Oregon
Theodore R. Kulongoski, Governor

Department of Land Conservation and Development
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NOTICE OF ADOPTED AMENDMENT

12/28/2011

TO: Subscribers to Notice of Adopted Plan or Land Use Regulation Amendments

FROM: Plan Amendment Program Specialist

SUBJECT: City of Sandy Plan Amendment
DLCD File Number 004-11

The Department of Land Conservation and Development (DLCD) received the attached notice of adoption. Due to the size of amended material submitted, a complete copy has not been attached. A Copy of the adopted plan amendment is available for review at the DLCD office in Salem and the local government office.

Appeal Procedures*

DLCD ACKNOWLEDGMENT or DEADLINE TO APPEAL: Tuesday, January 10, 2012

This amendment was submitted to DLCD for review prior to adoption with less than the required 45-day notice. Pursuant to ORS 197.830(2)(b) only persons who participated in the local government proceedings leading to adoption of the amendment are eligible to appeal this decision to the Land Use Board of Appeals (LUBA).

If you wish to appeal, you must file a notice of intent to appeal with the Land Use Board of Appeals (LUBA) no later than 21 days from the date the decision was mailed to you by the local government. If you have questions, check with the local government to determine the appeal deadline. Copies of the notice of intent to appeal must be served upon the local government and others who received written notice of the final decision from the local government. The notice of intent to appeal must be served and filed in the form and manner prescribed by LUBA, (OAR Chapter 661, Division 10). Please call LUBA at 503-373-1265, if you have questions about appeal procedures.

*NOTE: The Acknowledgment or Appeal Deadline is based upon the date the decision was mailed by local government. A decision may have been mailed to you on a different date than it was mailed to DLCD. As a result, your appeal deadline may be earlier than the above date specified. NO LUBA Notification to the jurisdiction of an appeal by the deadline, this Plan Amendment is acknowledged.

Cc: Tracy Brown, City of Sandy
Angela Lazarean, DLCD Urban Planner

Jennifer Donnelly, DLCD Regional Representative

<paa> YA

FORM 2 DLCD Notice of Adoption

This Form 2 must be mailed to DLCD within **5-Working Days after the Final Ordinance is signed** by the public Official Designated by the jurisdiction and all other requirements of ORS 197.615 and OAR 660-018-000

☐ In person ☐ electronic ☐ mailed

DATE STAMP

DEPT OF

DEC 21 2011

LAND CONSERVATION AND DEVELOPMENT

For Office Use Only

Jurisdiction: **City of Sandy**

Local file number: **11-029 CPA**

Date of Adoption: **12/19/2011**

Date Mailed: **12/20/2011**

Was a Notice of Proposed Amendment (Form 1) mailed to DLCD? ☒ Yes ☐ No Date: 9/8/2011

☐ Comprehensive Plan Text Amendment

☐ Comprehensive Plan Map Amendment

☐ Land Use Regulation Amendment

☐ Zoning Map Amendment

☐ New Land Use Regulation

☒ Other: **TSP update**

Summarize the adopted amendment. Do not use technical terms. Do not write "See Attached".

Update to Transportation System Plan originally adopted October 1997.

Does the Adoption differ from proposal? Yes, Please explain below:

Changes include additions to trails projects and the pedestrian system plan, addition of "Shared Lane Markings" on streets, and correction of maps to show road alignment of northern section of Kate Schmitz Ave., language was also added designating the Parks Master Plan as the guiding document for all trail projects.

Plan Map Changed from: to:

Zone Map Changed from: to:

Location: Acres Involved:

Specify Density: Previous: New:

Applicable statewide planning goals:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☒	☐	☐	☐	☐	☐	☐	☐

Was an Exception Adopted? ☐ YES ☒ NO

Did DLCD receive a Notice of Proposed Amendment...

45-days prior to first evidentiary hearing? ☒ **Yes** ☐ **No**

If no, do the statewide planning goals apply? ☐ **Yes** ☐ **No**

If no, did Emergency Circumstances require immediate adoption? ☐ **Yes** ☐ **No**

DLCD File No. 004-11 (18971) [16878]

ORDINANCE NO. 2011-12

AN ORDINANCE ADOPTING A NEW TRANSPORTION SYSTEM PLAN (TSP) TO ADDRESS THE REQUIREMENTS OF GOAL 12.

WHEREAS, the existing Transportation System Plan (TSP) for the City of Sandy was originally adopted by Ordinance No. 12-97 on October 20th, 1997; and

WHEREAS, on May 15, 2007 the city was awarded a grant from the Transportation and Growth Management Program of the State of Oregon to partially fund an update to the TSP and contracted with DKS Associates on September 5, 2008 to complete the update; and

WHEREAS, OAR 660 Division 12 (also referred to as the state Transportation Plan Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of comprehensive plans; and

WHEREAS, while this rule allows cities with populations less than 10,000 (Sandy's population is 9,655), a whole or partial exemption from these requirements, the City of Sandy has chosen to undertake this planning effort to establish a system of facilities and services to meet local transportation needs through the year 2029; and

WHEREAS, to help guide the project, the city established a Technical and Citizen's Advisory Committee; and

WHEREAS, during development of the update two public workshops were held (January 29, 2009 and June 25, 2009) to obtain broad community-based comments; and

WHEREAS, a joint workshop was held on June 21, 2011 with the Planning Commission and City Council to review and provide input on the TSP; and

WHEREAS, DKS Associates delivered a Final Draft TSP to the City of Sandy on July 5, 2011; and

WHEREAS, the City of Sandy sent the Final Draft TSP to the Department of Land Conservation and Development (DLCD) on September 8, 2011 in anticipation of a public hearing on October 24, 2011; and

WHEREAS, the Planning Commission held public hearings to review the Transportation System Plan on October 24 and November 22, 2011 and forwarded a recommendation to the City Council to adopt the plan; and

WHEREAS, the City Council held a public hearing to review the Transportation System Plan on December 5, 2011 and voted to approve the first reading of this Ordinance; and

WHEREAS, the City Council approved the second reading of this Ordinance on December 19, 2011; and

WHEREAS, on September 9, 2009, the City Council adopted a Transit Master Plan (TMP) by Ordinance No. 2009-02 which is incorporated as an element of the TSP.

NOW, THEREFORE, THE CITY OF SANDY DOES ORDAIN AS FOLLOWS:

Section 1. The Transportation System Plan for the City of Sandy dated December 2011 is hereby adopted, attached as Exhibit A and incorporated herein by reference. The information and data contained in Exhibit A supersedes any that exists to the contrary in the Transportation System Plan adopted by Ordinance No. 12-97 or its background documents.

Section 2. The Transit Master Plan adopted by Ordinance No. 2009-02 is incorporated as an element of the new Transportation System Plan.

Section 3. The adoption of the Transportation System Plan is supported by findings, attached hereto as Exhibit B and incorporated herein by reference.

THIS ORDINANCE ADOPTED BY THE COMMON COUNCIL AND APPROVED BY THE MAYOR THIS 19th DAY OF DECEMBER 2011.

Bill King
MAYOR

ATTEST:

Karen Evatt
City Recorder

EXHIBIT B
ORDINANCE NO. 2011-12

1. **Goal 1 – Citizen Involvement.**

Goal 1 requires the City to ensure that citizens are involved in all stages of the planning process. Regarding the Transportation System Plan ("TSP") process, the City established a Technical and Citizens Advisory Committee to guide and advise City staff, the Planning Commission and ultimately the City Council on the TSP's goals and content.

The City hosted two public workshops (January 29, 2009 and June 25, 2009) to obtain public input while the TSP was being developed.

A joint Planning Commission/City Council workshop open to the public was held on June 21, 2011. Statutorily required notice was provided to DLCD on September 8, 2011 in advance of the Planning Commission's first public hearing held on October 24, 2011. The Planning Commission held a second hearing on the TSP on November 22, 2011 and recommended approval to the City Council. The City Council held a public hearing relative to the TSP on December 5, 2011 and voted to approve the first reading of this Ordinance. The City Council voted to approve the second reading of this Ordinance on December 19, 2011.

Goal 1 is met.

2. **Goal 2 – Land Use Planning.**

For the purposes of the TSP process, Goal 2 requires the TSP to be supported by an adequate factual base and to have been coordinated with other affected governmental entities.

With respect to an adequate factual base, Oregon courts have interpreted this standard to mean that the TSP must be supported by "substantial evidence" or evidence that reasonable people would rely on in making day-to-day decisions. *1000 Friends of Oregon v. City of North Plains*, 27 Or LUBA 372, 377-78, *aff'd* 130 Or App 406, 882 P2d 1130 (1994). The record of the TSP process leading up to its adoption is replete with substantial evidence. The City hired a well known planning firm, DKS Associates, to guide the collection and assimilation of this evidence. That evidence was analyzed and formed the basis of the final TSP adopted by the Council.

With respect to coordination with other affected governmental entities, the City received a grant from the state to perform the work necessary to complete the TSP. The grant agreement required the City to meet certain state required goals and benchmarks and a representative for the state was continually kept apprised of the City's progress. In addition, the City regularly included representatives from Clackamas County and ODOT in its updates and notices regarding the TSP process. The City additionally reviewed relevant documents and plans from those jurisdictions to maintain consistency with such plans.

Goal 2 is met.

3. **Goal 3 – Agricultural Lands.**

   Goal 3 is not applicable to the TSP.

4. **Goal 4 – Forest Lands.**

   Goal 4 is not applicable to the TSP.

5. **Goal 5 – Natural and Historic Resources.**

   Goal 5 is not applicable to the TSP.

6. **Goal 6 – Land, Air and Water Quality.**

   While Goal 6 is likely not applicable to the TSP, it is reasonable to conclude that the TSP will improve land, air and water quality in Sandy because the TSP encourages walking, biking and using mass transit.

7. **Goal 7 – Natural Hazards.**

   Goal 7 is not applicable to the TSP.

8. **Goal 8 – Recreational Needs.**

   Goal 8 is not applicable to the TSP.

9. **Goal 9 – Economic Development.**

   Goal 9 is not applicable to the TSP.

10. **Goal 10 - Housing.**

    Goal 10 is not applicable to the TSP.

11. **Goal 11 – Public Facilities.**

    Goal 11 is arguably applicable to the TSP. Goal 11's implementing rule defines a "public facility" to include "transportation facilities" notwithstanding the existence of a separate goal (Goal 12) dealing exclusively with transportation-related planning requirements.

    Goal 11 requires Oregon's cities to provide public facilities and services at levels necessary and suitable for urban uses. The TSP update includes a project list and cost estimates for each anticipated improvement project. Other public facility projects, for example water, sewer and public transit improvements, are identified in other long range planning documents

adopted separately from the TSP. Certainly, a multi-modal transportation system to address pedestrian, bicycle, and vehicle transportation needs for a city with a population of less than 10,000 meets Goal 11's requirements.

Goal 11 is met.

12. Goal 12 - Transportation.

Goal 12's implementing rule requires TSPs to consider all modes of transportation including mass transit, air, water, pipeline, rail, highway, bicycle, and pedestrian. As evidenced by the TSPs language, the amendment will assist with congestion, access management, and achieving desired land use patterns through a balanced, multi-modal system that can accommodate future growth. In addition, on September 9, 2009, the City adopted a Transit Master Plan which is incorporated as an element of this TSP to address transit needs.

Goal 12 is met.

13. Goal 13 – Energy Conservation.

While not directly applicable to the TSP, the City's transportation system and by extension the TSP will assist the City and the region in being more energy efficient. It will do this by lessening reliance on the automobile, thereby conserving carbon-based resources.

14. Goal 14 - Urbanization.

Goal 14 is not applicable to the TSP.

Sandy Transportation System Plan



Prepared for

CITY OF SANDY OREGON 1911



City of Sandy
Transportation System Plan

Prepared for:

City of Sandy

Oregon Department of Transportation

December 2011

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

Acknowledgements

This report was prepared through the collective effort of the following people:

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Don Carlton – Planning Commission
Lois Coleman – City Council
Ron Lesowski – Planning Commission, Tollgate Inn
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Appendix

Technical Memorandum #1: Plans, Goals, & Policies Review

Technical Memorandum #2: Existing Conditions and Future Needs

Technical Memorandum #3: Transportation Alternatives and Improvement Strategies

Implementation Element Memorandum – Recommended Sandy Municipal Code Amendments

Public Involvement Documentation

Alternate Mobility Standards Report

Useful Abbreviations and Acronyms

ADA – Americans with Disabilities Act
ADT – Average Daily Traffic
HDM – Highway Design Manual
LOS – Level of Service
MPH – Miles per Hour
NTM – Neighborhood Traffic Management
ODOT – Oregon Department of Transportation
OHP – Oregon Highway Plan
SDC – System Development Charge
STA – Special Transportation Area
TDM – Transportation Demand Management
TPR – Transportation Planning Rule
TSM – Transportation System Management
TSP – Transportation System Plan
UGB – Urban Growth Boundary
V/C – Volume to Capacity Ratio
VMT – Vehicle Miles Traveled

Chapter 1: Introduction

The City of Sandy, in cooperation with the Oregon Department of Transportation (ODOT), has completed a thorough review of its transportation system with this update to the City Transportation System Plan (TSP). This TSP serves as the transportation element of the City of Sandy Comprehensive Land Use Plan, establishing a system of facilities and services to meet local transportation needs through the year 2029.

OAR 660 Division 12 (also referred to as the state Transportation Planning Rule, or TPR) requires jurisdictions throughout Oregon to prepare and adopt transportation plans as elements of their comprehensive plans. While cities with populations less than 10,000 may qualify for a whole or partial exemption from this requirement (Sandy's population was estimated at 9,570 as of the 2010 Census), the City of Sandy has chosen to undertake this planning effort because the plan will serve as a valuable resource for staff, policy makers, and the public. Having an adopted TSP establishes the function, capacity, and location of future transportation facilities, informs the community of the level of investment needed for facilities to support anticipated growth and development, and better positions the City to compete for scarce transportation funding.

TSP Development Process

This plan was prepared with public and agency participation. It was developed in close coordination with City and ODOT staff and received input and direction from two advisory committees:

Technical Advisory Committee (TAC): comprised of agency staff from the City of Sandy, Oregon Department of Transportation, Oregon Trail School District, Sandy Police Department, and Sandy Fire Department.

Citizen Advisory Committee (CAC): comprised of citizen representatives from the City Council, Chamber of Commerce, Planning Commission, and local business owners and residents.

These two committees met three times to review methods and findings, provide input on the development and selection of alternatives, and to comment on the draft plan. In addition, two community workshops were held to provide opportunities for the general public to comment on the plan, make suggestions, and voice concerns. The public was able to attend a joint Planning Commission/ City Council work session, where the draft plan and implementing ordinance amendments were presented and discussed. The TSP development process is outlined in Figure 1.

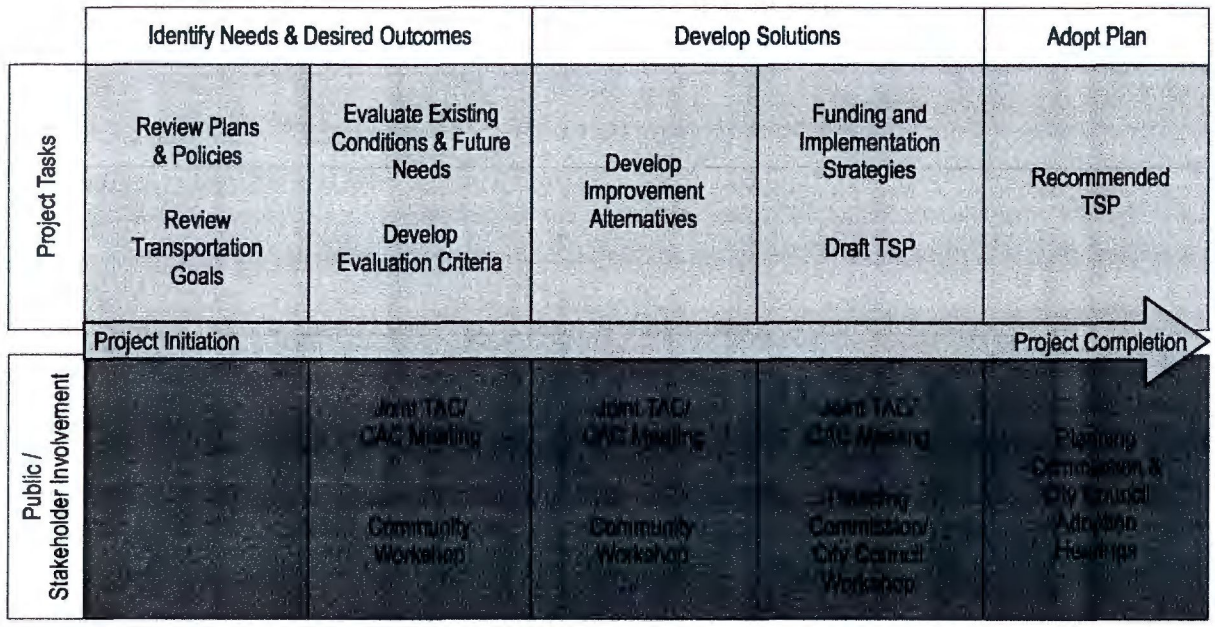


Figure 1: Sandy TSP Development Process

Through the process of identifying future transportation needs, it was discovered that there was no feasible way of complying with *Oregon Highway Plan* standards for mobility on US 26. In response, ODOT and the City of Sandy engaged in a supplementary process to develop alternate mobility standards for the US 26 corridors, which balance the need for highway throughput with the City's ability to continue to grow and multimodal access. These new mobility standards are reflected in this plan and are anticipated to be adopted by the Oregon Transportation Commission.

TSP Organization

This plan includes the actions and strategies needed to meet the City's transportation needs through the year 2029. The background documentation, included in the appendix for reference, describes the existing transportation system, alternatives considered, and why some recommendations were made. As part of the TSP development process, amendments to the Sandy Municipal Code were recommended to maintain compliance with state planning regulations and to implement the TSP itself. These recommended amendments are not included as part of the TSP, but are included in the appendix for reference and a separate adoption process if desired.

Chapter 2: Transportation Goals

The transportation goals developed for the City of Sandy TSP reflect the community vision for a balanced transportation system. They were used to provide direction for the planning process and evaluation criteria for the selection of recommended improvements. These goals include:

Mobility/Circulation/Safety Goals

- Develop a transportation system to encourage all travel modes (transit, bicycle, pedestrian)
- Improve the safety and accessibility of transit facilities
- Improve mobility for the transportation disadvantaged
- Improve vehicular/pedestrian interface along all arterial and collector streets
- Ensure sufficient capacity to accommodate future travel demand (transit,. vehicular, bicycle, pedestrian, etc.) to, within, and through the City of Sandy
- Emphasize improvements to the City street system, in an effort to reduce reliance on US 26 and OR 211 for local trips

Capital Improvement Goals

- Maximize the useful life of existing facilities
- Maximize the cost effectiveness of transportation improvements
- Seek opportunities to combine transportation, other infrastructure, and environmental mitigation projects

Community Goals

- Protect the scenic resources of the City of Sandy
- Preserve the historic character of Sandy
- Identify gateway and beautification treatments for OR 211
- Support Mt Hood Scenic Byway Enhancements
- Incorporate street network and transportation improvements contained within the Bornstedt Village Plan
- Explore transfer of OR 211 from ODOT to City jurisdiction

Economic Development Goals

- Balance local access to US 26 and OR 211 with the need to serve regional and statewide traffic, while supporting adjacent land uses
- Develop a transportation system that supports balanced growth of population and employment and the internalization of trips
- Support ODOT adoption of an alternate mobility standard for US 26 that allows for efficient use of capacity in the highway corridor, especially during peak seasonal travel periods.

Environmental Goals

- Avoid or mitigate transportation project impacts to environmental resources including creeks and wetlands, cultural resources, and wildlife corridors
- Support energy conservation through the provision of public transit, transportation demand management, a multi-modal transportation system, and improvements in City fleet operations and maintenance activities
- Encourage alternative/"green" transportation facility construction methods
- Minimize street cross-sections to protect and preserve open space and reduce impervious surface

Chapter 3: Modal Plans

This chapter includes plans directing transportation decisions to meet the needs of all modes of travel within the City of Sandy through the year 2029. Documentation developed through the planning process that led to these plans has been included in the appendix for reference. These include:

- Technical Memorandum #2: Existing Conditions and Future Needs
- Technical Memorandum #3: Transportation Alternatives and Improvement Strategies

Pedestrian System Plan

The Pedestrian System Plan identifies projects to improve conditions for walking within the City of Sandy – an important part of a balanced transportation network. Building upon existing local and regional planning efforts, the plan reflects the valuable input offered by City staff, stakeholder groups, and Sandy residents. The existing pedestrian system and identified deficiencies can be referenced in the appendix (Technical Memorandum #2: Existing Conditions and Future Needs).

Recommended Pedestrian Projects

The pedestrian plan builds upon Sandy's existing system of sidewalks, paths, trails, and other pedestrian infrastructure currently in place. The recommended projects, shown in Figure 2 and listed in Table 1, represent the pedestrian component of the "Preferred Plan", which consists of all transportation improvements identified to support growth and connectivity needs through the year 2029. Projects assumed for "Near Term" implementation, which represent a subset of the Preferred Plan that aligns with anticipated funding, are listed in Chapter 4.

The pedestrian facility improvement projects in the Preferred Plan do not include new pedestrian facilities that would be constructed as part of the recommended roadway projects identified in the motor vehicle plan (Tables 7 and 8). It should be noted that future off-road multi-modal trails/transportation corridors depicted on the system map represent conceptual alignments and are shown for informational purposes. Additional routes, local trail connections, specific alignments and designs will be identified in the Parks Master Plan, which will be the guiding document for all off-road multi-modal trails/transportation corridors projects. In two instances, multi-use trails and road alignments are shown in approximately the same location. Conflicts between overlapping trail and street alignments will be a matter of timing. If the trail is built prior to street construction, the street design will accommodate the existing trail and its users. If the street is built first then trail planners may choose to use sidewalks for some or all of the trail alignment or choose to link the trail to the pedestrian network at certain locations.

Table 1: Pedestrian System Projects and Costs

Project ID*	Project	Segment	Description	Project Cost (2009 Dollars)
City of Sandy Facility Pedestrian Improvements				
P1	362nd Ave.	Chinook St. to Industrial Way	Infill sidewalk gaps	$1,230,000
P2	Bluff Rd.	Strawbridge Pkwy to Nettie Connett Dr.	Infill sidewalk gaps	$505,000
P3	Bluff Rd.	Green Mountain St. to Northern UGB	Infill sidewalk gaps	$716,000
P4	Bornstedt Rd.	Cascadia Village Dr. to UGB	Infill sidewalk gaps	$1,420,000
P5	Dubarko Rd.	East of Melissa Ave. to East of OR 211	Infill sidewalk gaps	$3,240,000
P6	Dubarko Rd.	Langensand Rd. to Antler Ave.	Infill sidewalk gaps	$39,000
P7	Industrial Way	362nd Dr. to US 26	Infill sidewalk gaps	$1,790,000
P8	Jacoby Rd.	Dubarko Rd. to Cascadia Village Dr.	Infill sidewalk gaps	$40,000
P9	Jewelberry Ave.	Penny Ave. to Kelso Rd.	Infill sidewalk gaps	$194,000
P10	Langensand Rd.	Dubarko Rd. to US 26	Infill sidewalk gaps	$82,000
P11	Pleasant St.	Beers Ave. to Revenue Ave.	Infill sidewalk gaps	$173,000
P12	Ruben Ln.	US 26 to Dubarko Rd.	Infill sidewalk gaps	$51,000
P13	Sandy Heights St.	Dubarko Rd. to Tupper Rd	Infill sidewalk gaps	$176,000
P14	Downtown Core Pedestrian	Side streets perpendicular to US 26	Infill sidewalk gaps	$287,000
P15	Vista Loop	US 26 to US 26	Construct sidewalk	$600,000
P16	New Accessway / Trail***	Infill of Tickle Creek Trail south of Dubarko Rd and Ruben Ln	Accessway / Trail	$75,000
P17	New Accessway / Trail***	Extension of Tickle Creek Trail to OR 211	Accessway / Trail	$100,000
P18	New Accessway / Trail***	P21/362nd Ave North to Orient Dr	Accessway / Trail	$540,000
P19	New Accessway / Trail***	North of Kate Schmitz Ave. to P21/362nd Ave North	Accessway / Trail	$980,000
P20	New Accessway / Trail***	362nd Ave to Eastern UGB	Accessway / Trail	$1,310,000
P21	New Accessway / Trail***	362nd Ave North to new trail P19	Accessway / Trail	$300,000
P22	New Accessway / Trail***	OR 211 to Jacoby Rd.	Accessway / Trail	$320,000

Table 1 (Continued): Pedestrian System Projects and Costs

Project ID*	Project	Segment	Description	Project Cost (2009 Dollars)
ODOT Facility Pedestrian Improvements				
P23	OR 211	Parkway Path – UGB to Dubarko Rd	Construct Bike/Ped Accessway	$325,000
P24	OR 211	South UGB to US 26	Construct Sidewalk	(see B11)**
P25	US 26	Royal Ln. to 362nd Dr.	Infill sidewalk gaps and add landscaping	$440,000
P26	US 26	362nd Dr. to West UGB	Infill sidewalk gaps and add landscaping	$990,000
P27	US 26	Ruben Ln. to University Ave.	Infill sidewalk gaps	$510,000
P28	US 26	Ten Eyck Rd. to UGB	Infill sidewalk gaps	(see B12)**
Total Pedestrian Projects				**$16,433,000**

Notes: * Projects illustrated in Figure 2.
**Cost is covered in the Bicycle System Project Costs.
***Park project with potential transportation benefit. Transportation funding will be determined during project development.

In addition to the projects listed in Table 1, the City of Sandy will take the following actions to further facilitate safe and convenient travel by walking.

A. The City will engage ODOT periodically to evaluate the timing of traffic signals to ensure adequate pedestrian crossing time is provided. An emphasis will be placed on crossings where children, the elderly, or people with disabilities are prevalent.

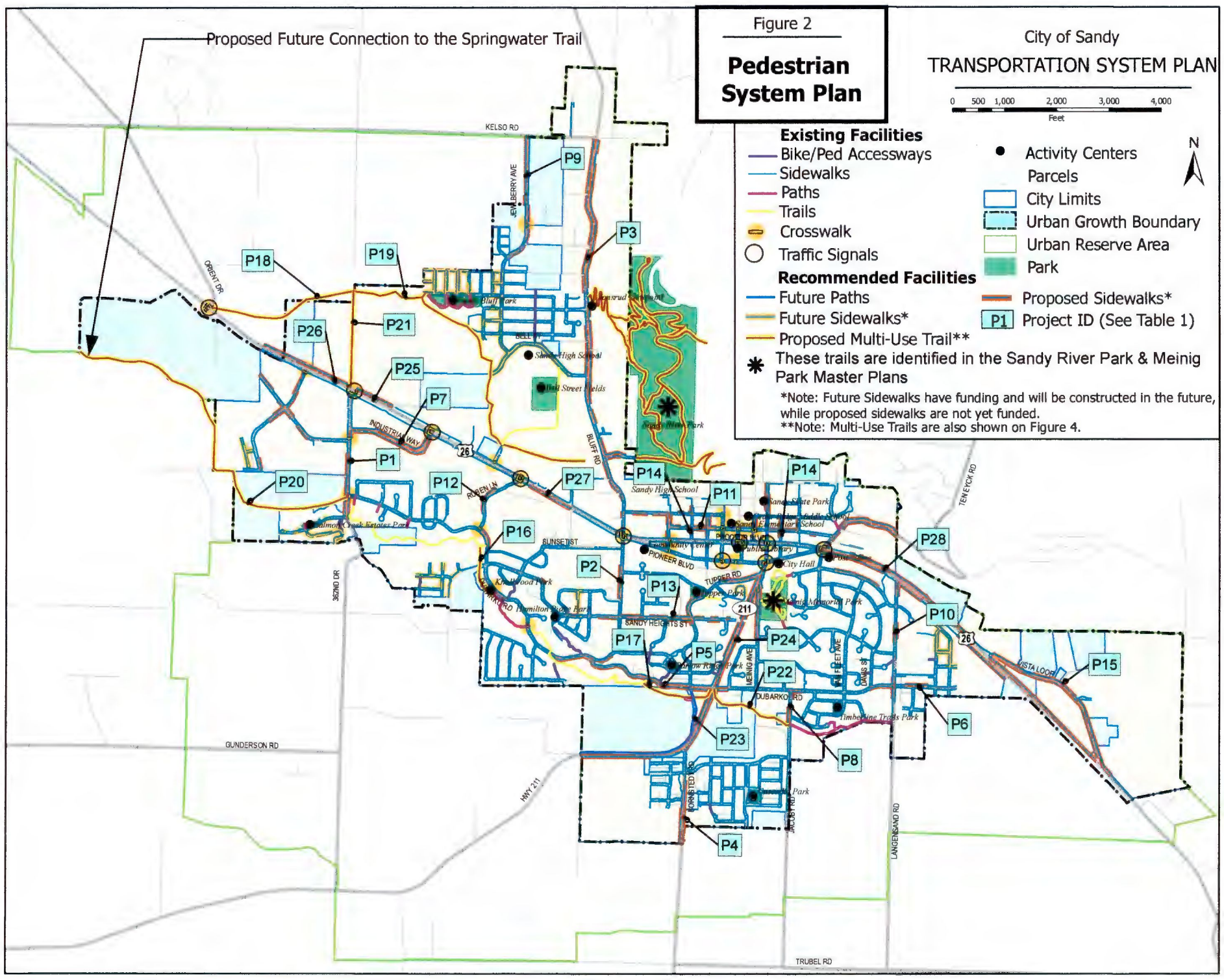
B. The City will work with ODOT to install pedestrian countdown signal heads at traffic signals on US 26.

C. The City will work with ODOT to explore options for the installation of audible and vibrotactile communication devices at signalized pedestrian crossings.

D. The City will apply Americans with Disabilities Act (ADA) requirements for curb ramps at intersections to all new crossings.

E. The City will continue to pursue opportunities to develop a network of multi-use paths.

F. The City will seek opportunities to coordinate transit improvements with pedestrian network improvements that enhance the accessibility of transit stops.


Proposed Future Connection to the Springwater Trail
Figure 2
Pedestrian System Plan
City of Sandy
TRANSPORTATION SYSTEM PLAN
0 500 1,000 2,000 3,000 4,000
Feet
N
Existing Facilities
Bike/Ped Accessways
Sidewalks
Paths
Trails
Crosswalk
Traffic Signals
Recommended Facilities
Future Paths
Future Sidewalks*
Proposed Multi-Use Trail**
These trails are identified in the Sandy River Park & Meinig Park Master Plans
Activity Centers
Parcels
City Limits
Urban Growth Boundary
Urban Reserve Area
Park
Proposed Sidewalks*
P1 Project ID (See Table 1)
*Note: Future Sidewalks have funding and will be constructed in the future, while proposed sidewalks are not yet funded.
**Note: Multi-Use Trails are also shown on Figure 4.
KELSO RD
JEWELBERRY AVE
ORIENT DR
INDUSTRIAL WAY
BLUFF RD
ROBEN LN
SUNSET ST
PIONEER BLVD
TUPPER RD
SANDY HEIGHTS ST
MEINIG AVE
DUBARKO RD
VISTA LOOP
TEN EYCK RD
362ND DR
GUNDERSON RD
HWY 211
LANGENSAND RD
TRUBEL RD
Sandy High School
City Hall
Timberline Trails Park
P1
P2
P3
P4
P5
P6
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Bicycle System Plan

Although Sandy currently lacks a comprehensive bikeway network, the City has the potential to create an excellent system despite challenges presented by topography. The Bicycle System Plan builds upon previous and on-going planning efforts and reflects the input offered by City staff, stakeholder groups, and Sandy residents. The existing bicycle system and identified deficiencies can be referenced in the appendix (Technical Memorandum #2: Existing Conditions and Future Needs).

Recommended Bicycle Projects

Described in Table 2 and depicted in Figure 3, the recommended bicycle system projects aim to fill system gaps and develop a more complete network. This list does not include new bike lanes or shoulders that would be constructed as part of the new roadway projects identified for the motor vehicle plan. Bike lanes are required on all new collector and arterial city streets. Projects that would include joint bicycle/pedestrian improvements (e.g., accessways and trails) are listed in the Pedestrian System Plan. It should be noted that future multi-use path corridors depicted on the system map represent conceptual alignments It should be noted that future off-road multi-modal trails/transportation corridors depicted on the system map represent conceptual alignments and are shown for informational purposes. Additional routes, local trail connections, specific alignments and designs will be identified in the Parks Master Plan, which will be the guiding document for all off-road multi-modal trails/transportation corridors projects. In two instances, multi-use trails and road alignments are shown in approximately the same location. Conflicts between overlapping trail and street alignments will be a matter of timing. If the trail is built prior to street construction, the street design will accommodate the existing trail and its users. If the street is built first then trail planners may choose to use sidewalks for some or all of the trail alignment or choose to link the trail to the pedestrian network at certain locations.

The projects shown represent the bicycle component of the "Preferred Plan", which consists of all transportation improvements identified to support growth and connectivity needs through the year 2029. Projects assumed for "Near Term" implementation, which represent a subset of the Preferred Plan that aligns with anticipated funding, are listed in Chapter 4.

A further challenge to the implementation of bicycle lanes on Sandy's streets is limited right-of-way and adverse topography. In these situations, an alternative to widening the existing street or right-of-way or reduction or elimination of parking along some sections of road could be to add "Shared Lane Markings" as per the Manual on Uniform Traffic Control Devices, 2009 (MUTCD) which indicate to bicyclists and motor vehicles that the lane shall be shared (Figure 3). In locations where it is only feasible to construct bike lanes in one direction, priority should be given to at least providing bike lanes in the uphill direction (where applicable) where the speed differential between motorists and bicyclists would be greater.

In addition to the projects listed in Table 2, the City of Sandy will take the following actions to further encourage and enhance biking as a viable mode of travel.

A. The City will continue to require bicycle parking for multi-family, retail, office, and institutional developments per the Sandy Municipal Code (Section 17.98.20).

B. The City will work with the School District to improve the quality of bicycle parking facilities at Sandy schools.

C. The City will seek opportunities to coordinate transit improvements with bicycle network improvements that enhance the accessibility of transit stops.

D. The City will support the establishment of regional bicycle connections such as:

   - A linkage from Dubarko Road to Colorado Road over a series of connections to south Boring and the Springwater Trail. This will eventually be replaced by a direct connection to the Springwater trail from the proposed Tickle Creek Trail extension to the western UGB.
   - A link to Estacada from Dubarko Road via Bornstedt Road and Wildcat Mountain Road.

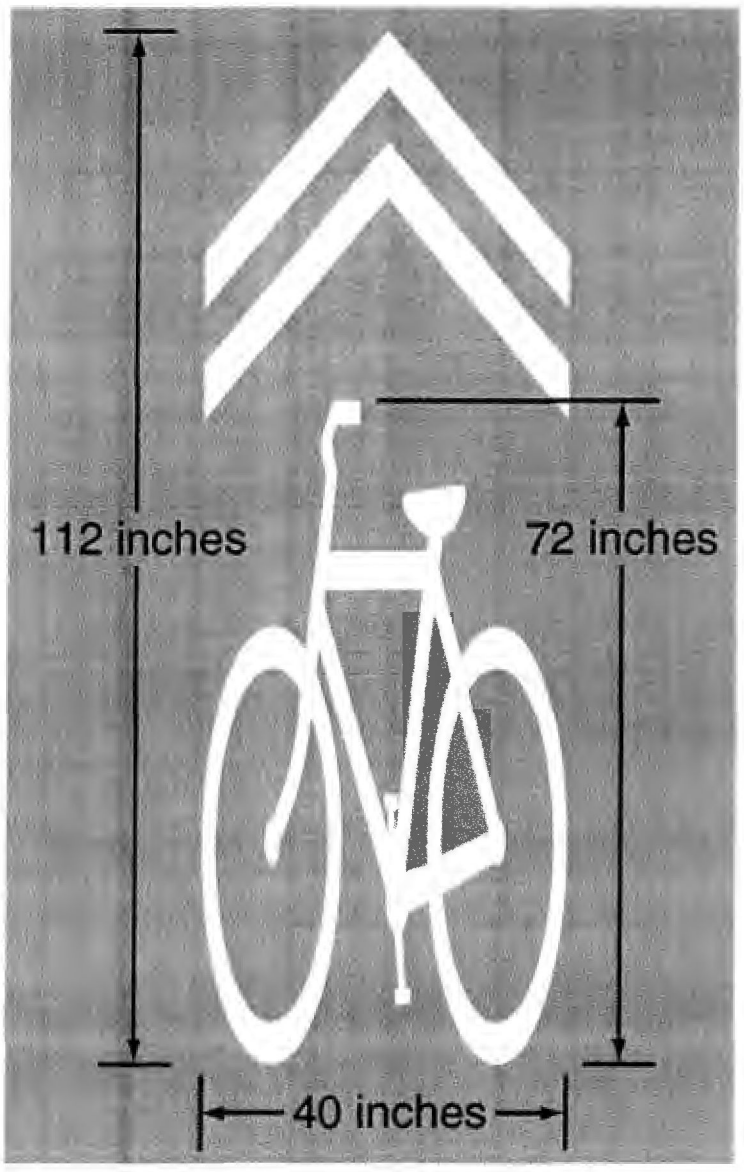


Figure 3: "Shared Lane Markings" (Manual on Uniform Traffic Control Devices, 2009).

Table 2: Bicycle System Projects and Costs

Project ID*	Project	Segment	Description	Project Cost (2009 Dollars)
City of Sandy Facility Bicycle Improvements				
B1	362nd Dr.	Dubarko Rd. to UGB	Widen shoulder to 6'	$1,230,000
B2	Bluff Rd.**	US 26 to Miller Rd.	Re-stripe/widen Rd.	$40,000
B3	Bornstedt Rd.**	OR 211 to UGB	Re-stripe/widen Rd.	$32,000
B4	Dubarko Rd.**	362nd Dr. to Eldridge Dr.	Re-stripe/widen Rd.	$36,000
B5	Dubarko Rd.**	Sandy Heights St. to Melissa Ave.	Re-stripe/widen Rd.	$36,000
B6	Langensand Rd.**	US 26 to UGB	Re-stripe/widen Rd.	$61,200
B7	Meinig Ave.**	Scenic St. to US 26	Re-stripe/widen Rd.	$61,000
B8	Meinig Ave.**	Barker Ct. to Dubarko Rd.	Re-stripe/widen Rd.	$17,000
B9	Sandy Heights St.**	Bluff To End	Re-stripe/widen Rd.	$40,000
B10	Tupper Rd.**	Long Circle to OR 211	Re-stripe/widen Rd.	$59,000
ODOT Facility Bicycle Improvements				
B11	OR 211	UGB to US 26	Widen shoulder to 6'	$28,200,000***
B12	US 26	Ten Eyck Rd. to UGB	Widen shoulder to 6'	$3,260,000
Total Bicycle Projects				$33,072,200

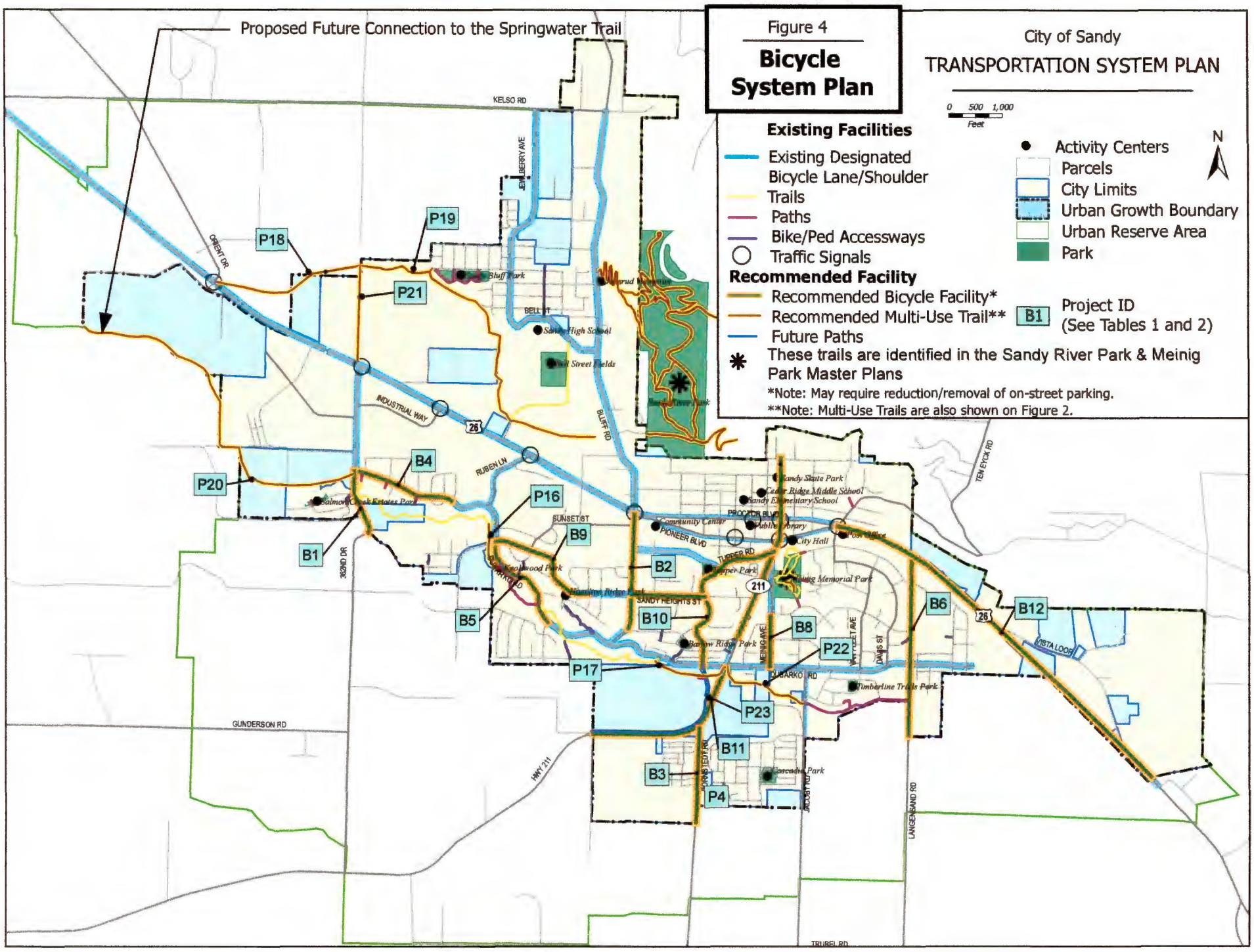
Notes: * Projects illustrated in Figure 3.
**May require the elimination of on street parking (cost estimate for restripe only).
***Includes drainage, lighting, bicycle and pedestrian elements.

Figure 4

Bicycle System Plan

City of Sandy

TRANSPORTATION SYSTEM PLAN



Sandy Transit Master Plan

Sandy Area Metro Transit (SAM) plays an important role in providing transportation within Sandy and as a link in the regional multimodal transportation network. The connections to TriMet, Mountain Express, and bicycle and pedestrian networks allow for an increased level of mobility for people in and around Sandy, whether they are traveling to jobs, school, shopping, parks, or social and recreational events. Sandy Transit services also help support a growing local economy, providing easy access to Sandy businesses for both workers and shoppers.

An effective transit system places emphasis on providing mobility and independence for people who rely on transit to meet their basic travel needs. Transit-dependent individuals often include people with disabilities, youth, elderly, and people with low-incomes. Providing effective service ensures that transit-dependent and other individuals are able to get to the places they need to go. However, in order for transit to effectively reduce automobile trips and the overall demand on the transportation system, Sandy Transit must also provide a service that is an attractive alternative to driving.

The Sandy Transit Master Plan (TMP)[1], completed in September 2009 and adopted by the City Council on September 9, 2009 as Ordinance 2009-02, represents the transit element of Sandy's TSP. As with the TSP, it is a long-term community vision and blueprint for transit development in the City over the next twenty years.

Motor Vehicle System Plan

The Motor Vehicle System Plan provides direction for the management and expansion of the roadway network to meet the City's needs through the year 2029. The plan elements provide an array of strategies to achieve local transportation goals by improving system capacity, efficiency, safety, and connectivity. An analysis of the motor vehicle system under existing (2009) and future (2029) conditions, as well as documentation of all alternatives considered, can be referenced in the appendices.

Transportation System Management

Transportation System Management (TSM) focuses on low-cost strategies to enhance the operational performance of the transportation system by seeking solutions that better manage facilities and treat all modes of travel as a coordinated system rather than relying on the construction of additional capacity through new roadways. TSM strategies are often easier to implement because of the lower capital investment required and they extend the functional life of existing and future facilities by optimizing their ability to move traffic in a safe and efficient manner.

[1] Sandy Transit Master Plan, CPH Planning, September 2009.

Roadway Functional Classification

The functional classification system provides direction for the management and design of streets in the City of Sandy. The roadway functional classification map is shown in Figure 4, with management objectives and design criteria described below.

Figure 5

Roadway Functional Classification

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000

Feet

Roadway Functional Classification

Future* Existing

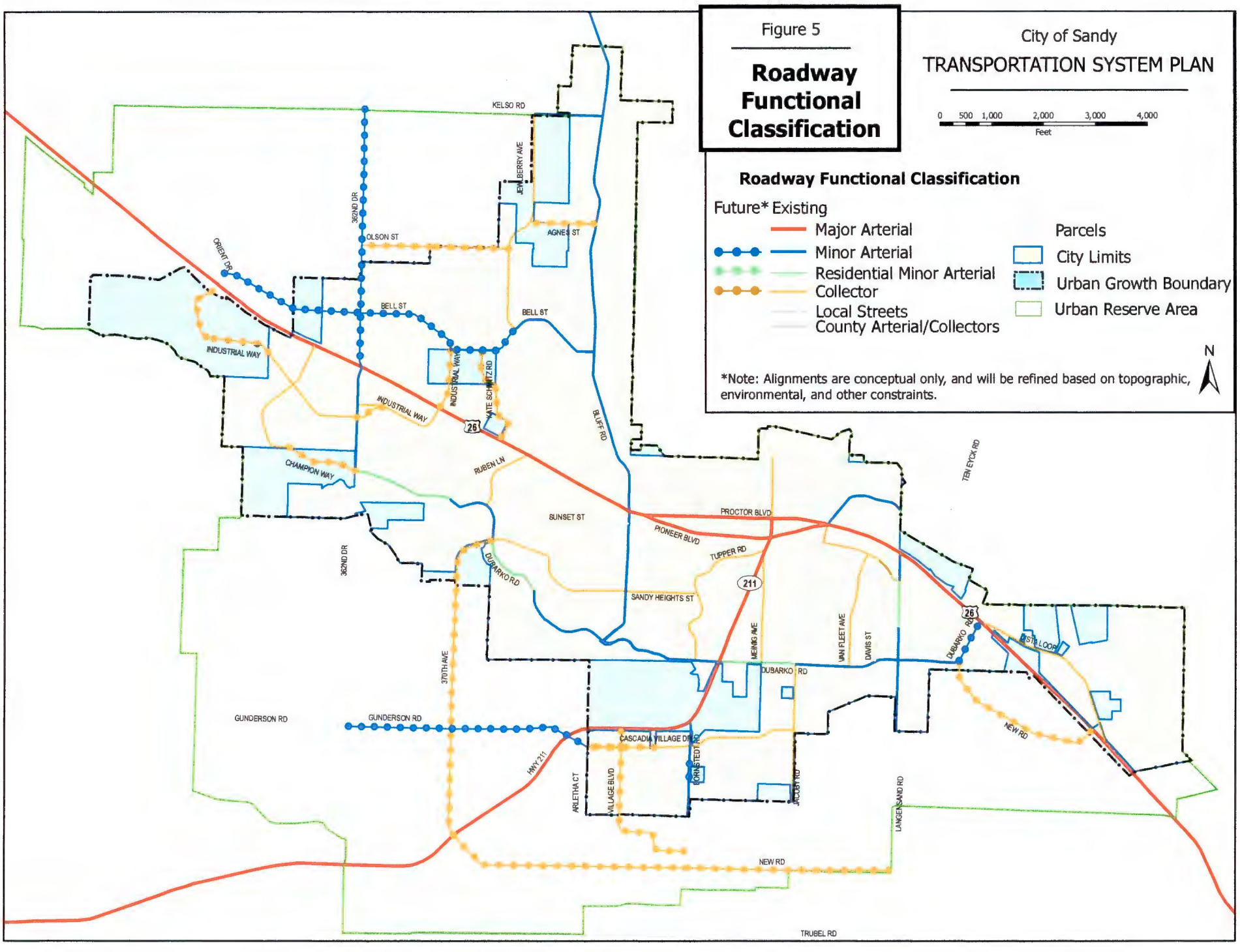
- Major Arterial
- Minor Arterial
- Residential Minor Arterial
- Collector
- Local Streets
- County Arterial/Collectors

Parcels

- City Limits
- Urban Growth Boundary
- Urban Reserve Area

*Note: Alignments are conceptual only, and will be refined based on topographic, environmental, and other constraints.

N



Functional Classification Management Objectives

Major Arterial

Major arterials are typically three to five-lane highways that operate as two-way streets or as a one-way couplet. These roads are intended to handle high volumes of traffic, typically 16,000 ADT (Average Daily Traffic) or more. Major arterials provide greater regional mobility, are managed to favor through traffic capacity and safety over direct access, and should generally be spaced approximately one mile apart. Private driveway access, on-street parking, and traffic calming measures are typically discouraged along major arterial routes and the provision of bike lanes or shoulders is required.

Minor Arterial

Minor arterials are high-volume, intra-city streets providing connectivity and parallel features and should generally be spaced approximately one mile apart. These roads have a typical capacity between 8,000 and 16,000 ADT. Minor arterials are generally the most critical classification for circulation in the urban areas of Sandy and are intended to serve longer local trips. Private driveway access is discouraged where access to facilities of lower classification is available and traffic calming measures and on-street parking should be avoided. The provision of bike lanes is required.

Residential Minor Arterial

Residential minor arterials are a hybrid between minor arterial and collector type streets that allows for moderate to high traffic volumes on streets where over 90% of the fronting lots are residential. These roads have similar typical capacity to minor arterials, 6,000 to 10,000 ADT. They are intended to provide some relief to the strained arterial system while ensuring a safe residential environment. Residential minor arterials may include on-street parking and traffic calming measures may be applied. Direct access to properties is managed in a manner similar to collector streets. The provision of bike lanes is required.

Collector

Collector streets provide both access and circulation within and between residential and commercial areas. These roads have a typical capacity between 2,000 and 6,000 ADT. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access (compared to arterials), and penetrate residential neighborhoods, distributing trips from the local street system to minor and major arterials. Collectors may provide on-street parking, may incorporate traffic calming measures, and should be spaced approximately one-half mile apart. Bike lanes are required on collectors.

Local Street

Local streets have the sole function of providing immediate access to adjacent land. These streets have a typical capacity between 800 and 1,000 ADT. Service to through traffic movements on local streets is deliberately discouraged by design. All other City streets in the City of Sandy that are not designated as arterial streets or collector streets are considered to be local streets. Local streets may allow on-street parking and may incorporate traffic calming measures. Bike lanes are not required.

Roadway Design Standards

The design characteristics of Sandy's streets are defined in Section 17.100.110 of the SMC, and were developed by the City to meet the function and demand for each facility type. Because the actual design of a roadway can vary from segment to segment due to adjacent land uses, demands or topography and resources, the objective was to define a system that allows for standardization of key characteristics to provide consistency, but also to provide criteria for application that provides some flexibility.

Figures 5 through 12 illustrate the City of Sandy's typical roadway standards. While roadways under State or County jurisdiction will be subject to the design standards of those agencies, typical cross-sections for US 26 and OR 211 are provided that comply with ODOT's design standards or an approved design exception. These standards are to be used to identify right-of-way needs and typical roadway design features to be included in the construction of new roadways or significant modifications to existing roadways. The adoption of these standards does not create a requirement to upgrade existing facilities. The appropriate application of elements identified as optional is guided by the functional classification management objectives for each type of facility.

Future improvements to the section of OR 211 from the urban growth boundary to US 26 may be faced with a number of environmental and topographical challenges. Key opportunities and constraints related to future modernization of the OR 211 corridor are noted below:

Constraints

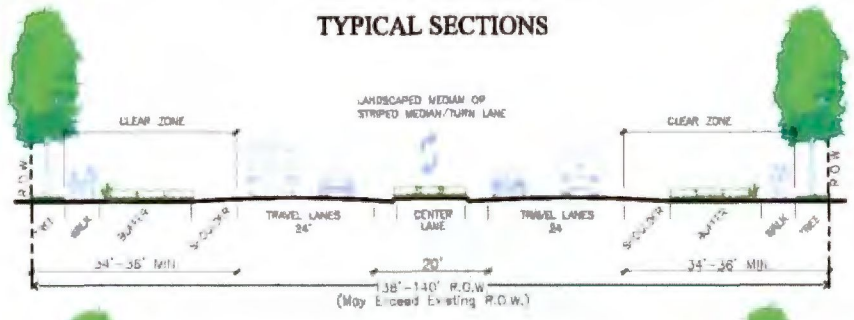
- Limited right-of-way to chase cut/fill sections (varies 80'-120')
- Potential Federal Highway Administration Sections 4F/6F environmental impacts for widening adjacent to No Name Creek
- Potential residential impacts on the east side of OR 211 north of Dubarko Road
- Potential riparian impacts at Tickle Creek crossing
- Fish passage improvements/culvert replacement needed at Tickle Creek crossing
- Wetland impacts at Tickle Creek crossing
- Floodplain impacts at Tickle Creek crossing
- Environmental Assessment/Environmental Impact Statement (EA/EIS) likely required with use of federal funds

Opportunities and Design Strategies

- Can limit right-of-way slope and riparian impacts with walls
- Reduce planter strip width in constrained areas.
- Eliminate turn lane or reduce median width in constrained sections where there is no demand for left turn.
- Design planters in a manner to satisfy water quality treatment requirements
- Consider a range of options to accommodate bicycle and pedestrian access along the corridor such as non-standard design features and creation/utilization of alternate (non-highway) routes.

TYPICAL SECTIONS

55 MPH POSTED/
70 MPH DESIGN SPEEDS



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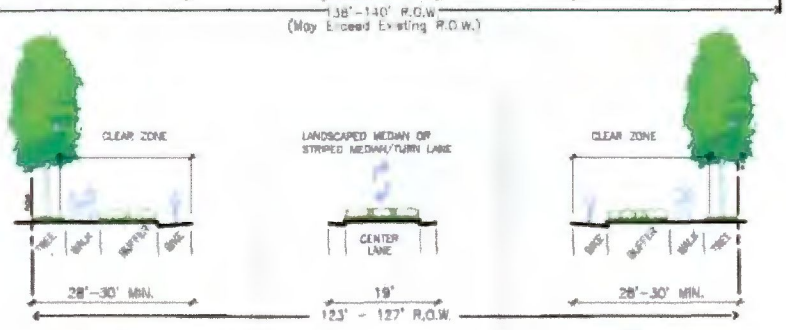
55 MPH DESIGN SPEED



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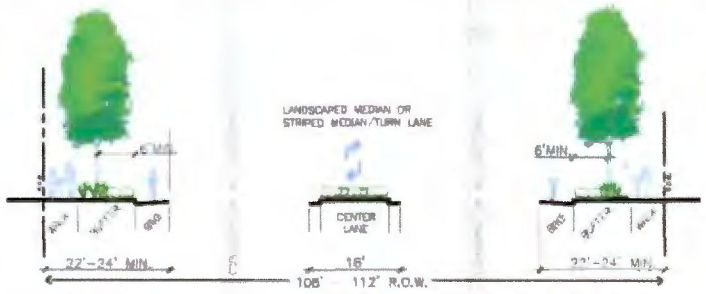

25 MPH POSTED/
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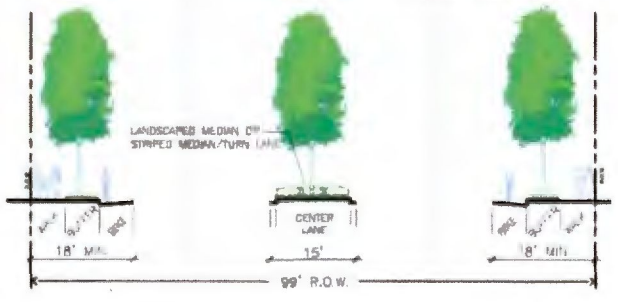
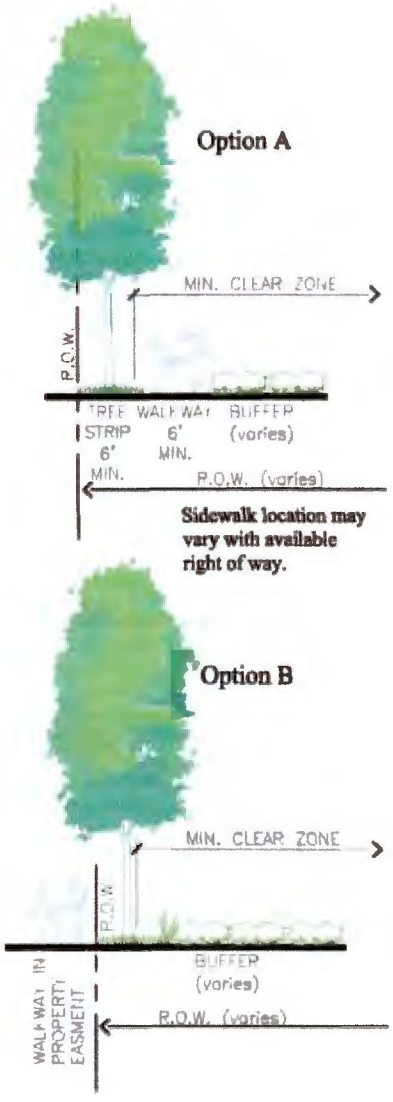




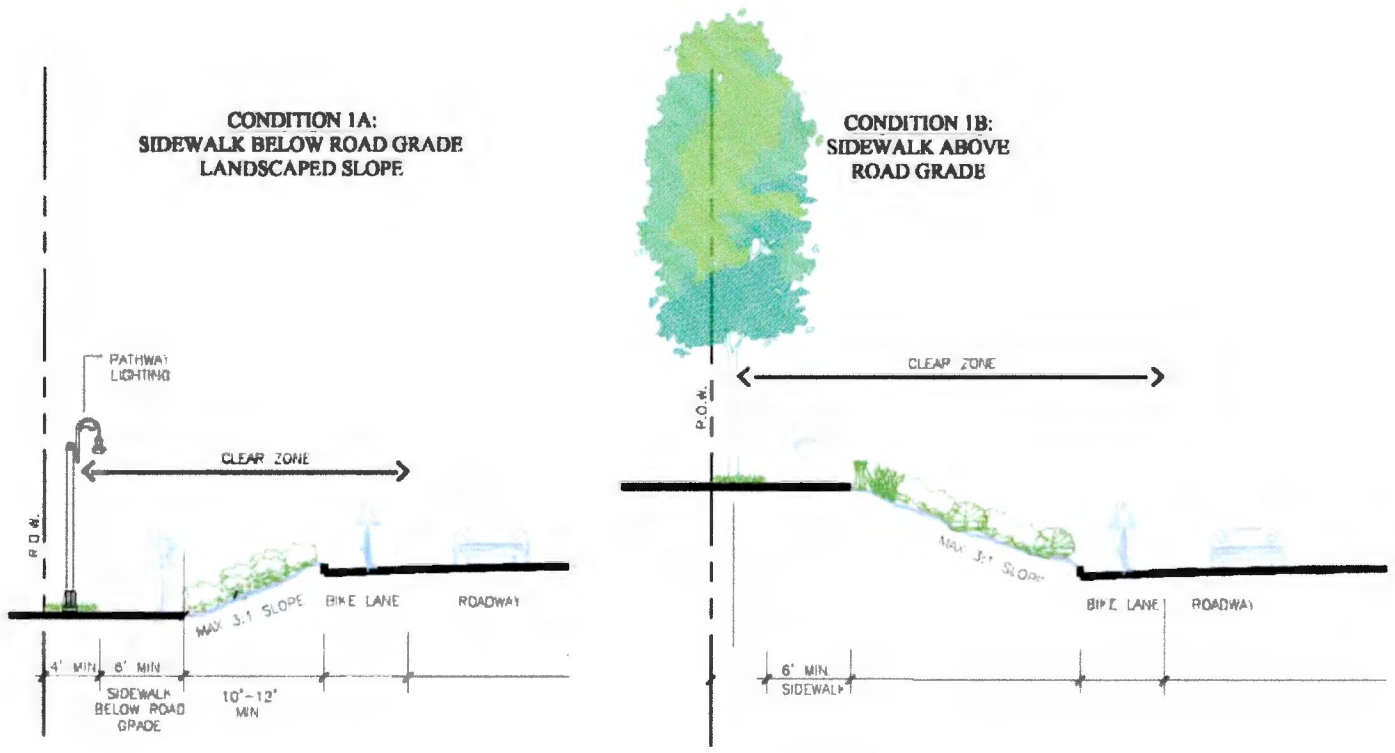
City of Sandy

TRANSPORTATION SYSTEM PLAN

(Not applicable within the Special Transportation Area along Pioneer and Proctor Boulevards.)

