avenue Pedestrian Improvements between Davis Street and Gray Street	Add pedestrian improvements to 14th Avenue between Davis Street and Gray Street (e.g., complete pedestrian facility gap on the west side).	Walking facility gap	Pedestrian	$180,000	Low
P9	Davis Street Pedestrian Improvements between 10th Avenue and 14th Avenue	Add pedestrian improvements to Davis Street between 10th Avenue and 14th Avenue (e.g., complete pedestrian facility gap on the south side).	Walking facility gap	Pedestrian	$455,000	Low
P10	Davis Street Pedestrian Improvements between 14th Avenue and 19th Avenue	Add pedestrian improvements to Davis Street between 14th Avenue and 19th Avenue (e.g., complete pedestrian facility gap on the south side).	Walking facility gap	Pedestrian	$470,000	Low
P11	19th Avenue Pedestrian Improvements between 20th Avenue and Davis Street	Add pedestrian improvements to 19th Avenue between 20th Avenue and Davis Street (e.g., complete pedestrian facility gap on the west side).	Walking facility gap	Pedestrian	$195,000	High
P12	19th Avenue Pedestrian Improvements between Davis Street and Council Creek	Add pedestrian improvements to 19th Avenue between Davis Street and Council Creek (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$630,000	High
P13a	26th Avenue Pedestrian Improvements between Baseline Street and Fremont Street	Add pedestrian improvements to 26th Avenue between Baseline Street and Fremont Street (e.g., complete pedestrian facility gap on the west side).	Walking facility gap	Pedestrian	$420,000	Low
P13b	26th Avenue Pedestrian Improvements between Baseline Street and Fremont Street	Add pedestrian improvements to 26th Avenue between Baseline Street and Fremont Street (e.g., complete pedestrian facility gap on the west side).	Walking facility gap	Pedestrian	Funded	N/A
P14	Hobbs Road-29th Avenue Pedestrian Improvements between Baseline Street and the north Urban Growth Boundary	Add pedestrian improvements to Hobbs Road-29th Avenue between Baseline Street and the north Urban Growth Boundary (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$830,000	High
P15	Baseline Street Pedestrian Improvements between 26th Avenue and East Lane	Add pedestrian improvements to Baseline Street between 26th Avenue and East Lane (e.g., complete pedestrian facility gap on the south side).	Walking facility gap	Pedestrian	$1,035,000	Low
P16a	Baseline Street Pedestrian Improvements between East Lane and the east Urban Growth Boundary	Add pedestrian improvements to Baseline Street between East Lane and the east Urban Growth Boundary (e.g., complete pedestrian facility gap on the north side).	Walking facility gap	Pedestrian	$1,655,000	High

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
P16b	Baseline Street Pedestrian Improvements between East Lane and the east Urban Growth Boundary	Add pedestrian improvements to Baseline Street between East Lane and the east Urban Growth Boundary (e.g., complete pedestrian facility gap on the south side).	Walking facility gap	Pedestrian	$1,655,000	Low
P17	4th Avenue Pedestrian Improvements near Fawn Street	Add pedestrian improvements to 4th Avenue near Fawn Street (e.g., complete pedestrian facility gap on the east side).	Walking facility gap	Pedestrian	$95,000	Medium
P18	14th Avenue Pedestrian Improvements between Baseline Street and Dogwood Street	Add pedestrian improvements to 14th Avenue between Baseline Street and Dogwood Street (e.g., widen the existing sidewalk on the east side).	Walking facility gap	Pedestrian	$250,000	Low
P19	Dogwood Street Pedestrian Improvements between 12th Avenue and 18th Avenue	Add pedestrian improvements to Dogwood Street between 12th Avenue and 18th Avenue (e.g., complete pedestrian facility gaps on the south side).	Walking facility gap	Pedestrian	Funded	N/A
P20	20th Avenue Pedestrian Improvements between Alpine Street and Elder Lane	Add pedestrian improvements to 20th Avenue between Alpine Street and Elder Lane (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$280,000	High
P21	Dogwood Street Pedestrian Improvements between 19th Place and 21st Avenue	Add pedestrian improvements to Dogwood Street between 19th Place and 21st Avenue (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	Funded	N/A
P22a	Heather Street Pedestrian Improvements between 6th Avenue and 10th Avenue	Add pedestrian improvements to Heather Street between 6th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$265,000	Low
P22b	Heather Street Pedestrian Improvements between 6th Avenue and 10th Avenue	Add pedestrian improvements to Heather Street between 6th Avenue and 10th Avenue (e.g., complete pedestrian facility gap on the south side).	Walking facility gap	Pedestrian	Funded	N/A
P23	Linden Street Pedestrian Improvements between 5th Circle and 10th Avenue	Add pedestrian improvements to Linden Street between 5th Circle and 10th Avenue (e.g., complete pedestrian facility gaps on both sides).	Walking facility gap	Pedestrian	$320,000	Medium
P24	341st Avenue Improvements between Baseline Street and the northern terminus of the street	Improve 341st Avenue between Baseline Street and the northern terminus of the street. This street should be improved as a Collector, with a sidewalk on the east side and shared-use path on the west side. Improve the existing rail crossing to Collector standard (pending ODOT Rail crossing order).	Walking and biking facility gap	Pedestrian/ Bicycle (Motor Vehicle)	$525,000	Low
Bicycle Solutions						

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
B1	Holladay Street Bicycle Improvements between 4th Avenue and 10th Avenue	Add bicycle improvements to Holladay Street between 4th Avenue and 10th Avenue (e.g., restripe with bike lanes).	Biking facility gap	Bicycle	$25,000	Low
B2	4th Avenue Bicycle Improvements between Adair Street and the northern terminus of the street	Add bicycle improvements to 4th Avenue between Adair Street and the northern terminus of the street (e.g., bike lanes).	Biking facility gap	Bicycle	$555,000	Medium
B3	10th Avenue Bicycle Improvements between Adair Street and the north Urban Growth Boundary	Add bicycle improvements to 10th Avenue between Adair Street and the north Urban Growth Boundary (e.g., bike lanes).	Biking facility gap	Bicycle	Funded	N/A
B4	4th Avenue Bicycle Improvements between Baseline Street and Adair Street	Add bicycle improvements to 4th Avenue between Baseline Street and Adair Street (e.g., bike lanes).	Biking facility gap	Bicycle	$145,000	Medium
B5	10th Avenue Bicycle Improvements between Adair Street and Baseline Street	Add bicycle improvements to 10th Avenue between Adair Street and Baseline Street (e.g., bike lanes).	Biking facility gap	Bicycle	Funded	N/A
B6	Davis Street Bicycle Improvements between 10th Avenue and 19th Avenue	Add bicycle improvements to Davis Street between 10th Avenue and 19th Avenue (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$35,000	Medium
B7	14th Avenue Bicycle Improvements between Gray Street and Dogwood Street	Add bicycle improvements to 14th Avenue between Gray Street and Dogwood Street (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$40,000	Medium
B8	19th Avenue Bicycle Improvements between 20th Avenue and the north Urban Growth Boundary	Add bicycle improvements to 19th Avenue between 20th Avenue and the north Urban Growth Boundary (e.g., bike lanes).	Biking facility gap	Bicycle	$1,150,000	High
B9	Holladay Street Bicycle Improvements between 19th Avenue and Hobbs Road-29th Avenue	Add bicycle improvements to Holladay Street between 19th Avenue and Hobbs Road-29th Avenue (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$40,000	Medium
B10	26th Avenue Bicycle Improvements between Baseline Street and Fremont Street	Add bicycle improvements to 26th Avenue between Baseline Street and Fremont Street (e.g., bike lanes).	Biking facility gap	Bicycle	$665,000	Medium

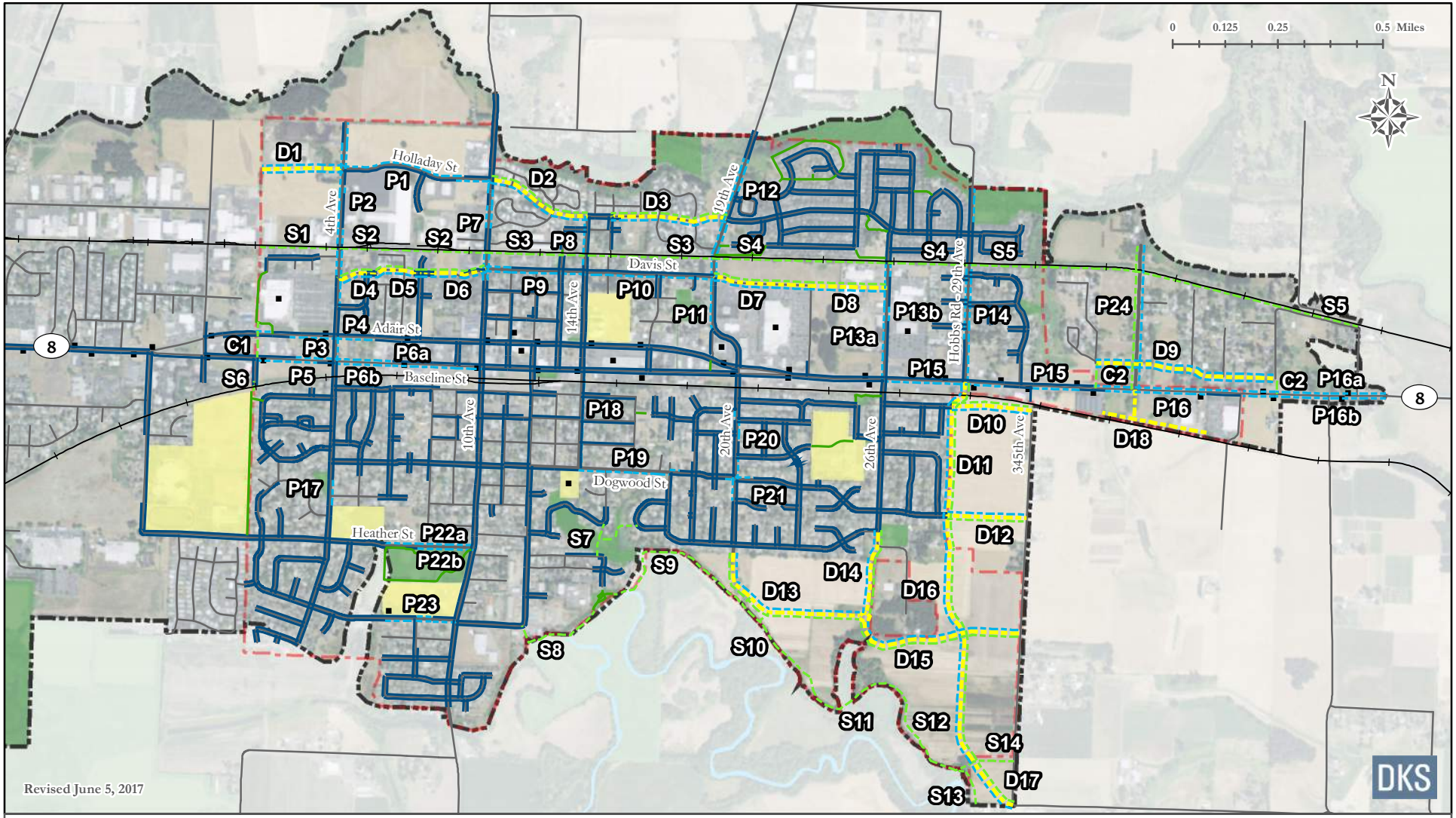
Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
B11	Hobbs Road-29th Avenue Bicycle Improvements between Baseline Street and Davis Drive	Add bicycle improvements to Hobbs Road-29th Avenue between Baseline Street and Davis Drive (e.g., bike lanes).	Biking facility gap	Bicycle	$600,000	Medium
B12	4th Avenue Bicycle Improvements between Baseline Street and Linden Street	Add bicycle improvements to 4th Avenue between Baseline Street and Linden Street (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$40,000	Medium
B13	Dogwood Street Bicycle Improvements between 4th Avenue and the eastern terminus of the street	Add bicycle improvements to Dogwood Street between 4th Avenue and the eastern terminus of the street (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$95,000	Medium
B14	Heather Street Bicycle Improvements between the city boundary and 10th Avenue	Add bicycle improvements to Heather Street between the city boundary and 10th Avenue (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$35,000	Medium
B15	Linden Street Bicycle Improvements between 4th Avenue and 10th Avenue	Add bicycle improvements to Linden Street between 4th Avenue and 10th Avenue (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$25,000	Low
B16	10th Avenue Bicycle Improvements between Baseline Street and the south Urban Growth Boundary	Add bicycle improvements to 10th Avenue between Baseline Street and the south Urban Growth Boundary (e.g., restripe with bike lanes).	Biking facility gap	Bicycle	$60,000	High
B17	12th Avenue-Flax Plant Road Bicycle Improvements between Dogwood Street and 10th Avenue	Add bicycle improvements to 12th Avenue-Flax Plant Road between Dogwood Street and 10th Avenue (e.g., pavement markings/ signage designating it as a shared street for bikes).	Biking facility gap	Bicycle	$35,000	Low
B18	20th Avenue Bicycle Improvements between Alpine Street and the southern terminus of the street	Add bicycle improvements to 20th Avenue between Alpine Street and the southern terminus of the street (e.g., restripe with bike lanes).	Biking facility gap	Bicycle	$25,000	High
B19	26th Avenue Bicycle Improvements between Baseline Street and the southern terminus of the street	Add bicycle improvements to 26th Avenue between Baseline Street and the southern terminus of the street (e.g., restripe with bike lanes).	Biking facility gap	Bicycle	$25,000	Medium

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
B20	Gray Street Bicycle Improvements between 14th Avenue and 15th Avenue	Add bicycle improvements to Gray Street between 14th Avenue and 15th Avenue (e.g., pavement markings/ signage designating it as a shared street for bike).	Biking facility gap	Bicycle	$5,000	Low
B21	Davis Street-1st Place Bicycle Improvements between 4th Avenue and the shared-use path on the west side of the Walmart parking lot	Add bicycle improvements to Davis Street-1st Place between 4th Avenue and the shared-use path on the west side of the Walmart parking lot (e.g., pavement markings/ signage designating it as a shared street for bike).	Biking facility gap	Bicycle	$15,000	Low
Shared-Use Path Solutions						
S1	Council Creek Trail connection between the west city limits and 4th Avenue	Create a shared-use path connection between the west city limits and 4th Avenue (e.g., Council Creek Trail).	Walking and biking facility gap	Pedestrian/ Bicycle	$805,000	Medium
S2	Council Creek Trail connection between 4th Avenue and 10th Avenue	Create a shared-use path connection between 4th Avenue and 10th Avenue (e.g., Council Creek Trail).	Walking and biking facility gap	Pedestrian/ Bicycle	$1,500,000	Medium
S3	Council Creek Trail connection between 10th Avenue and 19th Avenue	Create a shared-use path connection between 10th Avenue and 19th Avenue (e.g., Council Creek Trail).	Walking and biking facility gap	Pedestrian/ Bicycle	$2,135,000	Medium
S4	Council Creek Trail connection between 19th Avenue and Hobbs Road-29th Avenue	Create a shared-use path connection between 19th Avenue and Hobbs Road-29th Avenue (e.g., Council Creek Trail).	Walking and biking facility gap	Pedestrian/ Bicycle	$2,570,000	Medium
S5	Council Creek Trail connection between Hobbs Road-29th Avenue and the east Urban Growth Boundary	Create a shared-use path connection between Hobbs Road-29th Avenue and the east Urban Growth Boundary (e.g., Council Creek Trail).	Walking and biking facility gap	Pedestrian/ Bicycle	$3,995,000	Medium
S6	Shared-use path connection between 1st Avenue and the south side of the railroad crossing.	Create a shared-use path connection between 1st Avenue and the south side of the railroad crossing (west of the 1st Avenue/Alpine Drive intersection).	Walking and biking facility gap	Pedestrian/ Bicycle	$220,000	Medium
S7	Shared-use path connection between Heather Street and 15th Avenue, and Emerald Loop.	Create a shared-use path connection between Heather Street and 15th Avenue, and Emerald Loop.	Walking and biking facility gap	Pedestrian/ Bicycle	Funded	N/A
S8	Shared-use path connection between Flax Plant Road and Steamboat Park.	Create a shared-use path connection between Flax Plant Road and Steamboat Park.	Walking and biking facility gap	Pedestrian/ Bicycle	$930,000	Medium

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
S9	Shared-use path connection between Steamboat Park and south of 19th Avenue.	Create a shared-use path connection between Steamboat Park and south of 19th Avenue.	Walking and biking facility gap	Pedestrian/ Bicycle	$1,025,000	Medium
S10	Shared-use path connection between south of 19th Avenue and 25th Avenue.	Create a shared-use path connection between south of 19th Avenue and 25th Avenue.	Walking and biking facility gap	Pedestrian/ Bicycle	Funded	N/A
S11	Shared-use path connection between 25th Avenue and 27th Avenue.	Create a shared-use path connection between 25th Avenue and 27th Avenue.	Walking and biking facility gap	Pedestrian/ Bicycle	$205,000	Medium
S12	Shared-use path connection between 27th Avenue and 29th Boulevard.	Create a shared-use path connection between 27th Avenue and 29th Boulevard.	Walking and biking facility gap	Pedestrian/ Bicycle	Funded	N/A
S13	Shared-use path connection between 29th Boulevard and the south Urban Growth Boundary.	Create a shared-use path connection between 29th Boulevard and the south Urban Growth Boundary.	Walking and biking facility gap	Pedestrian/ Bicycle	$425,000	Medium
S14	Shared-use path connection between 29th Boulevard and the east Urban Growth Boundary.	Create a shared-use path connection between 29th Boulevard and the east Urban Growth Boundary.	Walking and biking facility gap	Pedestrian/ Bicycle	$615,000	Medium
Street Crossing Solutions						
C1	Adair-Baseline Street Crossing Study	Study to identify an alignment for a shared-use path connection between Adair Street and Baseline Street, and associated highway crossing needs between Walmart and 1st Avenue at the west end of the city.	Pedestrian and bicycle highway crossing	Pedestrian/ Bicycle	$100,000	High
C2	Baseline Street Crossing Study	Study for crossing enhancements along Baseline Street at the east end of the city (e.g., near transit stops).	Pedestrian and bicycle highway crossing	Pedestrian/ Bicycle	$100,000	High
Transit Solutions						
T1	Baseline Street/17th Avenue Bus Stop	Work with TriMet to provide a bus stop on Baseline Street at 17th Avenue.	Transit stop coverage in the main street district	Transit	$60,000	Medium
T2	Transit Stop Improvements	Upgrade transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, bicycle parking and improved lighting.	Transit facility improvements	Transit	$500,000	High

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
T3	OR 8 Park & Ride	Develop a Park & Ride along OR 8 and incorporate other transit amenities.	Transit access	Transit	$850,000	Medium
T4	High Capacity Transit Feasibility Study	Prepare a feasibility study for high capacity transit to Cornelius, including expected costs, expected revenue, and potential funding sources.	Improved transit service.	Transit	$125,000	Medium

5 Pedestrian Projects



Legend:

Pedestrian Facilities

Existing	Planned	
———	- - - -	Sidewalk
———	- - - -	Shared-Use Path

Roadway Facilities with Pedestrian Projects

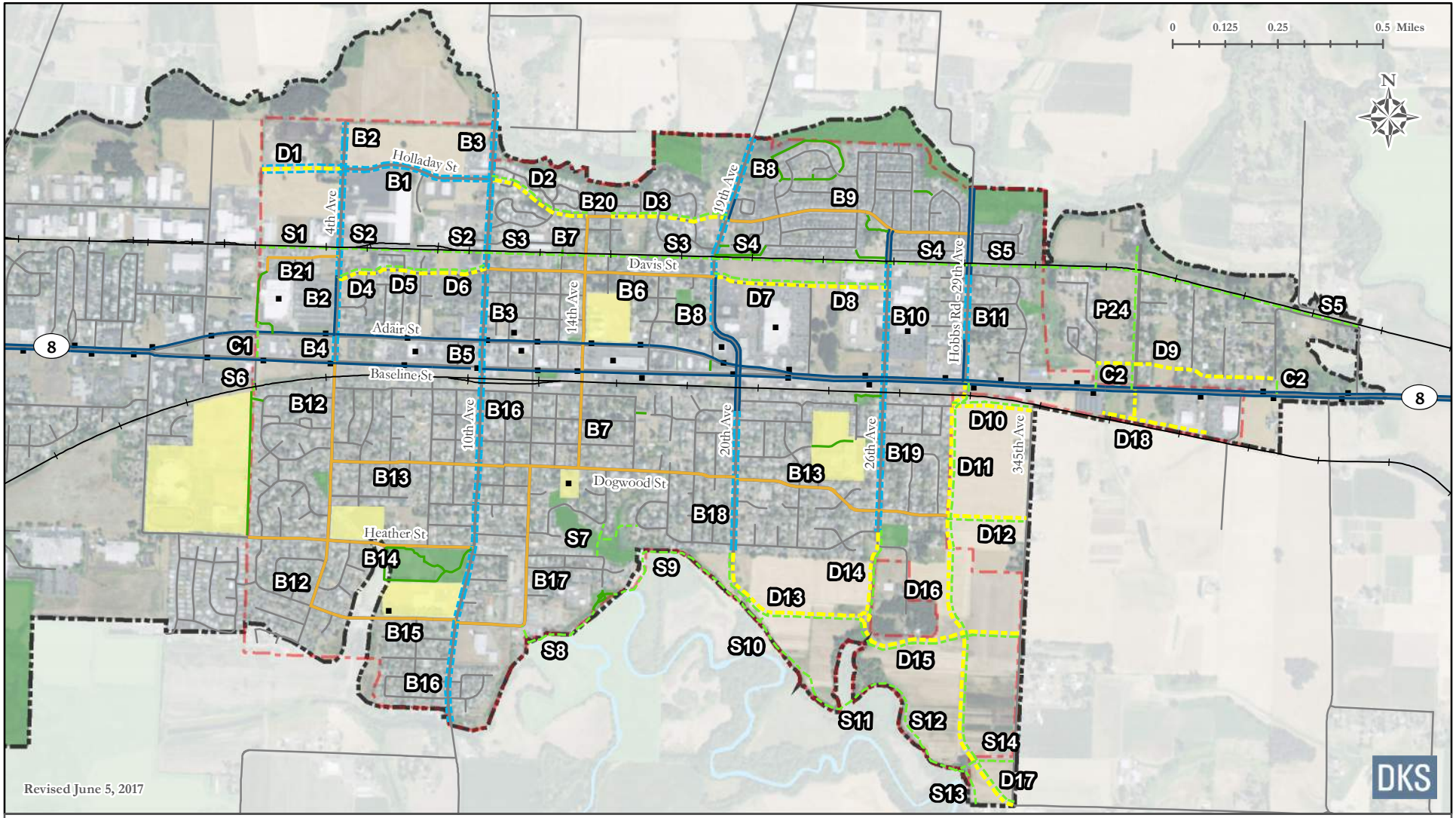
- - - - Planned Street Extension (Conceptual Alignment)

Activity Generators

- Parks and/or Natural Areas
- School
- ▪ Other Major Activity Generator

- Urban Growth Boundary
- Cornelius City Limit
- # Project Number

6 Bicycle Projects



Legend:

Bicycle Facilities

Existing	Planned	
		Bike Lane
		Shared-Use Path
		Planned Shared Street

Roadway Facilities

- Planned Street Extension (Conceptual Alignment)

Activity Generators

- Parks and/or Natural Areas
- School
- Other Major Activity Generator

- Urban Growth Boundary
- Cornelius City Limit
- # Project Number

DKS

Category 3: Establish new standards

Category 3 evaluated the existing transportation system with changes to congestion standards and cross-section standards. These decisions support multi-modal travel and encourage shorter driving trips in the city.

Congestion Standards

Establishing mobility standards for intersections in Cornelius will provide the city more flexibility in the future with regards to how funds are allocated for intersection and roadway improvements. By allowing more flexibility, the city will help encourage a sustainable transportation system and will allow funds to be focused on higher priority multi-modal improvements rather than driving-focused improvements at locations that are operating below capacity but over the city standard.

The following mobility standards are recommended for non-state owned streets in Cornelius. State owned streets should comply with the mobility targets included in the Oregon Highway Plan.

For streets not designated on the Metro Arterial and Throughway Network in the Regional Transportation Plan, the following mobility standards should be applied (applies to all streets in the city, except for 10th Avenue and 19th-20th Avenue north of OR 8):

Signalized, All-way Stop, or Roundabout Controlled Intersections:

- During the highest one-hour period of the day (typically, but not always during the evening peak period between 4 and 6 p.m.): LOS D or better will be required for the intersection

Two-way Stop and Yield Controlled Intersections:

- During the highest one-hour period of the day (typically, but not always during the evening peak period between 4 and 6 p.m.): LOS E or better will be required for each movement

For streets designated on the Metro Arterial and Throughway Network in the Regional Transportation Plan, the following mobility standards should be applied (applies to 10th Avenue and 19th-20th Avenue north of OR 8):

- During the highest one-hour period of the day (typically, but not always during the evening peak period between 4 and 6 p.m.): A maximum v/c ratio of 0.99 shall be maintained at all intersections. For signalized intersections, this standard applies to the overall intersection. For unsignalized intersections, this standard applies to the worst movement.
- For the second hour (either the hour before or hour after the peak hour): A maximum v/c ratio of 0.99 shall be maintained at all intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to the worst movement.

Street Design Standards

Design of the streets in Cornelius requires attention to many elements of the public right-of-way and considers how the street interacts with the adjoining properties. Street design provides an opportunity to encourage trips by walking, biking and transit. The City of Cornelius recently updated their Public Works

Design Standards which provides street types and design elements aimed at providing narrower facilities to improve safety and minimize maintenance costs. The ideal street designs for Cornelius are shown in Figures 7 to 11. The street sections shown do not include parking. Where parking is provided, it is in 8-foot wide concrete paved parking bays and the street right-of-way must be expanded by eight feet. These parking bays are limited to 300-feet in length and may never extend to an intersection or traverse driveways.

OR 8 is a State Highway and subject to the design criteria in the Oregon Highway Plan and ODOT Highway Design Manual. The city requires a minimum 6-foot wide landscape strip between the curb and sidewalk with any frontage improvement along OR 8, in addition to the ODOT standards. The city's Downtown Design Overlay also applies to OR 8 between 10th Avenue and 14th Avenue.

The city will continue to explore opportunities to safely reduce street widths through discussions with local fire department officials. Of interest to the city is queuing streets. These streets are designed so that moving cars must occasionally yield between parked cars before moving forward, which permits development of narrow streets, encourages vehicles to move slower, and allows for periodic areas where a 20-foot wide clear area is available for passing.

Figure 7: Arterial Street Cross-section

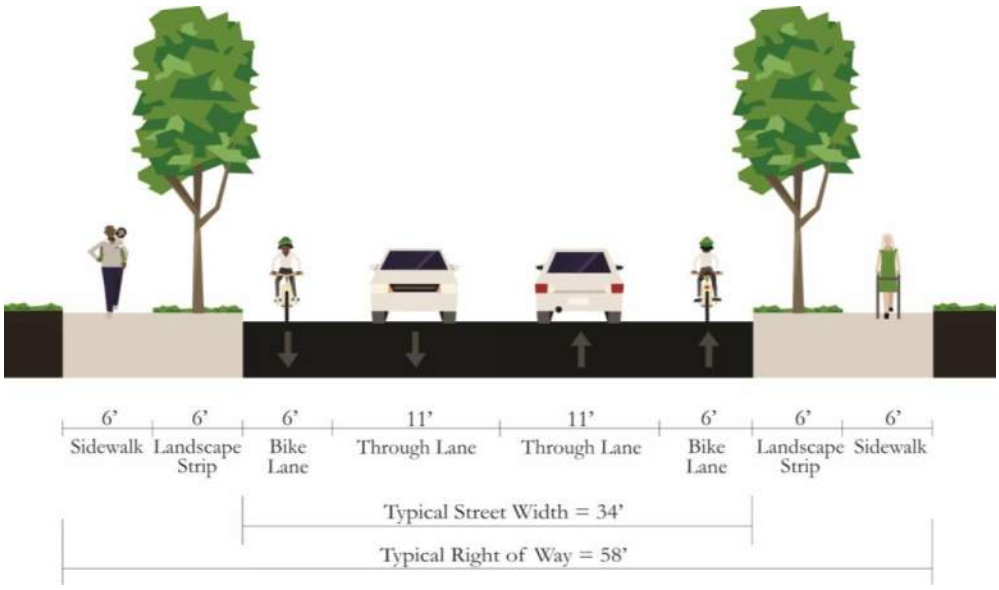


Figure 8: Collector Street Cross-section

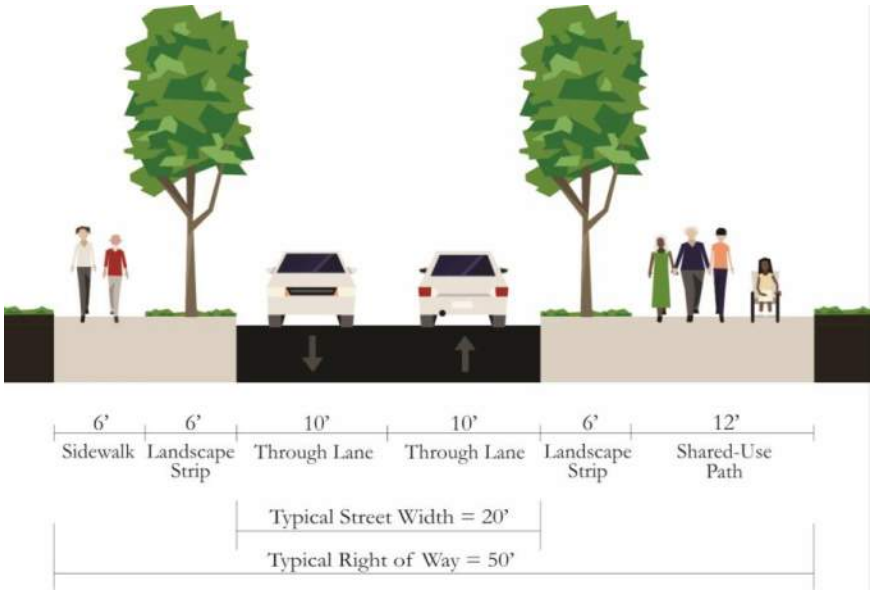


Figure 9: Industrial Collector Street Cross-section

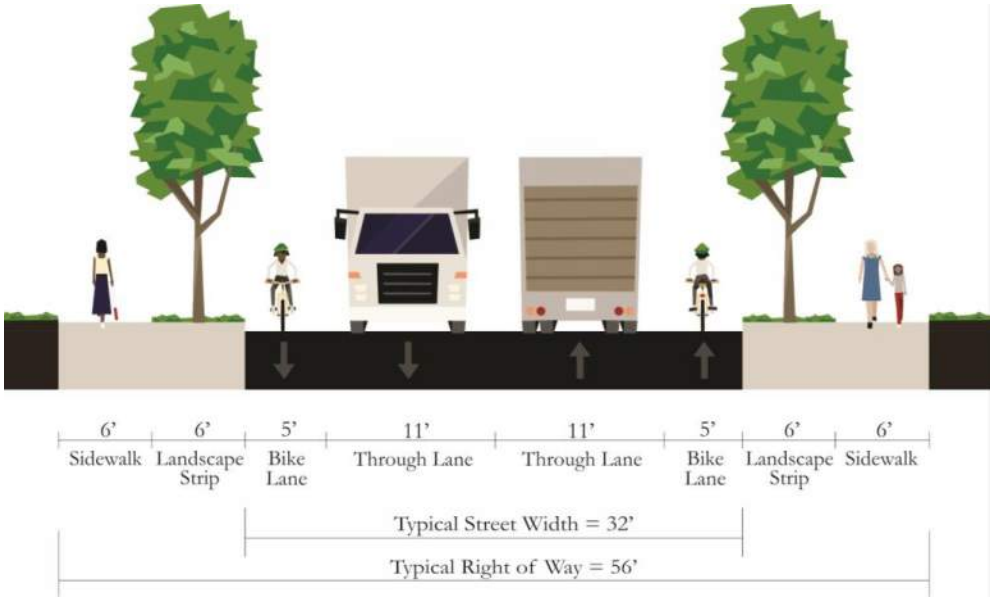


Figure 10: Local Street Cross-section

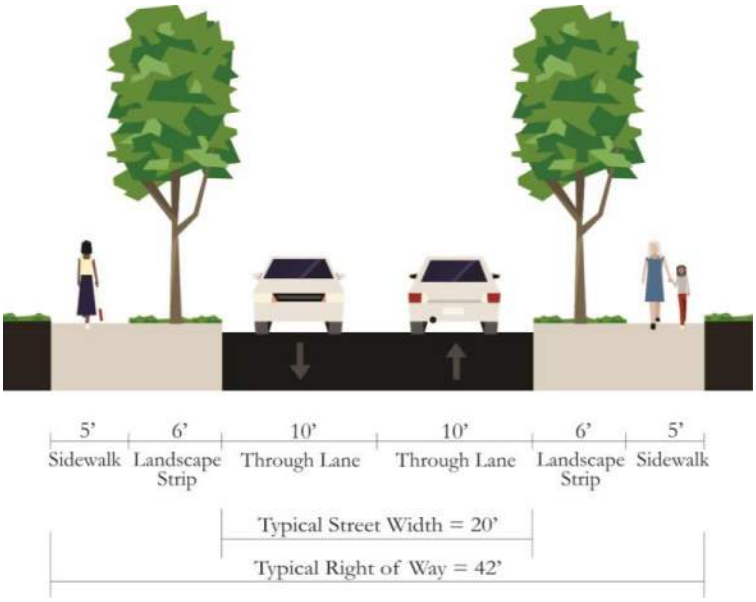
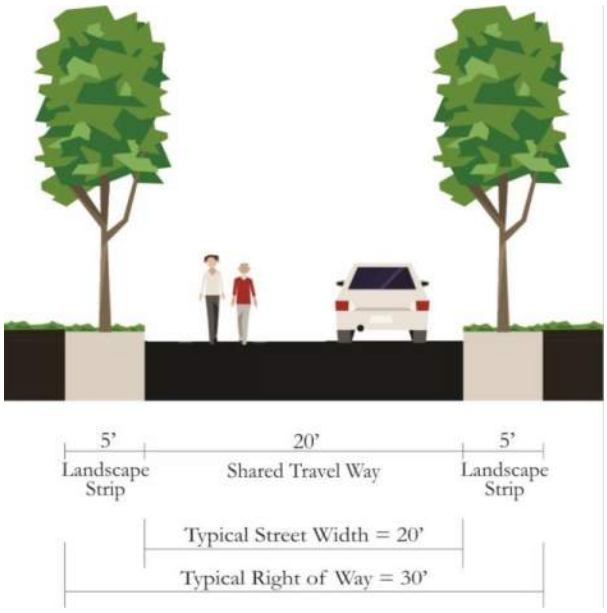


Figure 11 – Local Woonerf Cross-section



Category 4: Extend streets

Category 4 evaluated the existing transportation system with several street extensions. These solutions help the city work towards complying with Metro street spacing standards, provide alternate collector routes to alleviate congestion in the city and enhances multi-modal connectivity by reducing out-of-direction travel for walking and biking. This scenario assumes new collector street extensions and local street connectivity.

Street Extensions

Several new collector streets are needed in Cornelius to support future development and comply with the Metro Regional Transportation Functional Plan. The Plan requires that, to the extent possible, arterials be spaced at one-mile intervals, collectors to be spaced at half-mile intervals, and local streets either be spaced at 530 feet intervals, or provide a pedestrian and bicycle connection every 330 feet if a full local street connection is not possible[4]. The standards are shown in Table 2, earlier in this document. Existing development, topography, environmental areas, the Urban Growth Boundary (UGB) and OR 8 each pose a significant constraint in further improving connectivity.

A potential extension of Evergreen Road to the west from Hillsboro is supported by the city, despite being outside of the Urban Growth Boundary. This potential street extension would provide regional benefits through reduced travel time along OR 8, including through Cornelius. It would also provide an alternative route to OR 8 for emergency response, transit service and freight.

The solutions recommended for Category 4 are summarized in Table 4 and illustrated in Figure 12. The street projects numbered on Figure 12 correspond with the project numbers in Table 4. The project numbers are denoted with a "D" to represent driving improvements.

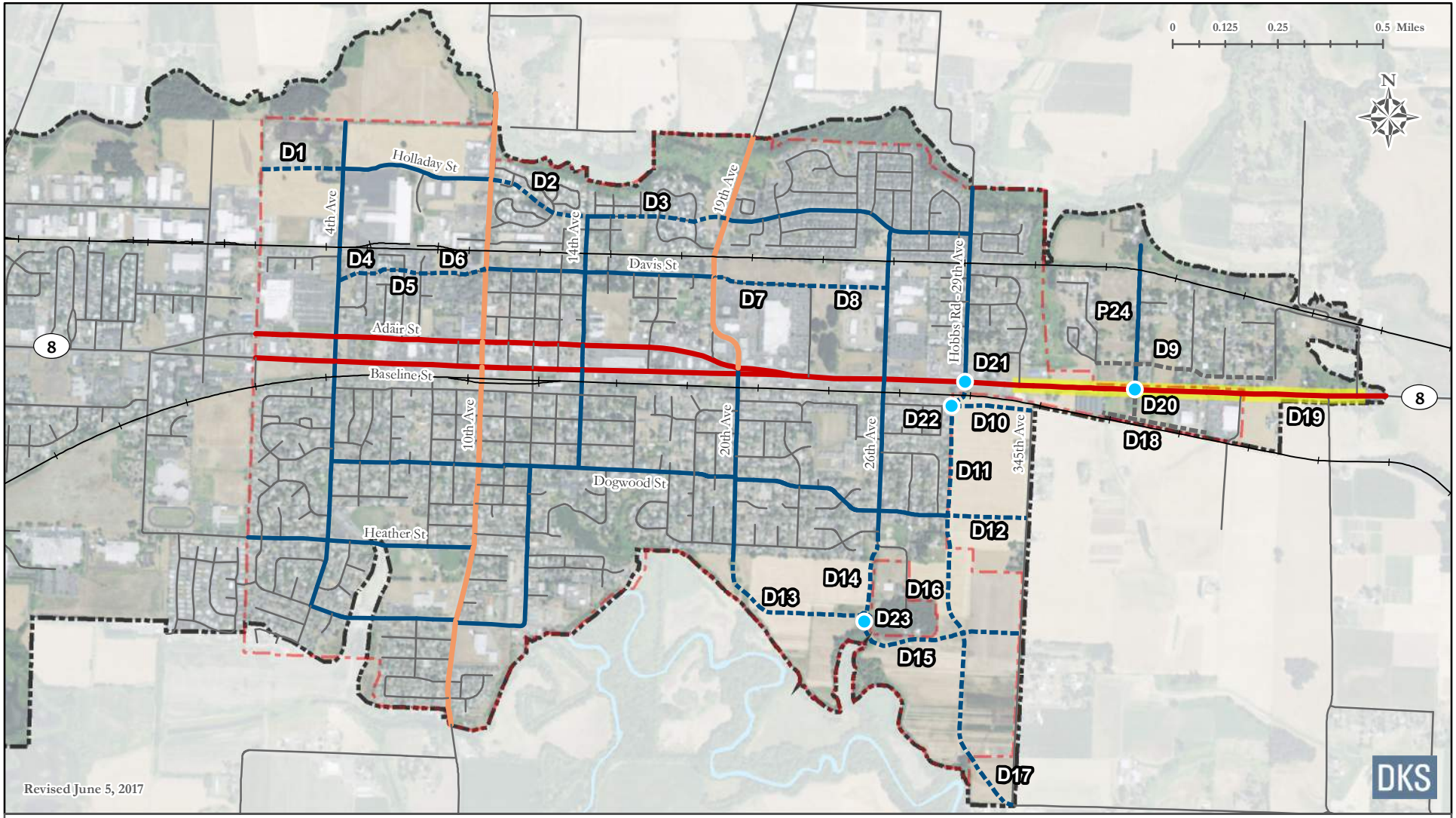
[4] Metro Regional Transportation Functional Plan, Section 3.08.110 Street System Design Requirements

Table 4: Summary of Category 4 Solutions to Extend Streets

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
D1	Holladay Street extension from 4th Avenue to the west city limits	Extend Holladay Street from 4th Avenue to the west city limits. This street should be constructed as an Industrial Collector, with sidewalks and bike lanes. Alignment should connect with a future street extension from Yew Street in Forest Grove.	Street connectivity; walking and biking facility gap	Motor Vehicle	$2,960,000	Low
D2	Holladay Street extension from 10th Avenue to Gray Street.	Extend Holladay Street from 10th Avenue to Gray Street. This street should be constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$2,810,000	Low
D3	Holladay Street extension from Gray Street to 19th Avenue.	Extend Holladay Street from Gray Street to 19th Avenue. This street should be constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$3,085,000	Low
D4	Davis Street extension from 4th Avenue to 5th Avenue.	Extend Davis Street from 4th Avenue to 5th Avenue. This street should be constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$790,000	Low
D5	Davis Street extension from 5th Avenue to 7th Avenue.	Extend Davis Street from 5th Avenue to 7th Avenue. This street should be constructed as a Collector, with a sidewalk on south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$1,465,000	Low
D6	Davis Street extension from 7th Avenue to 10th Avenue	Extend Davis Street from 7th Avenue to 10th Avenue. This street should be constructed as a Collector, with a sidewalk on south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	Funded	N/A
D7	Davis Street extension from 19th Avenue to the Fred Meyer driveway.	Extend Davis Street from 19th Avenue to the Fred Meyer driveway. This street should be constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$2,530,000	Low
D8	Davis Street extension from the Fred Meyer driveway to 26th Avenue	Extend Davis Street from the Fred Meyer driveway to 26th Avenue. This street should be constructed as a Collector, with a sidewalk on south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$2,065,000	Low
D10	Alpine Street extension from 28th Avenue to the east Urban Growth Boundary.	Extend Alpine Street from 28th Avenue to the east Urban Growth Boundary. This street should be constructed as a Collector, with a sidewalk on south side and shared-use path on the north side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$2,110,000	Low

Project ID	Project Description	Project Elements	Project Purpose	Primary (Secondary) Mode	Estimated Cost (2017 Dollars)	Evaluation Score
D11	29th Avenue extension from Baseline Street to Dogwood Street.	Extend 29th Avenue from Baseline Street to Dogwood Street. This street should be constructed as a Collector, with a sidewalk on the west side and shared-use path on the east side. Close the 345th Avenue railroad crossing and relocate the crossing to 29th Avenue (pending coordination and permitting with ODOT Rail). Improvement includes possible installation of a traffic signal at Baseline Street, if warranted (see project D21).	Street connectivity; walking and biking facility gap	Motor Vehicle	$4,530,000	Medium
D12	Dogwood Street extension from 28th Avenue to the east Urban Growth Boundary.	Extend Dogwood Street from 28th Avenue to the east Urban Growth Boundary. This street should be constructed as a Collector, with a sidewalk on the north side and shared-use path on the south side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$2,085,000	Low
D13	20th Avenue extension from Ginger Street to the 26th Avenue extension.	Extend 20th Avenue from Ginger Street to the 26th Avenue extension. This street should be constructed as a Collector, with a sidewalk on the north side and shared-use path on the south side.	Street connectivity; walking and biking facility gap	Motor Vehicle	Funded	N/A
D14	26th Avenue extension from Ginger Street to the 20th Avenue extension.	Extend 26th Avenue from Ginger Street to the 20th Avenue extension. This street should be constructed as a Collector, with a sidewalk on the west side and shared-use path on the east side.	Street connectivity; walking and biking facility gap	Motor Vehicle	Funded	N/A
D15	Kodiak Street extension from the 20th Avenue extension to the east Urban Growth Boundary.	Extend Kodiak Street from the 20th Avenue extension to the east Urban Growth Boundary. This street should be constructed as a Collector, with a sidewalk on the north side and shared-use path on the south side.	Street connectivity; walking and biking facility gap	Motor Vehicle	Funded	N/A
D16	29th Avenue extension from Dogwood Street to the south city limits.	Extend 29th Avenue from Dogwood Street to the south city limits. This street should be constructed as a Collector, with a sidewalk on the west side and shared-use path on the east side.	Street connectivity; walking and biking facility gap	Motor Vehicle	Funded	N/A
D17	29th Avenue extension from the south city limits to the south Urban Growth Boundary.	Extend 29th Avenue from the south city limits to the south Urban Growth Boundary. This street should be constructed as a Collector, with a sidewalk on the west side and shared-use path on the east side.	Street connectivity; walking and biking facility gap	Motor Vehicle	$2,120,000	Low

12 Motor Vehicle Projects



Legend:

Roadways:

Existing

Planned (Conceptual Alignments)

- Principal Arterial Streets
- Arterial Streets
- Collector Streets
- Local Streets

Intersections

- Planned Intersection Improvement

Roadway Segments

- Future Study

- Urban Growth Boundary
- Cornelius City Limit
- # Project Number

Category 5: Expand existing streets or intersections

No street or intersection widening projects are needed to accommodate future travel demand in Cornelius. All identified transportation gaps and deficiencies are addressed by solutions in Categories 1 through 4.