Figure 6

US 26 ROADWAY STANDARDS



City of Sandy

TRANSPORTATION SYSTEM PLAN

(Not applicable within the Special Transportation Area along Pioneer and Proctor Boulevards.)

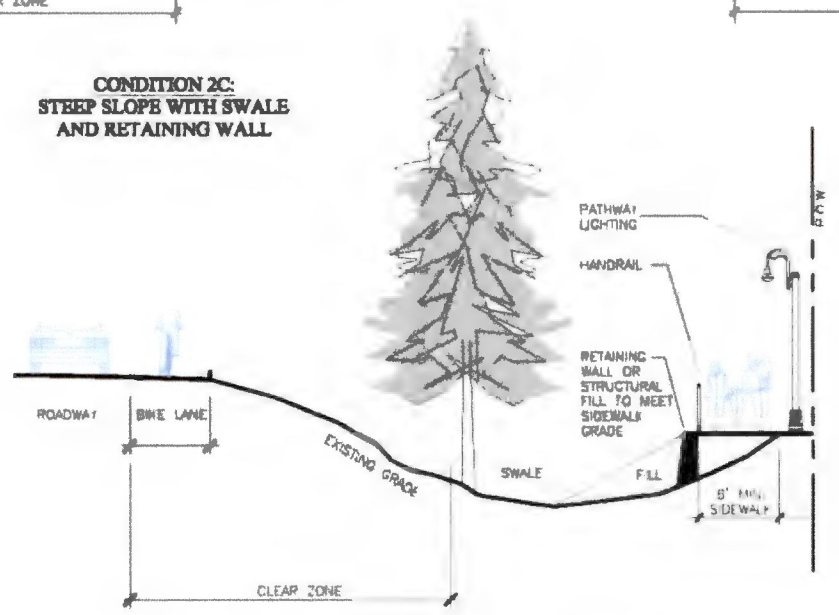
Figure 7

US 26 ROADWAY STANDARDS

Special Conditions







City of Sandy

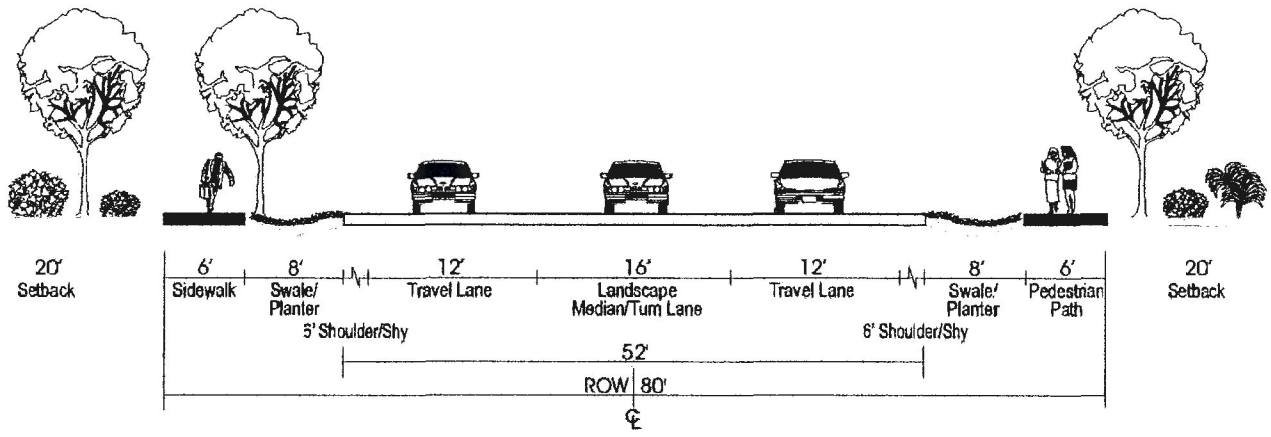
TRANSPORTATION SYSTEM PLAN

(Not applicable within the Special Transportation Area along Pioneer and Proctor Boulevards.)

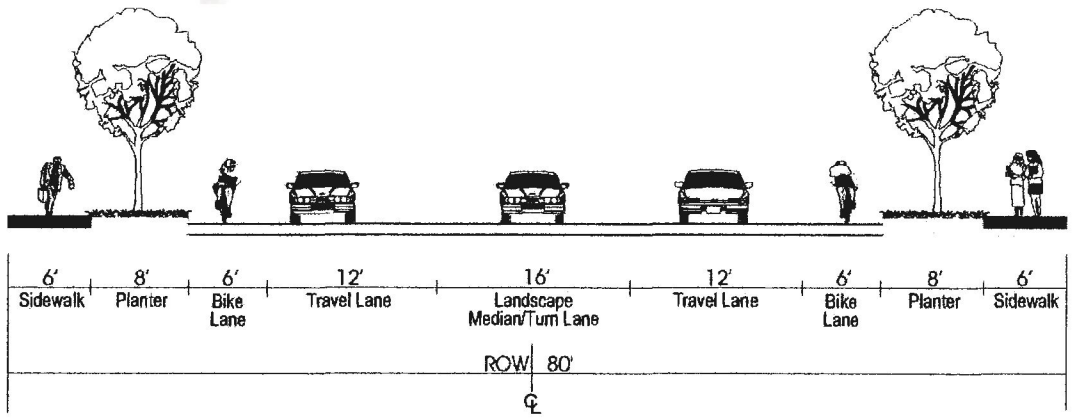
Figure 8

US 26 ROADWAY STANDARDS
Special Conditions

OR 211 - Between Arletha Ct. and Dubarko Rd.



OR 211 - Between Dubarko Rd. and US 26

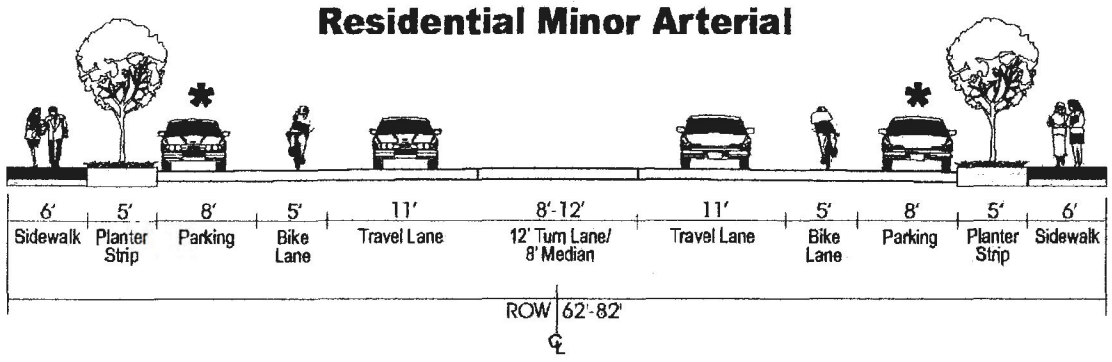


Source: City of Sandy Bornsted Village Plan

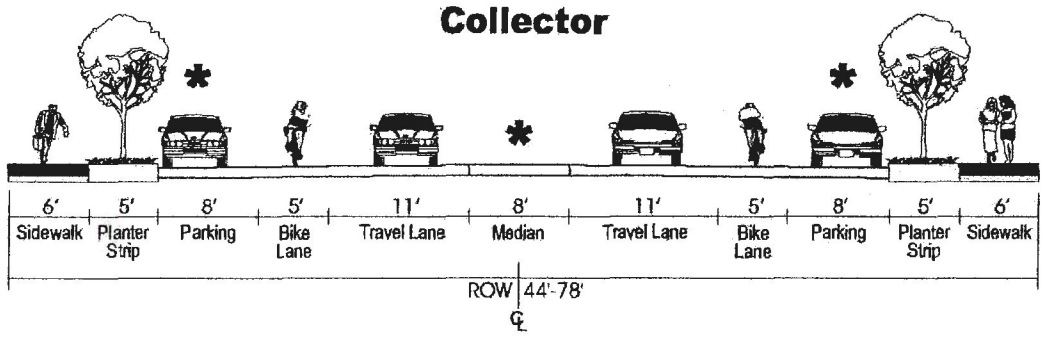
Figure 9

OR 211 ROADWAY STANDARDS

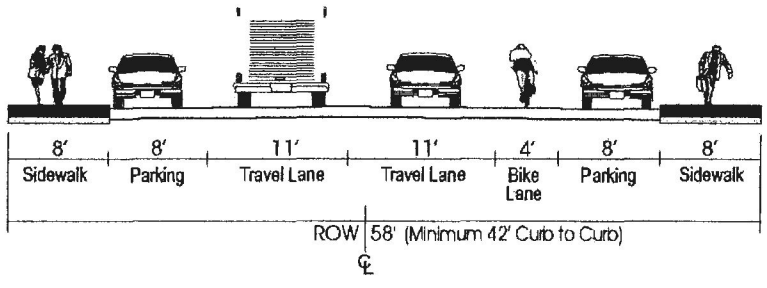
Minor Arterial/ Residential Minor Arterial



Collector



Pioneer and Proctor Boulevards (US 26) Within the Special Transportation Area



LEGEND

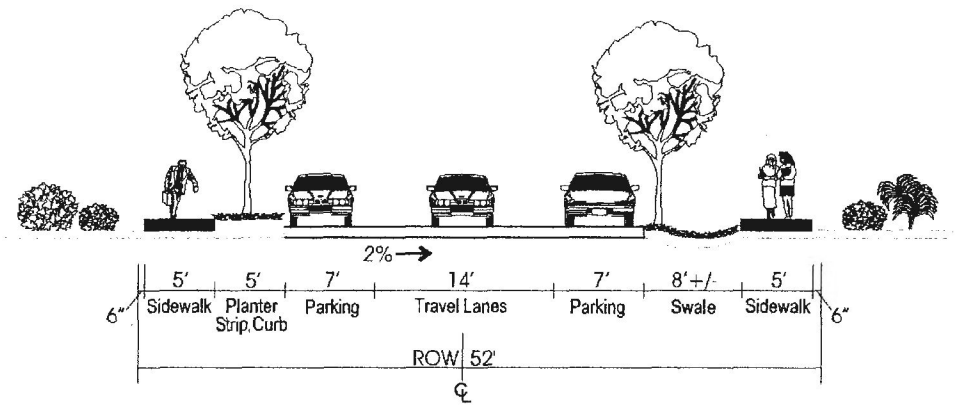
✱ - Optional

Figure 10

OTHER ARTERIAL and COLLECTOR ROADWAY STANDARDS

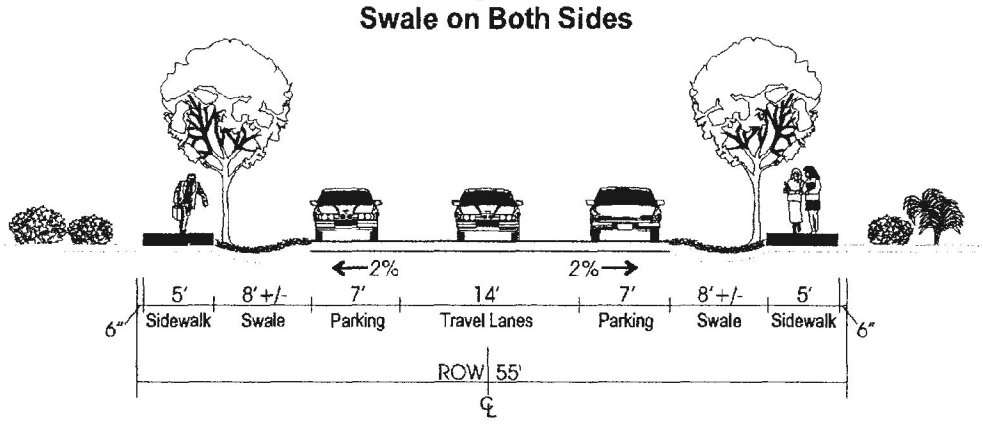
Green Street Option - 52 ft. ROW

Swale on One Side



Green Street Option - 55 ft. ROW

Swale on Both Sides

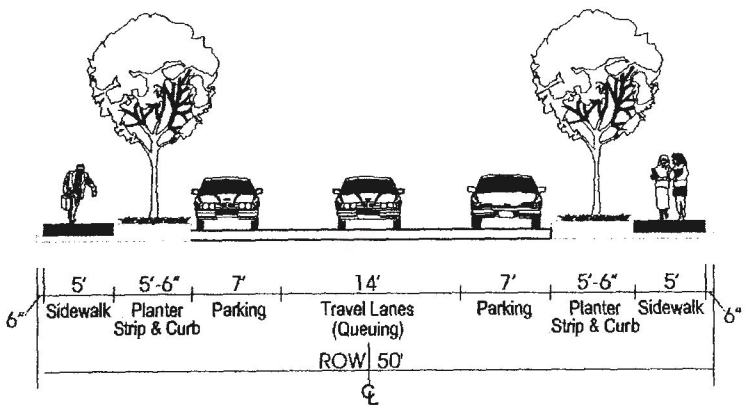


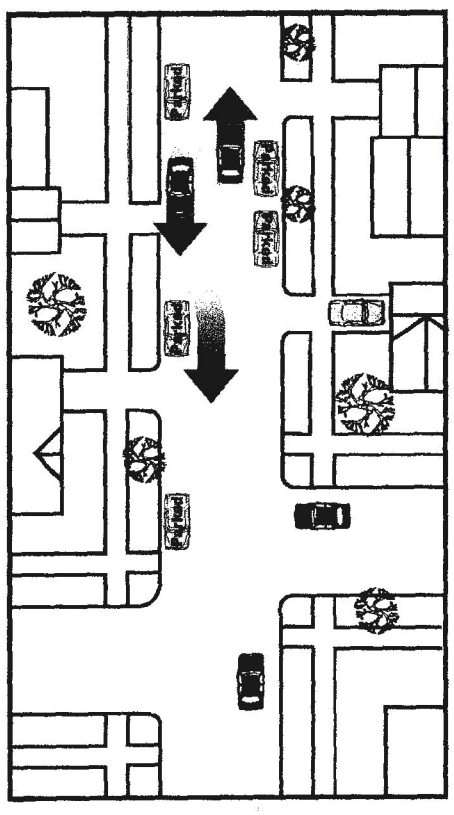
Source: City of Sandy Development Code, Section 17.100.110

Figure 11

NEIGHBORHOOD GREEN STREET ROADWAY STANDARDS

Neighborhood Street

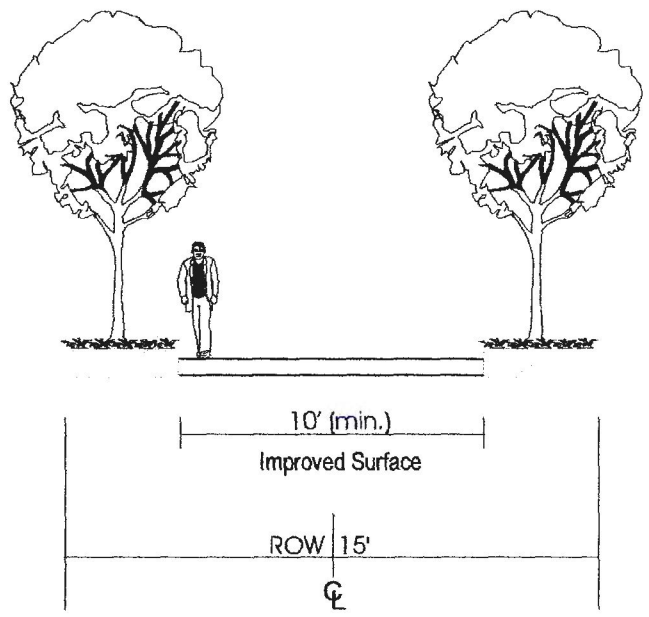




Source: City of Sandy Development Code, Section 17.100.110

Figure 12

NEIGHBORHOOD STREET ROADWAY STANDARDS



Source: City of Sandy Municipal Code, Section 17.100.120 (D)

Figure 13

PEDESTRIAN/BICYCLE ACCESSWAY STANDARD

Access Management

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. It involves the control or limiting of access to arterial and collector facilities to maximize their capacity and preserve their functional integrity.

New development and roadway projects involving City street facilities are required to meet the access spacing standards in Section 17.84.50, 17.98.80 and 17.100.110 of the SMC as shown in Table 3. In cases where physical constraints or unique site characteristics limit the ability to meet these spacing standards an exception may be granted under Section 17.84.50(H).

Table 3: Minimum Access Spacing Standards for City Street Facilities

Functional Classification	Distance between Public Streets	Distance between Private Accesses and other Private Access or Public Streets
Major Arterial*	5,280 feet (1-mile)	See Table 4
Minor Arterial	5,280 feet (1-mile)	300 feet
Residential Minor Arterial and Collector	2,640 feet (.5-mile)	150 feet
Local Street	400 - 660 feet	20 feet

Notes: *All major arterials in the City of Sandy are ODOT facilities.

In addition to these access spacing standards, requirements for joint access points, inter-parcel circulation, and crossover easements are covered in Section 17.90 and Table 2 of Section 17.100.90 of the SMC. To review adequacy of access designs, the City of Sandy may require a Traffic Analysis Letter[2], or Traffic Impact Analysis for new access points proposed to serve new developments. The City reviews the development design to determine that there are no inherent safety issues. Consideration of the need for a Traffic Analysis Letter or Traffic Impact Analysis is triggered by land use actions such as land division, conditional use, and design review.

All access to State facilities must be approved by ODOT. The *1999 Oregon Highway Plan* identifies access management objectives for all classifications of roadways under state jurisdiction. US 26 (classified a Statewide Highway) and OR 211 (classified a District Highway) both maintain management objectives that balance the needs of through traffic movement with direct property access. Based on these objectives, the *Oregon Highway Plan* (OHP) establishes access spacing standards for all highway classifications that vary with proximity to urbanized areas and changes in posted speeds. OHP Table 4 identifies the ODOT access spacing standards for Statewide and District Highways applicable within the Sandy urban growth boundary. Note that the spacing standards below are only to be applied to approaches on the same side of the highway.

[2] City of Sandy Traffic Analysis Letter Guidelines

Table 4: Minimum ODOT Access Spacing Standards

Posted Speed (mph)	Statewide Highway (US 26)			District Highway (OR 211)
	Urban Expressway	Urban	STA	Urban
≥ 55	2,640 feet	1,320 feet		700 feet
50	2,640 feet	1,100 feet		550 feet
40 & 45	2,640 feet	990 feet		500 feet
30 & 35		720 feet	*	350 feet
≤ 25		520 feet	*	350 feet

Notes: All measurements in feet, taken from center to center of approaches on the same side of the highway only.

* Minimum access management spacing for public road approaches is the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum access management spacing for driveways is 175 feet (55 meters) or mid-block if the current city block is less than 350 feet (110 meters).

ODOT's access management requirements are implemented through OAR 734-051. These rules outline the criteria and procedures for approach permitting, including the application process, conditions under which deviations from established access spacing standards can be allowed, and procedures for appealing decisions.

Clackamas County also maintains access spacing standards for facilities under County jurisdiction in Sandy's Urban Reserve Area. County access spacing standards call for distances between public streets and driveways of 1,000 feet on major arterials, 600 feet on minor arterials, and 150 feet on collectors (no requirement on local roads).

Local Street Connectivity

By providing connectivity between neighborhoods, out-of-direction travel and vehicle miles traveled (VMT) can be reduced, the attractiveness of various travel modes enhanced, traffic levels can be balanced between various streets, and public safety response time is reduced. In the City of Sandy, several important new roadway connections will be needed within developed areas to reduce out of direction travel for vehicles, pedestrians and bicyclists. New connections will be most critical in areas where a significant amount of new development is possible.

Figure 13 shows the Local Street Connectivity Plan for Sandy. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on local streets. The arrows shown in the figures represent potential connections and the general direction for the placement of the connection. In each case, the specific alignments and design should be determined as part of development review, with consideration being given to the built environment, topography, and environmental conditions.

Figure 14

Local Street Connectivity

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000

Feet

Existing Streets

- Arterial/Collector
- Local Streets
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

Future Streets

- Future Street
- Conceptual Local Street Connection*

*Note: Alignments are conceptual only, and will be refined based on topographic, environmental, and other constraints.

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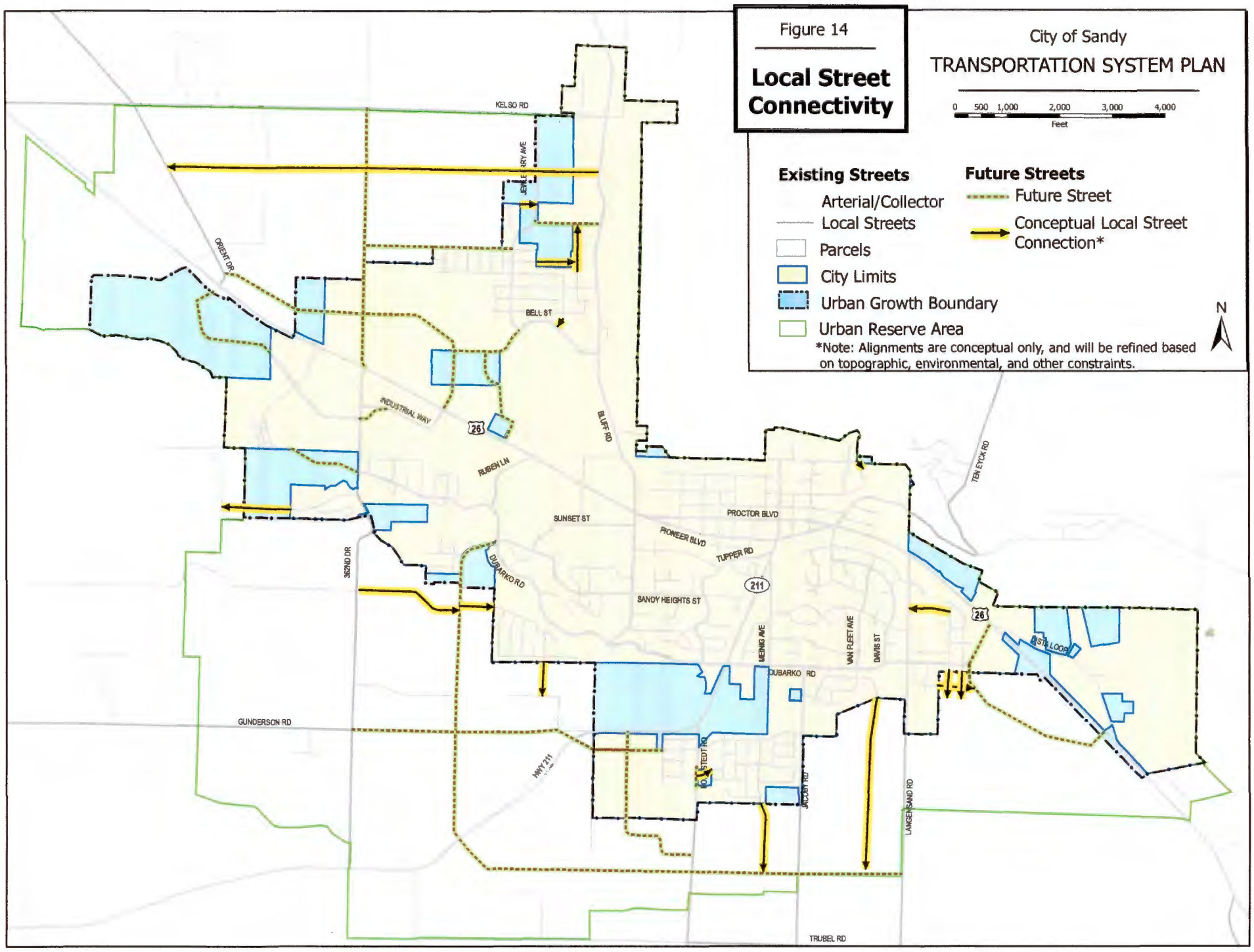

Should new cul-de-sacs be created, bicycle and pedestrian accessways to provide a connection to the surrounding transportation system from the cul-de-sac shall be required per Section 17.100.120(D) of the SMC.

To protect existing neighborhoods from the potential traffic impacts caused by extending stub end streets, the City may require appropriate traffic calming measures be incorporated into the design and construction of new street extensions. In addition, when a development constructs stub streets, the City may require the installation of signs indicating the potential for future connectivity to increase residents' awareness. Additionally, new developments that construct new streets or street extensions are required by Section 17.100.100(F) of the SMC to provide a proposed street map that:

- Provides full street connections with spacing of no more than 400 feet between connections except where prevented by barriers or access management standards on higher classified facilities
- Provides bike and pedestrian accessways through the middle of the block when block lengths exceed 600 feet
- Limits use of cul-de-sacs and other closed-end street systems to situations where existing barriers prevent full street connections
- Includes no cul-de-sacs or close-end street longer than 400 feet. Those longer than 400 feet, or developments with only one access point, may be required to provide an alternative access for emergency vehicle use only
- Includes street cross-sections showing dimensions of right-of-way improvements, with streets designed for posted or expected speed limits which meet City design standards (or ODOT standards for state highways)

Neighborhood Traffic Management

Neighborhood Traffic Management (NTM) strategies are commonly used to slow down or reduce automotive traffic with the intent of improving safety for pedestrians and bicyclists. Such strategies are not suited for arterial and collector streets, including US 26 and OR 211. However, NTM strategies can be applied to local streets. Sandy has a NTM program that outlines the process for identifying, prioritizing, and mitigating problems related to traffic speeds and volumes on local streets.

To initiate the Sandy Neighborhood Traffic Management Program process, a citizen request accompanied by a petition with signatures of at least 50% of the residents in the project area must be submitted to the City. Each request will be evaluated, and those that pass this process will be reviewed for a range of possible traffic calming device (Table 5) solutions.

Table 5: Traffic Calming Devices

Device	Impact				
	Safety	Speed Reduction	Traffic Diversion	Fuel Consumption, Pollution	Emergency Services
Chicanes	Possible Improvement	Possible	Possible	Small Increase	Possible Problems
Curb Extensions	Improved Ped. Crossing	Possible	No Effect	No Change	Possible Problems
Diverters	Possible Improvement	Mixed Results	Yes	No Change	Possible Problems
Entrance Treatments	Possible Improvement	Unlikely	Mixed Results	No Change	Possible Problems
Forced Turn Channelization	Possible Improvement	No	Yes	Small Increase	Possible Problems
Median Barriers	Possible Improvement	No	Possible	No Change	Possible Problems
Radar Speed Feedback Signs	Possible Improvement	Yes	No Effect	No Change	No Effect
Rumble Strips	Possible Improvement	Possible	No Effect	No Change	No Effect
Speed Humps	Unknown	Yes	Possible	Small Increase	Possible Problems
Traffic Circles	Improved	Yes	Possible	No Change	Possible Problems

Source: Sandy Traffic Management Program

Mobility Standards

Mobility standards are established to delineate the maximum level of congestion that will be accepted on a given facility or within a specified area. The road authority – City, State or County – sets and applies specific standards for their facilities.

The City of Sandy mobility standard requires a minimum level of service (LOS) D for signalized, as well as unsignalized intersections. Level of service shall be based on the most recent edition of the Transportation Research Board's Highway Capacity Manual.

ODOT mobility standards are given as volume to capacity (V/C) ratios and are based on roadway classification, land use designations, and posted speed limits. There are two types of mobility standards for state facilities that are used for different purposes. Those contained in the *1999 Oregon Highway Plan* are applied to the review of development proposals, to address Transportation Planning Rule compliance, and for the help determination of needed infrastructure improvements necessary to address land development. However, the mobility standards in the ODOT *Highway Design Manual* are to

be applied to the evaluation of all alternatives considered for roadway improvements through public investments. ODOT mobility standards applicable within the City of Sandy are shown in Table 6.

Through the process of updating the City of Sandy's TSP, it was found that, even with full build-out of the recommended transportation system, ODOT's mobility standards for US 26 could not be met. In response, ODOT and the City have worked together to develop alternate mobility standards for US 26 in the Orient Drive to Ten Eyck Road section. These alternate mobility standards shall be adopted in the Sandy TSP, but will not be in force until ODOT, through action by the Oregon Transportation Commission, adopts the alternate mobility standards in an amendment to the *1999 Oregon Highway Plan.*

The new mobility standards are to be applied to the average annual weekday peak hour of traffic rather than the 30th highest annual hour of traffic, and will allow volume to capacity ratios as high as 0.85.

At unsignalized intersections and road approaches, the volume to capacity ratios shall not be exceeded for either of the state highway approaches that are not stopped. Approaches at which traffic must stop, or otherwise yield the right of way, shall be operated to maintain safe operation of the intersection and all of its approaches and shall not exceed the volume capacity ratios for District/Local Interest Roads in Table 6 within the urban growth boundary.

Table 6: ODOT Mobility Standards within Sandy

Highway Category and Segment	Inside Urban Growth Boundary				Outside Urban Growth Boundary
	STA	Non-MPO outside of STA's where non-freeway speed ≤ 35 mph	Non-MPO outside of STAs where non-freeway speed > 35 mph	Non-MPO where non-freeway speed limit ≥ 45mph	Rural Lands
Oregon Highway Plan *Applied to the review of development proposals, comprehensive plan text and map amendments and for the determination of needed infrastructure improvements*					
US 26 from Orient Dr. to Ten Eyck Rd.* (Statewide Expressway NHS Freight Route)	0.85	0.85	0.85	0.85	0.85
US 26 from east of Ten Eyck Rd. to the east (Statewide NHS Freight Route)	-	0.80	0.75	0.70	0.70
OR 211 (District/ Local Interest Roads)	0.95	0.90	0.85	0.80	0.75
Highway Design Manual *Applied to the evaluation of all alternatives considered for roadway improvements through public investments*					
US 26 from west to MP 22.66 west of 362nd Dr. (Statewide Expressway NHS Freight Route)	-	-	0.70	0.65	0.60
US 26 from MP 22.66 west of 362nd Dr. to east (Statewide NHS Freight Route	0.85	0.70	0.70	0.70	0.60
OR 211 (District/ Local Interest Roads)	0.95	0.80	0.80	0.75	0.70

Notes: *The alternate mobility standard for this area is to be applied to the average annual weekday peak hour of traffic rather than the 30th highest annual hour of traffic.

Motor Vehicle System Projects

The motor vehicle system projects were developed to address existing and long-range needs for network capacity and safety. These projects, listed in Tables 7 and 8 and shown in Figure 14, represent the motor vehicle component of the "Preferred Plan", which consists of all transportation improvements identified to support growth through the year 2029. Projects assumed for "Near Term" implementation, which represent a subset of the Preferred Plan that aligns with anticipated funding, are listed in Chapter 4.

Operations at key roadway network intersections in the City were analyzed under future (year 2029) conditions with and without the Preferred Plan motor vehicle system projects in place. The results are provided in Table 9. As shown, all intersections under City jurisdiction will operate within adopted mobility standards with the Preferred Plan improvements in place. On the state highways, the recommended improvement projects coupled with the adoption of alternate mobility standards from Orient Drive to Ten Eyck Road will be essential for accommodating future growth. While this will mitigate intersection operations in most areas, the unsignalized intersections on US 26 east of the downtown (at Langensand Road, Vista Loop Drive West, and Vista Loop Drive East) are still projected to fail to meet mobility standards in the future.

At these locations, minor street delays can be long due to the conflict with high highway traffic volumes. However, the forecasted demand for the minor street movements remains too low to warrant the installation of traffic signals at any one intersection. This low demand results in part from the fact that most trips are oriented to and from the west and that there are other roadways available to serve that demand. Because the attractiveness of alternate routes to and from the west will be affected by the recommended improvement projects in this plan, the actual demand experienced at the US 26 intersections east of the downtown could be influenced by the timing of those improvements relative to development growth. Therefore, continued monitoring of operations and safety at these intersections as growth occurs is recommended.

Table 7: Intersection Improvement Projects and Costs – Preferred Plan

Project ID	Location	Improvement(s) Description	Project Cost (2009 Dollars)
City of Sandy Intersection Improvements			
M1	362nd Dr./ Industrial Way (West)	• Realign Industrial Way East to connect into the intersection of Industrial Way west • Construct a single lane roundabout	$3,390,000
M2	362nd Dr./ Dubarko Rd.	• Construct a single-lane roundabout	$1,165,000
ODOT Intersection Improvements			
M3	US 26/ 362nd Dr.	• Construct a second westbound left turn lane • Construct an acceptance lane for second westbound left turn lane to drop at southern access to Fred Meyer property • Construct a northbound through lane • Construct southbound through, right turn and left turn lanes	$5,350,000
M4	US 26/ Industrial Way	• Change southbound approach to dual left turn lanes and a shared through/right lane • Construct a northbound left turn lane	$780,000
M5	US 26/ Ruben Ln.	• Change southbound approach to dual left turn lanes and a shared through/right lane • Change northbound approach to left turn lane, and shared through/right lane	$770,000
M6	OR 211/ Proctor Blvd. (US 26)	• Construct a northbound left turn lane (restriping only)	$5,000
M7	US 26	• US 26 Adaptive Signal Timing	$400,000
M8	US 26/ Ten Eyck Rd./ Wolf Dr.	• Construct a northbound left turn lane • Construct a southbound left turn lane	$1,220,000
M9	OR 211/ Dubarko Rd.	• Construct a northbound right turn lane • Construct a southbound left turn lane • Construct a northbound left turn lane • Construct a traffic signal	$10,150,000
M10	OR 211/ Bornstedt Rd.	• Prohibit left turns out of Bornstedt Rd.*	$16,000
M11	OR 211/ Arletha Ct.	• Realign Arletha Ct. approach from the south	$2,570,000
Total Project Costs (Intersection Improvements)			**$25,816,000**

Notes: *Project would be necessary only if mobility standard is not met. Potential alternative projects are available.

Table 8: Roadway Improvement Projects and Costs – Preferred Plan

Project ID	Roadway Segment	Project Cost (2009 Dollars)
M12	Industrial Way extension to Jarl Rd./ US 26	$10,800,000
M13	Dubarko Rd. connection to Champion Way	$6,105,000
M14*	Extend Bell St. to Orient Dr.	$50,905,000
M15*	Extend 362nd Dr. to Kelso Rd.	$26,620,000
M16	Extend Kate Schmidt Ave. from US 26 to the proposed Bell St. extension	$7,345,000
M17	Extend Industrial Way north to Bell St. extension	$3,820,000
M18*	Extend Olson Rd. from 362nd Dr. to Jewelberry Ave.	$12,890,000
M19	Extend Agnes St. to Jewelberry Ave.	$4,870,000
M20	Extend Dubarko Rd. to US 26 opposite Vista Loop Dr. (West)	$3,200,000
M21*	Gunderson Rd., 370th Ave., Cascade Village Dr., Cascade Village Blvd., New Collector	$20,000,000
M22*	New road extension from Dubarko Rd. to US 26 opposite Vista Loop Dr. (East)	$16,390,000
M23	Bornstedt Rd. Vertical Realignment	$790,000
M24	Shelley Ave Realignment	$2,000,000
	Sub-total (inside UGB)	$103,602,850
	Sub-total (outside UGB)	$62,132,150
	Total Cost	$165,735,000

Notes: *Sections of these projects are outside the City's urban growth boundary, but inside the urban reserve area.

Figure 15

Motor Vehicle System Plan

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000

Feet

Roadway Functional Classification

Recommended* Existing

- Major Arterial
- Minor Arterial
- Residential Minor Arterial
- Collector
- Local Streets
- County Arterial/Collectors

Parcels

- City Limits
- Urban Growth Boundary
- Urban Reserve Area

M1 Project ID (See Tables 7 and 8)

*Note: Alignments are conceptual only, and will be refined based on topographic, environmental, and other constraints.

N

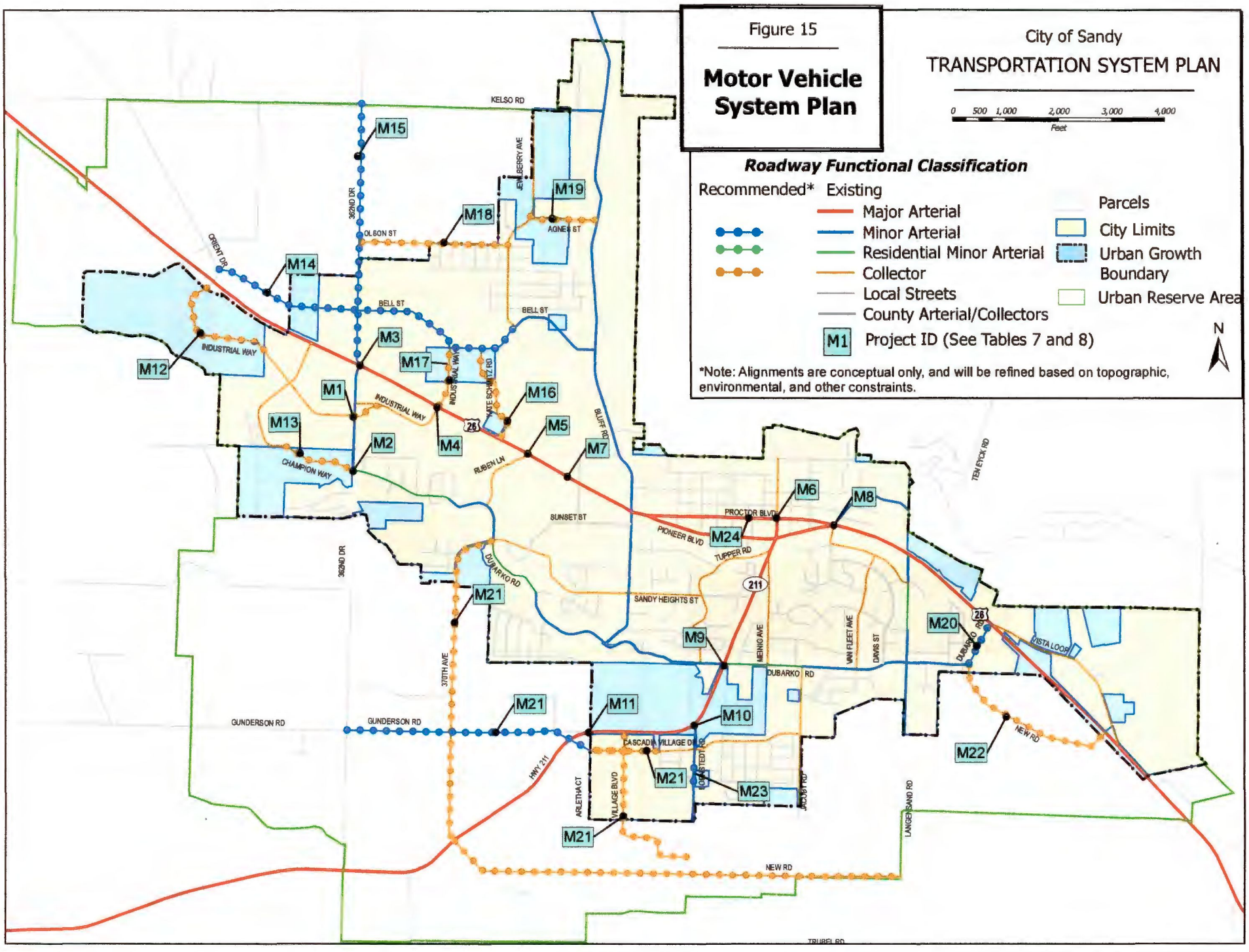

Table 9: 2029 Intersection Operations

Intersection	Mobility Standard (LOS or V/C)	2029 No-Build System			2029 Preferred Plan System		
		Average Delay (sec)	Level of Service (LOS)	volume/ capacity ratio (V/C)	Average Delay (sec)	Level of Service (LOS)	volume/ capacity ratio (V/C)
City of Sandy Intersections							
2-Way Stop Controlled Intersections							
Kelso Rd./ Bluff Rd.	D	16.0	A/C	0.50	14.2	A/B	0.34
Green Mountain St./ Bluff Rd.	D	13.3	A/B	0.15	11.7	A/B	0.20
Industrial Way East/ 362nd Dr.	D	21.8	A/C	0.35	7.3***	A***	0.50***
Industrial Way West/ 362nd Dr.	D	40.2	E	0.84			
Dubarko Rd./ 362nd Dr.*	D	37.8	B/E	0.56	12.4	B	0.90
Dubarko Rd./ Ruben Ln.	D	15.0	A/B	0.23	11.2	A/B	0.24
Dubarko Rd./ Tupper Rd.	D	10.6	A/B	0.06	9.6	A/A	0.07
Dubarko Rd./ Jacoby Rd.	D	11.4	A/B	0.10	17.4	A/C	0.35
Dubarko Rd./ Langensand Rd.	D	11.3	A/B	0.22	15.7	A/C	0.51
Cascadia Village Dr./ Bornstedt Rd.	D	13.3	A/B	0.07	11.3	A/B	0.09
ODOT Intersections							
Signal Controlled Intersections							
US 26/ Orient Dr.	0.60 / 0.85 **	>80.0	F	1.16	50.6	D	0.84
US 26/ 362nd Dr.	0.70 / 0.85 **	>80.0	F	1.33	36.9	D	0.84
US 26/ Industrial Way	0.70 / 0.85 **	>80.0	F	1.36	24.7	C	0.84
US 26/ Ruben Ln.	0.70 / 0.85 **	>80.0	F	1.36	40.8	D	0.85
US 26/ Bluff Rd.	0.85 / 0.85 **	>80.0	F	1.30	27.0	C	0.85
OR 211/ Proctor Blvd. (US 26)	0.85 / 0.85 **	>80.0	F	1.25	26.4	C	0.85
OR 211/ Pioneer Blvd. (US 26)	0.85 / 0.85 **	>80.0	F	1.06	33.1	C	0.68
US 26/ Ten Eyck Rd. - Wolf Dr.	0.85 / 0.85 **	>80.0	F	1.20	26.9	C	0.72
OR 211/ Dubarko Rd.	0.75 / 0.80	>80.0	A/F	1.22	9.1	A	0.64

Table 9: 2029 Intersection Operations (continued)

Intersection	Mobility Standard (LOS or V/C)	2029 No-Build System			2029 Preferred Plan System		
		Average Delay (sec)	Level of Service (LOS)	volume/ capacity ratio (V/C)	Average Delay (sec)	Level of Service (LOS)	volume/ capacity ratio (V/C)
ODOT Intersections							
2-Way Stop Controlled Intersections							
US 26/ Champion Way	0.65 / 0.80	34.8	A/D	0.20	27.0	A/D	0.28
US 26/ Langensand Rd.	0.70 / 0.85	>80.0	A/F	>1.50	>80.0	D/F	>1.50
US 26/ Vista Loop Dr. West	0.70 / 0.80	>80.0	A/F	>1.50	>80.0	D/F	>1.50
US 26/ Vista Loop Dr. East	0.70 / 0.80	>80.0	C/F	1.08	>80.0	C/F	>1.50
OR 211/ Bornstedt Rd.	0.75 / 0.80	40.4	A/E	0.59	13.4	B/B	0.42

Notes: Shaded cells indicate mobility standard is not met
(HDM/OHP) mobility standards shown for ODOT intersections
ODOT mobility standards for stopped approaches are shown for unsignalized intersections
(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
* Roundabout as proposed improvement
** Alternate OHP mobility standard to be applied to average annual weekday peak hour
*** Improvement realigns Industrial Way East to connect into the intersection of 362nd Drive and Industrial Way West

Potential Conflicts with Goal 5 Resources

Oregon's Statewide Planning Goals & Guidelines Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces (OAR 660-015-0000(5)) states that, "Local governments shall adopt programs that will protect natural resources and conserve scenic, historic, and open space resources for present and future generations." Resources addressed under Goal 5 include:

- Riparian corridors (including water and riparian areas and fish habitat)
- Wetlands
- Wildlife habitat
- Federal wild and scenic rivers
- State scenic waterways
- Groundwater resources
- Approved Oregon recreation trails
- Natural areas
- Wilderness areas
- Mineral and aggregate
- Energy sources
- Cultural areas
- Historic resources
- Open space
- Scenic views and sites

Preferred Plan projects including new streets, sidewalks, trails, and bike lanes were reviewed for conflicts with known or possible Goal 5 resources within the City of Sandy urban area. Several potential conflicts are identified in Table 10. It should be noted that although the proposed alignments currently show the potential for conflict with the City's Goal 5 resources, the actual alignment of each project will be refined in the future to mitigate or minimize impacts.

Table 10: Potential Preferred Plan Goal 5 Impacts

Project ID	Roadway	Location	Potential Impact
M14 / M15	362nd Dr.	Intersection at Bell St. and North of Bell St.	Wetland Riparian Corridor
P1 / B1	362nd Dr.	Between Dubarko Rd. and the southern UGB	Wetland Riparian Corridor
P27 / B11	OR 211	Between Dubarko Rd. and Bornstedt Rd., South of Tupper Rd.	Wetland Riparian Corridor
P5 / B3	Bornstedt Rd.	South of Redwood St.	Wetland

Freight Mobility

ODOT has designated US 26 as a State Freight Route and Federal Truck Route in the Oregon Highway Plan. The ODOT Motor Carrier Transportation Division has identified both US 26 and OR 211 as routes for freight movement through the City of Sandy. There are several restrictions associated with each highway, with Table 11 showing a matrix identifying the differences in allowed freight movement.

Table 11: Motor Carrier Freight Route Restrictions

Route	Highway Group Number*	Route for Over-Width Loads	Route for Over-Height Loads (up to 14'-06")	COVP Road Authority	Route for "Triples" Combinations	Route for Mobile Homes (12' to 14' Wide)	Route for Over-Length Loads	Route with Use Restricted Bridges	Route for Loads Up to 14' Wide
US 26	Group 1	Yes	Yes*2	Clackamas	Yes*3	Yes*4	Yes*5	None	Yes
OR 211	Group 1	Yes*1	No	Clackamas	No	No	No	None	No

Notes:
*The Motor Carrier Division has classified highways into three groups (1-3) to indicate general length, size, and weight requirements of freight vehicles: Group 1 is the least restrictive, and Group 3 has the most restrictions on the permitted vehicle and load dimensions.
*1Permit required for over width operations
*2Permit required for heights over 14'
*3Holiday restrictions apply east of Sandy
*4Route not authorized for continuous movement east of Sandy
*5Permit required for over-length loads
COPV - Continuous Operation Variance Permits

As can be seen in this table, there are fewer restrictions for freight movement on US 26 than on OR 211. It also is a more direct route between the freight generators in the Portland Metro region and

destinations to the east. Therefore, the management of congestion through the US 26 corridor will be critical to maintain efficient and reliable movement of freight through the City.

Off of the US 26 corridor, the following City streets serve industrial areas.

- Industrial Way (including proposed Jarl Road connection to US 26)
- Champion Way
- 362nd Drive between US 26 and Champion Way/ Dubarko Road

Transportation Demand Management

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network during peak travel demand periods. TDM focuses on reducing vehicle miles traveled (VMT) and promoting alternative modes of travel. By shifting peak travel demands on roadways, the roadway capacity can be used more efficiently, and the City may avoid or delay building new or wider roadways.

A wide variety of TDM strategies exist, however many are tailored to larger urban areas. Strategies for rural or smaller communities require special development and planning and should focus on increasing travel options and creating an environment that is supportive for walking and cycling. The most effective TDM measures for the City of Sandy may include strategies to increase parking management in the downtown (parking time limits and pricing), carpools, increase transit services and improve facilities for non-vehicular modes of travel (walking, bicycling, and transit).

Table 12 lists several strategies that could be applicable to large employers within the City of Sandy. Additional strategies that could be implemented by the City through its Comprehensive Plan and development code include continued support of pedestrian, bicycle, and transit projects, consideration of trip caps and other transportation demand management strategies as part of development review, and to continue to provide the opportunity for compact, mixed land-uses to reduce citywide VMT.

Table 12: Transportation Demand Management Strategies

Strategy	Description	Potential Trip Reduction
Telecommuting	Employees perform regular work duties at home or at a work center closer to home, rather than commuting from home to work. This can be full time or on selected workdays. This can require computer equipment to be most effective.	82-91% (Full Time) 14-36% (1-2 day/wk.)
Compressed Work Week	Schedule where employees work their regular scheduled number of hours in fewer days per week.	7-9% (9 day/80 hr.) 16-18% (4 day/40 hr.) 32-36% (3 day/36 hr.)
Alternative Mode Subsidy	For employees that commute to work by modes other than driving alone, the employer provides a monetary bonus to the employee.	21-34% (full subsidy of cost, high alternative modes) 2-4% (half subsidy of cost, medium alternative modes)

Table 12 (continued): Transportation Demand Management Strategies

Strategy	Description	Potential Trip Reduction
Bicycle Program	Employers provide support services to those employees that bicycle to work. Examples include: safe/secure bicycle storage, shower facilities and subsidy of commute bicycle purchase.	0-10%
On-site Rideshare Matching	Employees who are interested in carpooling or vanpooling provide information to a transportation coordinator regarding their work hours, availability of a vehicle and place of residence. The coordinator then matches employees who can reasonably rideshare together.	1-2%
Provide Vanpools	Employees that live near each other are organized into a vanpool for their trip to work. The employer may subsidize the cost of operation and maintaining the van.	15-25% (company provided van with fee) 30-40% (subsidized van)
Gift/Awards for Alternative Mode Use	Employees are offered the opportunity to receive a gift or an award for using modes other than driving alone.	0-3%
Walking Program	Provide support services for those who walk to work. This could include buying walking shoes or providing lockers and showers.	0-3%
Company Cars for Business Travel	Employees are allowed to use company cars for business-related travel during the day	0-1%
Guaranteed Ride Home Program	A company owned or leased vehicle is provided in the case of an emergency for employees that use alternative modes.	1-3%
Time off with Pay for Alternative Mode Use	Employees are offered time off with pay as an incentive to use alternative modes.	1-2%

Source: *Guidance for Estimating Trip Reductions from Commute Options*, Oregon Department of Environmental Quality, August 1996.

Other Transportation Modes

Other modes of transportation considered as part of the Sandy TSP include air, water, rail, and pipeline transport. At the present time, the City of Sandy is not directly served by any of these modes, but residents and businesses can access them from the surrounding region, typically by driving.

Air

Regional, national, and international freight and passenger air travel are provided at the Portland International Airport (PDX), located approximately 25 miles west of the city. PDX is accessible via transit by taking SAM to the Gresham Transit Center, transferring to the MAX Blue Line, and transferring again to the MAX Red Line at the Gateway Transit Center. Private, corporate, and light aircraft transport are also available at the Troutdale Airport (approximately 15 miles west of the city). Furthermore, five small privately held landing strips (McKinnon Enterprises, Sandy River landing strip, County Squire Airpark, Eagle Nest Ranch, and Krueger) are located within a five-mile radius of the city.

Rail

Regional, national, and international freight and passenger rail service are available for the residents and businesses of Sandy at several locations in the Portland Metro Region. Freight rail services are available from three national carriers (Burlington Northern Santa Fe Railroad, Union Pacific Railroad, and Southern Pacific Railroad), as well as several other short line freight rail companies. Long-haul passenger rail service is available from Amtrak.

Freight rail services are also available in Hood River through the Union Pacific Railroad line in the Columbia River Gorge, but there are no intermodal facilities of significance in the area for transferring goods.

Water

Regional, national, and international freight water transport is currently available at the Port of Portland. Tourist-oriented passenger water transport service is also available in the Portland Metro Region and the Gorge.

Pipeline/ Transmission Line

Natural gas service is available in the City of Sandy through feeder lines, but no major transmission pipelines for natural gas, oil, or any other commodity are currently available in the city.

Chapter 4: Plan Implementation

This chapter discusses the financial and regulatory needs associated with the implementation of this Transportation System Plan.

Projected Funding for Transportation Improvements

Projecting the revenue assumed to be available for future capital projects helps to provide an understanding of the City's capacity for constructing the transportation improvement projects identified to be needed to support future growth.

The revenue forecast conducted for the City of Sandy TSP accounted for the four regular income sources currently used to fund and maintain public transportation infrastructure. The State Gas Tax, Local Option Fuel Tax, and ODOT FAU-STP Fund revenue streams were forecast by calculating the average income from these sources over the last 10 years and projecting it through the year 2029. The projected revenue stream from transportation system development charges was calculated using the forecasted net new trips from development within the City over the next 20 years. The current SDC rates were applied to these new trips based on trip type, with a 45% reduction for pass-by trips applied to the retail and service type land uses. The split between maintenance expenses and capital projects was determined by City staff and was based on the City's history of transportation expenditures. Table 13 summarizes the funding collected for transportation related costs in the year 2008, and the projected total available revenue for the period between 2009 and 2029. As shown, the City is assumed to have approximately $10.2 million available for capital transportation improvements through 2029.

Table 13: Transportation Revenue Projection from Current Sources

Funding Source	2008 Total Collected	2009 to 2029* Total Forecast	2009 to 2029* Maintenance and Other Expenses	2009 to 2029* Capital Projects Only
State Shared - Gas Tax	$294,987	$ 5,900,000	$ 4,425,000	$ 1,475,000
Local Option Fuel Tax	$131,410	$ 2,482,000	$ 2,482,000	-
ODOT FAU-STP Funds	$79,500	$ 1,934,000	-	$ 1,934,000
Systems Development Charges	$338,765	$ 6,762,000	-	$ 6,762,000
Total	**$765,162**	**$ 17,078,000**	**$ 6,907,000**	**$ 10,171,000**

Notes: A portion of the projected revenue will be required for the maintenance of existing facilities, street lighting, staff salaries, as well as other miscellaneous transportation expenses, and thus not available for capital projects.

* Forecast revenue is displayed in 2009 dollars.

Project Programming

The TSP Preferred Plan consists of all transportation improvements identified to meet future needs through the year 2029. Because the cost to fund all Preferred Plan projects is far greater than the City's projected revenue for such improvements, the Preferred Plan has been separated into near-term and long-term lists (Tables 14 through 16), where the near-term projects include those that could be funded through a combination of the City's projected revenue for capital transportation projects and other reasonable funding strategies. The identification of near-term project lists informs future budgeting decisions and does not preclude any project in the Preferred Plan from being eligible for inclusion on the City's Capital Improvement Program at any time. Lead agencies have been identified for Preferred Plan projects according to jurisdiction of the roadway affected; the designation of a lead agency does not create an obligation or commitment for funding, but is intended to refine the projection of transportation funding needs for the City.

Table 14: Pedestrian System Projects – Preferred Plan

Project ID*	Project	Segment	Description	Project Costs (2009 Dollars)
Local System Improvements (Lead Agency – City of Sandy)				
		Near-Term Projects		
P2	Bluff Rd.	Hood St. to Green Mountain St.	Infill sidewalk gaps	$520,000
P10	Langensand Rd.	Dubarko Rd. to US 26	Infill sidewalk gaps	$82,000
P11	Pleasant St.	Beers Ave. to Revenue Ave.	Infill sidewalk gaps	$173,000
P13	Sandy Heights St.	Dubarko Rd to Tupper Rd	Infill sidewalk gaps	$176,000
P14	Downtown Core Pedestrian	Side streets perpendicular to US 26	Infill sidewalk gaps	$287,000
P15	Vista Loop	US 26 to US 26	Construct Sidewalk	$600,000
		Long-Term Projects		
P1	362nd Dr.	Chinook St. to Industrial Way	Infill sidewalk gaps	$1,230,000
P3	Bluff Rd.	Green Mountain St. to Northern UGB	Infill sidewalk gaps	$716,000
P4	Bornstedt Rd.	Cascadia Village Dr. to UGB	Infill sidewalk gaps	$1,420,000
P5	Dubarko Rd.	East of Melissa Ave. to East of OR 211	Infill sidewalk gaps	$3,240,000
P6	Dubarko Rd.	Langensand Rd. to Antler Ave.	Infill sidewalk gaps	$39,000
P7	Industrial Way	362nd Dr. to US 26	Infill sidewalk gaps	$1,790,000
P8	Jacoby Rd.	Dubarko Rd. to Cascadia Village Dr.	Infill sidewalk gaps	$40,000
P9	Jewelberry Ave.	Penny Ave. to Kelso Rd.	Infill sidewalk gaps	$194,000
P13	Ruben Ln.	US 26 to Dubarko Rd.	Infill sidewalk gaps	$51,000
P16	New Accessway / Trail***	Infill of Tickle Creek Trail south of Dubarko Rd and Ruben Ln	Accessway / Trail	$75,000

Table 14 (continued): Pedestrian System Projects – Preferred Plan

Project ID*	Project	Segment	Description	Project Costs (2009 Dollars)
P17	New Accessway / Trail***	Extension of Tickle Creek Trail to OR 211	Accessway / Trail	$100,000
P18	New Accessway / Trail***	P21/362nd Ave North to Orient Dr	Accessway / Trail	$540,000
P19	New Accessway / Trail***	North of Kate Schmitz Ave. to P21/362nd Ave North	Accessway / Trail	$980,000
P20	New Accessway / Trail***	Industrial Way to Eastern UGB	Accessway / Trail	$1,310,000
P21	New Accessway / Trail***	362nd Ave north to new trail P19	Accessway / Trail	$300,000
P22	New Accessway / Trail***	Extension of Tickle Creek Trail from OR 211 to Jacoby Rd	Accessway / Trail	$320,000
Highway Improvements (Lead Agency – Oregon Department of Transportation)				
		Long-Term Projects		
P23	OR 211	OR 211 Parkway Path	Construct Bike/Ped Accessway	$325,000
P24	OR 211	South UGB to US 26	Construct sidewalk	(see B11)**
P25	US 26	Royal Ln. to 362nd Dr.	Infill sidewalk gaps and add landscaping	$440,000
P26	US 26	362nd Dr. to West UGB	Infill sidewalk gaps and add landscaping	$990,000
P27	US 26	Ruben Ln. to University Ave.	Infill sidewalk gaps	$510,000
P28	US 26	Ten Eyck Rd. to eastern UGB	Infill sidewalk gaps	(see B12)**
Near-Term Projects Total Cost				**$1,823,000**
Long-Term Projects Total Cost				**$14,610,000**

Notes: * Projects illustrated in Figure 2.
**Cost is covered in the Bicycle System Project Costs.
***Park project with potential transportation benefit. Transportation funding will be determined during project development.

Table 15: Bicycle System Projects – Preferred Plan

Project ID*	Project	Segment	Description	Project Costs (2009 Dollars)
Local System Improvements (Lead Agency – City of Sandy)				
		Near-Term Projects		
B4	Dubarko Rd.**	362nd Dr. to Eldridge Dr.	Re-stripe/widen Rd.	$36,000
B5	Dubarko Rd.**	Sandy Heights St. to Melissa Ave.	Re-stripe/widen Rd.	$36,000
B6	Langensand Rd.**	US 26 to UGB	Re-stripe/widen Rd.	$61,200
B7	Meinig Ave.**	Scenic St. to US 26	Re-stripe/widen Rd.	$61,000
B9	Sandy Heights St.**	Bluff To End	Re-stripe/widen Rd.	$40,000
B10	Tupper Rd.**	Long Circle to OR 211	Re-stripe/widen Rd.	$59,000
		Long-Term Projects		
B1	362nd Dr.	Dubarko Rd. to UGB	Widen shoulder to 6'	$1,230,000
B2	Bluff Rd.**	US 26 to Miller Rd.	Re-stripe/widen Rd.	$40,000
B3	Bornstedt Rd.**	OR 211 to UGB	Re-stripe/widen Rd.	$32,000
B8	Meinig Ave.**	Barker Ct. to Dubarko Rd.	Re-stripe/widen Rd.	$17,000
Highway Improvements (Lead Agency – Oregon Department of Transportation)				
		Long-Term Projects		
B11	OR 211	UGB to US 26	Widen shoulder to 6'	$28,200,000***
B12	US 26	Ten Eyck Rd. to UGB	Widen shoulder to 6'	$3,260,000
Near-Term Projects Total Cost				**$293,200**
Long-Term Projects Total Cost				**$32,799,000**

Notes: * Projects illustrated in Figure 3.
**May require the elimination of on street parking (cost estimate for restripe only).
***Includes drainage, lighting, bicycle and pedestrian elements.

Table 16: Motor Vehicle System Projects – Preferred Plan

Project ID	Improvement(s) Description	Project Cost (2009 Dollars)	Improvement Type
Local System Improvements (Lead Agency – City of Sandy)			
	Near-Term Projects		
M2	**362nd Dr./Dubarko Road** • Construct a single-lane roundabout	$1,165,000	Intersection
M13	**Dubarko Road** • Connect to Champion Way	$6,105,000	Roadway
M16	**Kate Schmidt Avenue** • Extend. from US 26 to the proposed Bell Street extension	$7,345,000	Roadway
	Long-Term Projects		
M12	**Industrial Way** • Extend to Jarl Road/ US 26	$10,800,000	Roadway
M14*	**Bell Street** • Extend. to Orient Drive	$50,905,000	Roadway
M15*	**362nd Drive** • Extend to Kelso Road	$26,620,000	Roadway
M18*	**Olson Road** • Extend from 362nd Drive to Jewelberry Avenue	$12,890,000	Roadway
M17	**Industrial Way North** • Extend to Bell Street extension	$3,820,000	Roadway
M19	**Agnes Street** • Extend to Jewelberry Avenue	$4,870,000	Roadway
M20	**Dubarko Road** • Extend to US 26 opposite Vista Loop Drive (West)	$3,200,000	Roadway
M21	**Various Roads** • Gunderson Rd., 370th Avenue, Cascade Village Drive, Cascade Village Boulevard, New Collector	$20,000,000	Roadway
M22	**New Road** • New road extension from Dubarko Road to US 26 opposite Vista Loop Drive (East)	$16,390,000	Roadway
M1	**Industrial Way/362nd Drive** • Realign Industrial Way East to connect into the intersection of Industrial Way west • Construct a single lane roundabout	$3,390,000	Intersection

Table 16 (continued): Motor Vehicle System Projects – Preferred Plan

Project ID	Improvement(s) Description	Project Cost (2009 Dollars)	Improvement Type
Highway Improvements (Lead Agency – Oregon Department of Transportation)			
	Long-Term Projects		
M3	**US 26 at 362nd Drive** • Construct a second westbound left turn lane • Construct an acceptance lane for second westbound left turn lane to drop at southern access to Fred Meyer property • Construct a northbound through lane • Construct southbound through, right turn and left turn lanes	$5,350,000	Intersection
M4	**US 26 at Industrial Way** • Change southbound approach to dual left turn lanes and a shared through/right lane • Construct a northbound left turn lane	$780,000	Intersection
M5	**US 26 at Ruben Lane** • Change southbound approach to dual left turn lanes and a shared through/right lane • Change northbound approach to left turn lane, and shared through/right lane	$770,000	Intersection
M6	**Proctor Boulevard (US 26)/OR 211** • Construct a northbound left turn lane (restriping only)	$5,000	Intersection
M7	**Orient Drive to Ten Eyck Road)** • US 26 Adaptive Signal Timing	$400,000	Intersection
M8	**US 26 at Ten Eyck Road** • Construct a northbound left turn lane • Construct a southbound left turn lane	$1,220,000	Intersection
M9	**OR 211 at Dubarko Road** • Construct a northbound right turn lane • Construct a southbound left turn lane • Construct a northbound left turn lane • Construct a traffic signal	$10,150,000	Intersection
M10	**Bornstedt Road**** • Prohibit left turns out	$16,000	Intersection
M11	**Arletha Court/OR 211** • Realign approach from the south	$2,570,000	Intersection
Near-Term Projects Total Cost		**$14,615,000**	

Long-Term Projects Total Cost	**$174,146,000**

Notes: *Sections of these projects are outside the City's UGB.
**Project would be necessary only if mobility standard is not met. Potential alternative projects are available.

Understanding the magnitude of the difference between what projects are desired (Preferred Plan) and the capacity to fund them informs future decisions regarding the need for local tax and fee rate changes, alternate financing strategies, or approaches to allocating limited resources to where they are needed most. For example, the total cost of the near-term projects identified ($16.7 million) is approximately 65% greater than the amount of revenue that was projected to be available for transportation improvements ($10.2 million). This is an indication that reliance on the revenue streams identified in Table 13 will not be sufficient over the long-term. Therefore, the City will need to explore a range of complimentary funding strategies, such as those described below.

Potential New Funding Sources

Consideration of new funding sources to increase revenue for transportation projects is recommended to implement needed improvements in a timely manner to that supports the demands of growth and community livability. Any potential funding source is 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 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 it may be possible to provide and enhance funding for its transportation programs.

This section describes several potential transportation funding sources, including State and County contributions, City sources (i.e., residents, businesses, and/or developers), grants, and debt financing. Many of these sources have been used in the past by other agencies in Oregon, and in most cases, when used collectively, are sufficient to fund transportation improvements for a local community.

State and County Contributions

Within Sandy there are multiple roadways that are not under City jurisdiction but instead are the responsibility of either ODOT or Clackamas County. The City should seek contributions (i.e., funding partnerships) from ODOT and Clackamas for projects located on their respective roadways. City advocacy for direct appropriations from the state or federal legislatures could be another funding strategy.

ODOT Contributions

The Oregon Department of Transportation (ODOT) funds projects on state highways under three primary programs: modernization, preservation and maintenance, and grants (see Grant Programs below). Programmed projects are included in the four-year Statewide Transportation Improvement Program (STIP), which is updated every two years. ODOT maintenance districts (District 2C for Sandy) also have available funds that may be used for small-scale projects such as in-fill sidewalks or culvert repair on a state highway.

When considering proposed land use actions such as subdivisions or site development, the City should not assume that TSP projects on US 26 or OR 211 will be in place to support the proposed development unless the project is programmed in the current STIP. For proposed comprehensive plan amendments, which must consider the long-term adequacy of the transportation system for TPR 660-10-060 compliance, ODOT must be consulted to make a determination whether a highway project is "reasonably likely to be funded" based on funding projections at that time.

Clackamas County Contributions

Potentially, Clackamas County may contribute funds to projects located on County roadways. Clackamas County TSP 20-year Capital Improvement Plan (CIP) includes the following three projects that affect intersections identified in the Motor Vehicle Preferred Plan:

- **Project #217:** Remove or decrease horizontal and vertical curves on 362nd Drive between Colorado Road and Dubarko Road.
- **Project #218:** Remove or decrease horizontal and vertical curves on 362nd Drive and relocated intersection of 362nd Drive/Deming Road.
- **Project #220:** Reconstruct and widen Ten Eyck Road between Lusted Road and US 26.

The above listed projects are complementary to the projects identified in the City's TSP. For proposed land use actions, projects on County roads should not be considered available to serve development unless they are programmed in the County's Five-Year Transportation CIP. When considering comprehensive plan amendments, the City should consult with the County regarding the likelihood of County funding for projects contained in the TSP 20-year CIP list. City should also participate in the next update of the County TSP.

Direct Appropriations

The City may also seek direct appropriations from the State Legislature and/or the United States 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. In particular, projects that support economic development may gain support for direct appropriations.

City Sources

The City can also look to local residents, business owners, and developers to raise additional funds that can be designated for transportation-related uses. Some optional sources include developer exactions, Urban Renewal District (URD) fund increases, transportation systems development charge (SDC) increases, local improvement district (LID) funds, General Fund revenue transfers, special assessments, and employment taxes.

Developer Exactions

Exactions are roadway and/or intersection improvements that are partially or fully funded by developers as conditions of development approval. Typically, all developers are required to improve the roadways along their frontage upon site redevelopment. In addition, when a site develops or redevelops, the developer may be required to provide off-site improvements depending upon the expected level of

traffic generation and the resulting impacts to the transportation system. City may utilize the Zone of Benefit process to address proportionate contribution by development.

Urban Renewal District (URD)

A URD is a tax-funded district within the City. The URD is funded with the incremental increases in property taxes that result from the construction of applicable improvements. As desired, the funds raised by a URD can be used for, but are not limited to, transportation projects. These projects must be located within the URD boundaries.

In 1998, the City created a URD for its downtown core, which has been a funding source for several successful projects including utility undergrounding, streetscapes, and the construction of a civic plaza.

Transportation System Development Charges (SDCs)

SDCs are a funding source collected from new development that can be used to fund projects that increase the transportation system's capacity (not for projects that target maintenance or operations). While the methodologies for determining the SDC rate vary, a commonly used method is to base the rate on the estimated p.m. peak hour vehicle trips generated by a proposed development. A single-family home generates approximately one p.m. peak hour vehicle trip, so it is often considered the base unit.

The City of Sandy has a current SDC rate of approximately $1,943 per single-family residence and $203 per daily trip for all other uses, which is lower than most Metro area cities, but comparable to many similarly-sized cities outside of the Metro area. For every increase in SDC rates of $100 for single-family households and $10 per daily trip for all other trip types, there would be an additional $362,000 available for transportation improvements over a 20-year period.

Local Improvement District (LID)

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 and may only be spent on capital projects within the geographic area. Because LIDs may not fund ongoing maintenance costs, they require separate accounting. Furthermore, because citizens representing 33% of the assessment can terminate a LID and overturn the planned projects, LID projects and budgets must obtain broad approval of those within the LID boundaries.

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.

Special Assessments

A variety of special assessments are available in Oregon to defray costs of sidewalks, curbs, gutters, street lighting, parking, and central business district (CBD) or commercial zone transportation improvements. These assessments would likely fall within the Measure 50 limitations. One example is the 50/50 program. This is a match program for sidewalk infill projects where property owners pay half the cost of a sidewalk improvement and the City matches the investment to complete the project.

Employment Taxes

Employment taxes may be levied to raise additional funds. For example, in the Portland region, payroll and self-employment taxes are used to generate approximately $145 million annually for TriMet operations. It should be noted that Sandy currently collects a 0.6% payroll tax to fund SAM transit operations

Grants

The City of Sandy should actively pursue State and Federal grants, in particular to complete desired pedestrian and bicycle projects. Current grant opportunities include funding for pedestrian, bicycle, Intelligent Transportation System (ITS), and Safe Routes to School (SRTS) and Scenic Byway improvements. Current grant programs include:

Federal Funding Sources

- Highway Safety Improvement Program
- Transportation Enhancements
- Recreational Trails Program
- Safe Routes to School (SRTS)
- New Freedom Initiative
- Community Development Block Grants
- Land and Water Conservation Fund
- National Scenic Byways Program
- Transportation, Community and System Preservation Program

State of Oregon Funding Sources

- Immediate Opportunity Fund
- Transportation Infrastructure Bank
- Special Transportation Fund
- Bicycle and Pedestrian Program Grants
- Pedestrian Safety Mini-Grant Program
- Business Energy Tax Credits (BETC)
- Safe Routes to School (OSRTS)

Other Funding Sources

- American Greenways Program
- Bikes Belong Grant Program

Debt Financing

While not a direct funding source, debt financing is another funding method. Through debt financing, available funds can be leveraged and project costs can be spread over the projects' useful lives. Though interest costs are incurred, the use of debt financing can serve not only as a practical means of funding major improvements, but it is also viewed as an equitable funding source for larger projects because it spreads the burden of repayment over existing and future customers who will benefit from the projects. One caution in relying on debt service is that a funding source must still be identified to fulfill annual repayment obligations. Two methods of debt financing are voter-approved general obligation bonds and revenue bonds.

Voter-Approved General Obligation Bonds

Subject to voter approval, the City can issue General Obligation (GO) bonds to debt finance capital improvement projects. GO 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 throughout the City (i.e., a property tax increase). Depending on the critical nature of projects identified in the Transportation Plan and the willingness of the electorate to accept increased taxation for transportation improvements, voter-approved GO 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. 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.

Implementation

As part of the process to update the City of Sandy TSP, the City's Development Code (Title 17 of the City of Sandy Municipal Code) was audited to provide recommended regulatory language that will implement the TSP, as well as ensure consistency with the Transportation Planning Rule (OAR 660-12). Through this audit, several recommendations were made that would amend the City's Development Code. The complete code analysis and recommended amendments have been included in the appendix (Implementation Element Memorandum) for reference. The recommended code amendments can be adopted through a separate public hearing process or concurrently with the TSP.

Appendix

Sandy Transportation System Plan



Prepared for

CITY OF SANDY OREGON 1911



Appendix Contents

- **Technical Memorandum #1: Plans, Goals, & Policies Review**
- **Technical Memorandum #2: Existing Conditions and Future Needs**
- **Technical Memorandum #3: Transportation Alternatives and Improvement Strategies**
- **Implementation Element Memorandum – Recommended Sandy Municipal Code Amendments**
- **Public Involvement Documentation**
- **Alternate Mobility Standards Report**

Technical Memorandum #1: Plans, Goals, & Policies Review

Technical Memorandum #1

DATE: May 26, 2009

TO: Liz French – City of Sandy
Sonya Kazan – ODOT

FROM: John Bosket, PE – DKS Associates
Michael Tomasini, EIT – DKS Associates

SUBJECT: **City of Sandy TSP Update: Plans, Goals & Policies Review** P06097-017-002

This memorandum includes a review of planning documents, policies, and regulations applicable to the 2008 Sandy Transportation System Plan (TSP) update. The city's current TSP will serve as the foundation for the update process, upon which new information obtained from system analysis and stakeholder input will be applied to address changing transportation needs through the year 2029. As new strategies for addressing transportation needs are proposed, compliance and coordination with the plans, policies, and regulations described herein will be required.

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City of Sandy Transportation System Plan (December 1995)

Adopted, 1997

The City's Transportation System Plan (TSP), formally adopted by Ordinance No. 12-97 in 1997, provides a plan for the development of the City's transportation infrastructure, addressing improvements to existing roadways, new pedestrian and bicycle facilities, improvements in public transit service, and transportation demand management strategies required to address the City's transportation needs for a 20-year planning period. To guide the city in addressing their needs through this planning horizon, a set of goals were developed and adopted as part of the TSP. These goals will be reviewed and updated as part of the TSP update and will serve as the framework for the plan.

Mobility/Circulation/Safety Goals

- Develop a transportation system to facilitate all travel modes
- Ensure sufficient capacity to accommodate future travel demand (vehicular, bicycle, pedestrian, etc.) to, within, and through the city of Sandy
- Improve vehicular/pedestrian interface along U.S. 26 in downtown area
- Indentify the potential for improving the local circulation system, in an effort to reduce reliance on U.S. 26 and Highway 211 for local traffic
- Improve the safety of interactive multi-modal facilities
- Provide mobility to the transportation disadvantaged
- Ensure adequate truck route network to reduce commercial/neighborhood conflicts
- Resolve U.S. 26 street design and sidewalk requirements along downtown couplet

Capital Improvement Goal

- Maximize the useful life of existing facilities
- Maximize the cost effectiveness of transportation improvements

Community Goals

- Protect the scenic resources of the city
- Insure that U.S. 26 supports the pending Downtown Design Plan
- Preserve the historic character of "Old Sandy"
- Identify gateway and beautification treatments on U.S. 26 and Highway 211
- Maintain the beauty of the area by preserving critical View Sheds
- Improve pedestrian and bicycle access and safety within the Sandy urban core
- Enhance the vitality of the Sandy downtown area
- Access the viability of the Town Plan to meet the needs of the community

Economics Development Goal

- Balance local access to U.S. 26 and Highway 211, while encouraging business activities, with the need to serve regional and statewide traffic

- Develop a transportation system which supports balanced growth of population and employment and the internalization of trips

The goals outlined above were important in identifying and prioritizing city transportation projects. Projects identified in the TSP were grouped into near-term needs (0-10 years) and long-term needs (11-20 years). Since the City has limited funding to complete projects, the higher priority near-term needs, as well as their long-term needs are both currently included in their capital improvement program (CIP). These prioritized projects are then constructed as money becomes available, with the near-term projects taking priority for funding over the long-term projects. Planned transportation projects included in the City's current CIP are broken into three categories; capacity/connectivity, upgrades, and traffic signals. These projects will be reevaluated in the future alternatives part of the TSP update to test their relevance.

Capacity or Connectivity projects (in 1994 dollars)

- 362nd Ave. from US 26 to Kelso (Cost $1,353,000)
- Dubarko Rd., 362nd to US 26/Vista Loop (Cost $4,660,000)
- Bell St., Bluff to 362nd (Cost $1,900,000)
- Bluff Rd., US 26 to Hwy 211 (Cost $887,000)
- Olson/Agnes St., Bluff to 362nd (Cost $390,400)
- Un-named, Bell to Kelso (N-S collector) (Cost $1,500,000)
- Ruben/Kate Schmitz, Dubarko to Bell (Cost $690,000)
- Van Fleet, Gary to Dubarko (Cost $200,000)
- Industrial Way, Ruben to Jarl (Cost $1,840,000)
- McCormick Dr. to Dubarko (Cost $535,000)
- Gary St, Langensand to McCormick (Cost $295,000)
- Sunset, extend to Ruben/Dubarko (Cost $505,000)

Upgrades (in 1994 dollars)

- Highway 211(Cost $2,544,000)
- 362nd, Dubarko to US 26 (Cost $385,000)
- Bluff, north of US 26 (Cost $1,110,000)
- Vista Loop / Hwy 26 Realignment (Cost $300,000)
- Bornstedt Rd. Vertical Realignment (Cost $140,000)
- Hwy 211 / Village Blvd. Intersection (Cost $50,000)
- Hwy 211 / Bornstedt Rd. Intersection (Cost $80,000)
- Hwy 211 / Dubarko Dr. Intersection (Cost $180,000)

Traffic Signals (in 1994 dollars)

- US 26/Orient/Jarl (Cost $120,000)
- Upgrade US 26 & 362, Ruben (Cost $120,000)
- Downtown Signals, Strauss & Scales (Cost $480,000)
- Time Signals (Cost $100,000)
- Hwy 211 at Bluff, Dubarko (Cost $250,531)
- Vista Loop/Dubarko & Hwy 26 (Cost $200,000)

- Hwy 211 / Dubarko Dr. (Cost $200,000)

In addition, while unfunded, the City's TSP identifies the following transportation improvement projects within the city limits:

- Pedestrian facilities along US 26, Industrial Way, 362nd Drive, Ruben Lane, University Avenue, Bluff Road, Wolf Drive, Ten Eyck Road, Langensand Road, 370th Ave/Sandy Heights Road, Meinig Avenue, Proctor Boulevard, Pioneer Boulevard, Scales Avenue, Bruns Avenue, Strauss Avenue, Alt Avenue, Hoffman Avenue, and Dubarko Road
- On-street bicycle facilities along US 26, Orient Drive, Industrial Way, 362nd Drive, Ruben Lane, Bluff Road, Wolf Drive, Ten Eyck Road, Langensand Road, Vista Loop Drive, Pleasant Street, Strawbridge Parkway, and Dubarko Road.
- Off-street bicycle and pedestrian facilities including the High School Trail, 395th Avenue Trail, Vista Trail, and the Ten Eyck Trail.

The functional classification and consequential design of a roadway play important roles in how traffic can move through the city. The TSP also identifies minimum roadway design characteristics based on functional classification. The city's functional classifications are described in Table 1-1 as shown on Figure 20 in the City's current TSP (1995).

Table 1-1: City of Sandy Roadway Functional Classifications

Classification	Description
Major Arterial	Three to five lane highway, paved width of 54 feet to 80 feet that operates as a two-way or as a one-way couplet. U.S. 26 would be considered as a fully developed major arterial.
Minor Arterial	High-volume, intra-city street providing connectivity and parallel features, with limited access control and a paved width of 38 feet to 50 feet, minimum of three lane cross section. The most critical classification for circulation in the urban areas.
Residential Minor Arterial	A hybrid between minor arterial and collector street which allows moderate to high traffic volumes on streets where over 90 percent of the fronting lots are residential. Intended to provide some relief to the strained arterial system while ensuring a safe residential environment. Paved width of 38 feet to 50 feet, minimum three lane cross section, may include on-street parking.
Industrial Collector	Minimum of 48 feet paved width with one travel lane and one parking lane in each direction, carries truck traffic in industrial areas.
Collector	Connector of local street to minor and major arterials, side street of Central Business District, minimum paved width of 36 feet, provides on street parking.

City of Sandy Comprehensive Plan

Amended February, 2005

The Comprehensive Plan is a set of maps, policies, and implementing measures affecting land use within the city limits, and ultimately within the urban growth boundary. It acts as a guide to define the direction, quality and quantity of future development, and to evaluate decisions that will have an impact on the future of the community. Plan goals and policies are implemented through subsequent measures, such as zoning and development ordinances, that provide decision-making criteria and standards by which proposals can be evaluated.

The Comprehensive Plan addresses the 14 relevant statewide planning goals. Transportation policies are outlined in Goal 12 of the Plan and provide the policy direction in developing the Transportation System Plan and transportation related Development Code regulations. The overall Transportation Goal is to "establish policies to provide and encourage a safe, convenient, and economic transportation system.

The policies in Goal 12 are focused on six specific topic areas, Neighborhood Street System, Pedestrian Friendly Street and Streetscape Design, Bicycle Facilities, Transit, Major Roadway Circulation, and Parking. The policies for each of these topic areas are important to the TSP update and include:

Neighborhood Street System

1. Support a pattern of connected streets, sidewalks, and bicycle routes to: a) provide safe and convenient options for cars, bikes, and pedestrians; b) create a logical, recognizable pattern of circulation; and, c) spread traffic over local streets so that collector and arterial streets are not overburdened.
2. Work with fire district, police, and other emergency service providers to ensure that adequate emergency access is possible on all streets.
3. Require connected streets that form pedestrian-scaled blocks, except where it is shown that topography, existing land ownership patterns, or other conditions preclude the creation of blocks.
4. Discourage the use of cul-de-sacs and dead-end streets, except where it is shown that topography or other existing conditions make them necessary. If cul-de-sacs or dead-end streets are found necessary, the City shall consider requiring pathways that connect these streets to adjacent through streets.
5. Encourage the use of parks and open space corridors as pedestrian and other non-auto oriented linkages within the urban area. Where possible, connect these pathways to a regional system of trails linking public and private open space, parks, and recreational resources within and between jurisdictions.
6. Encourage the development of neighborhood parks or other public or private open spaces connecting short cul-de-sac streets or other local streets in order to provide neighborhood focal points.
7. Encourage joint use of major power line or utility corridors as pedestrian/bicycle linkages where feasible.

Pedestrian Friendly Street and Streetscape Design

8. Encourage the planting of street trees in tree-deficient area of the city.

9. Require buildings, awnings, landscaping, and modifications to the street width and sidewalks in commercial areas to create a sheltered, interesting, and safe environment that works for pedestrians as well as for automobiles.
10. Encourage the development of sidewalks on both sides of all streets, especially in high pedestrian activity areas such as near schools and in the downtown area.
11. Develop street, bicycle, and pedestrian facilities that encourage pedestrian-friendly streetscapes.

Bicycle Facilities

12. Establish a system of designated bicycle routes and pathways that link neighborhoods, schools, parks, employment centers, and other points of interest.
13. Establish a logical and coherent transportation network within the city, and provide connections to larger, regional facilities. Bicycle facilities should be constructed in accordance with the design standards of the Oregon Bicycle and Pedestrian Plan or other approved plan.
14. Make provisions for bicycle facilities in accordance with the bicycle network map. Recognize that this map represents a conceptual plan. Actual bicycle routes will be determined when the proposed street network is more fully developed.
15. Identify and develop local or collector streets which can provide good parallel bicycle facilities with less vehicular traffic within a short distance of an arterial as the preferred bicycle route.
16. Encourage the provision of bicycle racks for existing commercial, industrial, civic, and school facilities.

Transit

17. Promote local transit service for Sandy.
18. Promote the creation of transit stops in neighborhood centers and other areas of the city. The City shall consider the possibility of locating park-and-ride lots immediately adjacent to, or within, the downtown and other neighborhood centers.
19. Identify bus pull-outs and spaces for bus stops and shelters. Some type of bus shelter or other protection from weather should be included at all bus stops in the downtown area. Such protection may consist of awnings or other overhangs from adjacent buildings, provided the sheltered area is adequate to meet the needs of waiting transit riders as well as pedestrians.

Major Roadway Circulation

20. Work with property owners and developers to limit the number of accesses onto major roadways. Encourage the use of shared driveways, offstreet connections between properties, and access from lower order streets.
21. Work with ODOT to determine locations for necessary traffic control signals. Proposed locations for future traffic signals have been determined for the downtown area in the City of Sandy Transportation System Plan. Other locations need to be determined in order to improve the safety and convenience of pedestrians, bicycles, and automobiles. The location of traffic signals should be consistent with the street network indicated in the Comprehensive Plan Map and current traffic engineering standards.

22. Submit notice of development proposals impacting Highways 26 and 211 to ODOT for review and comment.

Parking

23. Wherever feasible, encourage the provision of on-street parking on both sides of streets. Cooperation with ODOT will be necessary along Highway 26 and Highway 211.
24. Reduce parking requirements for development proposals where existing on-street parking and excess parking from adjacent development is available to meet parking requirements. Consideration should also be given to allowing payment of fees in lieu of required on-site parking. The fees shall be dedicated to the development of public parking lots.
25. Public parking lots may be developed for commercial and other areas in order to help relieve obligations for off-street parking and to encourage commercial development with higher floor-to-area ratios.
26. Encourage shared parking arrangements when parking demands for the sharing uses can be satisfied.
27. Require convenient and safe bicycle parking as part of the parking requirement for all new development, except single-family houses.
28. Require that each downtown development project be connected to adjacent developments by a direct and continuous sidewalk.

City of Sandy Development Code

Amended October, 2008

The City of Sandy Development Code was created to implement Comprehensive Plan policies and is intended to ensure that development is of the proper type, design, and location and served by a proper range of public facilities and services. The code describes responsibilities of the City Council, Planning Commission, and the Director of Planning and Development, provides administrative procedures for public hearings, land use actions, describes uses allowed within zoning districts, and contains land division regulations and development provisions.

TSP related items covered in the code include sidewalk, parking, driveway, and access requirements, as well as building setback specifications for properties abutting arterials and collector streets. Specific sections of the development code that are of importance to the TSP update include:

15.20.010 New construction

Requires the construction of curbs, sidewalks, and half-street improvements, unless such facilities are already present for the issuance of a building permit.

15.20.020 Remodeling, alterations and additions-One and two family dwellings

Clarifies when the construction of curbs, sidewalks, and half-street improvements are required for the issuance of a building permit when a one or two family dwelling structure is remodeled.

15.20.030 Remodeling, alterations and additions-Multi-family, commercial and industrial development

Clarifies when requires the construction of curbs, sidewalks, and half-street improvements are required for the issuance of a building permit when a multi-family, commercial or industrial building or structure is remodeled.

15.28.040 System development charge established

Establishes the system development charge, defines whom it is imposed upon, and further defines which development types are eligible for this charge.

15.28.060 Authorized expenditures.

Establishes a system for the reimbursement of system development charges, given specific criteria are met by the developer.

15.28.070 Expenditure restrictions

Limits the use of system development charges for administrative uses and restricts the use of these funds for routine maintenance.

15.28.080 Improvement plan

Specifies that only projects on the capital improvement plan may be funded and constructed with system development charges.

17.80.10 APPLICABLITY

Specifies the streets for which building setbacks are required along minor arterials, collector streets, and residential minor arterials. These streets include:

- Minor Arterials.
  - SE 362nd Avenue (Duncan Road)
  - Bluff Road
  - Kelso Road
  - Ten Eyck Road
  - Langensand Road
  - Bornstedt Road
  - Bell Street
- Collector Streets.
  - Industrial Way
  - Sandy Heights (Wewer Road) Street
  - Tupper Road
  - Meinig Road (south of Proctor)
  - Meinig Road (First Avenue)
  - McCormick
  - Van Fleet Street
  - Gary Street
  - Pleasant Street
  - Sunset Street

- Residential Minor Arterial
  - Dubarko Road

Chapter 17.82 - Special Setbacks on Transit Streets

Refines building setback, parking, access, egress, and circulation requirements for buildings abutting existing and proposed transit streets.

17.82.40 ACCESS, EGRESS AND CIRCULATION

Specifies the requirements for the planning and construction of access walkways within the new development and between the new development and existing developments.

17.84.30 Pedestrian and Bicyclist Requirements (Ord. 2002-13)

Describes minimum requirements for pedestrian and bicycle facilities in the city including:

- Minimum sidewalk widths: 6 feet arterial and collector streets, 5 feet on local streets
- Sidewalks along arterial and collector streets shall be separated from curbs with a planting area, except as necessary to continue an existing curb-tight sidewalk.
- Off street paths shall have a minimum right of way of 15 feet with 8 feet of pavement
- Shared use pedestrian and bicycle paths shall have a minimum right of way of 15 feet with 12 feet of pavement

17.84.50 Street Requirements

Describes requirements and guidelines for the construction of streets within the city. Important aspects for the TSP update include:

- Arterial streets should generally be spaced in one-mile intervals.
- Traffic signals should generally not be spaced closer than 1500 ft. for reasonable traffic progression.
- Local streets should typically intersect in "T" configurations rather than 4-way intersections to minimize conflicts and discourage through traffic. Adjacent "T" intersections shall maintain a minimum of 150 ft. between the nearest edges of the 2 rights of way
- Cul-de-sacs should generally not exceed 400 ft. in length. Cul-de-sacs longer than 400 feet or developments with only one access point may be required to provide an alternative access for emergency vehicle use only.
- Where a development site abuts an existing public street not improved to City standards, the abutting street shall be improved to City standards along the full frontage of the property concurrent with development.
- The design of new streets must comply with several requirements outlined in this section, including:
  - Provide for continuation of the existing street network.
  - Grades shall not exceed 6 percent on arterial streets, 10 percent on collector streets, and 15 percent on local streets.
  - Avoid "T" intersections on arterial and collector streets, and where unavoidable, a minimum spacing of 150 feet between right of way lines is required.

- Centerline radii of curves shall not be less than 500 ft. on arterial streets, 300 ft. on collector streets, and 100 ft. on local streets.
- Streets shall be designed to intersect at angles as near as practicable to right angles.
- Right-of-way and improvement widths shall be as specified by the Transportation System Plan.

17.100.90 ACCESS CONTROL GUIDELINES AND COORDINATION

Requires the city to coordinate with ODOT regarding the granting of new or modified accesses on to Highways 26 and 211, with the goal of reducing the noncompliance with the Oregon Highway Plan Access Management Policy guidelines.

17.100.100 STREETS GENERALLY (Ord. 2002-13)

Requires that new developments connect to, or have a frontage to the existing street system. Furthermore, it outlines six principles to allow for the development of the city street network.

Street Connectivity Principle
The pattern of streets established through land divisions should be connected to: (a) provide safe and convenient options for cars, bikes and pedestrians; (b) create a logical, recognizable pattern of circulation; and (c) spread traffic over many streets so that key streets (particularly U.S. 26) are not overburdened.

Transportation impact studies
Transportation impact studies may be required by the city engineer to assist the city to evaluate the impact of development proposals, determine reasonable and prudent transportation facility improvements and justify modifications to the design standards. Such studies will be prepared in accordance with the following:

1. A proposal established with the scope of the transportation impact study shall be coordinated with, and agreed to, by the city engineer. The study requirements shall reflect the magnitude of the project in accordance with accepted transportation planning and engineering practices. A professional civil or traffic engineer registered in the State of Oregon shall prepare such studies.
2. If the study identifies level-of-service conditions less than the minimum standards established in the Sandy Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered as part of the land use decision for the proposal.

Topography and Arrangement
All streets shall be properly related to special traffic generators such as industries, business districts, schools, and shopping centers and to the pattern of existing and proposed land uses.

Street Spacing
Street layout shall generally use a rectangular grid pattern with modifications as appropriate to adapt to topography or natural conditions.

Future Street Plan

Future street plans are conceptual plans, street extensions and connections on acreage adjacent to land divisions. They assure access for future development and promote a logical, connected pattern of streets. It is in the interest of the city to promote a logical, connected pattern of streets. All applications for land divisions shall provide a future street plan that shows the pattern of existing and proposed future streets within the boundaries of the proposed land divisions, proposed connections to abutting properties, and extension of streets to adjacent parcels within a 400 foot radius of the study area where development may practically occur.

Connections
Except as permitted under Exemptions, all streets, alleys and pedestrian walkways shall connect to other streets within the development and to existing and planned streets outside the development and to undeveloped properties which have no future street plan. Streets shall terminate at other streets or at parks, schools or other public land within a neighborhood.

1. Where practicable, local roads shall align and connect with other roads when crossing collectors and arterials.
2. Proposed streets or street extensions shall be located to provide direct access to existing or planned transit stops, and existing or planned neighborhood activity centers, such as schools, shopping areas and parks.
3. Exemptions.
   a. A future street plan is not required for partitions of residentially zoned land when none of the parcels may be redivided under existing minimum density standards.
   b. Standards for street connections do not apply to freeways and other highways with full access control.
   c. When street connection standards are inconsistent with an adopted street spacing standard for arterials or collectors, a right turn in/right turn out only design including median control may be approved. Where compliance with the standards would result in unacceptable sight distances, an accessway may be approved in place of a street connection.

17.100.110 STREET STANDARDS AND CLASSIFICATION (Ord. 2002-13)

This section of the code defines the functional definitions for each of the City's street functional classifications.

- Major arterials are designed to carry high volumes of through traffic, mixed with some unavoidable local traffic, through or around the city. Major arterials should generally be spaced at 1-mile intervals.
- Minor arterials are designed to collect and distribute traffic from major and minor arterials to neighborhood collectors and local streets, or directly to traffic designations. Minor arterials should generally be spaced at 1-mile intervals.
- Collector streets are designed to collect and distribute traffic from higher type arterial streets to neighborhood access streets or directly to traffic destinations. Collector streets should generally be spaced at 1/2-mile intervals.
- Local streets are designed to provide direct access to abutting property and connect to collector streets. A general spacing of 8-10 local streets per mile is recommended.
- Cul-de-sacs and dead end streets are discouraged. If deemed necessary, cul-de-sacs shall be as short as possible and shall not exceed 400 feet in length.

17.100.120 BLOCKS AND ACCESSWAYS

This section of code specifies that blocks for residential areas should generally not exceed 400 feet in length and blocks for commercial areas shall not exceed 400 feet in length. A minimum of a 10 foot wide pedestrian and bicycle access way shall be provided in the middle of a block when its length exceeds 600 feet in a commercial or residential area.

17.100.170 INTERSECTIONS

This section of code specifies the requirements for the construction of city intersections and the curve radii of local streets.

Intersections
Streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two new streets at an angle of less than 75 degrees shall not be acceptable. No more than two streets shall intersect at any one point unless specifically approved by the City Engineer. The city engineer may require left turn lanes, signals, special crosswalks, curb extensions and other intersection design elements justified by a traffic study or necessary to comply with the Development Code.

Curve Radius
All local and neighborhood collector streets shall have a minimum curve radius (at intersections of rights-of-way) of 20 feet, unless otherwise approved by the City Engineer. When a local or neighborhood collector enters on to a collector or arterial street, the curve radius shall be a minimum of 30 feet, unless otherwise approved by the City Engineer.

17.100.260 SIDEWALKS

This section of code requires that sidewalks are installed on both sides of a public street and in any special pedestrian way within a subdivision.

17.100.270 BICYCLE ROUTES

This section of code enables to the Director or the Planning Commission to require the installation of bicycle lanes within streets.

17.100.280 STREET TREES

This section of code specifies that where planting strips are provided in the public right-of-way, a master street tree plan shall be submitted and approved by the Director. The street tree plan shall provide street trees approximately every 30' on center for all lots.

Sandy Urban Renewal Plan

Amended August, 2008

The original plan adopted in 1998 establishes policy guidance and provides project descriptions for projects to be carried out within the City's Urban Renewal District. The district includes the majority of properties with a commercial zoning designation in the downtown and gateway areas.

The plan has two goals that are specifically directed at the City's TSP and will be included in the TSP update:

- Provide direct, convenient, and safe bicycle and pedestrian travel within and between residential areas and activity centers.
- Use street design ("traffic calming") to encourage drivers to comply with the posted 25-mph speed limit in downtown Sandy.

The plan also includes proposed spending targets for the construction of various types of public projects. Specific projects are not outlined; instead, broad project categories are described. Public Improvement areas specific to the TSP update include:

- Traffic signalization
- Public parking facilities
- Public open spaces
- Street, curb, and sidewalk improvements
- Fire protection improvements
- Streetscape projects
- Street lighting
- Undergrounding utilities
- Pedestrian and bicycle connectivity

Some of the work under the *1998 Urban Renewal Plan* has already been completed or is currently in the process of being completed. Some projects completed with the urban renewal funds in the Sandy downtown area along Proctor Boulevard include the undergrounding of the utilities, reconstruction of sidewalks, and construction of curb extensions at several downtown side street intersections. Additionally, the new parking lot adjacent to Burns Street was also constructed using funding from the *Urban Renewal Plan*. The 2008 amendment to the plan outlines projected urban renewal spending over a ten year horizon starting in 2009.

City of Sandy Urbanization Study

January 2009

The *City of Sandy Urbanization Study* was conducted to determine if an expansion of the City's Urban Growth Boundary (UGB) is justified. It is intended to provide technical analysis supporting an update of the Sandy Comprehensive Plan relative to Goals 9, 10, and 14. Components included in this update include:

- growth forecasts
- buildable lands inventory

- required land for housing, employment, and other needs

The Urbanization Study revealed that the city does not have a demonstrated need to expand its UGB. Some key findings from this report include:

- The City of Sandy has a surplus of 357 acres of residential land.
- The City has a need of 17 acres for semi-public uses, which can be met by using surplus lands under other designations.
- The City has a surplus of 120 acres of employment land

The study also cataloged the current number of households and employees within the city and forecast the growth in households and employment out to the year 2029. Key findings used to create the future travel demand forecast model for the TSP update include:

- 2008 household total within the Sandy UGB is 3,625.
- 2008 employment total within the Sandy UGB is 4,327.
- Future household growth (1,214) and future employment growth (1,709) between 2008 and 2029 was based on the City of Sandy Urbanization Study.

US 26 Sandy Gateway Plan

Final Draft, April, 2008

The US 26 Sandy Gateway Plan provides a vision and implementation plan for safety, operational, and aesthetic enhancements of the US 26 corridors between the west and east urban growth boundaries and the downtown couplet (the couplet was not included). Key elements of the plan include: a system inventory, a needs assessment, an access management vision, streetscape designs with typical cross-sections, recommendations for traffic control and geometric improvements, and implementation recommendations. This plan has not been adopted, but plan findings and recommendations will be considered for inclusion in the City's TSP.

While an early goal of the US 26 Sandy Gateway Plan process was to identify all needed improvements within the US 26 corridors through the planning horizon, it was acknowledged during the development of the plan that future congestion would be too great to mitigate through projects along US 26 alone and that supporting improvements would be required city-wide. Therefore, while a "footprint" for US 26 improvements is provided, the TSP will need to reevaluate and refine those recommendations as off-highway improvements are identified.

Also, the transit accommodations along US 26 identified in the plan should be reevaluated as part of the separate Sandy Transit Master Plan process.

Parks Master Plan

Adopted 1997

The City of Sandy's *Parks Master Plan* was developed to provide a framework for the City to develop its existing and future recreational facilities. The study looked at the existing recreational facilities and projected future population and came to the realization that the City's current recreational needs are being met, but that the City will need more facilities in the future. The plan recommended enhancements to several existing recreational facilities and the construction of multiple new facilities within the City.

The *Parks Master Plan* recommends several new recreational facilities, including:

- New Parks
  - South of US 26 and Orient Drive
  - North of Kelso Road and west of Bluff Road
  - Northwest of the intersection of Ruben Lane/Dubarko Road
  - East of 370th Avenue and south of Dubarko Road
  - Northwest of the intersection of OR 211/Bornstedt Road
  - Southeast of the intersection of Jacoby Road/Dubarko Road
  - Southeast of the intersection of Langensand Road/Dubarko Road
  - East of Vista Loop Drive
  - South of US 26 and Vista Loop Drive
  - East of the Middle School
  - West of Bluff Road and South of Goldenrain Street
- New Off Road Bike/Walk Trails
  - South of the city along the city limits
  - Northwest of the city between Orient Drive and University Avenue
  - North of the city connecting the downtown and eastern fringe of the city to the Sandy River

Other Local Documents

Traffic Impact Studies

The City of Sandy provided Traffic Impact Studies for approved developments within the city that have not yet been constructed and occupied. As these developments would produce additional trips on the transportation system that cannot be captured in data collected today, the anticipated generated trips from these developments will be incorporated into future traffic volume projections. This list of impact studies is provided below.

Pioneer Park Phase II (2/18/2004)
Engineer: Kittelson & Associates, Inc.
Location: Champion Way & Industrial Way
Site Access: Champion Way and Industrial Way

Champion Way Business Park (7/2/2004)
Engineer: Group MacKenzie
Location: Champion & Industrial Way
Site Access: Champion Way

Snowberry Subdivision (06/23/2005)
Engineer: Lancaster Engineering
Location: Green Mountain & Bluff Road
Site Access: Bluff Road

Sandy Bluff IV & V (4/1/2004)
Engineer: Lancaster Engineering
Location: Green Mountain & Bluff Road
Site Access: Goldenrain Street

Salmon Creek Estates (8/1/2004)
Engineer: Lancaster Engineering
Location: 362nd & Skogan Road
Site Access: 362nd

Creekside Village (12/27/2005)
Engineer: Lancaster Engineering
Location: Champion Way
Site Access: 362nd

Tickle Creek Terrace (01/26/2006)
Engineer: Lancaster Engineering
Location: Dubarko Road & OR 211
Site Access: OR 211

Sleepy Hollow Subdivision (03/08/2006)
Engineer: Kittelson & Associates, Inc.
Location: SE 370th Avenue & Dubarko Road
Site Access: SE 370th Avenue

Shelby Subdivision (07/11/2006)
Engineer: Kelly Engineering
Location: Arletha Court & OR 211
Site Access: Arletha Court

Dubarko Estates Subdivision (08/31/2006)
Engineer: Lancaster Engineering
Location: Dubarko Road & Evans Street
Site Access: Evans Street

Sandy Bluff Phase VI (06/17/2005)
Engineer: Lancaster Engineering
Location: Jewelberry Avenue
Site Access: Green Mountain Street

Jones Project Subdivision (03/13/2006)
Engineer: Kelly Engineering
Location: Cascadia Village Drive
Site Access: Direct

Parmele Estates Subdivision (07/2006)
Engineer: Main Street Engineering
Location: Sandy Heights Street
Site Access: Nettie Connett Drive

Trimble Subdivision (08/01/2006)
Engineer: Group MacKenzie
Location: Tupper Road & OR 211
Site Access: Tupper Road

County Planning Documents

Clackamas County Rural Transportation System Plan

Adopted June, 1999

Much like the City of Sandy Transportation System plan, the Clackamas County Rural Transportation System Plan identifies transportation facility needs in the rural areas of the county over a 20-year planning horizon. This includes needs for all modes of travel such as motor vehicles, bicycles, pedestrians, transit, rail, air, freight, marine, and pipelines. Higher priority projects are then selected for inclusion in the County Capital Improvement Plan, which secures funding for these projects. Projects in the immediate vicinity of the City of Sandy on Clackamas County's Rural TSP include:

- Kelso Road: (Richey Road to Orient Drive) – Reconstruct and widen
- Kelso Road: (Orient Drive to Sandy UGB) – Remove or decrease vertical curve along Orient Drive, relocate intersection, widen shoulders to County standard, investigate speed zone
- SE 362nd Drive: (Colorado Road to Dubarko Road) – Remove or decrease horizontal and vertical curves
- SE 362nd Drive: (362nd/Deming Road intersection) – Remove or decrease vertical curve along SE 362nd Drive, relocate intersection
- Bull Run Road: (Ten Eyck Road to Multnomah County Line) – Reconstruct and widen
- Ten Eyck Road: (Lusted Road to US 26) – Reconstruct and widen (rural)
- Ten Eyck Bridge: (6570) – Bridge Reconstruct and widen to 32 feet (Note: also in CIP)

US 26 east of Sandy has been designated as a Scenic Roadway, which includes additional development standards for the protection of recreation values and scenic features. In addition, SAM transit operates along the western corridor on US 26, which, as a result of SAM operating along this corridor, has been identified as a local transit district route. Policies to support this designation encourage constructing bus pullouts and pedestrian shelters, improving pedestrian access to transit, and enhancing corridor operations to increase transit speed, convenience, and comfort.

Also, US 26, 362nd Drive, Bluff Road, Orient Drive, and Ten Eyck Road have all been designated as bikeways. Therefore, any recommendations affecting these roadways should provide appropriate bicycle accommodations.

Capital Improvement Program

Revised January, 2006

The Capital Improvement Program (CIP) implements the goals and policies that have been adopted into the Clackamas County Transportation System Plan. The CIP is a 5-year plan which identifies and funds specific high-priority projects and is updated every two years. The current adopted 2006/-2010/11 CIP is an update from the 1998/1999 to 2003/2004 plan referenced in the Clackamas County TSP. There is one Sandy area project included in the current 5-year CIP.

- Sandy River (Ten Eyck Rd.) Bridge. Reconstruct/widen - 32 ft. (22 x 200) (Program Year 2006/07).

Urban Growth Management Agreement

March, 2001

The Urban Growth Management Agreement between the City of Sandy and Clackamas County is a legal document that outlines the responsibilities of the city and county for management and planning for the area within the City of Sandy's Urban Growth Boundary (UGB), but outside of the city limits. Specific areas of agreement include:

- Coordination of population and employment projections used for UGB amendments.
- Coordination of comprehensive plans and measures affecting the city's urban growth.
- Providing notice and opportunity to comment on land use decisions and other actions affecting the City's urban growth plans and policies.

The plan is divided up into 12 sections. Sections that have a direct bearing on the TSP update include:

IV Boundaries
The Urban Growth Boundary (UGB), Urban Growth Area (UGA), and Urban Reserve Area (URA) are defined here.

V Coordination and Planning
The city may annex and change the zoning of lands within the UGB and URA. It is also responsible for public facilities planning and shall prepare a TSP for the lands within the UGB and URA. The city must coordinate with the County, affected state agencies, special districts and affected private transportation service providers when adopting a TSP.

VI Zoning and Development Proposals in Unincorporated UGA and URA
The County has authority over land use permits within the UGA and URA, but will coordinate with the city before any land use decisions are made. The county shall not grant approval for building construction within future rights of way as identified in the City's adopted TSP.

VII Annexation
Upon annexation, the city shall assume jurisdiction of county roads and local access roads that are within or abutting the area annexed after all public improvements are constructed. Arterial and collector roads will be considered for transfer on a case-by-case basis.

Clackamas County, Oregon Zoning and Development Ordinance

Revised April, 2005

The Clackamas County's zoning and development ordinance has been enacted to implement the goals and policies of the County's Comprehensive Plan and to provide methods of administration and enforcement of provisions described in this document. The zoning of lands surrounding the City of Sandy within the UGB and URA include: Rural Residential Farm/Forest 5 acre, Timber District, Farm-Forest 10 acre, Exclusive Farm Use, and Ag/Forest District. The allowable land uses for each zoning type are described in detail in this document.

Mt. Hood Scenic Byway Corridor Management Plan

March, 2005

The Mt. Hood Scenic Byway Corridor Management Plan was developed in a cooperative effort between several cities and counties, transportation jurisdictions, destination management organizations, and Mt. Hood National Forest staff. The corridor plan depicts the Mt. Hood Scenic Byway, which starts in Troutdale and follows a scenic route through Sandy around Mt. Hood, and ends in Hood River. The corridor plan describes the vision for how the byway will look and function by the year 2015.

To facilitate the implementation of the vision, the corridor plan includes a Management Plan and Development Strategy with three main goals:

- To assist in the protection and enhancement of the natural, scenic, historic and recreational resources of the Mt. Hood Scenic Byways
- To encourage appropriate economic development opportunities in the communities and businesses along the Mt. Hood Scenic Byway
- To assist in maintaining the small town, rural lifestyle and the friendly authentic feel of the area

The Mt. Hood Scenic Byway Corridor Management Plan recognizes the importance of the City of Sandy's Urban Renewal Plan and Special Transportation Area Agreement status for US 26 corridor in the Sandy downtown in creating a "main street' pedestrian friendly type atmosphere. These designations and restrictions are incorporated into the scenic byways corridor management plan.

The corridor plan also includes a signing portion that states that ODOT will be responsible for funding the installation and maintenance of portal and trailblazer signs along state facilities. Signs along county or city roads would be the responsibility of the local jurisdiction.

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State Planning Documents and Regulations

2008 Transportation System Planning Guidelines

May, 2008

Transportation System Planning Guidelines (TSP Guidelines) is intended to assist local jurisdictions in the preparation and updating of transportation system plans. The guidelines help jurisdictions develop plans that meet local needs and comply with state policies and regulations. The guideline document is designed to provide assistance to local jurisdictions in the preparation and update of TSP.

Oregon Transportation Planning Rule (TPR) (OAR 660-012)

July, 2006

The State of Oregon has adopted 19 statewide planning goals that must be implemented in the comprehensive plan for each city (with a population of 2,500 or more) and county in the state. In addition to identifying how land, air and water resources of each specific jurisdiction will be utilized, a needs analysis must be completed for improving public facilities.

One of the 19 goals is the Transportation Planning Rule (Goal 12). Any update to the Sandy TSP must comply with the TPR. The overarching goals to be accomplished by the TPR are to:

- Reduce dependence on the automobile and the number of people driving alone; and
- Establish a stronger connection between land use and transportation planning.

Local TSPs are expected to examine possible land use solutions to transportation needs and identify multi-modal, system management and demand management strategies to address these needs. This entails the development of modal plans, including pedestrian, bicycle, motor vehicle and transit travel. These plans must strive to provide an integrated transportation network and include an inventory of current infrastructure, provide a gap analysis and identify how these gaps are going to be filled. The areas of analysis addressed in the TPR for a transportation system plan include:

- Estimation of future transportation needs,
- A public transit plan,
- Bicycle and pedestrian system capacity,
- Access management,

These strategies were incorporated into the adopted TSP and will be carried forward in the update.

The *Oregon Land Conservation and Development Commission* adopted amendments to sections of the TPR – OAR 660-12-0050 and -0055 – in 2005. The amendments clarify planning requirements for incorporating proposed agency level land use plan amendments into local TSPs. The TSP update should reflect this new rule requirement.

Oregon Access Management Rule (OAR 734-051)

Amended January, 2007

ODOT has adopted the identified administrative rules to establish procedures and criteria used to govern highway approaches, access control, spacing standards, medians and restriction of turning movements in compliance with statewide planning goals and in a manner compatible with acknowledged comprehensive plans and consistent with Oregon Revised Statutes, Oregon Administrative Rules, and the *1999 Oregon Highway Plan*. Any new street or driveway connections, as well as any changes to existing street or driveway connections to US 26 or OR 211 within the city must be found to be in compliance with these rules by ODOT.

OAR 734-051, referred to as "Division 51" was crafted for the purpose of implementing the policies in the OHP regarding access management, and therefore, is founded upon the same highway classification system, management objectives, and spacing standards as described in the OHP. In addition, Division 51 provides detailed procedures for approach permitting and decision-making regarding the approval or denial of approaches, including requirements for deviations and a defined appeal procedure.

These rules enable the State to implement policies and direct the location and spacing of intersections and driveways on state highways.

The access management standards applicable to the City of Sandy for US 26 and OR 211 and adopted by ODOT are summarized below in Table 1.1.

Table 1.1: ODOT Access Management Standards

	Access Spacing Standards (feet)				
	Posted Speed (MPH)				
Facility	≥55	50	45 & 40	35 & 30	≤25
Statewide Expressway	2640	2640	2640		
Statewide Highway	1320	1100	990	720	520
Statewide Highway(inside STA)				*	*
District Highway	700	550	500	350	350
District Highway(inside STA)				*	*

* Minimum access management spacing for public road approaches is the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum access management spacing for driveways is 175 feet (55 meters) or mid-block if the current city block is less than 350 feet (110 meters).

1995 Oregon Bicycle and Pedestrian Plan

Adopted June, 1995

The *Oregon Bicycle and Pedestrian Plan* is currently being updated and will likely be finished and adopted by the Oregon Transportation Commission sometime in 2008. The provision of safe and accessible bicycling and walking facilities in an effort to encourage increased levels of bicycling and walking is the goal of the *Oregon Bicycle and Pedestrian Plan*. The Plan provides actions that will assist local jurisdictions in understanding the principals and policies that ODOT follows in providing bike and walkways along state highways. In order to reach the plan's objectives, the strategies for system design are outlined, including:

- Providing bikeway and walkway systems that are integrated with other transportation systems;
- Providing a safe and accessible biking and walking environment; and
- Development of education programs that improve bicycle and pedestrian safety.

The document includes two sections, including the *Policy & Action Plan* and *Bikeway & Walkway Planning Design, Maintenance & Safety*. The first section contains background information, legal mandates and current conditions, goals, actions, and implementation strategies ODOT proposes to improve bicycle and pedestrian transportation. The second section assists ODOT, cities and counties in designing, constructing and maintaining pedestrian and bicycle facilities. Design standards are recommended and information on safety is provided.

The Sandy TSP update will address design standards for all bicycling and pedestrian facilities located in the City of Sandy in accordance with the Oregon Bicycle and Pedestrian Plan.

Oregon Transportation Plan

Adopted September, 2006

The *Oregon Transportation Plan* (OTP) guides the State's transportation facility and mode plans by setting the general direction for transportation development statewide for the next twenty years and providing overall direction for allocation of resources and coordination of modes of transportation. It provides policies to increase livability in the State of Oregon by emphasizing alternative forms of transportation to the single occupant vehicle. The plan seeks to develop public transit, rail lines, bicycling and pedestrian facilities, airports and pipelines, while also emphasizing the maintenance and improvement of highways, roads and bridges. Thus, the plan calls for a transportation system that has a modal balance, is both efficient and accessible, provides connectivity among rural and urban places and between modes, and is environmentally and financially stable.

1999 Oregon Highway Plan As Amended

Amended January, 2006

The *1999 Oregon Highway Plan* (OHP) defines policies and investment strategies for Oregon's state highway system for the next 20 years by further refining the goals and policies of the *Oregon Transportation Plan* (OTP). One of the key goals of the OHP is to maintain and improve safe and efficient movement of people and goods, while supporting statewide, regional, and local economic growth and community livability. The implementation of this goal occurs through a number of policies and actions that guide management and investment decisions by defining a classification system for state highways, setting standards for mobility, employing access management techniques, supporting intermodal connections, encouraging public and private partnerships, addressing the relationship between the highway and land development patterns, and recognizing the responsibility to maintain and enhance environmental and scenic resources.

OHP Policy 1A

Among the policies established through the OHP, Policy 1A calls for the implementation of a classification system for state highways to identify management objectives. This policy classifies US 26 as a Statewide Highway. According to the OHP, Statewide Highways are typically intended to provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreational areas that are not directly served by Interstate Highways. Providing connections for intra-urban and intra-regional trips is a secondary function. For such highways, the management objective is to provide safe and efficient, high-speed, continuous-flow operation. In constrained urban areas, interruptions to flow should be minimal.

Policy 1A further designates the segment of US 26 between Powell Valley Road in Gresham to 362nd Drive in Sandy as an expressway. The portion of US 26 classified as an expressway within the City of Sandy's Urban Reserve Area/Urban Growth Boundary is between Orient Drive and 362nd Drive. Expressways are intended to provide for safe and efficient high-speed and high-volume travel and are primarily focused on inter-urban and connections to ports and major recreational areas with minimal interruptions. A secondary function is to provide for long-distance intra-urban travel in metropolitan areas. Speeds are high in rural areas, ranging from moderate to high in urban areas. Usually, there are no pedestrian facilities and bikeways may be separated from the roadway.

Other characteristics of expressways include:

- Discouraging private access with the long-range plan to eliminate existing approaches as opportunities arise,
- Purchasing of access rights,
- Public road connections are highly controlled,
- Traffic signals are discouraged in rural areas,
- Non-traversable medians are encouraged, and
- Parking is prohibited.

In addition, OR 211 has been classified by Policy 1A as a District Highway. According to the OHP, District Highways are facilities of county-wide significance and function largely as county and city arterials or collectors. They provide connections and links between small urbanized areas, rural centers and urban hubs, and also serve local access and traffic. The management objective is to provide for safe and efficient, moderate to high-speed continuous-flow operation in rural areas reflecting the surrounding environment and moderate to low-speed operation in urban and urbanizing areas for traffic flow and for pedestrian and bicycle movements. Inside STAs, local access is a priority.

OHP Policy 1B – Land Use and Transportation

US 26 serves as the main street for the City of Sandy. Policy 1B strives to maintain a balance between serving the function of a main street and a state highway. Key elements from this policy include:

- Encourage the availability and use of transportation alternatives.
- State and local government must work collaboratively in planning and decision-making relating to transportation system management.

- The OHP also provides specific guidance for *Special Transportation Areas* (STA) in Policy 1B. US 26 in downtown Sandy from milepost 23.87 to 24.61 is designated as a *Special Transportation Area* (STA). The primary objective of a STA is to provide access to community activities, businesses and residences and to accommodate pedestrian movement along and across the highway in a downtown, business district and/or community center. In an STA, direct property access is discouraged and direct street connections and shared on-street parking are encouraged. Local auto, pedestrian, bicycle and transit movements are generally as important as the through movement of traffic. Traffic speeds are low, generally 25 miles per hour or less.

OHP Policy 2B – Off-System Improvements
It is a State of Oregon policy to provide financial assistance to local jurisdictions to develop, enhance, and maintain improvements on local transportation systems when these projects are deemed cost-effective in improving the state highway system. For instance, Dubarko Road was partially funded through an ODOT off-system improvement to improve mobility and relieve congestion along US 26. This policy includes a specific set of criterion to be met when considering financial support for off-system improvements, including:

- The off-system costs are less than or equal to on-system costs, and/or the benefits to the state system are equal to or greater than those achieved by investing in on-system improvements;
- Local jurisdictions adopt land use, access management and other policies and ordinances to assure the continued benefit of the off-system improvement to the state highway system;
- Local jurisdictions agree to provide advance notice to ODOT of any land use decisions that may impact the off-system improvement in such a way as to adversely impact the state highway system; and
- Local jurisdictions agree to a minimum maintenance level for the off-system improvement that will assure the continued benefit of the off-system improvement to the state highway system.

Furthermore, as one of the actions listed to implement this policy, ODOT is directed to work with local governments to identify and evaluate off-system improvements that would be cost-effective in improving performance of the state highway when preparing corridor plans, transportation system plans and project plans.

OHP Policy 1C- Freight Route

US 26 has been designated as a Freight Route through the entire city by ODOT. This places added emphasis on efficient operation to ensure the timely and dependable movement of goods. To support this function, special management objectives for freight routes were developed as outlined in Policy 1C of the OHP. Key objectives relating to this plan include:

- Application of higher highway mobility standards than other Statewide Highways;
- Examine options to treat designated freight routes as expressways where the routes are outside of urban growth boundaries and unincorporated communities and continue to

treat freight routes as expressways within urban growth boundaries where existing facilities are limited access or where corridor or transportation system plans indicate limited access; and
- Consider the importance of timeliness in freight movements in developing and implementing plans and projects.

OHP Policy 1F Highway Mobility Standards

ODOT has adopted standards for mobility for state facilities through the OHP and the *Highway Design Manual* As Amended (HDM). The OHP mobility standards are intended to be used for identifying needs, while the HDM standards represent the level of operation for which state facilities are to be designed. For this study, the OHP standards will be applied to existing and future no-build analysis, while the future build alternatives will be compared to the standards in the HDM.

Table 6 in Policy 1F of the OHP (Amended August 2005) displays the maximum allowable volume to capacity (v/c) ratios for the 30th highest annual hour of traffic in areas outside of the Portland Metropolitan Area. Sections from that table relevant to the City of Sandy are presented below in Table 1.2.

Table 1.2: Applicable 1999 Oregon Highway Plan Mobility Standards

Facility	Milepost	Highway Classification	National Highway System	Freight Route*	Truck Route*	STA	Posted Speed Limit	Mobility Standard
US 26	19.96 to 22.66	Statewide Expressway	Yes	Yes	Yes		55	0.70
	22.66 to 23.31	Statewide	Yes	Yes	Yes		45	0.70
	23.31 to 23.81	Statewide	Yes	Yes	Yes		40	0.75
Eastbound	23.81 to 24.66	Statewide	Yes	Yes	Yes	Yes	25	0.85
Westbound	23.87W to 24.63	Statewide	Yes	Yes	Yes	Yes	25	0.85
	24.66 to 25.33	Statewide	Yes	Yes	Yes		40	0.75
	25.33 to 38.71	Statewide	Yes	Yes	Yes		55	0.70
OR 211	5.94 to 5.88	District					25	0.90
	5.88 to 5.62	District					40	0.85
	5.62 to 4.63	District					45	0.80
	4.63 to 1.30	District					55	0.80

*Note Truck route refers to the national network of highways designated by the federal government for truck traffic, while Freight Route refers to Oregon's highway network for truck traffic.

At signalized intersections, these standards are to be applied to the intersection as a whole. At unsignalized intersections, these standards are applicable only to movements that are not required to stop. For other movements at unsignalized intersections that are required to stop or otherwise yield the right of way, the standards for District/Local Interest Roads shall be applied for areas within urban growth boundaries and a maximum volume to capacity ratio of 0.80 shall be applied for areas outside of urban growth boundaries.

OHP Policy 1G

Policy 1G in the OHP pertains to Major Improvements and states that ODOT places a priority on improving system efficiency and management before adding capacity where improvements are needed. According to this policy, the highest priority should be placed on protection of the existing system, followed by improvements in efficiency and capacity of existing facilities. Once these options have been investigated, the third and fourth priorities would be to add capacity to the existing system and then to add new facilities.

OHP Policy 1H- Bypass Policy

The Bypass Policy of the OHP deals with increasing congestion on state highways and the need to potentially separate regional travel and local access. According to the policy, bypasses are highways designed to maintain or increase statewide or regional mobility. Generally they relocate a highway alignment around a downtown, an urban or metropolitan area or an existing highway. The goal of bypass facilities is to effectively serve state and regional traffic trips.

The policy states that the desire for a bypass often evolves from growing congestion and safety problems on a state highway that is serving both as a regional highway and as a main street for a city. The highway is trying to serve both efficient freight and through travel and access to local business and residential areas. As traffic grows, the highway can serve neither purpose well, resulting in inefficient travel for through traffic and congested and unsafe accesses for local businesses and residences.