Progress Towards Regional Goals

To understand how the recommended investment decisions could improve the performance of the transportation network in Cornelius, the plan's solutions were assessed against regional performance measures to determine long-term trends through 2040. The level of progress expected for the individual measures are presented in Table 5.

Table 5: Progress Towards Regional Performance Measures in Cornelius

Measure	Target by 2040	Progress by 2040
Safety	Reduce serious injuries and fatalities in all modes of travel by 50% (vs. 2005)	From 2010 and 2014, there have been zero fatalities and zero serious injury-collisions within the TSP study area. With investments in multimodal facilities, access management and improvements to high collision locations, the severity of collisions in the city is expected to remain low.
Congestion	Reduce vehicle hours of delay (VHD) by 10% per person (vs. 2005)	Using Metro travel demand models, the future trend for evening peak hour average delay for all vehicles in Cornelius is expected to increase by 15% from 2010 to 2040 with additional investments to the transportation system. The operations analysis found no street or intersection widening projects are needed to accommodate future travel demand in Cornelius.
Freight reliability	Reduce VHD per truck trip by 10% (vs. 2005)	Using Metro travel demand models, the future trend for evening peak hour average delay for freight vehicles in Cornelius is forecasted to decrease by almost 10% from 2010 to 2040 with additional investments to the transportation system.
Travel	Reduce vehicle miles traveled (VMT) per person by 10% (vs. 2005)	The overall distance traveled by vehicles in Cornelius is projected to increase by 37% in the future. With future population and employment growth, the average motor vehicle distance traveled per person is projected to decrease by 5% percent, which shows progress towards the long-term target.
Climate change	Reduce transportation greenhouse gas emissions by 40% (vs. 1990)	As shown in the Travel measure, VMT in Cornelius is forecasted to increase by year 2040, which does not show progress towards reducing transportation greenhouse gas emissions. However, the model is not sensitive enough to evaluate the impacts to VMT from pedestrian, bicycle and transit investments which are anticipated to help reduce greenhouse gas emissions.
Active transportation	Triple walking, biking and transit mode share (vs. 2005)	Over 60 projects are recommended that will encourage walking, biking and transit trips within Cornelius. The city is also encouraging more pedestrian and bicycle friendly street designs. These are expected to significantly increase the non-motor vehicle mode share by 2040.

Basic infrastructure	Increase by 50% access to sidewalks, trails and transit (vs. 2005)	As shown in Figure 5, recommended projects will provide a well-connected system of new complete streets and multi-use paths expected to significantly increase access to sidewalks, trails and transit facilities by 2040.
Clean air	Ensure 0% population exposure to at-risk levels of pollution	Similar to the Climate Change measure, investments in pedestrian, bicycle and transit projects are anticipated to decrease exposure to transportation related pollution by 2040.
Affordability	Reduce average household cost of housing and transportation by 25% (vs. 2000)	The project list includes four improvements which directly support transit service which is anticipated to reduce transportation costs for households in the future.
Access to daily needs	Increase by 50% the number of essential destinations within 30 minutes by bike, transit for low-income, minority, disabled pop. (vs. 2005)	Over 30 projects are recommended that will improve the biking and transit system, provide a more direct route to key destinations and reduce overall travel times in the future.

TM #7 – Regulatory Review

DATE: June 30, 2017

TO: Cornelius TSP Project Management Team

FROM: Darci Rudzinski, Angelo Planning Group
Andrew Parish, Angelo Planning Group

SUBJECT: **Cornelius Transportation System Plan Update**
Technical Memorandum #7: Regulatory Solutions

Introduction

This memorandum provides regulatory solutions to address recommendations from the Code Audit for Regional Transportation Functional Plan Compliance (Technical Memorandum #2: Plan Policy Review, Attachment B). Identified deficiencies from Memorandum #2 are included in the table below, along with citations to the Regional Transportation Functional Plan (RTFP) requirements that prompted the recommendation.[1]

Title 17 of the Cornelius Municipal Code contains the City's Subdivisions Code, and Title 18 contains the City's Zoning Code. Together, they comprise the City's land development code, which implements portions of the Transportation System Plan through development requirements. Transportation-related requirements can be found in the following code sections:

- Chapter 17.05 Land Divisions
  - 17.05.040 - Subdivisions.
- Chapter 18.143 – Transportation Facilities
  - 18.143.030 – Traffic Impact Analysis
  - 18.143.040 – Street design cross-sections per transportation system plan
  - 18.143.050 – Access standards
  - 18.143.060 – Transit supportive amenities
  - 18.143.070 – Intelligent transportation systems
- Chapter 18.145 – Off-Street Parking and Loading
- Chapter 18.147 – Street Vacations

This memorandum provides the City with sample code language that will ensure that regulatory provisions are 1) consistent with and implement the updated TSP; and 2) comply with RTFP requirements.

[1] Note that the Audit for Regional Transportation Functional Plan Compliance also includes recommendations to update City transportation policy. Draft policy recommendations will be developed as part of the Draft TSP (Task 6.1 in the project scope of work).

The following table identifies specific recommendations from the earlier audit (Technical Memorandum #2, Appendix B) and the corresponding RTFP reference. Sample or "model" code language is provided below the table, prefaced by the corresponding recommendation number. In some instances, model code language includes text in [brackets]; bracketed text includes placeholders that need to be made consistent with the existing Development Code or new standards that will need to be considered within the local context and potentially modified to reflect a reasonable requirement for the City of Cornelius. It is expected that the City will review existing City code and, informed by the model code language provided here, will develop draft code language in adoption-ready (underline/strikeout) format to implement the draft TSP.

	Recommendation	RTFP Reference
1	Modify code provisions and diagrams in Chapter 18.143 to implement changes to the TSP, or revise code to refer to the TSP itself for matters of facility design. ***See note in Recommendation #2, below.***	Title 1, Street System Design Section 3.08.110A(1)
2	Update TSP cross-sections to incorporate or consider bio-filtration and other green features in the street design, and include in development code or refer to the TSP itself. ***Street standards and classifications (recommendations 1 and 2) are provided in Technical Memorandum #6; modifications to the Development Code will be required to be consistent with changes to standards in the final TSP. Note that this consistency can be achieved through a Development Code reference to the TSP standards, eliminating the need to include the standards in both documents.***	Title 1, Street System Design Section 3.08.110A(2)
3	a. Consider specifying in section 18.143 requirements that sidewalks must be constructed free of impediments within the required minimum width. b. Evaluate a provision for short and direct right-of-way routes to connect residents with services, transit, schools, etc. This could take the form of policy language or code requirements. c. To ensure that there are "opportunities to extend streets in an incremental fashion." amend 17.05.040(3)(d) (Future Extension of Streets) to specify that posted notification regarding street extensions is required.	Title 1, Street System Design Sec 3.08.110B

	Recommendation	RTFP Reference
4	a. Revise Chapter 17 to refine requirements for new residential or mixed-use development of five or more acres. To be consistent with the RTFP, new residential or mixed use development of five or more acres that results in the extension or construction of new streets should: b. provide a crossing every 800 to 1,200 feet if streets must cross water features protected pursuant to Title 3 UGMFP (unless habitat quality or the length of the crossing prevents a full street connection) c. provide bike and pedestrian accessways in lieu of streets with spacing of no more than 330 feet except where prevented by barriers d. limit use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections e. restrict the number of dwelling units on a cult-de-sac to 25 dwelling	Title 1, Street System Design Sec 3.08.110E Title 1, Street System Design Sec 3.08.110F
5	a. Add a definition of "major bus stop," consistent with the updated transit system element of the TSP, to the development code. Add text in the definitions section to clarify what is considered "at" a major transit stop. The State Transportation Planning Rule includes the following definition: "At" means a parcel or ownership which is adjacent to or includes a major transit stop generally including portions of such parcels or ownerships that are within 200 feet of a transit stop. b. The Cornelius development code does not require that multi-family development include transit supportive site design, which is a requirement of the RTFP. Section 18.143.060 should be amended to require transit-supportive amenities in new multifamily developments. c. To better provide transit-supportive street and site design, the City should also consider requiring the applicant to coordinate with TriMet when a subject site potentially impacts transit streets as identified in the City TSP.	Title 1, Transit System Design Sec 3.08.120B(2)
6	The TSP update will inventory deficiencies in the pedestrian network of the Main Street district, access management strategies, and other elements of facility design within the pedestrian districts. TSP project	Title 1, Pedestrian System Design Sec 3.08.130B

	Recommendation	RTFP Reference
	recommendations may result in modifications to the Main Street District and Zones (section 18.60), in order to enhance pedestrian access to transit. *No modification necessary.*	
7	Consider adding subdivision requirements that address on-site non-motorized connectivity, including single-family subdivisions.	Title 1, Pedestrian System Design Sec 3.08.130C)
8	a. Review Table 1 for errors and address bicycle parking as a minimum requirement. b. Provide an updated map 1 that shows Zone A and Zone B more clearly. Include free surface parking within Table 1, along with the appropriate maximum allowances. c. Update code requirements to use parking resources more efficiently. Implementing policy language for new parking strategies may be an outcome of the TSP update, consistent with plan recommendations. d. Update Comprehensive Plan policies to include TSP recommendations pertaining to residential parking districts to better manage on-street supply of parking. e. Modify section 18.143 (Transportation Facilities) to address connectivity standards for new residential and mixed use areas, consistent with this RTFP requirement. f. Amend section 18.145.040 (Off-street loading) to allow for exemptions from off-street loading requirements within the Town Center. Criteria for the exemption(s) and whether these will be site specific within the Town Center will need to determined g. Amend Table 1 to address both short-term and long-term bicycle parking minimums. h. Add definitions of short-term and long-term bicycle parking to this section and potentially to Chapter 18.195, "Definitions" as well.	Title 4, Parking Management Section 3.08.410
9	The CE and Main Street districts are envisioned as comfortable pedestrian-friendly environments, pursuant to the Comprehensive Plan. The City may wish to re-evaluate these land use districts to ensure consistency with updated policies as part of the TSP. Updated TSP recommendations may require corresponding modifications to Comprehensive Plan and Development Code.	Title 1, Pedestrian System Design Sec 3.08.130B)

	Recommendation	RTFP Reference
10	City direction regarding pursuing transportation demand, transportation systems management and operations, and parking management programs will be reflected in the updated TSP and in new and revised policy language. The recommendations resulting from the TSP update will determine whether or not it is necessary to draft new code language for this requirement.	Title 5, Amendments of City and County Comprehensive and Transportation System Plans Sec 3.08.510A,B)
11	a. Review the recommended strategies in the parking management section of the RTFP requirement and reevaluate needed code/policy updates based on the outcomes of the draft TSP. b. Clarify Table 1 to indicate minimum bicycle parking standards. c. Evaluate the different bicycle parking requirements in the CE zone and Table 1 to ensure they are in agreement	Title 4, Parking Management Sec 3.08.410I)

Sample Code Language
Pedestrian Access and Circulation

Recommendation 1
See note in table.

Recommendation 2
See note in table.

Recommendation 3a.
Add to sidewalk standards:

Sidewalks must be constructed and maintained free of both permanent and temporary obstructions (e.g., utility poles, sandwich signs) within a minimum width of least five feet.

Recommendation 3b.[2]
Proposed shared-use paths shall be located to provide access to existing or planned commercial services and other neighborhood facilities, such as schools, shopping areas and park and transit facilities. To the greatest extent possible, access shall be reasonably direct, providing a route or routes that do not deviate unnecessarily from a straight line or that do not involve a significant amount of out-of-direction travel.

[2] The code currently uses the term "Pathways" in a few places, but it is not included in Chapter 18.195 - Definitions. "Pedestrianway" is included, and has a suitable definition that could also be applied to "Pathway."

Recommendation 3c.
In the case of dead-end stub streets that will connect to streets on adjacent sites in the future, notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future.

Recommendation 4a.
Mixed-use and residential development proposed on sites five (5) acres or greater must submit a site plan that identifies conceptual street connections that are consistent with [**Figure XX**] of the TSP.

Recommendation 4b.
A variance to street spacing standards may be granted pursuant to [local code citation] if resources are present that are mapped on the Natural Resources Map, where street spacing can be achieved at a minimum of 800 feet and no greater than 1,200 feet. Where habitat quality or the length of the crossing required prevents a full street connection, an exception to the street spacing standards may be granted, pursuant to [local code citation].

Recommendation 4c.
Exceptions to the above standards may be granted when blocks are divided by one or more pathways, where spacing is no more than 330 feet as measured from the right-of-way or easement line and in conformance with provisions of [local code citation]. Pathways shall be located to minimize out-of-direction travel by pedestrians and [may/shall] be designed to accommodate bicycles.

Recommendation 4d
Cul-de-sacs and Hammerheads. The use of cul-de-sac designs and closed-end street systems shall be limited to situations where topography, existing development, barriers such as railroads or highways, or environmental constraints such as major streams and rivers prevent full street extensions. If cul-de-sacs are used, they shall be as short as possible and shall have maximum lengths of two hundred feet (200') except where topography, existing development, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers prevent full street extensions. Closed-end street systems shall serve no more than twenty-five (25) single-family dwellings and terminate with adequate vehicle turnaround.

Recommendation 5a.
Major Bus Stops are identified as part of the regional transit system. Properties are considered "at" a major bus stop when they are within 200 feet of the stop.

Recommendations 5b and 5c.
A proposed development that is adjacent to or includes an existing or planned major transit stop will be required to plan for access to the transit stop and provide for transit improvements, in consultation with TriMet and consistent with an agency adopted or approved plan at the time of development. Requirements apply where the subject parcel(s) or portions thereof are within 200 feet of a major transit stop. Development requirements and improvements may include the following:

- Intersection or mid-block traffic management improvements to allow for pedestrian crossings at major transit stops.
- Building placement within 20 feet of the transit stop, a transit street or an intersection street, or a pedestrian plaza at the stop or a street intersections.
- Transit passenger landing pads accessible to disabled persons to transit agency standards.
- An easement or dedication for a passenger shelter and an underground utility connection to a major transit stop if requested by TriMet.
- Lighting to TriMet standards.
- Intersection and mid-block traffic management improvements as needed and practicable to enable marked crossings at major transit stops.

Recommendation 6.
No modification necessary.

Recommendation 7.
Internal sidewalks or pathways shall be provided to ensure safe and convenient pedestrian circulation throughout the development.[3]

Recommendation 8a.
Correction to table 1 header needed, or consider moving "Bicycle Parking Standards" under "minimum parking standards."

Recommendation 8b.
Consider an updated map 1 that shows Zone A and Zone B more clearly. Modify Table 1 to include free surface parking, along with the appropriate maximum allowances.

Recommendation 8c.
City to provide direction on needed code amendments related to transportation demand and parking management.

Recommendation 8d.
Updates to City transportation policy will be developed as part of the Draft TSP (Task 6.1 in the project scope of work).

Recommendation 8e.
Full street connections shall be provided at intervals consistent with the adopted Transportation System Plan for the identified street classification, except as modified by [local code citation for variances], or where prevented by topography, barriers such as railroads or freeways, or environmental constraints such as major streams and rivers.

[3] Text from Vehicular Access and Internal Circulation section of C-2 zone. Recommendation is to include in single-family zones as well.

Recommendation 8f.
Exceptions and Adjustments. Loading areas within a street right-of-way in the [Town Center] may be approved when all of the following conditions are met:

a) Area is signed for short duration only (i.e., less than one hour);

b) Expected visits are infrequent (less than three operations occur daily between [5:00 a.m. and 12:00 a.m.] or all operations occur between [12:00 a.m. and 5:00 a.m.] at a location that is not adjacent to a residential zone);

c) Area does not unreasonably obstruct traffic;

d) Area does not obstruct a primary emergency response route; and

e) Designation is acceptable to the applicable roadway authority.

Recommendation 8g and 8h.
Short-term bicycle parking. Short-term bicycle parking shall be provided to encourage shoppers, customers, and other visitors to use bicycles by providing a convenient and readily accessible place to park bicycles.

a) Short-term bicycle facilities shall be in the form of either a lockable enclosure or a stationary rack, either covered or uncovered, to which the bicycle can be locked.

b) Short-term bicycle facilities shall be located within 30 feet of the main entrance to the building, in a location that is easily accessible for bicycles.

Long-term bicycle parking. Long-term bicycle parking provides employees, students, residents, commuters, and others who generally stay at a site for several hours a weather-protected place to park bicycles.

a) A minimum of 50% of the bicycle parking spaces shall be provided as long-term bicycle parking in any of the following situations:

    1. When [10%] or more of automobile vehicle parking is covered.
    2. If more than [four (4)] bicycle parking spaces are required.
    3. Multifamily residential development with [nine (9)] or more units.

b) Secured bicycle parking facilities shall be provided onsite; facilities can include a bicycle storage room, bicycle lockers, covered racks, or other secure storage space inside or outside of the building.

Recommendation 9.
City to review CE and Main Street district requirements to ensure consistency with updated TSP outcomes and recommendations. Updates to City transportation policy will be developed as part of the Draft TSP (Task 6.1 in the project scope of work).

Recommendation 10.

City to provide direction on needed code amendments related to transportation demand and parking management. Updates to City transportation policy will be developed as part of the Draft TSP (Task 6.1 in the project scope of work).

Recommendation 11a.

City to provide direction on needed code amendments related to the parking management strategies for the Core Commercial-Employment District and Main Street District. Updates to City transportation policy will be developed as part of the Draft TSP (Task 6.1 in the project scope of work).

Recommendation 11b.

See recommendation 8a.

Recommendation 11c.

City to compare bicycle parking requirements as part of CE zone with the Off-Street Parking and Loading chapter (Chapter 18.145).

TM #8 – Planned and Financially Constrained Solutions

MEMORANDUM

DATE: October 2, 2017

TO: Cornelius TSP Project Management Team

FROM: Reah Flisakowski, PE, DKS Associates
Kevin Chewuk, DKS Associates

SUBJECT: Cornelius Transportation System Plan Update
Technical Memorandum #8: Strategic and Financially Constrained System

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This document reduces the identified solutions for meeting the needs of the Cornelius transportation system into a Financially Constrained Plan. Included is a summary of the funding available for the transportation system and a detail of the Financially Constrained and Strategic Transportation Systems identified for Cornelius.

Project Categories

The approach to developing transportation solutions for this update placed more value on investments in smaller cost-effective solutions for the transportation system rather than larger, more costly ones (see Technical Memorandum #6 for more information). The approach enabled more cost-effective solutions to increase transportation system capacity and helped to encourage multiple travel options, increase street connectivity and promote a more sustainable transportation system. Taking the network approach to transportation system improvements, the 100 projects in this plan fall within one of several categories:

- **Driving** projects to improve connectivity, safety and capacity throughout the City. Cornelius identified 23 driving projects that will cost an estimated $33.7 million to complete.
- **Walking** projects for sidewalk infill, providing seamless connections for pedestrians throughout the City. Cornelius identified 33 walking projects that will cost an estimated $15.9 million to complete.
- **Biking** projects including an integrated network of bicycle lanes and marked on-street routes that facilitates convenient travel citywide. Cornelius identified 23 biking projects that will cost an estimated $5.1 million to complete.
- **Shared-Use Path** projects providing local and regional off-street travel for walkers and bikers. The citywide shared-use path plan includes 14 projects totaling an estimated $14 million.
- **Street Crossing** projects proving safe travel across streets along key biking and walking routes. A total of three crossing projects were identified, totaling an estimated $200,000.
- **Transit** projects to enhance the quality and convenience for bus passengers. Cornelius identified 4 transit projects that will cost an estimated $2.2 million to complete.

DKS

Funding the Transportation Solutions

Unless additional funds are developed, about $22 million worth of projects would be unfunded. Clearly, a portion of the transportation solutions identified for the City are not reasonably likely to be funded through 2040. For this reason, the transportation solutions were divided into two categories. Those reasonably expected to be funded by 2040 were included in the Financially Constrained Transportation System, while the projects that are not expected to be funded by 2040 were included in the Strategic Transportation System.

With an estimated $72 million worth of multimodal transportation solutions identified, Cornelius must make investment decisions to develop a set of transportation improvements that will likely be funded to meet identified needs through 2040. Overall, Cornelius is expected to have approximately $50 million in funds for non-maintenance improvements to the transportation system dedicated through 2040:

- Over $29 million is expected to be funded with Washington County Transportation Development Tax (TDT) funds collected through 2040. Cornelius is eligible to use TDT money for roadway improvements if the project is on the County's TDT list. It was assumed that the needed transportation system investments identified through the TSP update would be used to amend the existing TDT project list in the future as needed.
- Approximately $20 million in regional funds has been identified for the Council Creek Trail as identified in RTP projects #10806 and #11479 which would construct a multi-use regional trail between Hillsboro and Forest Grove. The portion of this regional trail project in Cornelius is expected to be $11 million.
- The City is in the process of establishing an Urban Renewal District which would fund several transportation projects to support economic development. Approximately $1.5 million of Urban Renewal funds are estimated to be available for identified TSP projects.
- The City will condition developers to fund transportation projects that are along unimproved development property frontage or off-site improvements shown to be triggered by the development. The amount expected to be funded by developers through 2040 is unknown, however projects that are anticipated to be at least partially funded by developers have been identified.
- Approximately $24 million is expected to be available for maintenance and street operation needs through 2040. These funds can be spent on non-TDT eligible project costs related to street maintenance and for planning studies and programs related to the transportation system.

Financially Constrained Transportation System

The Financially Constrained Plan identifies the transportation solutions reasonably expected to be funded by 2040, as summarized in Table 1 and illustrated in Figures 1 to 3. The projects numbered on Figures 1 to 3 correspond with the project numbers in Table 1. The financially constrained projects were selected based on several factors and added to the list until the combined project costs exhausted the estimated available funding. The financially constrained project list includes projects with high and some medium evaluation scores, projects in areas where development is expected in the short-term and projects identified as funded in other plans. Projects identified in the Draft Metro Regional Transportation Plan Project List (dated July 24, 2017), with financially constrained funding, are noted with the corresponding RTP project number. Approximately $50 million worth of investments are included in the Financially Constrained Transportation System including several projects that have dedicated funds (including projects that are development conditions of approval) but have not been constructed (shown with gray highlighting). The project numbers are denoted as a driving ("D"), pedestrian ("P"), biking ("B"), shared-use path ("S"), transit ("T"), or street crossing ("C"). Planning level cost estimates used to determine the likeliness of funding are also included in Table 1.

Table 1: Financially Constrained Transportation System

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Primary Funding Source	Priority
Citywide Policy and Programmatic Solutions					
A	ADA/Curb Ramp Upgrade Program	Upgrade curb ramps and eliminate gaps in ADA access along pedestrian routes near key destinations.	$500,000	City	High
B	Bike Parking Program	Install new bike parking throughout the city.	$20,000	City Urban Renewal	High
C	Bicycle/Pedestrian Connections to Transit	Coordinate infrastructure upgrades on streets connecting to OR 8, near transit stops (estimate $10,000 per year).	$230,000	City	High
Pedestrian Solutions					
P3	4th Avenue Pedestrian Improvements between Adair Street and Baseline Street	Add pedestrian improvements to 4th Avenue between Adair Street and Baseline Street (e.g., complete pedestrian facility gaps on east side).	$95,000	TDT	High
P4	Adair Street Pedestrian Improvements between 1st Avenue and 7th Avenue	Add pedestrian improvements to Adair Street between 1st Avenue and 7th Avenue (e.g., complete pedestrian facility gaps on both sides).	$635,000	TDT & City Urban Renewal	Medium
P6a	Baseline Street Pedestrian Improvements between 4th Avenue and 10th Avenue	Add pedestrian improvements to Baseline Street between 4th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on the north side).	$978,000	City Urban Renewal & TDT (RTP #10805)	High
P7	10th Avenue Pedestrian Improvements between Clark Street and Holladay Street	Add pedestrian improvements to 10th Avenue between Clark Street and Holladay Street (e.g., complete pedestrian facility gaps on both sides).	Funded		

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Primary Funding Source	Priority
P9	Davis Street Pedestrian Improvements between 10th Avenue and 14th Avenue	Add pedestrian improvements to Davis Street between 10th Avenue and 14th Avenue (e.g., complete pedestrian facility gap on the south side).	$455,000	TDT (RTP #11245)	Low
P10	Davis Street Pedestrian Improvements between 14th Avenue and 19th Avenue	Add pedestrian improvements to Davis Street between 14th Avenue and 19th Avenue (e.g., complete pedestrian facility gap on the south side).	$470,000	TDT (RTP #11245)	Low
P11	19th Avenue Pedestrian Improvements between 20th Avenue and Davis Street	Add pedestrian improvements to 19th Avenue between 20th Avenue and Davis Street (e.g., complete pedestrian facility gap on the west side).	$195,000	TDT	High
P12	19th Avenue Pedestrian Improvements between Davis Street and Council Creek	Add pedestrian improvements to 19th Avenue between Davis Street and Council Creek (e.g., complete pedestrian facility gaps on both sides).	$630,000	TDT (RTP #11249)	High
P13b	26th Avenue Pedestrian Improvements between Baseline Street and Fremont Street	Add pedestrian improvements to 26th Avenue between Baseline Street and Fremont Street (e.g., complete pedestrian facility gap on the east side).	Funded		
P14	Hobbs Road-29th Avenue Pedestrian Improvements between Baseline Street and the north Urban Growth Boundary	Add pedestrian improvements to Hobbs Road-29th Avenue between Baseline Street and the north Urban Growth Boundary (e.g., complete pedestrian facility gaps on both sides).	$830,000	TDT	High
P15	Baseline Street Pedestrian Improvements between 26th Avenue and East Lane	Add pedestrian improvements to Baseline Street between 26th Avenue and East Lane (e.g., complete pedestrian facility gap on the south side).	$1,035,000	City Urban Renewal & Development	Low
P16a	Baseline Street Pedestrian Improvements between East Lane and the east Urban Growth Boundary	Add pedestrian improvements to north side of Baseline Street between East Lane and the east Urban Growth Boundary	$1,779,000	TDT (RTP #10805)	High
P17	4th Avenue Pedestrian Improvements near Fawn Street	Add pedestrian improvements to 4th Avenue near Fawn Street (e.g., complete pedestrian facility gap on the east side).	$95,000	TDT	Medium
P19	Dogwood Street Pedestrian Improvements between 12th Avenue and 18th Avenue	Add pedestrian improvements to Dogwood Street between 12th Avenue and 18th Avenue (e.g., complete pedestrian facility gaps on the south side).	Funded		
P20	20th Avenue Pedestrian Improvements between Alpine Street and Elder Lane	Add pedestrian improvements to 20th Avenue between Alpine Street and Elder Lane (e.g., complete pedestrian facility gaps on both sides).	$280,000	TDT	High
P21	Dogwood Street Pedestrian Improvements between 19th Place and 21st Avenue	Add pedestrian improvements to Dogwood Street between 19th Place and 21st Avenue (e.g., complete pedestrian facility gaps on both sides).	Funded		

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Primary Funding Source	Priority
P22b	Heather Street Pedestrian Improvements between 6th Avenue and 10th Avenue	Add pedestrian improvements to Heather Street between 6th Avenue and 10th Avenue (e.g., complete pedestrian facility gap on the south side).	Funded		
P24	341st Avenue Improvements between Baseline Street and the northern terminus of the street	Improve 341st Avenue between Baseline Street and the northern terminus of the street. This street should be improved as a Collector, with a sidewalk on the east side and shared-use path on the west side. Improve the existing rail crossing to Collector standard (pending ODOT Rail crossing order).	$525,000	TDT	Medium
P25	Fred Meyer Roadway Improvements	Add frontage improvements to the Fred Meyer roadway between OR 8 and Davis Street Extension (e.g., complete sidewalks, landscaping buffer).	$1,100,000	City Urban Renewal	Medium
P26	Ginger Street Pedestrian Improvements between 10th Avenue and 12th Avenue	Add pedestrian improvements to one side of Ginger Street between 10th and 12th Avenue (e.g., complete sidewalks).	$180,000	City	Medium
P27	Downtown Alleyway Improvements	Reconstruct downtown alleyways with pedestrian amenities and decorative features	$300,000	City Urban Renewal	High
Bicycle Solutions					
B3	10th Avenue Bicycle Improvements between Adair Street and the north Urban Growth Boundary	Add bicycle improvements to 10th Avenue between Adair Street and the north Urban Growth Boundary (e.g., bike lanes).	Funded		
B5	10th Avenue Bicycle Improvements between Adair Street and Baseline Street	Add bicycle improvements to 10th Avenue between Adair Street and Baseline Street (e.g., bike lanes).	Funded		
B8	19th Avenue Bicycle Improvements between 20th Avenue and the north Urban Growth Boundary	Add bicycle improvements to 19th Avenue between 20th Avenue and the north Urban Growth Boundary (e.g., bike lanes).	$1,150,000	TDT	High
B16	10th Avenue Bicycle Improvements between Baseline Street and the south Urban Growth Boundary	Add bicycle improvements to 10th Avenue between Baseline Street and the south Urban Growth Boundary (e.g., restripe with bike lanes).	$60,000	TDT	High
B18	20th Avenue Bicycle Improvements between Alpine Street and the southern terminus of the street	Add bicycle improvements to 20th Avenue between Alpine Street and the southern terminus of the street (e.g., restripe with bike lanes).	$25,000	TDT	High

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Primary Funding Source	Priority
Shared-Use Path Solutions					
S1	Council Creek Trail connection between the west city limits and 4th Avenue	Create a shared-use path connection between the west city limits and 4th Avenue (e.g., Council Creek Trail).	$805,000	Metro (RTP #10806 & #11479)	Medium
S2	Council Creek Trail connection between 4th Avenue and 10th Avenue	Create a shared-use path connection between 4th Avenue and 10th Avenue (e.g., Council Creek Trail).	$1,500,000	Metro (RTP #10806 & #11479)	Medium
S3	Council Creek Trail connection between 10th Avenue and 19th Avenue	Create a shared-use path connection between 10th Avenue and 19th Avenue (e.g., Council Creek Trail).	$2,135,000	Metro (RTP #10806 & #11479)	Medium
S4	Council Creek Trail connection between 19th Avenue and Hobbs Road-29th Avenue	Create a shared-use path connection between 19th Avenue and Hobbs Road-29th Avenue (e.g., Council Creek Trail).	$2,570,000	Metro (RTP #10806 & #11479)	Medium
S5	Council Creek Trail connection between Hobbs Road-29th Avenue and the east Urban Growth Boundary	Create a shared-use path connection between Hobbs Road-29th Avenue and the east Urban Growth Boundary (e.g., Council Creek Trail).	$3,995,000	Metro (RTP #10806 & #11479)	Medium
S7	Shared-use path connection between Heather Street and 15th Avenue, and Emerald Loop	Create a shared-use path connection between Heather Street and 15th Avenue, and Emerald Loop.	Funded		
S10	Shared-use path connection between south of 19th Avenue and 25th Avenue	Create a shared-use path connection between south of 19th Avenue and 25th Avenue.	Funded		
S11	Shared-use path connection between 25th Avenue and 27th Avenue	Create a shared-use path connection between 25th Avenue and 27th Avenue.	$205,000	TDT	Medium
S12	Shared-use path connection between 27th Avenue and 29th Boulevard	Create a shared-use path connection between 27th Avenue and 29th Boulevard.	Funded		
Street Crossing Solutions					
C1	Adair-Baseline Street Crossing Study	Study to identify an alignment for a shared-use path connection between Adair Street and Baseline Street, and associated highway crossing needs between Walmart and 1st Avenue at the west end of the city.	$100,000	City Urban Renewal	High
C2	Baseline Street Crossing Study	Study for crossing enhancements along Baseline Street at the east end of the city (e.g., near transit stops).	$100,000	City	High
C3	10th Avenue Crossing Improvements	Add flashers and ADA ramps at marked pedestrian crossing	Funded		
Transit Solutions					
T3	OR 8 Park & Ride	Develop a Park & Ride along OR 8 at 10th Avenue and 26th Avenue and incorporate other transit amenities.	$1,700,000	TDT (RTP #10807)	Medium

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Primary Funding Source	Priority
Driving Solutions					
D1	Holladay Street extension from 4th Avenue to the west city limits	Extend Holladay Street from 4th Avenue to the west city limits, construct as an Industrial Collector, with sidewalks and bike lanes. Alignment should connect with a future street extension from Yew Street.	$2,960,000	TDT (RTP #10795)	Low
D6	Davis Street extension from 7th Avenue to 10th Avenue	Extend Davis Street from 7th Avenue to 10th Avenue constructed as a Collector, with a sidewalk on south side and shared-use path on the north side.	Funded		
D7	Davis Street extension from 19th Avenue to the Fred Meyer driveway.	Extend Davis Street from 19th Avenue to the Fred Meyer driveway constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	$2,530,000	Development	Low
D10	Alpine Street extension from 28th Avenue to the east Urban Growth Boundary.	Extend Alpine Street from 28th Avenue to the east Urban Growth Boundary, construct as a Collector, with a sidewalk on south side and shared-use path on the north side.	$2,110,000	TDT	Medium
D11	29th Boulevard extension from Baseline Street to Dogwood Street.	Extend 29th Boulevard from Baseline Street to Dogwood Street as a Collector, with a shared-use path on east side. Close 345th Avenue railroad crossing and relocate to 29th Avenue (pending coordination and permitting with ODOT Rail). Includes possible installation of a traffic signal at Baseline Street, if warranted (see D21).	$4,530,000	TDT (RTP #11251)	Medium
D12	Dogwood Street extension from 28th Avenue to the east Urban Growth Boundary.	Extend Dogwood Street from 28th Avenue to the east Urban Growth Boundary, constructed as a Collector, with a sidewalk on the north side and shared-use path on the south side.	$2,085,000	TDT	Low
D13	20th Avenue extension from Ginger Street to the 26th Avenue extension.	Extend 20th Avenue from Ginger Street to the 26th Avenue extension constructed as a Collector, with a sidewalk on the north side and shared-use path on the south side.	Funded by Approved Development		
D14	26th Avenue extension from Ginger Street to the 20th Avenue extension.	Extend 26th Avenue from Ginger Street to the 20th Avenue extension constructed as a Collector, with a sidewalk on the west side and shared-use path on the east side.	Funded by Approved Development		
D15	Kodiak Street extension from the 20th Avenue extension to the east Urban Growth Boundary.	Extend Kodiak Street from the 20th Avenue extension to the east Urban Growth Boundary constructed as a Collector, with a sidewalk on the north side and shared-use path on the south side.	Funded by Approved Development		
D16	29th Boulevard extension from Dogwood Street to the south city limits.	Extend 29th Boulevard from Dogwood Street to the south city limits as a Collector, with a sidewalk on the west side and shared-use path on the east side.	Funded by Approved Development		

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Primary Funding Source	Priority
D19	Baseline Street Access Management Plan	Study for access management improvements along Baseline Street at the east end of the city.	$50,000	City Urban Renewal	Low
D20	Baseline Street/ 341st Avenue Intersection Improvements	Intersection improvements (e.g., possible installation of a traffic signal, if warranted and approved by State Traffic Engineer).	$750,000	TDT	Medium
D21	Baseline Street/ Hobbs Road-29th Avenue Intersection Improvements	Intersection improvements (e.g., possible installation of a traffic signal, if warranted and approved by State Traffic Engineer).	$2,000,000	TDT (RTP #10802)	Medium
D22	Hobbs Road-29th Avenue extension/ Alpine Street extension Intersection Improvements	Intersection improvements (e.g., installation of a mini-roundabout).	$750,000	TDT	Medium
D23	20th Avenue extension/ 26th Avenue extension Intersection Improvement	Intersection improvements (e.g., installation of a roundabout).	Funded by Approved Development		

Note: RTP projects shown reflect Draft Regional Transportation Plan Project List dated July 24, 2017
TDT is the Washington County Transportation Development Tax
Projects on ODOT facilities will require approval from the State Traffic Engineer. Inclusion of the project on this table does not obligate or imply funds for any project.

Strategic Transportation System

The projects and actions outlined within the Financially Constrained System will significantly improve Cornelius's transportation system. If the City is able to implement a majority of the System, nearly two decades from now Cornelius residents will have access to a safer, more balanced multimodal transportation network.

The Strategic Transportation System identifies those transportation solutions that are not reasonably expected to be funded by 2040 based on currently anticipated funding streams, but many of which are critically important to the transportation system. Some of the projects will require funding and resources beyond what is known or available in the time frame of this plan. Others are contingent upon redevelopment that makes it possible to provide the missing infrastructure, such as street connections.

The Strategic Transportation System solutions are summarized in Table 2 and illustrated in Figures 1 to 3. The projects numbered on Figures 1 to 3 correspond with the project numbers in Table 2. The project numbers are denoted as a driving ("D"), pedestrian ("P"), biking ("B"), shared-use path ("S"), transit ("T"), or street crossing ("C"). Planning level cost estimates used to determine the likeliness of funding are also included in Table 2.