The need for a highway bypass of US 26 in Sandy will be reviewed as part of the TSP update. The process for this is outlined in Action 1H.1 as follows:

- ODOT and the affected local governments shall identify the need for a bypass in a transportation system plan and/or corridor plan in a manner consistent with Oregon Highway Plan Policy 1G.
- In establishing the purpose and need for the bypass facility to guide its planning, design and development, ODOT and the affected local governments shall analyze the following:
  - Percentages of local and through trips projected at least over a 20-year period on the bypass;
  - Percentages, volumes and impacts of freight truck traffic;
  - Average trips on the proposed bypass facility based on build-out of the comprehensive land use plan, and
  - Crash data history on the nearby or impacted facility.

The other provisions of *OHP Policy 1H* would need to be addressed in a refinement plan or NEPA process if a bypass is determined to be an appropriate solution and as the location and design of the bypass become more specific.

OHP Goal 3

The management of access to state highways is addressed by Goal 3 of the OHP, along with several supporting policies. Policy 3A sets the foundation for much of ODOT's access management practices by pairing the classification system defined in Policy 1A with detailed

access management objectives and associated access spacing standards. As a Statewide Highway in an urban environment, US 26 through the city maintains the following access management objectives.

- Provision of high to moderate speed operations with limited interruptions in traffic flow.
- Direct access to the abutting property is a minor objective.
- The function of the highway is consistent with the purchasing of access rights. As the opportunity arises, access rights should be purchased with a preference to purchase access rights in full.
- The primary function of these highways is to provide connections to larger urban areas, ports, and major recreational areas of the state not served by freeways or expressways.

Furthermore, the segment of US 26 between Orient Drive and 362nd Drive that has been designated as an expressway maintains unique access management objectives that put a higher priority on through travel. These objectives are described below.

- Provision of safe and efficient high-speed and high-volume travel.
- Private access is discouraged. There is a long-range plan to eliminate, as possible, existing approach roads as opportunities occur or alternate access becomes available. Access rights will be purchased and a local road network may be developed consistent with the function of the roadway.
- Public road connections are highly controlled and must be spaced appropriately. Future grade separations (interchanges) may be an option. Compatible land use actions may be necessary and shall be included in local comprehensive plans.
- Traffic signals are discouraged. Where signals are allowed, their impact on through traffic must be minimized by ensuring the efficient progression of traffic is achieved.
- Parking is prohibited.
- The primary function of expressways is to provide connections to larger urban areas, ports, and major recreational areas of the state with minimal interruptions.
- Median treatments are considered in accordance with criteria in Action 3B.3.

In addition, OR 211, classified as a district highway, is held to the following access management objectives.

- These highways provide for safe and efficient medium speed and medium- to high-volume traffic movements.
- Traffic movement demands and access needs are more evenly balanced, with reasonable access to abutting property.
- The function of the highway supports acquisition of access rights in limited circumstances, recognizing the balanced demands of traffic movement and access needs. Purchase of access rights should be considered where beneficial such as, but not limited to, ensuring safe and efficient operation between connecting highways in interchange areas, protecting resource lands,
- Preserving highway capacity on land adjacent to an urban growth boundary, or ensuring safety on segments with sharp curves, steep grades or restricted sight distance, or those with a history of accidents.
- The primary function of these highways is to provide connections and links to intercity, inter-community and intracity movements.

Spacing Standards for State Highways

To support these objectives, access management spacing standards have been adopted for each highway classification. Within the city, US 26 and OR 211 would have the spacing standards applied from Table 1.3. Where approaches to the highway will be allowed that do not comply with adopted access spacing standards, a deviation to those standards must be documented, as described in Policy 3D.

Table 1.3: Applicable Access Spacing Standards for US 26 and OR 211

Posted Speed (mph)	Statewide Highway (US 26)					District Highway (OR211)	
	Rural Expressway	Urban Expressway	Rural	Urban	STA	Rural	Urban
≥ 55	5280	2640	1320	1320		700	700
50	5280	2640	1100	1100		550	550
40 & 45	5280	2640	990	990		500	500
30 & 35			770	720	*	400	350
≤ 25			550	520	*	400	350

Note: All measurements in feet, taken from center to center of approaches on the same side of the highway only.
*Minimum access management spacing for public road approaches is the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum access management spacing for driveways is 175 feet (55 meters) or mid-block if the current city block is less than 350 feet (110 meters).

Policy 3B in the OHP addresses the installation on non-traversable medians in state highways. According to this policy, the installation of non-traversable medians shall be considered for:

- Modernization of all urban, multi-lane Statewide Highways;
- Multi-lane highways undergoing 3-R or 4-R improvements;
- Highways not undergoing modernization where a median could improve safety;
- Highways where forecasted average daily traffic is anticipated to be 28,000 vehicles per day during the 20-year planning period;
- The annual accident rate is greater than the statewide average accident rate for similar roadways;
- Pedestrians are unable to safely cross the highway, as demonstrated by an accident rate that is greater than the statewide annual average accident rate for similar roadways; and/or
- Topography and horizontal or vertical alignment result in inadequate left-turn intersection sight distance and it is impractical to relocate or reconstruct the connecting approach road or highway to improve the situation.

Reasons for not using non-traversable medians when any of these conditions are present must be documented and reviewed and approved by the Region Manager.

Full and directional median openings shall be restricted to locations that meet applicable access spacing standards and shall be designed with a left turn bay and deceleration lane. Full median openings will be given preference to public road connections that are part of a continuous and comprehensive public road network.

Furthermore, using raised median pedestrian refuge islands and mid-block crosswalks in urban areas that are pedestrian and/or transit oriented should be considered.

2003 Highway Design Manual

Revised August, 2008

This manual contains standards for the design of state highways and various highway elements. Included in the manual are elements to be considered for evaluating the feasibility of construction and determination of right of way needs such as the general alignments, roadway widths, and criteria for installation of turn lanes. Typical roadway sections as developed in this TSP update for US 26 or OR 211will need to be compliant with the design requirements outlined in the *Highway Design Manual.*

Table 10-1 in the *Highway Design Manual* displays the maximum allowable volume to capacity ratios for the 30th highest annual hour of traffic for use in the design of highway projects. These standards are to be applied to conditions forecasted to exist 20 years after completion of the proposed improvement. If the applicable mobility standard cannot be met, a design exception should be sought. Sections from that table relevant to the study area are presented below in Table 1.4.

Table 1.4: Applicable 2003 Highway Design Manual Mobility Standards

Highway Category	Inside Urban Growth Boundary		Outside Urban Growth Boundary
	Non-MPO outside of STAs where non-freeway posted speed <45 mph	Non-MPO where non-freeway posted speed ≥45 mph	Rural Lands
Statewide Expressways	0.70	0.65	0.60
Freight Route on Statewide Highway	0.70	0.70	0.60
District / Local Interest Road	0.80	0.75	0.70

ODOT Statewide Transportation Improvement Program (STIP)

Amended September, 2008

The Statewide Transportation Improvement Program (STIP) is Oregon's four-year transportation capital improvement program. It is the document that identifies the funding for and scheduling of transportation projects and programs. It includes projects on the federal, state, city, and county transportation systems, multimodal projects (highway, passenger rail, freight, public transit, bicycle and pedestrian), and projects in the National Parks, National Forests, and Indian tribal lands. Oregon's STIP covers a four-year construction period, but is updated every two years in accordance with federal requirements. The currently approved program is the *2008-2011 STIP*. The *Draft 2010-2013 STIP* is currently under development, and is available for public viewing and comment.

The approved *2008-2011* and *Draft 2010-2013 STIPs* were reviewed for projects that should be considered for complimentary or conflicting traffic impacts. Projects found in the vicinity of the city are listed below. Even though these projects are not directly within the city, they could have an impact on the traffic entering and leaving Sandy.

The following projects will have an impact on the Sandy transportation system:

2008-2011 Approved STIP

- Preservation project including an overlay of US 26. US 26: SE Luzan Ln - MP 30 between MP 22.49 and 30 (total cost $6,418,000, Key Number 15048, construction year 2010).
- Modernization project including a yet to be determined safety component on US 26 between MP 27 and MP 41. (total cost $3.3 Million + construction, Key Number 13953, construction year 2009)
- Fleet replacement for the City of Sandy. (total cost $473,000, Key Number 15800, purchase year 2008)

2010-2013 Draft STIP
(Projects listed under 2008-2011 STIP not included)

- Improve geometry, illumination, sight distance and channelization. OR 211: Eagle Cr – Sandy Hwy @ Dubarko Rd (Sandy) (total cost $5,143,000, Key Number 16155 construction year 2013).

Intergovernmental Special Transportation Area Management and Design Plan – City of Sandy

Amended September 2003

The City of Sandy's Special Transportation Area (STA) is located along the one-way couplet of US 26 between the intersections of Bluff Road and Ten Eyck Road (MP 23.87 to 24.61). This intergovernmental agreement outlines specific responsibilities and authorities granted to the City by ODOT, including:

- The City is an Agent of ODOT and therefore isn't required to seek ODOT permits for roadway projects within STA, with the exception of signals, which must be approved by the State Traffic Engineer.
- The City will maintain the projects it designs and constructs on the State Highway within the STA area.
- ODOT will maintain the projects it designs and constructs on the State Highway within the STA area, but may delegate these projects to the City.

The agreement also identifies needed improvements along US 26 within the STA area including

- New signals on Pioneer and Proctor boulevards at Scales and Strauss Avenues,
- Signal coordination, sidewalks, curb extensions and cross-walks at the signalized intersections as well as Proctor and Hoffman, Alt, Bruns, and Beers, and at Pioneer and Hoffman, Shelley, Bruns, Scales, and Beers

When further improvements to the STA area on US 26 are identified in the TSP update, the City needs to use the design standards identified in the STA Agreement, including:

- Speed limit: 25
- Pedestrian Signals: Additional pedestrian signals in the STA area must be timed with the signals at Bluff and Meinig. Possible locations include Alt/Shelly, Bruns and Beers, or Strauss and Scales.
- Access Management: Where possible, the number of driveways accessing US 26 should be reduced.
- Through Traffic: Coordinate signal timing to provide for smooth traffic flow.
- Transportation System: Maintain the one-way couplet and consider the construction of a bypass to re-route truck traffic out of the downtown.
- Cross-section:
    - The City will follow AASHTO Guidelines for lane widths and striping. The minimum lanes widths are:
        - Travel lanes: 11'
        - Parking Lanes 8 „
        - Bicycle Lanes 4'
    - Right of way Allocation:
        - Sidewalks: 8' max,
        - Lanes widths: 11' minimum, and
        - Bicycle lanes: since US 26 is a Statewide Bike Route, bicycle lanes may only be removed if an adequate alternative bike route is designated and the TSP is amended.
- Traffic Calming:
    - Allowed treatments include
        - Signing or striping
        - Curb extensions
        - Overhead flashers
        - Landscaped medians at either end of the couplet
        - Narrowed travel lanes and widened sidewalks
        - Street trees and other pedestrian-oriented amenities
        - Speed enforcement and photo radar
    - Disallowed treatments include speed humps or other intentional mutilation of the road surface

Technical Memorandum #2: Existing Conditions and Future Needs

Technical Memorandum #2

DATE: March 30, 2011

TO: Liz French – City of Sandy
Sonya Kazan – ODOT

FROM: John Bosket, PE – DKS Associates
Michael Tomasini, PE – DKS Associates

SUBJECT: **City of Sandy TSP Update: Existing Conditions and Future Needs** P06097-017

This memorandum includes updates for Chapters 3 and 4 of the 2008 Sandy Transportation System Plan (TSP). The original intent of these chapters was for them to be equivalent replacements of the city's current TSP Chapters 3 and 4. Through the City's TSP update process, it was determined that these chapters would serve the city better if they were placed in the Technical Appendix as a technical memorandum do document the development and technical aspects of the TSP update. The Table of Contents below shows the content included in these two former TSP chapters.

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3. Existing Conditions

Overview

This chapter provides an inventory and evaluation of transportation facilities within the City of Sandy Urban Growth Boundary (UGB) under existing conditions (2008).[1] The identification of system characteristics and needs under existing conditions will provide baseline data for use in forecasting future conditions and will supplement the future needs assessment in Chapter 4. For this analysis, the following modes of travel were considered:

- Pedestrian
- Bicycle
- Motor Vehicle
- Freight
- Air
- Rail
- Water
- Pipelines and Transmission Lines

Note that transit is being addressed through a separate Transit Master Planning process that is being coordinated with the Transportation System Plan (TSP) update.

Study Area

The City of Sandy has a population of just over 8,000 people and is located in Clackamas County at the intersection of US 26 (Mt. Hood Highway) and OR 211 (Eagle Creek Sandy Highway), between Gresham to the west and Mt. Hood to the east (see Figure 3-1). At the base of Mt. Hood, the foothills terrain both adds to the scenic beauty of the city and creates challenges for land and public infrastructure development due to topographic constraints. The combination of the city's location and environment constrains options to provide an effective transportation network, especially on US 26, which is the primary transportation corridor in the area. Here, US 26 serves a number of roles, providing access to local Sandy businesses and homes, serving as a major

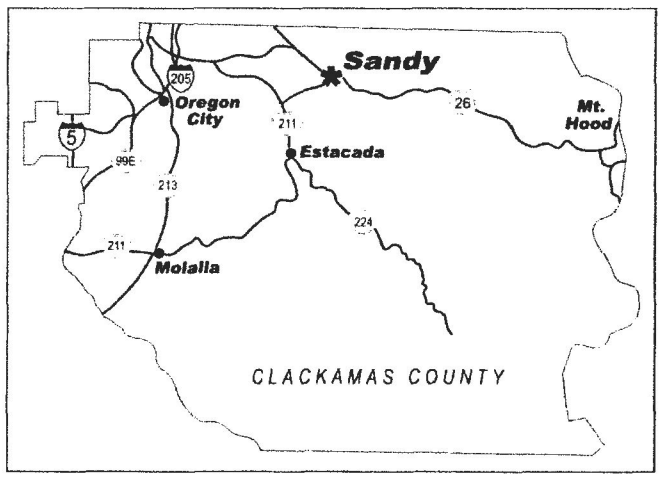

Figure 3-1: Vicinity Map

[1] Transportation inventories were primarily focused on the arterial and collector roadways.

east/west transportation route between the Portland Metro Area, Mt. Hood, and Central Oregon resorts and recreation, and as the City's "main street" through the downtown couplet. The relationship of the existing roadway network to the City of Sandy UGB and Urban Reserve areas is illustrated in Figure 3-2.

Mt. Hood National Scenic Byway

Part of the roadway system in Sandy has been designated as part of the Mt. Hood National Scenic Byway. This byway follows a scenic route that starts in Troutdale, traverses through Sandy around Mt. Hood, and ends in Hood River. It offers access to three of Oregon's unique natural wonders: Multnomah Falls, the Columbia River Gorge, and Mt. Hood. Within the city limits the byway runs along Ten Eyck Road, US 26 and Bluff Road, as can be seen in on Figure 3-2.

Environmental Features and Goal 5 Inventory

The layout of a city's transportation infrastructure is partially dependent upon the surrounding terrain and water features. There are several locations within the City of Sandy where steep slopes (>25%) are present. Water features in and around the city include the Sandy River to the north of the city and Tickle Creek in the southern area of the city. In Figure 3-3, the existing street network and city boundaries are projected on top of environmental feature setbacks, where slopes are greater than 25%, and around water features.

Local jurisdictions are required by Statewide Planning Goal 5 to adopt plans to protect natural resources and conserve scenic and historic areas and open spaces. Fish and wildlife habitats, historic and cultural scenic viewpoints, sites, scenic waterways, and mineral and aggregate sites are among the natural resources that are protected by Goal 5. The State Historic Preservation Office (SHPO) and the Sandy Historical Society have assembled a list of 14 historic buildings in the City of Sandy. The locations of these buildings along with the other Goal 5 resources and environmental features are identified in Figure 3-3.

Figure 3-2

Study Area

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Mt. Hood National Scenic Byway

Arterials/Collectors

Local Streets

Park

Activity Centers

City Limits

Urban Growth Boundary

Urban Reserve Area

N

KELSO RD

JENNIFER AVE

ORIENT DR

Bluff Park

Jonsrud Viewpoint

BELL ST

INDUSTRIAL WAY

26

Bell Street Fields

BLUFF RD

RUBEN LN

Sandy High School

Sandy Skate Park

Cedar Ridge Middle School

Sandy Elementary School

Salmon Creek Estates Park

SUNSET ST

Community

PROCTOR BLVD

Public Library

City Hall

Post Office

PIONEER BLVD

TUPPER RD

Tupper Park

Meinig Memorial Park

211

362ND DR

DUBARKO RD

Hamilton Ridge Park

SANDY HEIGHTS ST

Barlow Ridge Park

MEINIG AVE

VAN FLEET AVE

DAVIS ST

KRISTA LOOP

DUBARKO RD

Timberline Trails Park

GUNDERSON RD

HWY 211

CORNELIUS RD

JACOBY RD

Cascadia Park

LANGENSAND RD

TROUTDALE RD

TRUBEL RD

Figure 3-3

Environmental Features and Goal 5 Inventory

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

(FEMA and Shapiro 2001)

- Perennial Streams and Tickle Creek (top of bank)
- Pond
- Wetlands

Setback areas

- 25 ft setback on slopes > 25% (FSH Metro 1996)
- 25 ft Wetland Setback
- 50 ft Perennial Stream Setback
- 70 ft Tickle Creek Setback

- SHPO Site
- Scenic Viewpoint
- 5' Contour Lines
- Streets
- Park
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

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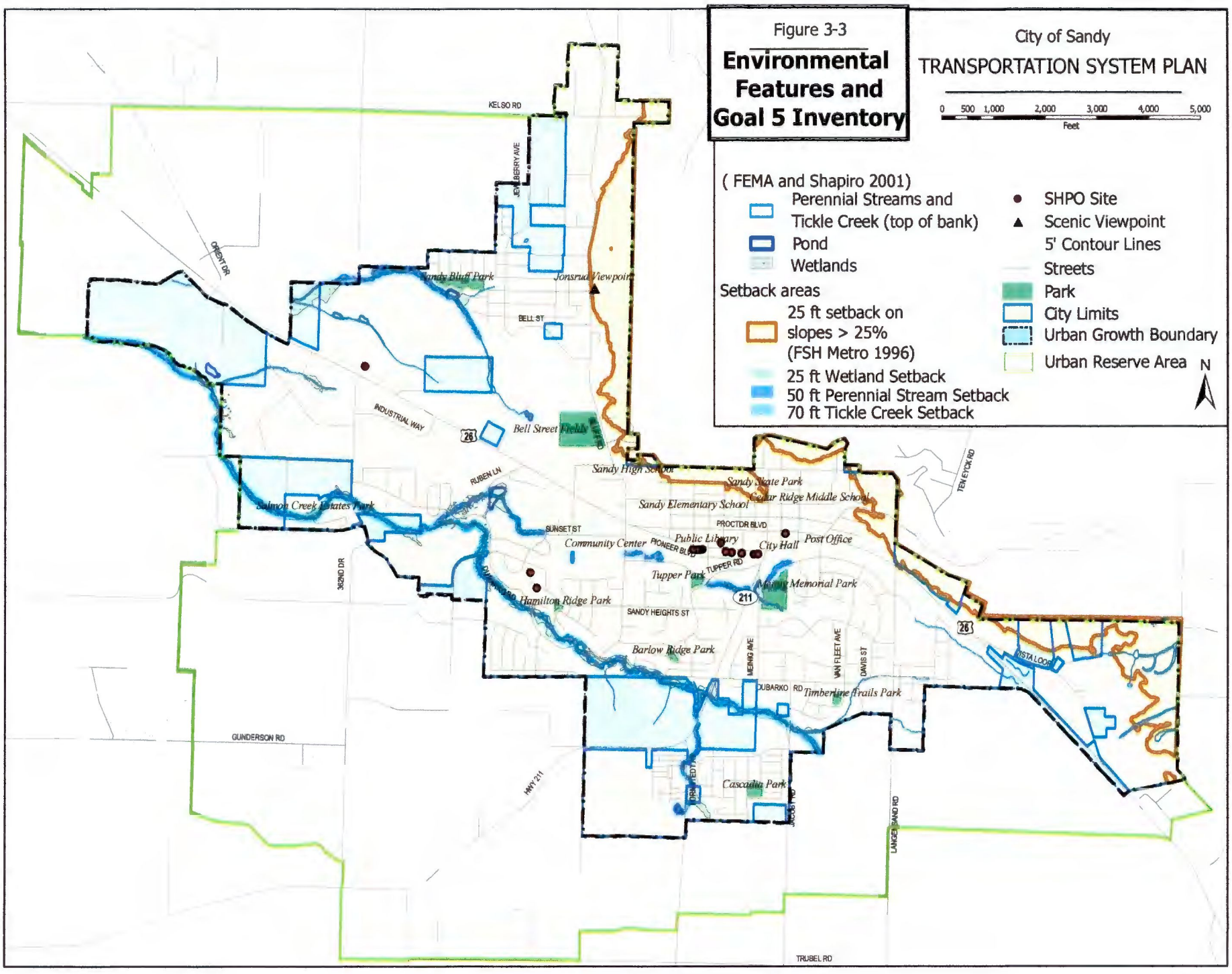

Surrounding Land Uses

The distribution of existing and future land uses within the City of Sandy has a direct influence on transportation choices and plays a key role in understanding transportation patterns and traffic volumes.

The intersection of US 26 and OR 211 is in the City's downtown, which is characterized primarily by high-density commercial development with buildings located close to the highway frontages. Through this area, US 26 is divided into a one-way couplet system (westbound travel along Proctor Boulevard and eastbound travel along Pioneer Boulevard) with a posted speed of 25 mph, on-street parking, marked crosswalks, and curb extensions to create a more pedestrian friendly environment.

Moving away from the downtown, land uses along the west US 26 corridor are a combination of commercial and residential, with most developments on relatively small lots. From University Avenue, there is a transition to large-lot highway commercial development that changes to light industrial and agricultural uses west of 362nd Drive.

Development density in the highway corridor east of the downtown is generally lower, with a small amount of commercial development adjacent to US 26 east of Ten Eyck Road that transitions to residential development near Langensand Road. From Vista Loop Drive, area development is generally agricultural and light industrial uses, although the area on the south side of US 26 near the future intersection of US 26 and Dubarko Drive has future development potential.

The majority of the residential lands in the city are located to the north and south of the US 26 corridor and to the east of Langensand Road that will include mixed use housing with limited commercial development to support the surrounding residential neighborhoods and encourage non-automobile modes of travel.

The orientation of land uses within the City UGB is shown in the zoning and comprehensive plan maps in Figures 3-4 and 3-5, respectively. The zoning map identifies current zoning designations, while the comprehensive plan map shows the zoning designations for future development.

Figure 3-4

Zoning

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Zoning

- C1-Central Business District
- C2-General Commercial
- C3-Village Commercial
- I1-Industrial Park
- I2-Light Industrial
- I3-Heavy Industrial
- SFR-Single Family Residential
- R1-Low Density Residential
- R2-Medium Density Residential
- R3-High Density Residential

- Arterials/Collectors
- Local Streets
- City Limits
- Urban Growth Boundary
- Parcels
- Urban Reserve Area

*Zoning designations for all parcels located outside of the City Limits are conceptual only and non-binding. The conceptual zoning designations are used to promote preferred development patterns, per the 2040 Comprehensive Plan.

N

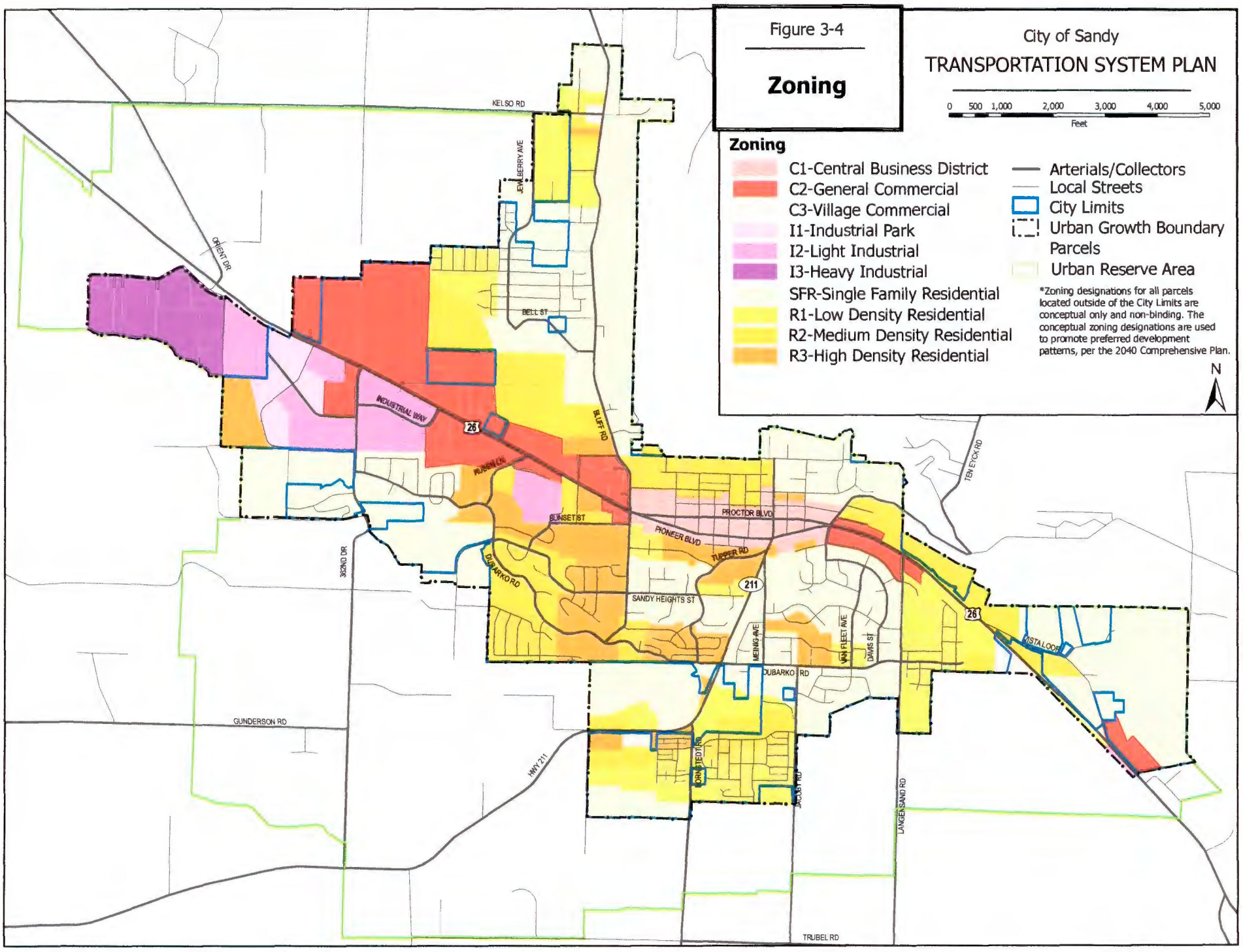

Figure 3-5

Comprehensive Plan

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Comprehensive Plan

- Village
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Retail/ Commercial
- Industrial

- Arterials/Collectors
- Local Streets
- City Limits
- Urban Growth Boundary
- Parcels
- Urban Reserve Area

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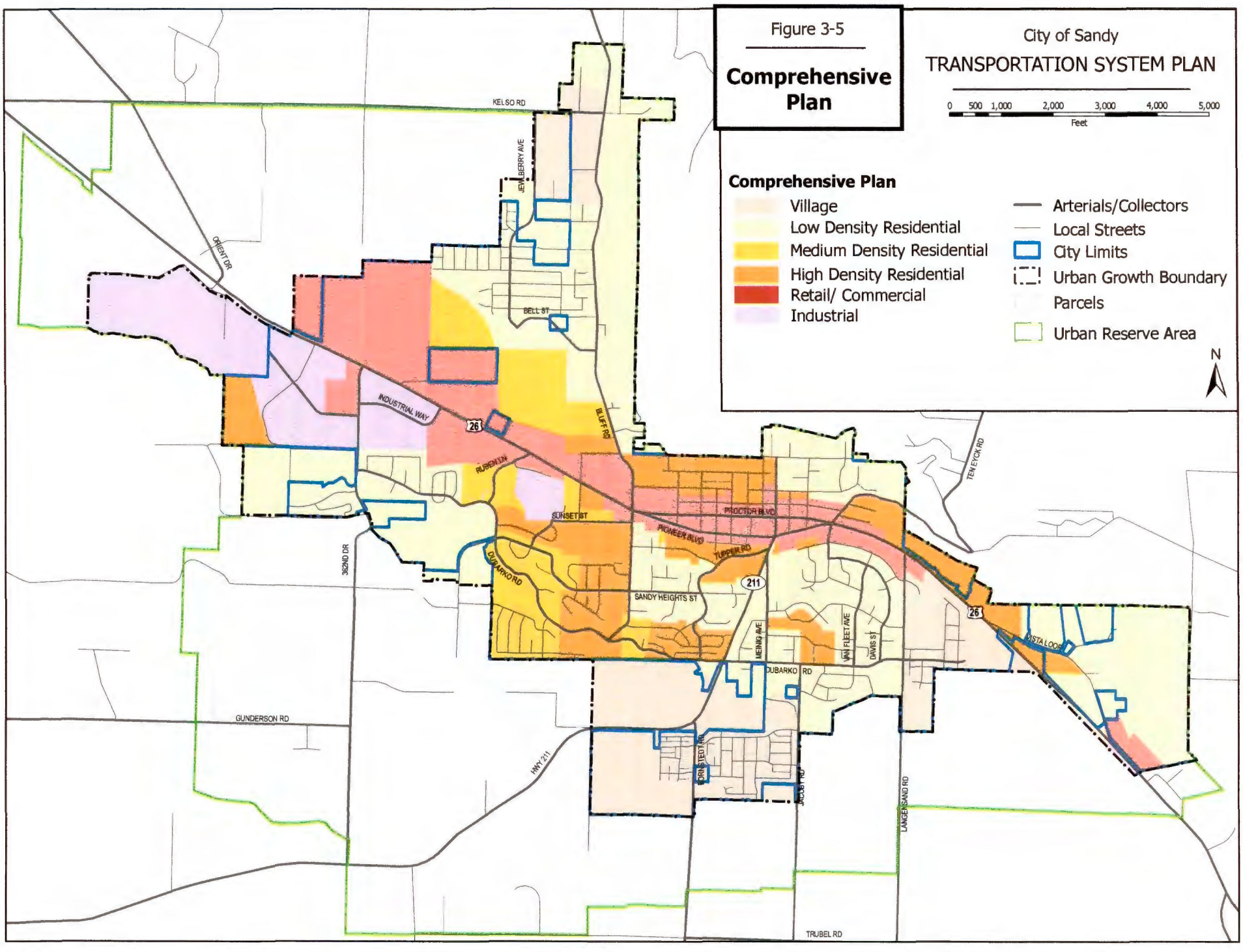


Pedestrians

The provision of facilities to support and encourage walking trips is a critical element in creating a livable and sustainable community and a transportation system that can adequately serve those who cannot or prefer not to drive. This section outlines the existing pedestrian network for use in identifying improvements for implementation.

Pedestrian Facilities

The assessment of existing pedestrian conditions began with a complete inventory of pedestrian facilities including: sidewalk locations and conditions, signalized and unsignalized crosswalks, accessibility of crosswalks per Americans with Disabilities Act (ADA) design requirements, locations of multi-use and demand trails[2], access to activity generators (e.g., schools, parks, libraries, post offices, etc.), and transit accessibility. Figure 3-6 displays the existing pedestrian facilities throughout the city in relation to key activity generators.

The downtown area of Sandy is a large activity generator, with many individual attractions for pedestrians. Centered on US 26 between Bluff Road and Ten Eyck Road, the downtown has been designated a Special Transportation Area (STA) by the Oregon Department of Transportation (ODOT) and the City. This designation is applied to downtowns, central business districts, and main streets, and indicates an emphasis on providing accessibility to community activities, businesses, and residences and strives to facilitate pedestrian movement along and across the highway.

Sidewalk and Crosswalk Conditions

Sidewalks

City design standards for sidewalks require a minimum width of five feet on local streets, and a minimum width of six feet on collector and arterial streets. Along state highways, ODOT design standards require minimum sidewalk widths of six feet, with a wider requirement of eight (if separated from the curb by a buffer strip) to ten feet in STAs.

In general, existing sidewalks meet these standards. However, there is a section along the south side of US 26 between University Avenue and Bluff Road where utility poles are located within the sidewalk, resulting in intermittent partial obstructions. This also occurs on the north side of US 26 eastbound (Pioneer Boulevard) through the downtown couplet. However, an improvement project that is planned to be completed by March of 2009 would remove all overhead utility wires and associated poles from the south side of Pioneer Boulevard through the couplet.

[2] Multi-use trails are formal, surfaced trails intended for most forms of non-motorized use. Demand trails are informal paths, often of dirt surfacing, worn from frequent use. Demand trails may be located across private property and are not identified as a recommended route of travel, but rather to identify a need that may not be adequately met.

Figure 3-6

Existing Pedestrian Facilities

City of Sandy

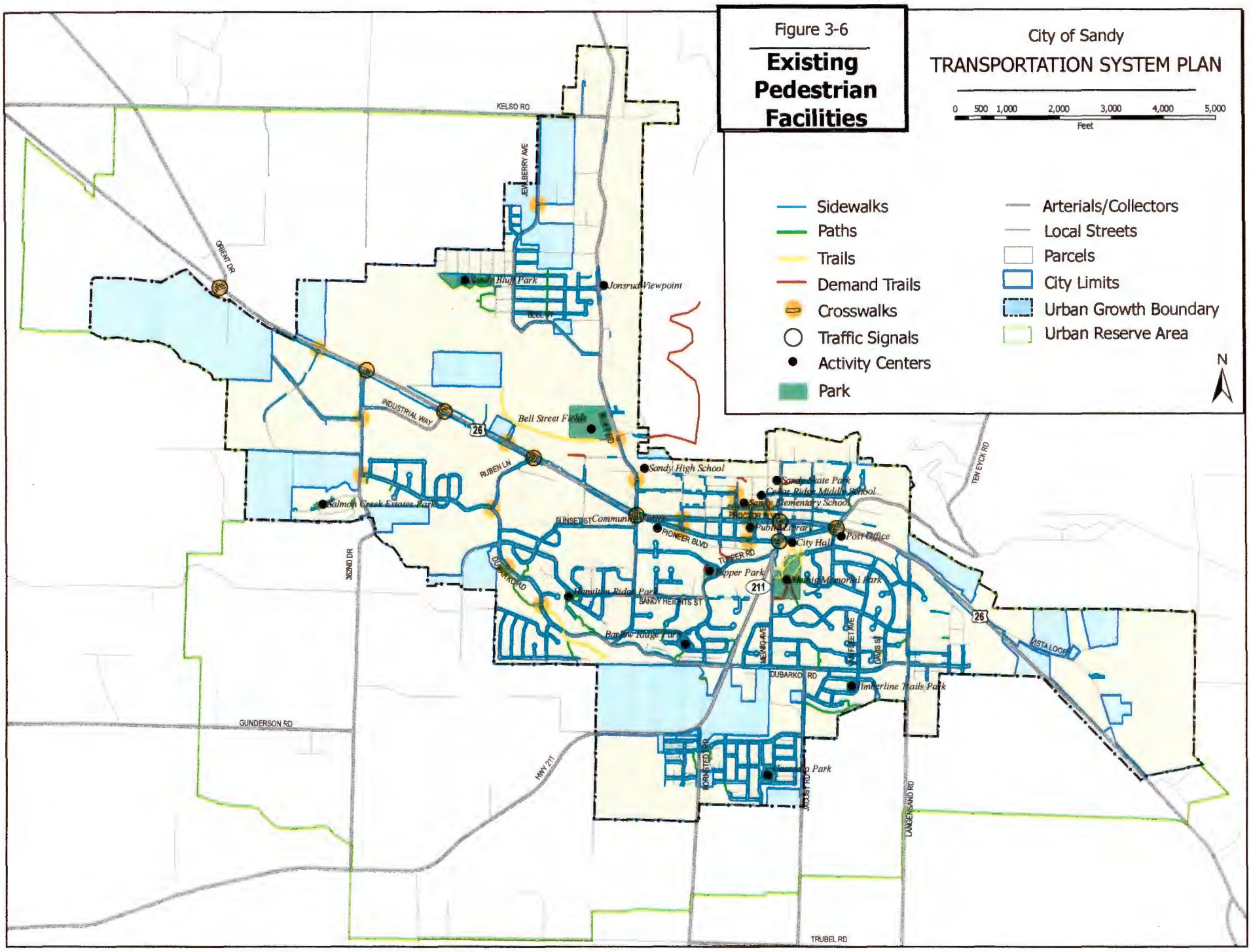
TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

- Sidewalks
- Paths
- Trails
- Demand Trails
- Crosswalks
- Traffic Signals
- Activity Centers
- Park
- Arterials/Collectors
- Local Streets
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

N



Sidewalk curb ramps at marked crosswalks within the city were evaluated for adequate accessibility per ADA design requirements. The evaluation at each location included measurements of: ramp accessibility (horizontal obstructions), ramp and roadway slopes, presence and design of detectable warnings (raised truncated domes), vertical edges between the pavement surface and the bottom of the ramp, and push-button accessibility at signalized crossings.

Curb ramps were generally well-designed where construction was noticeably more recent. This included ramps at marked crosswalks on city streets and through the downtown on US 26. However, in the downtown couplet, there were several ramps missing detectable warning strips, including:

- South side of Proctor Boulevard/ Alt Avenue crosswalk
- South side of Proctor Boulevard/ Strauss Avenue crosswalk
- South side of Pioneer Boulevard/ Beers Avenue crosswalk
- North and south sides of Pioneer Boulevard/ Junker Street crosswalk

Also, the intersections on US 26 at OR 211 have several deficiencies. At US 26 westbound (Proctor Boulevard) and OR 211, the northeast, southeast, and southwest corners do not provide a landing area between the push buttons and the ramps and there are utility poles, fire hydrants, and street signs that limit accessibility of the ramp from the sidewalk. At the intersection of US 26 eastbound (Pioneer Boulevard) and OR 211, the northeast corner has a utility pole between the curb ramp and the push-button.

In addition, the recently striped crosswalks on the west and south approaches of the Hood Street/ Strauss Avenue intersection are adjoined to older sidewalks and ramps that lack detectable warning strips and level landing areas at the back of the ramp.

Outside of the downtown, deficient curb ramp designs are present at intersections on US 26 from Ruben Lane to the west, where construction likely predates ADA design requirements (i.e., 1990). Deficiencies noted included:

US 26 at Champion Way

- No detectable warning strips
- Lack of adequate level landing area on outer ramps
- Broken sidewalk and poor sight distance (vegetation) at eastern-most ramp
- Presence of 2-inch lip between road surface and ramp at western island ramp

US 26 at 362nd Drive

- Lack of adequate level landing areas on all ramps
- No detectable warning strip on south ramp of the north-south crosswalk
- No curb or sidewalk on the north side of US 26

US 26 at Industrial Way

- No detectable warning strips on the northeast, northwest, or southwest corners
- Presence of 2-inch lip between road surface and ramp at southeast ramp
- Push buttons on northwest and northeast corners are difficult to reach

US 26 at Ruben Lane

- No detectable warning strips
- Lack of adequate level landing areas on most ramps (only southeast corner and eastern island ramp on the southwest corner are adequate)
- Steep ramp grades on southeast and southwest corners
- Severe algebraic difference between ramp slope and roadway slope (tipping hazard) on southeast and southwest corners
- Push buttons are difficult to reach on all corners
- Crosswalks are not directly accessible by ramps on the northwest and northeast corners, requiring travel in the roadway

Crosswalks

As shown in Figure 3-6, most marked crosswalks within the city are located along US 26. However, there are several others (all unsignalized) along Bluff Road, 362nd Ave., Dubarko Road, Ruben Lane, Jewelberry Ave., and Pleasant St. All marked crossings of US 26 are under signal control, with the exception of crosswalks downtown on Pioneer Boulevard near Beers Avenue and Shelley Avenue and on Proctor Boulevard near Beers Avenue, Strauss Avenue, and Alt Avenue.

In general, the distances between crossing opportunities on US 26 are very long. This makes crossings difficult for pedestrians, which creates a barrier effect and can encourage unprotected mid-block crossings. Pedestrians attempting to cross US 26 in the five-lane sections west and east of the downtown are commonly seen using the two-way left turn lane in the median as a refuge.

Many marked crosswalks currently provide enhanced access to transit stops. While the demand for individual stops, as well as stop locations, may be reevaluated as part of the Sandy Transit Master Plan effort, transit stop locations that might benefit from marked crosswalks or other crossing enhancements include:

- US 26 at University Avenue (previously identified in the US 26 Sandy Gateway Plan)[3]
- Bluff Road at Green Mountain Street

[3]Any crossing over an ODOT facility needs to be approved by the State Engineer. ODOT typically prefers pedestrian refuges over other types of marked crossings of multi-lane state highways. A grant for the construction of a pedestrian refuge at this location has been awarded to the city.

Pedestrian Gaps and Connectivity

Connectivity by Roadway Functional Classification

Arterials and collectors typically experience the highest motor vehicle volumes and speeds. Therefore, the provision of separate pedestrian facilities along these routes should generally be given priority. While sidewalks should generally be provided on both sides of a roadway, there may be times when it is impractical given the topography or environmental constraints. Alternatively, where funding is limited, sidewalk could be constructed on one side of the roadway only with the long-range goal being to construct sidewalk on the opposite side as funding becomes available. As shown in Figure 3-6, sidewalk coverage throughout much of the city is generally intermittent, but several key gaps are notable, including:

- North side of US 26 from Royal Lane to the west UGB
- South side of US 26 from University Avenue west to Ruben Lane
- US 26 from Ten Eyck Road to the east UGB
- OR 211 from Pioneer Boulevard to the south UGB;
- Bluff Road from Hood Street to the north UGB
- West side of 362nd Drive from Industrial Way to the south UGB
- Industrial Way from 362nd Drive to US 26
- Sandy Heights Street from Bluff Road to Bodley Court (intermittent)

Also shown in Figure 3-6, most local streets have sidewalks on at least one side of the road. Gaps in the sidewalk system on local streets most commonly occur in areas with vacant land or older development or where topographical/ environmental constraints exist. Motor vehicle volumes and speeds on local streets are typically lower than on arterials and collectors, so provision of separate pedestrian facilities on local streets is often a lower priority. However, opportunities to fill these gaps should be taken as they arise, particularly where no facilities are available on either side of the road or as part of new development activity.

Poor street connectivity and long block lengths can also deter walking, as they require extensive amounts of out-of-direction travel. The Transportation Planning Rule (TPR)[4] requires that local governments establish standards for street and access spacing to support safe and convenient walking opportunities. City code 17.100.120 states that a 400-foot block spacing should be used in residential and commercial areas. In areas where it is not practical to extend public streets, other options may be possible, such as the creation of access ways and trail easements for non-motorized travel. City code 17.100.120 states that pedestrian and bicycle access way shall be provided through the middle of the block when block lengths exceed 600 feet.

Connectivity around Schools & Activity Generators

Around the high school, there is adequate sidewalk coverage to the west and south, but to the north the sidewalk only extends as far as Marcy Street (approximately 275 feet from the school). In addition, while there are crosswalks on Bluff Road near the north and south

[4] OAR 660-012-0045(3)

entrances to the school, there is little sidewalk available on the west side of the road. Given the amount of existing and potential future residential development to the north, sidewalk infill along Bluff Road, specifically north of the high school, should be constructed to provide a safe walking route to school. The presence of the sports fields on the west side of Bluff Road furthers the need for additional sidewalks in this area.

In the future, the high school will be relocated to the west side of Bluff Road off of Bell Street (approximately 2,000 feet north of the existing high school). The new high school is expected to open in September 2011. When this occurs, there will continue to be a need to extend sidewalk facilities along Bluff Road in order to provide a pedestrian connection between the new school site and the downtown.

Unlike the high school, the elementary and middle schools are set within a residential neighborhood and are surrounded by low-volume, low-speed local streets. Intermittent sidewalks are present on most area streets, with the most notable gaps including:

- Pleasant Avenue between Scales Avenue and Strauss Avenue (north side of the street)
- Pleasant Avenue between Meinig Avenue and Revenue Avenue (north side of the street)
- Meinig Avenue between Scenic Street and Hood Street (west side of the street)

Street crossing treatments have also been installed around the elementary and middle schools, including crosswalks and curb extensions on Pleasant Avenue at Strauss, Alt, and Smith Avenues and on Strauss Avenue at Hood Street.

Many of the deficiencies in connectivity for other activity generators are the same as those for the schools. Most notably, the lack of sidewalks along Bluff Road make accessing the high school sports fields and the Jonsrud Viewpoint difficult and fails to provide a safe walking route from the large residential areas in the north end of the city to the downtown. Also, access to the elementary and middle school sports fields and the skate park could be improved by filling in sidewalk gaps along Meinig Avenue between Scenic Street and Hood Avenue (primarily on the west side of the street).

The Sandy Vista apartments, located on the northwest corner of the US 26/ Vista Loop Drive (west) intersection, are also a source of significant pedestrian activity between the downtown and the east end of the city. Because of the lack of sidewalks on US 26 east of the downtown, pedestrians are forced to walk on the highway shoulders, which can be as narrow as four feet in some areas.

Transit Accessibility

Research has shown that most people are willing to walk as much as ¼ to ½-mile to reach a transit stop. Therefore, to encourage more transit use, safe and convenient pedestrian facilities should be provided within a minimum of ¼-mile of all transit stops within the city. Figure 3-7 shows the relationship between existing pedestrian facilities and transit routes within the city and outlines a ¼-mile buffer around each transit stop. It should be noted that bicyclists are generally willing to ride much farther than ½-mile to reach transit stops. Therefore, where buses are equipped to transport bicycles, adequate bicycling facilities should be provided within one mile of transit stops.

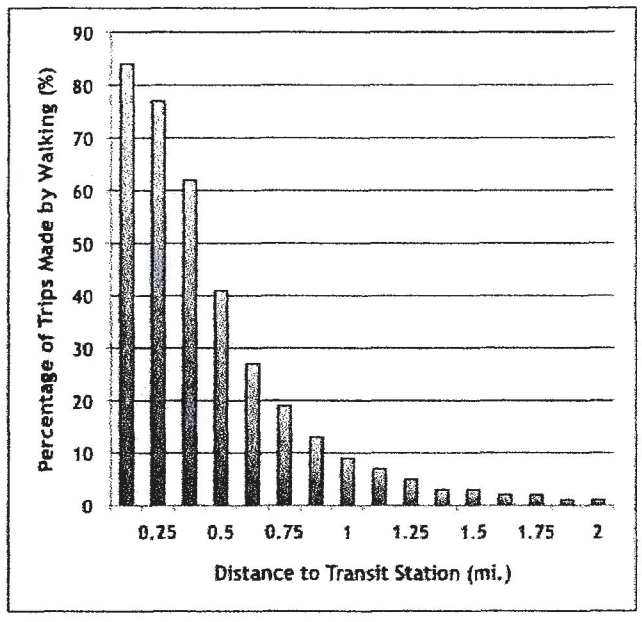


Figure 3-7: Relationship between Distance to Transit Facility and Pedestrian Mode Choice.[3]

When examining Figure 3-7, it appears that accessibility to transit stops through provision of sidewalks is relatively good citywide. However, it appears accessibility could be improved by constructing additional sidewalks in the key areas below:

- North side of US 26 from Royal Lane to the west UGB
- Industrial Way from 362nd Drive to US 26
- University Avenue from US 26 to Sunset Street
- Bluff Road from Bell Street to the north UGB
- Vista Loop Drive from US 26 to Ortiz Street

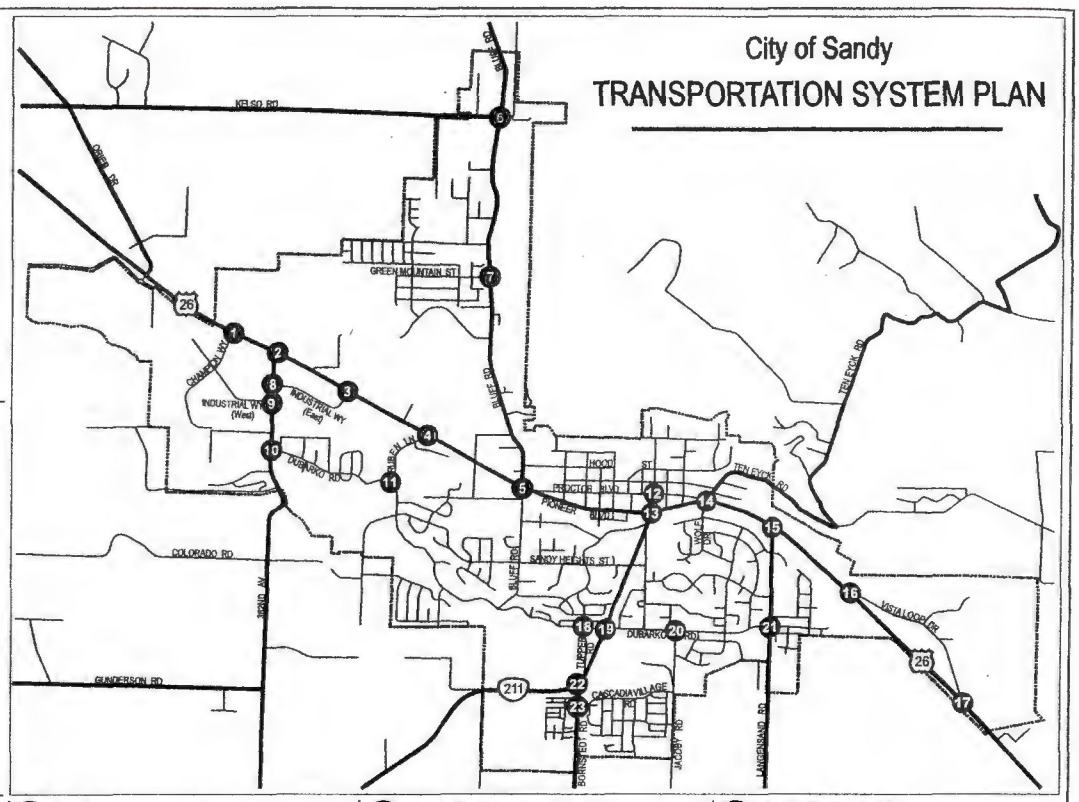
Pedestrian Volumes

Weekday peak hour pedestrian volume counts were collected between the hours of 4:00 and 6:00 p.m. at each study intersection to provide an indication of the usage of existing pedestrian facilities. These volumes have been mapped in Figures 3-8a and 3-8b, which shows the observed hourly pedestrian volume on each intersection approach.

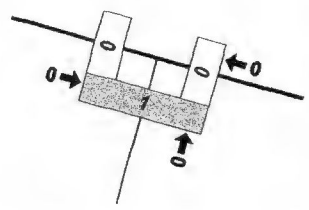
[5] Source: Federal Transit Administration, Transit Cooperative Research Program, Transit and Urban Form, TCRP Report 16, 1996.

City of Sandy

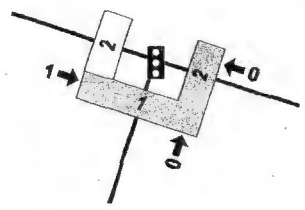
TRANSPORTATION SYSTEM PLAN



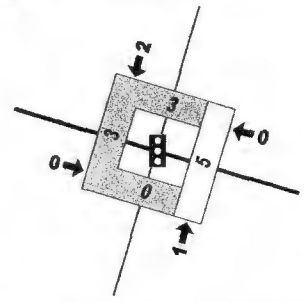
1 US 26 @ Champion Wy



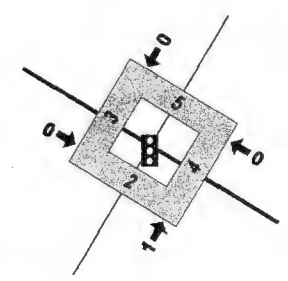
2 US 26 @ 362nd Dr



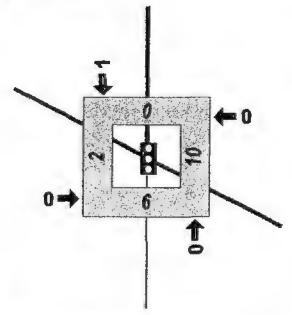
3 US 26 @ Industrial Wy



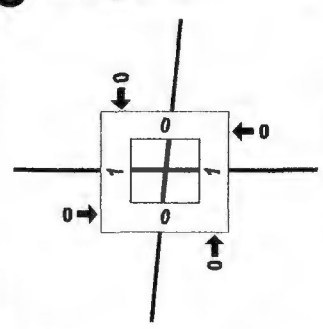
4 US 26 @ Ruben Ln



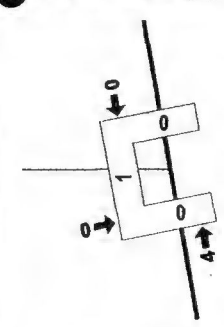
5 US 26 @ Bluff Rd



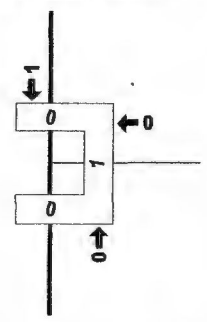
6 Kelso Rd @ Bluff Rd



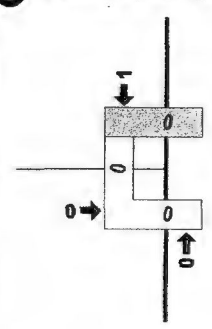
7 Green Mountain St @ Bluff Rd



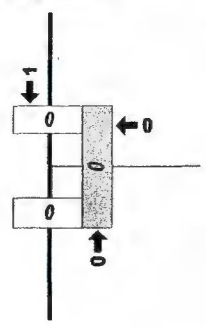
8 Industrial Way East @ 362nd Dr



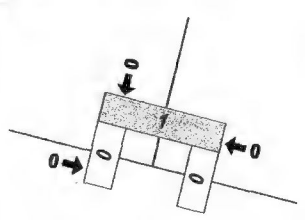
9 Industrial Way West @ 362nd Dr



10 Dubarko Rd @ 362nd Dr



11 Ruben Ln @ Dubarko Rd



LEGEND

- 00 - Study Intersection Number (This Page)
- 00 - Study Intersection Number (Next Page)
- 00 - Pedestrian Volume in Striped Crosswalk
- 00 - Pedestrian Volume
- ← 00 - Bike Volume
- - Traffic Signal

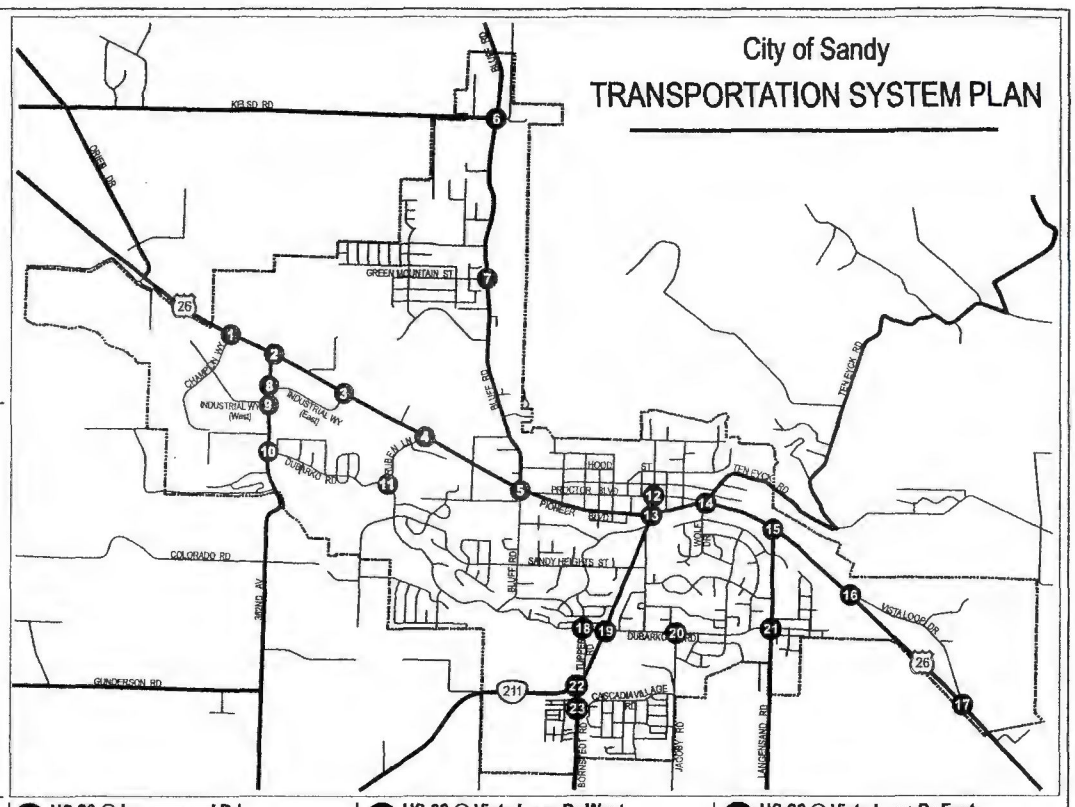
N

Figure 3-8a

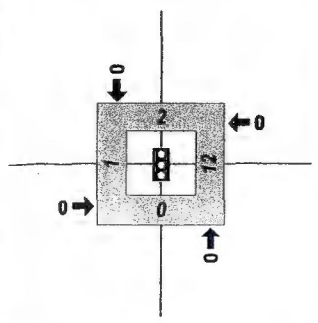
EXISTING PM PEAK HOUR BICYCLE AND PEDESTRIAN VOLUMES (2008)

City of Sandy

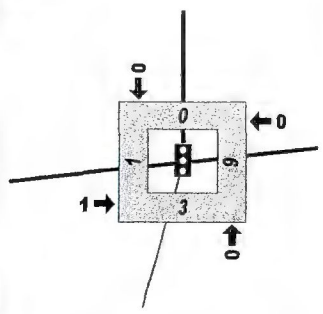
TRANSPORTATION SYSTEM PLAN



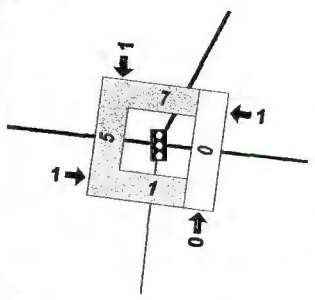
12 Proctor Blvd @ Hwy 211



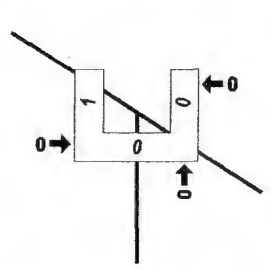
13 Pioneer Blvd @ Hwy 211



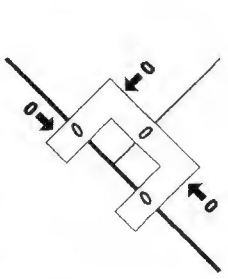
14 US 26 @ Ten Eyck Rd



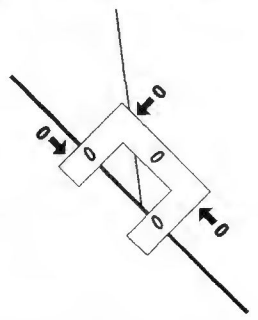
15 US 26 @ Langensand Rd



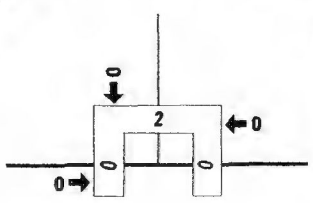
16 US 26 @ Vista Loop Dr West



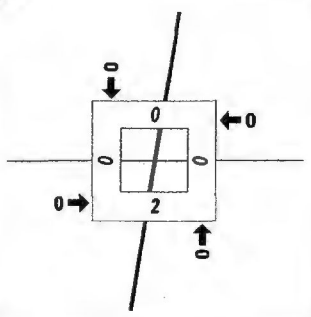
17 US 26 @ Vista Loop Dr East



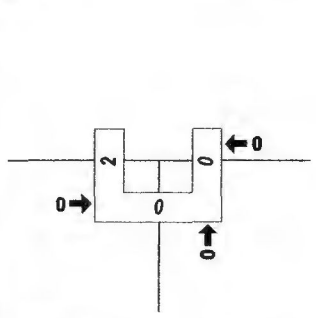
18 Dubarko Rd @ Tupper Rd



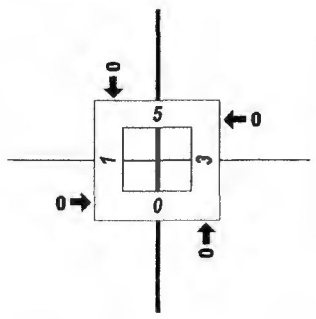
19 Dubarko Rd @ Hwy 211



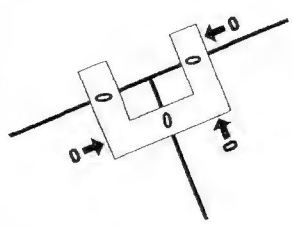
20 Jacoby Rd @ Dubarko Rd



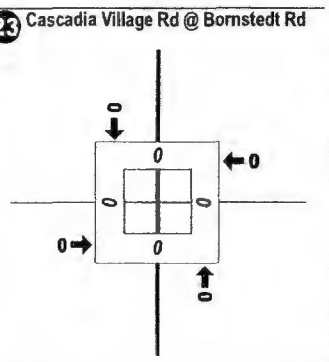
21 Langensand Rd @ Dubarko Rd



22 Bornstedt Rd @ Hwy 211



23 Cascadia Village Rd @ Bornstedt Rd



LEGEND

- 00 - Study Intersection Number (This Page)
- 00 - Study Intersection Number (Next Page)
- 00 - Pedestrian Volume in Striped Crosswalk
- 00 - Pedestrian Volume
- ← 00 - Bike Volume
- Traffic Signal

N

Figure 3-8b

EXISTING PM PEAK HOUR BICYCLE AND PEDESTRIAN VOLUMES (2008)

As shown, pedestrian volumes at most study intersections are fairly low, with most activity occurring downtown. Significant activity was also seen around the signalized crossings on US 26 at Industrial Way and Ruben Lane, which are near transit stops. When comparing the pedestrian volumes in Figure 3-8a with the pedestrian facilities map in Figure 3-6, it appears that pedestrian crossings are occurring along US 26 at the intersections of 362nd Drive and Industrial Way at approaches that do not provide crosswalks or protected crossing phases from the traffic signals.