Table 2: Strategic Transportation System

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Priority
Pedestrian Solutions				
P1	Holladay Street Pedestrian Improvements between 4th Avenue and 10th Avenue	Add pedestrian improvements to Holladay Street between 4th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on both sides).	$580,000	Low
P2	4th Avenue Pedestrian Improvements between Barlow Court and the northern terminus of the street	Add pedestrian improvements to 4th Avenue between Barlow Court and the northern terminus of the street (e.g., complete pedestrian facility gaps on both sides).	$925,000	Low
P5	Baseline Street Pedestrian Improvements between 1st Avenue and 4th Avenue	Add pedestrian improvements to Baseline Street between 1st Avenue and 4th Avenue (e.g., complete pedestrian facility gaps on both sides).	$625,000	Low
P6b	Baseline Street Pedestrian Improvements between 4th Avenue and 10th Avenue	Add pedestrian improvements to Baseline Street between 4th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on the south side).	$355,000	Low
P8	14th Avenue Pedestrian Improvements between Davis Street and Gray Street	Add pedestrian improvements to 14th Avenue between Davis Street and Gray Street (e.g., complete pedestrian facility gap on the west side).	$180,000	Low
P13a	26th Avenue Pedestrian Improvements between Baseline Street and Fremont Street	Add pedestrian improvements to 26th Avenue between Baseline Street and Fremont Street (e.g., complete pedestrian facility gap on the west side).	$420,000	Low
P16b	Baseline Street Pedestrian Improvements between East Lane and the east Urban Growth Boundary	Add pedestrian improvements to Baseline Street between East Lane and the east Urban Growth Boundary (e.g., complete pedestrian facility gap on the south side).	$1,655,000	Low
P18	14th Avenue Pedestrian Improvements between Baseline Street and Dogwood Street	Add pedestrian improvements to 14th Avenue between Baseline Street and Dogwood Street (e.g., widen the existing sidewalk on the east side).	$250,000	Low
P22a	Heather Street Pedestrian Improvements between 6th Avenue and 10th Avenue	Add pedestrian improvements to Heather Street between 6th Avenue and 10th Avenue (e.g., complete pedestrian facility gaps on both sides).	$265,000	Low
P23	Linden Street Pedestrian Improvements between 5th Circle and 10th Avenue	Add pedestrian improvements to Linden Street between 5th Circle and 10th Avenue (e.g., complete pedestrian facility gaps on both sides).	$320,000	Medium
Bicycle Solutions				
B1	Holladay Street Bicycle Improvements between 4th Avenue and 10th Avenue	Add bicycle improvements to Holladay Street between 4th Avenue and 10th Avenue (e.g., restripe with bike lanes).	$25,000	Low
B2	4th Avenue Bicycle Improvements between Adair Street and the northern terminus of the street	Add bicycle improvements to 4th Avenue between Adair Street and the northern terminus of the street (e.g., bike lanes).	$555,000	Medium
B4	4th Avenue Bicycle Improvements between Baseline Street and Adair Street	Add bicycle improvements to 4th Avenue between Baseline Street and Adair Street (e.g., bike lanes).	$145,000	Medium

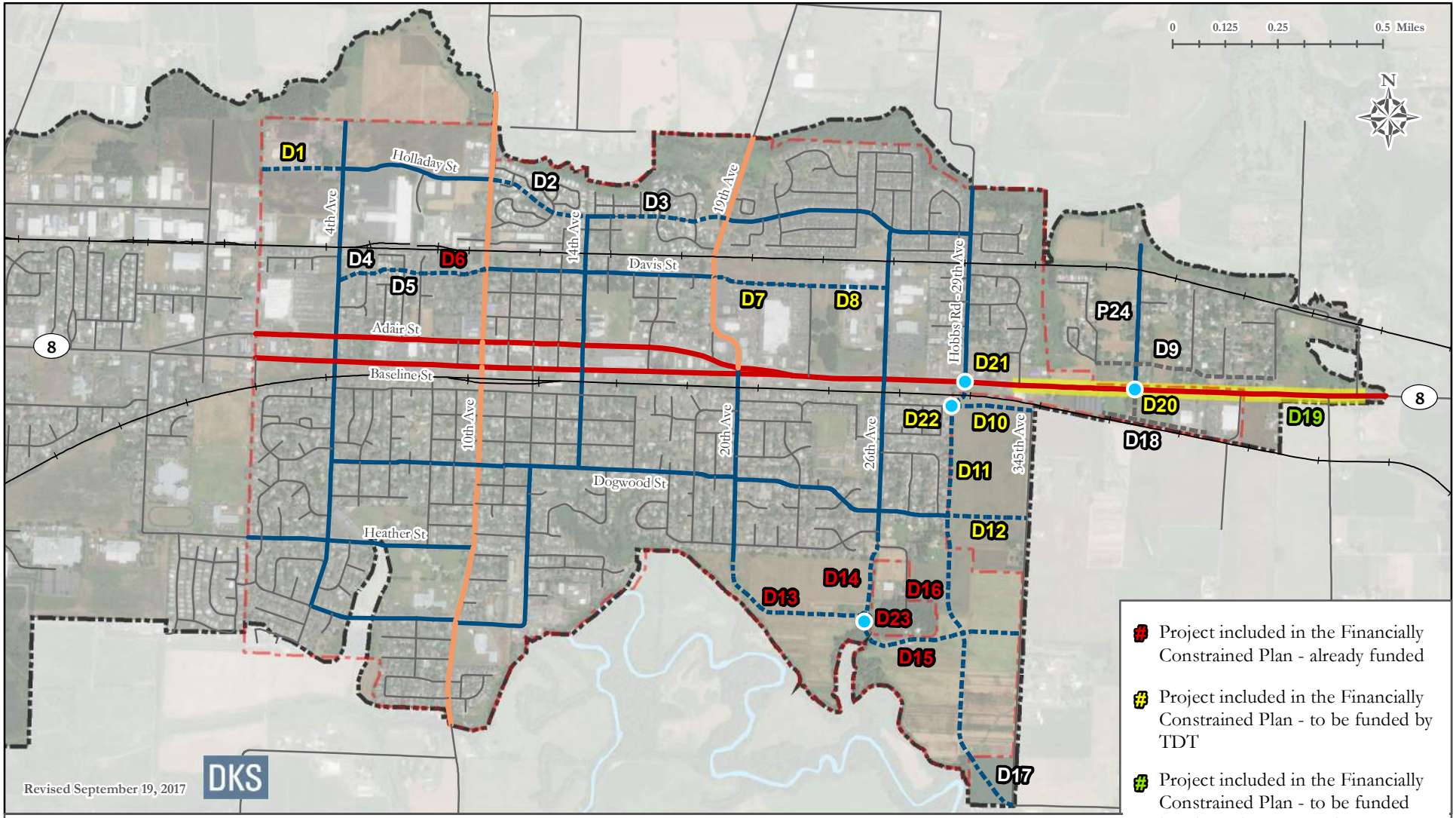
Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Priority
B6	Davis Street Bicycle Improvements between 10th Avenue and 19th Avenue	Add bicycle improvements to Davis Street between 10th Avenue and 19th Avenue (e.g., pavement markings/ signage designating a shared street for bikes).	$35,000	Medium
B7	14th Avenue Bicycle Improvements between Gray Street and Dogwood Street	Add bicycle improvements to 14th Avenue between Gray Street and Dogwood Street (e.g., pavement markings/ signage designating a shared street for bikes).	$40,000	Medium
B9	Holladay Street Bicycle Improvements between 19th Avenue and Hobbs Road-29th Avenue	Add bicycle improvements to Holladay Street between 19th Avenue and Hobbs Road-29th Avenue (e.g., pavement markings/ signage designating a shared street for bikes).	$40,000	Medium
B10	26th Avenue Bicycle Improvements between Baseline Street and Fremont Street	Add bicycle improvements to 26th Avenue between Baseline Street and Fremont Street (e.g., bike lanes).	$665,000	Medium
B11	Hobbs Road-29th Avenue Bicycle Improvements between Baseline Street and Davis Drive	Add bicycle improvements to Hobbs Road-29th Avenue between Baseline Street and Davis Drive (e.g., bike lanes).	$600,000	Medium
B12	4th Avenue Bicycle Improvements between Baseline Street and Linden Street	Add bicycle improvements to 4th Avenue between Baseline Street and Linden Street (e.g., pavement markings/ signage designating it as a shared street for bikes).	$40,000	Medium
B13	Dogwood Street Bicycle Improvements between 4th Avenue and the eastern terminus of the street	Add bicycle improvements to Dogwood Street between 4th Avenue and the eastern terminus of the street (e.g., pavement markings/signage designating a shared street for bikes).	$95,000	Medium
B14	Heather Street Bicycle Improvements between the city boundary and 10th Avenue	Add bicycle improvements to Heather Street between the city boundary and 10th Avenue (e.g., pavement markings/ signage designating a shared street for bikes).	$35,000	Medium
B15	Linden Street Bicycle Improvements between 4th Avenue and 10th Avenue	Add bicycle improvements to Linden Street between 4th Avenue and 10th Avenue (e.g., pavement markings/ signage designating it as a shared street for bikes).	$25,000	Low
B17	12th Avenue-Flax Plant Road Bicycle Improvements between Dogwood Street and 10th Avenue	Add bicycle improvements to 12th Avenue-Flax Plant Road between Dogwood Street and 10th Avenue (e.g., pavement markings/ signage designating it as a shared street for bikes).	$35,000	Low
B19	26th Avenue Bicycle Improvements between Baseline Street and the southern terminus of the street	Add bicycle improvements to 26th Avenue between Baseline Street and the southern terminus of the street (e.g., restripe with bike lanes).	$25,000	Medium
B20	Gray Street Bicycle Improvements between 14th Avenue and 15th Avenue	Add bicycle improvements to Gray Street between 14th Avenue and 15th Avenue (e.g., pavement markings/ signage designating it as a shared street for bike).	$5,000	Low
B21	Davis Street-1st Place Bicycle Improvements between 4th Avenue and the shared-use path on the west side of the Walmart parking lot	Add bicycle improvements to Davis Street-1st Place between 4th Avenue and the shared-use path on the west side of the Walmart parking lot (e.g., pavement markings/ signage designating it as a shared street for bike).	$15,000	Low

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Priority
B22	Baseline Street Bike Boulevard	Add a two-way bike boulevard on the south side of Baseline Street through town	$1,500,000	Low
Shared-Use Path Solutions				
S6	Shared-use path connection between 1st Avenue and the south side of the railroad crossing.	Create a shared-use path connection between 1st Avenue and the south side of the railroad crossing (west of the 1st Avenue/Alpine Drive intersection).	$220,000	Medium
S8	Shared-use path connection between Flax Plant Road and Steamboat Park.	Create a shared-use path connection between Flax Plant Road and Steamboat Park.	$930,000	Medium
S9	Shared-use path connection between Steamboat Park and south of 19th Avenue.	Create a shared-use path connection between Steamboat Park and south of 19th Avenue.	$1,025,000	Medium
S13	Shared-use path connection between 29th Boulevard and the south Urban Growth Boundary.	Create a shared-use path connection between 29th Boulevard and the south Urban Growth Boundary.	$425,000	Medium
S14	Shared-use path connection between 29th Boulevard and the east Urban Growth Boundary.	Create a shared-use path connection between 29th Boulevard and the east Urban Growth Boundary.	$615,000	Medium
Transit Solutions				
T1	Baseline Street/17th Avenue Bus Stop	Work with TriMet to provide a bus stop on Baseline Street at 17th Avenue.	$60,000	Medium
T2	Transit Stop Improvements	Upgrade transit stop amenities as needed, to include sheltered stops with seating, landing pads, route information, bicycle parking and improved lighting.	$500,000	High
T4	High Capacity Transit Feasibility Study	Prepare a feasibility study for high capacity transit to Cornelius, including expected costs, expected revenue, and potential funding sources.	$125,000	Medium
Driving Solutions				
D2	Holladay Street extension from 10th Avenue to Gray Street.	Extend Holladay Street from 10th Avenue to Gray Street. This street should be constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	$2,810,000	Low
D3	Holladay Street extension from Gray Street to 19th Avenue.	Extend Holladay Street from Gray Street to 19th Avenue. This street should be constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	$3,085,000	Low
D4	Davis Street extension from 4th Avenue to 5th Avenue.	Extend Davis Street from 4th Avenue to 5th Avenue. This street should be constructed as a Collector, with a sidewalk on the south side and shared-use path on the north side.	$790,000	Low
D5	Davis Street extension from 5th Avenue to 7th Avenue.	Extend Davis Street from 5th Avenue to 7th Avenue. This street should be constructed as a Collector, with a sidewalk on south side and shared-use path on the north side.	$1,465,000	Low
D8	Davis Street extension from the Fred Meyer driveway to 26th Avenue	Extend Davis Street from the Fred Meyer driveway to 26th Avenue constructed as a Collector, with a sidewalk on south side and shared-use path on the north side.	$2,065,000	Low

Project ID	Project Description	Project Elements	Estimated Cost (2017 Dollars)	Priority
D9	Baseline Street frontage road (north side) between East Lane and 334th Avenue.	Create a frontage road on the north side of Baseline Street between East Lane and 334th Avenue as properties redevelop. This street should be constructed as a Local street. Close the East Lane, 338th Avenue, and 336th Avenue connections to Baseline Street to general motor vehicle traffic but maintain access for pedestrians, bicycles and emergency vehicles.	$2,080,000	Low
D17	29th Avenue extension from the south city limits to the south Urban Growth Boundary.	Extend 29th Avenue from the south city limits to the south Urban Growth Boundary. This street should be constructed as a Collector, with a sidewalk on the west side and shared-use path on the east side.	$2,120,000	Low
D18	Baseline Street frontage road (south side) connecting to 341st Avenue	Create a frontage road on the south side of Baseline Street connecting to 341st Avenue as properties redevelop. This street should be constructed as a Local street, with sidewalks.	$1,545,000	Low

Note: Projects on ODOT facilities will require approval from the State Traffic Engineer. Inclusion of the project on this table does not obligate or imply funds for any project.

I Motor Vehicle Projects



Legend:

Roadways:

Existing

Planned (Conceptual Alignments)

- Principal Arterial Streets
- Arterial Streets
- Collector Streets
- Local Streets

Intersections

- Planned Intersection Improvement

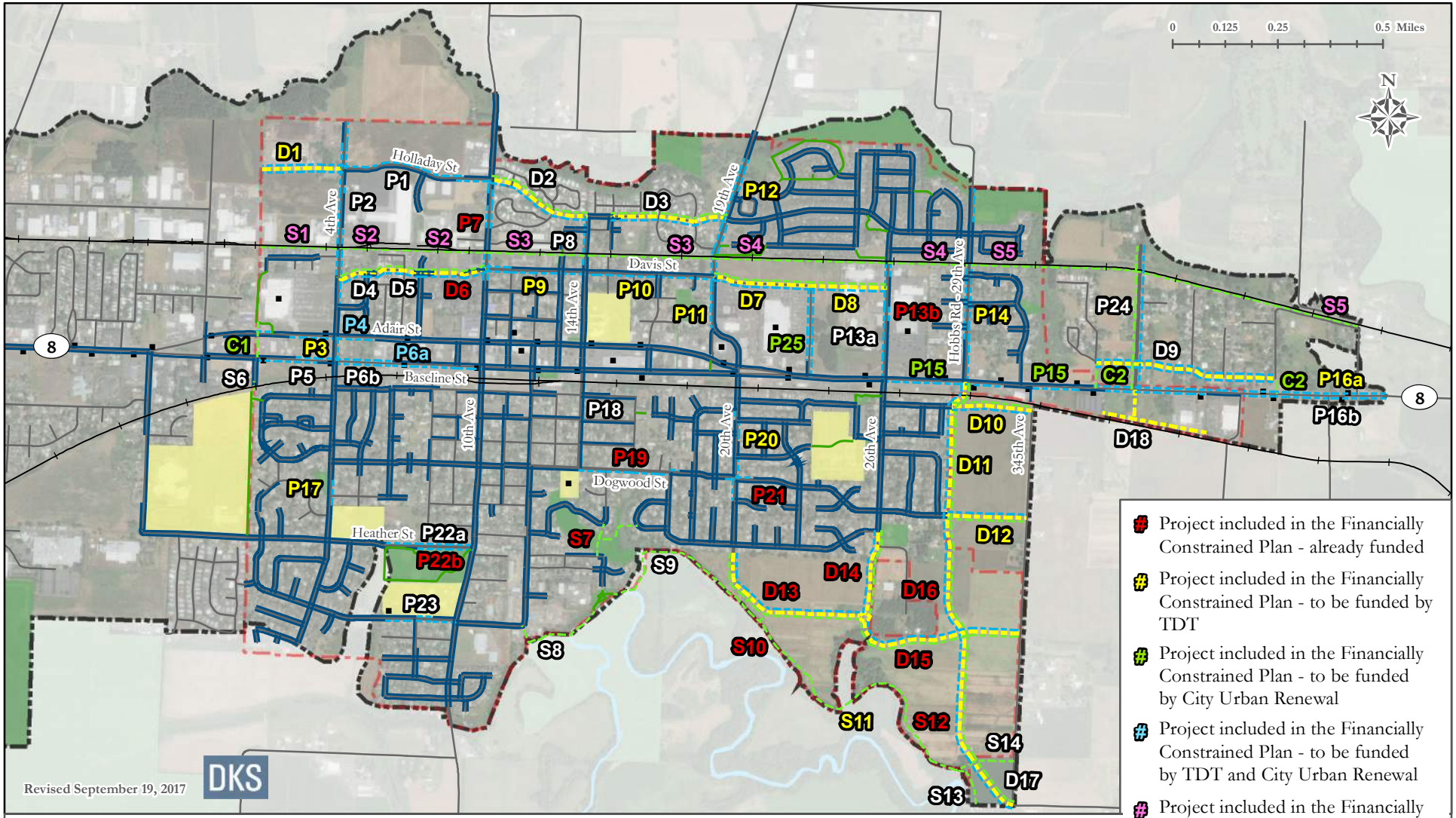
Roadway Segments

- Future Study

- # Project included in the Financially Constrained Plan - already funded
- # Project included in the Financially Constrained Plan - to be funded by TDT
- # Project included in the Financially Constrained Plan - to be funded by City Urban Renewal
- # Project included in the Strategic Plan

- Urban Growth Boundary
- Cornelius City Limit

2 Pedestrian Projects



Legend:

Pedestrian Facilities

Existing	Planned	
———	- - - -	Sidewalk
———	- - - -	Shared-Use Path

Roadway Facilities with Pedestrian Projects

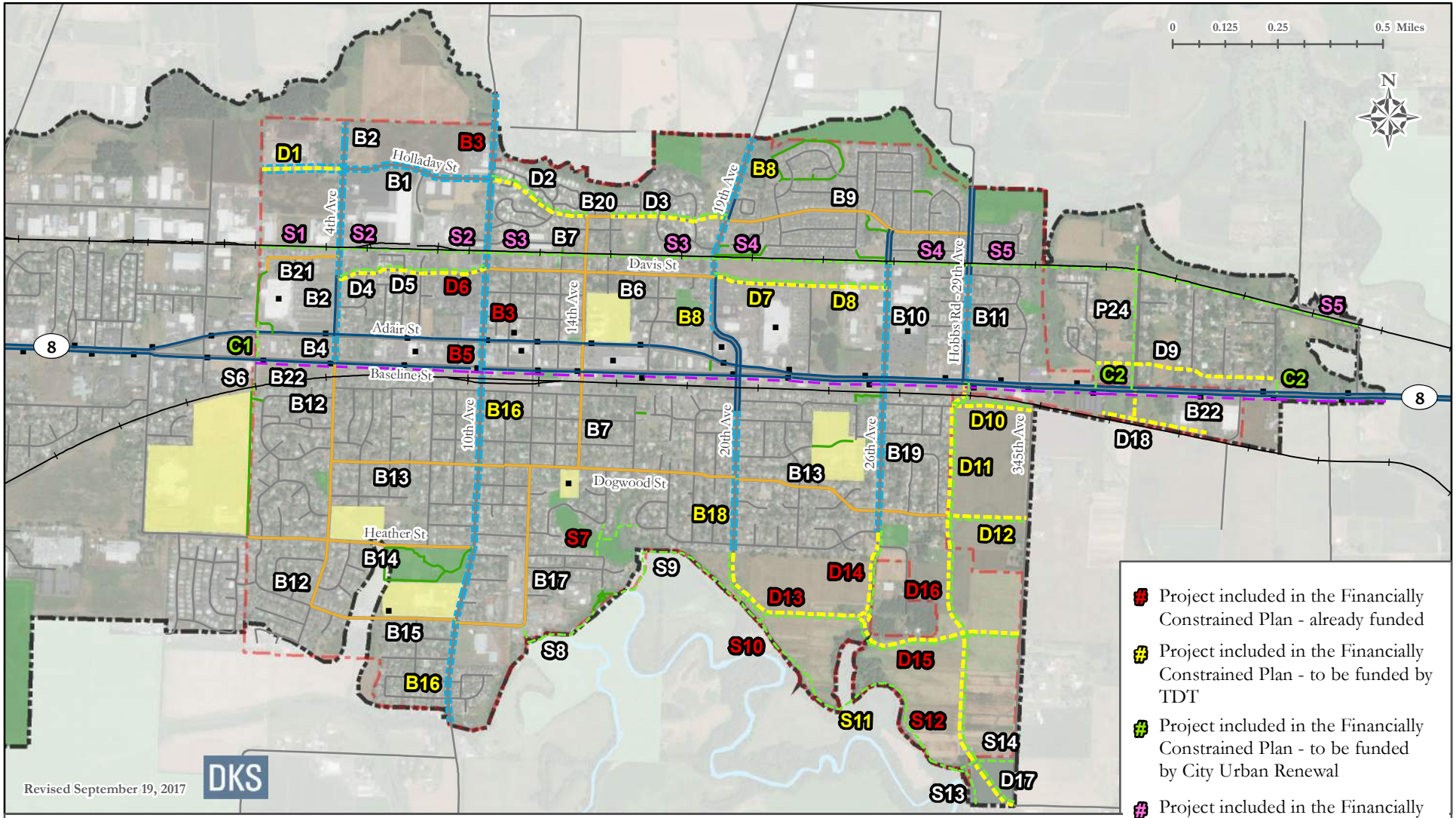
- - - - Planned Street Extension (Conceptual Alignment)

Activity Generators

- Parks and/or Natural Areas
- School
- ▪ Other Major Activity Generator

- # Project included in the Financially Constrained Plan - already funded
- # Project included in the Financially Constrained Plan - to be funded by TDT
- # Project included in the Financially Constrained Plan - to be funded by City Urban Renewal
- # Project included in the Financially Constrained Plan - to be funded by TDT and City Urban Renewal
- # Project included in the Financially Constrained Plan - to be funded by Metro
- # Project included in the Strategic Plan
- Urban Growth Boundary
- Cornelius City Limit

3 Bicycle Projects



Legend:

Bicycle Facilities

Existing	Planned	
———	- - -	Bike Lane
———	- - -	Shared-Use Path
	———	Planned Shared Street
	- - -	Planned Bike Route

Roadway Facilities

- - - Planned Street Extension (Conceptual Alignment)

Activity Generators

- Parks and/or Natural Areas
- School
- ▪ Other Major Activity Generator

- # Project included in the Financially Constrained Plan - already funded
- # Project included in the Financially Constrained Plan - to be funded by TDT
- # Project included in the Financially Constrained Plan - to be funded by City Urban Renewal
- # Project included in the Financially Constrained Plan - to be funded by Metro
- # Project included in the Strategic Plan
- Urban Growth Boundary
- Cornelius City Limit

TRAFFIC COUNT DATA

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

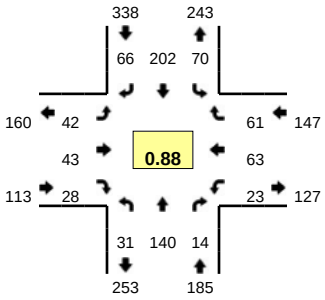
LOCATION: N 19th Ave -- N Davis St

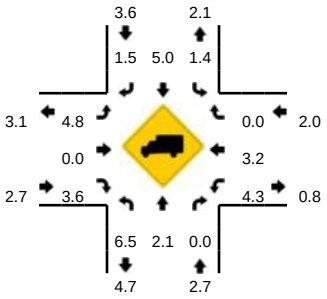
QC JOB #: 13937901

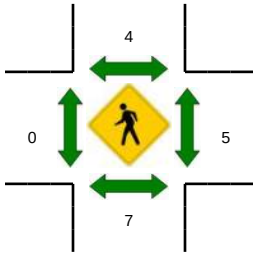
CITY/STATE: Cornelius, OR

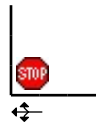
DATE: Thu, Oct 20 2016

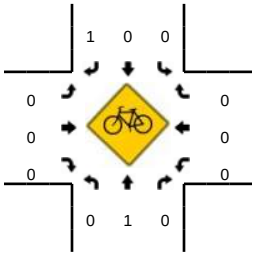
Peak-Hour: 4:05 PM -- 5:05 PM
Peak 15-Min: 4:05 PM -- 4:20 PM

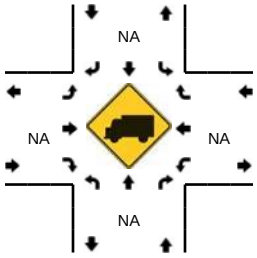


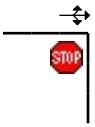


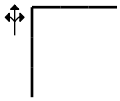


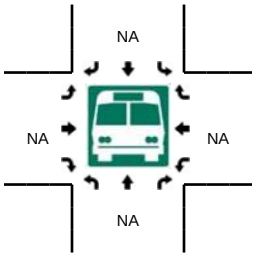












5-Min Count Period Beginning At	N 19th Ave (Northbound)				N 19th Ave (Southbound)				N Davis St (Eastbound)				N Davis St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	7	13	2	0	6	10	3	0	3	3	1	0	1	4	4	0	57	
4:05 PM	5	16	1	0	5	20	6	0	7	5	2	0	1	2	4	0	74	
4:10 PM	1	9	1	0	4	27	8	0	2	2	1	0	3	5	7	0	70	
4:15 PM	1	16	2	0	10	22	8	0	2	0	3	0	4	7	3	0	78	
4:20 PM	2	9	1	0	5	16	8	0	1	4	1	0	2	3	3	0	55	
4:25 PM	2	10	2	0	6	11	3	0	6	4	2	0	2	6	6	0	60	
4:30 PM	1	5	1	0	8	11	2	0	1	2	2	0	1	5	6	0	45	
4:35 PM	2	16	2	0	3	18	5	0	7	3	1	0	1	3	11	0	72	
4:40 PM	2	6	3	0	7	12	3	0	2	8	6	0	2	3	3	0	57	
4:45 PM	4	18	0	0	10	19	2	0	1	3	5	0	3	9	3	0	77	
4:50 PM	3	7	0	0	3	16	7	0	2	5	3	0	2	5	4	0	57	
4:55 PM	5	16	0	0	5	14	10	0	6	3	1	0	0	6	5	0	71	773
5:00 PM	3	12	1	0	4	16	4	0	5	4	1	0	2	9	6	0	67	783
5:05 PM	3	13	0	0	1	8	4	0	3	0	1	0	4	7	3	0	47	756
5:10 PM	4	10	1	0	9	5	9	0	1	3	2	0	1	6	5	0	56	742
5:15 PM	3	20	2	0	8	10	12	0	2	2	0	0	2	4	4	0	69	733
5:20 PM	3	7	1	0	5	14	8	0	4	2	1	0	3	3	4	0	55	733
5:25 PM	3	15	3	0	2	17	4	0	4	2	2	0	1	4	3	0	60	733
5:30 PM	4	19	0	0	6	11	8	0	3	3	2	0	1	6	4	0	67	755
5:35 PM	3	9	0	0	7	15	2	0	3	4	1	0	2	5	5	0	56	739
5:40 PM	2	8	1	0	8	12	2	0	4	3	0	0	2	4	6	0	52	734
5:45 PM	2	10	2	0	6	8	11	0	4	3	2	0	2	3	5	0	58	715
5:50 PM	2	8	3	0	8	12	4	0	2	4	2	0	2	3	8	0	58	716
5:55 PM	5	16	5	0	1	21	7	0	5	4	1	0	5	5	2	0	77	722

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	164	16	0	76	276	88	0	44	28	24	0	32	56	56	0	888
Heavy Trucks	4	4	0		0	16	4		0	0	0		0	0	0		28
Pedestrians		20				8				0				8			36
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

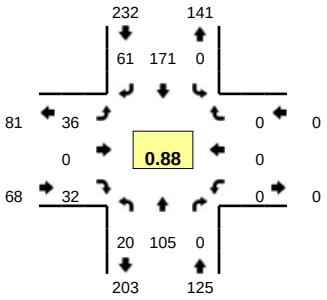
Method for determining peak hour: Total Entering Volume

LOCATION: N 10th Ave -- N Holiday St

QC JOB #: 13937902

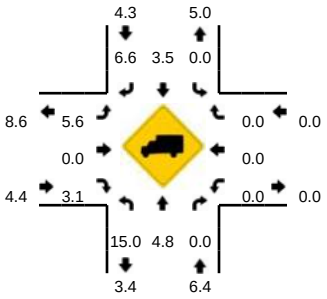
CITY/STATE: Cornelius, OR

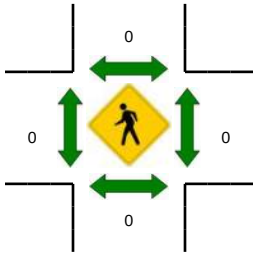
DATE: Thu, Oct 20 2016

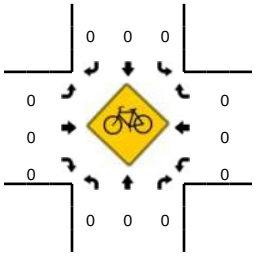


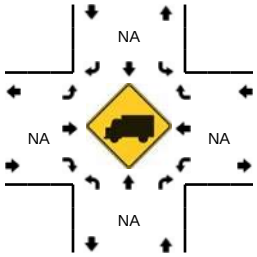
Peak-Hour: 4:00 PM -- 5:00 PM

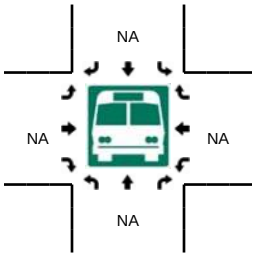
Peak 15-Min: 4:00 PM -- 4:15 PM











5-Min Count Period Beginning At	N 10th Ave (Northbound)				N 10th Ave (Southbound)				N Holiday St (Eastbound)				N Holiday St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	9	0	0	0	21	3	0	3	0	2	0	0	0	0	0	38	
4:05 PM	2	16	0	0	0	17	4	0	2	0	4	0	0	0	0	0	45	
4:10 PM	0	11	0	0	0	13	9	0	2	0	3	0	0	0	0	0	38	
4:15 PM	2	8	0	0	0	20	6	0	0	0	2	0	0	0	0	0	38	
4:20 PM	1	10	0	0	0	15	5	0	5	0	0	0	0	0	0	0	36	
4:25 PM	0	10	0	0	0	8	2	0	4	0	2	0	0	0	0	0	26	
4:30 PM	7	6	0	0	0	16	5	0	1	0	4	0	0	0	0	0	39	
4:35 PM	1	3	0	0	0	13	3	0	2	0	3	0	0	0	0	0	25	
4:40 PM	3	6	0	0	0	7	7	0	9	0	6	0	0	0	0	0	38	
4:45 PM	0	10	0	0	0	20	8	0	5	0	3	0	0	0	0	0	46	
4:50 PM	3	9	0	0	0	16	6	0	1	0	2	0	0	0	0	0	37	
4:55 PM	1	7	0	0	0	5	3	0	2	0	1	0	0	0	0	0	19	425
5:00 PM	0	11	0	0	0	6	4	0	1	0	3	0	0	0	0	0	25	412
5:05 PM	1	8	0	0	0	12	6	0	7	0	1	0	0	0	0	0	35	402
5:10 PM	2	8	0	0	0	15	6	0	0	0	2	0	0	0	0	0	33	397
5:15 PM	4	8	0	0	0	18	6	0	1	0	0	0	0	0	0	0	37	396
5:20 PM	3	6	0	0	0	12	10	0	3	0	2	0	0	0	0	0	36	396
5:25 PM	2	9	0	0	0	18	2	0	1	0	2	0	0	0	0	0	34	404
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5:50 PM	2	10	0	0	0	17	3	0	2	0	1	0	0	0	0	0	35	390
5:55 PM	2	6	0	0	0	11	5	0	2	0	0	0	0	0	0	0	26	397

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	144	0	0	0	204	64	0	28	0	36	0	0	0	0	0	484
Heavy Trucks	0	4	0		0	0	8		0	0	4		0	0	0		16
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

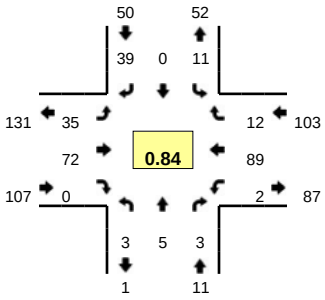
LOCATION: S 14th Ave -- S Dogwood St

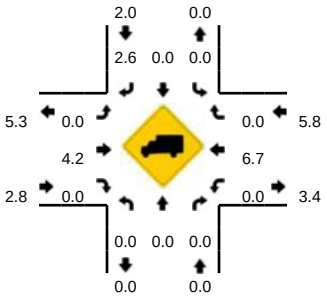
QC JOB #: 13937903

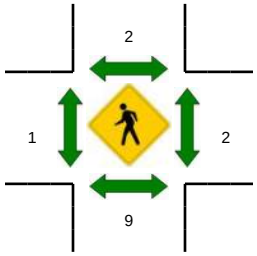
CITY/STATE: Cornelius, OR

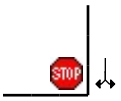
DATE: Thu, Oct 20 2016

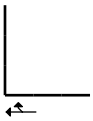
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:40 PM -- 4:55 PM

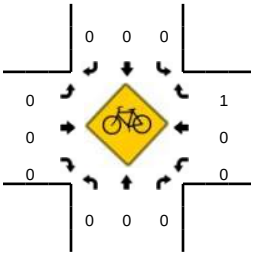


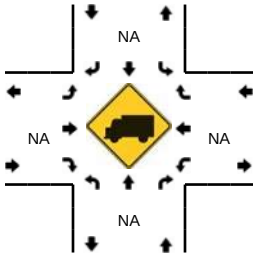


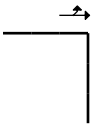


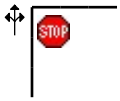


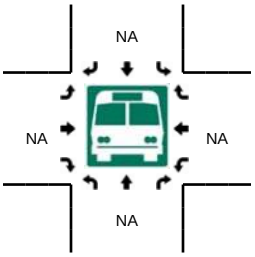












5-Min Count Period Beginning At	S 14th Ave (Northbound)				S 14th Ave (Southbound)				S Dogwood St (Eastbound)				S Dogwood St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	4	0	2	5	0	0	0	10	1	0	22	
4:05 PM	0	0	0	0	0	0	4	0	3	8	0	0	0	6	0	0	21	
4:10 PM	1	0	0	0	1	0	2	0	4	6	0	0	0	5	1	0	20	
4:15 PM	0	0	0	0	3	0	3	0	3	3	0	0	0	8	4	0	24	
4:20 PM	0	0	0	0	1	0	3	0	4	7	0	0	0	6	0	0	21	
4:25 PM	0	1	0	0	1	0	2	0	3	5	0	0	0	6	2	0	20	
4:30 PM	0	0	0	0	1	0	3	0	2	6	0	0	1	8	0	0	21	
4:35 PM	0	1	1	0	0	0	4	0	0	7	0	0	0	5	0	0	18	
4:40 PM	0	2	0	0	2	0	1	0	4	5	0	0	0	11	1	1	27	
4:45 PM	1	1	1	0	0	0	3	0	4	7	0	0	0	9	0	0	26	
4:50 PM	0	0	1	0	1	0	7	0	2	7	0	0	0	9	1	0	28	
4:55 PM	1	0	0	0	1	0	3	0	4	6	0	0	0	6	2	0	23	271
5:00 PM	0	0	1	0	2	0	5	0	0	3	0	0	0	3	2	0	16	265
5:05 PM	0	0	0	0	1	0	0	0	4	3	0	0	0	6	0	0	14	258
5:10 PM	0	0	0	0	0	0	3	0	1	3	0	0	0	8	2	0	17	255
5:15 PM	0	2	0	0	3	0	2	0	0	4	0	0	0	11	0	0	22	253
5:20 PM	0	0	0	0	2	0	0	0	3	0	0	0	0	8	1	0	14	246
5:25 PM	0	0	0	0	2	0	2	0	4	5	0	0	0	7	1	0	21	247
5:30 PM	1	1	0	0	0	0	2	0	1	8	0	0	0	8	2	0	23	249
5:35 PM	0	0	0	0	1	0	0	0	0	4	0	0	0	5	1	0	11	242
5:40 PM	0	0	0	0	2	0	0	0	2	6	0	0	0	5	2	0	17	232
5:45 PM	0	0	0	0	0	0	2	0	0	5	0	0	0	8	2	0	17	223
5:50 PM	0	0	0	0	1	0	1	0	2	3	0	0	0	6	2	0	15	210
5:55 PM	0	0	0	0	0	0	1	0	1	1	0	0	0	6	0	0	9	196

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	12	8	0	12	0	44	0	40	76	0	0	0	116	8	4	324
Heavy Trucks	0	0	0		0	0	0		0	4	0		0	4	0		8
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

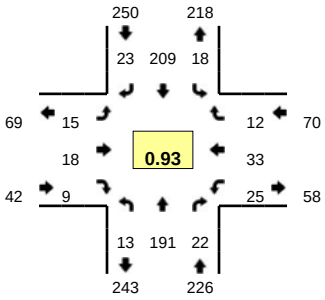
LOCATION: S 10th Ave -- S Dogwood St

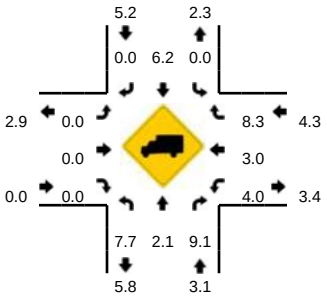
QC JOB #: 13937904

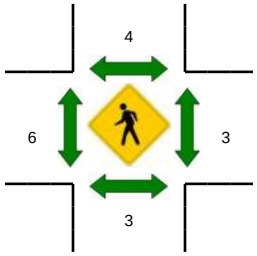
CITY/STATE: Cornelius, OR

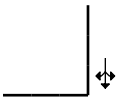
DATE: Thu, Oct 20 2016

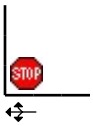
Peak-Hour: 4:35 PM -- 5:35 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

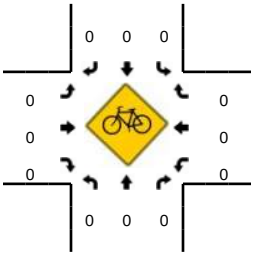


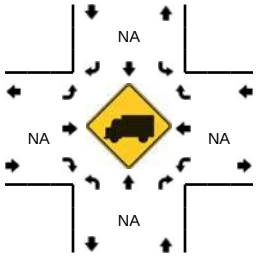


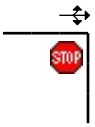


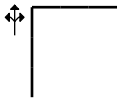


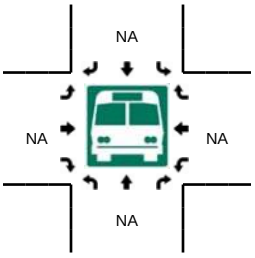












5-Min Count Period Beginning At	S 10th Ave (Northbound)				S 10th Ave (Southbound)				S Dogwood St (Eastbound)				S Dogwood St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	15	0	0	3	17	1	0	0	3	1	0	0	7	1	0	50	
4:05 PM	0	20	1	0	1	12	0	0	1	1	0	0	0	5	0	0	41	
4:10 PM	2	16	1	0	0	14	1	0	0	3	0	0	0	5	0	0	42	
4:15 PM	0	12	1	0	1	16	1	0	0	2	0	0	2	1	1	0	37	
4:20 PM	2	17	1	0	5	20	2	0	1	1	1	0	1	1	0	0	52	
4:25 PM	2	15	1	0	1	19	1	0	2	2	0	0	1	1	0	0	45	
4:30 PM	0	15	3	0	2	13	0	0	0	1	2	0	0	5	0	0	41	
4:35 PM	2	13	1	0	0	17	4	0	0	4	2	0	2	2	0	0	47	
4:40 PM	3	20	2	0	1	14	1	0	1	1	1	0	2	5	2	0	53	
4:45 PM	2	16	3	0	3	22	1	0	0	0	0	0	1	4	0	0	52	
4:50 PM	0	14	1	0	4	15	1	0	1	1	1	0	4	4	2	0	48	
4:55 PM	3	15	4	0	2	15	5	0	0	2	1	0	1	2	0	0	50	558
5:00 PM	0	9	2	0	1	19	2	0	1	3	1	0	4	1	1	0	44	552
5:05 PM	1	11	1	0	2	10	1	0	2	0	0	0	0	2	1	0	31	542
5:10 PM	0	22	2	0	0	22	0	0	2	0	1	0	1	2	2	0	54	554
5:15 PM	0	18	2	0	2	20	3	0	1	0	0	0	4	3	0	0	53	570
5:20 PM	1	20	0	0	0	16	0	0	3	2	1	0	4	2	2	0	51	569
5:25 PM	1	11	3	0	1	19	2	0	4	2	0	0	1	4	0	0	48	572
5:30 PM	0	22	1	0	2	20	3	0	0	3	1	0	1	2	2	0	57	588
5:35 PM	2	8	2	0	2	17	1	0	2	0	0	0	4	1	3	0	42	583
5:40 PM	0	10	2	0	1	16	3	0	0	2	0	0	1	2	0	0	37	567
5:45 PM	1	17	3	0	1	18	3	0	1	0	1	0	2	3	0	0	50	565
5:50 PM	0	15	3	0	0	15	1	0	1	0	0	0	2	1	3	0	41	558
5:55 PM	0	20	1	0	0	18	0	0	0	1	1	0	0	2	0	0	43	551

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	240	16	0	8	232	12	0	24	8	8	0	36	28	16	0	632
Heavy Trucks	0	8	4		0	8	0		0	0	0		0	0	4		24
Pedestrians		8				4				4				0			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

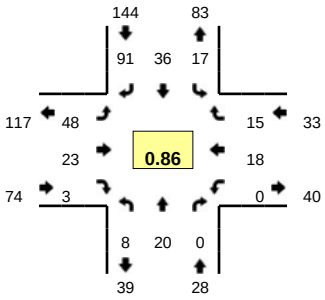
LOCATION: S 20th Ave -- S Dogwood St

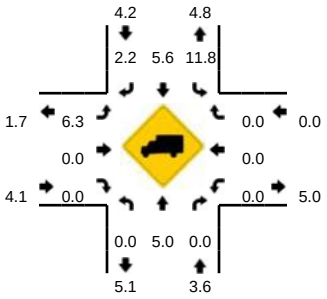
QC JOB #: 13937905

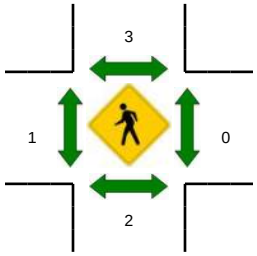
CITY/STATE: Cornelius, OR

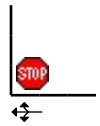
DATE: Thu, Oct 20 2016

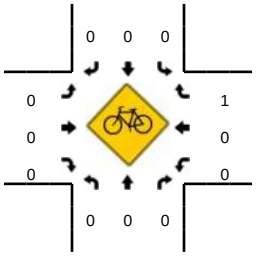
Peak-Hour: 4:50 PM -- 5:50 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

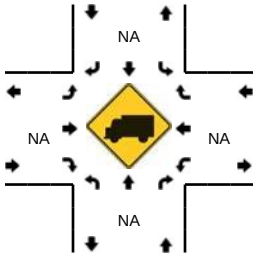


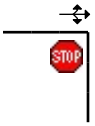


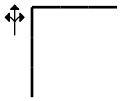


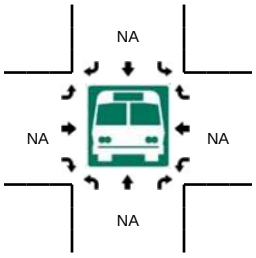












5-Min Count Period Beginning At	S 20th Ave (Northbound)				S 20th Ave (Southbound)				S Dogwood St (Eastbound)				S Dogwood St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	3	0	0	0	1	5	0	2	0	0	0	0	2	3	0	16	
4:05 PM	1	3	0	0	2	5	5	0	2	2	2	0	0	2	2	0	26	
4:10 PM	1	3	0	0	0	5	7	0	5	2	0	0	0	1	2	0	26	
4:15 PM	0	1	0	0	1	3	7	0	3	0	1	0	0	0	1	0	17	
4:20 PM	0	0	0	0	1	3	4	0	5	0	0	0	0	1	0	0	14	
4:25 PM	0	1	0	0	1	3	13	0	2	0	1	0	0	3	0	0	24	
4:30 PM	0	1	0	0	1	6	3	0	5	1	0	0	0	2	0	0	19	
4:35 PM	0	2	0	0	1	3	12	0	5	2	2	0	0	0	1	0	28	
4:40 PM	0	1	0	0	2	1	6	0	3	1	0	0	0	2	1	0	17	
4:45 PM	0	3	0	0	1	1	7	0	3	1	0	0	0	0	0	0	16	
4:50 PM	1	2	0	0	0	1	10	0	4	4	0	0	0	4	2	0	28	
4:55 PM	2	0	0	0	1	5	11	0	7	2	0	0	0	0	2	0	30	261
5:00 PM	0	2	0	0	1	1	3	0	4	1	0	0	0	1	2	0	15	260
5:05 PM	0	1	0	0	2	4	7	0	5	1	0	0	0	1	3	0	24	258
5:10 PM	1	2	0	0	2	3	5	0	5	1	0	0	0	1	0	0	20	252
5:15 PM	2	4	0	0	3	6	10	0	6	0	1	0	0	3	1	0	36	271
5:20 PM	1	1	0	0	2	4	7	0	2	1	0	0	0	1	1	0	20	277
5:25 PM	0	1	0	0	0	5	8	0	6	1	1	0	0	2	1	0	25	278
5:30 PM	1	1	0	0	1	2	8	0	3	2	0	0	0	1	0	0	19	278
5:35 PM	0	1	0	0	3	1	10	0	1	4	0	0	0	1	2	0	23	273
5:40 PM	0	4	0	0	0	3	5	0	2	1	1	0	0	3	0	0	19	275
5:45 PM	0	1	0	0	2	1	7	0	3	5	0	0	0	0	1	0	20	279
5:50 PM	0	3	0	0	2	1	3	0	3	0	0	0	0	1	0	0	13	264
5:55 PM	0	0	0	0	1	2	12	0	4	0	0	0	0	1	1	0	21	255

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	24	0	0	20	60	100	0	56	8	8	0	0	24	12	0	324
Heavy Trucks	0	0	0		8	8	0		4	0	0		0	0	0		20
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: S 26th Ave -- S Dogwood St

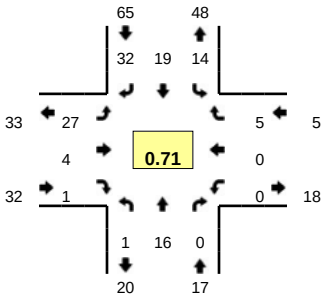
QC JOB #: 13937906

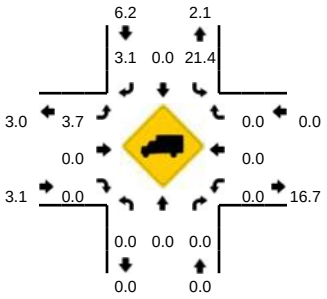
CITY/STATE: Cornelius, OR

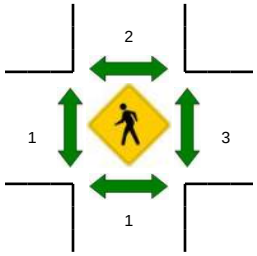
DATE: Thu, Oct 20 2016

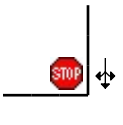
Peak-Hour: 4:00 PM -- 5:00 PM

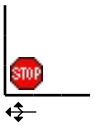
Peak 15-Min: 4:00 PM -- 4:15 PM

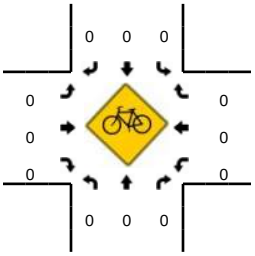


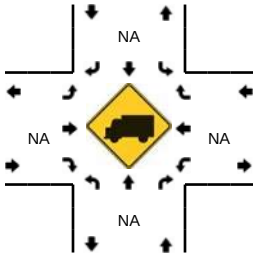


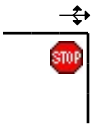


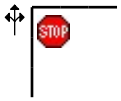


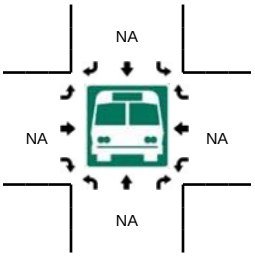












5-Min Count Period Beginning At	S 26th Ave (Northbound)				S 26th Ave (Southbound)				S Dogwood St (Eastbound)				S Dogwood St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	1	0	0	2	3	4	0	4	1	0	0	0	0	0	0	15	
4:05 PM	0	2	0	0	2	1	2	0	1	1	0	0	0	0	0	0	9	
4:10 PM	1	1	0	0	5	2	4	0	3	0	1	0	0	0	1	0	18	
4:15 PM	0	2	0	0	1	1	1	0	2	0	0	0	0	0	0	0	7	
4:20 PM	0	1	0	0	0	1	0	0	2	0	0	0	0	0	0	0	4	
4:25 PM	0	1	0	0	1	2	3	0	2	0	0	0	0	0	0	0	9	
4:30 PM	0	1	0	0	0	1	3	0	3	0	0	0	0	0	1	0	9	
4:35 PM	0	2	0	0	0	1	4	0	3	0	0	0	0	0	0	0	10	
4:40 PM	0	0	0	0	0	2	5	0	1	0	0	0	0	0	0	0	8	
4:45 PM	0	3	0	0	2	1	2	0	2	1	0	0	0	0	1	0	12	
4:50 PM	0	0	0	0	1	0	4	0	2	1	0	0	0	0	1	0	9	
4:55 PM	0	2	0	0	0	4	0	0	2	0	0	0	0	0	1	0	9	119
5:00 PM	0	1	0	0	1	3	3	0	1	0	0	0	0	0	0	0	9	113
5:05 PM	0	1	0	0	0	0	1	0	0	1	0	0	0	0	1	0	4	108
5:10 PM	0	1	0	0	0	2	3	0	1	0	0	0	0	0	0	0	7	97
5:15 PM	0	0	0	0	0	3	2	0	1	0	0	0	0	0	0	0	6	96
5:20 PM	0	1	0	0	0	1	2	0	2	0	0	0	0	0	1	0	7	99
5:25 PM	0	0	0	0	0	1	3	0	1	0	0	0	0	0	0	0	5	95
5:30 PM	0	0	0	0	0	1	1	0	2	0	0	0	0	1	0	0	5	91
5:35 PM	0	1	0	0	0	3	3	0	3	2	0	0	0	0	0	0	12	93
5:40 PM	0	0	0	0	1	0	3	0	0	0	0	0	0	1	0	0	5	90
5:45 PM	0	1	0	0	0	1	0	0	4	0	0	0	0	0	0	0	6	84
5:50 PM	0	0	0	0	1	1	3	0	1	0	0	0	0	0	0	0	6	81
5:55 PM	1	0	0	0	0	1	3	0	0	1	0	0	0	0	0	0	6	78

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	4	16	0	0	36	24	40	0	32	8	4	0	0	0	4	0	168
Heavy Trucks	0	0	0		8	0	4		4	0	0		0	0	0		16
Pedestrians		0				0				0				8			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

LOCATION: N 29th Ave -- E Baseline St

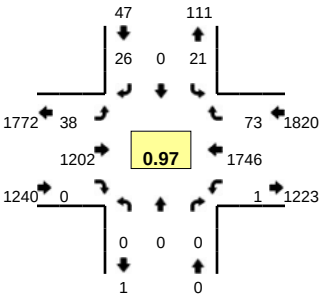
QC JOB #: 13937907

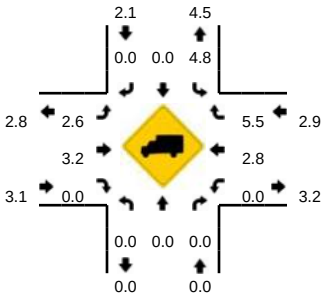
CITY/STATE: Cornelius, OR

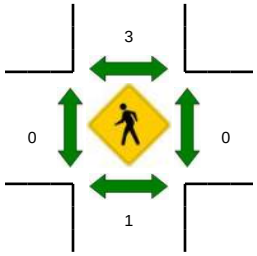
DATE: Thu, Oct 20 2016

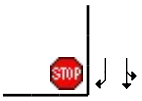
Peak-Hour: 4:15 PM -- 5:15 PM

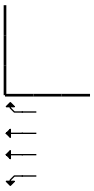
Peak 15-Min: 4:15 PM -- 4:30 PM

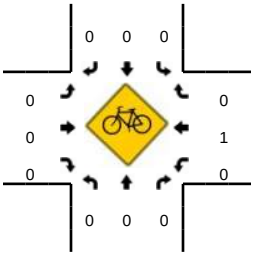


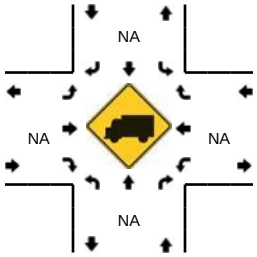


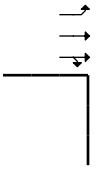


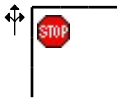


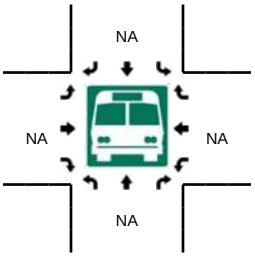












5-Min Count Period Beginning At	N 29th Ave (Northbound)				N 29th Ave (Southbound)				E Baseline St (Eastbound)				E Baseline St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	1	0	3	0	2	119	0	0	0	124	0	0	249	
4:05 PM	0	0	0	0	3	0	4	0	3	112	0	0	0	128	2	0	252	
4:10 PM	0	0	0	0	3	0	1	0	0	103	0	0	0	125	5	0	237	
4:15 PM	0	0	0	0	1	0	3	0	2	96	0	0	1	166	7	0	276	
4:20 PM	0	0	0	0	0	0	1	0	4	129	0	0	0	138	12	0	284	
4:25 PM	0	0	0	0	4	0	4	0	1	97	0	0	0	123	8	0	237	
4:30 PM	0	0	0	0	0	0	3	0	0	106	0	0	0	125	6	0	240	
4:35 PM	0	0	0	0	3	0	0	0	3	91	0	0	0	146	6	0	249	
4:40 PM	0	0	0	0	2	0	4	0	6	99	0	0	0	163	4	0	278	
4:45 PM	0	0	0	0	4	0	4	0	3	91	0	0	0	140	5	0	247	
4:50 PM	0	0	0	0	0	0	3	0	3	104	0	0	0	157	4	0	271	
4:55 PM	0	0	0	0	0	0	2	0	4	90	0	0	0	135	6	0	237	3057
5:00 PM	0	0	0	0	1	0	0	0	3	91	0	0	0	131	5	0	231	3039
5:05 PM	0	0	0	0	5	0	0	0	4	102	0	0	0	153	6	0	270	3057
5:10 PM	0	0	0	0	1	0	2	0	5	106	0	0	0	169	4	0	287	3107
5:15 PM	0	0	0	0	4	0	3	0	5	114	0	0	0	138	6	0	270	3101
5:20 PM	0	0	0	0	7	0	3	0	5	108	0	0	1	129	4	0	257	3074
5:25 PM	0	0	1	0	1	0	1	0	2	108	0	0	0	117	5	0	235	3072
5:30 PM	0	0	0	0	0	0	2	0	0	104	0	0	0	151	2	0	259	3091
5:35 PM	0	0	0	0	2	0	0	0	2	104	0	0	0	150	6	0	264	3106
5:40 PM	0	0	0	0	3	0	5	0	3	74	0	1	0	121	8	0	215	3043
5:45 PM	0	0	0	0	1	0	1	0	1	93	0	0	0	141	3	0	240	3036
5:50 PM	0	0	0	0	4	0	3	0	1	104	0	0	0	124	8	0	244	3009
5:55 PM	0	0	0	0	3	0	4	0	3	66	0	0	0	133	8	0	217	2989

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	20	0	32	0	28	1288	0	0	4	1708	108	0	3188
Heavy Trucks	0	0	0		4	0	0		4	40	0		0	72	0		120
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 10/28/2016 10:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

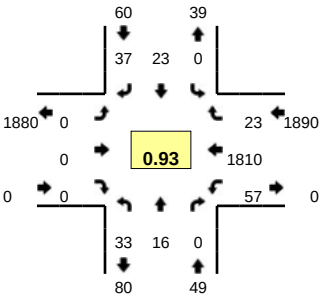
LOCATION: N 14th Ave -- N Adair St

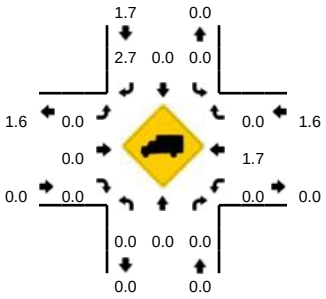
QC JOB #: 14076501

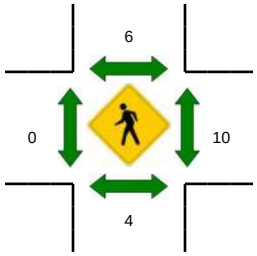
CITY/STATE: Cornelius, OR

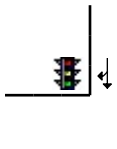
DATE: Tue, Dec 06 2016

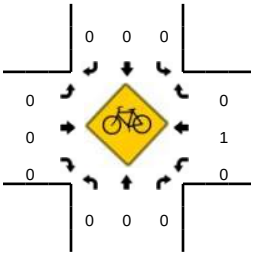
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

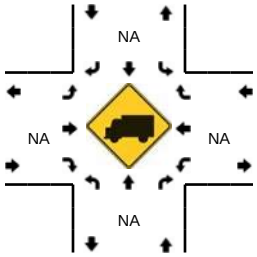


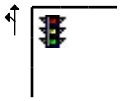


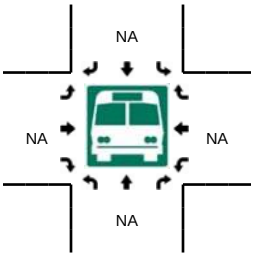












5-Min Count Period Beginning At	N 14th Ave (Northbound)				N 14th Ave (Southbound)				N Adair St (Eastbound)				N Adair St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	2	0	0	0	0	2	0	0	0	0	0	5	137	1	0	148	
4:05 PM	3	0	0	0	0	1	3	0	0	0	0	0	6	112	2	0	127	
4:10 PM	0	5	0	0	0	1	3	0	0	0	0	0	4	119	1	0	133	
4:15 PM	0	5	0	0	0	3	5	0	0	0	0	0	4	146	1	0	164	
4:20 PM	3	2	0	0	0	6	4	0	0	0	0	0	6	123	1	0	145	
4:25 PM	0	3	0	0	0	1	4	0	0	0	0	0	0	99	2	0	109	
4:30 PM	1	3	0	0	0	2	0	0	0	0	0	0	2	141	2	0	151	
4:35 PM	6	1	0	0	0	4	6	0	0	0	0	0	7	130	0	0	154	
4:40 PM	3	3	0	0	0	0	1	0	0	0	0	0	3	149	1	0	160	
4:45 PM	4	0	0	0	0	3	4	0	0	0	0	0	8	153	5	0	177	
4:50 PM	3	1	0	0	0	3	4	0	0	0	0	0	5	136	2	0	154	
4:55 PM	2	3	0	0	0	3	2	0	0	0	0	0	5	138	2	0	155	1777
5:00 PM	2	4	0	0	0	5	9	0	0	0	0	0	3	158	1	0	182	1811
5:05 PM	5	3	0	0	0	4	3	0	0	0	0	0	7	143	3	0	168	1852
5:10 PM	0	1	0	0	0	0	3	0	0	0	0	0	6	175	2	0	187	1906
5:15 PM	2	1	0	0	0	0	2	0	0	0	0	0	1	134	0	0	140	1882
5:20 PM	5	1	0	0	0	0	2	0	0	0	0	0	7	150	2	0	167	1904
5:25 PM	1	1	0	0	0	2	3	0	0	0	0	0	3	154	1	0	165	1960
5:30 PM	2	0	0	0	0	1	2	0	0	0	0	0	1	155	2	0	163	1972
5:35 PM	6	1	0	0	0	1	2	0	0	0	0	0	6	151	2	0	169	1987
5:40 PM	1	0	0	0	0	1	1	0	0	0	0	0	5	163	1	0	172	1999
5:45 PM	3	3	0	0	0	1	4	0	0	0	0	0	3	132	1	0	147	1969
5:50 PM	1	4	0	0	0	2	1	0	0	0	0	0	5	138	2	0	153	1968
5:55 PM	3	2	0	0	0	2	0	0	0	0	0	0	10	118	0	0	135	1948

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	28	32	0	0	0	36	60	0	0	0	0	0	64	1904	24	0	2148
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	16	0		16
Pedestrians		0				8				0				8			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/13/2016 1:02 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

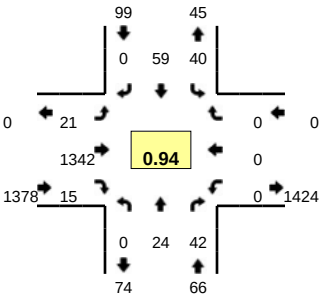
LOCATION: S 14th Ave -- E Baseline St

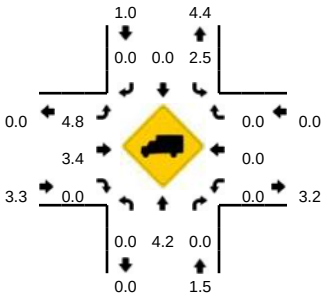
QC JOB #: 14076502

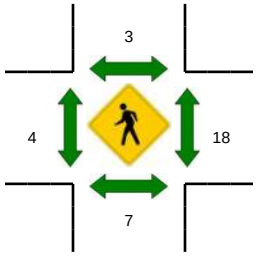
CITY/STATE: Cornelius, OR

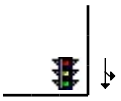
DATE: Tue, Dec 06 2016

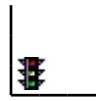
Peak-Hour: 4:00 PM -- 5:00 PM
Peak 15-Min: 4:10 PM -- 4:25 PM

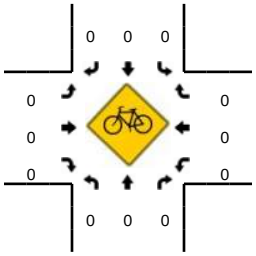


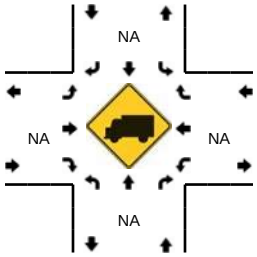


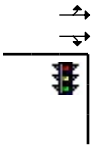


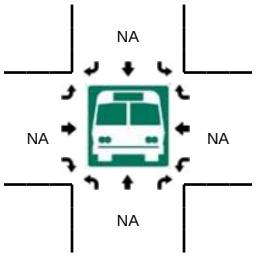












5-Min Count Period Beginning At	S 14th Ave (Northbound)				S 14th Ave (Southbound)				E Baseline St (Eastbound)				E Baseline St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	1	3	0	0	5	0	0	0	131	1	0	0	0	0	0	141	
4:05 PM	0	0	2	0	3	4	0	0	1	110	4	0	0	0	0	0	124	
4:10 PM	0	1	4	0	3	3	0	0	7	116	5	0	0	0	0	0	139	
4:15 PM	0	4	5	0	6	5	0	0	3	121	0	0	0	0	0	0	144	
4:20 PM	0	4	5	0	3	7	0	0	0	109	1	0	0	0	0	0	129	
4:25 PM	0	1	3	0	1	3	0	0	1	106	0	0	0	0	0	0	115	
4:30 PM	0	2	3	0	3	2	0	0	2	138	1	0	0	0	0	0	151	
4:35 PM	0	3	3	0	6	7	0	0	0	97	0	0	0	0	0	0	116	
4:40 PM	0	3	3	0	2	3	0	0	3	116	1	0	0	0	0	0	131	
4:45 PM	0	2	5	0	3	10	0	0	0	110	1	0	0	0	0	0	131	
4:50 PM	0	1	2	0	5	4	0	0	2	96	1	0	0	0	0	0	111	
4:55 PM	0	2	4	0	5	6	0	0	2	92	0	0	0	0	0	0	111	1543
5:00 PM	0	3	5	0	0	5	0	0	2	85	4	0	0	0	0	0	104	1506
5:05 PM	0	2	6	0	5	10	0	0	2	96	3	0	0	0	0	0	124	1506
5:10 PM	0	1	4	0	1	8	0	0	0	111	5	0	0	0	0	0	130	1497
5:15 PM	0	1	2	0	0	3	0	0	1	131	2	0	0	0	0	0	140	1493
5:20 PM	0	4	2	0	0	6	0	0	3	85	3	0	0	0	0	0	103	1467
5:25 PM	0	1	3	0	2	4	0	0	0	92	2	0	0	0	0	0	104	1456
5:30 PM	0	2	5	0	1	1	0	0	1	107	5	0	0	0	0	0	122	1427
5:35 PM	0	2	2	0	3	4	0	0	2	94	3	0	0	0	0	0	110	1421
5:40 PM	0	2	1	0	1	4	0	0	0	100	1	0	0	0	0	0	109	1399
5:45 PM	0	0	6	0	3	5	0	0	5	118	3	0	0	0	0	0	140	1408
5:50 PM	0	5	3	0	1	5	0	0	3	115	3	0	0	0	0	0	135	1432
5:55 PM	0	2	1	0	4	7	0	0	2	101	1	0	0	0	0	0	118	1439

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	36	56	0	48	60	0	0	40	1384	24	0	0	0	0	0	1648
Heavy Trucks	0	4	0		0	0	0		4	68	0		0	0	0		76
Pedestrians		12				0				12				12			36
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/13/2016 1:02 PM

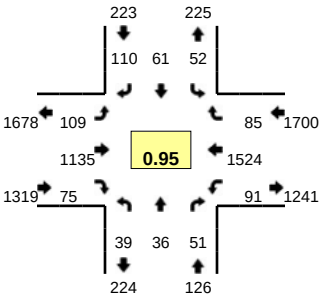
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

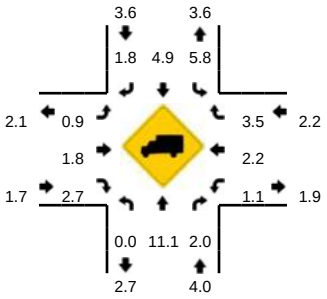
Method for determining peak hour: Total Entering Volume

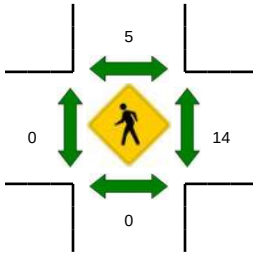
LOCATION: S 20th Ave -- OR 8
CITY/STATE: Cornelius, OR

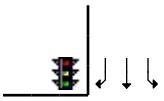
QC JOB #: 13208301
DATE: Wed, Feb 18 2015

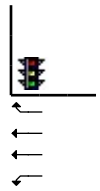


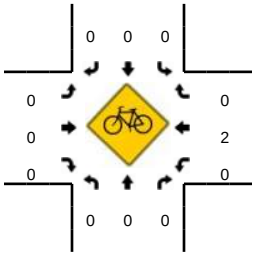
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

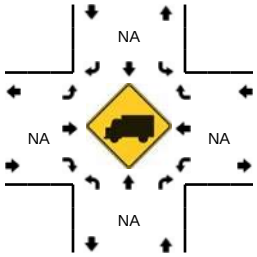


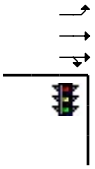


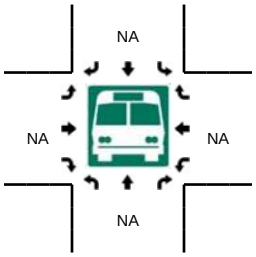












5-Min Count Period Beginning At	S 20th Ave (Northbound)				S 20th Ave (Southbound)				OR 8 (Eastbound)				OR 8 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	6	3	2	0	2	10	6	0	11	77	5	0	4	123	9	0	258	
4:05 PM	4	8	3	0	2	12	10	0	6	95	1	1	7	119	7	0	275	
4:10 PM	4	5	2	0	1	3	11	0	17	85	7	0	8	91	7	0	241	
4:15 PM	1	5	1	0	4	8	10	0	3	96	8	0	5	128	9	0	278	
4:20 PM	1	3	3	0	4	11	14	0	12	68	6	0	8	105	8	0	243	
4:25 PM	5	6	4	0	4	7	11	0	8	106	5	0	3	92	7	0	258	
4:30 PM	4	8	4	0	6	5	11	0	8	75	6	2	12	126	11	0	278	
4:35 PM	3	3	1	0	6	6	8	0	10	112	7	0	5	137	4	0	302	
4:40 PM	4	5	2	0	8	6	18	0	8	88	5	0	10	117	10	2	283	
4:45 PM	4	2	10	0	4	5	9	0	7	105	5	0	5	121	6	0	283	
4:50 PM	4	1	4	0	3	2	3	0	7	77	5	0	10	126	3	0	245	
4:55 PM	4	4	6	0	3	3	10	0	9	91	3	0	6	107	5	0	251	3195
5:00 PM	3	1	3	0	4	5	5	0	13	102	11	1	13	104	8	1	274	3211
5:05 PM	3	2	4	0	5	6	8	0	12	79	6	0	5	139	6	0	275	3211
5:10 PM	4	1	3	0	4	4	9	0	6	113	8	0	4	125	7	0	288	3258
5:15 PM	1	1	7	0	2	7	11	0	6	90	2	1	6	144	8	0	286	3266
5:20 PM	1	3	4	0	2	5	9	0	11	112	8	1	7	139	11	0	313	3336
5:25 PM	4	5	3	0	5	7	9	0	7	91	9	0	5	139	6	0	290	3368
5:30 PM	4	4	5	0	3	2	16	0	6	68	4	1	14	106	4	1	238	3328
5:35 PM	6	4	4	0	4	10	10	0	6	75	8	0	5	97	4	0	233	3259
5:40 PM	5	2	6	0	3	4	5	0	5	84	3	0	6	112	6	0	241	3217
5:45 PM	1	3	7	0	5	7	10	0	9	86	5	0	6	105	9	0	253	3187
5:50 PM	4	1	2	0	5	6	3	0	17	90	5	0	5	107	3	0	248	3190
5:55 PM	2	5	3	0	4	9	5	0	1	97	7	0	4	112	3	0	252	3191

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	36	56	0	36	76	116	0	96	1172	76	8	72	1688	100	0	3556
Heavy Trucks	0	4	4		4	0	0		0	16	4		0	52	0		84
Pedestrians		0				12				0				8			20
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/20/2015 9:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

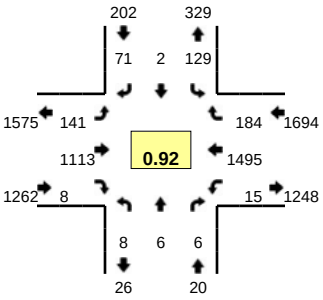
Type of peak hour being reported: Intersection Peak

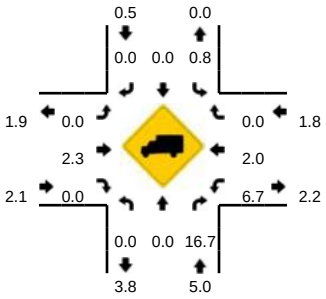
Method for determining peak hour: Total Entering Volume

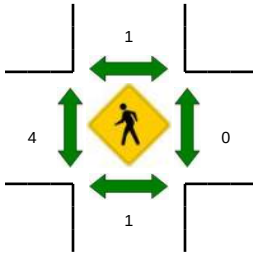
LOCATION: Fred Meyer Dwy -- OR 8
CITY/STATE: Cornelius, OR

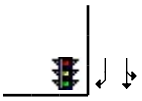
QC JOB #: 13208302
DATE: Wed, Feb 18 2015

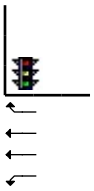
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

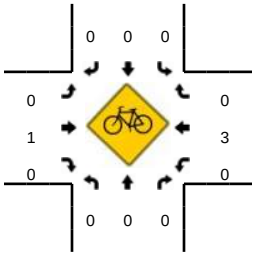


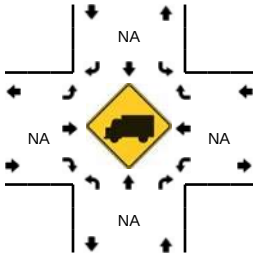


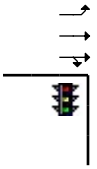


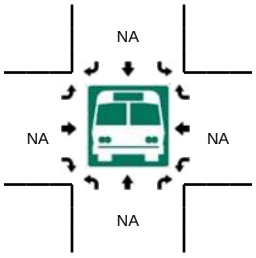












5-Min Count Period Beginning At	Fred Meyer Dwy (Northbound)				Fred Meyer Dwy (Southbound)				OR 8 (Eastbound)				OR 8 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	1	0	0	0	11	0	8	0	10	65	1	0	0	103	16	0	215	
4:05 PM	0	0	0	0	6	0	6	0	4	91	2	0	0	131	17	0	257	
4:10 PM	0	1	0	0	14	0	9	0	13	86	0	0	1	90	15	0	229	
4:15 PM	1	0	0	0	12	0	7	0	2	98	0	0	1	115	14	0	250	
4:20 PM	1	1	0	0	13	0	6	0	13	63	0	0	2	102	14	0	215	
4:25 PM	0	0	0	0	6	0	3	0	8	90	2	0	0	94	17	0	220	
4:30 PM	1	1	0	0	10	0	12	0	16	73	1	0	3	124	13	0	254	
4:35 PM	0	0	1	1	8	0	8	0	15	109	0	0	1	148	16	0	307	
4:40 PM	0	0	0	0	14	0	4	0	10	84	1	0	3	106	22	0	244	
4:45 PM	0	0	1	0	8	0	6	0	8	118	0	0	1	118	16	0	276	
4:50 PM	1	1	1	0	9	0	6	0	13	63	1	0	0	104	11	0	210	
4:55 PM	1	1	0	0	12	0	8	0	5	95	2	0	1	120	17	0	262	2939
5:00 PM	2	0	0	0	16	0	3	0	13	83	0	0	2	105	17	0	241	2965
5:05 PM	1	0	1	0	4	0	4	0	11	96	0	0	0	133	20	0	270	2978
5:10 PM	1	0	0	0	11	1	6	0	9	98	0	0	1	110	12	0	249	2998
5:15 PM	0	0	1	0	14	1	4	0	11	100	1	2	1	150	20	0	305	3053
5:20 PM	0	2	0	0	12	0	5	0	15	94	0	0	0	131	8	0	267	3105
5:25 PM	0	1	1	0	11	0	5	0	13	100	2	0	2	146	12	0	293	3178
5:30 PM	1	1	1	0	9	0	4	0	11	60	0	0	0	98	13	0	198	3122
5:35 PM	1	0	0	0	12	0	4	0	10	73	0	0	1	91	11	0	203	3018
5:40 PM	2	0	1	0	9	0	5	0	14	78	0	0	2	98	19	0	228	3002
5:45 PM	0	0	0	0	6	0	4	0	10	94	0	0	0	113	23	0	250	2976
5:50 PM	0	0	0	0	9	0	7	0	10	76	0	0	0	104	9	0	215	2981
5:55 PM	0	0	0	0	9	0	6	0	14	99	1	0	0	91	15	0	235	2954

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	12	8	0	148	4	56	0	156	1176	12	8	12	1708	160	0	3460
Heavy Trucks	0	0	0		4	0	0		0	40	0		0	44	0		88
Pedestrians		0				4				8				0			12
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/20/2015 9:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

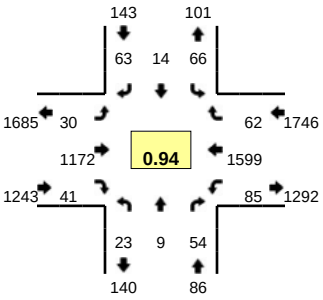
Type of peak hour being reported: Intersection Peak

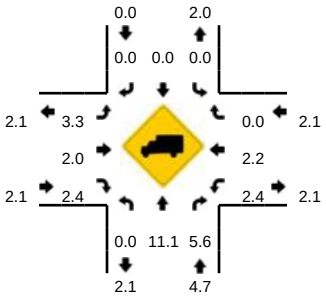
Method for determining peak hour: Total Entering Volume

LOCATION: S 26th Ave -- OR 8
CITY/STATE: Cornelius, OR

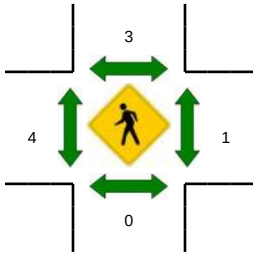
QC JOB #: 13208303
DATE: Wed, Feb 18 2015

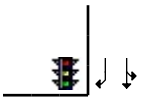
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

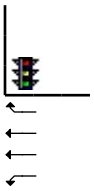


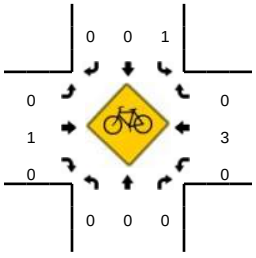


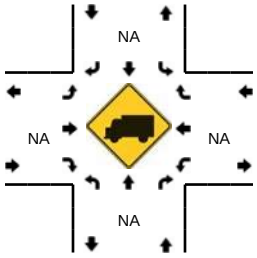
Quality Counts
TRANSPORTATION DATA COLLECTION SERVICES

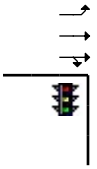


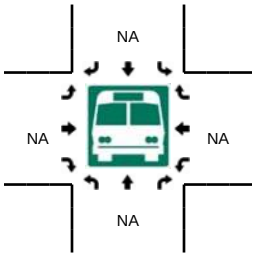












5-Min Count Period Beginning At	S 26th Ave (Northbound)				S 26th Ave (Southbound)				OR 8 (Eastbound)				OR 8 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	1	6	0	4	3	10	0	1	77	4	0	2	98	2	1	213	
4:05 PM	1	0	4	0	2	0	6	0	3	80	2	0	5	139	6	0	248	
4:10 PM	1	0	3	0	7	0	5	0	7	105	2	0	6	100	4	0	240	
4:15 PM	2	0	3	0	6	0	7	0	3	89	2	0	4	117	8	0	241	
4:20 PM	1	0	3	0	9	0	5	0	5	75	7	0	6	120	2	0	233	
4:25 PM	1	1	2	0	1	0	4	0	7	87	2	0	7	104	6	0	222	
4:30 PM	1	1	1	0	16	3	11	0	3	75	1	0	9	127	4	0	252	
4:35 PM	3	0	7	0	7	4	14	0	2	104	4	0	3	143	6	0	297	
4:40 PM	2	2	9	0	9	2	10	0	6	100	5	0	6	117	5	0	273	
4:45 PM	1	0	3	0	5	1	4	0	0	122	2	0	11	127	8	0	284	
4:50 PM	3	2	3	0	8	1	1	0	0	71	2	0	5	133	2	0	231	
4:55 PM	2	0	2	0	3	0	2	0	5	97	7	0	7	115	8	0	248	2982
5:00 PM	3	1	1	0	5	2	3	0	1	88	6	0	8	132	3	0	253	3022
5:05 PM	0	0	9	0	1	1	6	0	1	97	3	0	10	131	5	0	264	3038
5:10 PM	5	2	4	0	1	0	1	0	1	103	5	0	7	126	2	0	257	3055
5:15 PM	1	1	5	0	5	0	0	0	2	116	2	0	6	173	7	0	318	3132
5:20 PM	1	0	4	0	5	0	5	0	6	92	2	0	9	134	4	0	262	3161
5:25 PM	1	0	6	0	1	0	6	0	3	107	2	0	4	141	8	0	279	3218
5:30 PM	3	2	3	0	3	0	5	0	5	63	3	0	7	116	7	0	217	3183
5:35 PM	4	1	1	0	6	0	1	0	0	74	5	0	9	86	0	0	187	3073
5:40 PM	0	0	5	0	2	1	3	0	4	82	3	0	12	121	3	0	236	3036
5:45 PM	2	0	8	0	2	0	2	0	4	93	5	0	8	122	8	0	254	3006
5:50 PM	1	1	2	0	2	0	3	0	3	78	5	0	10	122	4	0	231	3006
5:55 PM	0	0	2	0	4	0	3	0	3	98	2	0	14	99	0	0	225	2983

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	4	60	0	44	0	44	0	44	1260	24	0	76	1792	76	0	3436
Heavy Trucks	0	0	4		0	0	0		4	40	0		0	48	0		96
Pedestrians		0				4				4				0			8
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/20/2015 9:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

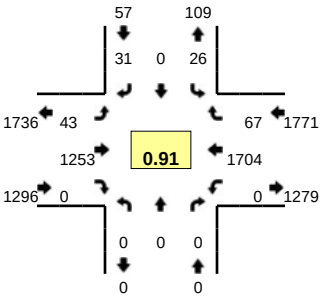
Type of peak hour being reported: Intersection Peak

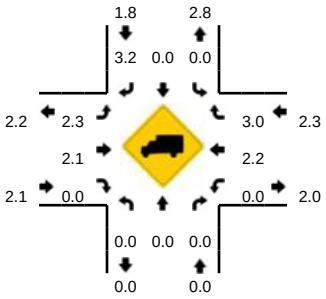
Method for determining peak hour: Total Entering Volume

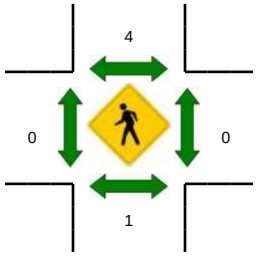
LOCATION: N 29th Ave -- OR 8
CITY/STATE: Cornelius, OR

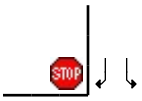
QC JOB #: 13208304
DATE: Wed, Feb 18 2015

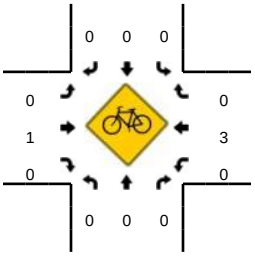
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

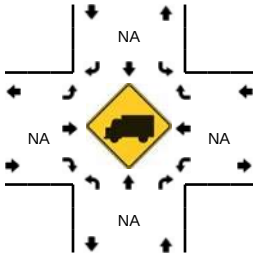


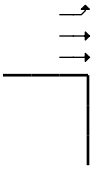


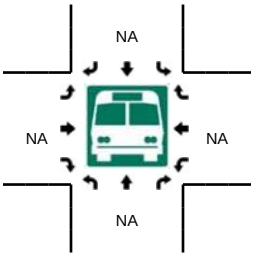












5-Min Count Period Beginning At	N 29th Ave (Northbound)				N 29th Ave (Southbound)				OR 8 (Eastbound)				OR 8 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	3	0	2	0	5	85	0	0	0	90	9	0	194	
4:05 PM	0	0	0	0	3	0	7	0	2	79	0	0	0	140	2	0	233	
4:10 PM	0	0	0	0	3	0	1	0	2	119	0	0	0	111	3	0	239	
4:15 PM	0	0	0	0	0	0	3	0	2	91	0	0	0	128	2	0	226	
4:20 PM	0	0	0	0	2	0	1	0	3	90	0	0	0	131	7	0	234	
4:25 PM	0	0	0	0	1	0	0	0	1	83	0	0	0	116	5	0	206	
4:30 PM	0	0	0	0	5	0	2	0	4	97	0	0	0	144	5	0	257	
4:35 PM	0	0	0	0	1	0	2	0	3	108	0	0	0	141	6	0	261	
4:40 PM	0	0	0	0	2	0	3	0	1	122	0	0	0	133	4	0	265	
4:45 PM	0	0	0	0	2	0	0	0	5	123	0	0	0	140	7	0	277	
4:50 PM	0	0	0	0	2	0	5	0	3	86	0	0	0	133	6	0	235	
4:55 PM	0	0	0	0	2	0	1	0	5	98	0	0	0	126	2	0	234	2861
5:00 PM	0	0	0	0	2	0	4	0	3	89	0	0	0	136	5	0	239	2906
5:05 PM	0	0	0	0	1	0	2	0	4	92	0	0	0	148	8	0	255	2928
5:10 PM	0	0	0	0	4	0	1	0	3	112	0	0	0	139	7	0	266	2955
5:15 PM	0	0	0	0	0	0	4	0	4	122	0	1	0	188	6	0	325	3054
5:20 PM	0	0	0	0	4	0	3	0	4	97	0	0	0	157	3	0	268	3088
5:25 PM	0	0	0	0	1	0	4	0	3	107	0	0	0	119	8	0	242	3124
5:30 PM	0	0	0	0	1	0	1	0	2	70	0	0	0	130	3	0	207	3074
5:35 PM	0	0	0	0	4	0	1	0	5	77	0	1	0	98	3	0	189	3002
5:40 PM	0	0	0	0	3	0	1	0	2	86	0	0	0	136	8	0	236	2973
5:45 PM	0	0	0	0	2	0	2	0	1	99	0	0	0	139	3	0	246	2942
5:50 PM	0	0	0	0	3	0	1	0	1	87	0	0	0	129	9	0	230	2937
5:55 PM	0	0	0	0	2	0	2	0	3	98	0	0	0	103	5	0	213	2916

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	32	0	32	0	44	1324	0	4	0	1936	64	0	3436
Heavy Trucks	0	0	0		0	0	0		4	44	0		0	64	0		112
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/20/2015 9:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

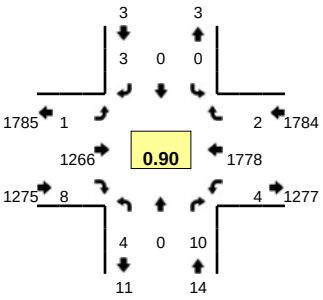
Type of peak hour being reported: Intersection Peak

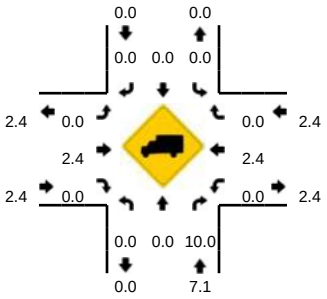
Method for determining peak hour: Total Entering Volume

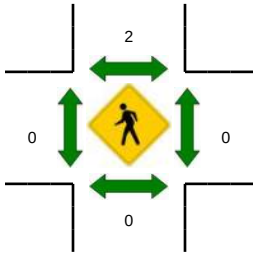
LOCATION: SW 345th Ave -- OR 8
CITY/STATE: Cornelius, OR

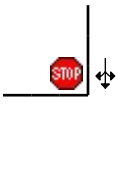
QC JOB #: 13208305
DATE: Wed, Feb 18 2015

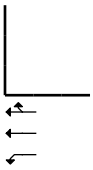
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:10 PM -- 5:25 PM