Summary

A number of key deficiencies exist in the pedestrian network throughout the City of Sandy. Below is a summary of these deficiencies to guide identification and prioritization of improvements to enhance the pedestrian network in the future.

- Sidewalks are partially obstructed by utility poles along the south side of US 26 between University Avenue and Bluff Road, and along the north side of Pioneer Boulevard in the couplet.
- At the intersection on US 26 westbound (Proctor Boulevard) with OR 211 (Meinig Avenue), the northeast, southeast, and southwest corners have curb ramps with slopes greater than 5% and do not provide a landing area between the push buttons and the ramps. In addition, there are utility poles, fire hydrants, and street signs that limit accessibility of the ramp from the sidewalk.
- At the intersection of US 26 eastbound (Pioneer Boulevard) with OR 211 (Meinig Avenue), the northeast corner has a utility pole between the curb ramp and the push-button.
- With the exception of the downtown area, distances between crossing opportunities on US 26 and OR 211 are very long. This makes crossings difficult for pedestrians, which creates a barrier effect and can encourage unprotected mid-block crossings. As a result, pedestrians attempting to cross US 26 outside the couplet area are commonly seen using the two-way left turn lane in the median as a refuge (a potential hazard) and have been documented to cross US 26 at intersection approaches where no signal protection is provided.
- Several key gaps in the sidewalk system were noted:

  Gaps on the Arterial Street Network

  - North side of US 26 from Royal Lane to the west UGB
  - South side of US 26 from University Avenue west to Ruben Lane
  - US 26 from Ten Eyck Road to the east UGB
  - OR 211 from Pioneer Boulevard to the south UGB;
  - Bluff Road from Hood Street to the north UGB
  - West side of 362nd Drive from Industrial Way to the south UGB

Gaps on the Collector Street Network

- Industrial Way from 362nd Drive to US 26
- Sandy Heights Street from Bluff Road to Bodley Court (intermittent)

Gaps around schools

- Bluff Road from Hood Street to the north UGB
- Pleasant Avenue between Scales Avenue and Strauss Avenue (north side of the street)
- Pleasant Avenue between Meinig Avenue and Revenue Avenue (north side of the street)
- Meinig Avenue between Scenic Street and Hood Street (west side of the street)

Gaps around other activity generators

- Bluff Road from Hood Street to the north UGB
- Meinig Avenue between Scenic Street and Hood Street (west side of the street)

Gaps around transit stops

- North side of US 26 from Royal Lane to the west UGB
- Industrial Way from 362nd Drive to US 26
- University Avenue from US 26 to Sunset Street
- Bluff Road from Bell Street to the north UGB
- Vista Loop Drive from US 26 to Ortiz Street

Bicycles

Bicycle travel is a cost-effective and environmentally beneficial mode of transportation that not only provides personal health benefits, but is an important element of an overall plan to reduce motor vehicle miles traveled. The Transportation Planning Rule requires bicycle modal elements in Transportation System Plans, and requires the City to plan bikeways for all arterials and major collector streets.

Bicycle Facility Types

The Oregon Bicycle and Pedestrian Plan[6] outlines four different types of bikeways, including:

- shared roadways
- shoulder bikeways
- bike lanes
- multi-use paths

A **shared roadway** is a facility where motorists and bicycles must share a common travel lane. This type of bikeway requires the motorist to either follow bicycles or pass them using an adjacent lane. Shared roadways are generally only recommended where posted traffic speeds are 25 mph or lower and traffic volumes are less than 3,000 vehicles per day. This is a common design on local streets.

A **shoulder bikeway** is a paved shoulder suitable for bicycle travel that is not specifically designated for bicycle use. For this type of treatment, a paved shoulder width of at least six feet is preferred, but narrower widths to a minimum of four feet may be used in constrained areas. However, on uphill grades, a minimum width of six feet should be provided to accommodate the additional maneuvering area needed. Shoulder bikeways are most commonly seen in rural areas.

To be considered a **bike lane**, a paved lane must be specifically designated for use by bicycles. This is commonly done through pavement markings, such as the symbol depicting a bicycle with rider. Bike lanes are recommended for urban arterials and major collectors and are occasionally appropriate in rural areas where bike volumes are high. Bike lanes should not be used on roadways with speeds higher than 55 mph. ODOT design standards[7] require minimum bike lane widths of six feet, with widths as low as five feet allowed in STAs and downtown areas. The City of Sandy does not have a minimum width requirement for bike lanes, but typically uses the Oregon Bicycle and Pedestrian Plan as a guide, which recommends a minimum width of six feet.

A **multi-use path** is a roadway that is separated from motor vehicle facilities and used by bicyclist, pedestrians, and other non-motorized modes of transportation. City design standards require a minimum right of way width for multi-use paths of 15 feet, with at least eight feet of

[6] *Oregon Bicycle and Pedestrian Plan*, Oregon Department of Transportation, adopted June 14, 1995.
[7] *Highway Design Manual*, Oregon Department of Transportation, 2003.

paved surface provided. Where a significant amount of bicycle use is anticipated, the minimum paved width is increased to 12 feet. In comparison, the Oregon Bicycle and Pedestrian Plan recommends minimum widths of 10 to 12 feet.

Bicycle Gaps and Connectivity

Connectivity by Roadway Functional Classification

Designated bike lanes or shoulder bikeways should be provided on urban arterials and major collectors. The locations of Sandy's existing bike lanes and shoulders are shown on Figure 3-9. By examining this figure, key gaps on the arterial and collector roadway network where the addition of bicycle facilities could improve overall connectivity can be identified. These include:

- OR 211 from Proctor Boulevard to the south UGB
- US 26 from Ten Eyck Road to the east UGB (widening to provide a minimum shoulder of six feet)
- West side of 362nd Drive from Industrial Way to the UGB
- Ten Eyck Road from US 26 to the UGB
- Langensand Road from US 26 to the UGB
- Bluff Road from US 26 to Miller Street
- Bornstedt Road from OR 211 to the UGB
- Dubarko Road from 362nd Drive to Eldridge Drive
- Dubarko Road from Sandy Heights Street to Reich Court

Local streets within Sandy have posted speeds of 25 mph and average daily traffic volumes less than 3,000 and can therefore operate effectively as shared roadways.

Connectivity around Schools, Activity Centers, and Transit

Roadways adjacent to the high school, middle school, and elementary school are adequately equipped for bicycle travel. Bluff Road provides a continuous designated bike lane near the high school, while other adjacent roadways to the high school and the roadways adjacent to the middle school and elementary school are all suitable for use as shared roadways. While good bicycle connectivity is present within the vicinity of the schools, connectivity from neighborhoods south of US 26 could be significantly improved by filling in some of the gaps identified above.

Much like the schools, the major activity centers in Sandy have routes that are adequately equipped for bicycle travel. While this makes these locations directly accessible from the transportation system, improving citywide bicycle facilities by addressing the gaps previously identified for arterial and collector roadways would enhance accessibility from locations throughout the city.

Finally, all Sandy Area Metro (SAM) and Sandy Transit Area Rides (STAR) buses currently in use are equipped with bike racks, which facilitates combined transit and bicycle travel.

Again, improving citywide bicycle facilities by addressing the gaps identified above would enhance accessibility to transit stops throughout the city.

Bicycle Volumes

Weekday p.m. peak hour bicycle volume counts were taken at the study intersections throughout the city, and are displayed previously in Figures 3-8a and 3-8b. While these figures shows bicycle volumes to be very low in these locations, it should be recognized that there may be other routes in the city that are preferred by bicyclists. Furthermore, low bicycle volumes under existing conditions should not be considered as an indicator that bicycle system improvements are not needed; improvements would encourage greater bicycle use.

Summary

The following is a summary of existing bicycle system deficiencies that can be used as a guide in determining potential future improvements to complete the bicycle network throughout the city.

- There are key gaps in the provision of bicycle facilities on area roadways, including:
  - OR 211 from Proctor Boulevard to the south UGB
  - US 26 from Ten Eyck Road to the east UGB (widening to provide a minimum shoulder of six feet)
  - West side of 362nd Drive from Industrial Way to the UGB
  - Ten Eyck Road from US 26 to the UGB
  - Langensand Road from US 26 to the UGB
  - Bluff Road from US 26 to Miller Street
  - Bornstedt Road from OR 211 to the UGB
  - Dubarko Road from 362nd Drive to Eldridge Drive
  - Dubarko Road from Sandy Heights Street to Reich Court

Figure 3-9

Existing Bicycle Facilities

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

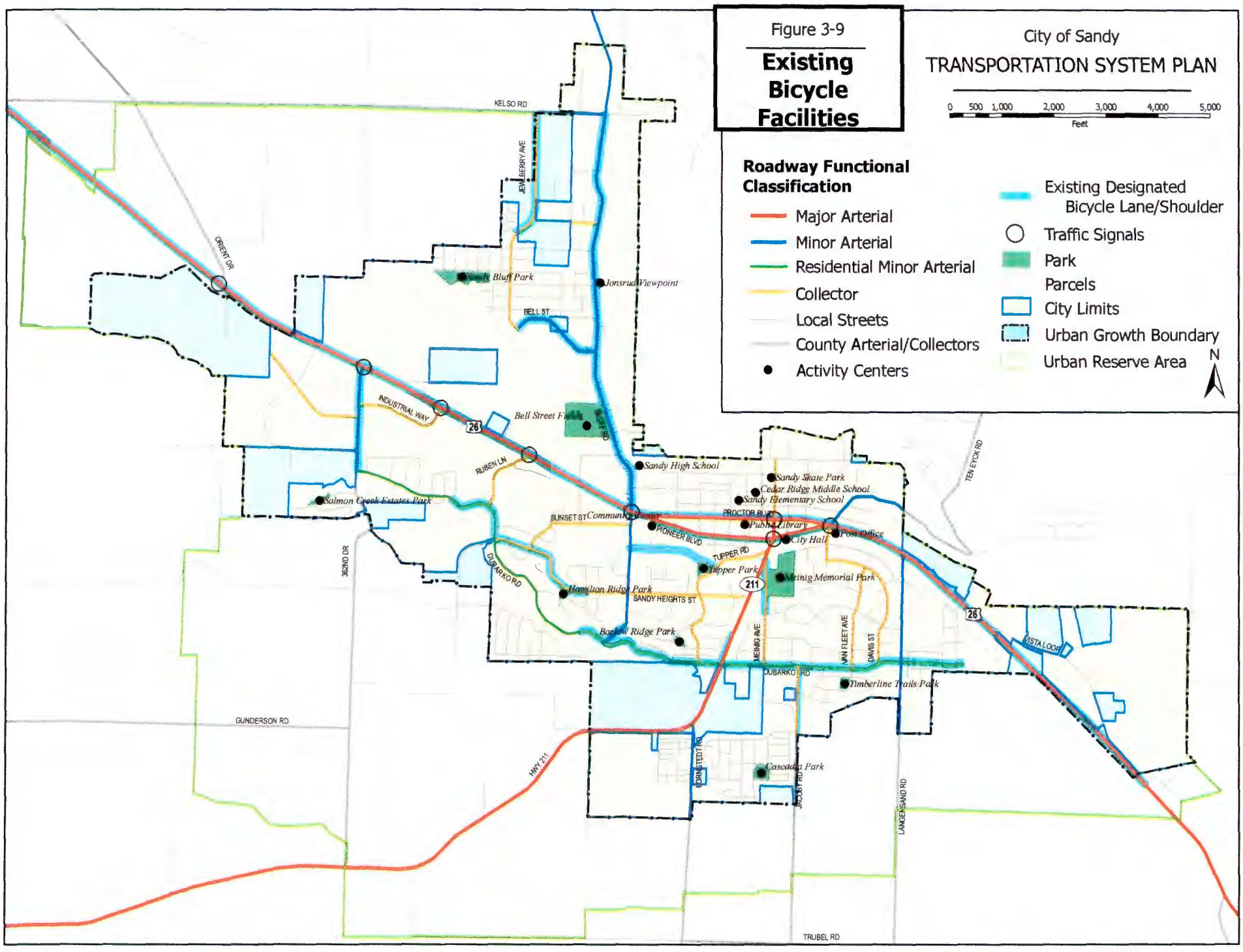
Feet

Roadway Functional Classification

- Major Arterial
- Minor Arterial
- Residential Minor Arterial
- Collector
- Local Streets
- County Arterial/Collectors
- Activity Centers

- Existing Designated Bicycle Lane/Shoulder
- Traffic Signals
- Park
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

N



Other Modes

Other modes of transportation considered as part of the Sandy Transportation System Plan include air, water, rail, and pipeline transport. At the present time, the City of Sandy is not directly served by any of these modes, but residents and businesses can access them from the surrounding region, which would typically require motor vehicle travel.

Air

Regional, national, and international freight and passenger air travel are provided at the Portland International Airport (PDX), located approximately 25 miles west of the city. PDX is accessible via transit by taking SAM to the Gresham Transit Center, transferring to the MAX Blue Line, and transferring again to the MAX Red Line at the Gateway Transit Center. Private, corporate, and light aircraft transport are also available at the Troutdale Airport (approximately 15 miles west of the city). Furthermore, five small privately-held landing strips (McKinnon Enterprises, Sandy River landing strip, County Squire Airpark, Eagle Nest Ranch, and Krueger) are located within a five-mile radius of the city.

Rail

Regional, national, and international freight and passenger rail service are available for the residents and businesses of Sandy at several locations in the Portland Metro Region. Freight rail services are available from three national carriers (Burlington Northern Santa Fe Railroad, Union Pacific Railroad, and Southern Pacific Railroad), as well as several other short line freight rail companies. Long-haul passenger rail service is available from Amtrak.

Rail services are also available in Hood River, with passenger service provided by Amtrak. Freight rail is also served in the Columbia River gorge, but there are no intermodal facilities of significance in the area for transferring goods.

Water

Regional, national, and international freight water transport is currently available at the Port of Portland. Tourist-oriented passenger water transport service is also available in the Portland Metro Region.

Pipeline/ Transmission Line

Natural gas service is available in the City of Sandy through feeder lines, but no major transmission pipelines for natural gas, oil, or any other commodity are currently available in the city.

Motor Vehicles

Many local trips within Sandy, and most regional trips from, to, and through the city are made via automobile. This assessment of the existing motor vehicle facilities provides a description of the physical roadway network, how it is being managed, and how it is performing under traffic demands in 2008.

System Description

The motor vehicle system within the City of Sandy includes city streets, county roadways, and state highways. The following sections describe the physical characteristics of the existing motor vehicle facilities as well as their designated management objectives.

Functional Classification

A functional classification system categorizes roadways by the nature of service they are intended to provide. Within any city, there are competing travel needs and varying driver expectations throughout the transportation network. Designating the intended functions of roadways allows for proper design and management to achieve travel objectives and provide a balanced transportation system.

The schematic diagram below is useful for illustrating the competing functionalities of roadway facilities as they relate to access, mobility, multi-modal integration, and facility design. For example, as the level of mobility increases (bottom axis), the provision for non-motor vehicle modes (top axis) decreases accordingly. Similarly, as the provision of access is given priority (left axis), the facility design (right axis) dictates slower speeds, narrower travel ways, and non-exclusive facilities. The goal of assigning functional classes for particular roadways is to provide a suitable balance of these four competing objectives.

The diagram shows that as street classifications progress from local to collector to arterial to freeway (top left corner to bottom right corner) the following occurs:

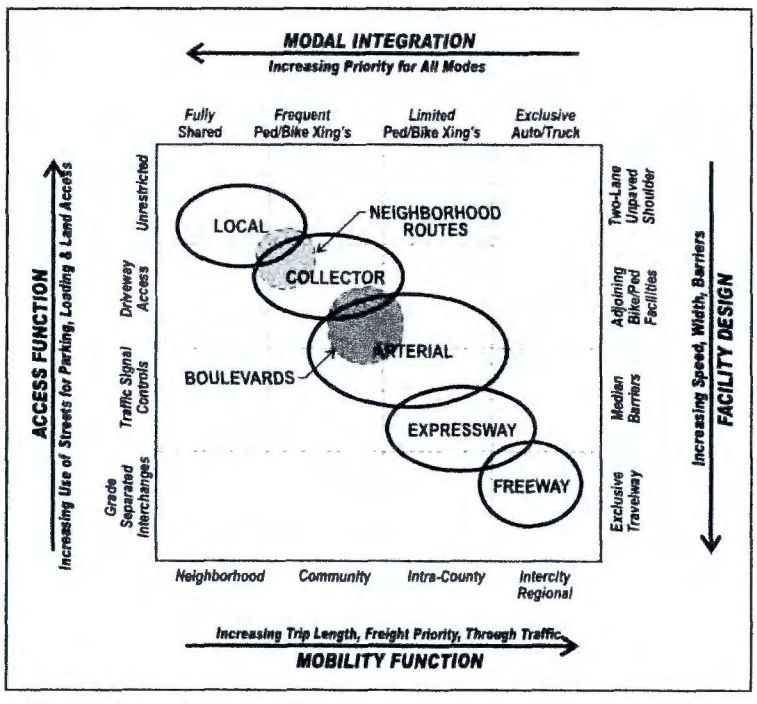


Figure 3-10: Roadway Functional Classification Characteristics

- *Mobility Increases* – These routes become attractive for longer trips between destinations, experience a greater proportion of freight traffic movement, and have a higher proportion of through traffic.
- *Integration of Pedestrian and Bicycle Modes Decreases* – Provisions for adjoining sidewalks and bike facilities are recommended for the local, collector, and arterial classes. However, the frequency of intersection or mid-block crossings for non-motorized vehicles steadily decreases with higher functional classes. As an example, expressway and freeway facilities typically do not allow pedestrian and bike facilities adjacent to the roadway and crossings are often grade-separated to enhance mobility and safety.
- *Access Decreases* – Provisions for parking, loading, and direct land access are reduced. This occurs through application of parking regulations, access control, and access spacing standards (see opposite axis).
- *Facility Design Standards Increase* – Roadway design standards require increasingly wider and faster facilities leading to exclusive travel ways for autos and trucks only. The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders.

The City of Sandy, Clackamas County, and ODOT all maintain their own functional classification systems with management objectives identified for each classification. The existing functional classification of the roadways, as classified by the City of Sandy, is shown in Figure 3-11, with descriptions of each classification provided in Table 3-1.

Table 3-1: City of Sandy Roadway Functional Classifications

Classification	Description
Major Arterial	Three to five lane highway, paved width of 54 feet to 80 feet that operates as a two-way or as a one-way couplet. U.S. 26 would be considered as a fully developed major arterial.
Minor Arterial	High-volume, intra-city street providing connectivity and parallel features, with limited access control and a paved width of 38 feet to 50 feet, minimum of three lane cross section. The most critical classification for circulation in the urban areas.
Residential Minor Arterial	A hybrid between minor arterial and collector street which allows moderate to high traffic volumes on streets where over 90 percent of the fronting lots are residential. Intended to provide some relief to the strained arterial system while ensuring a safe residential environment. Paved width of 38 feet to 50 feet, minimum three lane cross section, may include on-street parking.
Industrial Collector	Minimum of 48 feet paved width with one travel lane and one parking lane in each direction, carries truck traffic in industrial areas.
Collector	Connector of local street to minor and major arterials, side street of Central Business District, minimum paved width of 36 feet, provides on-street parking.

Figure 3-11

Existing Roadway Functional Classifications

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

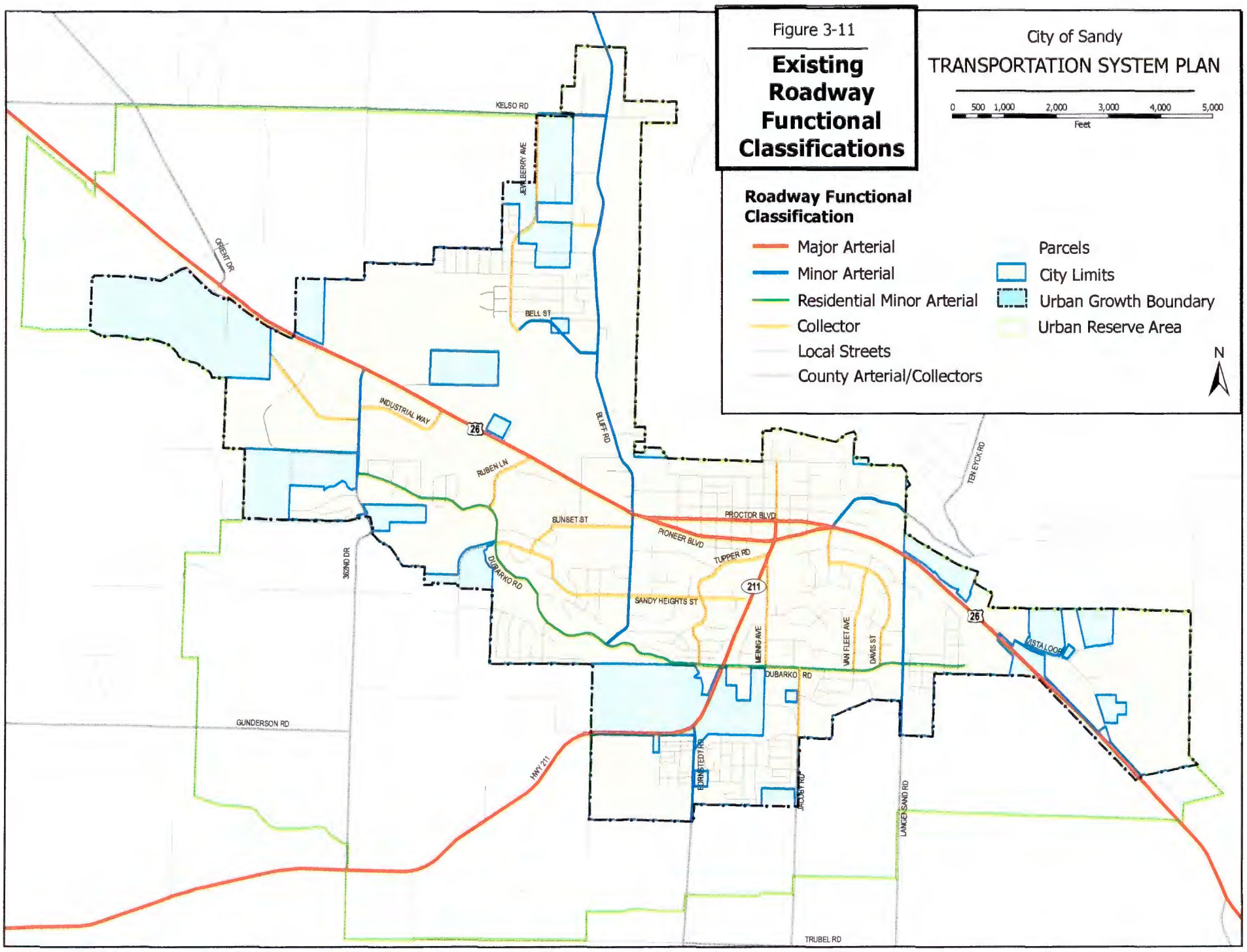
Feet

Roadway Functional Classification

- Major Arterial
- Minor Arterial
- Residential Minor Arterial
- Collector
- Local Streets
- County Arterial/Collectors

- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

N



Clackamas County's Rural Functional Classification differs slightly from the City of Sandy's functional classification plan. The Clackamas County functional classification hierarchy is described in Table 3-2 below.[8]

When comparing the County's functional classification map to the City's (Figure 3-11) for major County roadways feeding the City, such as 362nd Drive, Bornstedt Road, Langensand Road, Ten Eyck Road, Bluff Road, and Kelso Road, it appears that management objectives between these jurisdictions align relatively well. The only notable differences are seen in the designations of Bornstedt Road and Langensand Road, where the City has classified them as minor arterials, but the County has classified them as a collector and local street, respectively. As the sections of these roadways outside of the UGB are annexed into the city in the future, it is likely that improvements will be necessary to meet City design standards for the appropriate functional classification.

Table 3-2: Clackamas County Roadway Functional Classifications

Classification	Description
Freeway/ Expressway	Serves interregional and intraregional trips. Carries heavy volume at high speed.
Major Arterial	Carries local and through traffic to and from destinations outside local communities and connects cities and rural centers. Moderate to heavy volume; moderate to high speed.
Minor Arterial	Connects collectors to higher order roadways. Carries moderate volume at moderate speed.
Collector	Principle carrier within neighborhoods or single land use areas. Links neighborhoods with major activity centers, other neighborhoods, and arterials. Generally not for through traffic. Low to moderate volume; low to moderate speed. New collectors should intersect minor arterials rather than major arterials.
Connector	Collects traffic from and distributes traffic to local streets within neighborhoods or industrial districts. Usually longer than local streets. Low traffic volumes and speeds. Primarily serves access and local circulation functions. Not for through traffic. Traffic calming measures may be appropriate. A connector should connect to a collector or minor arterial.
Local	Provides access to abutting property and connects to higher order roads. New local roads should intersect collectors, connectors, or, if necessary, minor arterials. Traffic calming measures may be appropriate. Not for through traffic.
Alley	May be public or private, to provide access to the rear of property. Alleys should intersect local roads or connectors. Not for through traffic.

ODOT has classified US 26 as a Statewide Highway. The management objectives for such facilities are typically to provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreation areas that are not directly served by Interstate Highways. In doing so, the intent is to provide for safe and efficient, high-speed, continuous-flow operation.

[8] Clackamas County Comprehensive Plan, Chapter 5

US 26 is designated as part of the National Highway System, a state Freight Route, and a federal Truck Route. Furthermore, it is designated as an Expressway by ODOT from 362nd Drive west. The city has expressed a desire to re-evaluate the Expressway desigination for US 26 west of 362nd Avenue. These additional designations and their associated management objectives further emphasize a need to prioritize transportation mobility.

In contrast to this, the downtown area encompassing the US 26 couplet of Pioneer and Proctor Boulevards has been designated a Special Transportation Area (STA). In STAs, the primary objective is to provide access to community activities, businesses, and residences and to accommodate pedestrian movement along and across the highway. Public street connections and on-street parking are encouraged and local auto, pedestrian, bicycle, and transit movements to the business district or community center is generally as important as through movement of traffic.

ODOT classifies OR 211 as a District Highway, with an intended function of providing a link between small urban areas and serving local traffic. OR 211 is not designated a state Freight Route or federal Truck Route. The management objective is to provide for safe and efficient, moderate to low-speed operation in urban areas. The City's adopted Bornstedt Village Plan includes a cross section for OR 211 between Arletha and Bornstedt Roads with two travel lanes and a raised median with left turn bays. The City and ODOT have refined the design to address ODOT *Highway Design Manual* specifications.

The management objectives associated with the classifications for US 26 and OR 211 assigned by ODOT are consistent with the major arterial classifications assigned by the City.

Table 3-3: Sandy Arterial and Collector Inventory

Street Name	Functional Classification	Agency	Number of Travel Lanes
US 26	Major Arterial	State	4/5
Pioneer Boulevard (US 26)	Major Arterial	City/State*	2
Proctor Boulevard (US 26)	Major Arterial	City/State*	2
OR 211	Major Arterial	State	2
Kelso Road	Minor Arterial	County	2
362nd Drive	Minor Arterial	City/County	2/3
Bornstedt Road	Minor Arterial	City/County	2
Bluff Road	Minor Arterial	City	2
Ten Eyck Road	Minor Arterial	County	2
Langensand Road	Minor Arterial	City/County	2
Dubarko Road	Residential Minor Arterial	City	2
Industrial Way	Collector	City	2
Bell Street	Minor Arterial	City	2
Jewelberry Avenue	Collector	City	2
Sunset Street	Collector	City	2
Sandy Heights Road	Collector	City	2
Meinig Avenue	Collector	City	2
Tupper Road	Collector	City	2
Jacoby Road	Collector	City	2
Wolf Drive	Collector	City	2
Towle Drive	Collector	City	2
Davis Street	Collector	City	2
Van Fleet Avenue	Collector	City	2

* ODOT and the City of Sandy have entered into a formal agreement (No. 21319) outlining authorities over improvement, operation, and maintenance of US 26 between Bluff Road and Ten Eyck Road.

Table 3-3 provides an inventory of all arterials and collectors within the city, showing the agency of jurisdiction and the existing number of travel lanes. In general, minor arterials within the city have not been constructed in accordance with the functional classification description, which required a three-lane cross-section.

Roadway Characteristics

Field inventories were conducted to record the characteristics of major roadways in the City of Sandy. The data collected included posted speed limits, intersection traffic controls, lane geometries and configurations, roadway cross sections, and the presence of on-street parking. These characteristics can be used to define roadway capacities and operating speeds and indicate whether roadways are currently designed and managed in accordance with functional classifications.

The inventory of posted speeds and intersection traffic controls throughout the City of Sandy is shown in Figure 3-12. As shown, the majority of the streets in Sandy are posted at 25 mph. Arterial roadways, such as US 26, OR 211, 362nd Drive, and Bluff Road are posted at higher speeds, generally between 35 and 55 mph. All traffic signals within the City of Sandy are along US 26 and are under ODOT jurisdiction. Traffic controls and lane configurations present at selected study intersections throughout the city are provided in the Motor Vehicle Volumes section of this chapter (see Figures 3-16a and 3-16b).

In general, parking is allowed on city streets where the existing right-of-way and cross-section can accommodate parked cars unless specifically prohibited through signing or curb markings, which is done on a case-by-case basis where parking activity has been determined to be undesirable for safety or operational reasons. The frequency of on-street parking is often determined by the presence of nearby attractions and availability of adequate pavement width.

On-street parallel parking is available on the south side of US 26 between Industrial Way and Kate Schmitz Avenue, as well as between University Avenue and approximately 100 feet west of Bluff Road. These areas are not designated for parking, but cars often park on the shoulder where there is adequate width. Marked on-street parking is also generally available along both Pioneer and Proctor Boulevards between Bluff Road and Ten Eyck Road. One-way streets between Proctor and Pioneer, such as Strauss Avenue, Revenue Avenue and Hoffman Avenue, have either marked angle or parallel parking spaces. Streets outside of the downtown area, such as Dubarko Road, Sandy Heights, and Bluff Road, currently have enough width in some segments to accommodate on-street parking. Once Bluff Road north of US 26 is developed to its ultimate cross-section on-street parking will be eliminated.

Figure 3-12

Existing Speed Limits and Traffic Controls

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Existing Posted Speeds

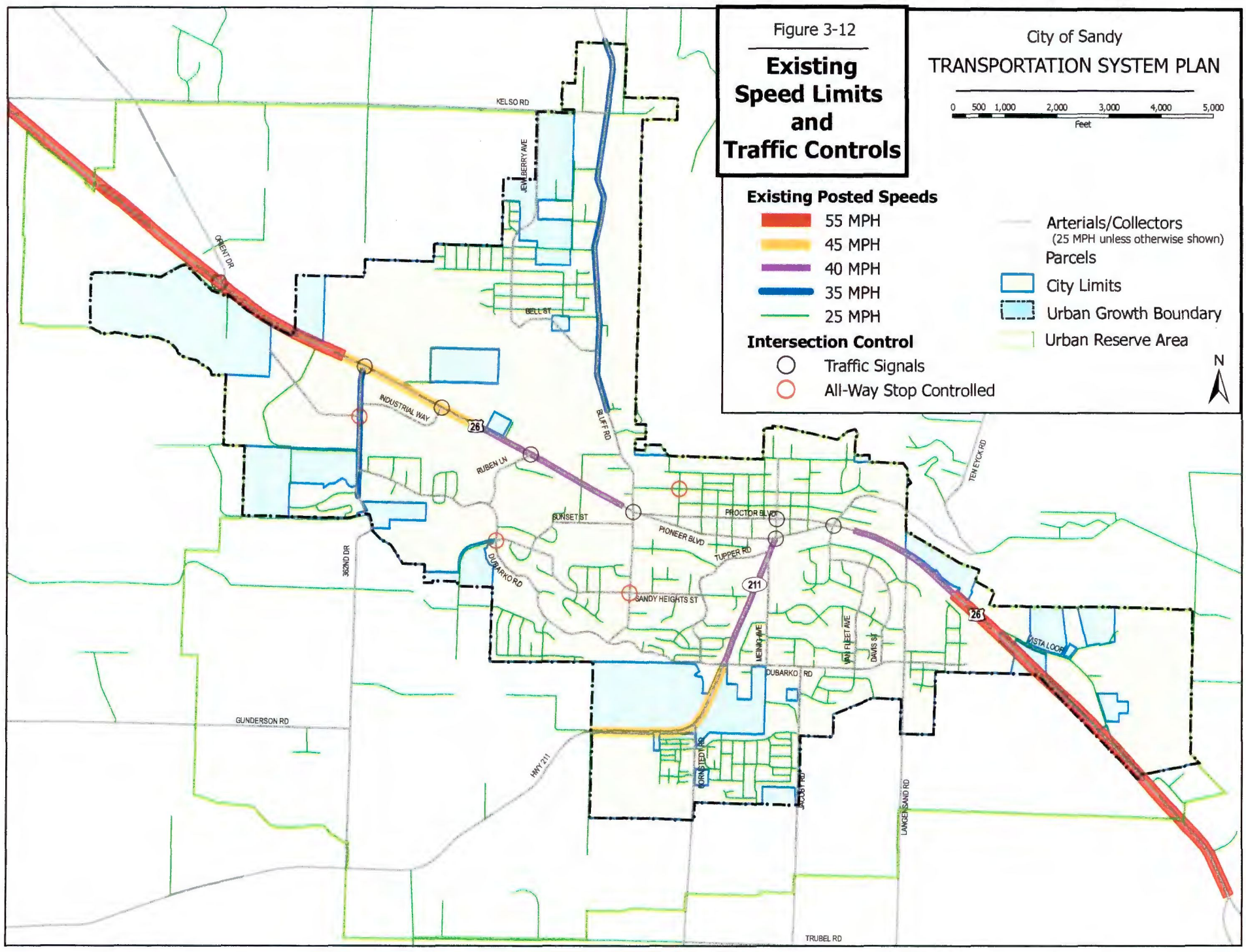
- 55 MPH
- 45 MPH
- 40 MPH
- 35 MPH
- 25 MPH

Intersection Control

- Traffic Signals
- All-Way Stop Controlled

- Arterials/Collectors (25 MPH unless otherwise shown)
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

N



Access Management

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, reduced accident rates, less need for additional highway capacity, conservation of energy, and reduced air pollution.

The City of Sandy, Clackamas County, and ODOT all have adopted access spacing standards. The City of Sandy standards require a minimum of 150 feet between access points on arterials and collectors. Direct access to arterial or collector streets is prohibited if an alternative exists. Shared access points to the collector or arterial streets are required when no alternative access exists. The City also maintains a preferred block length maximum of 400 feet.

Access spacing on many streets within the city does not comply with adopted standards. However, it should be pointed out that in most cases the access spacing on Bluff Road, Dubarko Road, and other minor arterials was established prior to the adoption of spacing standards.

Clackamas County has access spacing guidelines in their Roadway Standards that recommend distances between public streets and driveways of 1,000 feet on major arterials, 600 feet on minor arterials, and 150 feet on collectors (no requirement on local roads)..

The ODOT access management standards, as defined in the *1999 Oregon Highway Plan*[9] and OAR 734-051 call for minimum distances between access points on the same side of the highway. The standards vary depending on the highway classification and the posted speed as shown in Table 3-4.

Table 3-4: ODOT Access Management Standards within Sandy

Facility	Segment	Highway Classification	STA	Posted Speed Limit (mph)	Minimum Access Spacing Standard
US 26	19.96 to 22.66	Statewide Expressway		55	2,640 ft *
	22.66 to 23.31	Statewide		45	990 ft
	23.31 to 23.81	Statewide		40	990 ft
Eastbound	23.81 to 24.66	Statewide	Yes	25	**
Westbound	23.87W to 24.63	Statewide	Yes	25	**
	24.66 to 25.33	Statewide		40	990 ft
	25.33 to 38.71	Statewide		55	1,320 ft
OR 211	5.94 to 5.88	District		25	350 ft
	5.88 to 5.62	District		40	500 ft
	5.62 to 4.63	District		45	500 ft
	4.63 to 1.30	District		55	700 ft

*Private access on Expressways is discouraged.

** Minimum access management spacing for public road approaches is the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum access management spacing for driveways is 175 feet (55 meters) or mid-block if the current city block is less than 350 feet (110 meters).

[9] *1999 Oregon Highway Plan* – August 2005 Amendment, Oregon Department of Transportation, 2005.

Under existing conditions, access spacing on most segments of US 26 does not meet ODOT standards. However, east of the downtown where there is less urban development and fewer highway commercial developments, the access density is considerably lower. On OR 211, access spacing is relatively good, with few driveways or public street intersections between US 26 and Bornstedt Road. The City's Bornstedt Village Plan calls for public street connections, rather than private driveways, on the south side of OR 211 within the plan area.

To balance the need between access and mobility concerns, ODOT has the option to acquire access control along their facilities. ODOT has previously acquired access control along US 26 from near Orient Drive to Bluff Road and from Ten Eyck Road to near Luzon Lane. Where access control exists, no right of access between the property and the highway remains, as it may have been acquired or eliminated by law. Where no right of access is present, an application for an approach permit cannot be accepted.

Reservations of access represent specific locations where access rights remain, include maximum approach widths allowed, and sometimes include use restrictions. A reservation of access affords the property owner the right to apply for an approach permit, which is reviewed under current ODOT access management regulations (OAR 734-051) but does not guarantee ODOT approval for a driveway at that location for the proposed use of the property. Existing reservations of access can be relocated or slightly modified upon approval from ODOT through a process called an "indenture of access."

Emergency Routes

The designation of emergency routes is not a required element of a TSP, but is a common practice by first responders to identify critical response routes to destinations throughout the city. Where such routes have been designated, it is important for them to be recognized in the TSP to ensure management objectives do not conflict with emergency vehicle access and efficient travel.

Through discussions with the Sandy Fire Department, there are not currently any specific emergency routes designated through the city. However, first responders typically use the city's arterial and collector network to reach their destinations.

Pavement Conditions

The City of Sandy maintains records of the pavement condition on all roads under their jurisdiction as part of their ongoing Pavement Management System (PMS). Pavement conditions are rated in a Pavement Condition Index (PCI), where ratings of 0 to 24 are considered "Poor", 25 to 49 are considered "Fair", 50 to 69 are considered "Satisfactory", and 70 to 100 are considered "Good". Data on pavement conditions is collected by the City and data for US 26 and OR 211 is provided by ODOT. Figure 3-13 shows the PCI ratings for all streets in the city. In general, most of the City streets are in "Good" condition, with pavement on US 26 rated as "Satisfactory". However, there are three sections of roadway within the city that are considered to be in poor condition: OR 211, Tupper Road north of Sandy Heights Street, and Vista Loop Drive.

Figure 3-13

Pavement Conditions

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

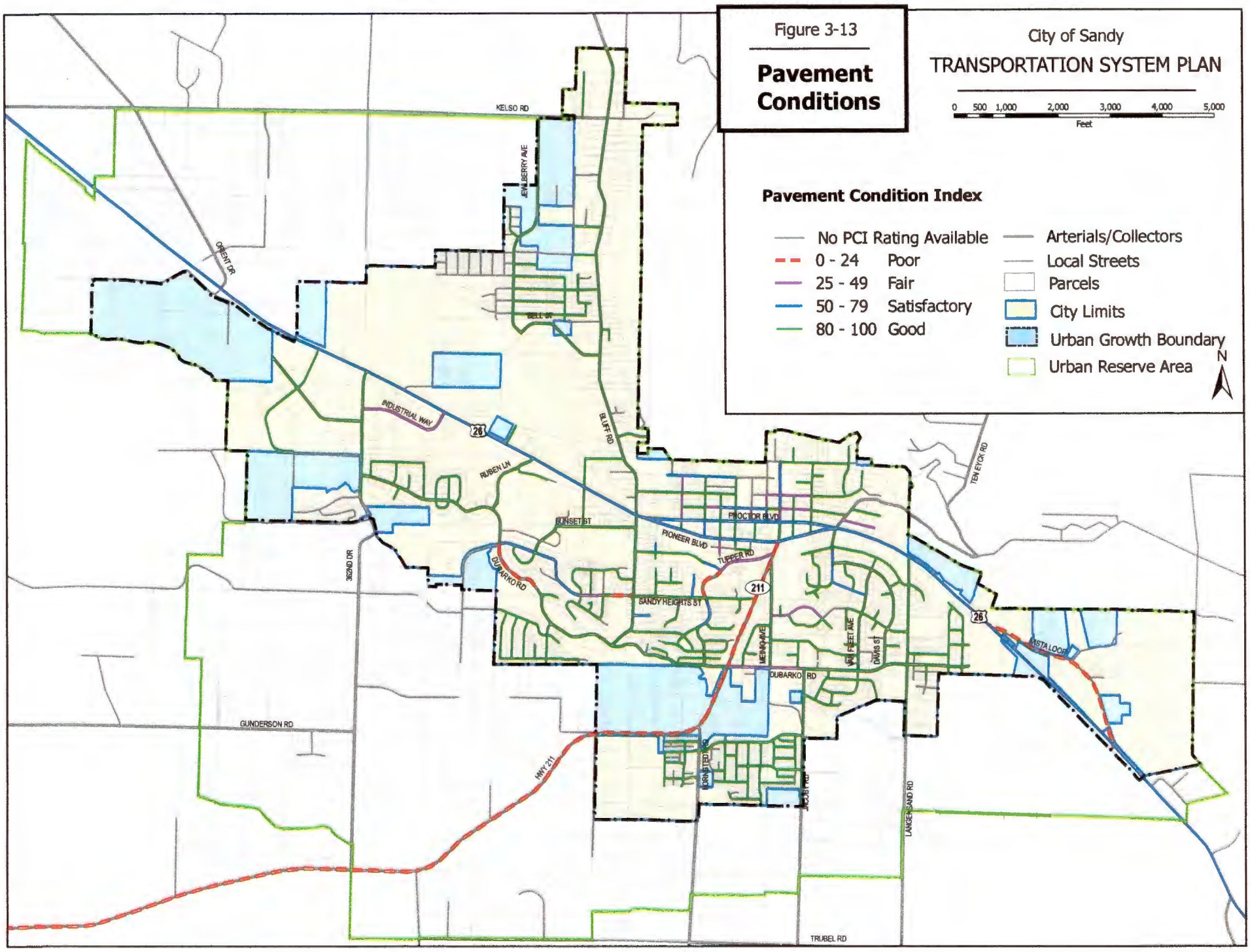
Feet

Pavement Condition Index

- No PCI Rating Available
- 0 - 24 Poor
- 25 - 49 Fair
- 50 - 79 Satisfactory
- 80 - 100 Good

- Arterials/Collectors
- Local Streets
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

N



Motor Vehicle Volumes

Obtaining and analyzing data describing motor vehicle volumes throughout the city provides an understanding of how the transportation system is being used and whether or not it is adequately serving demand. This section characterizes past and present motor vehicle demands that will be one of the keys to identifying system deficiencies.

Data Collection

To assess area travel patterns, motor vehicle volume data was collected from a variety of sources. Data has been obtained from two Automatic Traffic Recorder (ATR) stations along US 26 that continuously record information related to motor vehicle types and volumes for every hour of the year: the first ATR is located in Gresham (ATR 26-003), approximately 8 miles west of Sandy; the second ATR is located in Rhododendron (03-006), approximately 18 miles east of Sandy.

This data was supplemented with historic 24-hour directional counts on area roadways obtained from ODOT and Clackamas County databases, as well as new 24-hour counts taken at select locations throughout the city.

Finally, manual turn movement counts were collected for study area intersections. Along US 26, counts were collected during the first week of January 2006 on a Friday afternoon between 3:00 and 6:00 p.m., which is reported to be the typical peak period of traffic through the City. An average annual growth rate of 2.5% per year, which has been used for other recent transportation studies, was applied to these counts to reflect traffic volumes for the year 2008. For other study intersections, including those along OR 211, manual counts were collected on an average weekday in May 2008 between 4:00 and 6:00 p.m.

Seasonal Traffic Trends

Because ODOT mobility standards are based on the 30th highest annual hour of traffic volumes (30 HV) experienced within the year, seasonal factors were applied to the January (US 26) and May (OR 211) counts for the year 2008 to better represent volumes seen during that time. To determine when the 30th highest annual hour occurs, data was examined from the two ATR stations to calculate a factor for traffic along US 26. Because there are no ATR stations directly on OR 211, ODOT's ATR Characteristics Table was used to calculate a factor for that corridor.

Since the ATR stations on US 26 are constantly collecting data year-round, they can be used to assess how traffic volumes change throughout the course of the year. Figure 3-14 provides profiles of traffic volumes from the Gresham and Rhododendron ATR stations through the year 2007. The Gresham ATR shows peak travel occurring in the months of July and August, with seasonal variations no greater than 13% during any month of the year, which is typical of commuter-based travel. However, while the Rhododendron ATR also shows peak travel occurring in July, seasonal variations throughout the year reached nearly 75% during some months, which is common in corridors characterized by recreation-based travel.

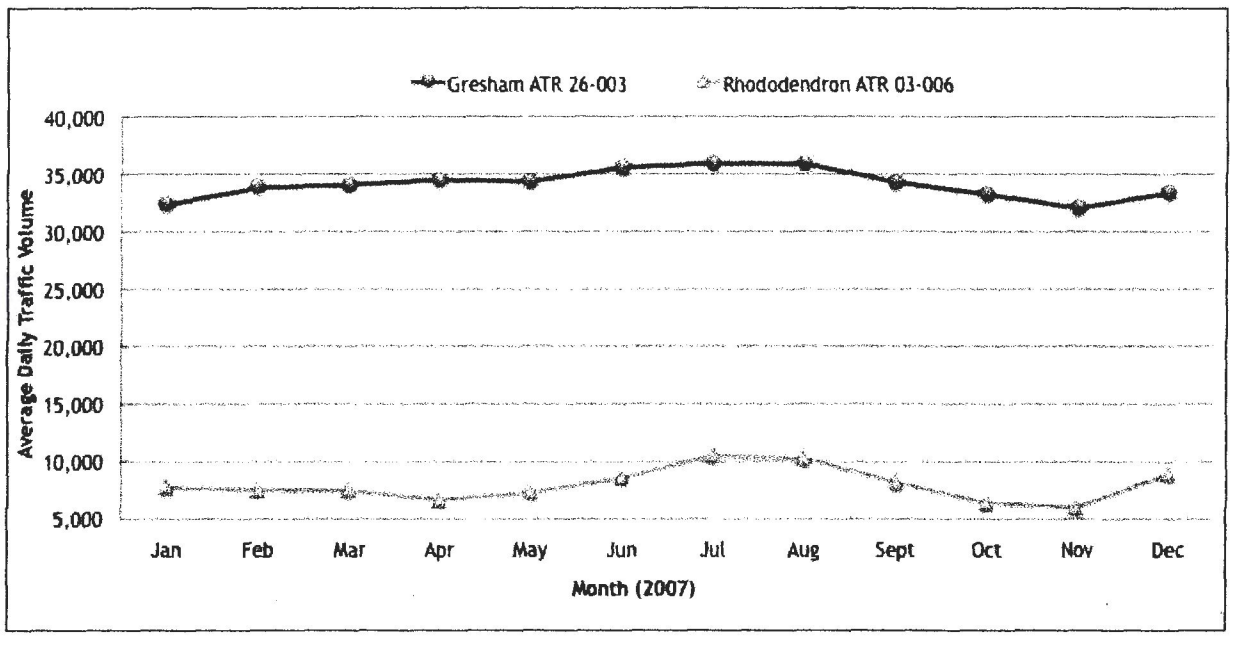


Figure 3-14: Annual Traffic Variations along US 26 (2007)

While both commuter-based and recreation-based trips are common along US 26, the proximity to the Metro area, developed land within Sandy, and major area roadways (e.g., OR 212, OR 211, Bluff Road, Orient Drive, and Ten Eyck Road), affects the influence of different trip types on travel characteristics. As such, the segment of US 26 west of the downtown is strongly influenced by commuter-based trips. Therefore, a seasonal factor of 1.13, derived from the Gresham ATR, was applied to the January counts to replicate 30th highest hour volumes that occur in July and August.

Because the segment of US 26 east of the downtown is more heavily influenced by recreation-based trips than travel occurring at the Gresham ATR, but still more heavily influenced by commuter-based trips than travel occurring at the Rhododendron ATR, the seasonal factor of 1.23 for this area was derived by averaging the data from both ATRs.

The 30 HV for OR 211 was determined by using an ATR station with similar characteristics from ODOT's ATR Characteristics Table. Using this methodology, the ATR station at Modoc Point (18-022) was selected, resulting in a seasonal factor of 1.23.

In selecting an analysis time period for City intersections, it was decided that using an average weekday during the school year was more appropriate than using the 30 HV. Therefore, no factoring was applied to the May traffic counts obtained.

Daily Traffic Volumes and Historical Growth

Figure 3-15 displays select count locations throughout the city and shows how traffic volumes have grown since 1994, which represents the "existing conditions" year from the previous Sandy TSP. Due to the availability of data, the locations used to determine traffic growth are primarily on state highways and county roads. On average, traffic volumes throughout the city have grown approximately 2.5% per year.

It can also be seen that traffic volumes are significantly higher along US 26 than on any other corridor in the city. However, as discussed later (see US 26 Through-Travel), most of this traffic is considered to be "through" traffic, with no intention of stopping anywhere within the city. Also, the arterials of OR 211, Bluff Road, 362nd Drive, Dubarko Road, and Ten Eyck Road experience the highest traffic volumes, with relatively low volumes occurring on other streets. In all cases, traffic volumes appear to be consistent with the functional classifications assigned.

It was also noticed through analysis of the 24-hour directional counts that significant peaks in traffic volume occur during the morning period between 7:00 a.m. and 8:00 a.m. on Bluff Road north of Hood Street and on Pleasant Street between Strauss Avenue and Alt Avenue. These peaks are likely the result of activity associated with the schools.

Weekday PM Peak Hour Volumes

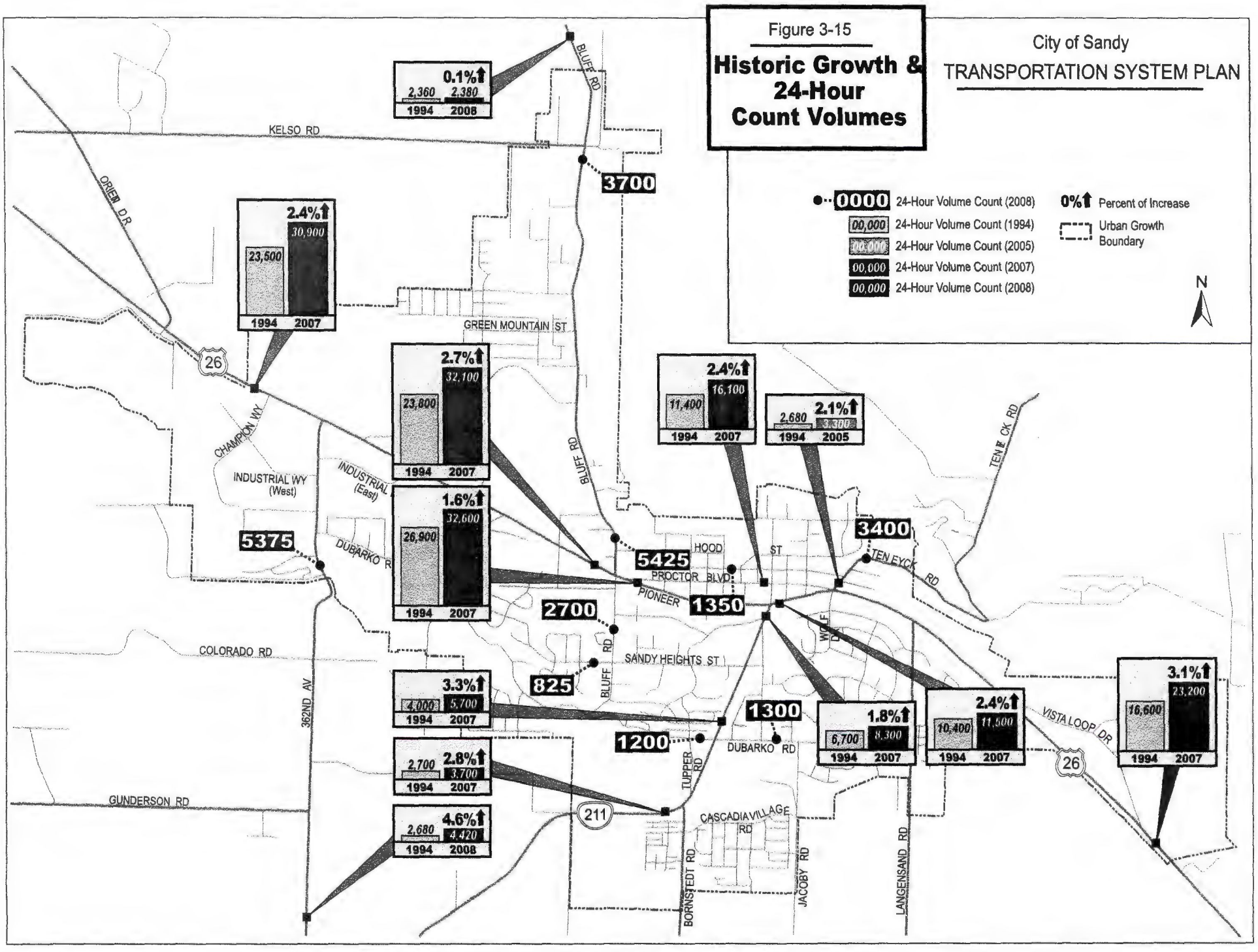
As previously described, manual turn movement counts were collected for study area intersections during weekday p.m. peak periods. Along the highway corridors of US 26 and OR 211, seasonal factors were applied to represent the 30th highest hour of traffic volumes in the year. Counts taken on City streets were not factored and represent a typical spring weekday p.m. peak hour. The final traffic volumes developed for the study intersections, which were used in the operations analysis to determine system deficiencies, are displayed in Figures 3-16a and 3-16b.