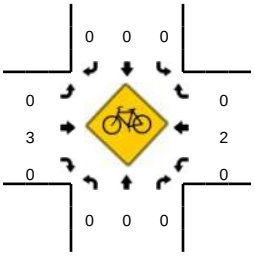


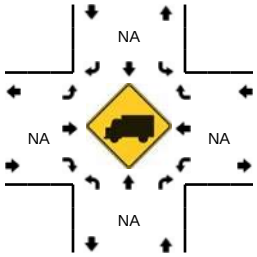


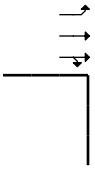


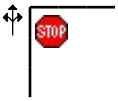


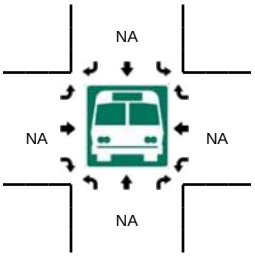












5-Min Count Period Beginning At	SW 345th Ave (Northbound)				SW 345th Ave (Southbound)				OR 8 (Eastbound)				OR 8 (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	0	2	0	0	0	0	0	0	96	0	0	0	101	0	0	201	
4:05 PM	0	0	0	0	0	0	1	0	0	85	0	0	1	151	1	0	239	
4:10 PM	0	0	0	0	0	0	0	0	0	125	0	0	0	110	1	0	236	
4:15 PM	0	0	0	0	0	0	3	0	0	87	0	0	0	125	0	0	215	
4:20 PM	1	0	0	0	0	0	0	0	0	98	0	0	0	139	0	0	238	
4:25 PM	0	0	1	0	0	0	0	0	0	75	2	0	0	127	0	0	205	
4:30 PM	0	0	0	0	0	0	0	0	0	102	2	0	0	150	0	0	254	
4:35 PM	1	0	1	0	0	0	0	0	0	108	1	0	0	152	1	0	264	
4:40 PM	1	0	2	0	0	0	0	0	1	121	0	0	0	134	1	0	260	
4:45 PM	0	0	3	0	0	0	3	0	0	121	0	0	0	143	0	0	270	
4:50 PM	0	0	0	0	0	0	0	0	0	92	0	0	0	146	0	1	239	
4:55 PM	0	0	0	0	0	0	0	0	0	95	2	0	0	125	0	0	222	2843
5:00 PM	1	0	1	0	0	0	0	0	0	99	0	0	0	142	0	0	243	2885
5:05 PM	1	0	0	0	0	0	0	0	0	83	1	0	0	157	0	0	242	2888
5:10 PM	0	0	1	0	0	0	0	0	0	121	0	0	1	152	0	0	275	2927
5:15 PM	0	0	1	0	0	0	0	0	0	116	0	0	1	197	0	0	315	3027
5:20 PM	0	0	0	0	0	0	0	0	0	109	1	0	1	149	0	0	260	3049
5:25 PM	0	0	1	0	0	0	0	0	0	99	1	0	0	131	0	0	232	3076
5:30 PM	0	0	0	0	0	0	0	0	1	85	0	0	0	131	0	0	217	3039
5:35 PM	0	0	0	0	0	0	0	0	0	86	0	0	0	102	0	0	188	2963
5:40 PM	0	0	0	0	2	0	0	0	0	93	1	0	1	140	0	0	237	2940
5:45 PM	1	0	0	0	0	0	0	0	0	100	1	0	1	144	0	0	247	2917
5:50 PM	1	0	1	0	0	0	0	0	0	92	0	0	2	144	0	0	240	2918
5:55 PM	3	0	0	0	0	0	0	0	0	92	0	0	1	104	0	0	200	2896

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	8	0	0	0	0	0	0	1384	4	0	12	1992	0	0	3400
Heavy Trucks	0	0	0		0	0	0		0	52	0		0	68	0		120
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/20/2015 9:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

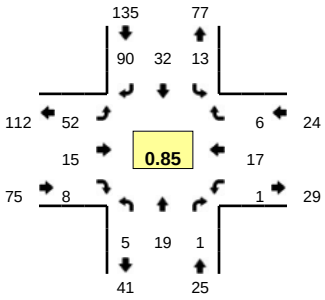
LOCATION: S 20th Ave -- S Dogwood St

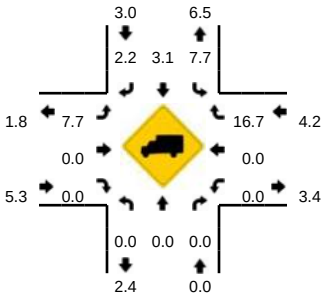
QC JOB #: 13208306

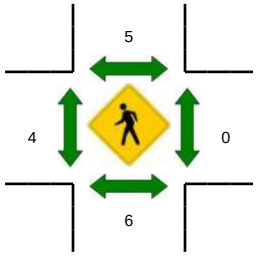
CITY/STATE: Cornelius, OR

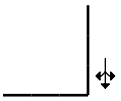
DATE: Wed, Feb 18 2015

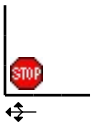
Peak-Hour: 4:40 PM -- 5:40 PM
Peak 15-Min: 5:20 PM -- 5:35 PM

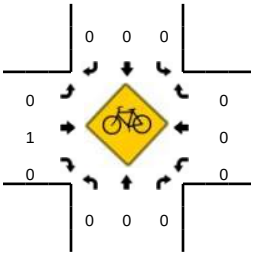


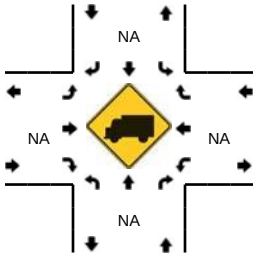


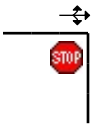


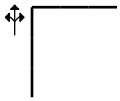


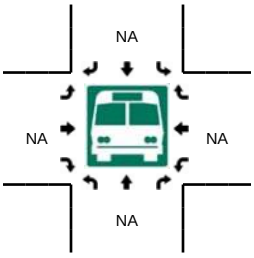












5-Min Count Period Beginning At	S 20th Ave (Northbound)				S 20th Ave (Southbound)				S Dogwood St (Eastbound)				S Dogwood St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	1	0	0	3	1	9	0	4	0	0	0	0	2	0	0	20	
4:05 PM	0	0	0	0	1	2	9	0	9	0	1	0	0	1	1	0	24	
4:10 PM	1	1	0	0	0	2	9	0	5	2	1	0	0	1	2	0	24	
4:15 PM	0	2	0	0	1	5	4	0	2	2	0	0	0	2	0	0	18	
4:20 PM	1	2	0	0	3	3	9	0	2	2	0	0	0	0	1	0	23	
4:25 PM	0	1	0	0	0	2	9	0	4	3	0	0	0	1	2	0	22	
4:30 PM	0	3	0	0	2	1	8	0	5	0	0	0	0	2	0	0	21	
4:35 PM	0	1	0	0	0	3	9	0	1	0	0	0	0	1	0	0	15	
4:40 PM	1	0	0	0	3	3	9	0	5	2	1	0	0	2	0	0	26	
4:45 PM	0	2	0	0	0	2	4	0	8	1	1	0	0	1	1	0	20	
4:50 PM	1	0	0	0	1	0	6	0	6	2	0	0	0	2	0	0	18	
4:55 PM	0	2	1	0	0	3	7	0	5	0	0	0	0	1	1	0	20	251
5:00 PM	0	1	0	0	0	2	13	0	2	2	1	0	0	1	0	0	22	253
5:05 PM	0	2	0	0	0	4	9	0	2	2	0	0	0	1	0	0	20	249
5:10 PM	0	0	0	0	2	3	6	0	2	0	1	0	0	0	1	0	15	240
5:15 PM	1	3	0	0	0	2	3	0	4	1	1	0	0	2	0	0	17	239
5:20 PM	0	1	0	0	2	5	7	0	6	1	1	0	0	3	0	0	26	242
5:25 PM	1	3	0	0	0	4	6	0	4	1	0	0	1	0	2	0	22	242
5:30 PM	1	3	0	0	2	2	10	0	6	3	0	0	0	1	0	0	28	249
5:35 PM	0	2	0	0	3	2	10	0	2	0	2	0	0	3	1	0	25	259
5:40 PM	0	3	0	0	1	2	5	0	6	0	0	0	0	1	0	0	18	251
5:45 PM	0	4	0	0	3	1	8	0	3	3	0	0	0	2	1	0	25	256
5:50 PM	0	2	0	0	1	3	9	0	2	1	1	0	0	2	0	0	21	259
5:55 PM	0	3	0	0	1	2	8	0	4	0	0	0	0	0	0	0	18	257

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	28	0	0	16	44	92	0	64	20	4	0	4	16	8	0	304
Heavy Trucks	0	0	0		0	0	4		4	0	0		0	0	0		8
Pedestrians		8				0				16				0			24
Bicycles	0	0	0		0	0	0		0	1	0		0	0	0		1
Railroad																	
Stopped Buses																	

Comments:

Report generated on 2/20/2015 9:49 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

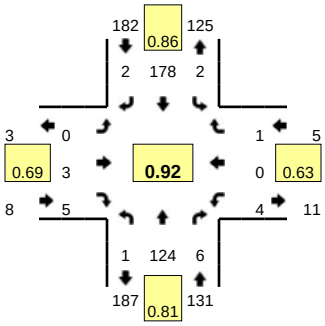
Method for determining peak hour: Total Entering Volume

LOCATION: N 10th Ave -- N Barlow St

QC JOB #: 10867001

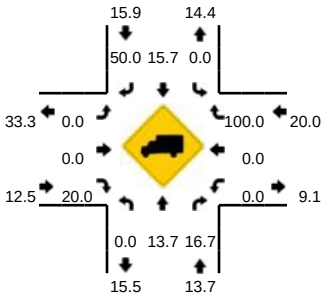
CITY/STATE: Cornelius, OR

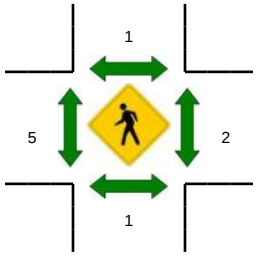
DATE: Thu, Dec 13 2012

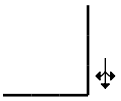


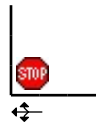
Peak-Hour: 8:00 AM -- 9:00 AM

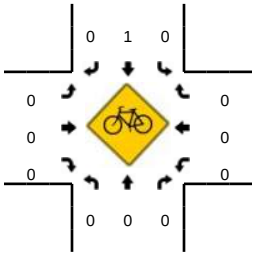
Peak 15-Min: 8:15 AM -- 8:30 AM

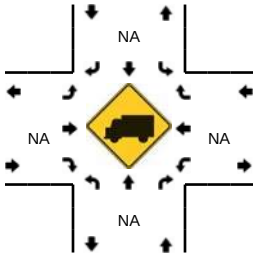


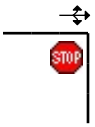


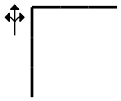


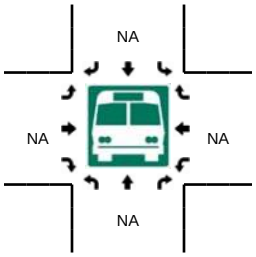












15-Min Count Period Beginning At	N 10th Ave (Northbound)				N 10th Ave (Southbound)				N Barlow St (Eastbound)				N Barlow St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	40	0	0	1	24	1	0	0	1	0	0	0	0	1	0	70	
7:15 AM	0	41	0	0	0	34	0	0	1	0	1	0	0	0	0	0	77	
7:30 AM	0	29	0	0	1	27	0	0	0	0	3	0	0	0	0	0	60	
7:45 AM	1	23	0	0	0	40	0	0	0	1	2	0	2	0	0	0	69	276
8:00 AM	0	25	2	0	0	52	1	0	0	0	1	0	1	0	1	0	83	289
8:15 AM	0	38	1	0	2	43	0	0	0	2	2	0	1	0	0	0	89	301
8:30 AM	0	27	0	0	0	39	0	0	0	0	2	0	0	0	0	0	68	309
8:45 AM	1	34	3	0	0	44	1	0	0	1	0	0	2	0	0	0	86	326

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	152	4	0	8	172	0	0	0	8	8	0	4	0	0	0	356
Heavy Trucks	0	20	4		0	24	0		0	0	4		0	0	0		52
Pedestrians		4				0				4				8			16
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2012 8:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

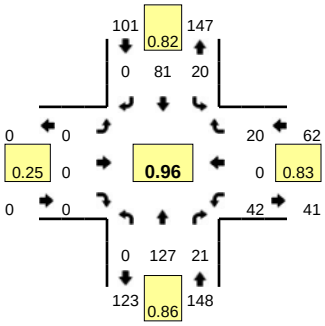
Method for determining peak hour: Total Entering Volume

LOCATION: N 10th Ave -- N Davis St

QC JOB #: 10867003

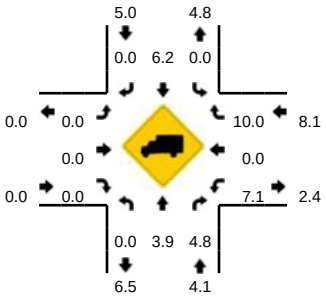
CITY/STATE: Cornelius, OR

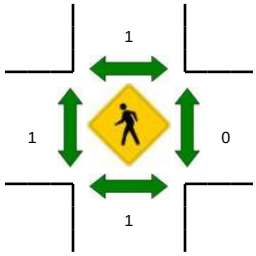
DATE: Tue, Dec 11 2012

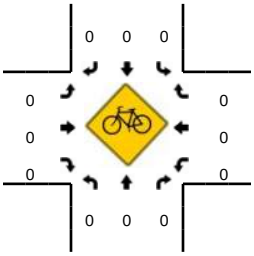


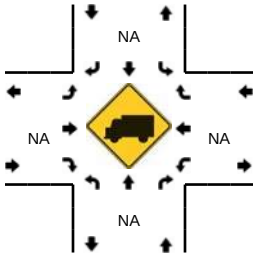
Peak-Hour: 7:00 AM -- 8:00 AM

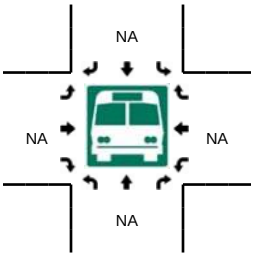
Peak 15-Min: 7:45 AM -- 8:00 AM











15-Min Count Period Beginning At	N 10th Ave (Northbound)				N 10th Ave (Southbound)				N Davis St (Eastbound)				N Davis St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	35	8	0	6	14	0	0	0	0	0	0	10	0	2	0	75	
7:15 AM	0	35	8	0	3	21	0	0	0	0	0	0	9	0	3	0	79	
7:30 AM	0	31	4	0	2	21	0	0	0	0	0	0	10	0	8	0	76	
7:45 AM	0	26	1	0	9	25	0	0	0	0	0	0	13	0	7	0	81	311
8:00 AM	2	12	5	0	2	23	0	0	0	0	0	0	7	0	5	0	56	292
8:15 AM	2	24	6	0	6	18	0	0	0	0	0	0	11	0	5	0	72	285
8:30 AM	1	21	3	0	6	22	0	0	0	0	1	0	7	0	5	0	66	275
8:45 AM	0	15	4	1	5	23	0	0	0	0	0	0	11	0	0	0	59	253

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	104	4	0	36	100	0	0	0	0	0	0	52	0	28	0	324
Heavy Trucks	0	4	0		0	4	0		0	0	0		0	0	4		12
Pedestrians		0				4				4				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/13/2012 4:18 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

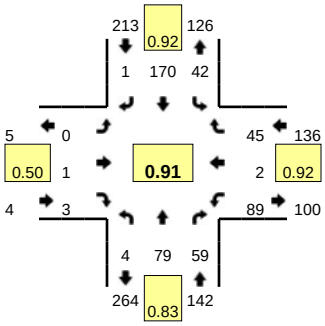
Method for determining peak hour: Total Entering Volume

LOCATION: N 10th Ave -- N Davis St

QC JOB #: 10867004

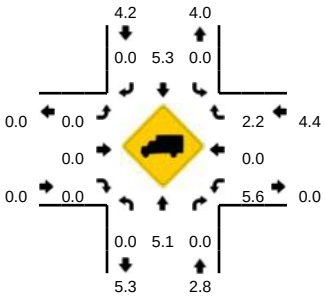
CITY/STATE: Cornelius, OR

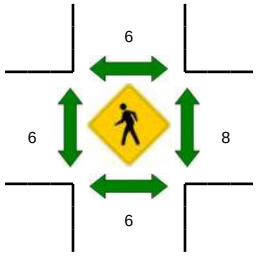
DATE: Tue, Dec 11 2012

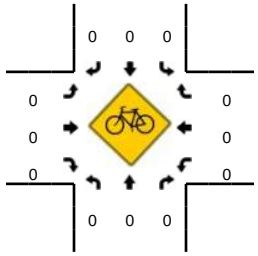


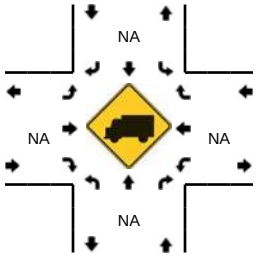
Peak-Hour: 4:15 PM -- 5:15 PM

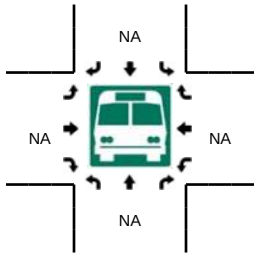
Peak 15-Min: 4:45 PM -- 5:00 PM











15-Min Count Period Beginning At	N 10th Ave (Northbound)				N 10th Ave (Southbound)				N Davis St (Eastbound)				N Davis St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	22	9	0	12	30	0	0	0	0	0	0	18	0	17	0	108	
4:15 PM	0	14	14	0	10	41	1	0	0	0	1	0	19	0	10	0	110	
4:30 PM	1	18	14	0	11	38	0	0	0	0	0	0	25	0	10	0	117	
4:45 PM	0	23	18	2	7	45	0	2	0	1	1	0	21	2	14	0	136	471
5:00 PM	1	24	13	0	12	46	0	0	0	0	1	0	24	0	11	0	132	495
5:15 PM	0	18	8	0	7	27	0	0	0	0	0	0	18	0	6	0	84	469
5:30 PM	2	13	4	0	5	32	0	0	1	0	0	0	22	0	5	0	84	436
5:45 PM	0	20	11	0	6	20	0	0	0	0	0	0	16	0	7	0	80	380

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	92	72	8	28	180	0	8	0	4	4	0	84	8	56	0	544
Heavy Trucks	0	16	0		0	12	0		0	0	0		4	0	4		36
Pedestrians		8				0				0				24			32
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/13/2012 4:19 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

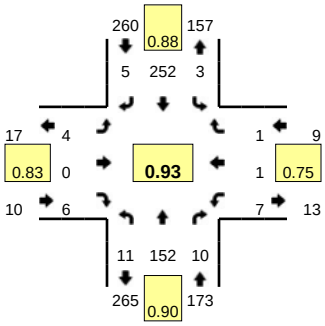
Method for determining peak hour: Total Entering Volume

LOCATION: N 10th Ave -- N Barlow St

QC JOB #: 10867002

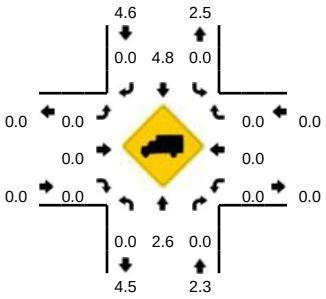
CITY/STATE: Cornelius, OR

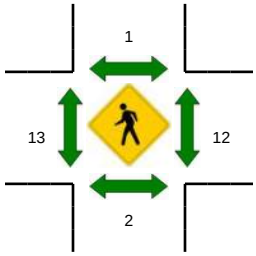
DATE: Wed, Dec 12 2012

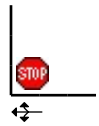


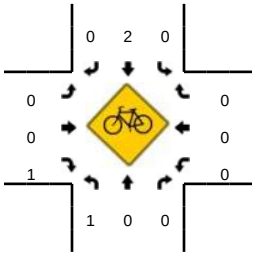
Peak-Hour: 4:15 PM -- 5:15 PM

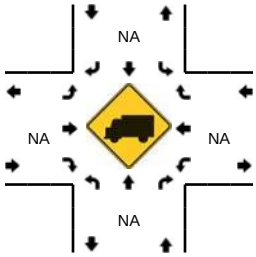
Peak 15-Min: 5:00 PM -- 5:15 PM

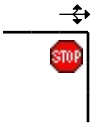


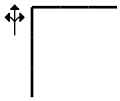


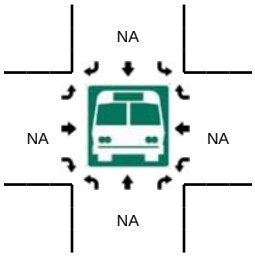












15-Min Count Period Beginning At	N 10th Ave (Northbound)				N 10th Ave (Southbound)				N Barlow St (Eastbound)				N Barlow St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	2	38	1	0	0	48	0	0	0	0	1	0	2	0	0	0	92	
4:15 PM	3	42	1	0	1	55	1	0	1	0	2	0	1	0	0	0	107	
4:30 PM	4	35	1	0	0	72	2	0	0	0	3	0	1	1	0	0	119	
4:45 PM	1	36	2	0	1	59	1	0	2	0	1	0	1	0	0	0	104	422
5:00 PM	3	39	6	0	1	66	1	0	1	0	0	0	4	0	1	0	122	452
5:15 PM	7	35	2	0	1	48	1	0	1	0	2	0	5	0	1	0	103	448
5:30 PM	1	30	3	0	3	51	0	0	0	0	1	0	4	0	0	0	93	422
5:45 PM	4	24	12	0	2	55	2	0	1	0	1	0	1	0	2	0	104	422

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	156	24	0	4	264	4	0	4	0	0	0	16	0	4	0	488
Heavy Trucks	0	4	0		0	12	0		0	0	0		0	0	0		16
Pedestrians		0				0				8				16			24
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/14/2012 8:42 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

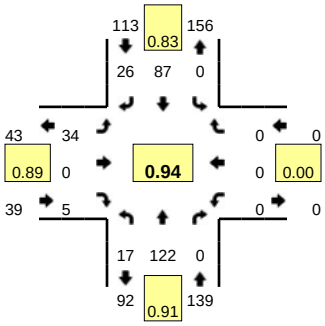
Method for determining peak hour: Total Entering Volume

LOCATION: N 10th Ave -- N Holladay St

QC JOB #: 10867005

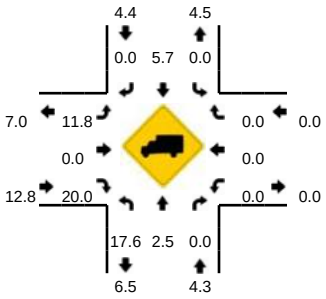
CITY/STATE: Cornelius, OR

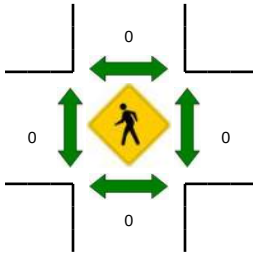
DATE: Tue, Dec 11 2012

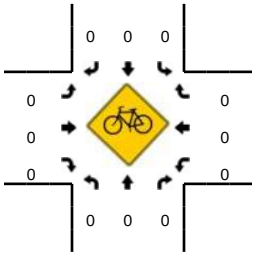


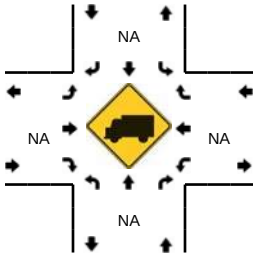
Peak-Hour: 7:00 AM -- 8:00 AM

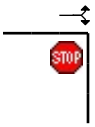
Peak 15-Min: 7:45 AM -- 8:00 AM

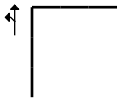


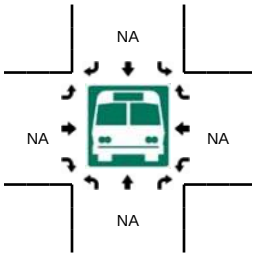












15-Min Count Period Beginning At	N 10th Ave (Northbound)				N 10th Ave (Southbound)				N Holladay St (Eastbound)				N Holladay St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	2	33	0	0	0	18	3	0	8	0	2	0	0	0	0	0	66	
7:15 AM	6	32	0	0	0	20	7	0	8	0	1	0	0	0	0	0	74	
7:30 AM	3	32	0	0	0	22	6	0	11	0	0	0	0	0	0	0	74	
7:45 AM	6	25	0	0	0	27	10	0	7	0	2	0	0	0	0	0	77	291
8:00 AM	6	11	0	0	0	23	6	0	3	0	1	0	0	0	0	0	50	275
8:15 AM	5	25	0	0	0	20	7	0	4	0	4	0	0	0	0	0	65	266
8:30 AM	2	23	0	0	0	19	11	0	3	0	6	0	0	0	0	0	64	256
8:45 AM	1	13	0	0	0	27	8	0	2	0	5	0	0	0	0	0	56	235

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	100	0	0	0	108	40	0	28	0	8	0	0	0	0	0	308
Heavy Trucks	4	4	0		0	8	0		12	0	0		0	0	0		28
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 12/13/2012 4:21 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

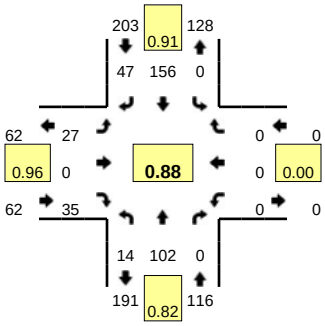
Method for determining peak hour: Total Entering Volume

LOCATION: N 10th Ave -- N Holladay St

QC JOB #: 10867006

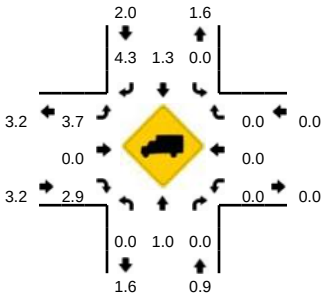
CITY/STATE: Cornelius, OR

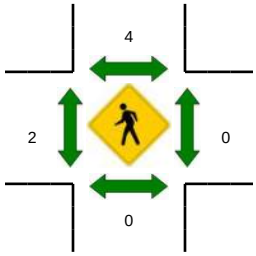
DATE: Tue, Dec 11 2012

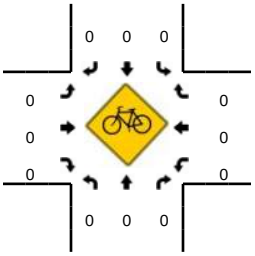


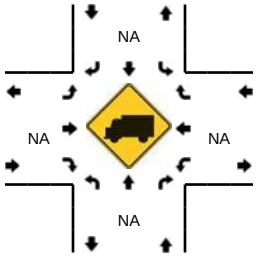
Peak-Hour: 4:15 PM -- 5:15 PM

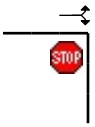
Peak 15-Min: 4:45 PM -- 5:00 PM

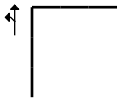


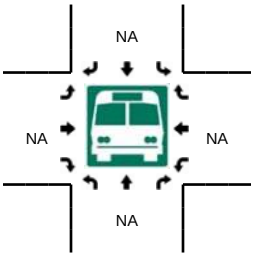












15-Min Count Period Beginning At	N 10th Ave (Northbound)				N 10th Ave (Southbound)				N Holladay St (Eastbound)				N Holladay St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	30	0	0	0	32	6	0	7	0	8	0	0	0	0	0	87	
4:15 PM	2	19	0	0	0	41	15	0	5	0	9	0	0	0	0	0	91	
4:30 PM	7	20	0	0	0	29	8	0	7	0	8	0	0	0	0	0	79	
4:45 PM	3	33	0	0	0	42	14	0	7	0	8	1	0	0	0	0	108	365
5:00 PM	2	30	0	0	0	44	10	0	7	0	10	0	0	0	0	0	103	381
5:15 PM	2	16	0	0	0	26	14	0	9	0	8	0	0	0	0	0	75	365
5:30 PM	2	16	0	0	0	27	8	0	7	0	3	0	0	0	0	0	63	349
5:45 PM	5	18	0	0	0	16	7	0	2	0	4	0	0	0	0	0	52	293

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	132	0	0	0	168	56	0	28	0	32	4	0	0	0	0	432
Heavy Trucks	0	4	0		0	0	4		0	0	4		0	0	0		12
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

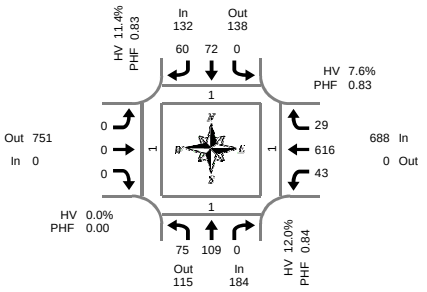
Comments:

Report generated on 12/13/2012 4:22 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



N 10th Ave & N Adair St

Wednesday, July 21, 2010
7:00 AM to 10:00 AM

Peak Hour Summary
7:35 AM to 8:35 AM

5-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	8	8	0	0	0	4	2	0	0	0	0	0	1	39	1	0	63	1	2	0	0
7:05 AM	1	9	0	0	0	2	3	0	0	0	0	0	3	33	3	0	54	0	0	0	0
7:10 AM	4	7	0	0	0	9	2	0	0	0	0	0	3	48	2	0	75	0	1	1	0
7:15 AM	2	14	0	0	0	10	1	0	0	0	0	0	1	37	0	0	65	1	0	0	1
7:20 AM	3	9	0	0	0	3	2	0	0	0	0	0	4	38	4	1	63	0	0	1	0
7:25 AM	5	7	0	0	0	9	9	0	0	0	0	0	4	31	1	0	66	0	0	0	0
7:30 AM	5	11	0	0	0	6	3	0	0	0	0	0	1	40	0	0	66	0	0	0	0
7:35 AM	5	11	0	0	0	6	6	0	0	0	0	0	3	53	3	0	87	0	0	0	0
7:40 AM	8	13	0	0	0	2	4	0	0	0	0	0	4	49	5	0	85	0	0	0	0
7:45 AM	5	9	0	0	0	11	2	0	0	0	0	0	1	46	0	0	74	0	0	0	0
7:50 AM	9	11	0	1	0	4	4	0	0	0	0	0	3	65	5	0	101	0	1	1	1
7:55 AM	6	8	0	0	0	6	4	0	0	0	0	0	2	60	4	0	90	0	0	0	0
8:00 AM	5	6	0	0	0	3	4	0	0	0	0	0	8	54	7	0	87	1	0	0	0
8:05 AM	7	9	0	0	0	8	7	0	0	0	0	0	6	47	2	0	86	0	0	0	0
8:10 AM	7	7	0	0	0	6	5	0	0	0	0	0	1	49	1	0	76	0	0	0	0
8:15 AM	5	10	0	0	0	7	7	1	0	0	0	0	7	53	0	0	89	0	0	0	0
8:20 AM	5	5	0	0	0	7	7	0	0	0	0	0	3	48	1	1	76	0	0	0	0
8:25 AM	5	10	0	0	0	7	5	0	0	0	0	0	2	36	1	0	66	0	0	0	0
8:30 AM	8	10	0	0	0	5	5	0	0	0	0	0	3	56	0	0	87	0	0	0	0
8:35 AM	3	3	0	0	0	6	5	0	0	0	0	0	3	52	4	0	76	0	0	0	1
8:40 AM	2	10	0	0	0	5	5	1	0	0	0	0	4	42	4	1	72	1	0	0	3
8:45 AM	5	4	0	0	0	5	7	0	0	0	0	0	5	51	1	0	78	0	2	0	0
8:50 AM	4	12	0	0	0	8	6	0	0	0	0	0	4	40	3	2	77	1	0	1	1
8:55 AM	5	6	0	0	0	6	7	0	0	0	0	0	3	60	1	0	88	0	0	3	0
9:00 AM	3	7	0	0	0	11	5	0	0	0	0	0	4	44	3	0	77	2	0	1	0
9:05 AM	4	9	0	1	0	6	3	0	0	0	0	0	0	48	0	0	70	2	1	0	0
9:10 AM	2	7	0	0	0	11	0	0	0	0	0	0	3	52	4	0	79	2	2	2	0
9:15 AM	8	13	0	0	0	7	7	0	0	0	0	0	1	43	0	0	79	1	0	1	1
9:20 AM	6	7	0	0	0	7	3	0	0	0	0	0	4	38	2	0	67	0	0	1	0
9:25 AM	6	6	0	0	0	7	10	0	0	0	0	0	4	38	6	0	77	0	1	0	0
9:30 AM	1	6	0	0	0	5	6	0	0	0	0	0	5	55	0	0	78	0	1	0	1
9:35 AM	7	5	0	0	0	9	6	0	0	0	0	0	6	39	3	0	75	0	0	0	1
9:40 AM	5	6	0	0	0	6	4	0	0	0	0	0	5	49	3	0	78	0	0	5	0
9:45 AM	5	11	0	0	0	9	8	0	0	0	0	0	5	49	4	0	91	0	0	0	4
9:50 AM	1	4	0	0	0	6	6	0	0	0	0	0	5	51	0	0	73	0	0	0	0
9:55 AM	7	4	0	0	0	5	3	0	0	0	0	0	2	58	0	0	79	0	0	2	0
Total Survey	177	294	0	2	0	234	173	2	0	0	0	0	123	1,691	78	5	2,770	12	11	19	14

15-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	13	24	0	0	0	15	7	0	0	0	0	0	7	120	6	0	192	1	3	1	0
7:15 AM	10	30	0	0	0	22	12	0	0	0	0	0	9	106	5	1	194	1	0	1	1
7:30 AM	18	35	0	0	0	14	13	0	0	0	0	0	8	142	8	0	238	0	0	0	0
7:45 AM	20	28	0	1	0	21	10	0	0	0	0	0	6	171	9	0	265	0	1	1	1
8:00 AM	19	22	0	0	0	17	16	0	0	0	0	0	15	150	10	0	249	1	0	0	0
8:15 AM	15	25	0	0	0	21	19	1	0	0	0	0	12	137	2	1	231	0	0	0	0
8:30 AM	13	23	0	0	0	16	15	1	0	0	0	0	10	150	8	1	235	1	0	0	4
8:45 AM	14	22	0	0	0	19	20	0	0	0	0	0	12	151	5	2	243	1	2	4	1
9:00 AM	9	23	0	1	0	28	8	0	0	0	0	0	7	144	7	0	226	6	3	3	0
9:15 AM	20	26	0	0	0	21	20	0	0	0	0	0	9	119	8	0	223	1	1	2	1
9:30 AM	13	17	0	0	0	20	16	0	0	0	0	0	16	143	6	0	231	0	1	5	2
9:45 AM	13	19	0	0	0	20	17	0	0	0	0	0	12	158	4	0	243	0	0	2	4
Total Survey	177	294	0	2	0	234	173	2	0	0	0	0	123	1,691	78	5	2,770	12	11	19	14

Peak Hour Summary
7:35 AM to 8:35 AM

By Approach	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	184	115	299	1	132	138	270	1	0	751	751	0	688	0	688	1	1,004	1	1	1	1
%HV	12.0%				11.4%				0.0%				7.6%				8.9%				
PHF	0.84				0.83				0.00				0.83				0.90				

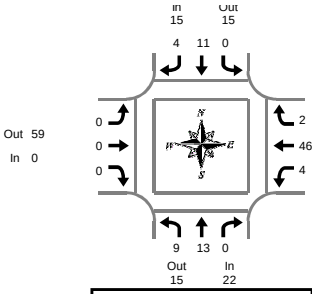
By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	75	109	0	184	0	72	60	132	0	0	0	0	43	616	29	688	1,004
%HV	12.0%	11.9%	0.0%	12.0%	0.0%	15.3%	6.7%	11.4%	0.0%	0.0%	0.0%	0.0%	9.3%	7.5%	6.9%	7.6%	8.9%
PHF	0.85	0.83	0.00	0.84	0.00	0.86	0.79	0.83	0.00	0.00	0.00	0.00	0.67	0.86	0.45	0.83	0.90

Rolling Hour Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	61	117	0	1	0	72	42	0	0	0	0	0	30	539	28	1	889	2	4	3	2
7:15 AM	67	115	0	1	0	74	51	0	0	0	0	0	38	569	32	1	946	2	1	2	2
7:30 AM	72	110	0	1	0	73	58	1	0	0	0	0	41	600	29	1	983	1	1	1	1
7:45 AM	67	98	0	1	0	75	60	2	0	0	0	0	43	608	29	2	980	2	1	1	5
8:00 AM	61	92	0	0	0	73	70	2	0	0	0	0	49	588	25	4	958	3	2	4	5
8:15 AM	51	93	0	1	0	84	62	2	0	0	0	0	41	582	22	4	935	8	5	7	5
8:30 AM	56	94	0	1	0	84	63	1	0	0	0	0	38	564	28	3	927	9	6	9	6
8:45 AM	56	88	0	1	0	88	64	0	0	0	0	0	44	557	26	2	923	8	7	14	4
9:00 AM	55	85	0	1	0	89	61	0	0	0	0	0	44	564	25	0	923	7	5	12	7

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



N 10th Ave & N Adair St

Wednesday, July 21, 2010
7:00 AM to 10:00 AM

Peak Hour Summary
7:35 AM to 8:35 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	3	0	3	0	1	0	1	0	0	0	0	0	6	0	6	10
7:05 AM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
7:10 AM	0	3	0	3	0	2	1	3	0	0	0	0	0	6	1	7	13
7:15 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	5	0	5	7
7:20 AM	0	3	0	3	0	1	0	1	0	0	0	0	1	5	0	6	10
7:25 AM	2	1	0	3	0	2	0	2	0	0	0	0	0	1	0	1	6
7:30 AM	0	0	0	0	0	1	2	3	0	0	0	0	0	4	0	4	7
7:35 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	4	0	4	6
7:40 AM	0	3	0	3	0	0	0	0	0	0	0	0	1	1	1	3	6
7:45 AM	0	1	0	1	0	2	1	3	0	0	0	0	0	6	0	6	10
7:50 AM	2	0	0	2	0	1	0	1	0	0	0	0	0	4	0	4	7
7:55 AM	0	1	0	1	0	1	1	2	0	0	0	0	1	1	1	3	6
8:00 AM	0	1	0	1	0	0	0	0	0	0	0	0	1	1	0	2	3
8:05 AM	2	1	0	3	0	0	0	0	0	0	0	0	1	6	0	7	10
8:10 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	4	0	4	6
8:15 AM	2	2	0	4	0	1	1	2	0	0	0	0	0	7	0	7	13
8:20 AM	1	0	0	1	0	2	1	3	0	0	0	0	0	6	0	6	10
8:25 AM	1	0	0	1	0	1	0	1	0	0	0	0	0	1	0	1	3
8:30 AM	1	2	0	3	0	1	0	1	0	0	0	0	0	5	0	5	9
8:35 AM	1	0	0	1	0	1	1	2	0	0	0	0	1	8	1	10	13
8:40 AM	0	1	0	1	0	2	1	3	0	0	0	0	1	1	0	2	6
8:45 AM	0	1	0	1	0	0	1	1	0	0	0	0	0	1	0	1	3
8:50 AM	0	1	0	1	0	1	0	1	0	0	0	0	0	8	0	8	10
8:55 AM	1	0	0	1	0	1	0	1	0	0	0	0	0	3	0	3	5
9:00 AM	0	0	0	0	0	4	0	4	0	0	0	0	1	0	0	1	5
9:05 AM	0	3	0	3	0	0	0	0	0	0	0	0	0	5	0	5	8
9:10 AM	0	2	0	2	0	1	0	1	0	0	0	0	0	2	0	2	5
9:15 AM	1	2	0	3	0	0	0	0	0	0	0	0	0	2	0	2	5
9:20 AM	1	0	0	1	0	1	1	2	0	0	0	0	0	2	0	2	5
9:25 AM	0	1	0	1	0	0	1	1	0	0	0	0	0	3	0	3	5
9:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
9:35 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	6	1	7	8
9:40 AM	0	0	0	0	0	1	0	1	0	0	0	0	0	4	0	4	5
9:45 AM	1	3	0	4	0	1	0	1	0	0	0	0	1	4	1	6	11
9:50 AM	0	2	0	2	0	0	1	1	0	0	0	0	0	3	0	3	6
9:55 AM	1	0	0	1	0	2	0	2	0	0	0	0	0	6	0	6	9
Total Survey	17	42	0	59	0	34	14	48	0	0	0	0	9	135	6	150	257

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	8	0	8	0	3	1	4	0	0	0	0	0	12	1	13	25
7:15 AM	2	5	0	7	0	4	0	4	0	0	0	0	1	11	0	12	23
7:30 AM	0	4	0	4	0	2	2	4	0	0	0	0	1	9	1	11	19
7:45 AM	2	2	0	4	0	4	2	6	0	0	0	0	1	11	1	13	23
8:00 AM	2	3	0	5	0	1	0	1	0	0	0	0	2	11	0	13	19
8:15 AM	4	2	0	6	0	4	2	6	0	0	0	0	0	14	0	14	26
8:30 AM	2	3	0	5	0	4	2	6	0	0	0	0	2	14	1	17	28
8:45 AM	1	2	0	3	0	2	1	3	0	0	0	0	0	12	0	12	18
9:00 AM	0	5	0	5	0	5	0	5	0	0	0	0	1	7	0	8	18
9:15 AM	2	3	0	5	0	1	2	3	0	0	0	0	0	7	0	7	15
9:30 AM	0	0	0	0	0	1	1	2	0	0	0	0	0	14	1	15	17
9:45 AM	2	5	0	7	0	3	1	4	0	0	0	0	1	13	1	15	26
Total Survey	17	42	0	59	0	34	14	48	0	0	0	0	9	135	6	150	257

Heavy Vehicle Peak Hour Summary
7:35 AM to 8:35 AM

By Approach	Northbound N 10th Ave			Southbound N 10th Ave			Eastbound N Adair St			Westbound N Adair St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	22	15	37	15	15	30	0	59	59	52	0	52	89
PHF	0.69			0.63			0.00			0.72			0.77

By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	9	13	0	22	0	11	4	15	0	0	0	0	4	46	2	52	89
PHF	0.56	0.65	0.00	0.69	0.00	0.69	0.50	0.63	0.00	0.00	0.00	0.00	0.33	0.68	0.50	0.72	0.77

Heavy Vehicle Rolling Hour Summary
7:00 AM to 10:00 AM

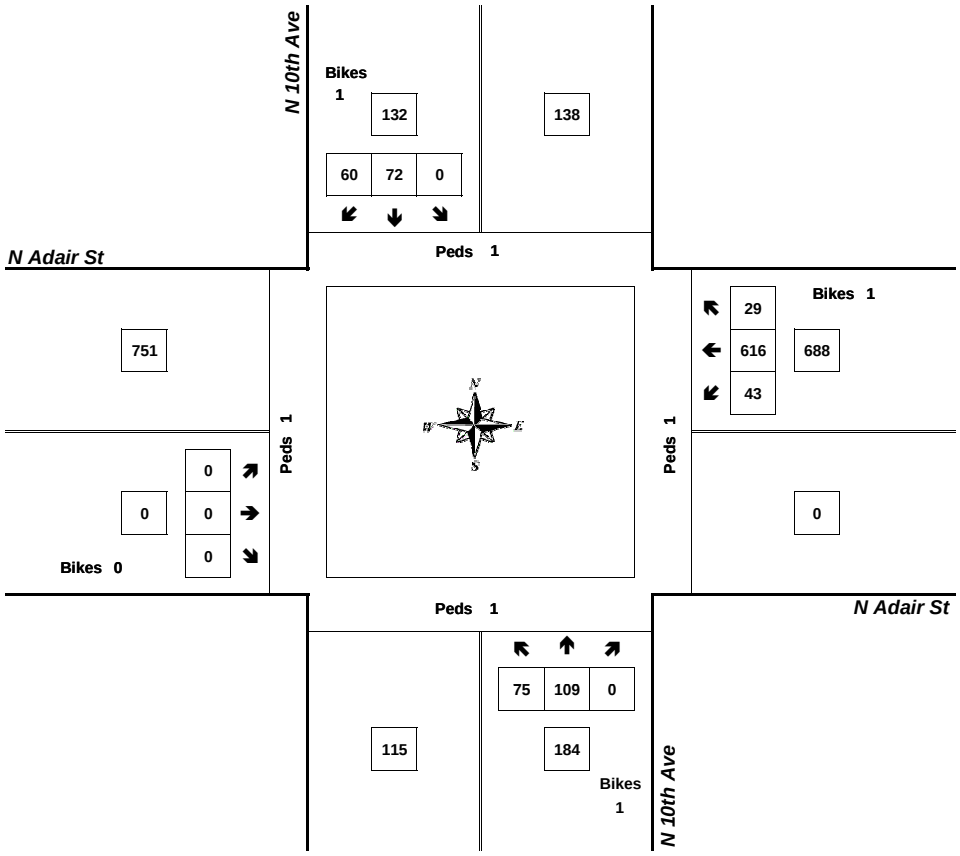
Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	4	19	0	23	0	13	5	18	0	0	0	0	3	43	3	49	90
7:15 AM	6	14	0	20	0	11	4	15	0	0	0	0	5	42	2	49	84
7:30 AM	8	11	0	19	0	11	6	17	0	0	0	0	4	45	2	51	87
7:45 AM	10	10	0	20	0	13	6	19	0	0	0	0	5	50	2	57	96
8:00 AM	9	10	0	19	0	11	5	16	0	0	0	0	4	51	1	56	91
8:15 AM	7	12	0	19	0	15	5	20	0	0	0	0	3	47	1	51	90
8:30 AM	5	13	0	18	0	12	5	17	0	0	0	0	3	40	1	44	79
8:45 AM	3	10	0	13	0	9	4	13	0	0	0	0	1	40	1	42	68
9:00 AM	4	13	0	17	0	10	4	14	0	0	0	0	2	41	2	45	76

Peak Hour Summary

Clay Carney
(503) 833-2740

N 10th Ave & N Adair St

7:35 AM to 8:35 AM
Wednesday, July 21, 2010

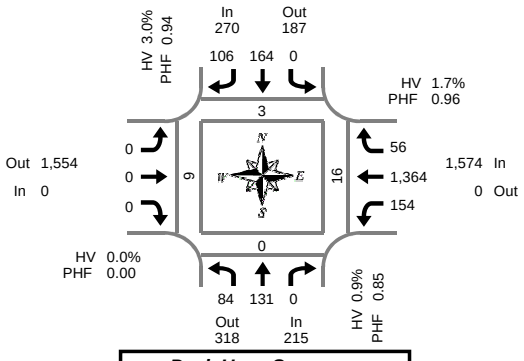


Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.83	7.6%	688
NB	0.84	12.0%	184
SB	0.83	11.4%	132
Intersection	0.90	8.9%	1,004

Count Period: 7:00 AM to 10:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:50 PM to 5:50 PM

N 10th Ave & N Adair St

Tuesday, July 20, 2010
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	3	8	0	0	0	19	7	0	0	0	0	0	15	93	1	0	146	0	0	0	1
4:05 PM	8	5	0	0	0	15	12	0	0	0	0	0	12	61	4	0	117	0	0	0	1
4:10 PM	5	4	0	0	0	22	10	0	0	0	0	0	9	104	7	0	161	2	0	1	4
4:15 PM	7	20	0	0	0	13	7	0	0	0	0	0	12	113	4	0	176	0	0	0	0
4:20 PM	2	15	0	0	0	20	7	0	0	0	0	0	11	99	10	0	164	0	0	2	0
4:25 PM	6	10	0	0	0	18	13	1	0	0	0	0	13	115	2	0	177	4	0	3	1
4:30 PM	8	8	0	0	0	14	3	0	0	0	0	0	12	98	4	0	147	0	0	6	1
4:35 PM	4	10	0	0	0	16	9	0	0	0	0	0	9	88	2	0	138	4	0	1	1
4:40 PM	1	14	0	0	0	15	10	0	0	0	0	0	9	107	4	0	160	0	1	2	1
4:45 PM	5	9	0	0	0	14	8	0	0	0	0	0	7	97	8	2	148	0	0	0	0
4:50 PM	10	13	0	1	0	15	10	0	0	0	0	0	7	112	4	0	171	0	0	0	2
4:55 PM	10	13	0	0	0	11	8	0	0	0	0	0	12	125	3	0	182	0	0	2	1
5:00 PM	8	9	0	0	0	16	7	0	0	0	0	0	10	116	4	0	170	0	0	1	0
5:05 PM	10	9	0	0	0	15	7	0	0	0	0	0	16	109	7	0	173	1	0	1	1
5:10 PM	6	10	0	0	0	16	10	0	0	0	0	0	16	115	4	0	177	0	0	3	0
5:15 PM	7	15	0	0	0	8	6	0	0	0	0	0	12	119	10	0	177	0	0	1	3
5:20 PM	11	10	0	0	0	11	15	0	0	0	0	0	8	103	5	0	163	1	0	5	0
5:25 PM	5	11	0	0	0	17	5	0	0	0	0	0	18	124	4	0	184	0	0	2	0
5:30 PM	3	11	0	0	0	15	6	0	0	0	0	0	17	103	3	0	158	0	0	0	1
5:35 PM	6	10	0	0	0	13	16	1	0	0	0	0	10	103	6	1	164	1	0	0	1
5:40 PM	4	11	0	0	0	13	9	1	0	0	0	0	15	110	4	0	166	0	0	1	0
5:45 PM	4	9	0	2	0	14	7	0	0	0	0	0	13	125	2	0	174	0	0	0	0
5:50 PM	6	6	0	0	0	11	6	0	0	0	0	0	12	97	5	0	143	0	0	0	0
5:55 PM	5	9	0	0	0	5	10	0	0	0	0	0	13	117	1	0	160	1	0	0	0
Total Survey	144	249	0	3	0	346	208	3	0	0	0	0	288	2,553	108	3	3,896	14	1	31	19

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	16	17	0	0	0	56	29	0	0	0	0	0	36	258	12	0	424	2	0	1	6
4:15 PM	15	45	0	0	0	51	27	1	0	0	0	0	36	327	16	0	517	4	0	5	1
4:30 PM	13	32	0	0	0	45	22	0	0	0	0	0	30	293	10	0	445	4	1	9	3
4:45 PM	25	35	0	1	0	40	26	0	0	0	0	0	26	334	15	2	501	0	0	2	3
5:00 PM	24	28	0	0	0	47	24	0	0	0	0	0	42	340	15	0	520	1	0	5	1
5:15 PM	23	36	0	0	0	36	26	0	0	0	0	0	38	346	19	0	524	1	0	8	3
5:30 PM	13	32	0	0	0	41	31	2	0	0	0	0	42	316	13	1	488	1	0	1	2
5:45 PM	15	24	0	2	0	30	23	0	0	0	0	0	38	339	8	0	477	1	0	0	0
Total Survey	144	249	0	3	0	346	208	3	0	0	0	0	288	2,553	108	3	3,896	14	1	31	19

Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	215	318	533	3	270	187	457	2	0	1,554	1,554	0	1,574	0	1,574	1	2,059	3	0	16	9
%HV	0.9%				3.0%				0.0%				1.7%				1.8%				
PHF	0.85				0.94				0.00				0.96				0.98				

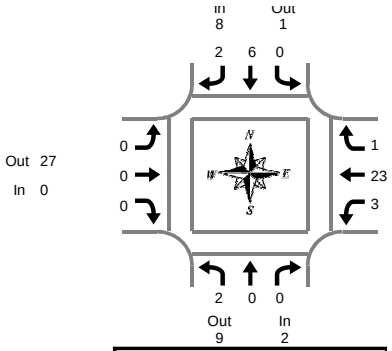
By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	84	131	0	215	0	164	106	270	0	0	0	0	154	1,364	56	1,574	2,059
%HV	2.4%	0.0%	0.0%	0.9%	0.0%	3.7%	1.9%	3.0%	0.0%	0.0%	0.0%	0.0%	1.9%	1.7%	1.8%	1.7%	1.8%
PHF	0.75	0.91	0.00	0.85	0.00	0.87	0.83	0.94	0.00	0.00	0.00	0.00	0.86	0.97	0.67	0.96	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	69	129	0	1	0	192	104	1	0	0	0	0	128	1,212	53	2	1,887	10	1	17	13
4:15 PM	77	140	0	1	0	183	99	1	0	0	0	0	134	1,294	56	2	1,983	9	1	21	8
4:30 PM	85	131	0	1	0	168	98	0	0	0	0	0	136	1,313	59	2	1,990	6	1	24	10
4:45 PM	85	131	0	1	0	164	107	2	0	0	0	0	148	1,336	62	3	2,033	3	0	16	9
5:00 PM	75	120	0	2	0	154	104	2	0	0	0	0	160	1,341	55	1	2,009	4	0	14	6

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



N 10th Ave & N Adair St

Tuesday, July 20, 2010
4:00 PM to 6:00 PM

Peak Hour Summary
4:50 PM to 5:50 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	1	0	1	4
4:05 PM	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:10 PM	2	0	0	2	0	1	0	1	0	0	0	0	0	1	1	2	5
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	3	3
4:20 PM	0	0	0	0	0	2	0	2	0	0	0	0	1	3	0	4	6
4:25 PM	0	1	0	1	0	2	1	3	0	0	0	0	0	2	0	2	6
4:30 PM	2	0	0	2	0	1	0	1	0	0	0	0	0	1	0	1	4
4:35 PM	0	0	0	0	0	2	0	2	0	0	0	0	0	4	0	4	6
4:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	4	4
4:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	4	1	5	6
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	5	5
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
5:05 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3
5:10 PM	0	0	0	0	0	1	1	2	0	0	0	0	1	2	0	3	5
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:20 PM	1	0	0	1	0	2	0	2	0	0	0	0	0	4	1	5	8
5:25 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
5:30 PM	1	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	2
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
5:40 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	2	2
5:45 PM	0	0	0	0	0	2	0	2	0	0	0	0	1	0	0	1	3
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1
5:55 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
Total Survey	6	4	0	10	0	18	3	21	0	0	0	0	5	47	3	55	86

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	3	0	5	0	3	0	3	0	0	0	0	0	2	1	3	11
4:15 PM	0	1	0	1	0	4	1	5	0	0	0	0	2	7	0	9	15
4:30 PM	2	0	0	2	0	3	0	3	0	0	0	0	0	9	0	9	14
4:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	1	9	1	11	12
5:00 PM	0	0	0	0	0	1	1	2	0	0	0	0	1	8	0	9	11
5:15 PM	1	0	0	1	0	2	0	2	0	0	0	0	0	7	1	8	11
5:30 PM	1	0	0	1	0	1	1	2	0	0	0	0	0	3	0	3	6
5:45 PM	0	0	0	0	0	3	0	3	0	0	0	0	1	2	0	3	6
Total Survey	6	4	0	10	0	18	3	21	0	0	0	0	5	47	3	55	86

Heavy Vehicle Peak Hour Summary
4:50 PM to 5:50 PM

By Approach	Northbound N 10th Ave			Southbound N 10th Ave			Eastbound N Adair St			Westbound N Adair St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	9	11	8	1	9	0	27	27	27	0	27	37
PHF	0.25			0.50			0.00			0.75			0.66

By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	0	2	0	6	2	8	0	0	0	0	3	23	1	27	37
PHF	0.25	0.00	0.00	0.25	0.00	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.75	0.72	0.25	0.75	0.66

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

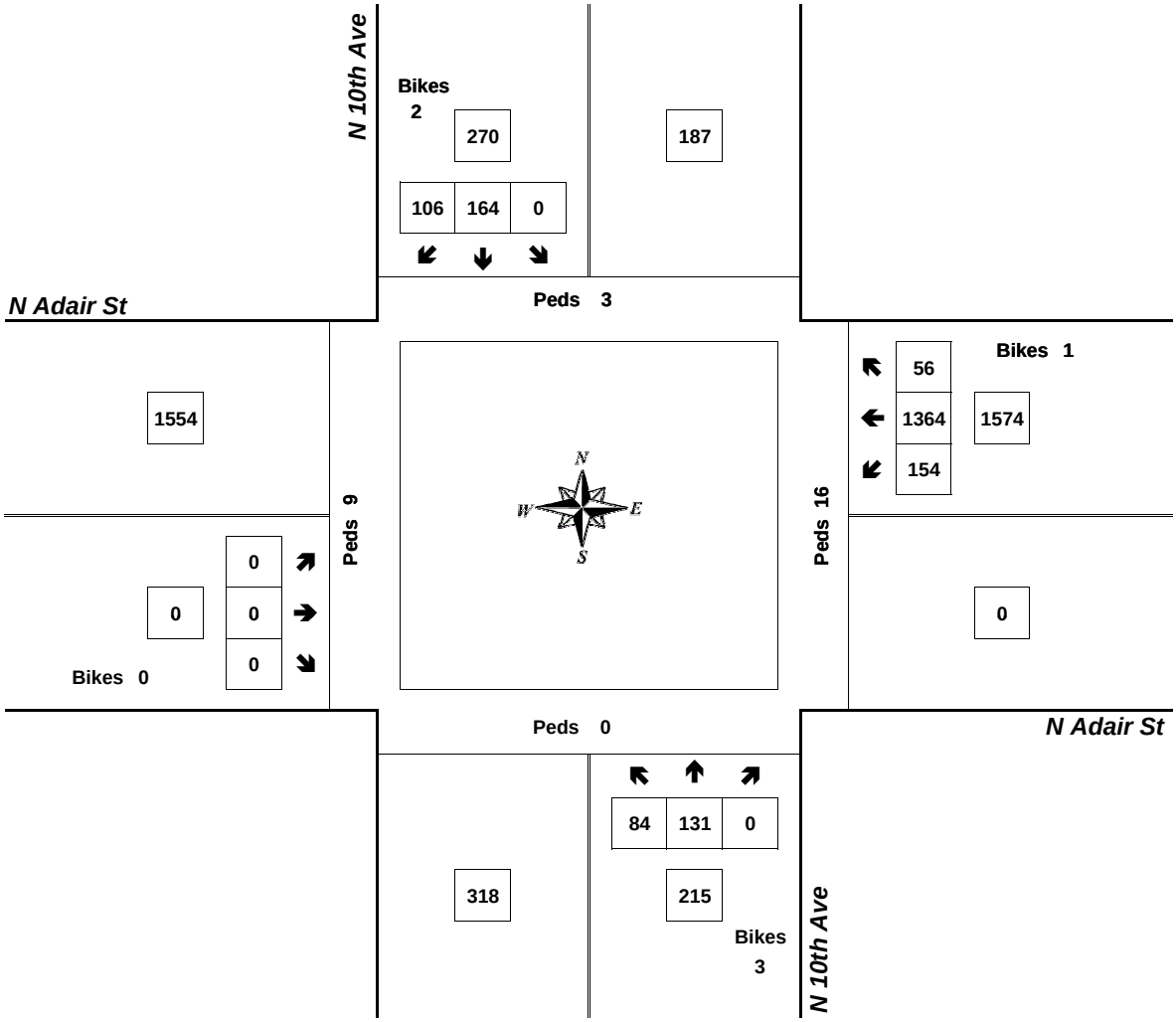
Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound N Adair St				Westbound N Adair St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	4	4	0	8	0	11	1	12	0	0	0	0	3	27	2	32	52
4:15 PM	2	1	0	3	0	9	2	11	0	0	0	0	4	33	1	38	52
4:30 PM	3	0	0	3	0	7	1	8	0	0	0	0	2	33	2	37	48
4:45 PM	2	0	0	2	0	5	2	7	0	0	0	0	2	27	2	31	40
5:00 PM	2	0	0	2	0	7	2	9	0	0	0	0	2	20	1	23	34

Peak Hour Summary

Clay Carney
(503) 833-2740

N 10th Ave & N Adair St

4:50 PM to 5:50 PM
Tuesday, July 20, 2010

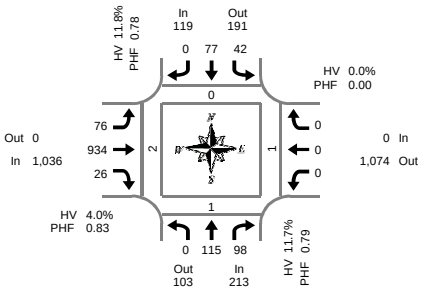


Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.96	1.7%	1,574
NB	0.85	0.9%	215
SB	0.94	3.0%	270
Intersection	0.98	1.8%	2,059

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
7:25 AM to 8:25 AM

N 10th Ave & W Baseline St

Wednesday, July 21, 2010
7:00 AM to 10:00 AM

5-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	9	6	0	1	2	0	0	8	62	4	0	0	0	0	0	92	0	0	0	0
7:05 AM	0	8	10	0	3	4	0	0	9	68	3	0	0	0	0	0	105	0	0	0	1
7:10 AM	0	4	8	0	6	7	0	0	3	55	4	1	0	0	0	0	87	0	1	1	0
7:15 AM	0	6	5	0	5	5	0	0	9	74	3	0	0	0	0	0	107	0	0	0	0
7:20 AM	0	6	5	0	1	7	0	0	7	69	2	0	0	0	0	0	97	1	0	1	1
7:25 AM	0	10	11	0	5	9	0	1	6	80	1	0	0	0	0	0	122	0	0	0	0
7:30 AM	0	6	9	0	6	1	0	0	5	68	2	0	0	0	0	0	97	0	0	0	0
7:35 AM	0	9	5	0	3	5	0	0	11	76	4	0	0	0	0	0	113	0	0	1	0
7:40 AM	0	13	11	0	1	4	0	0	9	92	2	0	0	0	0	0	132	0	0	0	0
7:45 AM	0	15	7	0	5	9	0	0	5	90	2	0	0	0	0	0	133	0	0	0	0
7:50 AM	0	11	10	1	3	4	0	0	10	100	2	0	0	0	0	0	140	0	0	0	0
7:55 AM	0	9	9	0	4	3	0	0	3	83	0	0	0	0	0	0	111	0	0	0	0
8:00 AM	0	9	9	1	3	12	0	0	4	66	2	0	0	0	0	0	105	0	0	0	0
8:05 AM	0	11	2	0	4	8	0	0	2	55	3	0	0	0	0	0	85	0	0	0	0
8:10 AM	0	10	10	0	4	7	0	0	8	80	1	0	0	0	0	0	120	0	1	0	0
8:15 AM	0	6	9	0	2	6	0	1	4	66	2	2	0	0	0	0	95	0	0	0	0
8:20 AM	0	6	6	0	2	9	0	0	9	78	5	0	0	0	0	0	115	0	0	0	2
8:25 AM	0	9	6	0	2	7	0	0	5	57	2	0	0	0	0	0	88	0	0	0	1
8:30 AM	0	13	9	0	6	4	0	0	5	68	4	0	0	0	0	0	109	0	0	0	0
8:35 AM	0	6	5	0	4	7	0	0	1	70	4	0	0	0	0	0	97	0	0	0	0
8:40 AM	0	6	8	0	4	5	0	1	9	70	2	1	0	0	0	0	104	0	0	0	0
8:45 AM	0	5	10	0	4	6	0	0	4	88	2	0	0	0	0	0	119	0	0	0	4
8:50 AM	0	9	6	0	3	7	0	0	7	67	2	0	0	0	0	0	101	0	1	1	2
8:55 AM	0	6	5	0	4	8	0	0	5	67	2	0	0	0	0	0	97	0	0	1	1
9:00 AM	0	3	7	0	4	5	0	0	2	45	1	0	0	0	0	0	67	0	0	0	0
9:05 AM	0	8	4	1	5	6	0	0	5	62	5	0	0	0	0	0	95	0	0	0	0
9:10 AM	0	9	10	0	9	9	0	0	5	84	2	0	0	0	0	0	128	0	3	5	1
9:15 AM	0	10	13	0	2	4	0	0	9	69	4	0	0	0	0	0	111	0	0	0	0
9:20 AM	0	8	5	0	5	13	0	0	5	67	5	0	0	0	0	0	108	0	0	0	0
9:25 AM	0	8	6	0	3	9	0	0	4	56	1	0	0	0	0	0	87	0	0	0	2
9:30 AM	0	3	2	0	3	10	0	0	4	64	1	0	0	0	0	0	87	0	0	0	0
9:35 AM	0	10	6	0	4	11	0	0	5	76	0	0	0	0	0	0	112	0	0	0	0
9:40 AM	0	5	6	0	2	6	0	0	6	68	3	0	0	0	0	0	96	0	0	5	1
9:45 AM	0	7	8	0	7	4	0	0	6	66	2	0	0	0	0	0	100	0	0	0	3
9:50 AM	0	3	7	0	6	8	0	0	2	51	5	0	0	0	0	0	82	1	0	0	1
9:55 AM	0	4	6	0	2	2	0	0	5	67	1	0	0	0	0	0	87	0	0	1	0
Total Survey	0	280	261	3	137	233	0	3	206	2,524	90	4	0	0	0	0	3,731	2	6	16	20

15-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	21	24	0	10	13	0	0	20	185	11	1	0	0	0	0	284	0	1	1	1
7:15 AM	0	22	21	0	11	21	0	1	22	223	6	0	0	0	0	0	326	1	0	1	1
7:30 AM	0	28	25	0	10	10	0	0	25	236	8	0	0	0	0	0	342	0	0	1	0
7:45 AM	0	35	26	1	12	16	0	0	18	273	4	0	0	0	0	0	384	0	0	0	0
8:00 AM	0	30	21	1	11	27	0	0	14	201	6	0	0	0	0	0	310	0	1	0	0
8:15 AM	0	21	21	0	6	22	0	1	18	201	9	2	0	0	0	0	298	0	0	0	3
8:30 AM	0	25	22	0	14	16	0	1	15	208	10	1	0	0	0	0	310	0	0	0	0
8:45 AM	0	20	21	0	11	21	0	0	16	222	6	0	0	0	0	0	317	0	1	2	7
9:00 AM	0	20	21	1	18	20	0	0	12	191	8	0	0	0	0	0	290	0	3	5	1
9:15 AM	0	26	24	0	10	26	0	0	18	192	10	0	0	0	0	0	306	0	0	0	2
9:30 AM	0	18	14	0	9	27	0	0	15	208	4	0	0	0	0	0	295	0	0	5	1
9:45 AM	0	14	21	0	15	14	0	0	13	184	8	0	0	0	0	0	269	1	0	1	4
Total Survey	0	280	261	3	137	233	0	3	206	2,524	90	4	0	0	0	0	3,731	2	6	16	20

Peak Hour Summary
7:25 AM to 8:25 AM

By Approach	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	213	103	316	2	119	191	310	2	1,036	0	1,036	2	0	1,074	1,074	0	1,368	0	1	1	2
%HV	11.7%				11.8%				4.0%				0.0%				5.8%				
PHF	0.79				0.78				0.83				0.00				0.84				

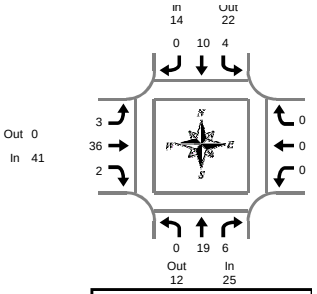
By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	115	98	213	42	77	0	119	76	934	26	1,036	0	0	0	0	1,368
%HV	0.0%	16.5%	6.1%	11.7%	9.5%	13.0%	0.0%	11.8%	3.9%	3.9%	7.7%	4.0%	0.0%	0.0%	0.0%	0.0%	5.8%
PHF	0.00	0.74	0.88	0.79	0.75	0.71	0.00	0.78	0.76	0.83	0.81	0.83	0.00	0.00	0.00	0.00	0.84

Rolling Hour Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	106	96	1	43	60	0	1	85	917	29	1	0	0	0	0	1,336	1	1	3	2
7:15 AM	0	115	93	2	44	74	0	1	79	933	24	0	0	0	0	0	1,362	1	1	2	1
7:30 AM	0	114	93	2	39	75	0	1	75	911	27	2	0	0	0	0	1,334	0	1	1	3
7:45 AM	0	111	90	2	43	81	0	2	65	883	29	3	0	0	0	0	1,302	0	1	0	3
8:00 AM	0	96	85	1	42	86	0	2	63	832	31	3	0	0	0	0	1,235	0	2	2	10
8:15 AM	0	86	85	1	49	79	0	2	61	822	33	3	0	0	0	0	1,215	0	4	7	11
8:30 AM	0	91	88	1	53	83	0	1	61	813	34	1	0	0	0	0	1,223	0	4	7	10
8:45 AM	0	84	80	1	48	94	0	0	61	813	28	0	0	0	0	0	1,208	0	4	12	11
9:00 AM	0	78	80	1	52	87	0	0	58	775	30	0	0	0	0	0	1,160	1	3	11	8

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



N 10th Ave & W Baseline St

Wednesday, July 21, 2010
7:00 AM to 10:00 AM

Peak Hour Summary
7:25 AM to 8:25 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	0	1	0	0	0	0	1	2	0	3	0	0	0	0	4
7:05 AM	0	3	0	3	1	0	0	1	1	3	0	4	0	0	0	0	8
7:10 AM	0	2	0	2	2	0	0	2	1	3	0	4	0	0	0	0	8
7:15 AM	0	1	0	1	0	1	0	1	0	2	0	2	0	0	0	0	4
7:20 AM	0	1	0	1	0	2	0	2	1	5	0	6	0	0	0	0	9
7:25 AM	0	2	1	3	1	0	0	1	1	3	0	4	0	0	0	0	8
7:30 AM	0	0	1	1	1	0	0	1	0	3	0	3	0	0	0	0	5
7:35 AM	0	0	0	0	0	1	0	1	1	3	1	5	0	0	0	0	6
7:40 AM	0	3	1	4	0	1	0	1	0	4	0	4	0	0	0	0	9
7:45 AM	0	2	0	2	1	2	0	3	0	1	0	1	0	0	0	0	6
7:50 AM	0	2	0	2	0	0	0	0	0	4	0	4	0	0	0	0	6
7:55 AM	0	1	0	1	1	0	0	1	0	6	0	6	0	0	0	0	8
8:00 AM	0	1	1	2	0	2	0	2	0	3	0	3	0	0	0	0	7
8:05 AM	0	3	0	3	0	1	0	1	0	2	1	3	0	0	0	0	7
8:10 AM	0	2	1	3	0	1	0	1	1	3	0	4	0	0	0	0	8
8:15 AM	0	2	1	3	0	0	0	0	0	1	0	1	0	0	0	0	4
8:20 AM	0	1	0	1	0	2	0	2	0	3	0	3	0	0	0	0	6
8:25 AM	0	1	0	1	0	1	0	1	0	3	1	4	0	0	0	0	6
8:30 AM	0	3	0	3	1	0	0	1	0	2	0	2	0	0	0	0	6
8:35 AM	0	0	0	0	0	2	0	2	1	3	0	4	0	0	0	0	6
8:40 AM	0	1	1	2	2	1	0	3	1	2	0	3	0	0	0	0	8
8:45 AM	0	0	1	1	0	0	0	0	0	4	0	4	0	0	0	0	5
8:50 AM	0	1	0	1	0	0	0	0	0	4	0	4	0	0	0	0	5
8:55 AM	0	1	1	2	0	1	0	1	0	4	0	4	0	0	0	0	7
9:00 AM	0	0	0	0	1	1	0	2	0	3	0	3	0	0	0	0	5
9:05 AM	0	2	0	2	0	3	0	3	1	1	0	2	0	0	0	0	7
9:10 AM	0	1	1	2	0	0	0	0	1	4	0	5	0	0	0	0	7
9:15 AM	0	3	1	4	0	0	0	0	1	3	1	5	0	0	0	0	9
9:20 AM	0	0	0	0	1	6	0	7	0	1	1	2	0	0	0	0	9
9:25 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
9:30 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
9:35 AM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
9:40 AM	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
9:45 AM	0	1	0	1	1	0	0	1	3	4	0	7	0	0	0	0	9
9:50 AM	0	1	0	1	1	0	0	1	1	3	0	4	0	0	0	0	6
9:55 AM	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	0	6
Total Survey	0	44	11	55	14	28	0	42	16	105	5	126	0	0	0	0	223

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	6	0	6	3	0	0	3	3	8	0	11	0	0	0	0	20
7:15 AM	0	4	1	5	1	3	0	4	2	10	0	12	0	0	0	0	21
7:30 AM	0	3	2	5	1	2	0	3	1	10	1	12	0	0	0	0	20
7:45 AM	0	5	0	5	2	2	0	4	0	11	0	11	0	0	0	0	20
8:00 AM	0	6	2	8	0	4	0	4	1	8	1	10	0	0	0	0	22
8:15 AM	0	4	1	5	0	3	0	3	0	7	1	8	0	0	0	0	16
8:30 AM	0	4	1	5	3	3	0	6	2	7	0	9	0	0	0	0	20
8:45 AM	0	2	2	4	0	1	0	1	0	12	0	12	0	0	0	0	17
9:00 AM	0	3	1	4	1	4	0	5	2	8	0	10	0	0	0	0	19
9:15 AM	0	4	1	5	1	6	0	7	1	6	2	9	0	0	0	0	21
9:30 AM	0	1	0	1	0	0	0	0	0	5	0	5	0	0	0	0	6
9:45 AM	0	2	0	2	2	0	0	2	4	13	0	17	0	0	0	0	21
Total Survey	0	44	11	55	14	28	0	42	16	105	5	126	0	0	0	0	223

Heavy Vehicle Peak Hour Summary
7:25 AM to 8:25 AM

By Approach	Northbound N 10th Ave			Southbound N 10th Ave			Eastbound W Baseline St			Westbound W Baseline St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	25	12	37	14	22	36	41	0	41	0	46	46	80
PHF	0.69			0.70			0.79			0.00			0.91

By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	19	6	25	4	10	0	14	3	36	2	41	0	0	0	0	80
PHF	0.00	0.68	0.75	0.69	0.50	0.63	0.00	0.70	0.38	0.69	0.50	0.79	0.00	0.00	0.00	0.00	0.91

Heavy Vehicle Rolling Hour Summary
7:00 AM to 10:00 AM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	18	3	21	7	7	0	14	6	39	1	46	0	0	0	0	81
7:15 AM	0	18	5	23	4	11	0	15	4	39	2	45	0	0	0	0	83
7:30 AM	0	18	5	23	3	11	0	14	2	36	3	41	0	0	0	0	78
7:45 AM	0	19	4	23	5	12	0	17	3	33	2	38	0	0	0	0	78
8:00 AM	0	16	6	22	3	11	0	14	3	34	2	39	0	0	0	0	75
8:15 AM	0	13	5	18	4	11	0	15	4	34	1	39	0	0	0	0	72
8:30 AM	0	13	5	18	5	14	0	19	5	33	2	40	0	0	0	0	77
8:45 AM	0	10	4	14	2	11	0	13	3	31	2	36	0	0	0	0	63
9:00 AM	0	10	2	12	4	10	0	14	7	32	2	41	0	0	0	0	67

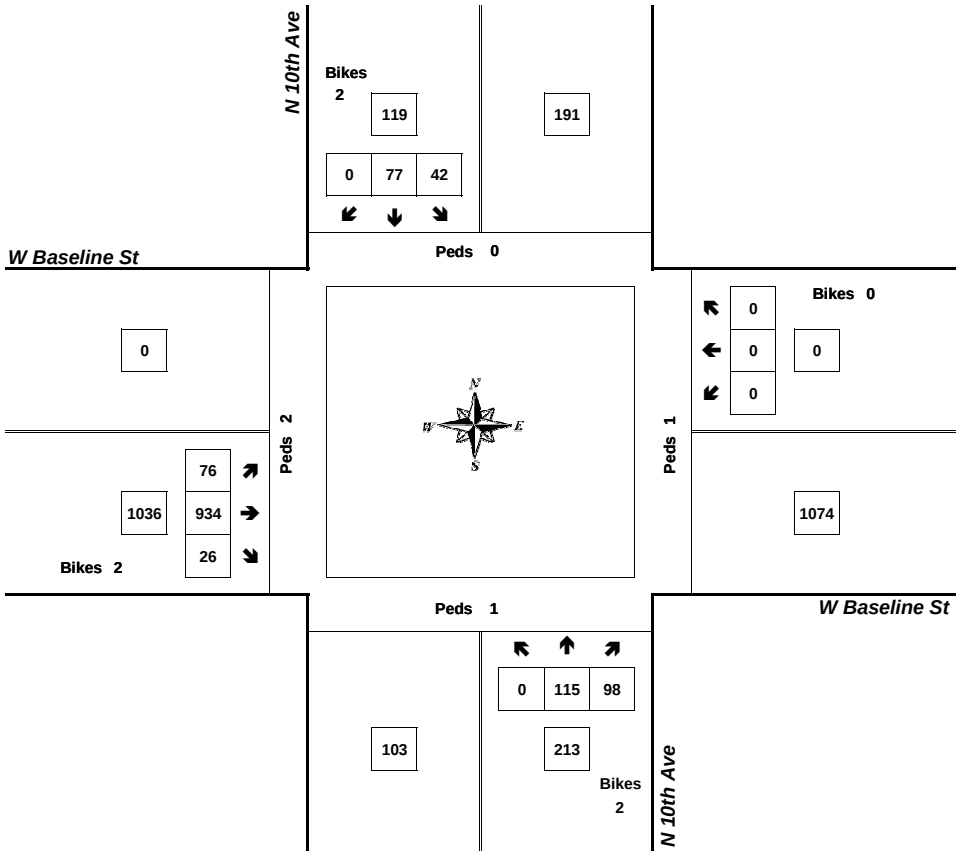
Peak Hour Summary

All Traffic Data Services Inc.

Clay Carney
(503) 833-2740

N 10th Ave & W Baseline St

7:25 AM to 8:25 AM
Wednesday, July 21, 2010

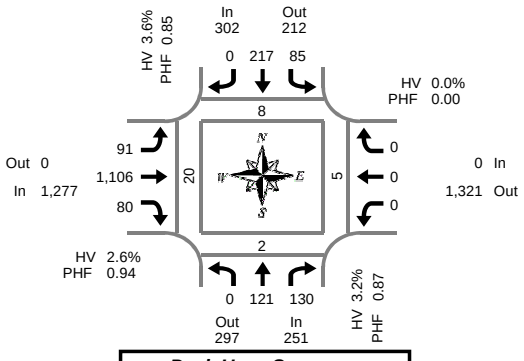


Approach	PHF	HV%	Volume
EB	0.83	4.0%	1,036
WB	0.00	0.0%	0
NB	0.79	11.7%	213
SB	0.78	11.8%	119
Intersection	0.84	5.8%	1,368

Count Period: 7:00 AM to 10:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:25 PM to 5:25 PM

N 10th Ave & W Baseline St

Tuesday, July 20, 2010
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	10	6	0	7	32	0	0	5	79	3	0	0	0	0	0	142	0	0	1	0
4:05 PM	0	8	7	0	6	20	0	0	4	118	7	0	0	0	0	0	170	1	0	0	0
4:10 PM	0	8	9	0	10	16	0	0	4	83	3	0	0	0	0	0	133	0	0	2	1
4:15 PM	0	14	13	0	10	26	0	0	13	92	7	0	0	0	0	0	175	0	0	0	0
4:20 PM	0	8	8	0	6	16	0	0	6	86	1	1	0	0	0	0	131	0	0	0	0
4:25 PM	0	13	10	0	5	18	0	1	5	88	8	0	0	0	0	0	147	1	0	0	0
4:30 PM	0	10	13	0	10	25	0	0	5	81	7	0	0	0	0	0	151	0	0	0	0
4:35 PM	0	5	7	0	10	12	0	0	10	87	5	1	0	0	0	0	136	0	0	2	2
4:40 PM	0	8	13	0	6	18	0	0	6	112	10	0	0	0	0	0	173	2	0	0	3
4:45 PM	0	9	10	0	8	16	0	0	9	81	7	0	0	0	0	0	140	0	2	0	0
4:50 PM	0	8	7	1	6	14	0	0	7	81	2	0	0	0	0	0	125	0	0	0	2
4:55 PM	0	10	10	0	2	16	0	0	16	89	4	1	0	0	0	0	147	2	0	0	4
5:00 PM	0	10	14	0	10	22	0	0	4	97	1	1	0	0	0	0	158	1	0	1	3
5:05 PM	0	13	10	0	7	21	0	0	5	106	6	0	0	0	0	0	168	0	0	1	0
5:10 PM	0	10	11	0	8	21	0	0	8	102	10	0	0	0	0	0	170	2	0	1	3
5:15 PM	0	15	13	0	5	22	0	0	10	81	9	2	0	0	0	0	155	0	0	0	2
5:20 PM	0	10	12	0	8	12	0	0	6	101	11	0	0	0	0	0	160	0	0	0	1
5:25 PM	0	7	5	0	5	22	0	1	11	84	7	1	0	0	0	0	141	1	1	2	0
5:30 PM	0	5	7	0	11	33	0	0	3	82	4	1	0	0	0	0	145	0	0	0	1
5:35 PM	0	5	10	0	6	14	0	1	9	84	6	0	0	0	0	0	134	0	0	0	0
5:40 PM	0	5	5	0	6	19	0	1	12	89	7	0	0	0	0	0	143	1	0	0	0
5:45 PM	0	15	11	2	3	31	0	0	8	79	6	0	0	0	0	0	153	0	0	1	1
5:50 PM	0	3	10	0	5	21	0	0	9	89	4	0	0	0	0	0	141	0	0	0	0
5:55 PM	0	7	11	0	2	14	0	0	6	73	1	0	0	0	0	0	114	0	0	0	0
Total Survey	0	216	232	3	162	481	0	4	181	2,144	136	8	0	0	0	0	3,552	11	3	11	23

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	26	22	0	23	68	0	0	13	280	13	0	0	0	0	0	445	1	0	3	1
4:15 PM	0	35	31	0	21	60	0	1	24	266	16	1	0	0	0	0	453	1	0	0	0
4:30 PM	0	23	33	0	26	55	0	0	21	280	22	1	0	0	0	0	460	2	0	2	5
4:45 PM	0	27	27	1	16	46	0	0	32	251	13	1	0	0	0	0	412	2	2	0	6
5:00 PM	0	33	35	0	25	64	0	0	17	305	17	1	0	0	0	0	496	3	0	3	6
5:15 PM	0	32	30	0	18	56	0	1	27	266	27	3	0	0	0	0	456	1	1	2	3
5:30 PM	0	15	22	0	23	66	0	2	24	255	17	1	0	0	0	0	422	1	0	0	1
5:45 PM	0	25	32	2	10	66	0	0	23	241	11	0	0	0	0	0	408	0	0	1	1
Total Survey	0	216	232	3	162	481	0	4	181	2,144	136	8	0	0	0	0	3,552	11	3	11	23

Peak Hour Summary
4:25 PM to 5:25 PM

By Approach	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	251	297	548	1	302	212	514	1	1,277	0	1,277	5	0	1,321	1,321	0	1,830	8	2	5	20
%HV	3.2%				3.6%				2.6%				0.0%				2.8%				
PHF	0.87				0.85				0.94				0.00				0.92				

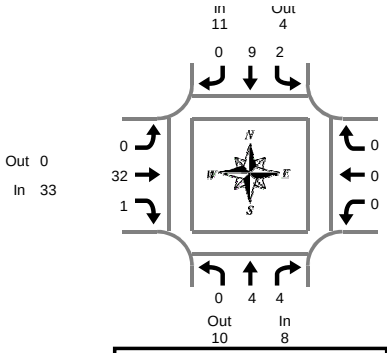
By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	121	130	251	85	217	0	302	91	1,106	80	1,277	0	0	0	0	1,830
%HV	0.0%	3.3%	3.1%	3.2%	2.4%	4.1%	0.0%	3.6%	0.0%	2.9%	1.3%	2.6%	0.0%	0.0%	0.0%	0.0%	2.8%
PHF	0.00	0.80	0.90	0.87	0.82	0.85	0.00	0.85	0.71	0.91	0.67	0.94	0.00	0.00	0.00	0.00	0.92

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	111	113	1	86	229	0	1	90	1,077	64	3	0	0	0	0	1,770	6	2	5	12
4:15 PM	0	118	126	1	88	225	0	1	94	1,102	68	4	0	0	0	0	1,821	8	2	5	17
4:30 PM	0	115	125	1	85	221	0	1	97	1,102	79	6	0	0	0	0	1,824	8	3	7	20
4:45 PM	0	107	114	1	82	232	0	3	100	1,077	74	6	0	0	0	0	1,786	7	3	5	16
5:00 PM	0	105	119	2	76	252	0	3	91	1,067	72	5	0	0	0	0	1,782	5	1	6	11

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



N 10th Ave & W Baseline St

Tuesday, July 20, 2010
4:00 PM to 6:00 PM

Peak Hour Summary
4:25 PM to 5:25 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	2	1	3	0	3	0	3	1	5	2	8	0	0	0	0	14
4:05 PM	0	0	2	2	0	0	0	0	1	5	0	6	0	0	0	0	8
4:10 PM	0	2	0	2	0	1	0	1	0	5	1	6	0	0	0	0	9
4:15 PM	0	0	0	0	0	3	0	3	0	7	0	7	0	0	0	0	10
4:20 PM	0	0	2	2	0	1	0	1	0	1	0	1	0	0	0	0	4
4:25 PM	0	2	1	3	0	3	0	3	0	4	0	4	0	0	0	0	10
4:30 PM	0	1	1	2	0	1	0	1	0	6	0	6	0	0	0	0	9
4:35 PM	0	0	0	0	1	1	0	2	0	3	0	3	0	0	0	0	5
4:40 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
4:45 PM	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	1
4:50 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	0	0	0	5
4:55 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
5:00 PM	0	0	1	1	0	0	0	0	0	1	0	1	0	0	0	0	2
5:05 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:10 PM	0	0	0	0	0	1	0	1	0	2	1	3	0	0	0	0	4
5:15 PM	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	0	3
5:20 PM	0	0	1	1	0	2	0	2	0	1	0	1	0	0	0	0	4
5:25 PM	0	0	0	0	0	0	0	0	0	5	1	6	0	0	0	0	6
5:30 PM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
5:35 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:40 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
5:45 PM	0	0	0	0	0	3	0	3	0	3	0	3	0	0	0	0	6
5:50 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
5:55 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
Total Survey	0	9	9	18	2	21	0	23	2	76	5	83	0	0	0	0	124

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	4	3	7	0	4	0	4	2	15	3	20	0	0	0	0	31
4:15 PM	0	2	3	5	0	7	0	7	0	12	0	12	0	0	0	0	24
4:30 PM	0	1	1	2	1	2	0	3	0	13	0	13	0	0	0	0	18
4:45 PM	0	0	0	0	1	0	0	1	0	8	0	8	0	0	0	0	9
5:00 PM	0	0	1	1	0	1	0	1	0	5	1	6	0	0	0	0	8
5:15 PM	0	1	1	2	0	3	0	3	0	7	1	8	0	0	0	0	13
5:30 PM	0	1	0	1	0	1	0	1	0	6	0	6	0	0	0	0	8
5:45 PM	0	0	0	0	0	3	0	3	0	10	0	10	0	0	0	0	13
Total Survey	0	9	9	18	2	21	0	23	2	76	5	83	0	0	0	0	124