Figure 3-15

Historic Growth & 24-Hour Count Volumes

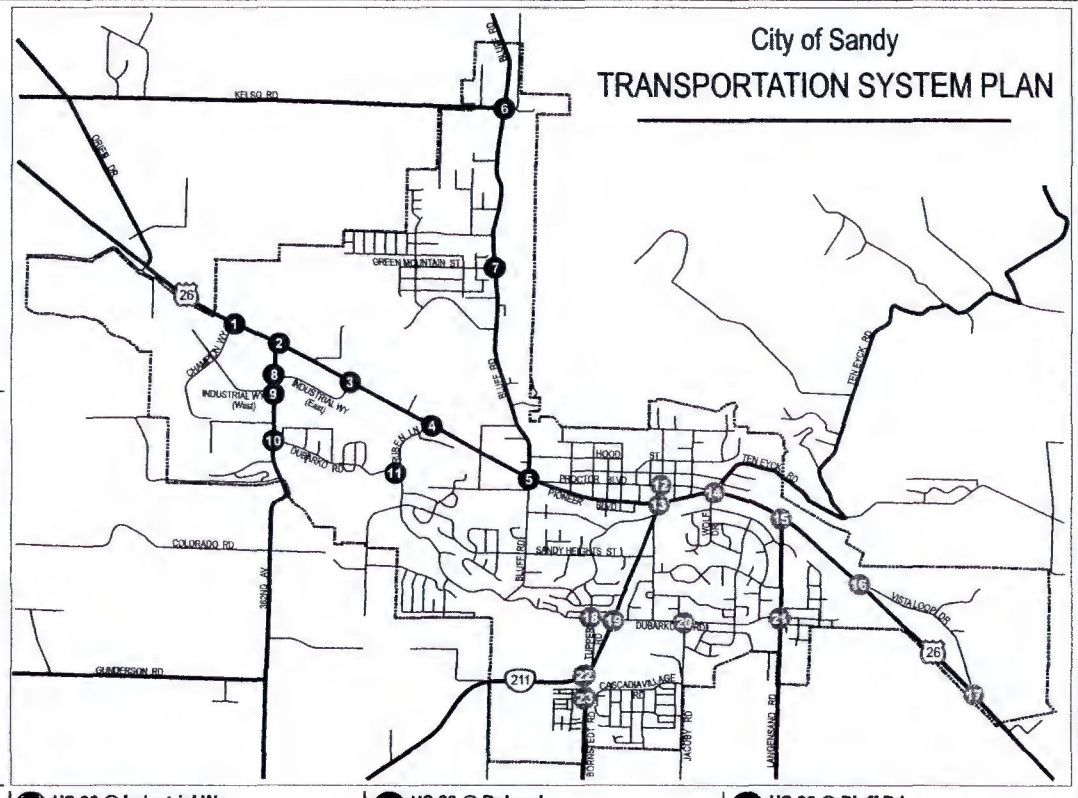
City of Sandy

TRANSPORTATION SYSTEM PLAN

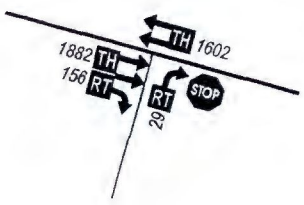


City of Sandy

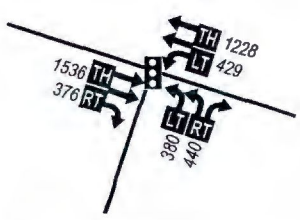
TRANSPORTATION SYSTEM PLAN



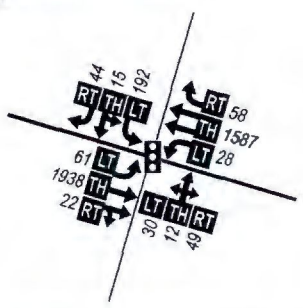
1 US 26 @ Champion Wy



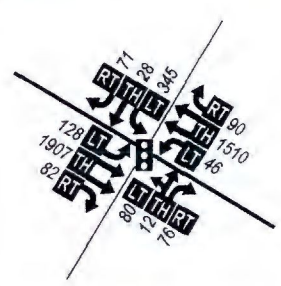
2 US 26 @ 362nd Dr



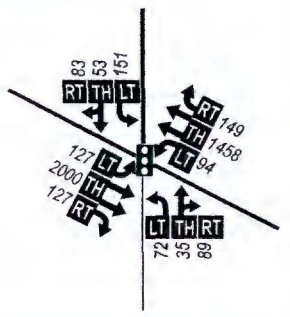
3 US 26 @ Industrial Wy



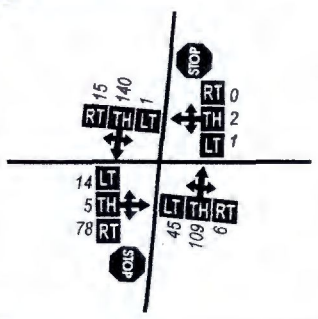
4 US 26 @ Ruben Ln



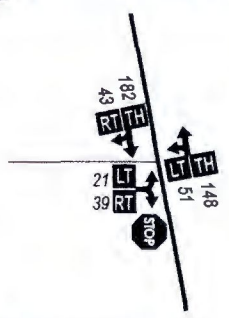
5 US 26 @ Bluff Rd



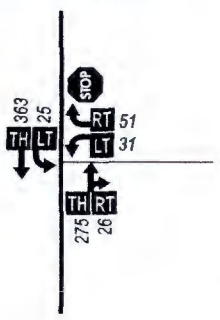
6 Kelso Rd @ Bluff Rd



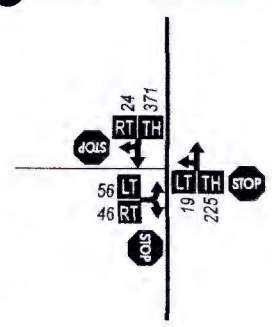
7 Green Mountain St @ Bluff Rd



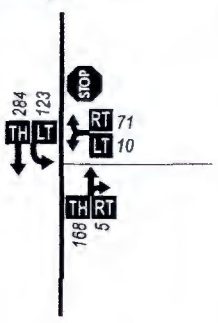
8 Industrial Way East @ 362nd Dr



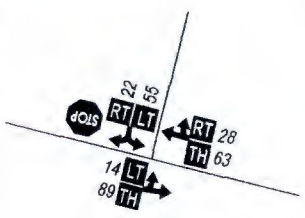
9 Industrial Way West @ 362nd Dr



10 Dubarko Rd @ 362nd Dr



11 Ruben Ln @ Dubarko Rd



LEGEND

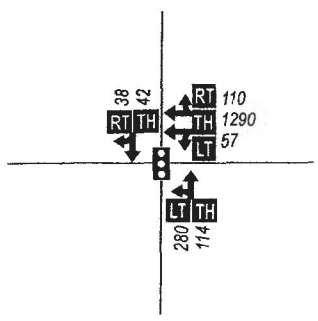
- (00) - Study Intersection Number (This Page)
- (00) - Study Intersection Number (Next Page)
- ← - Lane Configuration
- STOP - Stop Sign
- - Traffic Signal
- 00 - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left-Thru-Right)

N

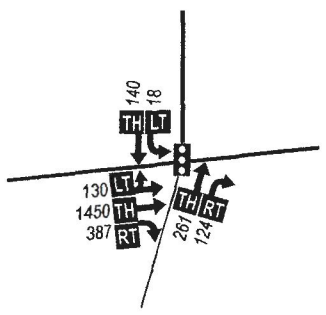
Figure 3-16a

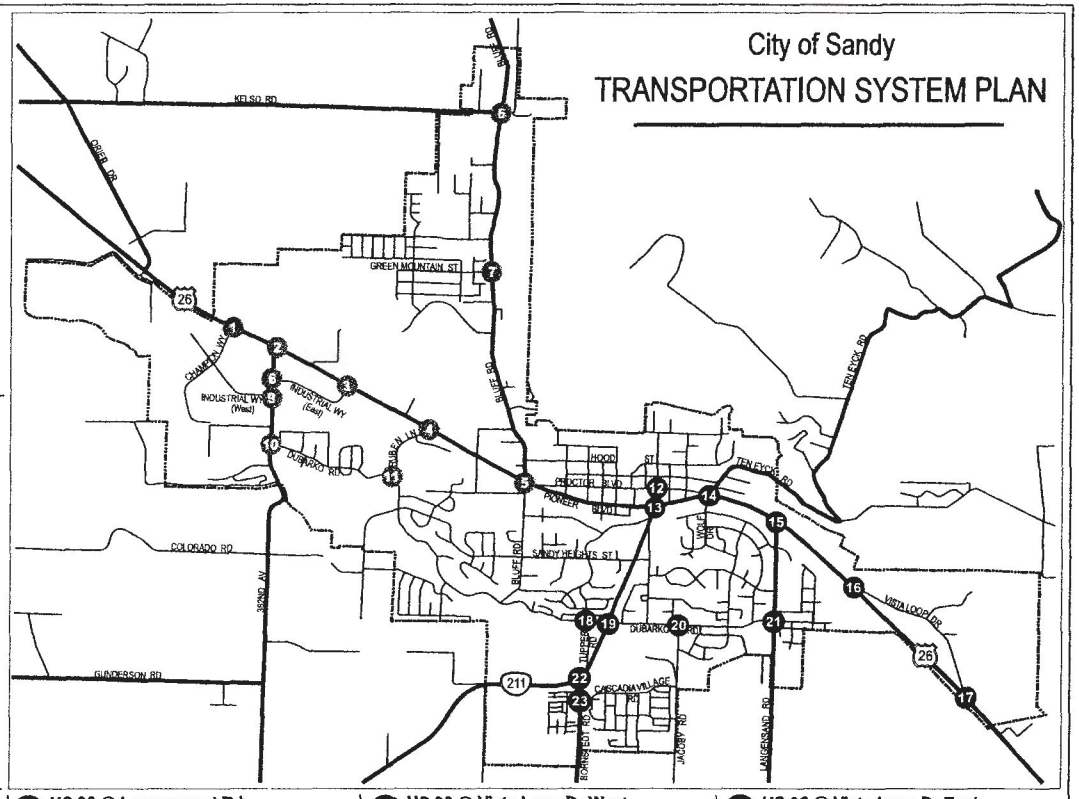
EXISTING PM PEAK HOUR TRAFFIC VOLUME COUNTS 2008 UPDATE

12 Proctor Blvd @ Hwy 211

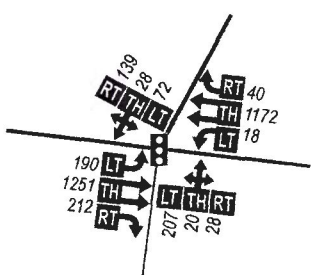


13 Pioneer Blvd @ Hwy 211

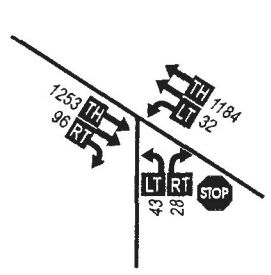




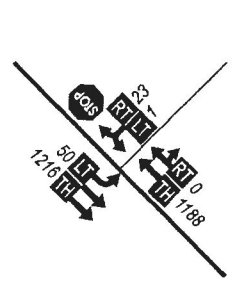
14 US 26 @ Ten Eyck Rd



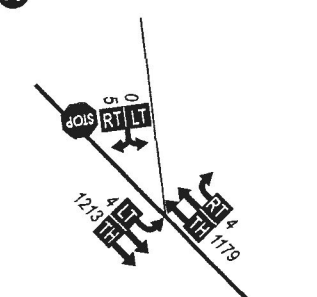
15 US 26 @ Langensand Rd



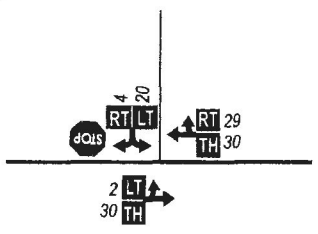
16 US 26 @ Vista Loop Dr West



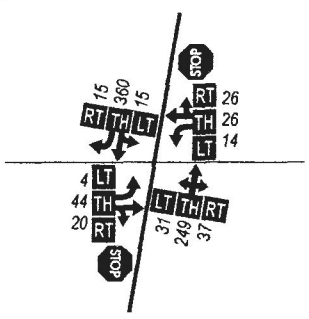
17 US 26 @ Vista Loop Dr East



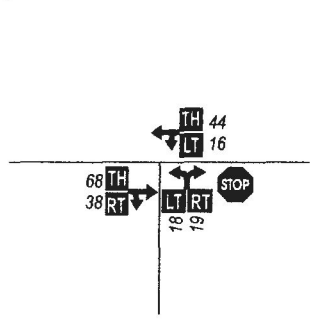
18 Dubarko Rd @ Tupper Rd



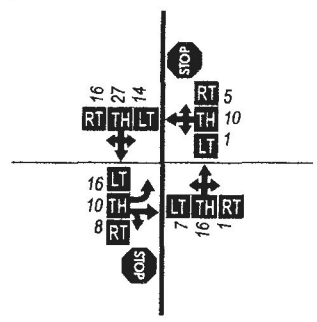
19 Dubarko Rd @ Hwy 211



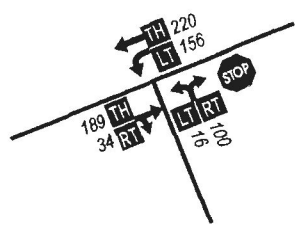
20 Jacoby Rd @ Dubarko Rd



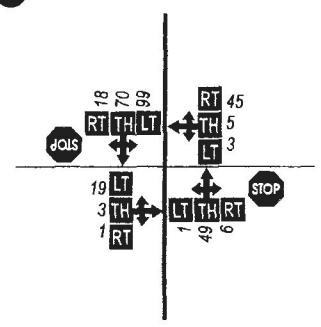
21 Langensand Rd @ Dubarko Rd



22 Bornstedt Rd @ Hwy 211



23 Cascadia Village Rd @ Bornstedt Rd



LEGEND

- (00) - Study Intersection Number (This Page)
- (00) - Study Intersection Number (Previous Page)
- ← - Lane Configuration
- STOP - Stop Sign
- Traffic Signal
- *00* - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left-Thru-Right)

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Figure 3-16b

EXISTING PM PEAK HOUR TRAFFIC VOLUME COUNTS 2008 UPDATE

US 26 Through-Travel

To better understand the nature of trip-making along US 26 through Sandy, an origin-destination (OD) study was preformed to assess the number of trips being made during the 30 HV[10] that were associated with activities within the city compared to those that are merely passing through. This was accomplished by setting up synchronized video recording stations on US 26 at Orient Drive (west of the city) and at Luzon Lane (east of the city), along with license plate recognition software to identify vehicles passing through each station and to determine the amount of time taken by each vehicle to travel from one station to the next.

The data provided by this survey allows for differentiation between three distinct trip types that comprise the traffic stream on this highway. The three types of trips, which are categorized based on whether their origin and/or destination are internal or external to the study area (i.e., the Sandy UGB), are as follows:

- **Internal-Internal trips**: These trips begin and end within the Sandy UGB and, therefore, would not be recorded at the video stations.
- **Internal-External and External-Internal trips:** These include trips with either an origin or destination in Sandy, with the opposite trip end in a location outside the Sandy UGB. This includes all trips that are ultimately passing through the city, but stop for gas, food, or other services.
- **External-External trips:** This includes trips that do not have an origin or destination in the city. In other words, these are purely "through trips" that do not stop in Sandy.

Trips recorded at both stations were grouped together in 15-minute increments, based on the total amount of time elapsed from when they were recorded at the entry station, and then again at the exit station. For the purposes of this study, external-external type trips (which are assumed to make no stops within the city) were considered to take 15 minutes or less. Trips that last longer were considered to be either an external-internal trip or an internal-external trip, because the person making the trip most likely stopped to do something in the city before leaving.

Table 3-5 shows the number of through vehicles recorded in each direction of travel on US 26, as well as the percentage of the total volume. As can be seen in the table below, most through trips were able to pass entirely through the city within 15 minutes. It is also shown that during this time period, approximately one-third of the trips entering the city on US 26 are traveling through, whether an intermediate stop is made or not.

Of course, it should be recognized that some stops within the city could take longer than one hour and that there are some trips entering from US 26 that leave the city through another route, such as OR 211 or Bluff Road, and such trips would not be reflected in this limited survey.

[10] The survey was conducted on Friday August 8, 2008, between 4:00 and 5:00 p.m.

Table 3-5: Through-Trip Characteristics on US 26

Time Interval	Eastbound US 26 at Orient drive		Westbound US 26 at Luzon Lane	
	Through Trips	Percent of Total Trips	Through Trips	Percent of Total Trips
≤ 15 min.	333	21%	304	39%
15 to 30 min.	67	4%	42	5%
30 to 60 min.	18	1%	8	1%
Total	**418**	**26%**	**354**	**45%**

Truck Freight

US 26 is classified as a Statewide Highway on the National Highway System with additional designations as a State Freight Route and Federal Truck Route along its entire length. The ODOT Motor Carrier Transportation Division has designated US 26 through the city as a route that allows over-dimension loads, including those of widths up to 14 feet. Trucks with triple-trailers are allowed to continuously operate along US 26 between Portland and Sandy and are allowed to operate under holiday restrictions between Sandy and Government Camp. There are no bridges with additional weight or width restrictions along US 26 in or around Sandy.

OR 211 has no state or national freight route or truck route classification, and the typical restrictions for height, width, and weight apply to all heavy vehicles using this highway. There are no bridges with additional weight or width restrictions along OR 211 in or around Sandy.

There are no other roadways within the city that have been specifically designated for truck use.

Figure 3-17 shows the corridors within the city where heavy vehicle traffic was recorded during the weekday p.m. peak hour. As can be seen in the figure, the majority of the heavy vehicle traffic was recorded on US 26, which is consistent with the State Freight Route and Federal Truck Route designations. Lesser volumes of heavy vehicle traffic were also recorded along other routes, such as 362nd Drive, Bluff Road, OR 211, and Industrial Way. However, on most city streets, truck traffic is fairly low.

Figure 3-17

Heavy Vehicle Volumes

Weekday PM Peak Hour

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Hourly Truck Volume

Arterials/Collectors

Local Streets

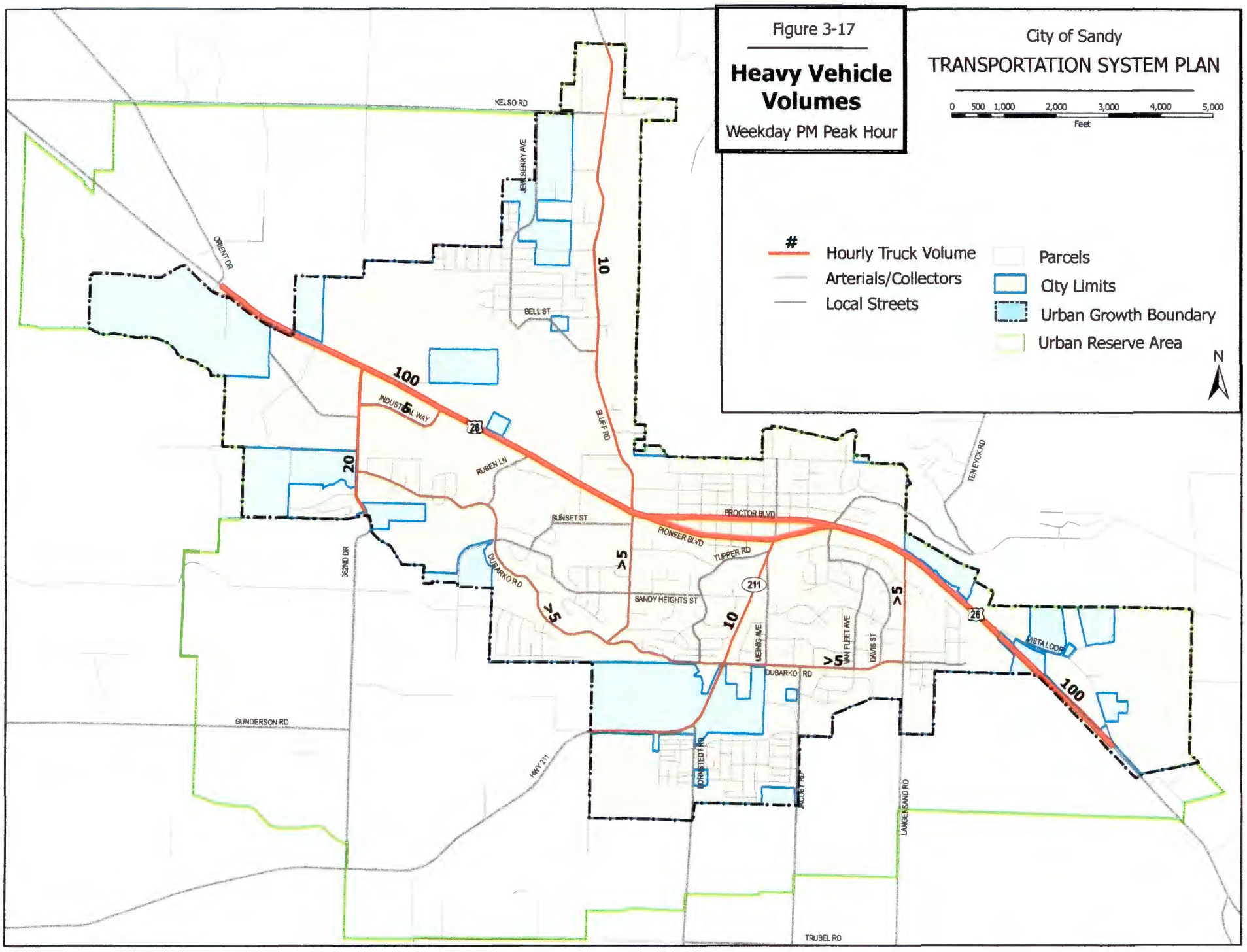
Parcels

City Limits

Urban Growth Boundary

Urban Reserve Area

N



Traffic Operations

To determine the quality of motor vehicle traffic operations within the City of Sandy, the previously noted data describing the transportation system design and usage was analyzed to determine the performance of key study intersections.

Measures of Effectiveness

Level of service (LOS) is used as a measure of effectiveness for the operation of both signalized and unsignalized intersections. It is similar to a "report card" rating and is based upon average vehicle delay. Level of service A, B, and C indicate conditions where vehicles can move freely. Level of service D and E are progressively worse. Level of service F represents conditions where drivers experience very long delays, often resulting in long queues at intersection approaches. Table 3-6 shows a summary of the level of service ratings as they relate to delay, as identified in the 2000 Highway Capacity Manual.[11]

Table 3-6: Level of Service Descriptions

Level of Service	Signalized Intersection Delay (sec)	Unsignalized Intersection Delay (sec)
A	< 10	<10
B	10-20	10-15
C	20-35	15-25
D	35-55	25-35
E	55-80	35-50
F	>80	>50

Volume to capacity ratios (v/c ratios) are another commonly used means of describing intersection operations. Volume to capacity ratios are comparisons of the actual volume using the intersection (or a particular movement) to the maximum volume that could be served. A v/c ratio greater than 1.0 indicates there is more demand for the intersection than it can adequately serve, which often results in long queues at the approaches.

Mobility Standards

The City of Sandy TSP establishes a mobility standard of LOS D for signalized, as well as unsignalized intersections. Therefore, any intersections found to be operating at LOS E or F would be considered "failing" and in need of mitigation.

The *1999 Oregon Highway Plan* (OHP) has established mobility standards based on v/c ratios. The OHP specifies v/c thresholds for each highway classification, reflecting the management objectives for that type of facility. These standards vary with posted speeds and proximity to urban areas. There is also a provision for highways within Special Transportation Areas, such as the US 26 Pioneer-Proctor downtown couplet.

The applicable mobility standard for each intersection is shown in Table 3-7.

[11] *2000 Highway Capacity Manual*, Transportation Research Board, 200

Intersection Operations

Analysis of existing conditions at study intersections was preformed using Synchro, which utilizes the level of service and volume to capacity ratio analysis methodologies outlined in the 2000 Highway Capacity Manual. The analysis was preformed using the existing p.m. peak hour volumes, lane configurations, and traffic controls shown in Figures 3-16a and 3-16b. The results are displayed in Table 3-7.

Table 3-7: Weekday PM Peak Hour Intersection Operations (2008)

Intersection	Mobility Standard (LOS or v/c)	Average Delay (Seconds)	Level of Service (LOS)	volume/ capacity ratio (v/c)
City Intersections				
2-Way Stop Controlled Intersections				
Kelso Road/ Bluff Road	D	10.5	A/B	0.15
Green Mountain/ Bluff Road	D	10.8	A/B	0.09
Industrial Way East/ 362nd Drive	D	12.7	A/B	0.15
Dubarko Road/ 362nd Drive	D	10.8	A/B	0.13
Dubarko Road/ Ruben Lane	D	10.1	A/B	0.12
Dubarko Road/ Tupper Road	D	9.0	A/A	0.03
Dubarko Road/ Jacoby Road	D	9.4	A/A	0.05
Dubarko Road/ Langensand Road	D	9.4	A/A	0.02
Cascadia Village Drive/ Bornstedt Road	D	12.4	A/B	0.05
All-Way Stop Controlled Intersections				
Industrial Way West/ 362nd Drive (3-way)	D	9.2	A	0.37
ODOT Intersections				
Signal Controlled Intersections				
US 26/ 362nd Drive	0.70	36.3	D	0.91
US 26/ Industrial Way	0.70	23.3	C	0.87
US 26/ Ruben Lane	0.75	33.8	C	0.93
US 26/ Bluff Road	0.85	24.5	C	0.93
OR 211/ Proctor Boulevard	0.85	55.3	E	>1.00
OR 211/ Pioneer Boulevard	0.85	78.8	E	0.88
US 26/ Ten Eyck Road	0.85	38.1	D	0.88
2-Way Stop Controlled Intersections				
US 26/ Champion Way	0.70	20.8	A/C	0.11
US 26/ Langensand Road	0.85	>50.0	A/F	>1.00
US 26/ Vista Loop West	0.70	18.7	A/C	0.09
US 26/ Vista Loop East	0.70	14.6	A/B	0.01
OR 211/ Dubarko Road	0.80	16.9	A/C	0.19
OR 211/ Bornstedt Road	0.80	12.0	A/B	0.21

Notes: **Shaded cells indicate mobility standard is not being met.**

A/A = major street LOS/minor street LOS

Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection

2-Way Stop delay = highest minor street approach delay

According to Table 3-7, all City intersections are currently operating within mobility standards with a level of service B or better.

However, most of the study intersections under ODOT jurisdiction are not meeting mobility standards, including all signalized intersections in the city. Among these, the intersection of US 26 with Proctor Boulevard is particularly congested, with traffic demands exceeding capacity. Among the stop-controlled intersections, only US 26 at Langensand Road was found to exceed mobility standards, with a v/c ratio over 1.0.

Study intersections on OR 211 are operating well within standards.

Signal Warrant Analysis

A signal warrant analysis was performed for the unsignalized intersection of US 26 at Langensand Road to determine if side-street volumes are high enough to justify (i.e., warrant) the added delays that would be imposed on mainline traffic by construction of a signal. For this analysis, ODOT preliminary signal warrants were assessed using the p.m. peak hour turn movement volume data collected at this intersection. Because drivers are currently using less than 85% of the capacity available on the northbound right-turn movement, 100% of the northbound right-turn volume was discounted from the analysis in accordance with ODOT analysis procedures. The result of the analysis revealed that the signal is not warranted at the 100% or the 70% warrant level.

Signal warrants were not evaluated for any of the other unsignalized study intersections in the city, as peak hour operating conditions were found to be acceptable and traffic volumes on these stop-controlled approaches were determined by inspection to be too low to meet warrants.

Queuing Analysis

An estimate of the 95th percentile vehicle queue for each of the study intersection approach movements was made using SimTraffic modeling software. This value estimates the queue length that would have only a five percent chance of being exceeded during the peak hour and is commonly used for design purposes. Queuing results are summarized in Table 3-8 for intersections experiencing queues that exceeded or approached available storage. Queuing results for all other intersections are included in the technical appendix.

As shown in Table 3-8, queuing is currently only a problem at the signalized intersection along US 26, which were shown failing to meet mobility standards. Queues at unsignalized approaches were generally low.

Table 3-8: 95th Percentile Vehicle Queuing (2008)

Intersection	Approach	Movement	Available Queue Length (ft)	Queue Length (ft)
US 26 @ 362nd Drive	Eastbound	T	3,025	1,050
		R	400	**525**
	Westbound	L	450*	**975**
		T	1,540	875
	Northbound	L	100	**550**
		R	100	**150**
US 26 @ Industrial Way	Eastbound	L	150*	125
		T	1,540	800
	Westbound	L	150*	75
		T	1,800	300
		R	150	25
	Southbound	L	175	125
		LT	175	**200**
		R	175	50
US 26 @ Ruben lane	Eastbound	L	125*	**200**
		T	1,800	1,025
		R	225	175
	Westbound	L	125*	125
		T	2,120	475
		R	100	100
	Northbound	R	25	**75**
	Southbound	L	125	**150**
		R	200	200
US 26 @ Bluff Road	Eastbound	L	125*	**200**
		T	2,120	1,625
		R	125	**150**
	Westbound	L	275	200
		T	2,650	500
		R	125	**175**
	Northbound	L	150	**275**
	Southbound	L	150	**550**
Proctor Boulevard (US 26) @ OR 211	Westbound	T	>5,000	450
	Northbound	LT	275	225
Pioneer Boulevard (US 26) @ OR 211	Eastbound	T	2,775	1,875
		R	125	**200**
	Northbound	R	125	**150**
	Southbound	L	125	50
		T	275	100

Notes: Bold type indicates storage is exceeded.
*Left turn storage followed by two-way left turn lane

Traffic Safety

To analyze the history of traffic safety on the transportation network in Sandy, crash data for all streets within the city was obtained from ODOT for the most recent three-year period available (2005-2007). The individual crashes occurring within this three-year period have been mapped in Figure 3-18. To identify potential deficiencies, crash rates for study intersections were assessed, crash rates for sections of US 26 and OR 211 were compared to statewide average crash rates for similar facilities, crash types were analyzed to identify patterns or trends, and ODOT's Safety Priority Index System was reviewed to identify potentially hazardous locations.

Intersection Crash Rates

Crash rates at study intersections were calculated to identify problem areas in need of mitigation. Because the total number of crashes experienced at an intersection is typically proportional to the number of vehicles entering it, a crash rate describing the frequency of crashes per million entering vehicles (MEV) is used to determine if the number of crashes should be considered high. Using this technique, a crash rate of 1.0 MEV or greater is commonly used to identify when further investigation is warranted. Table 3-9 shows the three-year crash rates at the study intersections.

Table 3-9: Intersection Crash Rates (2005-2007)

Intersection	Crash Rate (MEV)
Dubarko Road @ OR 211	**1.08**
Langensand Road @ Dubarko Road	0.66
Pioneer Boulevard @ OR 211	0.38
Proctor Boulevard @ OR 211	0.33
US 26 @ Bluff Road	0.29
US 26 @ 362nd Drive	0.25
US 26 @ Industrial Way	0.15
US 26 @ Ruben Lane	0.14
Dubarko Road @ 362nd Drive	0.13
Industrial Way West @ 362nd Drive	0.12
US 26 @ Ten Eyck Road	0.10
US 26 @ Langensand Road	0.10
US 26 @ Vista Loop Drive East	0.07
US 26 @ Vista Loop Drive West	0.03
Bornstedt Road @ OR 211	0.00
Industrial Way East @ 362nd Drive	0.00
Ruben Lane @ Dubarko Road	0.00
Cascadia Village Drive @ Bornstedt Road	0.00
Jacoby Road @ Dubarko Road	0.00
Green Mountain Street @ Bluff Road	0.00
Kelso Road @ Bluff Road	0.00
Dubarko Road @ Tupper Road	0.00
US 26 @ Champion Way	0.00

As shown, all study intersections are operating with relatively low crash rates with the exception of the intersection of OR 211 at Dubarko Road. Based on crash data provided for the last three years, there were eight recorded crashes, all of which were angle-type crashes caused by vehicles entering the intersection from Dubarko Road. Seven of the eight crashes involved vehicles on Dubarko Road attempting to cross OR 211 to continue on Dubarko Road. The severity of the crashes ranged from only property damage to serious injuries.

Figure 3-18

Crash Locations (2005 - 2007)

City of Sandy

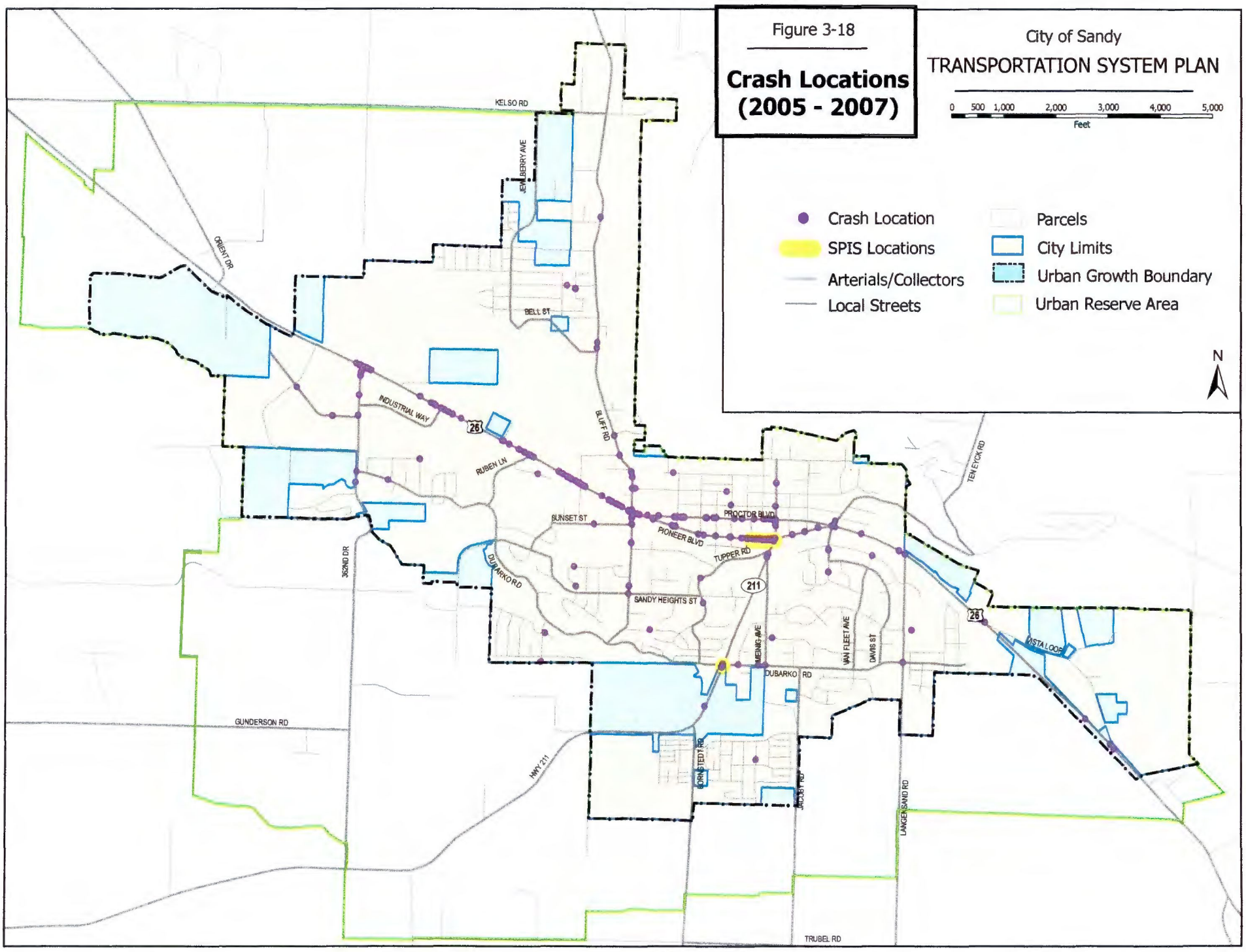
TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

- Crash Location
- SPIS Locations
- Arterials/Collectors
- Local Streets
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

N



This trend may be associated with the nature of traffic movement at this location where vehicles from the stop-controlled Dubarko Road approaches must cross or enter OR 211, which is operating at relatively high speeds, with topographic impediments to sight distance, and the lack of left turn lanes on OR 211. With a limited number of crossings provided along OR 211, this trend could continue as more land develops to the east along Dubarko Road. However, there is a safety project on ODOT's Draft Statewide Transportation Improvement Program (anticipated construction by 2013) planned for this intersection to address this condition that is described as including improvements to geometry, illumination, sight distance, and channelization.

Another intersection that has been identified as having sight distance restrictions is the intersection of Arletha Court at OR 211. The combination of several large trees and a horizontal curve in OR 211 reduce the available sight distance for vehicle

Corridor Crash Rates

Crash rates identifying the number of crashes per million vehicle-miles traveled for specified sections of US 26 and OR 211, as well as statewide average crash rates for various facility types, were obtained from ODOT's *2007 State Highway Crash Rate Tables*.[12] Highway sections analyzed in these tables are categorized by surrounding area (e.g., urban city, suburban, rural) and functional classification to provide a basis for comparison between various facilities.

For the comparison to statewide averages, US 26 is classified as a non-freeway principal arterial through an urban city area and OR 211 is classified as a non-freeway minor arterial through an urban city area.[13] Predetermined highway sections with assumed area types are provided in the crash rate tables with crash rates calculated for each section, as well as for groups of contiguous sections within the same area type. Some of the sections provided in the ODOT crash tables were short (less than one mile in length), resulting in a less reliable crash rate. Therefore, some sections were combined to provide a more accurate representation of crash activity along the evaluated roadways. The reported crash rates along segments of US 26 and OR 211 are shown in Table 3-10.

Crash rates along US 26 to the west and east of the downtown couplet are far below statewide averages for similar facilities, while crash rates within the couplet are consistently above statewide averages. The higher rate of crashes in the couplet could be due to several factors. First, it should be recognized that this section is only ¾ of a mile long and that crash rate calculations for segments shorter than one mile in length often appear inflated. However, this area is also characterized by a much different roadside environment than other sections of US 26 and has a significantly different design.

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[12] *2007 State Highway Crash Rate Tables (August 2008)*. Retrieved October 2008, from Oregon Dept. Transportation Web site: http://www.oregon.gov/ODOT/TD/TDATA/car/CAR_Publications.shtml

[13] The classifications chosen to represent these facilities are not intended to reflect their actual functional classification as designated in the Sandy TSP, but to appropriately categorize them among similar facilities across the state by design and volume characteristics.

Within the couplet area, travel is limited to one-way movements along the mainline, on-street parking is available, uncontrolled pedestrian crosswalks are present, and the roadside environment is densely developed with retail and service businesses, features which create a pedestrian-friendly downtown. The amount of activity surrounding this corridor triggers many potential conflicts for motorists to negotiate, such as pedestrian crossings, vehicles entering and exiting driveways, and parking maneuvers, which in combination can result in a higher frequency of crashes.

In addition, crash rates along OR 211 have been significantly higher than the statewide averages for each of the three years examined. However, Figure 3-18 shows that most crashes have been occurring at intersections, specifically at Dubarko Road and OR 211. This is an indication that the focus on safety issues should be on those specific locations rather than on the OR 211 corridor as a whole.

Table 3-10: Highway Segment Crash Rates

Section Limits (Milepoints)	Section Description	Crashes per Million Vehicles		
		2007	2006	2005
Statewide Average Rate (Urban Principal Arterials)		*2.37*	*2.37*	*2.38*
MP 22.49-23.87	US 26: West City Limits – Bluff Rd	1.25	1.46	1.79
MP 23.87 to 24.61	US 26: Begin Couplet to End Couplet EB	**3.39**	**2.42**	**3.62**
MP 23.87 to 24.61	US 26: Begin Couplet to End Couplet WB	**3.65**	0.51	**2.47**
MP 24.61-25.57	US 26: End Couplet to East City Limits	0.27	0.68	0.26
Statewide Average Rate (Suburban Minor Arterials)		*1.09*	*1.31*	*0.94*
MP 4.77 to 5.39	OR 211: Suburban Area to Urban City	**2.32**	**1.78**	**6.89**
Statewide Average Rate (Urban Minor Arterials)		*2.61*	*2.59*	*2.48*
MP 5.39 to 5.94	OR 211: Urban City to US 26 (Proctor Ave)	**5.72**	**4.54**	**5.09**

Note: Bold type indicates that the crash rate experienced exceeds the statewide average crash rate for similar facilities.

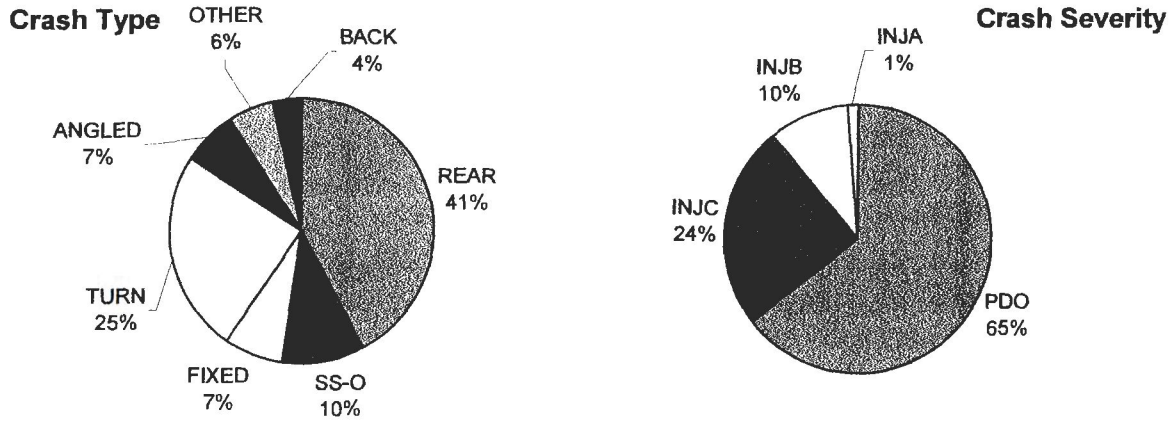
Crash Characteristics

Individual crash types were examined throughout the city to see if any patterns would emerge. Figure 3-19 breaks down the crash types and severities experienced, with percentages of each shown. Most crashes involved rear-end (41%) or turning (25%) collisions and crash severities are typically low, with approximately 89% of all crashes involving only property damage or minor injuries.

Further analysis of the crash data showed that there were 10 pedestrian related crashes within the last three years, with located relatively close to schools and/or the downtown area. Three of the crashes occurred on Bluff Road near the high school, with all crashes involving pedestrians under the age of 18, two of which occurred during school hours. One crash involved both a driver and pedestrian under the age of 18. It should be pointed out that crash

rates around high schools tend to be higher due to the larger numbers of inexperienced drivers and tend to be higher during arrival/dismissal times when students, parents and school busses concentrate around the school. One crash occurred on Pleasant Street near the middle and elementary schools during school hours that also involved a pedestrian under the age of 18. The remaining six pedestrian crashes occurred within the downtown area, with pedestrians of varying ages.

Figure 3-19: Crash Characteristics (2005-2007)



Key:

REAR: Rear end
FIXED: Fixed object or other object
BACK: Backing
ANGLED: Angled
SS-O: Sideswipe – overtaking
TURN: Turn movement
OTHER: Miscellaneous
PDO: Property Damage Only
INJA: Incapacitating Injury
INJB: Non-Incapacitating Injury
INJC: Possible Injury

SPIS Ratings

The crash analysis was supplemented by a review of ODOT Safety Priority Index System listings for locations along US 26 and OR 211 ranked among the state's top 10% of hazardous locations. The Safety Priority Index System (SPIS) is a method developed by ODOT for identifying hazardous locations on state highways, with the score based on three years of crash data as well as crash frequency, rate, and severity. ODOT bases its SPIS on 0.10-mile segments to account for variances in how crash locations are reported. This rating provides a general comparison of the overall safety of the highway based on crash information for all highway segments throughout the state.

According to ODOT 2008 SPIS ratings, only two locations within the city rate within the top 10% of SPIS sites: the intersection of US 26 (Pioneer Boulevard) at OR 211 and the intersection of OR 211 at Dubarko Road. At the intersection of US 26 (Pioneer Boulevard) with OR 211, the majority of the crashes involved rear-end-type crashes (71%), which are most likely a result of vehicles being rear-ended while slowing down or stopping for the signal at the intersection. Some of the crash activity at this location may also be related to the

factors previously described that are associated with the conflicts introduced by the downtown environment (e.g., on-street parking, pedestrian crossings, and access points).

The intersection of OR 211 at Dubarko Road has previously been identified as having a high crash rate.

The SPIS locations along with the locations of all crashes within the city are shown in Figure 3-18.

Summary of Deficiencies

The following is a summary of key deficiencies noted in the motor vehicle network that can be utilized as a guide in determining potential future roadway improvements.

- In general, minor arterials within the city have not been constructed in accordance with the functional classification description, which required a three-lane cross-section.
- Access spacing on many streets within the city, including state highways, does not comply with adopted standards. However, it should be pointed out that in most cases the access spacing on Bluff Road, Dubarko Road, and other minor arterials was established prior to the adoption of spacing standards.
- Poor pavement conditions are present on OR 211, Tupper Road north of Sandy Heights Street, and Vista Loop Drive.
- US 26 is a critical route for freight, both locally and statewide. However, it has also been shown to be heavily congested.
- All signalized intersections along US 26 are heavily congested during the 30th highest hour of the year and do not comply with ODOT adopted mobility standards. Furthermore, the following intersections currently experience vehicle queues that approach or exceed the available storage:
  - US 26 @ 362nd Drive
  - US 26 @ Industrial Way
  - US 26 @ Ruben Lane
  - US 26 @ Bluff Road
  - US 26 (Pioneer Boulevard) @ OR 211
  - US 26 (Proctor Boulevard) @ OR 211
  - US 26 @ Ten Eyck Road
- The unsignalized intersection on US 26 at Langensand Road does not comply with ODOT adopted mobility standards and does not currently meet warrants for signalization.

- The intersections on US 26 (both Pioneer and Proctor Boulevards) at OR 211 rate among the top 10% of hazardous ODOT SPIS locations.
- The intersection of OR 211 at Dubarko Road has a relatively high crash rate and is rated among the top 10% of hazardous ODOT SPIS locations.
- Intersection sight distance concerns have been noted at the intersections of OR 211/Dubarko Road and OR 211/Arletha Court.
- The frequency of crashes along US 26 is higher within the downtown couplet than on other segments to the west and east.
- There have been a number of pedestrians struck by motor vehicles near the schools, including three school-age children during school hours, and in the downtown area.

4. Future Needs

Overview

Future transportation system needs through the TSP horizon year of 2029 were projected by building on the inventory and assessment of existing conditions and accounting for the additional impact of forecasted travel demand associated with regional and local growth. This chapter explains the underlying assumptions used in forecasting future trip growth and identifies transportation system deficiencies through the year 2029, which will act as a baseline for developing and prioritizing improvement alternatives.

Future Travel Demand Forecasting Methodology

The process of developing future traffic volumes included the establishment of key assumptions affecting trip growth through the city and the application of those assumptions to a model framework that uses the relationship between transportation and land use to assign trips to the roadway network. This required the development of two model scenarios: 1) a base year (2008) scenario calibrated to replicate existing conditions, and 2) a future year (2029) scenario constructed by applying growth assumptions to the base year scenario. The process for developing these model scenarios and the assumptions used are described below.

Base Year (2008) Model

The traffic forecasting tool used (referred to as the "model" herein) was an automated version of the cumulative analysis methodology described in ODOT's Transportation Planning Analysis Unit *Analysis Procedures Manual*.[14] The fundamental steps in developing the base year model scenario included:

- **Construction of a Street Network:** The street network for the base year model was developed from field inventories describing lane geometries, posted speeds, street lengths, and traffic control characteristics (stop signs, traffic calming devices, and signal timing).
- **Division of Lands into Transportation Analysis Zones:** Transportation Analysis Zones (TAZs) are used to group areas of land with similar trip-making characteristics. For this model, the city was separated into 40 TAZs, with boundaries established by major streets, topographical and environmental constraints, and zoning designations. The TAZ system developed can be seen in Figures 4-2 and 4-3.

[14] *Analysis Procedures Manual*, Oregon Dept. of Transportation, Transportation Planning Analysis Unit, as amended October 2008.

- **Defining Land Use Characteristics:** Within each TAZ, existing land uses were identified through field inventories and aerial photographs and used to estimate the number of households and employees present. This information was used as the basis for defining trip generation and distribution estimates throughout the city. Control totals for citywide housing and employment were taken from the *City of Sandy Urbanization Study,*[15] which estimated that there were 3,625 households and 4,327 employees within the urban growth boundary (UGB) in the year 2008. Employment types were separated into retail, service, other (generally industrial and office), and education categories, with selected employers interviewed to improve the accuracy of employee estimates.

- **Estimation of Through Trips:** Trips within the City of Sandy were separated into categories including those beginning and ending their trip outside of the city, those with one end of their trip within the city and the other outside of the city, and those beginning and ending their trip inside the city. These trip categories are referred to as external-external trips, internal-external or external-internal trips, and internal-internal trips, respectively. The identification of through trips, or external-external trips, along US 26 was aided through the origin-destination survey described in Chapter 3.

- **Establishing Trip Origins and Destinations for TAZs:** Inbound and outbound motor vehicle trips for each TAZ were estimated by associating trip generation characteristics with household and employment types. Trip generation characteristics were taken from *Trip Generation*[16], which includes a national database relating trip making characteristics to various land use types. These characteristics were entered into a matrix used to match trips between TAZs using the relative number of attractions.

- **Assignment of Trips throughout the City**: The VISUM modeling software was used to route trips between TAZs and external destinations across the area street network. The model selected the route of travel by choosing the path that offered the shortest travel time between trip ends. The calculation of travel times through the network was performed over dozens of iterations, using several attributes including speed, intersection delay, and street capacity.

- **Calibration to Replicate Existing Conditions:** Creating a base year model that can accurately represent existing conditions provides for a foundation upon which to construct a new model that can reasonably estimate future conditions. This process involved several iterations where model trip assignments on intersection turn movements and street links were compared to actual counts obtained in the field. Parameters in the model, such as trip generation rates, speeds, and street capacities, were incrementally adjusted until the base year model could produce reasonable replications of actual conditions in the year 2008.

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[15] *City of Sandy Urbanization Study*, ECONorthwest, January 2009.
[16] *Trip Generation*, 7th edition, Institute of Transportation Engineers, Washington, D.C., 2003.

Future Year (2029) Model

Using the calibrated base year model as a foundation, a future year model for the year 2029 was developed using traffic volume growth estimates for key roadways and housing and employment growth projections for the City of Sandy. The fundamental steps in developing the future year model scenario included:

- **Accounting for Transportation System Changes:** Before future trips are assigned to the street network, any planned changes to the street network that are not present in the base year model must be incorporated into the future model. Due to the uncertainty surrounding the ability of the City to fund transportation system improvements, it was preferred to use the existing network as a base for identifying needed improvements.
- **Estimating Future Growth in Through Trips and at External Nodes:** Growth on roadways surrounding the city that act as key gateways was estimated by calculating annual growth rates from historic count databases. For County facilities, historic traffic volume counts were obtained from Clackamas County's traffic counting program webpage.[17] For US 26 and OR 211, annual growth rates were calculated from projections included in ODOT's Future Traffic Volume Tables.[18] Through trip growth on US 26 was estimated using the origin-destination survey results in combination with the total highway growth projections from the Future Volume Tables.

Table 4-1 shows the calculated annual growth rates for county and state facilities. It should be noted that a minimum one percent growth rate was applied to avoid underestimating future traffic volumes.

Table 4-1: Roadway Growth Rates from Historical Trends

Facility	Location	Average Annual Growth Rate
County Facilities		
Orient Drive	North of Kelso Road	1.9%
Kelso Road	West of Bluff Road	3.3%
Bluff Road	South of Serban Road	1.0%
Ten Eyck Road	North of US 26	1.0%
Bornstedt Road	North of Trubel Road	1.0%
362nd Drive	North of OR 211	4.8%
State Facilities		
US 26 (West)	West of Orient Drive	2.3%
US 26 (East)	East of Vista Loop Drive	2.6%
OR 211	West of 362nd Drive	4.8%

[17] http://www.clackamas.us/roads/adt.htm
[18] http://www.oregon.gov/ODOT/TD/TP/docs/TADR/2027FVT.pdf

- **Estimating Future Growth Housing & Employment:** Growth estimates for housing and employment within the city were taken from the recently completed *City of Sandy Urbanization Study*, which used these estimates to project needs for developable land through the year 2029. According to this study, by the year 2029, there will be approximately 1,156 additional households within the urban growth boundary and approximately 1,642 additional employees. The growth in housing and employment in Sandy is illustrated in Figure 4-1.

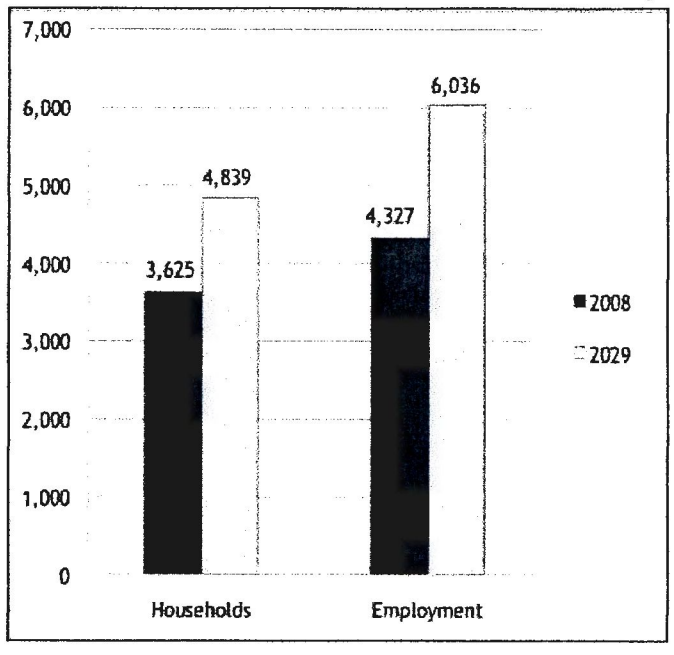


Figure 4-1: Existing and Future Household and Employment Totals in Sandy

- **Allocating Future Land Uses:** Projected growth in housing and employment was allocated among the TAZs based on comprehensive plan zoning designations and the amount of vacant and buildable lands. The resulting allocations of housing and employment growth across the city are shown in Figures 4-2 and 4-3, respectively.
- **Distributing and Assigning Trips through the City**: Trips in the future model were distributed between TAZs and assigned to the transportation network using the same methodology described for the base year model.
- **Validating Results:** Unlike the base year model, the future year model cannot be compared to actual traffic counts to test the validity of the results. Instead, it relies on the calibration used for the base year model upon which it was built and post-processing of the output to ensure results are reasonable and significant changes in travel patterns are justified. As part of this post-processing effort, changes in traffic volumes between the base and future year models are assessed across screenlines and the network as a whole to ensure growth projections are within reasonable limits and that the area roadways are being used in a logical manner.

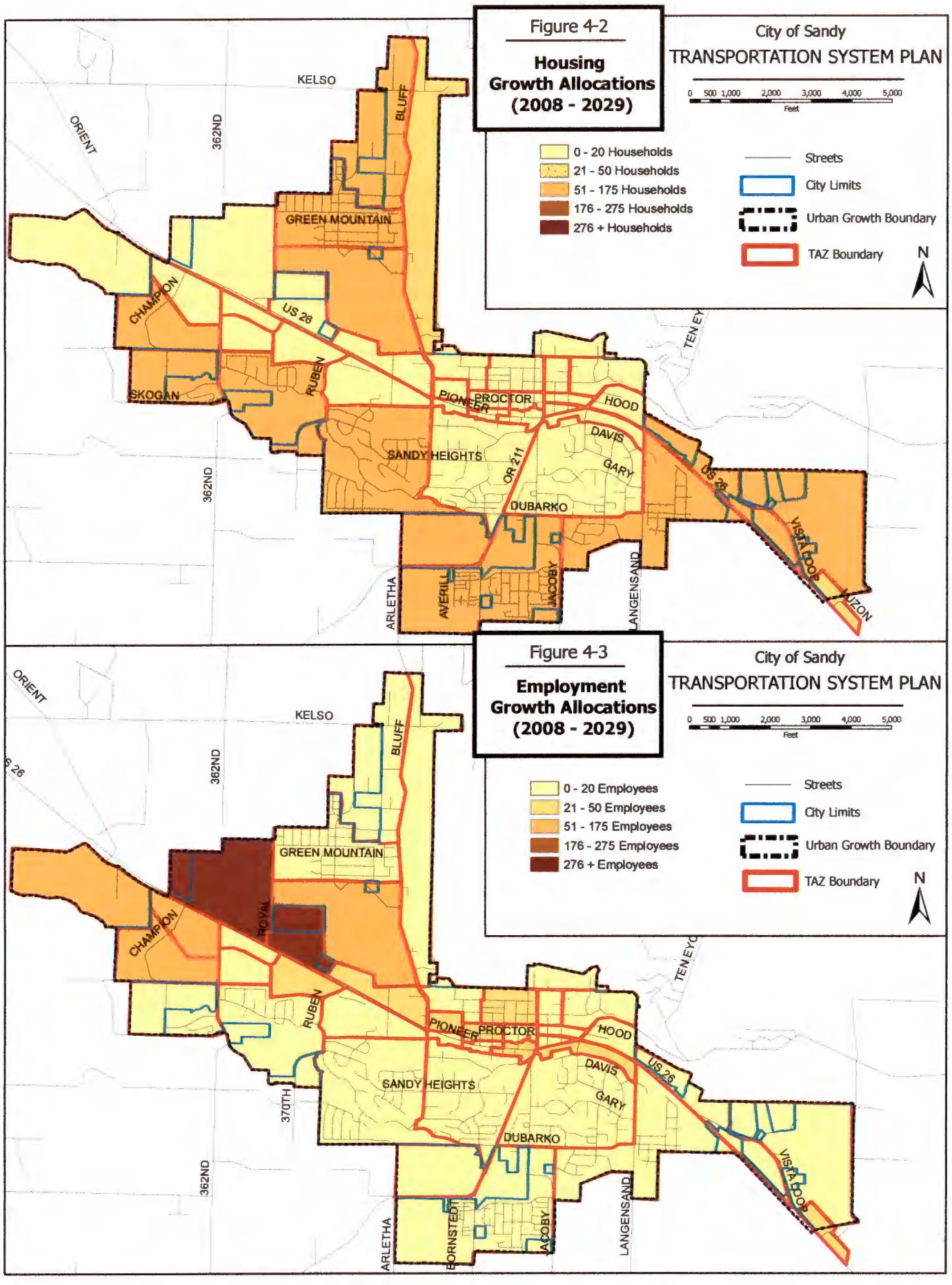


Figure 4-2
Housing Growth Allocations (2008 - 2029)
City of Sandy
TRANSPORTATION SYSTEM PLAN
0 500 1,000 2,000 3,000 4,000 5,000
Feet
0 - 20 Households
21 - 50 Households
51 - 175 Households
176 - 275 Households
276 + Households
Streets
City Limits
Urban Growth Boundary
TAZ Boundary
N
KELSO
ORIENT
362ND
BLUFF
GREEN MOUNTAIN
CHAMPION
US 26
RUBEN
SKOGAN
PIONEER
PROCTOR
HOOD
DAVIS
GARY
SANDY HEIGHTS
OR 211
DUBARKO
TEN EY
VISTA LOOP
LUZON
ARLETHA
AVERILL
JACOBY
LANGENSAND
Figure 4-3
Employment Growth Allocations (2008 - 2029)
City of Sandy
TRANSPORTATION SYSTEM PLAN
0 - 20 Employees
21 - 50 Employees
51 - 175 Employees
176 - 275 Employees
276 + Employees
Streets
City Limits
Urban Growth Boundary
TAZ Boundary
N
ORIENT
KELSO
362ND
BLUFF
GREEN MOUNTAIN
ROYAL
CHAMPION
RUBEN
PIONEER
PROCTOR
HOOD
DAVIS
GARY
US 26
SANDY HEIGHTS
370TH
DUBARKO
VISTA LOOP
ARLETHA
BORNSTEDT
JACOBY
LANGENSAND

Key Findings

When the base and future year models were completed, the growth in traffic volumes shown between the two models was applied to the 30th highest hour annual volumes and weekday p.m. peak hour volumes developed in Chapter 3 for the study intersections. While the traffic volumes and system operation in 2029 will be discussed in detail later in this chapter, future model results indicate that congestion along US 26 will be significantly increased. As a result, the model predicts traffic will divert to the following routes:

- Some of the traffic traveling between OR 211 and US 26 diverts to Dubarko Road and Langensand Road to reach the highway.
- Some of the traffic traveling between the southwest area of the city and US 26 eastbound diverts to OR 211, Dubarko Road, Langensand Road, and 362nd Drive to avoid using US 26.
- Some of the traffic traveling between Bluff Road north of the city and US 26 eastbound diverts through Hood Street and Pleasant Avenue to avoid the downtown couplet.
- Some eastbound traffic on US 26 diverts to 362nd Drive and Industrial Way to attempt to bypass some of the US 26 queuing.
- Other diversion routes used by US 26 eastbound traffic included Ruben Lane to Sandy Heights Street to Tupper Road to OR 211, as well as Bluff Road to Strawbridge Parkway to Tupper Road to OR 211.

Future Traffic Volumes (2029)

Using the previously described methodology, design hour traffic volumes for the year 2029 were forecast across study intersections, representing the future 30th highest annual hour of the year on the highways and the average weekday p.m. peak hour on the city streets. The resulting volumes are described below.

Future Volumes

Most of the traffic growth in the study area is forecast for the US 26 corridor (see Figure 4-4), with annual growth rates ranging from 1.2% to 2.7%. Notable growth also occurred on OR 211 and 362nd Drive. However, a significant amount of the growth experienced on OR 211 and 362nd Drive appears to be related to traffic diversions around US 26 congestion. Traffic growth on city streets was generally low, with the exception of a few corridors (i.e., 362nd Drive, Dubarko Road, Langensand Road, Sandy Heights Street, Tupper Road, Ten Eyck Road, and Pleasant Avenue) that may be impacted by diversions around US 26. As alternatives to relieve congestion on US 26 are evaluated, trip growth on city streets should be reassessed.

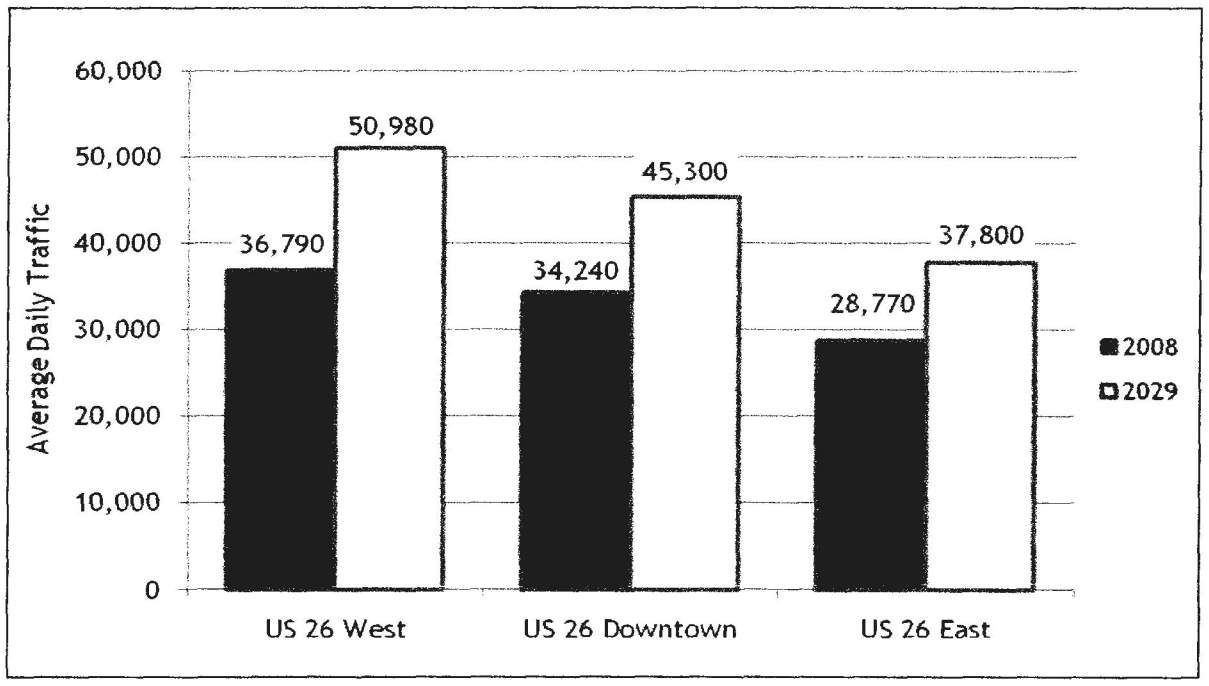
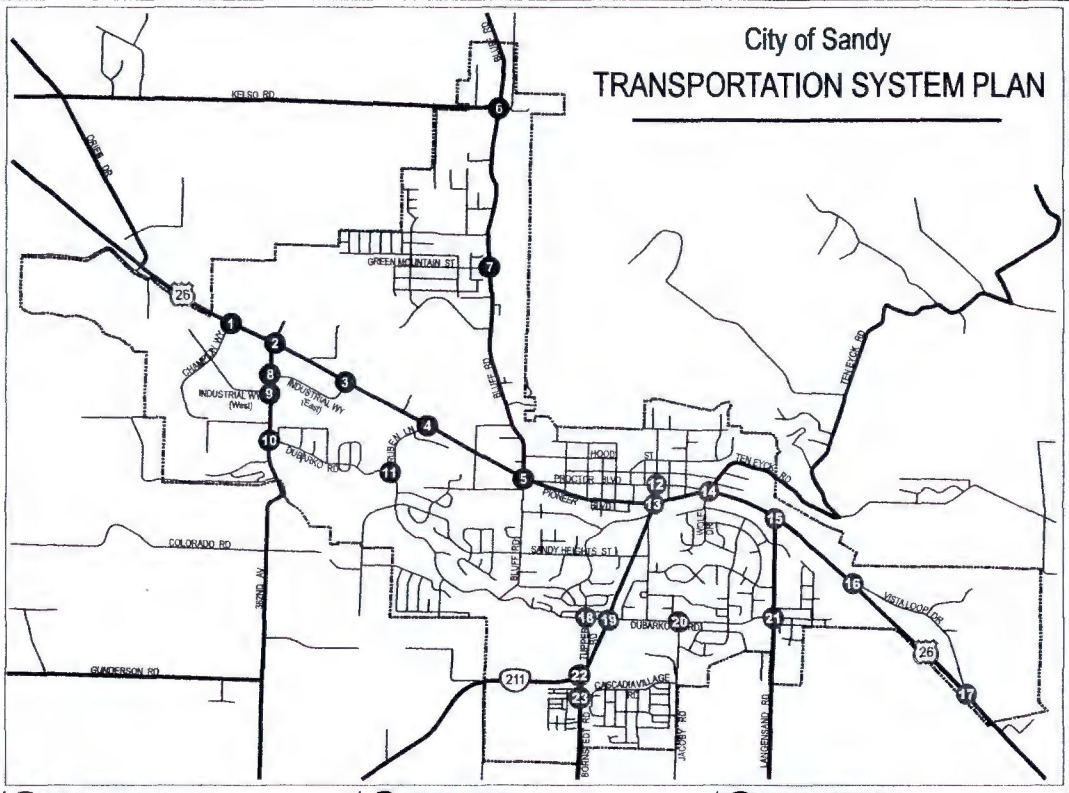


Figure 4-4: Average Daily Traffic Volumes Increases on US 26

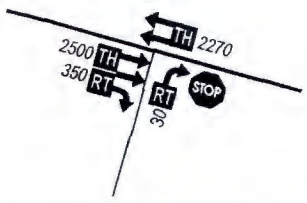
The forecasted design hour volumes for the year 2029, which were used in the analysis of future operations and needs, are displayed for each study intersection in Figures 4-5a and 4-5b.