Heavy Vehicle Peak Hour Summary
4:25 PM to 5:25 PM

By Approach	Northbound N 10th Ave			Southbound N 10th Ave			Eastbound W Baseline St			Westbound W Baseline St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	8	10	18	11	4	15	33	0	33	0	38	38	52
PHF	0.40			0.46			0.63			0.00			0.54

By Movement	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	4	4	8	2	9	0	11	0	32	1	33	0	0	0	0	52
PHF	0.00	0.33	0.50	0.40	0.25	0.45	0.00	0.46	0.00	0.62	0.25	0.63	0.00	0.00	0.00	0.00	0.54

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

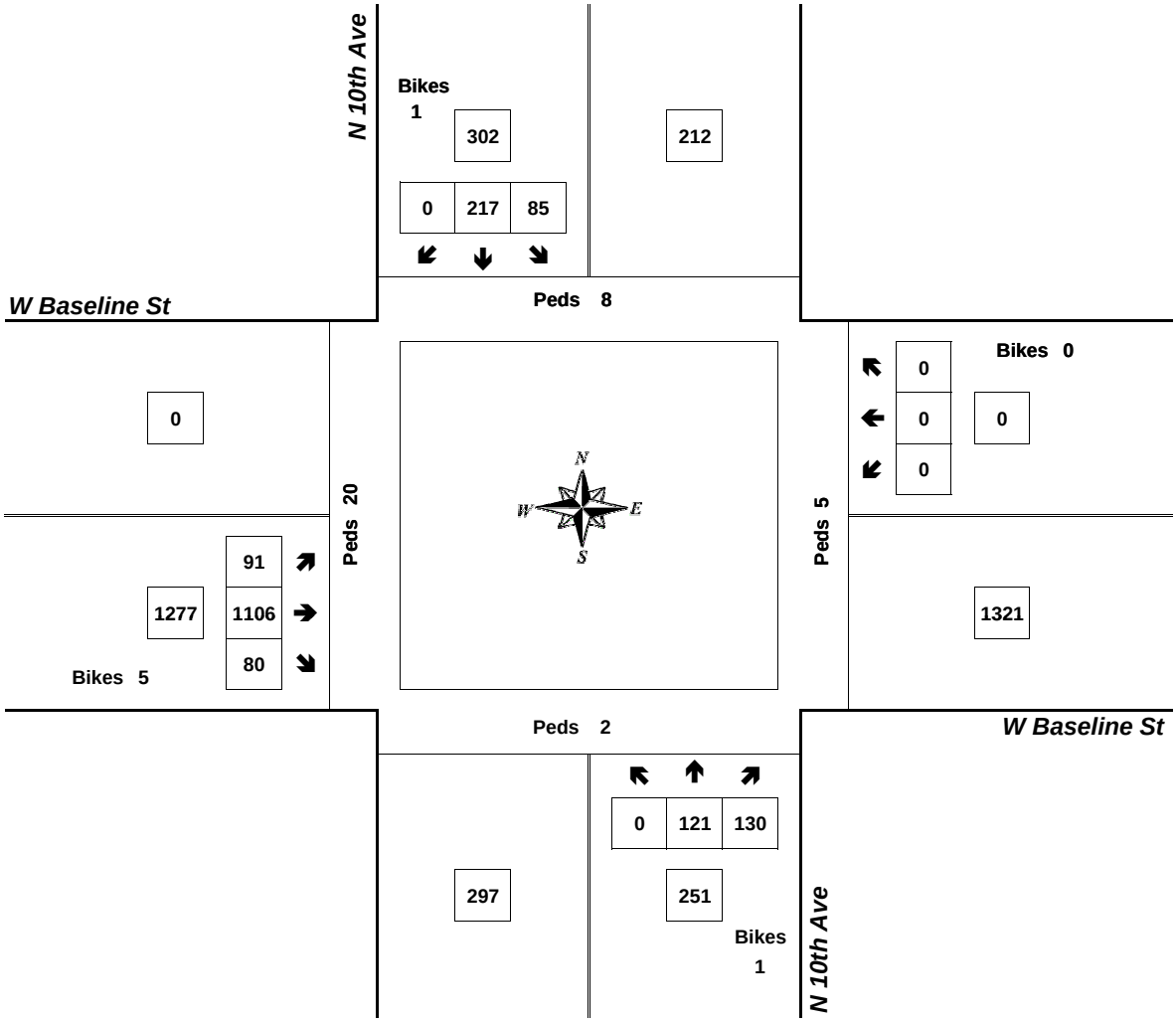
Interval Start Time	Northbound N 10th Ave				Southbound N 10th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	7	7	14	2	13	0	15	2	48	3	53	0	0	0	0	82
4:15 PM	0	3	5	8	2	10	0	12	0	38	1	39	0	0	0	0	59
4:30 PM	0	2	3	5	2	6	0	8	0	33	2	35	0	0	0	0	48
4:45 PM	0	2	2	4	1	5	0	6	0	26	2	28	0	0	0	0	38
5:00 PM	0	2	2	4	0	8	0	8	0	28	2	30	0	0	0	0	42

Peak Hour Summary

Clay Carney
(503) 833-2740

N 10th Ave & W Baseline St

4:25 PM to 5:25 PM
Tuesday, July 20, 2010

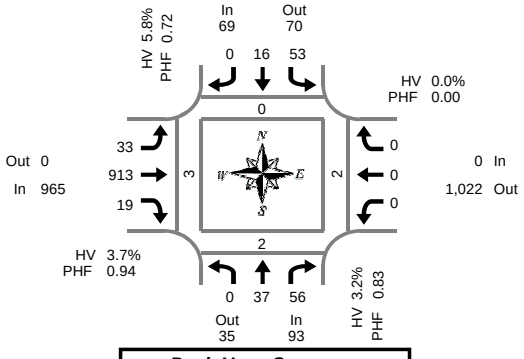


Approach	PHF	HV%	Volume
EB	0.94	2.6%	1,277
WB	0.00	0.0%	0
NB	0.87	3.2%	251
SB	0.85	3.6%	302
Intersection	0.92	2.8%	1,830

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



S 4th Ave & W Baseline St

Tuesday, August 24, 2010
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	2	2	0	1	1	0	0	0	58	2	0	0	0	0	0	66	0	1	0	0
7:05 AM	0	1	7	0	0	0	0	0	1	72	0	0	0	0	0	0	81	0	0	0	1
7:10 AM	0	0	1	0	3	2	0	0	0	87	4	0	0	0	0	0	97	0	0	0	0
7:15 AM	0	4	3	0	4	1	0	0	2	74	1	1	0	0	0	0	89	0	0	1	0
7:20 AM	0	4	2	0	2	3	0	0	1	68	0	0	0	0	0	0	80	0	0	0	0
7:25 AM	0	2	7	0	6	0	0	0	3	79	2	0	0	0	0	0	99	0	0	0	0
7:30 AM	0	3	3	0	6	2	0	0	2	76	3	0	0	0	0	0	95	0	1	0	1
7:35 AM	0	4	6	0	7	2	0	0	1	82	2	0	0	0	0	0	104	0	1	0	0
7:40 AM	0	3	7	0	3	0	0	0	1	73	1	0	0	0	0	0	88	0	0	0	0
7:45 AM	0	2	6	0	6	2	0	0	5	86	2	1	0	0	0	0	109	0	0	1	1
7:50 AM	0	4	4	0	8	1	0	0	7	79	0	0	0	0	0	0	103	0	0	0	0
7:55 AM	0	6	4	0	4	3	0	0	6	71	2	0	0	0	0	0	96	0	0	0	0
8:00 AM	0	4	6	0	4	0	0	0	4	66	2	0	0	0	0	0	86	0	0	0	0
8:05 AM	0	1	6	0	3	3	0	0	2	56	8	0	0	0	0	0	79	0	0	0	0
8:10 AM	0	7	2	0	1	0	0	0	3	72	3	0	0	0	0	0	88	0	1	0	0
8:15 AM	0	4	7	0	2	1	0	0	2	54	2	0	0	0	0	0	72	0	0	1	1
8:20 AM	0	5	1	0	1	1	0	0	1	66	1	0	0	0	0	0	76	0	0	0	0
8:25 AM	0	1	3	0	3	0	0	0	3	54	3	0	0	0	0	0	67	0	0	0	0
8:30 AM	0	3	4	0	7	4	0	0	6	72	4	2	0	0	0	0	100	0	2	0	0
8:35 AM	0	7	7	0	2	1	0	0	7	60	3	0	0	0	0	0	87	0	0	0	0
8:40 AM	0	2	6	0	3	3	0	0	4	68	2	0	0	0	0	0	88	0	0	0	0
8:45 AM	0	4	4	0	4	2	0	0	7	62	4	0	0	0	0	0	87	0	1	1	1
8:50 AM	0	3	5	0	2	2	0	1	6	67	5	0	0	0	0	0	90	1	0	0	0
8:55 AM	0	3	4	0	6	3	0	0	8	57	2	0	0	0	0	0	83	0	0	0	0
Total Survey	0	79	107	0	88	37	0	1	82	1,659	58	4	0	0	0	0	2,110	1	7	4	5

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	3	10	0	4	3	0	0	1	217	6	0	0	0	0	0	244	0	1	0	1
7:15 AM	0	10	12	0	12	4	0	0	6	221	3	1	0	0	0	0	268	0	0	1	0
7:30 AM	0	10	16	0	16	4	0	0	4	231	6	0	0	0	0	0	287	0	2	0	1
7:45 AM	0	12	14	0	18	6	0	0	18	236	4	1	0	0	0	0	308	0	0	1	1
8:00 AM	0	12	14	0	8	3	0	0	9	194	13	0	0	0	0	0	253	0	1	0	0
8:15 AM	0	10	11	0	6	2	0	0	6	174	6	0	0	0	0	0	215	0	0	1	1
8:30 AM	0	12	17	0	12	8	0	0	17	200	9	2	0	0	0	0	275	0	2	0	0
8:45 AM	0	10	13	0	12	7	0	1	21	186	11	0	0	0	0	0	260	1	1	1	1
Total Survey	0	79	107	0	88	37	0	1	82	1,659	58	4	0	0	0	0	2,110	1	7	4	5

Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	93	35	128	0	69	70	139	0	965	0	965	2	0	1,022	1,022	0	1,127	0	2	2	3
%HV	3.2%				5.8%				3.7%				0.0%				3.8%				
PHF	0.83				0.72				0.94				0.00				0.91				

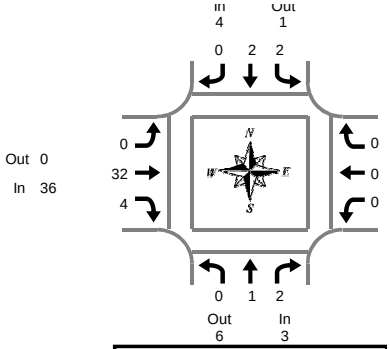
By Movement	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	37	56	93	53	16	0	69	33	913	19	965	0	0	0	0	1,127
%HV	0.0%	2.7%	3.6%	3.2%	3.8%	12.5%	0.0%	5.8%	0.0%	3.5%	21.1%	3.7%	0.0%	0.0%	0.0%	0.0%	3.8%
PHF	0.00	0.66	0.74	0.83	0.70	0.67	0.00	0.72	0.46	0.95	0.68	0.94	0.00	0.00	0.00	0.00	0.91

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	35	52	0	50	17	0	0	29	905	19	2	0	0	0	0	1,107	0	3	2	3
7:15 AM	0	44	56	0	54	17	0	0	37	882	26	2	0	0	0	0	1,116	0	3	2	2
7:30 AM	0	44	55	0	48	15	0	0	37	835	29	1	0	0	0	0	1,063	0	3	2	3
7:45 AM	0	46	56	0	44	19	0	0	50	804	32	3	0	0	0	0	1,051	0	3	2	2
8:00 AM	0	44	55	0	38	20	0	1	53	754	39	2	0	0	0	0	1,003	1	4	2	2

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



S 4th Ave & W Baseline St

Tuesday, August 24, 2010
7:00 AM to 9:00 AM

Peak Hour Summary
7:05 AM to 8:05 AM

Heavy Vehicle 5-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
7:05 AM	0	0	1	1	0	0	0	0	0	3	0	3	0	0	0	0	4
7:10 AM	0	0	0	0	0	0	0	0	0	4	1	5	0	0	0	0	5
7:15 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
7:20 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
7:25 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
7:30 AM	0	0	0	0	1	1	0	2	0	4	1	5	0	0	0	0	7
7:35 AM	0	0	0	0	0	1	0	1	0	1	1	2	0	0	0	0	3
7:40 AM	0	0	0	0	1	0	0	1	0	6	0	6	0	0	0	0	7
7:45 AM	0	0	1	1	0	0	0	0	0	2	1	3	0	0	0	0	4
7:50 AM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
7:55 AM	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
8:05 AM	0	0	0	0	0	1	0	1	0	3	2	5	0	0	0	0	6
8:10 AM	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	0	6
8:15 AM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
8:20 AM	0	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	3
8:25 AM	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
8:30 AM	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	2
8:35 AM	0	1	0	1	0	0	0	0	0	2	0	2	0	0	0	0	3
8:40 AM	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	0	6
8:45 AM	0	0	1	1	0	1	0	1	0	5	1	6	0	0	0	0	8
8:50 AM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
8:55 AM	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
Total Survey	0	3	3	6	3	4	0	7	0	67	8	75	0	0	0	0	88

Heavy Vehicle 15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	1	1	0	0	0	0	0	8	1	9	0	0	0	0	10
7:15 AM	0	1	0	1	0	0	0	0	0	5	0	5	0	0	0	0	6
7:30 AM	0	0	0	0	2	2	0	4	0	11	2	13	0	0	0	0	17
7:45 AM	0	0	1	1	0	0	0	0	0	7	1	8	0	0	0	0	9
8:00 AM	0	0	0	0	0	1	0	1	0	11	2	13	0	0	0	0	14
8:15 AM	0	1	0	1	0	0	0	0	0	6	1	7	0	0	0	0	8
8:30 AM	0	1	0	1	1	0	0	1	0	9	0	9	0	0	0	0	11
8:45 AM	0	0	1	1	0	1	0	1	0	10	1	11	0	0	0	0	13
Total Survey	0	3	3	6	3	4	0	7	0	67	8	75	0	0	0	0	88

Heavy Vehicle Peak Hour Summary
7:05 AM to 8:05 AM

By Approach	Northbound S 4th Ave			Southbound S 4th Ave			Eastbound W Baseline St			Westbound W Baseline St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	3	6	9	4	1	5	36	0	36	0	36	36	43
PHF	0.38			0.25			0.69			0.00			0.63

By Movement	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	1	2	3	2	2	0	4	0	32	4	36	0	0	0	0	43
PHF	0.00	0.25	0.50	0.38	0.25	0.25	0.00	0.25	0.00	0.67	0.50	0.69	0.00	0.00	0.00	0.00	0.63

Heavy Vehicle Rolling Hour Summary
7:00 AM to 9:00 AM

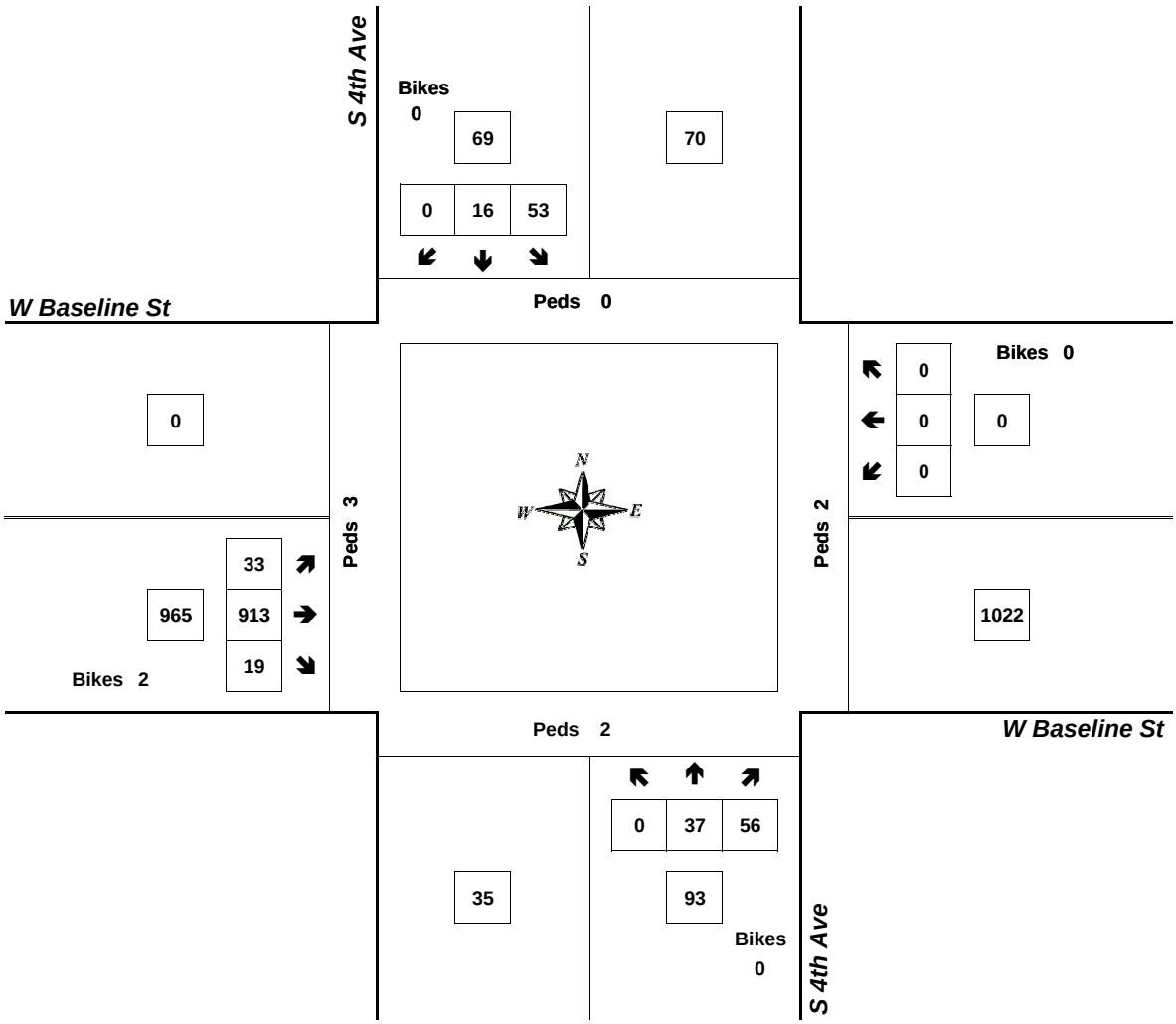
Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	2	3	2	2	0	4	0	31	4	35	0	0	0	0	42
7:15 AM	0	1	1	2	2	3	0	5	0	34	5	39	0	0	0	0	46
7:30 AM	0	1	1	2	2	3	0	5	0	35	6	41	0	0	0	0	48
7:45 AM	0	2	1	3	1	1	0	2	0	33	4	37	0	0	0	0	42
8:00 AM	0	2	1	3	1	2	0	3	0	36	4	40	0	0	0	0	46

Peak Hour Summary

Clay Carney
(503) 833-2740

S 4th Ave & W Baseline St

7:05 AM to 8:05 AM
Tuesday, August 24, 2010

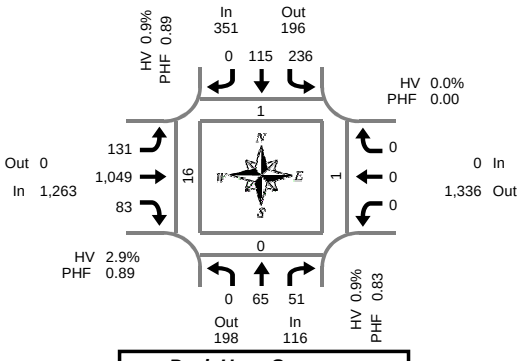


Approach	PHF	HV%	Volume
EB	0.94	3.7%	965
WB	0.00	0.0%	0
NB	0.83	3.2%	93
SB	0.72	5.8%	69
Intersection	0.91	3.8%	1,127

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Clay Carney
(503) 833-2740



Peak Hour Summary
4:40 PM to 5:40 PM

S 4th Ave & W Baseline St

Tuesday, August 24, 2010
4:00 PM to 6:00 PM

5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	4	6	0	12	8	0	0	10	81	5	0	0	0	0	0	126	0	0	0	4
4:05 PM	0	5	7	0	19	5	0	0	7	99	4	0	0	0	0	0	146	0	1	0	2
4:10 PM	0	9	5	0	15	12	0	0	11	89	7	0	0	0	0	0	148	0	0	0	0
4:15 PM	0	7	4	0	14	7	0	0	12	90	7	0	0	0	0	0	141	0	0	0	3
4:20 PM	0	5	8	0	18	5	0	0	8	95	6	0	0	0	0	0	145	1	0	0	2
4:25 PM	0	3	5	0	11	9	0	0	7	89	5	0	0	0	0	0	129	0	0	0	0
4:30 PM	0	6	2	0	20	6	0	0	11	77	3	1	0	0	0	0	125	0	1	0	5
4:35 PM	0	5	4	0	22	7	0	0	8	85	4	0	0	0	0	0	135	1	0	1	4
4:40 PM	0	7	3	0	18	8	0	0	8	92	2	0	0	0	0	0	138	0	0	0	3
4:45 PM	0	4	4	0	20	10	0	0	5	72	6	0	0	0	0	0	121	0	0	0	0
4:50 PM	0	5	2	0	18	8	0	0	12	96	8	0	0	0	0	0	149	0	0	0	1
4:55 PM	0	6	9	0	19	6	0	1	9	78	9	1	0	0	0	0	136	0	0	0	0
5:00 PM	0	7	5	0	17	12	0	0	17	85	11	0	0	0	0	0	154	0	0	0	2
5:05 PM	0	5	3	0	23	10	0	0	8	87	8	0	0	0	0	0	144	0	0	0	6
5:10 PM	0	2	7	0	20	14	0	0	14	103	11	0	0	0	0	0	171	0	0	1	1
5:15 PM	0	6	4	0	21	11	0	0	11	103	6	0	0	0	0	0	162	0	0	0	0
5:20 PM	0	5	2	0	17	7	0	0	10	86	9	0	0	0	0	0	136	0	0	0	2
5:25 PM	0	7	5	0	19	6	0	0	9	80	6	0	0	0	0	0	132	1	0	0	0
5:30 PM	0	5	3	0	19	14	0	0	12	82	4	0	0	0	0	0	139	0	0	0	1
5:35 PM	0	6	4	0	25	9	0	0	16	85	3	0	0	0	0	0	148	0	0	0	0
5:40 PM	0	8	5	0	21	6	0	0	11	71	6	0	0	0	0	0	128	0	0	0	1
5:45 PM	0	5	2	0	22	7	0	0	7	77	4	0	0	0	0	0	124	0	1	0	2
5:50 PM	0	8	3	0	18	11	0	0	13	84	3	2	0	0	0	0	140	0	0	1	0
5:55 PM	0	4	6	0	15	9	0	0	11	69	6	0	0	0	0	0	120	1	1	0	0
Total Survey	0	134	108	0	443	207	0	1	247	2,055	143	4	0	0	0	0	3,337	4	4	3	39

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	18	18	0	46	25	0	0	28	269	16	0	0	0	0	0	420	0	1	0	6
4:15 PM	0	15	17	0	43	21	0	0	27	274	18	0	0	0	0	0	415	1	0	0	5
4:30 PM	0	18	9	0	60	21	0	0	27	254	9	1	0	0	0	0	398	1	1	1	12
4:45 PM	0	15	15	0	57	24	0	1	26	246	23	1	0	0	0	0	406	0	0	0	1
5:00 PM	0	14	15	0	60	36	0	0	39	275	30	0	0	0	0	0	469	0	0	1	9
5:15 PM	0	18	11	0	57	24	0	0	30	269	21	0	0	0	0	0	430	1	0	0	2
5:30 PM	0	19	12	0	65	29	0	0	39	238	13	0	0	0	0	0	415	0	0	0	2
5:45 PM	0	17	11	0	55	27	0	0	31	230	13	2	0	0	0	0	384	1	2	1	2
Total Survey	0	134	108	0	443	207	0	1	247	2,055	143	4	0	0	0	0	3,337	4	4	3	39

Peak Hour Summary
4:40 PM to 5:40 PM

By Approach	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	116	198	314	0	351	196	547	1	1,263	0	1,263	1	0	1,336	1,336	0	1,730	1	0	1	16
%HV	0.9%				0.9%				2.9%				0.0%				2.4%				
PHF	0.83				0.89				0.89				0.00				0.91				

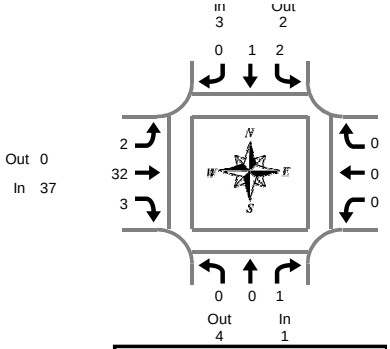
By Movement	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	65	51	116	236	115	0	351	131	1,049	83	1,263	0	0	0	0	1,730
%HV	0.0%	0.0%	2.0%	0.9%	0.8%	0.9%	0.0%	0.9%	1.5%	3.1%	3.6%	2.9%	0.0%	0.0%	0.0%	0.0%	2.4%
PHF	0.00	0.90	0.75	0.83	0.92	0.80	0.00	0.89	0.84	0.90	0.69	0.89	0.00	0.00	0.00	0.00	0.91

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	66	59	0	206	91	0	1	108	1,043	66	2	0	0	0	0	1,639	2	2	1	24
4:15 PM	0	62	56	0	220	102	0	1	119	1,049	80	2	0	0	0	0	1,688	2	1	2	27
4:30 PM	0	65	50	0	234	105	0	1	122	1,044	83	2	0	0	0	0	1,703	2	1	2	24
4:45 PM	0	66	53	0	239	113	0	1	134	1,028	87	1	0	0	0	0	1,720	1	0	1	14
5:00 PM	0	68	49	0	237	116	0	0	139	1,012	77	2	0	0	0	0	1,698	2	2	2	15

Heavy Vehicle Summary

Clay Carney
(503) 833-2740



S 4th Ave & W Baseline St

Tuesday, August 24, 2010
4:00 PM to 6:00 PM

Peak Hour Summary
4:40 PM to 5:40 PM

Heavy Vehicle 5-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	1	0	1	1	3	0	4	0	0	0	0	5
4:05 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
4:10 PM	0	0	0	0	0	0	0	0	1	3	1	5	0	0	0	0	5
4:15 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	0	0	0	5
4:20 PM	0	1	0	1	0	0	0	0	0	1	0	1	0	0	0	0	2
4:25 PM	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	0	6
4:30 PM	0	0	0	0	1	0	0	1	0	2	0	2	0	0	0	0	3
4:35 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
4:40 PM	0	0	0	0	1	0	0	1	1	3	0	4	0	0	0	0	5
4:45 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
4:50 PM	0	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	3
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	4	1	5	0	0	0	0	5
5:05 PM	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	2
5:10 PM	0	0	1	1	0	0	0	0	1	0	0	1	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	6	0	6	0	0	0	0	6
5:20 PM	0	0	0	0	0	0	0	0	0	2	1	3	0	0	0	0	3
5:25 PM	0	0	0	0	0	0	0	0	0	4	0	4	0	0	0	0	4
5:30 PM	0	0	0	0	1	0	0	1	0	4	0	4	0	0	0	0	5
5:35 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:40 PM	0	0	0	0	0	0	0	0	1	3	0	4	0	0	0	0	4
5:45 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
5:50 PM	0	1	0	1	0	1	0	1	0	0	1	1	0	0	0	0	3
5:55 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	0	0	0	3
Total Survey	0	2	1	3	3	3	0	6	5	68	5	78	0	0	0	0	87

Heavy Vehicle 15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	0	1	0	1	2	10	1	13	0	0	0	0	14
4:15 PM	0	1	0	1	0	0	0	0	0	12	0	12	0	0	0	0	13
4:30 PM	0	0	0	0	2	0	0	2	1	9	0	10	0	0	0	0	12
4:45 PM	0	0	0	0	0	0	0	0	0	6	1	7	0	0	0	0	7
5:00 PM	0	0	1	1	0	1	0	1	1	5	1	7	0	0	0	0	9
5:15 PM	0	0	0	0	0	0	0	0	0	12	1	13	0	0	0	0	13
5:30 PM	0	0	0	0	1	0	0	1	1	9	0	10	0	0	0	0	11
5:45 PM	0	1	0	1	0	1	0	1	0	5	1	6	0	0	0	0	8
Total Survey	0	2	1	3	3	3	0	6	5	68	5	78	0	0	0	0	87

Heavy Vehicle Peak Hour Summary
4:40 PM to 5:40 PM

By Approach	Northbound S 4th Ave			Southbound S 4th Ave			Eastbound W Baseline St			Westbound W Baseline St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	1	4	5	3	2	5	37	0	37	0	35	35	41
PHF	0.25			0.75			0.71			0.00			0.79

By Movement	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	0	1	1	2	1	0	3	2	32	3	37	0	0	0	0	41
PHF	0.00	0.00	0.25	0.25	0.50	0.25	0.00	0.75	0.50	0.67	0.38	0.71	0.00	0.00	0.00	0.00	0.79

Heavy Vehicle Rolling Hour Summary
4:00 PM to 6:00 PM

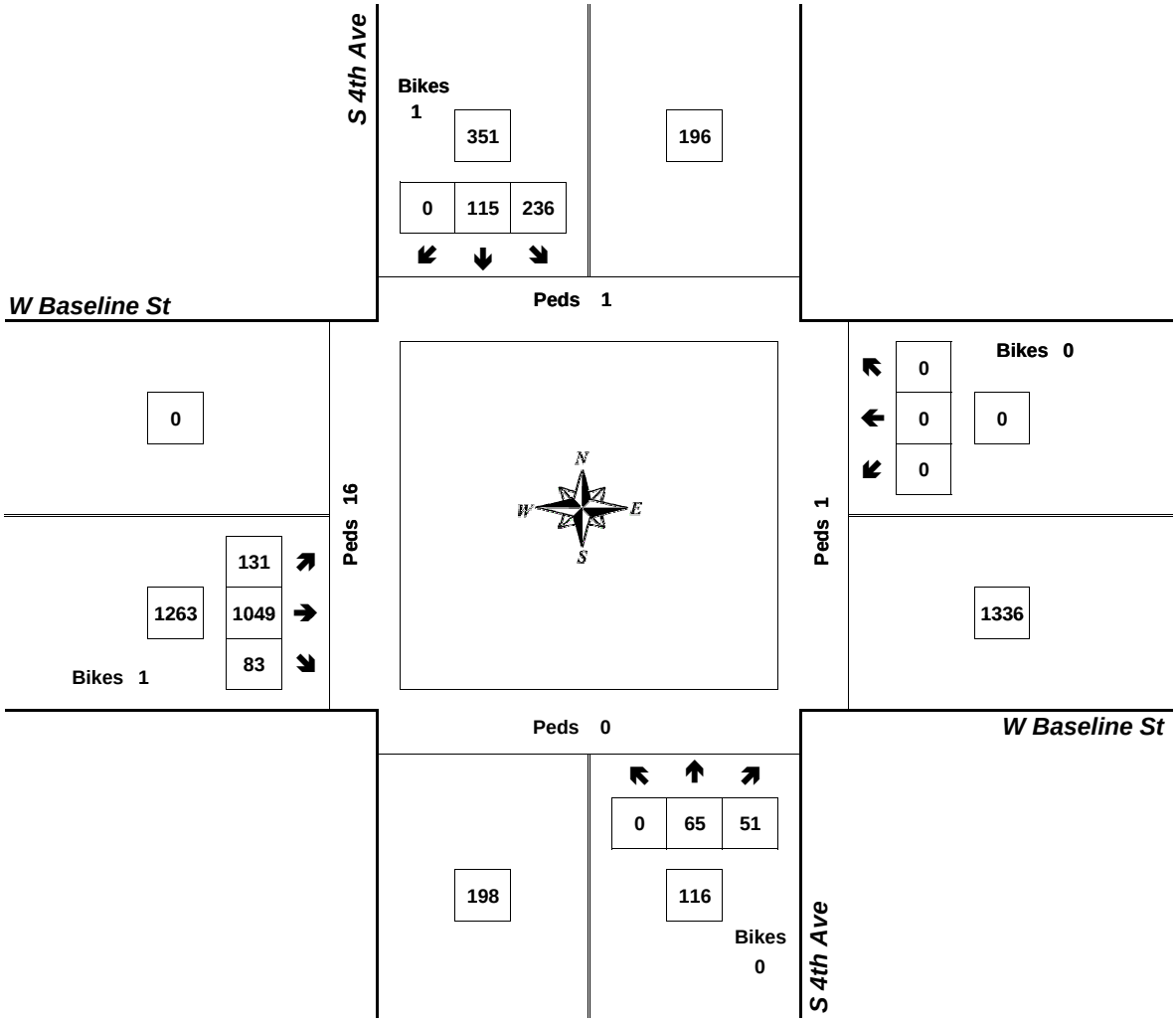
Interval Start Time	Northbound S 4th Ave				Southbound S 4th Ave				Eastbound W Baseline St				Westbound W Baseline St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	1	0	1	2	1	0	3	3	37	2	42	0	0	0	0	46
4:15 PM	0	1	1	2	2	1	0	3	2	32	2	36	0	0	0	0	41
4:30 PM	0	0	1	1	2	1	0	3	2	32	3	37	0	0	0	0	41
4:45 PM	0	0	1	1	1	1	0	2	2	32	3	37	0	0	0	0	40
5:00 PM	0	1	1	2	1	2	0	3	2	31	3	36	0	0	0	0	41

Peak Hour Summary

Clay Carney
(503) 833-2740

S 4th Ave & W Baseline St

4:40 PM to 5:40 PM
Tuesday, August 24, 2010



Approach	PHF	HV%	Volume
EB	0.89	2.9%	1,263
WB	0.00	0.0%	0
NB	0.83	0.9%	116
SB	0.89	0.9%	351
Intersection	0.91	2.4%	1,730

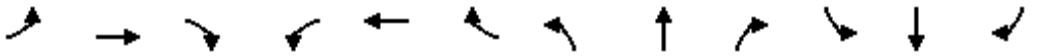
Count Period: 4:00 PM to 6:00 PM

OPERATIONS ANALYSIS

Movement	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Traffic Volume (vph)	110	1135	75	95	1565	85	40	40	55	55	65	110
Future Volume (vph)	110	1135	75	95	1565	85	40	40	55	55	65	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	14	12	12	12	12	12	12
Total Lost time (s)	5.3	5.3		4.5	5.3	5.3	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.88	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.96	1.00	1.00	0.98		1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	0.99		1.00	0.85	0.85	1.00	0.91		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1736	3506		1770	2676	1656	1736	1627		1688	1827	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.71	1.00		0.69	1.00	1.00
Satd. Flow (perm)	1736	3506		1770	2676	1656	1302	1627		1224	1827	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92
Adj. Flow (vph)	116	1195	79	100	1647	89	42	42	58	58	68	120
RTOR Reduction (vph)	0	3	0	0	0	31	0	39	0	0	0	42
Lane Group Flow (vph)	116	1271	0	100	1647	58	42	61	0	58	68	78
Confl. Peds. (#/hr)	5				5				14	14		
Confl. Bikes (#/hr)					2							
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%	2%
Turn Type	Perm	NA		Prot	Perm	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2		1				8			4	
Permitted Phases	2				6	6	8			4		4
Actuated Green, G (s)	53.7	53.7		12.1	70.3	70.3	39.9	39.9		39.4	39.4	39.4
Effective Green, g (s)	53.7	53.7		12.1	70.3	70.3	39.9	39.9		39.4	39.4	39.4
Actuated g/C Ratio	0.45	0.45		0.10	0.59	0.59	0.33	0.33		0.33	0.33	0.33
Clearance Time (s)	5.3	5.3		4.5	5.3	5.3	4.5	4.5		5.0	5.0	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)	776	1568		178	1567	970	432	540		401	599	519
v/s Ratio Prot		0.36		0.06				0.04			0.04	
v/s Ratio Perm	0.07				c0.62	0.03	0.03			0.05		c0.05
v/c Ratio	0.15	0.81		0.56	1.05	0.06	0.10	0.11		0.14	0.11	0.15
Uniform Delay, d1	19.6	28.7		51.4	24.9	10.7	27.6	27.8		28.4	28.1	28.5
Progression Factor	1.00	1.00		0.81	1.62	3.62	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	4.7		2.9	34.4	0.1	0.4	0.4		0.8	0.4	0.6
Delay (s)	20.0	33.4		44.6	74.6	38.7	28.1	28.2		29.2	28.5	29.1
Level of Service	C	C		D	E	D	C	C		C	C	C
Approach Delay (s)		32.3						28.2			28.9	
Approach LOS		C						C			C	

Intersection Summary			
HCM 2000 Control Delay	51.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		

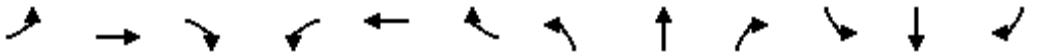
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1115	10	15	1535	185	10	10	10	130	5	75
Future Volume (vph)	145	1115	10	15	1535	185	10	10	10	130	5	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	14	14	11
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.95	1.00
Satd. Flow (prot)	1770	3534		1769	3539	1544		1761	1538		1914	1518
Flt Permitted	0.07	1.00		0.23	1.00	1.00		0.87	1.00		0.72	1.00
Satd. Flow (perm)	123	3534		423	3539	1544		1564	1538		1439	1518
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	1212	11	16	1668	201	11	11	11	141	5	82
RTOR Reduction (vph)	0	0	0	0	0	51	0	0	9	0	0	69
Lane Group Flow (vph)	158	1223	0	16	1668	150	0	22	2	0	146	13
Confl. Peds. (#/hr)	1		1	1		1	4					4
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	83.6	83.6		78.0	77.2	77.2		19.2	19.2		19.2	19.2
Effective Green, g (s)	83.6	83.6		78.0	77.2	77.2		19.2	19.2		19.2	19.2
Actuated g/C Ratio	0.70	0.70		0.65	0.64	0.64		0.16	0.16		0.16	0.16
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	233	2462		324	2276	993		250	246		230	242
v/s Ratio Prot	c0.06	0.35		0.00	c0.47							
v/s Ratio Perm	0.41			0.03		0.10		0.01	0.00		c0.10	0.01
v/c Ratio	0.68	0.50		0.05	0.73	0.15		0.09	0.01		0.63	0.05
Uniform Delay, d1	25.9	8.4		7.9	14.4	8.5		42.9	42.4		47.1	42.7
Progression Factor	2.41	0.19		0.44	0.97	0.63		1.00	1.00		1.00	1.00
Incremental Delay, d2	5.3	0.5		0.0	1.5	0.2		0.7	0.1		12.6	0.4
Delay (s)	67.8	2.1		3.5	15.4	5.6		43.6	42.4		59.8	43.1
Level of Service	E	A		A	B	A		D	D		E	D
Approach Delay (s)		9.6			14.3			43.2			53.8	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	1175	45	85	1640	65	25	10	55	70	15	65
Future Volume (vph)	30	1175	45	85	1640	65	25	10	55	70	15	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	14	16
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00		0.96	1.00
Satd. Flow (prot)	1770	3517		1770	3539	1535		1741	1517		1944	1794
Flt Permitted	0.09	1.00		0.16	1.00	1.00		0.76	1.00		0.74	1.00
Satd. Flow (perm)	160	3517		289	3539	1535		1375	1517		1494	1794
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	32	1250	48	90	1745	69	27	11	59	74	16	69
RTOR Reduction (vph)	0	1	0	0	0	19	0	0	53	0	0	62
Lane Group Flow (vph)	32	1297	0	90	1745	50	0	38	6	0	90	7
Confl. Peds. (#/hr)	3					3	4		1	1		4
Confl. Bikes (#/hr)			1			3						1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1!	2!		5!	6!			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	94.7	91.0		94.7	76.1	76.1		12.5	12.5		12.5	12.5
Effective Green, g (s)	94.7	91.0		94.7	76.1	76.1		12.5	12.5		12.5	12.5
Actuated g/C Ratio	0.79	0.76		0.79	0.63	0.63		0.10	0.10		0.10	0.10
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	175	2667		457	2244	973		143	158		155	186
v/s Ratio Prot	0.01	c0.37		0.03	c0.49							
v/s Ratio Perm	0.14			0.12		0.03		0.03	0.00		c0.06	0.00
v/c Ratio	0.18	0.49		0.20	0.78	0.05		0.27	0.04		0.58	0.04
Uniform Delay, d1	8.0	5.6		11.4	15.8	8.3		49.5	48.3		51.3	48.3
Progression Factor	1.67	1.08		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.4	0.6		0.2	2.7	0.1		1.0	0.1		5.4	0.1
Delay (s)	13.8	6.6		11.6	18.6	8.4		50.5	48.4		56.7	48.4
Level of Service	B	A		B	B	A		D	D		E	D
Approach Delay (s)		6.7			17.9			49.3			53.1	
Approach LOS		A			B			D			D	

Intersection Summary			
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	40	1205	1750	75	25	30
Future Vol, veh/h	40	1205	1750	75	25	30
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	288	-	-	126	0	15
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	2	2
Mvmt Flow	41	1242	1804	77	26	31

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1807	0	-	0	2511	905
Stage 1	-	-	-	-	1807	-
Stage 2	-	-	-	-	704	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	332	-	-	-	~ 23	279
Stage 1	-	-	-	-	116	-
Stage 2	-	-	-	-	452	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	332	-	-	-	~ 20	278
Mov Cap-2 Maneuver	-	-	-	-	88	-
Stage 1	-	-	-	-	116	-
Stage 2	-	-	-	-	395	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	38.9
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	332	-	-	-	88	278
HCM Lane V/C Ratio	0.124	-	-	-	0.293	0.111
HCM Control Delay (s)	17.4	-	-	-	62	19.6
HCM Lane LOS	C	-	-	-	F	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.1	0.4