City of Sandy

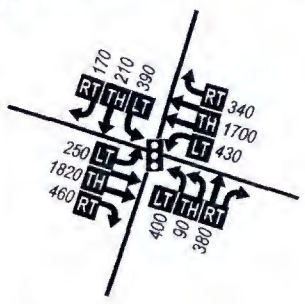
TRANSPORTATION SYSTEM PLAN



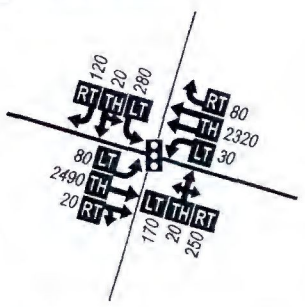
1 US 26 @ Champion Wy



2 US 26 @ 362nd Dr



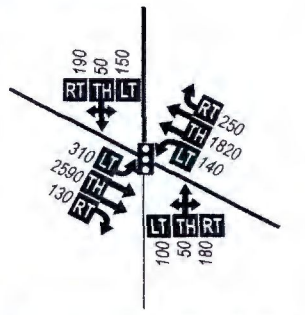
3 US 26 @ Industrial Wy



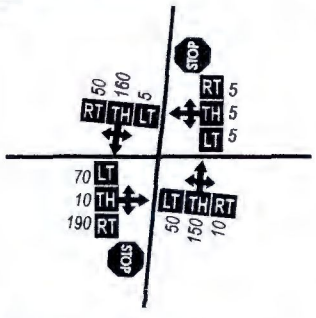
4 US 26 @ Ruben Ln



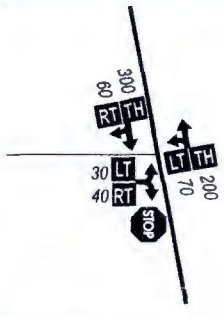
5 US 26 @ Bluff Rd



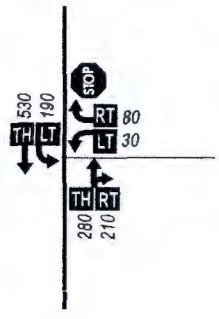
6 Kelso Rd @ Bluff Rd



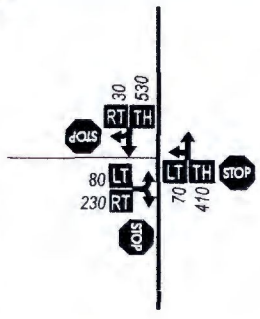
7 Green Mountain St @ Bluff Rd



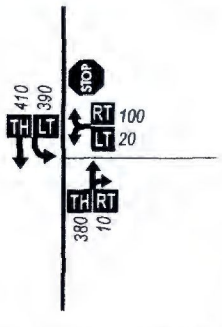
8 Industrial Way East @ 362nd Dr



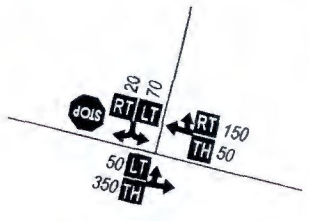
9 Industrial Way West @ 362nd Dr



10 Dubarko Rd @ 362nd Dr



11 Ruben Ln @ Dubarko Rd



LEGEND

- 00 - Study Intersection Number (This Page)
- 00 - Study Intersection Number (Next Page)
- ← - Lane Configuration
- STOP - Stop Sign
- Traffic Signal
- *00* - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left-Thru-Right)

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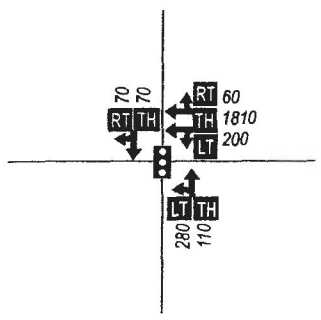
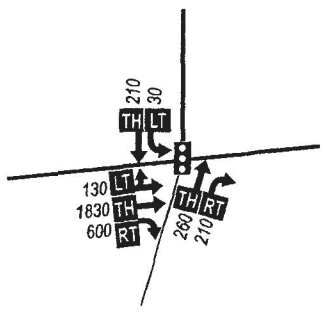
Figure 4-5a

FUTURE 2029 WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

12 Proctor Blvd @ Hwy 211

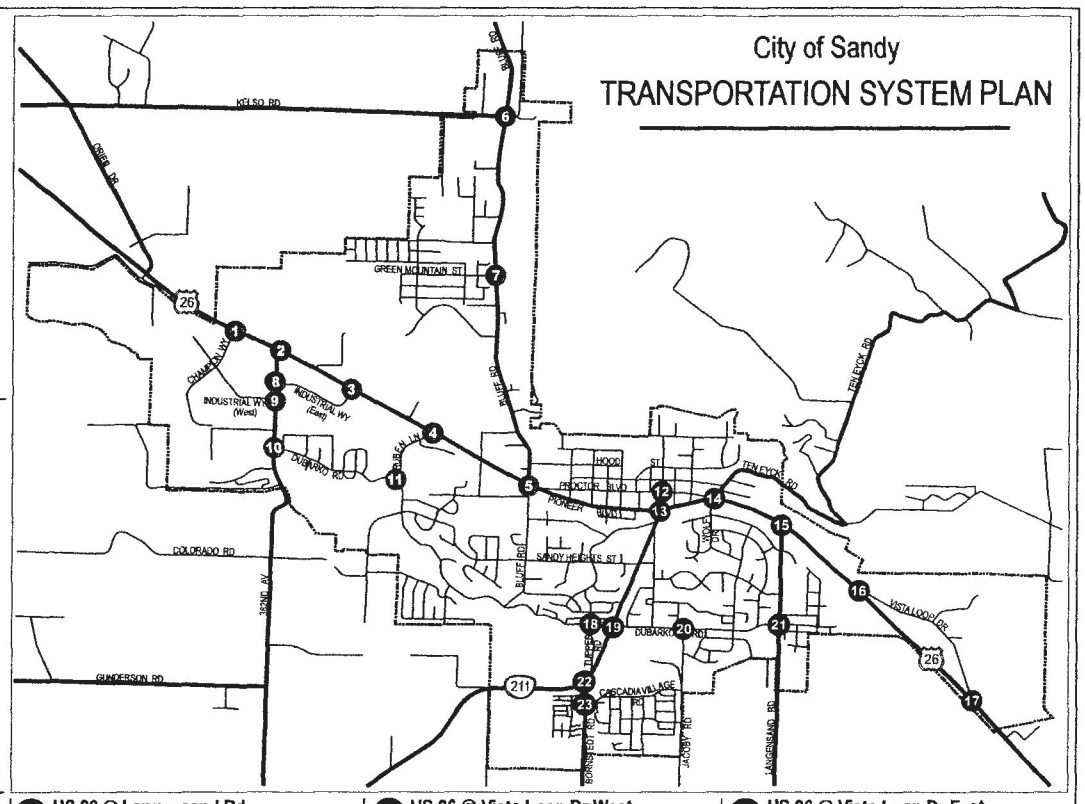


13 Pioneer Blvd @ Hwy 211

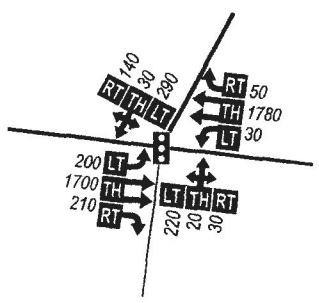


City of Sandy

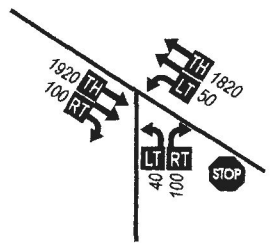
TRANSPORTATION SYSTEM PLAN



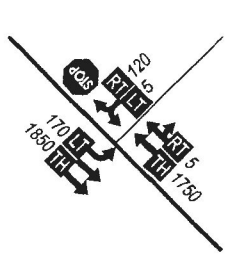
14 US 26 @ Ten Eyck Rd



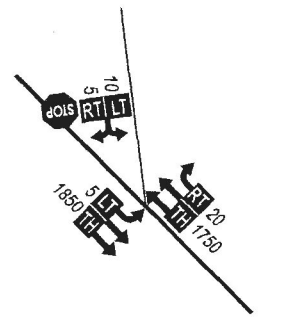
15 US 26 @ Langensand Rd



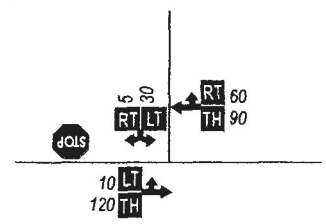
16 US 26 @ Vista Loop Dr West



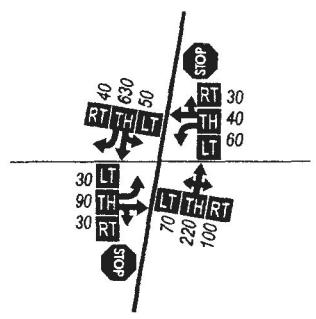
17 US 26 @ Vista Loop Dr East



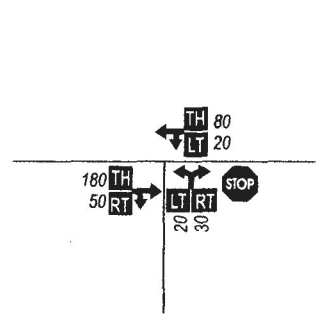
18 Dubarko Rd @ Tupper Rd



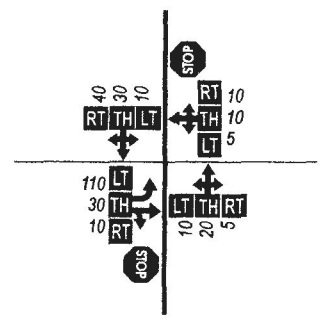
19 Dubarko Rd @ Hwy 211



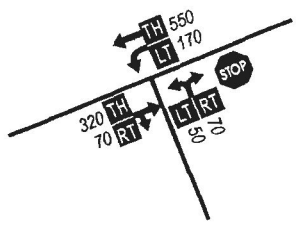
20 Jacoby Rd @ Dubarko Rd



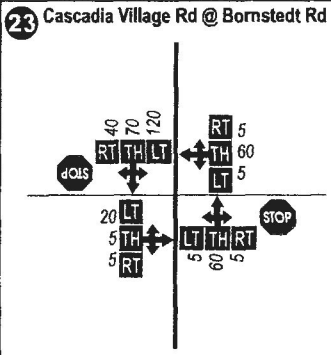
21 Langensand Rd @ Dubarko Rd



22 Bornstedt Rd @ Hwy 211



23 Cascadia Village Rd @ Bornstedt Rd



LEGEND

- (00) - Study Intersection Number (This Page)
- (00) - Study Intersection Number (Previous Page)
- ← - Lane Configuration
- STOP - Stop Sign
- Traffic Signal
- *00* - PM Peak Hour Traffic Volume
- LT TH RT - Volume Turn Movement (Left-Thru-Right)

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Figure 4-5b

FUTURE 2029 WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

Congestion Duration

As evidenced by existing and future traffic patterns, US 26 is the critical transportation corridor in the study area. While the analysis of the peak hour operating conditions provides an evaluation of mobility standards and frames design criteria, it does not indicate how long congestion will be present. The understanding of congestion duration is particularly important in corridors such as US 26 where over-capacity conditions are known to exist.

To gauge the approximate duration of congestion that would be experienced in 2029, traffic volume profiles over a 24-hour period were created using counts collected under existing conditions. To project future volumes for all hours in this profile, the rate of growth found to occur between the future design hour and the same hour under existing conditions was applied to volumes measured during all hours under existing conditions. For this evaluation, the intersection on US 26 at Bluff Road was selected, as it maintains some of the highest traffic volumes in the corridor and represents a key bottleneck in the system.

Figure 4-6 presents the hourly volume profile on US 26 under both existing and future conditions. To indicate when congested conditions would occur, a capacity ceiling was overlaid on the chart using the maximum total entering volume that can be served by the intersection (representing a v/c = 1.0). It should be recognized when considering this information that when traffic volumes exceed capacity the actual duration of congestion may be longer than shown because of the time needed for the system to recover from the "breakdown" that has occurred. Also, any unserved demand in a given hour will either be pushed to the following hour or could avoid the corridor altogether.

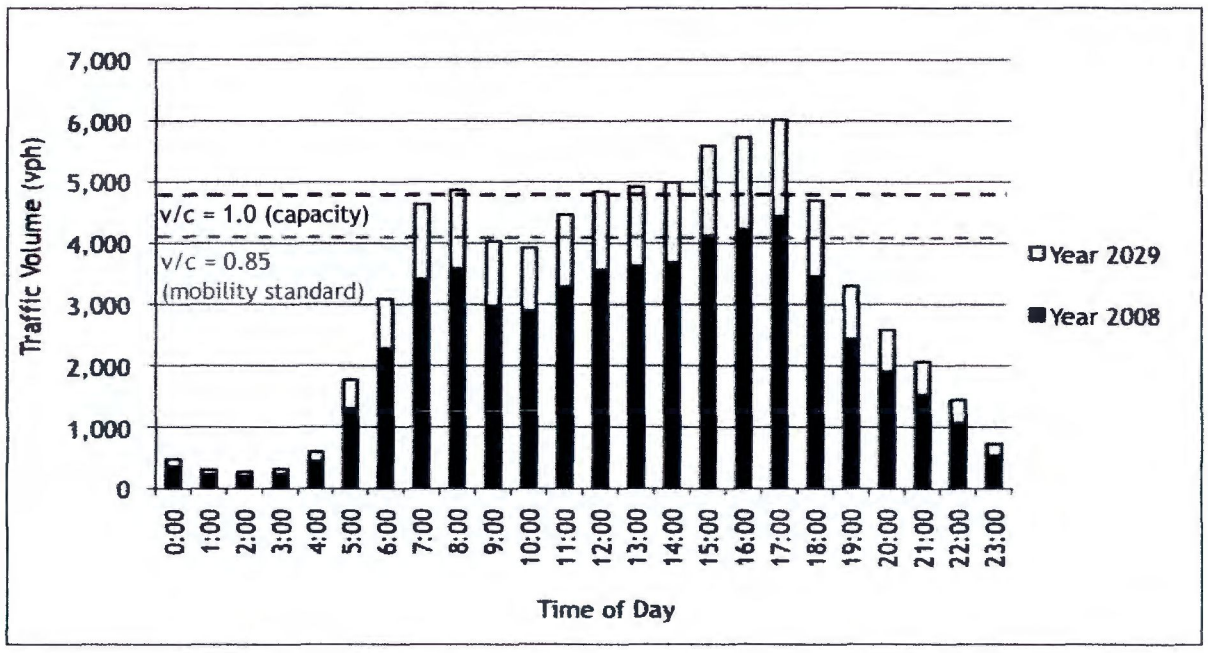

Figure 4-6: Congestion Duration on US 26 at Bluff Road

As shown in this figure, the p.m. peak period currently experiences higher traffic volumes than the a.m. peak period, with peak hour volumes between 5:00 and 6:00 p.m. approaching capacity. However, by 2029, there will be at least seven hours of the day where traffic demands will exceed system capacity (v/c > 1.0), beginning as early as 8:00 a.m.

An additional line was overlaid on the chart to indicate approximately how many hours of the day would experience conditions that failed to meet ODOT's mobility standard (v/c $\leq$ 0.85). Under existing conditions, there are approximately three hours during the p.m. peak period where mobility standards are not being met. However, by 2029, this condition would occur for at least 10 hours, beginning at 7:00 a.m. and continuing until sometime after 7:00 p.m. when the system has recovered.

Future Traffic Operations (2029)

The analysis of forecasted conditions in the year 2029 was essentially a no-build scenario, using the same transportation infrastructure that is in place under existing conditions to serve future traffic volumes. This provides for a "needs assessment" that can be used to identify and prioritize transportation system improvements. Using these assumptions, the 2029 design hour traffic volumes were applied to study area intersections and re-analyzed, using the same methodology employed for existing conditions to assess future operations.

Intersection Operations

Table 4-2 displays the results of this analysis. As shown, city intersections will continue to operate within adopted mobility standards, with the exception of the all-way stop controlled intersection of 362nd Drive at Industrial Way West and the 2-way stop controlled intersection of 362nd Drive at Dubarko Road. Both intersections degrade to LOS E.

Under existing conditions, many of the intersections along the state highways fail to meet adopted mobility standards. This included all signalized intersections along US 26, as well as the two-way stop controlled intersection on US 26 at Langensand Road. In the future, as traffic demand and congestion increases, operations at the signalized intersections along US 26 will be degraded further. In addition, all stop-controlled intersections in the east US 26 corridor, including those at Langensand Road, West Vista Loop Drive, and East Vista Loop Drive, as well as the intersection on OR 211 at Dubarko Road, will fail to meet mobility standards.

Queuing Analysis

An estimate of the 95th percentile vehicle queue for each of the study intersection approach movements was made using SimTraffic modeling software. Due to the level and duration of congestion along US 26, accurate queuing estimates cannot be made. Under these conditions, very long queues along the US 26 mainline should be expected for several hours of the day. Also, turn lane storage lengths at intersections will either be inadequate or the turn lanes will be frequently blocked by through traffic, leaving them underutilized.

Table 4-2: Weekday PM Peak Hour Intersection Operations (2029)

Intersection	Mobility Standard (LOS or v/c)	Existing 2008 Average Delay (Seconds)	Existing 2008 Level of Service (LOS)	Existing 2008 volume/ capacity ratio (v/c)	Future 2029 No Build Average Delay (Seconds)	Future 2029 No Build Level of Service (LOS)	Future 2029 No Build volume/ capacity ratio (v/c)
City Intersections							
2-Way Stop Controlled Intersections							
Kelso Road/Bluff Road	D	10.5	A/B	0.15	16.0	A/C	0.50
Green Mountain/Bluff Road	D	10.8	A/B	0.09	13.3	A/B	0.15
Industrial Way East/362nd Drive	D	12.7	A/B	0.15	21.8	A/C	0.35
Dubarko Road/362nd Drive	D	10.8	A/B	0.13	37.8	B/E	0.56
Dubarko Road/Ruben Lane	D	10.1	A/B	0.12	15.8	A/C	0.24
Dubarko Road/Tupper Road	D	9.0	A/A	0.03	10.3	A/B	0.05
Dubarko Road/Jacoby Road	D	9.4	A/A	0.05	10.6	A/B	0.09
Dubarko Road/Langensand Road	D	9.4	A/A	0.02	10.4	A/B	0.16
Cascadia Village Dr/Bornstedt Rd	D	12.4	A/B	0.05	13.3	A/B	0.07
All-Way Stop Controlled Intersections							
Industrial Way West/362nd Drive	D	9.2	A	0.37	40.2	E	0.84
ODOT Intersections							
Signal Controlled Intersections							
US 26/362nd Drive	0.70	36.3	D	0.91	>80.0	F	>1.00
US 26/Industrial Way	0.70	23.3	C	0.87	>80.0	F	>1.00
US 26/Ruben Lane	0.75	33.8	C	0.93	>80.0	F	>1.00
US 26/Bluff Road	0.85	24.5	C	0.93	>80.0	F	>1.00
OR 211/Proctor Boulevard	0.85	55.3	E	>1.00	>80.0	F	>1.00
OR 211/Pioneer Boulevard	0.85	78.8	E	0.88	>80.0	F	>1.00
US 26/Ten Eyck Road	0.85	38.1	D	0.88	>80.0	F	>1.00
2-Way Stop Controlled Intersections							
US 26/Champion Way	0.70	20.8	A/C	0.11	33.4	A/D	0.20
US 26/Langensand Road	0.85	>50.0	A/F	>1.00	>50.0	C/F	>1.00
US 26/Vista Loop West	0.70	18.7	A/C	0.09	>50.0	D/F	>1.00
US 26/Vista Loop East	0.70	14.6	A/B	0.01	>50.0	C/F	>1.00
OR 211/Dubarko Road	0.85	16.9	A/C	0.19	>50.0	A/F	>1.00
OR 211/Bornstedt Road	0.80	12.0	A/B	0.21	40.4	A/E	0.59

Notes: **Shaded cells indicate mobility standard is not being met.**
A/A=major street LOS/minor street LOS
Signalized and all-way stop delay = average vehicle delay in seconds for entire intersection
2-Way Stop delay = highest minor street approach delay

The congestion on US 26 also impacts queuing estimates at nearby intersections surrounding the highway, such as 362nd Drive at Industrial Way and Dubarko Road at Ruben Lane, making them unreliable. However, reasonable estimates could be made at city intersections farther away from US 26. In contrast to US 26, city intersections continue to operate relatively well, with no significant queuing noticed.

Queuing results for study intersections are included in the technical appendix.

Signal Warrant Analysis

Unsignalized study intersections that fail to meet adopted mobility standards in 2029 were evaluated for potential signalization using ODOT Preliminary Signal Warrants. These warrants are intended for use in determining whether signalization of an intersection would be justified at a time in the future. However, even where the preliminary warrants are met, actual conditions will need to be evaluated before signal construction is authorized by ODOT or the City.

The intersections evaluated and the results of the analysis are discussed below. It should be recognized that as alternatives are tested to address deficiencies, travel patterns through the city may change and could potentially affect the signalization needs of intersections evaluated under No-Build conditions.

- **362nd Drive at Industrial Way West:** The minor street volumes on Industrial Way West were too low to justify signalization. A roundabout could be an effective treatment and should be considered during alternatives evaluation. However, the required geometrics may be difficult to achieve given the current right-of-way constraints.
- **362nd Drive at Dubarko Road:** The minor street volumes on Dubarko Road were too low to justify signalization. A roundabout could be an effective treatment and should be considered during alternatives evaluation. However, the required geometrics may be difficult to achieve given the current right-of-way constraints.
- **OR 211 at Dubarko Road:** The minor street volumes on Dubarko Road were too low to meet signal warrants. However, they were very near the warrant threshold. While the recent crash history should be considered when assessing the need for signalization at this location, ODOT's planned safety project to improve sight distance and channelization may be adequate. Therefore, this intersection should continue to be considered for signalization in the future.
- **US 26 at Langensand Road:** The minor street volumes on Langensand Road were too low to meet signal warrants.
- **US 26 at Vista Loop Drive West:** The minor street volumes on Vista Loop Drive West were too low to meet signal warrants.
- **US 26 at Vista Loop Drive East:** The minor street volumes on Vista Loop Drive East were too low to meet signal warrants.

Summary of Deficiencies

To provide a complete list of transportation system needs within the City of Sandy through the year 2029, a comprehensive summary of deficiencies for all modes noted under existing and future conditions is provided below.

Pedestrian System

- Sidewalks are partially obstructed by utility poles along the south side of US 26 between University Avenue and Bluff Road, and along the north side of Pioneer Boulevard in the couplet.
- At the intersection on US 26 westbound (Proctor Boulevard) with OR 211 (Meinig Avenue), the northeast, southeast, and southwest corners have curb ramps with slopes greater than 5% and do not provide a landing area between the push buttons and the ramps. In addition, there are utility poles, fire hydrants, and street signs that limit accessibility of the ramp from the sidewalk.
- At the intersection of US 26 eastbound (Pioneer Boulevard) with OR 211 (Meinig Avenue), the northeast corner has a utility pole between the curb ramp and the push-button.
- With the exception of the downtown area, distances between crossing opportunities on US 26 and OR 211 are very long. This makes crossings difficult for pedestrians, which creates a barrier effect and can encourage unprotected mid-block crossings. As a result, pedestrians attempting to cross US 26 outside the couplet area are commonly seen using the two-way left turn lane in the median as a refuge and have been documented crossing US 26 at intersection approaches where no signal protection is provided.
- Several key gaps in the sidewalk system were noted as follows:

  Gaps on the Arterial Street Network

  - North side of US 26 from Royal Lane to the west UGB
  - South side of US 26 from University Avenue west to Ruben Lane
  - US 26 from Ten Eyck Road to the east UGB
  - OR 211 from Pioneer Boulevard to the south UGB;
  - Bluff Road from Hood Street to the north UGB
  - West side of 362nd Drive from Industrial Way to the south UGB

  Gaps on the Collector Street Network

  - Industrial Way from 362nd Drive to US 26
  - Sandy Heights Street from Bluff Road to Bodley Court (intermittent)

Gaps around schools

- Bluff Road from Hood Street to the north UGB
- Pleasant Avenue between Scales Avenue and Strauss Avenue (north side of the street)
- Pleasant Avenue between Meinig Avenue and Revenue Avenue (north side of the street)
- Meinig Avenue between Scenic Street and Hood Street (west side of the street)

Gaps around other activity generators

- Bluff Road from Hood Street to the north UGB
- Meinig Avenue between Scenic Street and Hood Street (west side of the street)

Gaps around transit stops

- North side of US 26 from Royal Lane to the west UGB
- Industrial Way from 362nd Drive to US 26
- University Avenue from US 26 to Sunset Street
- Bluff Road from Bell Street to the north UGB
- Vista Loop Drive from US 26 to Ortiz Street

Bicycle System

- There are key gaps in the provision of bicycle facilities on area roadways, including:
  - OR 211 from Proctor Boulevard to the south UGB
  - US 26 from Ten Eyck Road to the east UGB (widening to provide a minimum shoulder of six feet)
  - West side of 362nd Drive from Industrial Way to the UGB
  - Ten Eyck Road from US 26 to the UGB
  - Langensand Road from US 26 to the UGB
  - Bluff Road from US 26 to Miller Street
  - Bornstedt Road from OR 211 to the UGB
  - Dubarko Road from 362nd Drive to Eldridge Drive
  - Dubarko Road from Sandy Heights Street to Reich Court

Motor Vehicle System

Existing Conditions (2008)

- In general, minor arterials within the city have not been constructed in accordance with the functional classification in the adopted TSP, which requires a three-lane cross-section.
- Access spacing on many streets within the city, including state highways, does not comply with adopted standards. However, it should be pointed out that in most cases the access spacing on Bluff Road, Dubarko Road, and other minor arterials was established prior to the adoption of City and ODOT spacing standards.

- Poor pavement conditions are present on OR 211, Tupper Road north of Sandy Heights Street, and Vista Loop Drive.
- US 26 is a critical route for freight, both locally and statewide. However, it has also been shown to be heavily congested.
- All signalized intersections along US 26 are heavily congested during the 30th highest hour of the year and do not comply with ODOT adopted mobility standards. Furthermore, the following intersections currently experience vehicle queues that approach or exceed the available storage:
  - US 26 @ 362nd Drive
  - US 26 @ Industrial Way
  - US 26 @ Ruben Lane
  - US 26 @ Bluff Road
  - US 26 (Pioneer Boulevard) @ OR 211
  - US 26 (Proctor Boulevard) @ OR 211
  - US 26 @ Ten Eyck Road
- The unsignalized intersection on US 26 at Langensand Road does not comply with ODOT adopted mobility standards and does not currently meet warrants for signalization because of low traffic volume on Langensand Road.
- Under existing conditions, there are approximately three hours during the p.m. peak period where mobility standards are not being met along US 26.
- The intersections on US 26 (both Pioneer and Proctor Boulevards) at OR 211 rate among the top 10% of hazardous ODOT SPIS locations.
- The intersection of OR 211 at Dubarko Road has a relatively high crash rate and is rated among the top 10% of hazardous ODOT SPIS locations.
- The frequency of crashes along US 26 is higher within the downtown couplet than on other segments to the west and east.
- There have been a number of pedestrians struck by motor vehicles near the schools, including three school-age children during school hours, and in the downtown area.

Future Conditions (2029)

- In response to heavy congestion along US 26 in 2029 under No-Build conditions, the model indicates traffic will divert to the following routes.
  - Some of the traffic traveling between OR 211 and US 26 diverts to Dubarko Road and Langensand Road to reach the highway.
  - Some of the traffic traveling between the southwest area of the city and US 26 eastbound diverts to OR 211, Dubarko Road, Langensand Road, and 362nd Drive to avoid using US 26.

- Some of the traffic traveling between Bluff Road north of the city and US 26 eastbound diverts through Hood Street and Pleasant Avenue to avoid the downtown couplet.
- Some eastbound traffic on US 26 diverts to 362nd Drive and Industrial Way to attempt to bypass some of the US 26 queuing.
- Other diversion routes used by US 26 eastbound traffic included Ruben Lane to Sandy Heights Street to Tupper Road to OR 211, as well as Bluff Road to Strawbridge Parkway to Tupper Road to OR 211.

- By 2029, on US 26 there will be at least seven hours of the day where traffic demands will exceed system capacity (v/c > 1.0), beginning as early as 8:00 a.m.
- By 2029, mobility standards for US 26 would not be met for at least 10 hours, beginning at 7:00 a.m. and continuing until sometime after 7:00 p.m. when the system has recovered.
- City intersections will continue to operate within adopted mobility standards, with the exception of the all-way stop controlled intersection of 362nd Drive at Industrial Way West and the 2-way stop controlled intersection of 362nd Drive at Dubarko Road. Both intersections degrade to LOS E.
- In the future, operations at the signalized intersections along US 26 will be degraded further. In addition, all stop-controlled intersections in the east US 26 corridor, including those at Langensand Road, West Vista Loop Drive, and East Vista Loop Drive, as well as the intersection on OR 211 at Dubarko Road, will fail to meet mobility standards. Signal warrants thresholds at these intersections are not projected to be met by 2029; due to low minor street traffic volume.
- Very long queues along the US 26 mainline should be expected for several hours of the day. Also, turn lane storage lengths at intersections will either be inadequate or the turn lanes will be frequently blocked by through traffic, leaving them underutilized.
- The congestion on US 26 also impacts queuing at nearby intersections surrounding the highway, such as 362nd Drive at Industrial Way and Dubarko Road at Ruben Lane.

Technical Memorandum #3: Transportation Alternatives and Improvement Strategies

Technical Memorandum #3

DATE: February 25, 2011

TO: Liz French – City of Sandy
Sonya Kazen – ODOT

FROM: John Bosket, PE – DKS Associates
Michael Tomasini, PE – DKS Associates

SUBJECT: **City of Sandy TSP Update:**
Transportation Alternatives and Improvement Strategies P06097-017-004

To meet performance standards, address safety and accessibility for all modes of travel, and accommodate future growth, the transportation system in the City of Sandy will need to efficiently manage the forecasted travel demand. By implementing a variety of management and capital improvement strategies, investments in transportation will yield greater returns and will benefit a wider range of users. The strategies described in this memorandum include:

- Transportation System Management (TSM)
- Transportation Demand Management (TDM) Programs
- Pedestrian Facility Improvements
- Bicycle Facility Improvements
- Transit Service Enhancements
- Motor Vehicle Improvements
- Freight Mobility Enhancements

Transportation System Management

Transportation System Management (TSM) focuses on low-cost strategies to enhance the operational performance of the transportation system by seeking solutions that better manage facilities and treat all modes of travel as a coordinated system rather than relying on the construction of additional capacity through new roadways. TSM strategies are often easier to implement because of the lower capital investment required and they extend the functional life of existing and future facilities by optimizing their ability to move traffic in a safe and efficient manner.

Access Management

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. Consistent implementation of access management techniques will promote reduced congestion, reduced crash rates, less need for roadway widening, conservation of energy, and reduced air pollution.

Access management involves the control or limiting of access on arterial and collector facilities to maximize their capacity and preserve their functional integrity. Numerous driveways erode the

capacity of arterial and collector roadways and introduce a series of conflict points that present the potential for crashes and interfere with traffic flow. Preservation of capacity is particularly important on higher volume roadways for maintaining traffic flow and mobility. Whereas local and neighborhood streets primarily function to provide direct access, collector and arterial streets serve greater traffic volume with the objective of facilitating through travel.

Several access management strategies have been identified through the TSP update to improve access, safety, and mobility in Sandy, including:

- Employ strategies to consolidate driveways, provide crossover easements, and to take property access from lower classified roads where feasible, as currently required in the Sandy Municipal Code (SMC).
- Comply with ODOT access regulations on State facilities (US 26 and OR 211).
- Future improvements to the intersection of OR 211 at Bornstedt Road may include the prohibition of northbound to westbound left turn movements. Alternative improvements to this may include construction of a roundabout, prohibiting, or improving alternate routes such as the OR 211/ 367th Avenue intersection or an extension of 362nd Drive south to Trubel Rd.
- Realign the Arletha Court connection to OR 211create a perpendicular intersection and improve the sight distance, when the Gunderson Road extension is constructed. Alternatively, in the near term improved sight distance could be created by obtaining a vegetation management easement from the adjacent property owner and removing trees and other vegetation south and west of this intersection.

New development and roadway projects involving City street facilities are required to meet the access spacing standards in Section 17.84.50, 17.98.80 and 17.100.110 of the SMC as shown in Table 1. In cases where physical constraints or unique site characteristics limit the ability to meet these spacing standards an exception may be granted under Section 17.84.50(H).

Table 1: Minimum Access Spacing Standards for City Street Facilities

Functional Classification	Distance between Public Streets	Distance between Private Accesses and other Private Access or Public Streets
Major Arterial*	5,280 feet (1-mile)	See Table 2
Minor Arterial	5,280 feet (1-mile)	300 feet
Collector	2,640 feet (.5-mile)	150 feet
Local	400 - 660 feet	20 feet

* All major arterials in the City of Sandy are under ODOT jurisdiction.

The access spacing standards have been designed to provide higher levels of mobility (greater access spacing) for streets of higher classification, with spacing requirements decreasing with classification to allow for more direct property access. Direct access to properties should be taken from the lowest order street adjacent to the site.

In addition to these existing access spacing standards, the City of Sandy at a minimum may require a Traffic Analysis Letter[1], for new access points proposed to serve new developments. One component of the Traffic Analysis Letter deals with site access. The City reviews the development design to determine that there are no inherent safety issues, and that the study intersections have adequate queue storage, sight distance and deceleration lane requirements as established by the City. Consideration of the need for Traffic Analysis Letter would be triggered by land use actions such as land division, conditional use and design reviews.

Through local development review, opportunities to establish joint access points between adjacent properties should be pursued where land uses are compatible for such a configuration. In addition, the establishment of inter-parcel circulation between adjacent retail and service oriented land uses should be established to reduce the need for short trips on major and minor arterials. Requirements for these joint access points, inter-parcel circulation and crossover easements are covered in Section 17.90 and Table 2 of Section 17.100.90 of the SMC. Through access sharing, several accesses can be combined to maintain the City's minimum access spacing requirements for driveways[2].

Any proposed accesses to State facilities must be approved by ODOT. The *1999 Oregon Highway Plan* identifies access management objectives for all classifications of roadways under State jurisdiction. US 26, classified a Statewide Highway, and OR 211, classified a District Highway both maintain management objectives that balance the needs of through traffic movement with direct property access. Based on these objectives, ODOT has established access spacing standards for all highway classifications that vary with proximity to urbanized areas and changes in posted speeds. These standards are found in the *1999 Oregon Highway Plan*. Table 2 identifies the ODOT access spacing standards for Statewide and District Highways applicable within the Sandy urban growth boundary. Note that the spacing standards below are only to be applied to accesses on the same side of the highway.

Table 2: Minimum ODOT Access Spacing Standards

Posted Speed (mph)	Statewide Highway (US 26)			District Highway (OR211)
	Urban Expressway	Urban	STA	Urban
≥ 55	2,640 feet	1,320 feet		700 feet
50	2,640 feet	1,100 feet		550 feet
40 & 45	2,640 feet	990 feet		500 feet
30 & 35		720 feet	*	350 feet
≤ 25		520 feet	*	350 feet

Note: All measurements in feet, taken from center to center of approaches on the same side of the highway only.

* Minimum access management spacing for public road approaches is the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways and in STAs driveways are discouraged. However, where driveways are allowed and where land use patterns permit, the minimum access management spacing for driveways is 175 feet (55 meters) or mid-block if the current city block is less than 350 feet (110 meters).

[1] City of Sandy Traffic Analysis Letter Guidelines
[2] Sandy Municipal Code Section 17.90.110(A)3

ODOT's access management requirements are implemented through OAR 734-051. These rules outline the criteria and procedure for approach permitting decisions, including the application process, conditions under which deviations from established access spacing standards can be allowed, and procedures for appealing decisions.

ODOT has previously acquired access control throughout much of the US 26 corridor in Sandy. In the areas where access control exists, the right of access to the highway from the property may have been acquired or eliminated by law. Where no right of access is present, an application for an approach permit cannot be accepted. Reservations of access represent specific locations where access rights remain, include maximum approach widths allowed, and sometimes include use restrictions. A reservation of access affords the property owner the right to apply for an approach permit, which is reviewed under current ODOT access management regulations (OAR 734-051) but does not guarantee ODOT approval for a driveway at that location for the proposed use of the property. Existing reservations of access can be relocated or slightly modified upon approval from ODOT through a process called an "indenture of access".

Clackamas County also maintains access spacing standards for facilities under County jurisdiction in Sandy's Urban Reserve Area. County access spacing standards call for distances between public streets and driveways of 1,000 feet on major arterials, 600 feet on minor arterials, and 150 feet on collectors (no requirement on local roads).

Neighborhood Traffic Management (NTM)

Neighborhood traffic management strategies are commonly used to slow down or reduce automotive traffic with the intent of improving safety for pedestrians and bicyclists. Sandy currently has a neighborhood traffic management program that outlines the process for identifying, prioritizing, and mitigating problems related to traffic speeds and volumes on local streets.

Neighborhood traffic management strategies are not suited for arterial and collector streets, including US 26 and OR 211. However, NTM strategies can be applied to local streets. The primary goal of the Sandy Neighborhood Traffic Management Program[3] is to improve the livability and environment on neighborhood streets. Program objectives include:

- Provide solutions that improve livability along publicly-owned neighborhood streets through the thoughtful implementation of a traffic management program, by properly controlling vehicular traffic and enhancing the safety and ability to walk and bicycle, while reducing accidents and maintaining emergency vehicle access.
- Provide a means for residents to work together to seek solutions to neighborhood traffic concerns.
- Provide a wide range of solutions to address neighborhood traffic management issues, including devices and street designs that accomplish the goals related to control of vehicular traffic, without creating adverse impacts to other key areas such as pedestrian and bicycle access, service provider activities, and maintenance.

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[3] *City of Sandy Neighborhood Traffic Management Program*, Kimley-Horn & Associates, January 1998.

- Provide an equitable and credible process to evaluate neighborhood traffic calming requests.
- Provide a process that incorporates the input of affected citizens, potentially affected citizens, and service providers into the solution.
- Develop a process based on engineering and factual information.
- Develop solutions that are maintainable after implementation and that minimize maintenance costs.

To initiate the Sandy Neighborhood Traffic Management Program process, a citizen request accompanied by a petition with signatures of at least 50% of the residents along the project street(s) or within 1,000 feet of the project intersection(s) must be submitted to the City. Each request will be evaluated, and those that pass this process will be reviewed for a range of possible traffic calming device (Table 3) solutions. When the City considers traffic calming measures, it will work with the community to find the solution that best meets their needs and maintains roadway function.

Table 3: Traffic Calming Devices

	Impact				
Device	**Safety**	**Speed Reduction**	**Traffic Diversion**	**Fuel Consumption, Pollution**	**Emergency Services**
Chicanes	Possible Improvement	Possible	Possible	Small Increase	Possible Problems
Curb Extensions	Improved Ped. Crossing	Possible	No Effect	No Change	Possible Problems
Diverters	Possible Improvement	Mixed Results	Yes	No Change	Possible Problems
Entrance Treatments	Possible Improvement	Unlikely	Mixed Results	No Change	Possible Problems
Forced Turn Channelization	Possible Improvement	No	Yes	Small Increase	Possible Problems
Median Barriers	Possible Improvement	No	Possible	No Change	Possible Problems
Rumble Strips	Possible Improvement	Possible	No Effect	No Change	No Effect
Speed Humps	Unknown	Yes	Possible	Small Increase	Possible Problems
Traffic Circles	Improved	Yes	Possible	No Change	Possible Problems

Source: Sandy Traffic Management Program

Adaptive Signal Systems

The traffic signals in the City of Sandy are currently coordinated using time of day plans, as is typical of most signals. Under time of day control, a few different signal timing plans are entered into the traffic signal controller with directions indicating which days and times of day to run each plan. Time of day plans are generally effective and can use vehicle detection devices in the roadway to better accommodate changes in traffic demands on each approach.

However, in corridors where traffic volumes fluctuate significantly between different days (e.g., weekdays vs. weekends), different times of day, and various seasons, as they do in Sandy with its high percentage of recreational traffic, it is difficult to design time of day plans that adequately respond to each of these unique time periods. Time of day plans are typically designed for average conditions. Therefore, the users of the system will experience times when signal timing does not seem to be reflective of actual needs.

Adaptive signal systems differ from time of day plans in that they measure congestion levels on every travel lane of every approach and continuously (every signal cycle) adjust signal timing at each intersection in the corridor to minimize delay for all users while maintaining the progression of vehicles on the major route. Under this type of control, there is no need to create customized timing plans to match changing flows for different times of day, week, or year. Users often experience far more responsive signal timing during off-peak hours and at times when traffic flows are atypical. In addition, adaptive signal systems are able to respond to changes in travel patterns resulting from inclement weather, incidents, construction, and recreational and holiday travel. As a case example, an adaptive signal system was recently installed in Gresham along Burnside Road between Eastman Parkway and Powell Boulevard.

The peak hour benefits of adaptive signal systems on US 26 may be minimal compared to a well designed and maintained time of day plan. However, the overall efficiency of the corridor could be significantly improved, especially during midday hours, weekends, and times of the year when recreational traffic is high. Because of the potential non-peak hour benefits and variability of traffic on US 26, it may be particularly advantageous for freight traffic, which often peaks during morning and midday time periods, and as a traffic management tool when recreational traffic is causing congestion through the City.

Adaptive signal systems require communication between the signals in the system for proper coordination and operation. The City has installed conduit and signal interconnect between Bluff Road and Ten Eyck Road through the downtown for ODOT's use. This could be used in conjunction with communications between the rest of the signals along US 26 as part of an adaptive signal system.

Adaptive signal systems are also relatively cost-effective compared to other types of transportation system improvements. For planning purposes, typical installations could be assumed to cost approximately $50,000 per intersection.

Signal installations and/or modifications to existing signals on ODOT facilities shall require ODOT State or Region Traffic Engineer approvals as defined in Chapter 5 of the ODOT Traffic Manual. This requirement for obtaining approvals also applies to changes in phasing or operation of existing signals, such as adaptive signal timing.

Local Street Connectivity

The local street network in the downtown area of the City and in newer developments provides good connectivity, with multiple options for travel in any direction. However, existing neighborhoods developed in the 1970s and 80s around the City have developed with limited connections to the surrounding street network, funneling all pedestrian, bicycle, and vehicular traffic onto a single street. This type of street network results in out-of-direction travel and an imbalance of traffic volumes that impacts residential frontages. This can result in the need for investments in wider roads, traffic signals, traffic calming devices, and turn lanes that could otherwise be avoided.

By providing connectivity between neighborhoods, out-of-direction travel and vehicle miles traveled (VMT) can be reduced, the attractiveness of various travel modes enhanced, traffic levels can be balanced between various streets, and public safety response time is reduced. In the City of Sandy, several roadway connections will be needed within developable areas to reduce out of direction travel for vehicles, pedestrians, and bicyclists. This is most important in the areas where a significant amount of new development is possible.

Figure 1 shows the Local Street Connectivity Plan for Sandy. In most cases, the connector alignments are not specific and are aimed at reducing potential neighborhood traffic impacts by better balancing traffic flows on local streets. The arrows shown in the figures represent potential connections and the general direction for the placement of the connection. In each case, the specific alignments and design should be determined as part of development review, with consideration being given to the built environment, topography, and environmental conditions.

Should new cul-de-sacs be created, bicycle and pedestrian accessways providing a connection to the surrounding transportation system from the cul-de-sac should be required per Section 17.100.120(D) of the SMC.

To protect existing neighborhoods from the potential traffic impacts caused by extending stub end streets, connector roadways should incorporate neighborhood traffic management into their design and construction. In addition, when a development constructs stub streets, the City requires the installation of signs indicating the potential for future connectivity to increase the awareness of residents.

Additionally, new developments that construct new streets or street extensions are required by Section 17.100.100(F) of the SMC to provide a proposed street map that:

- Provides full street connections with spacing of no more than 400 feet between connections except where prevented by barriers or access management standards on higher classified facilities.
- Provides bike and pedestrian access ways through the middle of the block when block lengths exceed 600 feet
- Limits use of cul-de-sacs and other closed-end street systems to situations where barriers prevent full street connections
- Includes no cul-de-sacs or close-end street longer than 400 feet. Those longer than 400 feet, or developments with only one access point, may be required to provide an alternative access for emergency vehicle use only

Figure 1

Local Street Connectivity

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Existing Streets

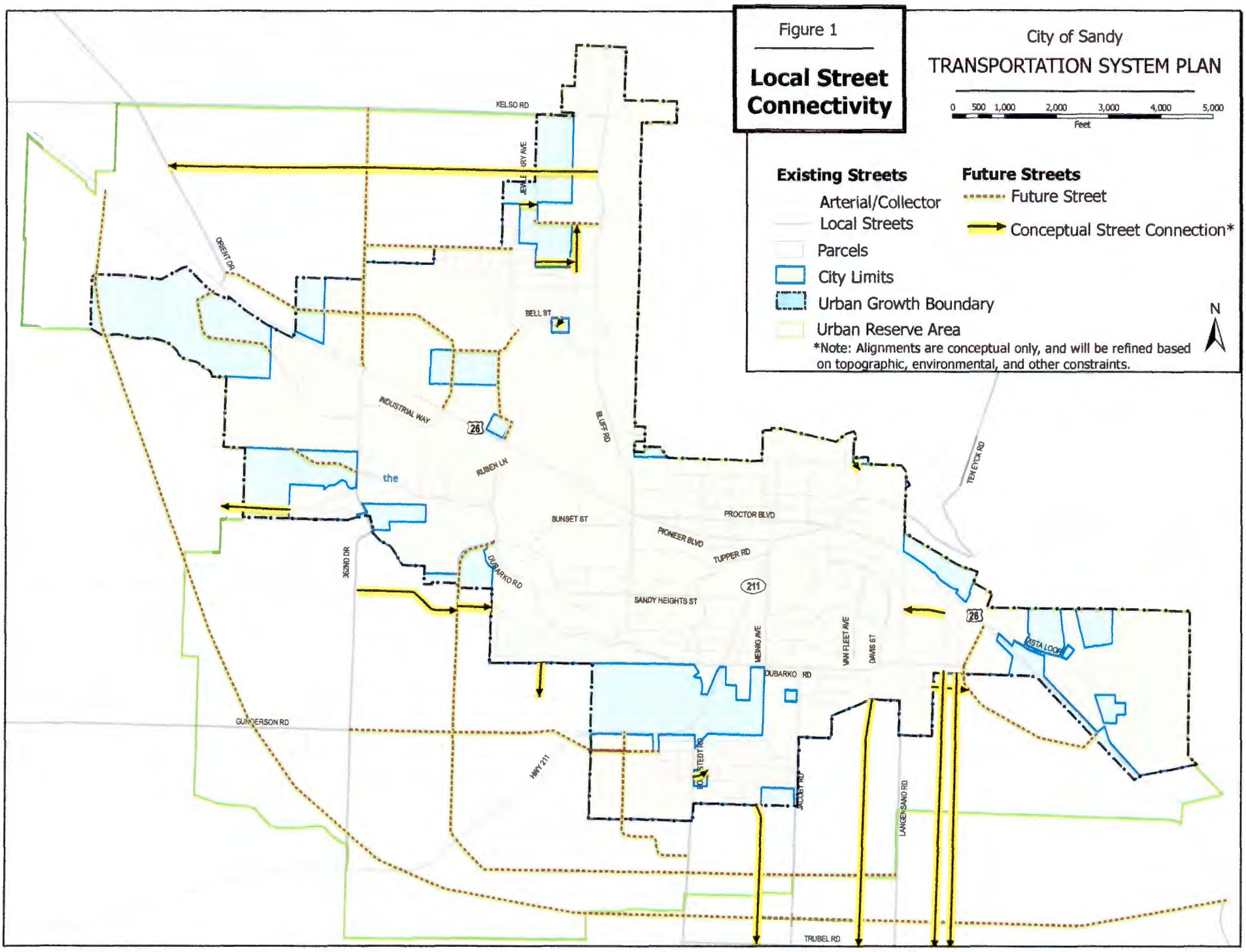
- Arterial/Collector
- Local Streets
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

Future Streets

- Future Street
- Conceptual Street Connection*

*Note: Alignments are conceptual only, and will be refined based on topographic, environmental, and other constraints.

N



- Includes street cross-sections showing dimensions of ROW improvements, with streets designed for posted or expected speed limits which meet City design standards (or ODOT standards for state highways)

Functional Classification

The proposed functional classification map for streets in the City of Sandy is shown in Figure 2. The functional classification map includes the new streets considered as part of the motor vehicle alternatives analysis and updated functional classifications of existing roadways. Any street not designated as an arterial or collector is considered a local street. Typical roadway standards for each functional class are provided in Figures G-J. These standards are intended to be applied to new facilities or significant improvements to existing facilities. The adoption of these standards does not create a requirement to upgrade existing facilities.

The management objectives for each functional class, criteria for future classification changes, and proposed classifications for City of Sandy roadways are explained in the following sections.

Functional Classification Management Objectives

Major Arterial

Major arterials are typically three to five-lane highways that operate as two-way streets or as a one-way couplet. These roads are intended to handle high volumes of traffic, typically 16,000 ADT (Average Daily Traffic) or more. Major arterials provide greater regional mobility, are managed to favor through traffic capacity and safety over direct access, and should generally be spaced approximately one mile apart. Private driveway access on-street parking, and traffic calming measures are typically discouraged along major arterial routes and the provision of bike lanes or shoulders is required.

Minor Arterial

Minor arterials are high-volume, intra-city streets providing connectivity and parallel features and should generally be spaced approximately one mile apart. These roads have a preferred capacity between 8,000 and 16,000 ADT. Minor arterials are generally the most critical classification for circulation in the urban areas of Sandy and are intended to serve longer local trips. Private driveway access is discouraged where access to facilities of lower classification is available and traffic calming measures and on-street parking should be avoided. The provision of bike lanes is required.

Residential Minor Arterial

Residential minor arterials are a hybrid between minor arterial and collector type streets that allows for moderate to high traffic volumes on streets where over 90 percent of the fronting lots are residential. These roads have similar preferred capacity to minor arterials, 6,000 to 10,000 ADT. They are intended to provide some relief to the strained arterial system while ensuring a safe residential environment. Residential minor arterials may include on-street parking and traffic calming measures may be applied. Direct access to properties is managed in a manner similar to collector streets. The provision of bike lanes is required.

Collector

Collector streets provide both access and circulation within and between residential and commercial areas. These roads have a preferred capacity between 2,000 and 6,000 ADT. Collectors differ from arterials in that they provide more of a citywide circulation function, do not require as extensive control of access (compared to arterials) and penetrate residential neighborhoods, distributing trips from the local street system to minor and major arterials. Collectors may provide on-street parking, may incorporate traffic calming measures, and should be spaced approximately one-half mile feet apart. Bike lanes are required on collectors.

Local Streets

Local streets have the sole function of providing immediate access to adjacent land. These streets have a preferred capacity between 800 and 1,000 ADT. Service to through traffic movements on local streets is deliberately discouraged by design. All other City streets in the City of Sandy that are not designated as arterial streets or collector streets are considered to be local streets. Local streets may allow on-street parking and may incorporate traffic calming measures. Bike lanes are not required.

Criteria for Changes to Functional Classification

The proposed functional classifications were developed following detailed review of the existing Sandy TSP and Clackamas County TSP. The two components used to assess functional classification are the extent of street connectivity and the spacing of the facility type. Maps can be used to determine arterial, collector, and local connections. However, the facility frequency is not routine or easy to package into a single criterion. Spacing standards do not form the only basis for defining functional classification.

Changes in land use, environmental issues or barriers, topographic constraints, and demand for facilities can influence the spacing of arterial and collector streets throughout the City. While spacing standards can be a guide, they must consider other features and potential long term uses in the area (some areas would not experience significant changes in demand, where others will). The City may classify street functional designations with different naming conventions than the Clackamas County street functional classifications. However, the general intent and purpose of the facility, whatever the name, should be consistent with regional, state, and federal guidelines.

Functional Classification Changes in Sandy

The following changes to street functional classifications are proposed as part of this TSP update to improve the network design, circulation, and mobility throughout the City of Sandy.

Upgrade from a local street to a collector:

- Champion Way (entire length)
- Sandy Heights Street/SE 370th west of Dubarko Road
- McCormick Drive Between Wolf Drive and Langensand Road
- Cascadia Village Drive (entire length)
- Vista Loop (entire length)

Downgrade from a collector to a local street:

- Sunset Street (entire length)

Figure 2

Roadway Functional Classification

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

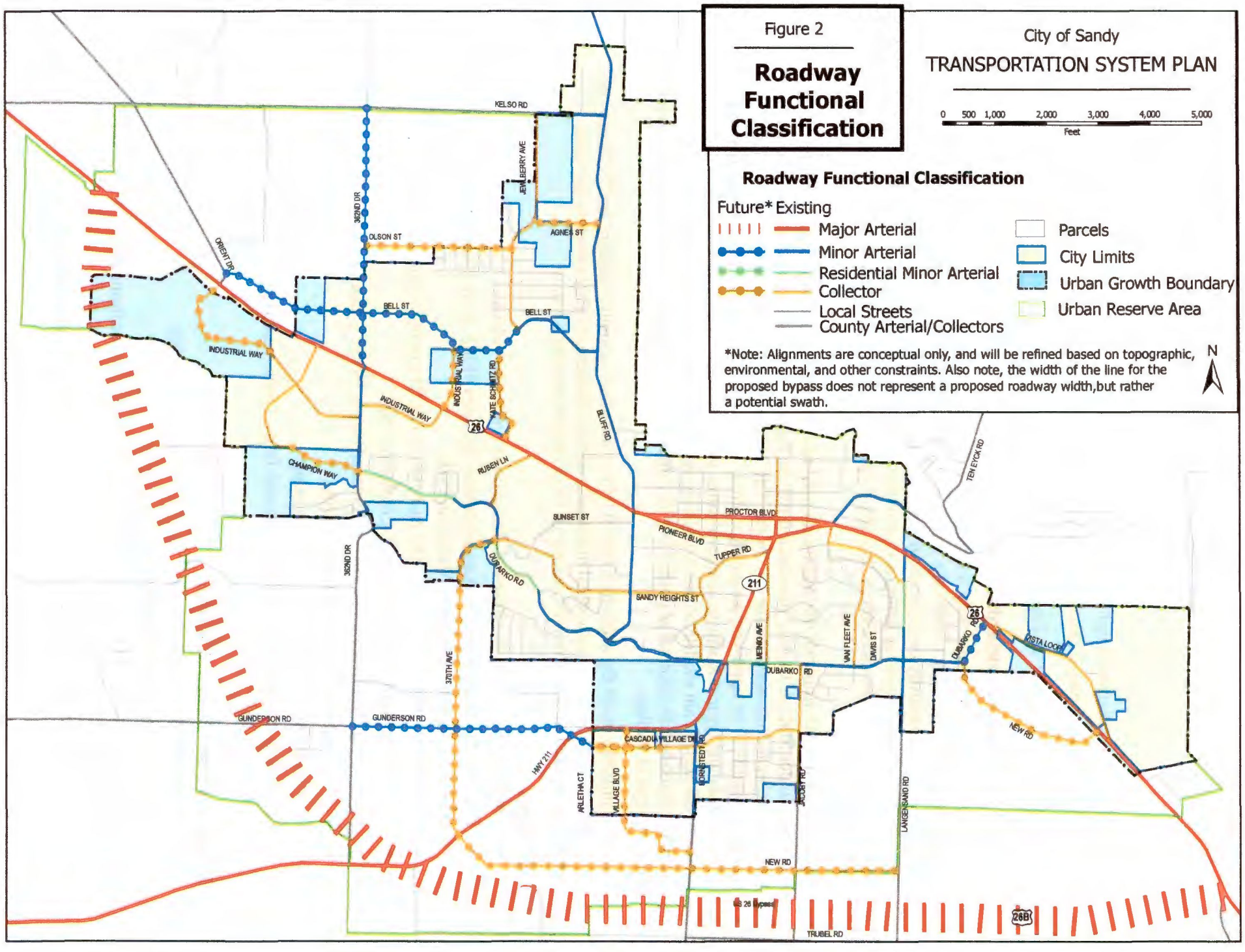
Roadway Functional Classification

Future* Existing

- Major Arterial
- Minor Arterial
- Residential Minor Arterial
- Collector
- Local Streets
- County Arterial/Collectors
- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

*Note: Alignments are conceptual only, and will be refined based on topographic, environmental, and other constraints. Also note, the width of the line for the proposed bypass does not represent a proposed roadway width,but rather a potential swath.

N



- Davis Street (entire length)
- Wolf Drive between Davis Street and McCormick Drive
- Sandy Heights east of Tupper Road

Typical Roadway Standards

The design characteristics of Sandy's streets are defined in Section 17.100.110 of the SMC, and were developed by the City to meet the function and demand for each facility type. Because the actual design of a roadway can vary from segment to segment due to adjacent land uses and demands, the objective was to define a system that allows for standardization of key characteristics to provide consistency, but also to provide criteria for application that provides some flexibility.

Figures 3 through 10 illustrate the proposed cross-sections for roadways in Sandy. While roadways under State or County jurisdiction will be subject to the design standards of those agencies, typical cross-sections for US 26 and OR 211 are provided that comply with ODOT's design standards or an approved design exception. These standards can be used to identify right of way needs and typical roadway design features to be included in the construction of new roadways or significant modifications to existing roadways. The appropriate application of elements identified as optional is guided by the functional classification management objectives for each type of facility.

Future improvements to the section of OR 211 from the urban growth boundary to US 26 may be faced with a number of environmental and topographical challenges. Key opportunities and constraints related to future modernization of this corridor are noted below.