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	1270	10	5	1820	5	5	0	10	0	0	5
Future Vol, veh/h	5	1270	10	5	1820	5	5	0	10	0	0	5
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	215	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	0	0	0
Mvmt Flow	6	1411	11	6	2022	6	6	0	11	0	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	2030	0	0	1422	0	0	2450	3469	711	2755	3471	1016
Stage 1	-	-	-	-	-	-	1428	1428	-	2038	2038	-
Stage 2	-	-	-	-	-	-	1022	2041	-	717	1433	-
Critical Hdwy	4.14	-	-	4.14	-	-	7.64	6.64	7.04	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.64	5.64	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.64	5.64	-	6.5	5.5	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.57	4.07	3.37	3.5	4	3.3
Pot Cap-1 Maneuver	275	-	-	475	-	-	15	6	364	10	7	239
Stage 1	-	-	-	-	-	-	135	190	-	60	101	-
Stage 2	-	-	-	-	-	-	244	93	-	391	201	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	275	-	-	475	-	-	13	5	364	9	6	239
Mov Cap-2 Maneuver	-	-	-	-	-	-	13	5	-	9	6	-
Stage 1	-	-	-	-	-	-	121	170	-	54	100	-
Stage 2	-	-	-	-	-	-	235	92	-	339	180	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	172.4	20.4
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	36	275	-	-	475	-	-	239
HCM Lane V/C Ratio	0.463	0.02	-	-	0.012	-	-	0.023
HCM Control Delay (s)	172.4	18.4	-	-	12.7	-	-	20.4
HCM Lane LOS	F	C	-	-	B	-	-	C
HCM 95th %tile Q(veh)	1.6	0.1	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	50	25	10	0	20	15	5	20	0	15	40	90
Future Vol, veh/h	50	25	10	0	20	15	5	20	0	15	40	90
Conflicting Peds, #/hr	4	0	2	2	0	4	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	5	5	5
Mvmt Flow	57	28	11	0	23	17	6	23	0	17	45	102

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	191	167	101	187	218	27	150	0	0	23	0	0
Stage 1	133	133	-	34	34	-	-	-	-	-	-	-
Stage 2	58	34	-	153	184	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.13	6.53	6.23	4.1	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.527	4.027	3.327	2.2	-	-	2.245	-	-
Pot Cap-1 Maneuver	762	720	946	771	678	1046	1444	-	-	1573	-	-
Stage 1	863	781	-	979	865	-	-	-	-	-	-	-
Stage 2	946	861	-	847	746	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	718	707	943	728	666	1043	1442	-	-	1568	-	-
Mov Cap-2 Maneuver	718	707	-	728	666	-	-	-	-	-	-	-
Stage 1	858	770	-	975	862	-	-	-	-	-	-	-
Stage 2	899	858	-	795	736	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.6	9.8	1.5	0.8
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1442	-	-	735	788	1568	-	-
HCM Lane V/C Ratio	0.004	-	-	0.131	0.05	0.011	-	-
HCM Control Delay (s)	7.5	0	-	10.6	9.8	7.3	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.2	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	75	0	5	90	15	5	5	5	15	0	40
Future Vol, veh/h	35	75	0	5	90	15	5	5	5	15	0	40
Conflicting Peds, #/hr	2	0	9	9	0	2	1	0	2	2	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	6	6	6	0	0	0	2	2	2
Mvmt Flow	40	85	0	6	102	17	6	6	6	17	0	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	121	0	0	94	0	0	320	307	96	296	298	114
Stage 1	-	-	-	-	-	-	174	174	-	124	124	-
Stage 2	-	-	-	-	-	-	146	133	-	172	174	-
Critical Hdwy	4.13	-	-	4.16	-	-	7.1	6.5	6.2	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Follow-up Hdwy	2.227	-	-	2.254	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Cap-1 Maneuver	1460	-	-	1475	-	-	637	610	966	656	614	939
Stage 1	-	-	-	-	-	-	833	759	-	880	793	-
Stage 2	-	-	-	-	-	-	861	790	-	830	755	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1459	-	-	1473	-	-	586	585	957	629	588	937
Mov Cap-2 Maneuver	-	-	-	-	-	-	586	585	-	629	588	-
Stage 1	-	-	-	-	-	-	803	731	-	853	789	-
Stage 2	-	-	-	-	-	-	815	786	-	794	728	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.3	10.5	9.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	673	1459	-	-	1473	-	-	827
HCM Lane V/C Ratio	0.025	0.027	-	-	0.004	-	-	0.076
HCM Control Delay (s)	10.5	7.5	0	-	7.5	0	-	9.7
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	40	10	20	65	25	20	190	25	30	195	20
Future Vol, veh/h	10	40	10	20	65	25	20	190	25	30	195	20
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	3	3	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	5	5	5	5	5	5	6	6	6
Mvmt Flow	11	43	11	22	70	27	22	204	27	32	210	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	603	570	232	580	568	222	239	0	0	234	0	0
Stage 1	293	293	-	264	264	-	-	-	-	-	-	-
Stage 2	310	277	-	316	304	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.15	6.55	6.25	4.15	-	-	4.16	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.545	4.045	3.345	2.245	-	-	2.254	-	-
Pot Cap-1 Maneuver	409	430	805	421	428	810	1310	-	-	1310	-	-
Stage 1	713	668	-	735	685	-	-	-	-	-	-	-
Stage 2	698	679	-	689	658	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	329	406	797	366	404	807	1306	-	-	1309	-	-
Mov Cap-2 Maneuver	329	406	-	366	404	-	-	-	-	-	-	-
Stage 1	695	645	-	719	670	-	-	-	-	-	-	-
Stage 2	592	664	-	615	635	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15	16	0.7	1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1306	-	-	424	446	1309	-	-
HCM Lane V/C Ratio	0.016	-	-	0.152	0.265	0.025	-	-
HCM Control Delay (s)	7.8	0	-	15	16	7.8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.5	1.1	0.1	-	-

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	30	5	5	0	0	0	5	0	5	20	0
Future Vol, veh/h	0	30	5	5	0	0	0	5	0	5	20	0
Peak Hour Factor	0.92	0.99	0.99	0.99	0.92	0.99	0.99	0.99	0.92	0.99	0.99	0.99
Heavy Vehicles, %	2	3	3	3	2	0	0	0	2	0	0	0
Mvmt Flow	0	30	5	5	0	0	0	5	0	5	20	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.4	6.6	7.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	75%	0%	21%
Vol Thru, %	80%	12%	0%	29%
Vol Right, %	0%	12%	100%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	25	40	5	70
LT Vol	5	30	0	15
Through Vol	20	5	0	20
RT Vol	0	5	5	35
Lane Flow Rate	25	40	5	71
Geometry Grp	1	1	1	1
Degree of Util (X)	0.029	0.047	0.005	0.075
Departure Headway (Hd)	4.072	4.195	3.496	3.842
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	877	851	1016	931
Service Time	2.106	2.233	1.542	1.871
HCM Lane V/C Ratio	0.029	0.047	0.005	0.076
HCM Control Delay	7.2	7.4	6.6	7.2
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0	0.2

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	15	20	35
Future Vol, veh/h	0	15	20	35
Peak Hour Factor	0.92	0.99	0.99	0.99
Heavy Vehicles, %	2	6	6	6
Mvmt Flow	0	15	20	35
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.2
HCM LOS	A

Intersection	
Int Delay, s/veh	8.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	45	30	25	65	65	35	140	15	70	205	70
Future Vol, veh/h	45	45	30	25	65	65	35	140	15	70	205	70
Conflicting Peds, #/hr	4	0	7	7	0	4	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	2	2	2	3	3	3	4	4	4
Mvmt Flow	51	51	34	28	74	74	40	159	17	80	233	80

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	757	693	280	733	724	177	313	0	0	181	0	0
Stage 1	432	432	-	252	252	-	-	-	-	-	-	-
Stage 2	325	261	-	481	472	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.12	6.52	6.22	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.518	4.018	3.318	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	323	366	756	336	352	866	1242	-	-	1382	-	-
Stage 1	600	581	-	752	698	-	-	-	-	-	-	-
Stage 2	685	690	-	566	559	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	222	326	752	258	314	860	1235	-	-	1377	-	-
Mov Cap-2 Maneuver	222	326	-	258	314	-	-	-	-	-	-	-
Stage 1	578	540	-	722	670	-	-	-	-	-	-	-
Stage 2	535	662	-	452	519	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	24.9	20.4	1.5	1.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1235	-	-	315	408	1377	-	-
HCM Lane V/C Ratio	0.032	-	-	0.433	0.432	0.058	-	-
HCM Control Delay (s)	8	0	-	24.9	20.4	7.8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.1	2.1	0.2	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	40	35	20	105	175	65
Future Vol, veh/h	40	35	20	105	175	65
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	4	4	6	6	4	4
Mvmt Flow	45	40	23	119	199	74

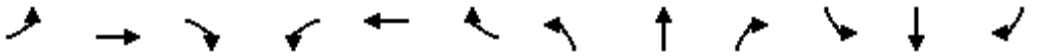
Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	401	236	273	0	-	0
Stage 1	236	-	-	-	-	-
Stage 2	165	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.16	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.254	-	-	-
Pot Cap-1 Maneuver	601	798	1267	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	859	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	590	798	1267	-	-	-
Mov Cap-2 Maneuver	590	-	-	-	-	-
Stage 1	799	-	-	-	-	-
Stage 2	843	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.7	1.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1267	-	590	798	-	-
HCM Lane V/C Ratio	0.018	-	0.077	0.05	-	-
HCM Control Delay (s)	7.9	0	11.6	9.7	-	-
HCM Lane LOS	A	A	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	0.2	-	-

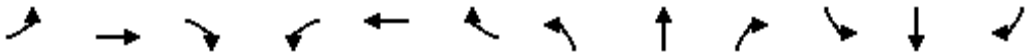
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	155	1565	60	85	135	0	0	165	110
Future Volume (vph)	0	0	0	155	1565	60	85	135	0	0	165	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes					1.00		1.00	1.00			1.00	0.97
Flpb, ped/bikes					1.00		0.99	1.00			1.00	1.00
Frt					0.99		1.00	1.00			1.00	0.85
Flt Protected					1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3503		1767	1881			1845	1524
Flt Permitted					1.00		0.59	1.00			1.00	1.00
Satd. Flow (perm)					3503		1103	1881			1845	1524
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	158	1597	61	87	138	0	0	168	112
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	0	0	0	22
Lane Group Flow (vph)	0	0	0	0	1814	0	87	138	0	0	168	90
Confl. Peds. (#/hr)	3					3	9		16	16		9
Confl. Bikes (#/hr)						1			3			2
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					6			8			4	
Permitted Phases				6			8					4
Actuated Green, G (s)					57.0		30.1	30.1			30.1	30.1
Effective Green, g (s)					57.0		30.1	30.1			30.1	30.1
Actuated g/C Ratio					0.60		0.32	0.32			0.32	0.32
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)					2099		349	595			583	482
v/s Ratio Prot								0.07			c0.09	
v/s Ratio Perm					0.52		0.08					0.06
v/c Ratio					0.86		0.25	0.23			0.29	0.19
Uniform Delay, d1					15.8		24.1	24.0			24.4	23.6
Progression Factor					1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2					4.0		1.7	0.9			1.2	0.9
Delay (s)					19.8		25.8	24.9			25.7	24.5
Level of Service					B		C	C			C	C
Approach Delay (s)		0.0			19.8			25.2			25.2	
Approach LOS		A			B			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	95.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	1110	80	0	0	0	0	125	130	85	220	0
Future Volume (vph)	95	1110	80	0	0	0	0	125	130	85	220	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3486	1526					1845	1535	1728	1827	
Flt Permitted		1.00	1.00					1.00	1.00	0.59	1.00	
Satd. Flow (perm)		3486	1526					1845	1535	1079	1827	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	103	1207	87	0	0	0	0	136	141	92	239	0
RTOR Reduction (vph)	0	0	24	0	0	0	0	0	66	0	0	0
Lane Group Flow (vph)	0	1310	63	0	0	0	0	136	75	92	239	0
Confl. Peds. (#/hr)	8		2	2		8	20		5	5		20
Confl. Bikes (#/hr)			5						1			1
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2						8	4		
Actuated Green, G (s)		64.9	64.9					17.1	17.1	17.1	17.1	
Effective Green, g (s)		64.9	64.9					17.1	17.1	17.1	17.1	
Actuated g/C Ratio		0.72	0.72					0.19	0.19	0.19	0.19	
Clearance Time (s)		4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2513	1100					350	291	205	347	
v/s Ratio Prot								0.07			c0.13	
v/s Ratio Perm		0.38	0.04						0.05	0.09		
v/c Ratio		0.52	0.06					0.39	0.26	0.45	0.69	
Uniform Delay, d1		5.6	3.7					31.9	31.0	32.3	34.0	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.8	0.1					0.7	0.5	1.6	5.6	
Delay (s)		6.4	3.7					32.6	31.5	33.8	39.6	
Level of Service		A	A					C	C	C	D	
Approach Delay (s)		6.2			0.0			32.0			38.0	
Approach LOS		A			A			C			D	

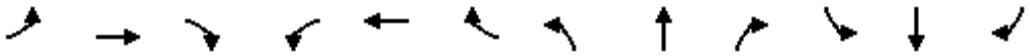
Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	60	1765	25	35	25	0	0	30	40
Future Volume (vph)	0	0	0	60	1765	25	35	25	0	0	30	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					1.00			1.00			0.99	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					1.00			1.00			0.92	
Flt Protected					1.00			0.97			1.00	
Satd. Flow (prot)					3525			1843			1704	
Flt Permitted					1.00			0.78			1.00	
Satd. Flow (perm)					3525			1472			1704	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	66	1940	27	38	27	0	0	33	44
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	25	0
Lane Group Flow (vph)	0	0	0	0	2032	0	0	65	0	0	52	0
Confl. Peds. (#/hr)	5		4	4		5	2		14	14		2
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			8			4	
Permitted Phases				6			8					
Actuated Green, G (s)					75.9			8.1			8.1	
Effective Green, g (s)					75.9			8.1			8.1	
Actuated g/C Ratio					0.83			0.09			0.09	
Clearance Time (s)					4.0			4.0			4.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					2908			129			150	
v/s Ratio Prot											0.03	
v/s Ratio Perm					0.58			c0.04				
v/c Ratio					0.70			0.50			0.35	
Uniform Delay, d1					3.3			40.0			39.5	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					1.4			3.1			1.4	
Delay (s)					4.7			43.1			40.9	
Level of Service					A			D			D	
Approach Delay (s)		0.0			4.7			43.1			40.9	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	7.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	1250	25	0	0	0	0	25	45	35	70	0
Future Volume (vph)	20	1250	25	0	0	0	0	25	45	35	70	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.5						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		1.00						0.97			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		1.00						0.91			1.00	
Flt Protected		1.00						1.00			0.98	
Satd. Flow (prot)		3491						1655			1834	
Flt Permitted		1.00						1.00			0.87	
Satd. Flow (perm)		3491						1655			1614	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	22	1374	27	0	0	0	0	27	49	38	77	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	44	0	0	0	0
Lane Group Flow (vph)	0	1422	0	0	0	0	0	32	0	0	115	0
Confl. Peds. (#/hr)	1		4	4		1	5		19	19		5
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2									4		
Actuated Green, G (s)		73.4						10.1			10.1	
Effective Green, g (s)		73.4						10.1			10.1	
Actuated g/C Ratio		0.82						0.11			0.11	
Clearance Time (s)		2.5						4.0			4.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		2847						185			181	
v/s Ratio Prot								0.02				
v/s Ratio Perm		0.41									c0.07	
v/c Ratio		0.50						0.18			0.64	
Uniform Delay, d1		2.6						36.2			38.2	
Progression Factor		0.50						0.96			1.00	
Incremental Delay, d2		0.6						0.5			7.1	
Delay (s)		1.8						35.1			45.3	
Level of Service		A						D			D	
Approach Delay (s)		1.8			0.0			35.1			45.3	
Approach LOS		A			A			D			D	

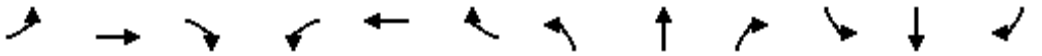
Intersection Summary			
HCM 2000 Control Delay	6.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR2
Lane Configurations												
Traffic Volume (vph)	70	1270	115	60	1600	165	50	25	55	60	70	125
Future Volume (vph)	70	1270	115	60	1600	165	50	25	55	60	70	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	14	12	12	12	12	12	12
Total Lost time (s)	5.3	5.3		4.5	5.3	5.3	4.5	4.5		5.0	5.0	5.0
Lane Util. Factor	1.00	0.95		1.00	0.88	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.96	1.00	1.00	0.97		1.00	1.00	1.00
Flpb, ped/bikes	0.98	1.00		1.00	1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frt	1.00	0.99		1.00	0.85	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1736	3495		1770	2676	1656	1736	1589		1687	1827	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.71	1.00		0.70	1.00	1.00
Satd. Flow (perm)	1736	3495		1770	2676	1656	1295	1589		1247	1827	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.92
Adj. Flow (vph)	74	1337	121	63	1684	174	53	26	58	63	74	136
RTOR Reduction (vph)	0	4	0	0	0	60	0	39	0	0	0	42
Lane Group Flow (vph)	74	1454	0	63	1684	114	53	45	0	63	74	94
Confl. Peds. (#/hr)	5				5				14	14		
Confl. Bikes (#/hr)					2							
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%	4%	4%	4%	4%	4%	2%
Turn Type	Perm	NA		Prot	Perm	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		2		1				8			4	
Permitted Phases	2				6	6	8			4		4
Actuated Green, G (s)	57.3	57.3		8.5	70.3	70.3	39.9	39.9		39.4	39.4	39.4
Effective Green, g (s)	57.3	57.3		8.5	70.3	70.3	39.9	39.9		39.4	39.4	39.4
Actuated g/C Ratio	0.48	0.48		0.07	0.59	0.59	0.33	0.33		0.33	0.33	0.33
Clearance Time (s)	5.3	5.3		4.5	5.3	5.3	4.5	4.5		5.0	5.0	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)	828	1668		125	1567	970	430	528		409	599	519
v/s Ratio Prot		0.42		0.04				0.03			0.04	
v/s Ratio Perm	0.04				c0.63	0.07	0.04			0.05		c0.06
v/c Ratio	0.09	0.87		0.50	1.07	0.12	0.12	0.09		0.15	0.12	0.18
Uniform Delay, d1	17.1	28.1		53.7	24.9	11.1	27.9	27.5		28.5	28.2	28.8
Progression Factor	1.00	1.00		0.73	1.63	4.16	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	6.6		2.3	42.9	0.2	0.6	0.3		0.8	0.4	0.8
Delay (s)	17.3	34.6		41.3	83.5	46.1	28.5	27.8		29.3	28.6	29.6
Level of Service	B	C		D	F	D	C	C		C	C	C
Approach Delay (s)		33.8						28.1			29.2	
Approach LOS		C						C			C	

Intersection Summary			
HCM 2000 Control Delay	55.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	14.8
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

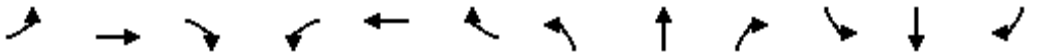
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	175	1200	10	15	1555	275	10	10	10	355	5	80
Future Volume (vph)	175	1200	10	15	1555	275	10	10	10	355	5	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	14	14	11
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00		0.95	1.00
Satd. Flow (prot)	1770	3534		1769	3539	1544		1764	1538		1912	1518
Flt Permitted	0.06	1.00		0.21	1.00	1.00		0.42	1.00		0.71	1.00
Satd. Flow (perm)	105	3534		383	3539	1544		767	1538		1430	1518
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	190	1304	11	16	1690	299	11	11	11	386	5	87
RTOR Reduction (vph)	0	0	0	0	0	78	0	0	9	0	0	73
Lane Group Flow (vph)	190	1315	0	16	1690	221	0	22	2	0	391	14
Confl. Peds. (#/hr)	1		1	1		1	4					4
Confl. Bikes (#/hr)			1			3						
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	1%	1%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	83.6	83.6		76.0	75.2	75.2		19.2	19.2		19.2	19.2
Effective Green, g (s)	83.6	83.6		76.0	75.2	75.2		19.2	19.2		19.2	19.2
Actuated g/C Ratio	0.70	0.70		0.63	0.63	0.63		0.16	0.16		0.16	0.16
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	250	2462		293	2217	967		122	246		228	242
v/s Ratio Prot	c0.08	0.37		0.00	c0.48							
v/s Ratio Perm	0.45			0.03		0.14		0.03	0.00		c0.27	0.01
v/c Ratio	0.76	0.53		0.05	0.76	0.23		0.18	0.01		1.71	0.06
Uniform Delay, d1	33.8	8.8		8.9	16.0	9.8		43.6	42.4		50.4	42.7
Progression Factor	2.03	0.16		0.52	0.97	0.61		1.00	1.00		1.00	1.00
Incremental Delay, d2	8.1	0.5		0.1	1.7	0.4		3.2	0.1		339.6	0.5
Delay (s)	76.7	1.9		4.6	17.3	6.3		46.8	42.4		390.0	43.2
Level of Service	E	A		A	B	A		D	D		F	D
Approach Delay (s)		11.4			15.5			45.4			326.9	
Approach LOS		B			B			D			F	

Intersection Summary			
HCM 2000 Control Delay	51.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	89.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	1410	95	150	1675	55	65	15	90	75	25	105
Future Volume (vph)	60	1410	95	150	1675	55	65	15	90	75	25	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	14	16
Total Lost time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97		1.00	0.99		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00		0.96	1.00
Satd. Flow (prot)	1770	3501		1770	3539	1535		1732	1517		1952	1795
Flt Permitted	0.08	1.00		0.09	1.00	1.00		0.56	1.00		0.66	1.00
Satd. Flow (perm)	146	3501		163	3539	1535		1018	1517		1342	1795
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	1500	101	160	1782	59	69	16	96	80	27	112
RTOR Reduction (vph)	0	3	0	0	0	20	0	0	85	0	0	99
Lane Group Flow (vph)	64	1598	0	160	1782	39	0	85	11	0	107	13
Confl. Peds. (#/hr)	3					3	4		1	1		4
Confl. Bikes (#/hr)			1			3						1
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	5%	5%	5%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1!	2!		5!	6!			8			4	
Permitted Phases	2			6		6	8		8	4		4
Actuated Green, G (s)	92.9	87.6		92.9	75.1	75.1		14.3	14.3		14.3	14.3
Effective Green, g (s)	92.9	87.6		92.9	75.1	75.1		14.3	14.3		14.3	14.3
Actuated g/C Ratio	0.77	0.73		0.77	0.63	0.63		0.12	0.12		0.12	0.12
Clearance Time (s)	4.0	4.8		4.0	4.8	4.8		4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	184	2555		364	2214	960		121	180		159	213
v/s Ratio Prot	0.02	c0.46		0.07	c0.50							
v/s Ratio Perm	0.25			0.27		0.03		c0.08	0.01		0.08	0.01
v/c Ratio	0.35	0.63		0.44	0.80	0.04		0.70	0.06		0.67	0.06
Uniform Delay, d1	10.0	8.1		26.0	16.9	8.6		50.8	46.9		50.6	46.9
Progression Factor	1.99	0.84		1.00	1.00	1.00		1.00	1.00		1.00	1.00
Incremental Delay, d2	0.7	0.7		0.9	3.2	0.1		16.8	0.1		10.7	0.1
Delay (s)	20.6	7.5		26.9	20.2	8.7		67.7	47.1		61.3	47.0
Level of Service	C	A		C	C	A		E	D		E	D
Approach Delay (s)		8.0			20.4			56.7			54.0	
Approach LOS		A			C			E			D	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.8
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	50	1520	1835	75	30	45
Future Vol, veh/h	50	1520	1835	75	30	45
Conflicting Peds, #/hr	3	0	0	3	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	288	-	-	126	0	15
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	97	97	97	97	97	97
Heavy Vehicles, %	3	3	3	3	2	2
Mvmt Flow	52	1567	1892	77	31	46

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1895	0	-	0	2782	949
Stage 1	-	-	-	-	1895	-
Stage 2	-	-	-	-	887	-
Critical Hdwy	4.16	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.23	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	307	-	-	-	~ 15	261
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	363	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	307	-	-	-	~ 12	260
Mov Cap-2 Maneuver	-	-	-	-	75	-
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	301	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	46.4
HCM LOS			E

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	307	-	-	-	75	260
HCM Lane V/C Ratio	0.168	-	-	-	0.412	0.178
HCM Control Delay (s)	19.1	-	-	-	83.2	21.8
HCM Lane LOS	C	-	-	-	F	C
HCM 95th %tile Q(veh)	0.6	-	-	-	1.6	0.6

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1470	10	5	1950	5	5	0	10	0	0	5
Future Vol, veh/h	0	1470	10	5	1950	5	5	0	10	0	0	5
Conflicting Peds, #/hr	2	0	0	0	0	2	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	215	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	7	7	7	0	0	0
Mvmt Flow	0	1633	11	6	2167	6	6	0	11	0	0	6

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	1644	0	0	2733	3824	822	3000	3827	1088
Stage 1	-	-	-	-	-	-	1639	1639	-	2183	2183	-
Stage 2	-	-	-	-	-	-	1094	2185	-	817	1644	-
Critical Hdwy	-	-	-	4.14	-	-	7.64	6.64	7.04	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.64	5.64	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.64	5.64	-	6.5	5.5	-
Follow-up Hdwy	-	-	-	2.22	-	-	3.57	4.07	3.37	3.5	4	3.3
Pot Cap-1 Maneuver	0	-	-	390	-	-	9	3	307	6	4	214
Stage 1	0	-	-	-	-	-	99	149	-	48	85	-
Stage 2	0	-	-	-	-	-	220	78	-	341	159	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	390	-	-	9	3	307	6	4	214
Mov Cap-2 Maneuver	-	-	-	-	-	-	9	3	-	6	4	-
Stage 1	-	-	-	-	-	-	99	149	-	48	84	-
Stage 2	-	-	-	-	-	-	211	77	-	329	159	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	278.2	22.3
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	26	-	-	390	-	-	214
HCM Lane V/C Ratio	0.641	-	-	0.014	-	-	0.026
HCM Control Delay (s)	278.2	-	-	14.4	-	-	22.3
HCM Lane LOS	F	-	-	B	-	-	C
HCM 95th %tile Q(veh)	2	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	30	25	15	60	20	5	10	45	40	5	115	80
Future Vol, veh/h	30	25	15	60	20	5	10	45	40	5	115	80
Conflicting Peds, #/hr	4	0	2	2	0	4	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	3	3	3	0	0	0	5	5	5
Mvmt Flow	34	28	17	68	23	6	11	51	45	6	131	91

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	305	309	180	309	332	78	224	0	0	97	0	0
Stage 1	190	190	-	97	97	-	-	-	-	-	-	-
Stage 2	115	119	-	212	235	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.13	6.53	6.23	4.1	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.527	4.027	3.327	2.2	-	-	2.245	-	-
Pot Cap-1 Maneuver	641	600	855	641	586	980	1357	-	-	1478	-	-
Stage 1	805	737	-	907	813	-	-	-	-	-	-	-
Stage 2	883	791	-	788	709	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	609	591	852	598	577	977	1355	-	-	1473	-	-
Mov Cap-2 Maneuver	609	591	-	598	577	-	-	-	-	-	-	-
Stage 1	796	732	-	899	806	-	-	-	-	-	-	-
Stage 2	843	784	-	737	704	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.4	12.1	0.8	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1355	-	-	641	607	1473	-	-
HCM Lane V/C Ratio	0.008	-	-	0.124	0.159	0.004	-	-
HCM Control Delay (s)	7.7	0	-	11.4	12.1	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.6	0	-	-

Intersection	
Int Delay, s/veh	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	75	0	5	90	15	5	5	5	15	0	40
Future Vol, veh/h	35	75	0	5	90	15	5	5	5	15	0	40
Conflicting Peds, #/hr	2	0	9	9	0	2	1	0	2	2	0	1
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	6	6	6	0	0	0	2	2	2
Mvmt Flow	40	85	0	6	102	17	6	6	6	17	0	45

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	121	0	0	94	0	0	320	307	96	296	298	114
Stage 1	-	-	-	-	-	-	174	174	-	124	124	-
Stage 2	-	-	-	-	-	-	146	133	-	172	174	-
Critical Hdwy	4.13	-	-	4.16	-	-	7.1	6.5	6.2	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.12	5.52	-
Follow-up Hdwy	2.227	-	-	2.254	-	-	3.5	4	3.3	3.518	4.018	3.318
Pot Cap-1 Maneuver	1460	-	-	1475	-	-	637	610	966	656	614	939
Stage 1	-	-	-	-	-	-	833	759	-	880	793	-
Stage 2	-	-	-	-	-	-	861	790	-	830	755	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1459	-	-	1473	-	-	586	585	957	629	588	937
Mov Cap-2 Maneuver	-	-	-	-	-	-	586	585	-	629	588	-
Stage 1	-	-	-	-	-	-	803	731	-	853	789	-
Stage 2	-	-	-	-	-	-	815	786	-	794	728	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.4	0.3	10.5	9.7
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	673	1459	-	-	1473	-	-	827
HCM Lane V/C Ratio	0.025	0.027	-	-	0.004	-	-	0.076
HCM Control Delay (s)	10.5	7.5	0	-	7.5	0	-	9.7
HCM Lane LOS	B	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.2

Intersection	
Int Delay, s/veh	4.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	10	40	10	20	65	25	20	195	20	30	220	20
Future Vol, veh/h	10	40	10	20	65	25	20	195	20	30	220	20
Conflicting Peds, #/hr	1	0	4	4	0	1	8	0	3	3	0	8
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	3	3	3	5	5	5	5	5	5	6	6	6
Mvmt Flow	11	43	11	22	70	27	22	210	22	32	237	22

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	633	597	259	609	597	224	266	0	0	234	0	0
Stage 1	320	320	-	266	266	-	-	-	-	-	-	-
Stage 2	313	277	-	343	331	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.15	6.55	6.25	4.15	-	-	4.16	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.545	4.045	3.345	2.245	-	-	2.254	-	-
Pot Cap-1 Maneuver	391	415	777	403	412	808	1281	-	-	1310	-	-
Stage 1	690	651	-	733	683	-	-	-	-	-	-	-
Stage 2	696	679	-	666	640	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	312	391	769	349	388	805	1277	-	-	1309	-	-
Mov Cap-2 Maneuver	312	391	-	349	388	-	-	-	-	-	-	-
Stage 1	672	628	-	717	668	-	-	-	-	-	-	-
Stage 2	590	664	-	592	617	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.5	16.5	0.7	0.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1277	-	-	407	430	1309	-	-
HCM Lane V/C Ratio	0.017	-	-	0.159	0.275	0.025	-	-
HCM Control Delay (s)	7.9	0	-	15.5	16.5	7.8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.6	1.1	0.1	-	-

Intersection	
Intersection Delay, s/veh	7.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Lane Configurations												
Traffic Vol, veh/h	0	30	10	5	0	0	0	5	0	5	45	0
Future Vol, veh/h	0	30	10	5	0	0	0	5	0	5	45	0
Peak Hour Factor	0.92	0.99	0.99	0.99	0.92	0.99	0.99	0.99	0.92	0.99	0.99	0.99
Heavy Vehicles, %	2	3	3	3	2	0	0	0	2	0	0	0
Mvmt Flow	0	30	10	5	0	0	0	5	0	5	45	0
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.6	6.7	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	67%	0%	18%
Vol Thru, %	90%	22%	0%	41%
Vol Right, %	0%	11%	100%	41%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	50	45	5	85
LT Vol	5	30	0	15
Through Vol	45	10	0	35
RT Vol	0	5	5	35
Lane Flow Rate	51	45	5	86
Geometry Grp	1	1	1	1
Degree of Util (X)	0.057	0.054	0.005	0.093
Departure Headway (Hd)	4.071	4.256	3.569	3.915
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	876	835	990	912
Service Time	2.115	2.313	1.637	1.954
HCM Lane V/C Ratio	0.058	0.054	0.005	0.094
HCM Control Delay	7.4	7.6	6.7	7.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Lane Configurations			↕	
Traffic Vol, veh/h	0	15	35	35
Future Vol, veh/h	0	15	35	35
Peak Hour Factor	0.92	0.99	0.99	0.99
Heavy Vehicles, %	2	6	6	6
Mvmt Flow	0	15	35	35
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.4
HCM LOS	A

Intersection	
Int Delay, s/veh	19.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	45	45	30	20	65	80	35	195	0	180	205	70
Future Vol, veh/h	45	45	30	20	65	80	35	195	0	180	205	70
Conflicting Peds, #/hr	4	0	7	7	0	4	0	0	5	5	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	3	3	3	2	2	2	3	3	3	4	4	4
Mvmt Flow	51	51	34	23	74	91	40	222	0	205	233	80

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1070	988	280	1037	1028	231	313	0	0	227	0	0
Stage 1	682	682	-	306	306	-	-	-	-	-	-	-
Stage 2	388	306	-	731	722	-	-	-	-	-	-	-
Critical Hdwy	7.13	6.53	6.23	7.12	6.52	6.22	4.13	-	-	4.14	-	-
Critical Hdwy Stg 1	6.13	5.53	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.13	5.53	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.527	4.027	3.327	3.518	4.018	3.318	2.227	-	-	2.236	-	-
Pot Cap-1 Maneuver	198	246	756	209	234	808	1242	-	-	1330	-	-
Stage 1	438	448	-	704	662	-	-	-	-	-	-	-
Stage 2	634	660	-	413	431	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	101	191	752	131	182	802	1235	-	-	1326	-	-
Mov Cap-2 Maneuver	101	191	-	131	182	-	-	-	-	-	-	-
Stage 1	422	363	-	675	635	-	-	-	-	-	-	-
Stage 2	477	633	-	273	350	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	84.7	43.5	1.2	3.2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1235	-	-	166	271	1326	-	-
HCM Lane V/C Ratio	0.032	-	-	0.821	0.692	0.154	-	-
HCM Control Delay (s)	8	0	-	84.7	43.5	8.2	0	-
HCM Lane LOS	A	A	-	F	E	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	5.5	4.7	0.5	-	-

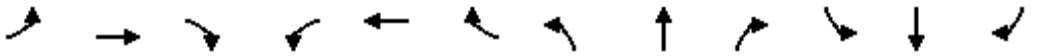
Intersection	
Int Delay, s/veh	5.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	175	65	40	75	185	110
Future Vol, veh/h	175	65	40	75	185	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	50	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	4	4	6	6	4	4
Mvmt Flow	199	74	45	85	210	125

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	449	273	335	0	-	0
Stage 1	273	-	-	-	-	-
Stage 2	176	-	-	-	-	-
Critical Hdwy	6.44	6.24	4.16	-	-	-
Critical Hdwy Stg 1	5.44	-	-	-	-	-
Critical Hdwy Stg 2	5.44	-	-	-	-	-
Follow-up Hdwy	3.536	3.336	2.254	-	-	-
Pot Cap-1 Maneuver	564	761	1202	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	850	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	542	761	1202	-	-	-
Mov Cap-2 Maneuver	542	-	-	-	-	-
Stage 1	768	-	-	-	-	-
Stage 2	817	-	-	-	-	-

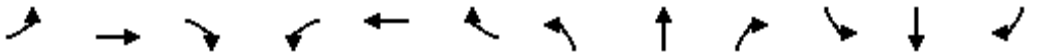
Approach	EB	NB	SB
HCM Control Delay, s	14	2.8	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1202	-	542	761	-	-
HCM Lane V/C Ratio	0.038	-	0.367	0.097	-	-
HCM Control Delay (s)	8.1	0	15.4	10.2	-	-
HCM Lane LOS	A	A	C	B	-	-
HCM 95th %tile Q(veh)	0.1	-	1.7	0.3	-	-



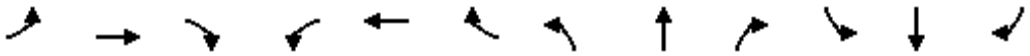
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	125	1695	80	65	120	0	0	185	180
Future Volume (vph)	0	0	0	125	1695	80	65	120	0	0	185	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0		4.0	4.0			4.0	4.0
Lane Util. Factor					0.95		1.00	1.00			1.00	1.00
Frpb, ped/bikes					1.00		1.00	1.00			1.00	0.97
Flpb, ped/bikes					1.00		0.99	1.00			1.00	1.00
Frt					0.99		1.00	1.00			1.00	0.85
Flt Protected					1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)					3501		1768	1881			1845	1523
Flt Permitted					1.00		0.56	1.00			1.00	1.00
Satd. Flow (perm)					3501		1036	1881			1845	1523
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	0	0	128	1730	82	66	122	0	0	189	184
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	16
Lane Group Flow (vph)	0	0	0	0	1937	0	66	122	0	0	189	168
Confl. Peds. (#/hr)	3					3	9		16	16		9
Confl. Bikes (#/hr)						1			3			2
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	1%	1%	1%	3%	3%	3%
Turn Type				Perm	NA		Perm	NA			NA	Perm
Protected Phases					6			8			4	
Permitted Phases				6			8					4
Actuated Green, G (s)					59.0		30.0	30.0			30.0	30.0
Effective Green, g (s)					59.0		30.0	30.0			30.0	30.0
Actuated g/C Ratio					0.61		0.31	0.31			0.31	0.31
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)					2129		320	581			570	471
v/s Ratio Prot								0.06			0.10	
v/s Ratio Perm					0.55		0.06					c0.11
v/c Ratio					0.91		0.21	0.21			0.33	0.36
Uniform Delay, d1					16.7		24.7	24.7			25.8	26.0
Progression Factor					1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2					6.2		1.5	0.8			1.6	2.1
Delay (s)					22.9		26.2	25.6			27.3	28.1
Level of Service					C		C	C			C	C
Approach Delay (s)		0.0			22.9			25.8			27.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	97.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1240	40	0	0	0	0	115	100	110	200	0
Future Volume (vph)	65	1240	40	0	0	0	0	115	100	110	200	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor		0.95	1.00					1.00	1.00	1.00	1.00	
Frpb, ped/bikes		1.00	0.97					1.00	0.98	1.00	1.00	
Flpb, ped/bikes		1.00	1.00					1.00	1.00	1.00	1.00	
Frt		1.00	0.85					1.00	0.85	1.00	1.00	
Flt Protected		1.00	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3493	1526					1845	1534	1728	1827	
Flt Permitted		1.00	1.00					1.00	1.00	0.61	1.00	
Satd. Flow (perm)		3493	1526					1845	1534	1115	1827	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	71	1348	43	0	0	0	0	125	109	120	217	0
RTOR Reduction (vph)	0	0	12	0	0	0	0	0	49	0	0	0
Lane Group Flow (vph)	0	1419	31	0	0	0	0	125	60	120	217	0
Confl. Peds. (#/hr)	8		2	2		8	20		5	5		20
Confl. Bikes (#/hr)			5						1			1
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	3%	3%	3%	4%	4%	4%
Turn Type	Perm	NA	Perm					NA	Perm	Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2		2						8	4		
Actuated Green, G (s)		65.9	65.9					16.1	16.1	16.1	16.1	
Effective Green, g (s)		65.9	65.9					16.1	16.1	16.1	16.1	
Actuated g/C Ratio		0.73	0.73					0.18	0.18	0.18	0.18	
Clearance Time (s)		4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)		3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		2557	1117					330	274	199	326	
v/s Ratio Prot								0.07			c0.12	
v/s Ratio Perm		0.41	0.02						0.04	0.11		
v/c Ratio		0.55	0.03					0.38	0.22	0.60	0.67	
Uniform Delay, d1		5.4	3.3					32.5	31.6	34.0	34.4	
Progression Factor		1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.9	0.0					0.7	0.4	5.1	5.1	
Delay (s)		6.3	3.3					33.3	32.0	39.1	39.5	
Level of Service		A	A					C	C	D	D	
Approach Delay (s)		6.2			0.0			32.7			39.4	
Approach LOS		A			A			C			D	

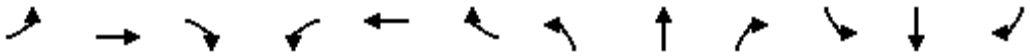
Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	75	1840	25	35	25	0	0	30	40
Future Volume (vph)	0	0	0	75	1840	25	35	25	0	0	30	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0			4.0			4.0	
Lane Util. Factor					0.95			1.00			1.00	
Frpb, ped/bikes					1.00			1.00			0.99	
Flpb, ped/bikes					1.00			1.00			1.00	
Frt					1.00			1.00			0.92	
Flt Protected					1.00			0.97			1.00	
Satd. Flow (prot)					3524			1843			1704	
Flt Permitted					1.00			0.78			1.00	
Satd. Flow (perm)					3524			1472			1704	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	0	0	0	82	2022	27	38	27	0	0	33	44
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	0	21	0
Lane Group Flow (vph)	0	0	0	0	2130	0	0	65	0	0	56	0
Confl. Peds. (#/hr)	5		4	4		5	2		14	14		2
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	0%	0%	2%	2%	2%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					6			8			4	
Permitted Phases				6			8					
Actuated Green, G (s)					75.9			8.1			8.1	
Effective Green, g (s)					75.9			8.1			8.1	
Actuated g/C Ratio					0.83			0.09			0.09	
Clearance Time (s)					4.0			4.0			4.0	
Vehicle Extension (s)					3.0			3.0			3.0	
Lane Grp Cap (vph)					2907			129			150	
v/s Ratio Prot											0.03	
v/s Ratio Perm					0.60			c0.04				
v/c Ratio					0.73			0.50			0.37	
Uniform Delay, d1					3.6			40.0			39.6	
Progression Factor					1.00			1.00			1.00	
Incremental Delay, d2					1.7			3.1			1.6	
Delay (s)					5.2			43.1			41.1	
Level of Service					A			D			D	
Approach Delay (s)		0.0			5.2			43.1			41.1	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	7.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	1405	25	0	0	0	0	35	45	35	70	0
Future Volume (vph)	25	1405	25	0	0	0	0	35	45	35	70	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		2.5						4.0			4.0	
Lane Util. Factor		0.95						1.00			1.00	
Frpb, ped/bikes		1.00						0.98			1.00	
Flpb, ped/bikes		1.00						1.00			0.99	
Frt		1.00						0.92			1.00	
Flt Protected		1.00						1.00			0.98	
Satd. Flow (prot)		3492						1681			1834	
Flt Permitted		1.00						1.00			0.86	
Satd. Flow (perm)		3492						1681			1607	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	1544	27	0	0	0	0	38	49	38	77	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	44	0	0	0	0
Lane Group Flow (vph)	0	1597	0	0	0	0	0	43	0	0	115	0
Confl. Peds. (#/hr)	1		4	4		1	5		19	19		5
Heavy Vehicles (%)	3%	3%	3%	0%	0%	0%	2%	2%	2%	1%	1%	1%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		2						8			4	
Permitted Phases	2									4		
Actuated Green, G (s)		73.4						10.1			10.1	
Effective Green, g (s)		73.4						10.1			10.1	
Actuated g/C Ratio		0.82						0.11			0.11	
Clearance Time (s)		2.5						4.0			4.0	
Vehicle Extension (s)		3.0						3.0			3.0	
Lane Grp Cap (vph)		2847						188			180	
v/s Ratio Prot								0.03				
v/s Ratio Perm		0.46									c0.07	
v/c Ratio		0.56						0.23			0.64	
Uniform Delay, d1		2.8						36.4			38.2	
Progression Factor		0.44						0.96			1.00	
Incremental Delay, d2		0.7						0.6			7.2	
Delay (s)		1.9						35.4			45.5	
Level of Service		A						D			D	
Approach Delay (s)		1.9			0.0			35.4			45.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	6.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	6.5
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group