Constraints

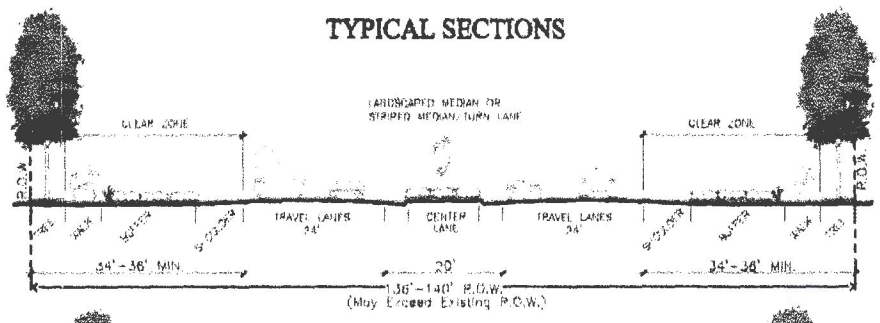
- Limited right of way to chase cut/fill sections (varies 80'-120')
- Potential Federal Highways Administration Sections 4F/6F environmental impacts for widening adjacent to Meinig Memorial Park
- Potential residential impacts on the east side of OR 211 north of Dubarko Road
- Potential riparian impacts at Tickle Creek crossing
- Fish passage improvements / culvert replacement at Tickle Creek crossing
- Wetland impacts at Tickle Creek crossing
- Floodplain impacts at Tickle Creek crossing
- Environmental Assessment/Environmental Impact Statement (EA / EIS) likely required with use of federal funds

Opportunities and Design Strategies

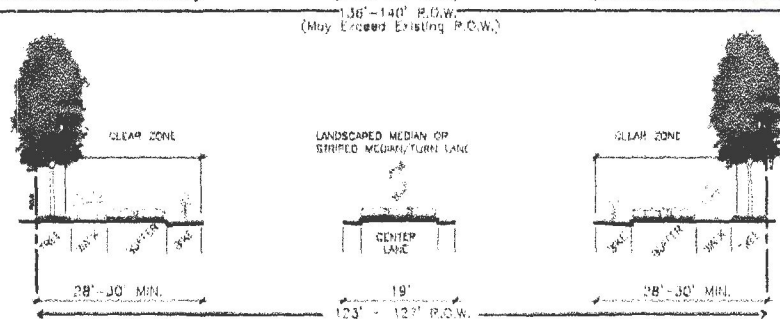
- Can limit right of way slope and riparian impacts with walls
- Reduce planter strip width in constrained areas.
- Eliminate turn lane or reduce median width in constrained sections where there is no demand for left turn.
- Design planters in a manner to satisfy water quality treatment requirements

TYPICAL SECTIONS

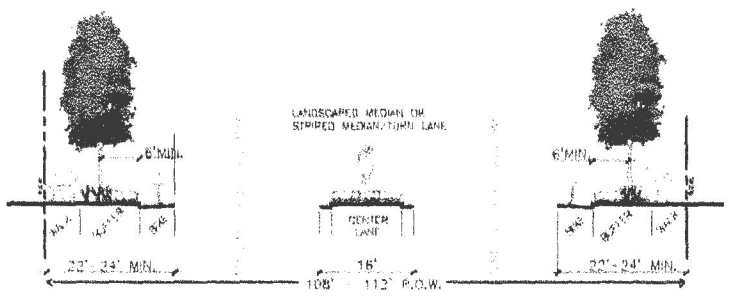
55 MPH POSTED/
70 MPH DESIGN SPEEDS



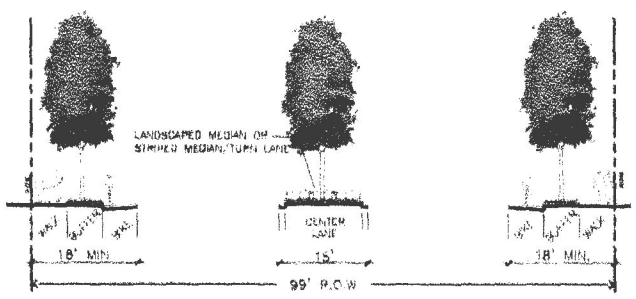
45 MPH POSTED/
55 MPH DESIGN SPEED

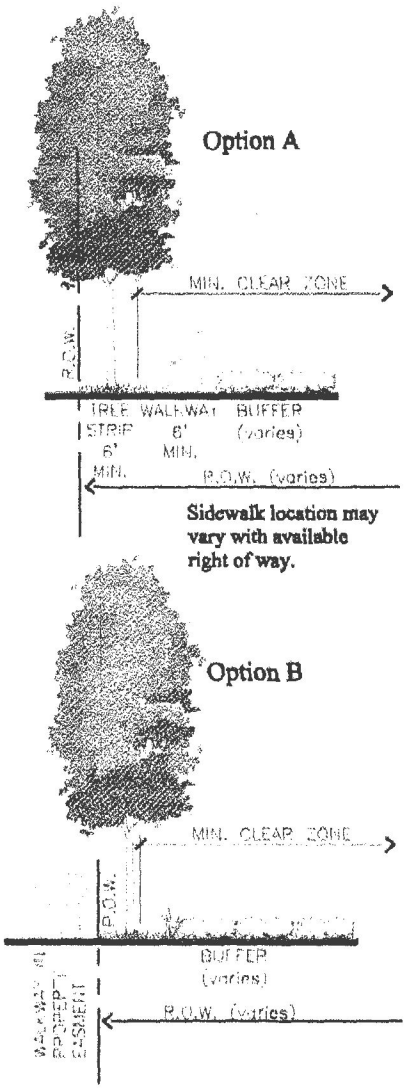


40 MPH POSTED/
45 MPH DESIGN SPEED



25 MPH POSTED/
30 MPH DESIGN SPEED



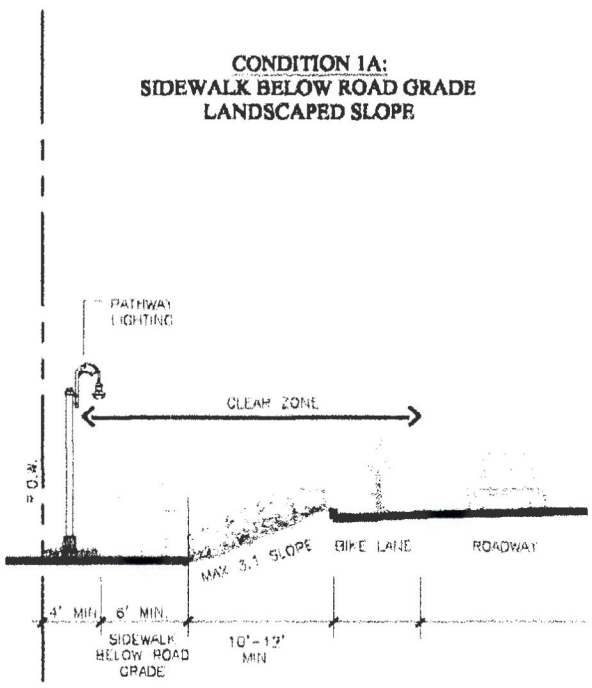


(Not applicable within the Special Transportation Area along Pioneer and Proctor Boulevards.)

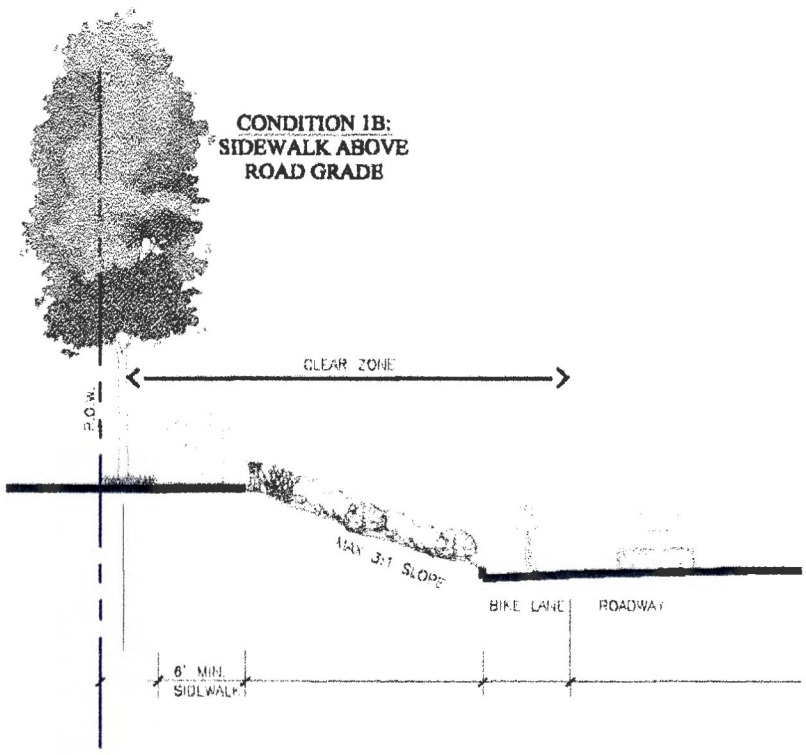
Figure 3

US 26 CROSS-SECTIONS

CONDITION 1A:
SIDEWALK BELOW ROAD GRADE
LANDSCAPED SLOPE



CONDITION 1B:
SIDEWALK ABOVE
ROAD GRADE

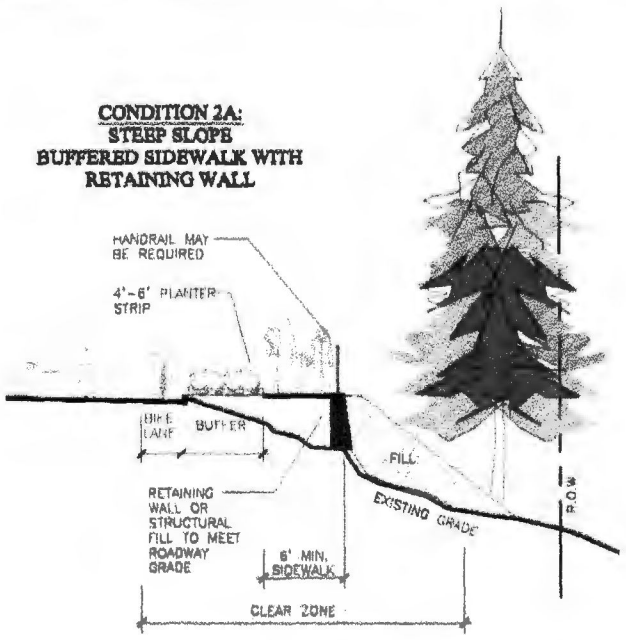


(Not applicable within the Special Transportation Area along Pioneer and Proctor Boulevards.)

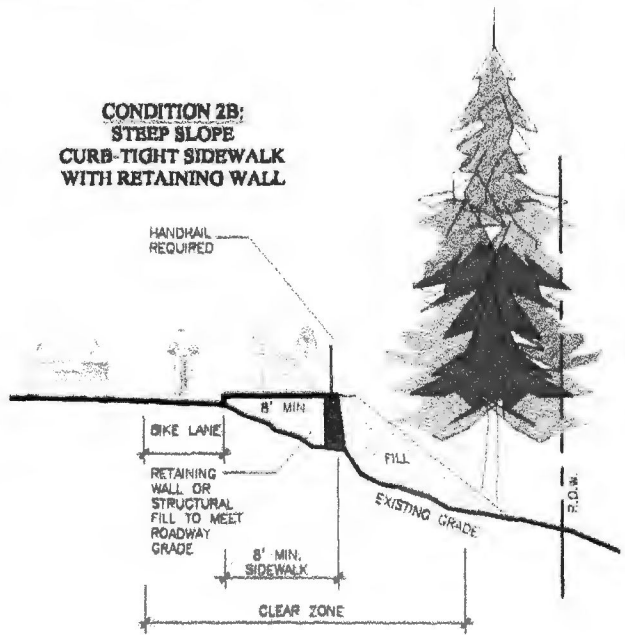
Figure 4

US 26 CROSS-SECTIONS
Special Conditions

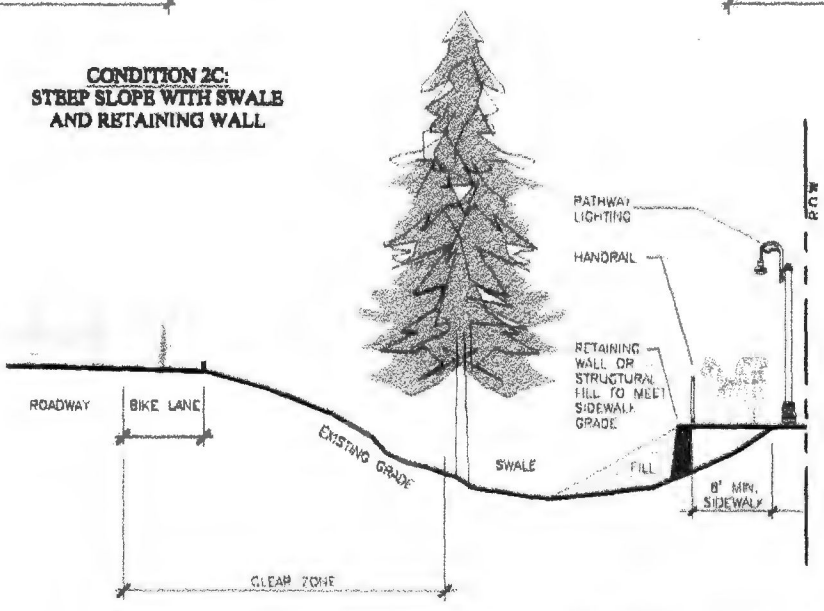
CONDITION 2A:
STEEP SLOPE
BUFFERED SIDEWALK WITH RETAINING WALL



CONDITION 2B:
STEEP SLOPE
CURB-TIGHT SIDEWALK WITH RETAINING WALL



CONDITION 2C:
STEEP SLOPE WITH SWALE AND RETAINING WALL

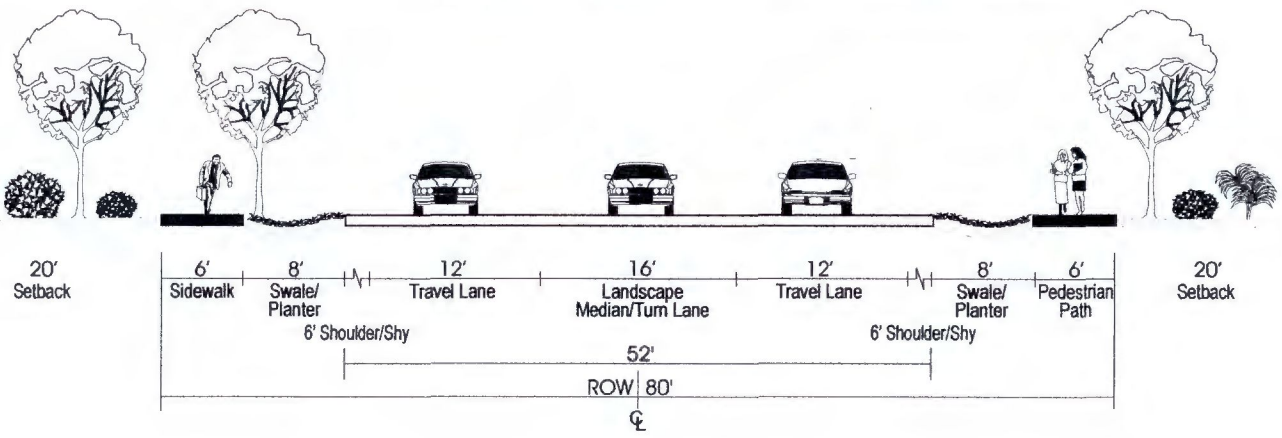


(Not applicable within the Special Transportation Area along Pioneer and Proctor Boulevards.)

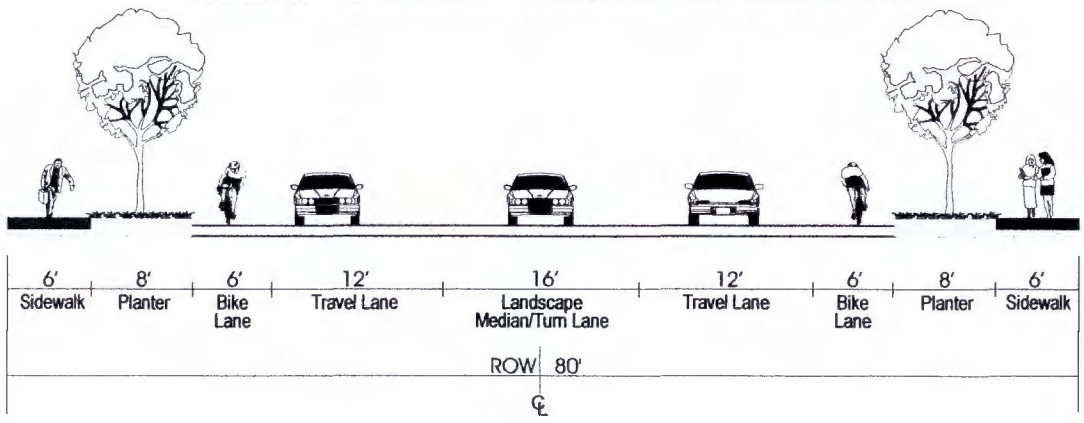
Figure 5

US 26 CROSS-SECTIONS
Special Conditions

OR 211 - Between Arletha Ct. and Dubarko Rd.



OR 211 - Between Dubarko Rd. and US 26

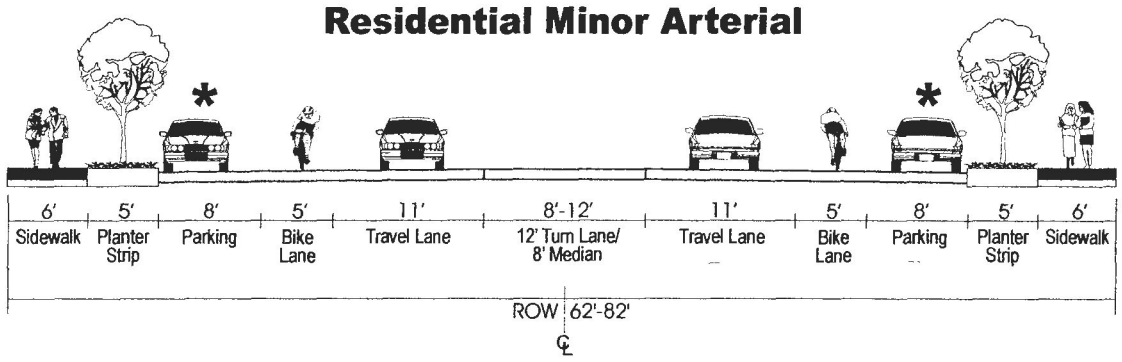


Source: City of Sandy Bornsted Village Plan

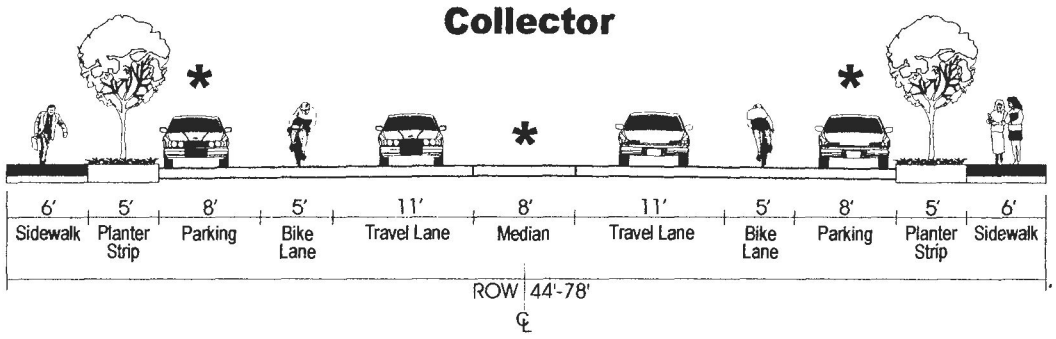
Figure 6

OR 211 PROPOSED ROADWAY CROSS-SECTIONS

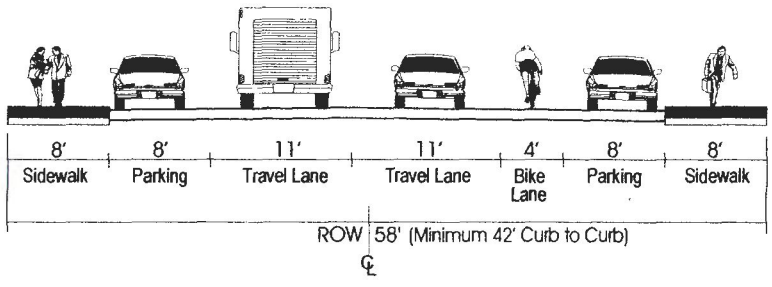
Minor Arterial/ Residential Minor Arterial



Collector



Pioneer and Proctor Boulevards (US 26) Within the Special Transportation Area



LEGEND

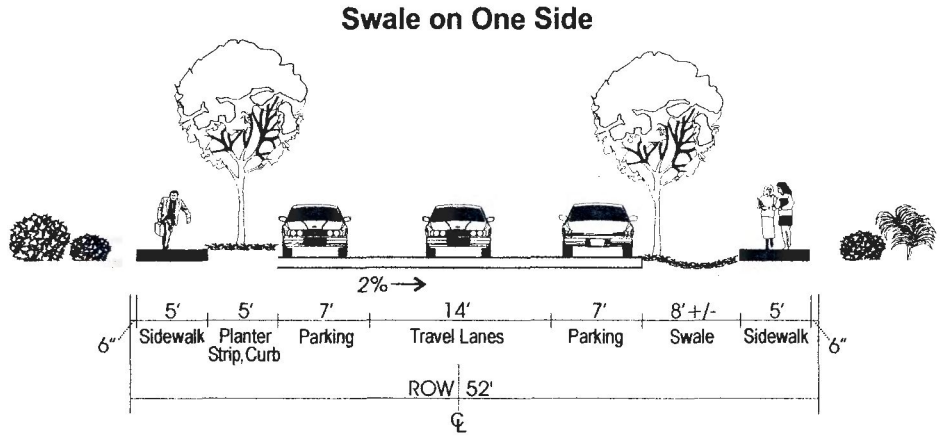
✱ - Optional

Figure 7

ROADWAY STANDARDS

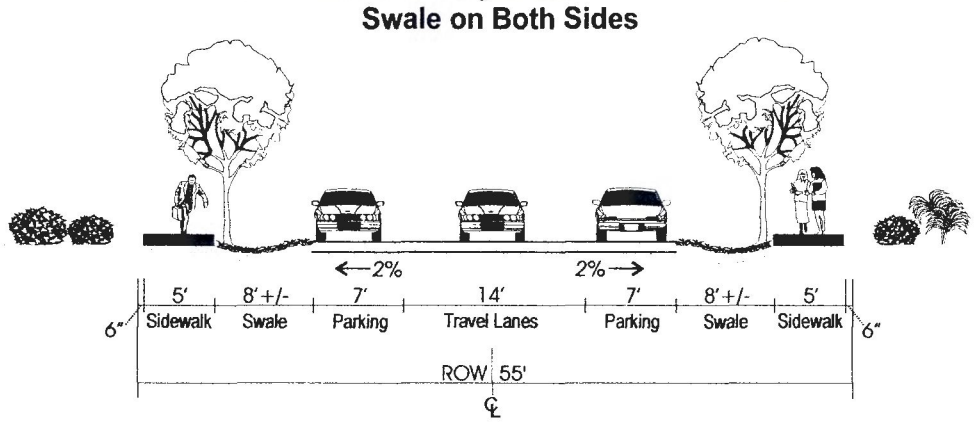
Green Street Option - 52 ft. ROW

Swale on One Side



Green Street Option - 55 ft. ROW

Swale on Both Sides

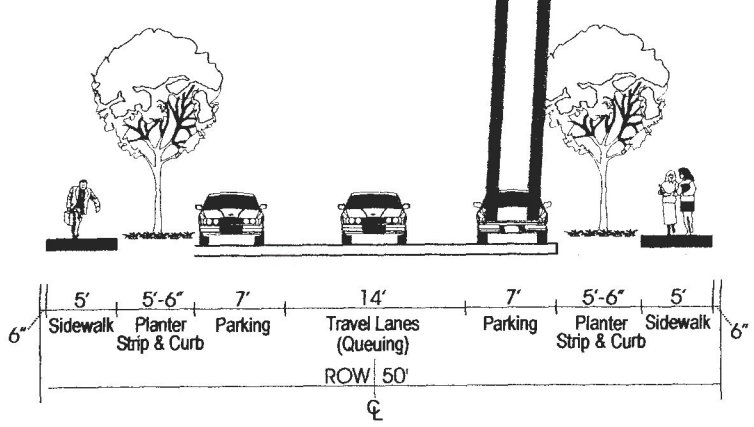


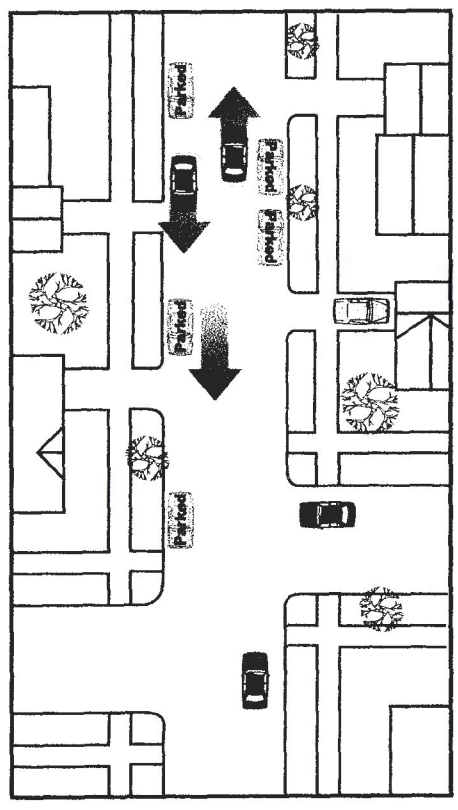
Source: City of Sandy Development Code, Section 17.100.110

Figure 8

NEIGHBORHOOD GREEN STREET ROADWAY STANDARDS

Neighborhood Street

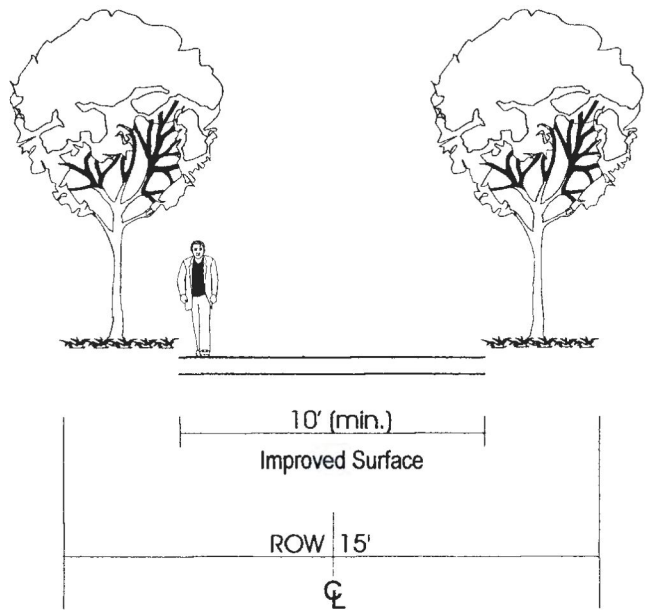




Source: City of Sandy Development Code, Section 17.100.110

Figure 9

NEIGHBORHOOD STREET ROADWAY STANDARDS



Source: City of Sandy Municipal Code, Section 17.100.120 (D)

Figure 10

ACCESSWAY STANDARD

Transportation Demand Management (TDM)

Transportation Demand Management (TDM) is the general term used to describe any action that removes single occupant vehicle trips from the roadway network. As growth in the Sandy area occurs, the number of vehicle trips and travel demand in the area will also increase. The ability to change a user's travel behavior and provide alternative mode choices will help accommodate this growth and reduce impacts to the road system.

Research has shown that a comprehensive set of complementary policies implemented over a large geographic area can have an effect on the number of vehicle miles traveled to/from that area.[4] However, the same research indicates that in order for TDM measures to be effective, they should go beyond the low-cost, uncontroversial measures commonly used such as carpooling, transportation coordinators/associations, priority parking spaces, etc.

Many TDM strategies are tailored towards urban areas, where there are major employment generators and transit opportunities. TDM measures for rural or smaller communities require special development, compared to those in heavily urbanized areas. TDM measures in rural and smaller urban environments should focus on increasing travel options and creating an environment that is supportive for walking and cycling. The most effective TDM measures for the City of Sandy may include strategies related to increased parking management in the downtown (parking time limits and pricing), carpools, and improved services for alternative modes of travel (walking, bicycling, and transit).

Additionally, the Employee Commute Options (ECO) program administered by the Department of Environmental Quality (DEQ) under OAR 340-20-047 requires larger employers (more than 50 employees) in metropolitan areas to provide commute options that encourage employees to reduce auto trips to the work site. While this would not be directly applicable to the City of Sandy, the concept could still be applied to larger employers in the future. A recommended target for implementation would be for employers of at least 100 people. The Oregon Trail School District is currently the largest employer in Sandy and could reduce a.m. peak hour trips by adjusting school arrival times to avoid the peak hour. The School District should also consider providing adequate bicycle parking and limiting the availability of student parking to encourage the use of school busses and alternate modes of travel, which would be beneficial during both the a.m. and p.m. peak hours. A closed campus at the new high school could also eliminate lunch hour student trips.

Table 4 lists several strategies that could be applicable to employers within the City of Sandy. Setting TDM goals and policies for new development may be necessary to help implement TDM measures in the future. Additional strategies that could be implemented by the City through its comprehensive plan and development code include continued support of pedestrian, bicycle, and transit projects, consideration of trip caps, or transportation demand management strategies as part of development, and to continue to provide the opportunity for compact, mixed land-uses to reduce citywide VMT.

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[4] *The Potential for Land Use Demand Management Policies to Reduce Automobile Trips*, ODOT, by ECO Northwest, June 1992.

Recognizing that local trips are not the sole contributor to area congestion and total vehicle-miles traveled in Sandy, the City should coordinate with Clackamas County and ODOT to develop regional TDM strategies in addition to the local strategies proposed in Table 4.

Table 4: Transportation Demand Management Strategies

Strategy	Description	Potential Trip Reduction
Telecommuting	Employees perform regular work duties at home or at a work center closer to home, rather than commuting from home to work. This can be full time or on selected workdays. This can require computer equipment to be most effective.	82-91% (Full Time) 14-36% (1-2 day/wk)
Compressed Work Week	Schedule where employees work their regular scheduled number of hours in fewer days per week.	7-9% (9 day/80 hr) 16-18% (4 day/40 hr) 32-36% (3 day/36 hr)
Alternative Mode Subsidy	For employees that commute to work by modes other than driving alone, the employer provides a monetary bonus to the employee.	21-34% (full subsidy of cost, high alternative modes) 2-4% (half subsidy of cost, medium alternative modes)
Bicycle Program	Employers provide support services to those employees that bicycle to work. Examples include: safe/secure bicycle storage, shower facilities and subsidy of commute bicycle purchase.	0-10%
On-site Rideshare Matching	Employees who are interested in carpooling or vanpooling provide information to a transportation coordinator regarding their work hours, availability of a vehicle and place of residence. The coordinator then matches employees who can reasonably rideshare together.	1-2%
Provide Vanpools	Employees that live near each other are organized into a vanpool for their trip to work. The employer may subsidize the cost of operation and maintaining the van.	15-25% (company provided van with fee) 30-40% (subsidized van)
Gift/Awards for Alternative Mode Use	Employees are offered the opportunity to receive a gift or an award for using modes other than driving alone.	0-3%
Walking Program	Provide support services for those who walk to work. This could include buying walking shoes or providing lockers and showers.	0-3%
Company Cars for Business Travel	Employees are allowed to use company cars for business-related travel during the day	0-1%
Guaranteed Ride Home Program	A company owned or leased vehicle is provided in the case of an emergency for employees that use alternative modes.	1-3%
Time off with Pay for Alternative Mode Use	Employees are offered time off with pay as an incentive to use alternative modes.	1-2%

Source: *Guidance for Estimating Trip Reductions from Commute Options*, Oregon Department of Environmental Quality, August 1996.

Pedestrian Improvements

The Pedestrian Plan identifies projects for improving the City of Sandy's pedestrian system, an important part of a balanced citywide transportation network. Building upon existing local and regional planning efforts, the proposed plan reflects the valuable input offered by City staff,

stakeholder groups, and Sandy residents. This section focuses on pedestrian infrastructure improvements for improving walking attractiveness and the viability of walking as a mode of travel in Sandy. The existing pedestrian system and identified deficiencies were previously described in Chapter 3 (Existing Conditions).

Proposed Pedestrian Projects

The pedestrian network builds upon Sandy's existing system of sidewalks, paths, trails, and other pedestrian infrastructure currently in place. Figure 11 depicts the proposed pedestrian system projects that are listed in Table 5. This list does not include new pedestrian facilities that would be constructed as part of the new roadway projects identified for the motor vehicle plan. These projects are intended to enhance pedestrian safety and convenience while making walking a more attractive travel mode. It should be noted that most future shared-use path corridors depicted on the system map represent conceptual alignments, with further evaluation needed to identify specific routes.

Some specific projects and general applications for pedestrian system enhancements are further described in the sections below.

Table 5: Proposed Pedestrian System Projects

Project	Segment	Description
City of Sandy Facility Pedestrian Improvements		
362nd Drive	Chinook Dr. to Industrial Way	Infill sidewalk gaps
Bluff Rd.	Green Mountain St. to Northern UGB	Infill sidewalk gaps
Bluff Rd	Hood St. to Green Mountain St.	Infill sidewalk gaps
Bluff Rd	Strawbridge Pkwy to Nettie Connett Dr.	Infill sidewalk gaps
Bornstedt Rd.	Cascadia Village Dr to UGB	Infill sidewalk gaps
Dubarko Rd.	East of Melissa Ave. to East of OR 211	Infill sidewalk gaps
Dubarko Rd.	Langensand Rd. to Antler Ave.	Infill sidewalk gaps
Industrial Way	362nd Dr. to US 26	Infill sidewalk gaps
Jewelberry Rd.	Penny Ave. to Kelso Rd.	Infill sidewalk gaps
Jacoby Rd.	Dubarko Rd. to Cascadia Village Dr.	Infill sidewalk gaps
Langensand Rd	Dubarko Rd. to US 26	Infill sidewalk gaps
Langensand Rd.	US 26 to South of Dubarko Rd.	Infill sidewalk gaps
Meinig Avenue	Scenic St. to US 26	Infill sidewalk gaps
New Accessway / Trail	Bell St. Fields to Kate Schmitz Ave.	Accessway / Trail
New Accessway / Trail	North of Kate Schmitz Ave. to Orient Dr	Accessway / Trail
New Accessway / Trail	Industrial Way to Eastern UGB	Accessway / Trail
New Accessway / Trail	Marcy to Middle School Fields	Accessway / Trail
New Accessway / Trail	Marcy to Sandy River	Accessway / Trail
New Accessway / Trail	OR 211 to Jacoby	Accessway / Trail
New Accessway / Trail	Meinig Memorial Park Demand Trails	Accessway / Trail
New Accessway / Trail	Meinig Memorial Park Demand Trail to SW Corner	Accessway / Trail
New Accessway / Multi-Use Trail	Extension of Tickle Creek Trail to Dubarko Rd.	Accessway / Trail
Pleasant St	Beers Ave. to Revenue Ave.	Infill sidewalk gaps
Ruben Ln	US 26 to Dubarko Rd.	Infill sidewalk gaps
Sandy Heights St	Bluff Rd. to Tupper Rd.	Infill sidewalk gaps
Downtown Core Pedestrian Improvements	N/A	Infill sidewalk gaps
University Ave	Sunset St. to US 26	Construct sidewalk

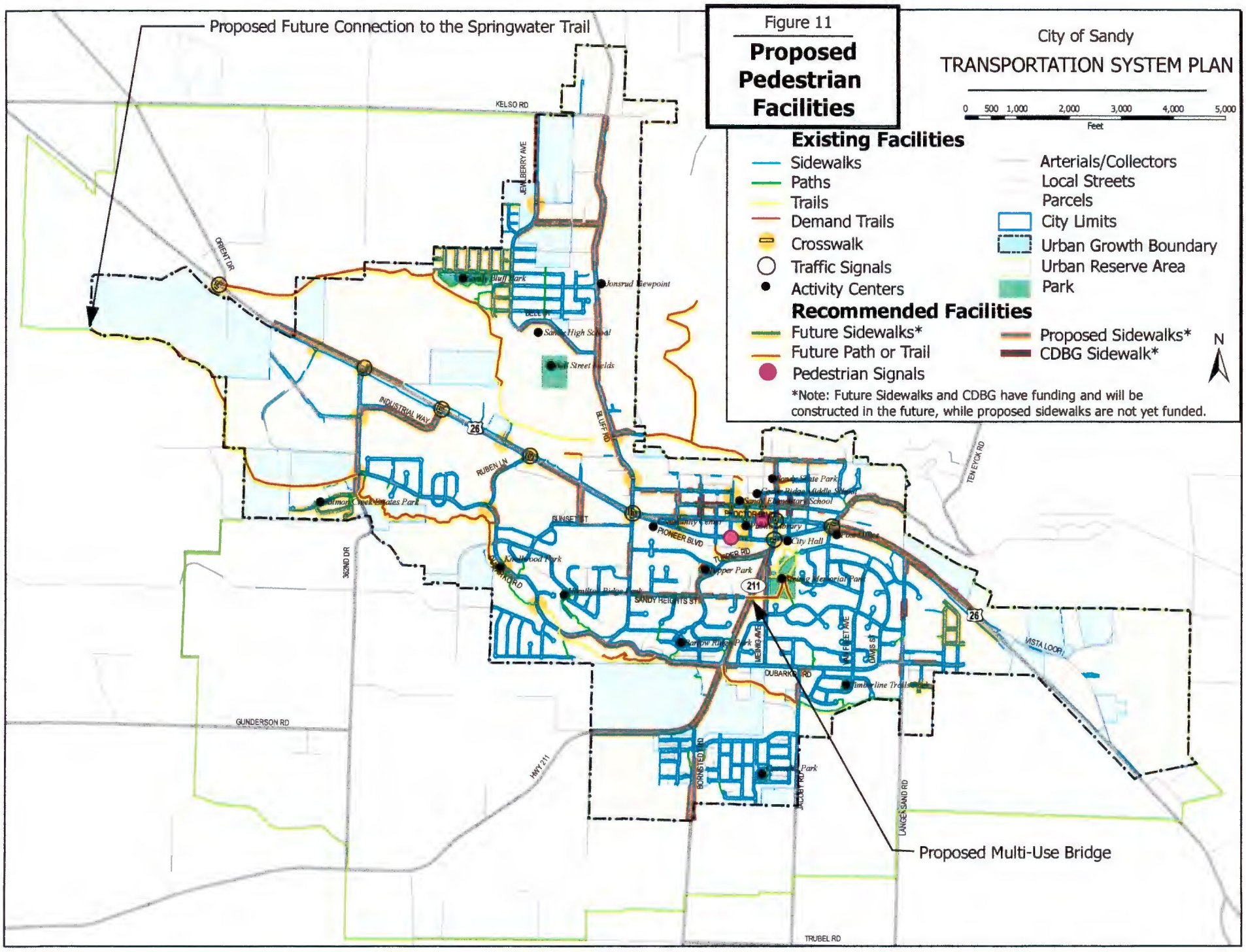

Proposed Future Connection to the Springwater Trail
Figure 11
Proposed Pedestrian Facilities
City of Sandy
TRANSPORTATION SYSTEM PLAN
0 500 1,000 2,000 3,000 4,000 5,000
Feet
Existing Facilities
Sidewalks
Paths
Trails
Demand Trails
Crosswalk
Traffic Signals
Activity Centers
Arterials/Collectors
Local Streets
Parcels
City Limits
Urban Growth Boundary
Urban Reserve Area
Park
Recommended Facilities
Future Sidewalks*
Future Path or Trail
Pedestrian Signals
Proposed Sidewalks*
CDBG Sidewalk*
*Note: Future Sidewalks and CDBG have funding and will be constructed in the future, while proposed sidewalks are not yet funded.
N
KELSO RD
JEWELBERRY AVE
ORIENT DR
INDUSTRIAL WAY
RUBEN LN
BLUFF RD
SUNSET ST
PIONEER BLVD
TUPPER RD
SANDY HEIGHTS ST
DUBARKO RD
MEINIG AVE
DAVIS ST
VISTA LOOP
TEN EYCK RD
362ND DR
GUNDERSON RD
HWY 211
BORNSTEDT RD
JACOBY RD
LANGENSAND RD
TRUBEL RD
Proposed Multi-Use Bridge

Table 5: Proposed Pedestrian System Projects (continued)

Project	Segment	Description
ODOT Facility Pedestrian Improvements		
US 26	Royal Ln to 362nd Dr.	Infill sidewalk gaps
US 26	362nd Dr. to West UGB	Infill sidewalk gaps
US 26	Ruben Ln. to University Ave.	Infill sidewalk gaps
US 26	Ten Eyck Rd. to Vista Loop Dr. West	Infill sidewalk gaps
OR 211	South UGB to US 26	Construct sidewalk
OR 211	Sandy Heights St. to Meinig Ave	Pedestrian Overcrossing

Sidewalks

Several arterial and collector streets, as well as many local streets in older sections of Sandy, have limited sidewalk coverage. A challenge facing Sandy lies in retrofitting existing streets where sidewalks are fragmented or not yet provided, especially in areas where significant redevelopment is not expected to occur.

Completing some sidewalk links can be especially challenging in older residential areas where residents have developed fencing and landscaping within the public right-of-way and may consider those areas to be part of their properties. In addition, some residents may not want traditional sidewalks as they may alter the existing character of their neighborhoods and have the potential to impact mature landscaping and trees. Regardless, the public right-of way that is generally located on either side of the paved driving and parking area is intended for walking, whether or not a sidewalk currently exists.

Several sidewalk construction/ infill projects have been proposed for consideration. Key project that may be higher in priority include:

- US 26: between Ten Eyck Road and Vista Loop Drive West (priority on north side of highway)
- Bluff Road: between Hood Street and Green Mountain Street
- Pleasant Street: between Beers Avenue and Revenue Avenue
- OR 211: between Bornstedt Road and US 26 (segment of South UGB to US 26 project)

Pedestrian Buffer Strips

Pedestrian buffer strips are bands of land that provide physical separation between the roadway and the sidewalk. They benefit pedestrians by increasing the physical separation from automobiles, reducing the amount of water and debris thrown onto the sidewalk by passing vehicles, and preventing curb cuts and driveway aprons from protruding onto sidewalks. The buffer also provides a space for street trees, utility poles, fire hydrants, and other street furniture. The City requires the provision of planting areas in the pedestrian buffers on all arterial, collector and local streets, as outlined in Section 17.84.30 (A) of the SMC. Buffer strips are also included as part of the typical cross-section design for US 26 and OR 211.

Pedestrian Walkways on Private Property

The City of Sandy promotes walking with the requirement that developments provide safe and convenient pedestrian connections between new developments and existing city infrastructure.

Section 17.84.30 (B4) of the SMC specifies the requirements for pedestrian access from on-site parking areas and city streets to the buildings on the new development site. According to these requirements, walkways need to be as direct as possible, allow for ease of access from abutting streets, pedestrian facilities, and transit stops, be separate from motor vehicle traffic, and encourage for the inclusion of pedestrian amenities, such as covered walk-ways, awnings, visual corridors, and benches.

Intersection Improvements,

Pedestrian crossings at intersections are locations where the potential for conflict exists between pedestrians and motor vehicles. This plan identifies a variety of treatments to improve intersections and other pedestrian crossings. Most intersections that could benefit from improvements are located on streets with wide cross-sections (e.g., with multiple travel lanes), higher vehicle speeds and volumes, and/or other conditions complicating pedestrian crossing movements. The following paragraphs describe proposed treatments to improve pedestrian crossings at intersections.

Signal Timing Evaluation and Modification

Providing adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The Manual on Uniform Traffic Control Devices (MUTCD) recommends traffic signal timing to assume a pedestrian walking speed of four feet per second, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street. It should be noted, however, that the four feet per second walking speed does not reflect the walking rates of many users. At crossings where children, older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as three feet per second may be assumed. Jurisdictional responsibility for signals in Sandy belongs to ODOT. The City and ODOT should periodically evaluate signal timing plans to ensure adequate pedestrian crossing times are provided.

Pedestrian Countdown Signals

According to the MUTCD, "Pedestrian Signal Heads provide special types of traffic signal indications exclusively intended for controlling pedestrian traffic. These signal indications consist of the illuminated symbols of a WALKING PERSON (symbolizing WALK) and an UPRAISED HAND (symbolizing DON'T WALK)." An advanced type of pedestrian signal head contains a countdown signal, in addition to the WALK/DON'T WALK symbol. The countdown signal displays the number of seconds remaining for the individual to complete their crossing. These applications could be effective at the US 26 crossing locations in the Sandy downtown core (where higher volumes of pedestrians exist) and especially at the other US 26 crossing locations where long pedestrian crossing distances exist.

Pedestrian Refuge Islands

Pedestrian refuge islands are raised concrete (typically) pads located in the center of a roadway separating opposing lanes of traffic. Their purpose is to provide shelter for pedestrians while crossing a single direction of traffic at a time. These crossing treatments are particularly suitable for wide streets with several lanes, such as US 26. Pedestrian refuges can also be installed as part of pork chop islands that are adjacent to separated right turn lanes (i.e., the intersection of Pioneer Boulevard/ OR 211).

Leading Pedestrian Interval (LPI)

Including LPIs at signalized crossings provides pedestrians with a three to four-second head start into the intersection before parallel traffic is released by the green light. LPIs ensure that pedestrians are well into the intersection and visible to turning vehicles prior to vehicles entering the crosswalk.

Accessible Pedestrian Signals

Accessible pedestrian signals supplement pedestrian signal indications with audible and/or vibrotactile information. These treatments include directly-audible or transmitted tones, speech messages, talking signs, and/or vibrating surfaces. They are intended to make real-time pedestrian signal information accessible to visually-impaired pedestrians. Audible signals can also provide directional guidance, which is particularly useful at non-perpendicular intersections and at wide multi-lane crossings. Many different technologies exist. Newer signal types have a quiet, slowly repeating locator tone indicating to approaching pedestrians that they must push a button to trigger a WALK signal. Directly-audible or transmitted speech messages can identify the location of the intersection and the specific crosswalk controlled by that push button. A vibrating arrow at the push button can also supplement the audible signals. To be considered for audible signals, an intersection must first meet the following basic criteria:

- The intersection must already be signalized
- The location must be suitable for audible signals in terms of safety, noise level, and neighborhood acceptance
- There must be a demonstrated need for an audible signal device (typically through a user request)

Curb Ramps

Curb ramps are a fundamental element of an accessible pedestrian system. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access. Likewise, street crossings must be aligned and properly designed to accommodate the needs and desires of all people. Many of the single access ramps built in previous decades direct users diagonally into the intersection (rather than straight into the crosswalk area). This can be problematic for visually impaired pedestrians as they could experience difficulty orienting themselves toward the crosswalk. Where possible, all intersection corners should provide dual curb ramps oriented directly across the street. Dual curb ramps should be provided on all collector and arterial street intersections. Curb ramps should also have detectable warning strips to accommodate the visually-impaired. The City of Sandy has been actively retrofitting pedestrian crossings to meet Americans with Disabilities Act (ADA) requirements for curb ramps at intersections and applies these requirements to all new crossings.

Shared Use Paths and Accessways

Sandy has a few key paths and trails that could serve as the beginning of a more interconnected path system. The base of this system includes internal paths within parks and neighborhood accessways. The City should continue to pursue path development opportunities.

Users have created informal demand paths to create more direct routes from nearby residential neighborhoods to key roadways. The City should explore accessway development opportunities in existing neighborhoods and continue developing accessways in future residential subdivisions.

Path feasibility studies devote detailed attention to specific trail projects. These studies examine a particular corridor in-depth, and include opportunities-and-constraints analyses, development of potential path alignment options, selection of a preferred alignment, and preliminary cost estimates. Feasibility studies are particularly useful for agencies exploring potential path corridors in areas faced with topographic, environmental, political or other challenges.

Pedestrian Overcrossing

Sandy has the opportunity to enhance pedestrian connectivity by constructing a pedestrian overcrossing of OR 211 at Sandy Heights Street. The difference in grade between the travel lanes on OR 211 and the adjacent roadside (Sandy Heights is approximately 15 feet higher than OR 211) would facilitate the construction of a multi-use bridge over the highway, connecting the east and west sides of the City and providing additional access to Meinig Memorial Park. Through examination of tax lot maps, it also appears that sufficient public right of way may be available to complete an east-west connection at this location between Sandy Heights Street and Meinig Avenue.

Pedestrian Access to Transit

Pedestrian infrastructure improvements within ½-mile of transit stops enhances pedestrian safety, comfort, and may generate more ridership since most passengers start and end their trips as pedestrians. To improve the pedestrian-transit link, the following actions are proposed:

- Complete the sidewalk network on both sides of streets along bus routes (where feasible) to ensure connectivity and accessibility for all users
- Provide benches, shelters, lighting, and maps at transit stops
- Address the needs of pedestrian circulation in the design of future transit centers and/or park-and-rides

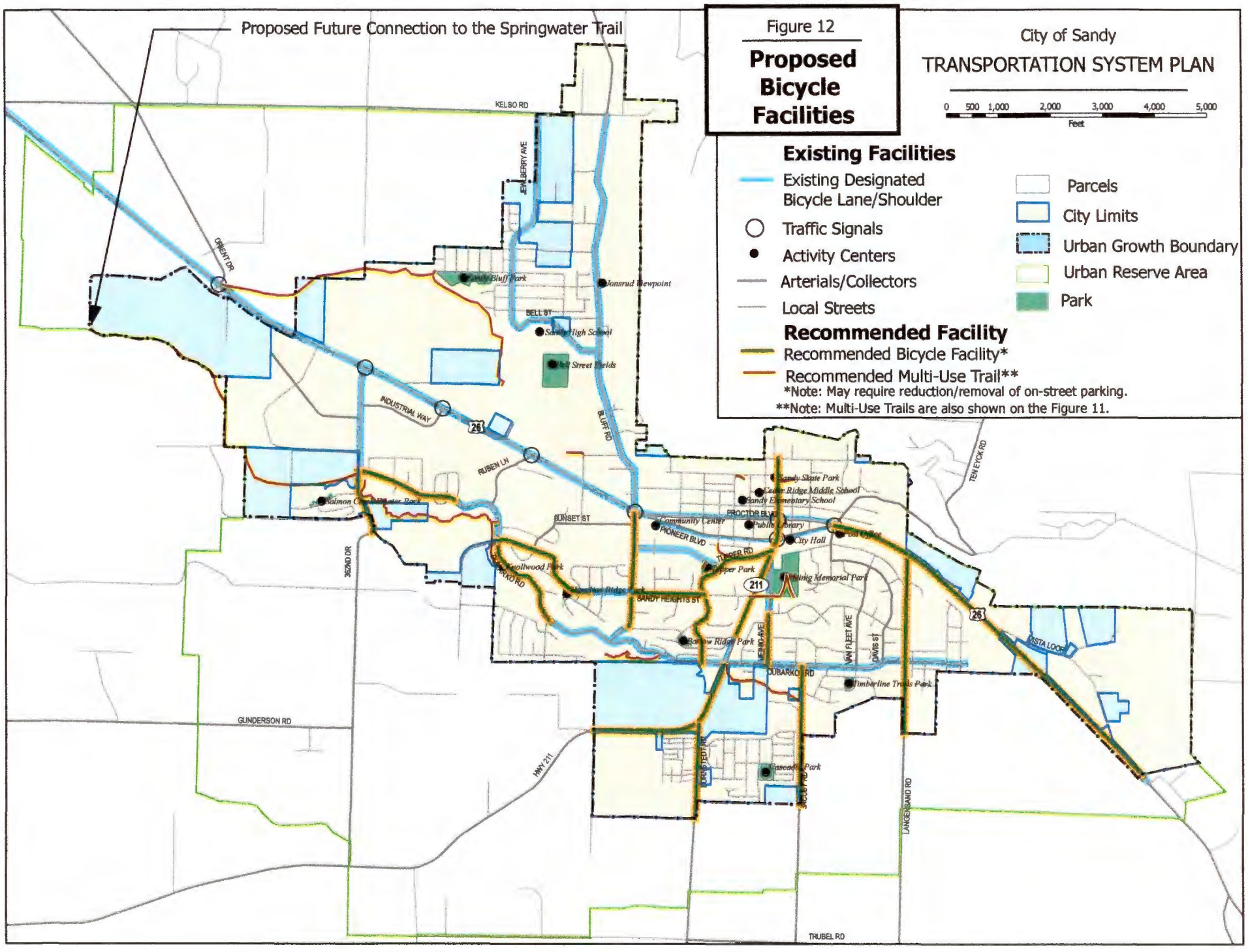
Bicycle Improvements

This chapter identifies a 20-year proposed plan for expanding and improving the City's bicycle system. The bicycle network builds upon previous and on-going planning efforts and reflects the input offered by City staff, stakeholder groups, and Sandy residents. The existing bicycle system and identified deficiencies were previously described in Chapter 3 (Existing Conditions).

Proposed Bicycle Network

Although Sandy currently lacks a comprehensive bikeway network, the City has potential to create an excellent system despite challenges presented by topography. The proposed bicycle network builds upon the system of bike lanes and shoulder bikeways already in place.

Depicted in Figure 12 and listed in Table 6, proposed projects aim to fill system gaps and develop a more complete network. Bike lanes are required on all new collector and arterial city streets, and this list does not include new bike lanes or shoulders that would be constructed as


Proposed Future Connection to the Springwater Trail
Figure 12
Proposed Bicycle Facilities
City of Sandy
TRANSPORTATION SYSTEM PLAN
0 500 1,000 2,000 3,000 4,000 5,000
Feet
Existing Facilities
Existing Designated Bicycle Lane/Shoulder
Traffic Signals
Activity Centers
Arterials/Collectors
Local Streets
Recommended Facility
Recommended Bicycle Facility*
Recommended Multi-Use Trail**
*Note: May require reduction/removal of on-street parking.
**Note: Multi-Use Trails are also shown on the Figure 11.
Parcels
City Limits
Urban Growth Boundary
Urban Reserve Area
Park
KELSO RD
JEWELBERRY AVE
ORIENT DR
BELL ST
INDUSTRIAL WAY
26
RUBEN LN
BLUFF RD
TEN EYCK RD
SUNSET ST
PROCTOR BLVD
PIONEER BLVD
TUPPER RD
211
SANDY HEIGHTS ST
362ND DR
DUBARKO RD
VAN FLEET AVE
DAVIS ST
VISTA LOOP
GUNDERSON RD
HWY 211
LANGENSAND RD
TRUBEL RD

part of the new roadway projects identified for the motor vehicle plan. Projects that would include joint bicycle/pedestrian improvements (e.g., shared use paths or street improvement projects that would include bike lanes and sidewalks) are listed in the Pedestrian Plan. It should be noted that most future shared use path corridors depicted on the system map represent conceptual alignments, with further evaluation needed to identify specific routes. A further challenge to the implementation of bicycle lanes on Sandy's streets is limited right-of-way and adverse topography. In these situations, an alternative to widening the existing street or right-of-way could be the reduction or elimination of parking along some sections of road.

Table 6: Bicycle System Projects and Programs

Project	Segment	Description
362nd Dr.	Dubarko Rd. to OR 211	Widen shoulder to 6 feet minimum for bike access
Bluff Rd.*	US 26 to Miller Rd.	Re-stripe/widen Roadway to provide bike lanes
Bornstedt Rd	OR 211 to UGB	Re-stripe/widen Roadway to provide bike lanes
Dubarko Rd.*	362nd Dr. to Eldridge Dr.	Re-stripe/widen Roadway to provide bike lanes
Dubarko Rd.*	Sandy Heights St. to Melissa Ave.	Re-stripe/widen Roadway to provide bike lanes
Langensand Rd.*	US 26 to UGB	Re-stripe/widen Roadway to provide bike lanes
Meinig Ave	Scenic St. to US 26	Re-stripe/widen Roadway to provide bike lanes
Meinig Ave*	Barker Ct. to Dubarko Rd.	Re-stripe/widen Roadway to provide bike lanes
Sandy Heights St	Bluff Rd. To Tupper Rd.	Re-stripe/widen Roadway to provide bike lanes
Tupper Rd.	Long Circle to OR 211	Re-stripe/widen Roadway to provide bike lanes
OR 211	City limits to US 26	Re-stripe/widen Roadway to provide bike lanes
US 26	Ten Eyck Rd. east to UGB	Re-stripe/widen Roadway to provide bike lanes

*Note: May require the elimination of on street parking.

The system includes an expanded bike lane network on streets where bicyclists could benefit from delineated separation from motorists. The network also includes recommendations for shared use paths and accessways, which would also be used by pedestrians. In addition to these specific projects, some general applications for bicycle system improvement are proposed below.

Bike Lanes

It is important to accommodate bicyclists on major roadways because major streets generally offer the most direct routes between destinations. Consequently, commuter cyclists and those traveling longer distances often gravitate to these routes. Also, the commercial character of major streets (e.g., employment, shopping, etc.) makes these corridors destinations in and of themselves.

To safely accommodate bicyclists on corridors with current or anticipated high traffic volumes (greater than 3,000 vehicles per day) or posted speed greater than 25 mph, bike lanes are proposed on several major streets in Sandy.

Implementation of the bike lane projects would primarily occur through new street construction, widening of existing streets, or roadway re-striping. The following sections describe these approaches in greater detail.

Bike Lanes as Part of New Street Construction

Bike lanes must be included as part of new arterial and collector construction,. Though new roadway projects may not explicitly list bike lanes as part of the improvement, some streets will be required to provide bike lanes due to the associated traffic volumes or speeds. Where limited right of way or environmental features make the provision of bike lanes difficult, priority should be placed on at least providing bike lanes in the uphill direction (where applicable) where the speed differential between motorists and bicyclists would be greater.

Bike Lanes as Part of Roadway Widening Projects

Continued urban expansion on Sandy's outskirts could alter the role of existing rural roadways. As these roadways transition to serve more urban traffic, roadway widening may be necessary to address vehicle capacity and safety needs. Even without vehicle capacity expansion, roadway widening may be necessary to provide greater separation between bicyclists and increasing vehicle traffic volumes (e.g., by adding dedicated bike lanes).

Bike Lanes as Part of Roadway Re-Striping Projects

Roadway re-striping represents one of the most cost-effective and least physically intrusive approaches for expanding a community bike lane system. Sometimes referred to as a "road diet," roadway re-striping reallocates a street's space to better accommodate multiple travel modes.

Shoulder Bikeways

Shoulder bikeways are common in less-developed and rural areas, and typically consist of a paved shoulder (four to six feet wide) for bicycle travel. Shoulder bikeways exist in Sandy's outlying areas along US 26, OR 211, Bluff Road, and Langensand Road. Although shoulder bikeways may suitably accommodate bicyclists and pedestrians today, the City will need to consider additional treatments (e.g., bike lanes, sidewalks and shared use paths) as new development occurs and as traffic volumes increase in these areas.

Shared Use Paths and Accessways

The Pedestrian Plan describes the approach for improving and expanding the path and accessway system in Sandy, which would also be used by bicycles.

Bicycle Parking

Lack of secure, convenient bicycle parking is a deterrent to bicycle travel. Bicyclists need parking options that provide security against theft, vandalism, and weather. Like automobile parking, bicycle parking is most effective when located close to trip destinations, is easy to access, and is easy to find. Where quality bicycle parking facilities are not provided, determined bicyclists tend to lock their bicycles to street signs, utility poles, or trees. These alternatives are undesirable as they are usually not secure, may interfere with pedestrian movement, and can create liability or damage street furniture or trees. Bicycle parking facilities that are conveniently located and adequate in both quantity and quality can help reduce bicycle theft and eliminate inappropriate parking, benefiting everyone. Bicycle parking is highly cost-effective compared with automobile parking.

Sandy could benefit from improved bicycle parking facilities including long-term bicycle parking and other end-of-trip facilities. The City should consider establishing long-term parking

requirements for large employment centers such as business parks and government buildings. Long-term bicycle parking facilities typically include bicycle lockers, attended facilities, and/or other secure provisions, while other end-of-trip facilities include showers and changing areas. The City should also work with the School District to improve the quality of bike parking facilities at Sandy schools. This is an amenity that can easily be planned into the new high school.

Bicycle Access to Transit

Given Sandy's location outside of a major urbanized area, destinations that can reasonably be biked to are relatively limited for many potential riders. In this environment, transit stops are particularly important destinations to consider for bicycle travel. Removing barriers to bicycling within the city and improving transit stop access can greatly improve the attractiveness of transit as an alternative to motor vehicle travel.

Regional Bicycle Connections

There are bicycling opportunities around Sandy available for both commuting and recreation purposes. Two important links for bicycle commuters to the Portland/Metro region from Sandy include:

- A linkage from Dubarko Road to Colorado Road over a series of connections to south Boring and the Springwater Trail. This will eventually be replaced by a direct connection to the Springwater trail from the proposed Tickle Creek Trail extension to the western UGB.
- A link to Estacada from Dubarko Road via Bornstedt Road and Wildcat Mountain Road.

Motor Vehicle Improvements

The analysis of future conditions in 2029 with the current (No-Build) roadway network in place was documented in Chapter 4. Based on the needs identified, alternatives were developed in cooperation with City and ODOT staff. The following sections describe the proposed alternatives and evaluate their ability to achieve adopted standards for mobility and improve roadway safety.

Alternatives Development

Under No Build conditions in 2029, several significant deficiencies were noted, including over-capacity conditions at all US 26 intersections and the OR 211 intersection with Dubarko Road, as well as the failure of the intersections on 362nd Drive at Industrial Way (west) and Dubarko Road to meet City mobility standards. Using projects recommended in the past Sandy TSP as a baseline, a series of alternatives to address these deficiencies were developed. While many of the elements of these alternatives are the same, the key differences are in the manner in which critical capacity deficiencies along US 26 are addressed.

The following sections describe the improvements proposed at specific intersections and provide a comparison of alternatives considered to enhance connectivity and alleviate congestion along the US 26 corridor.

Intersection Improvements

The intersection improvements shown in Table 7 were applied to all alternatives. The intersection improvements identified for US 26 intersections are intended to maximize capacity while maintaining a reasonable right of way footprint. They were initially developed as part of Alternative 1 for improving the US 26 corridor (Local System Enhancements with Minor Highway Improvements), but were retained for Alternatives 2 and 3 to provide a consistent basis for comparison. Other key intersection improvements are discussed in detail below.

362nd Drive/ Industrial Way (West)

Due to sight distance issues at the southern entrance to the Fred Meyer site, this intersection is currently controlled as an all-way stop. Given the high number of eastbound right turns from Industrial Way (West), the construction of a 50-foot long eastbound left turn lane is proposed to separate the left and right turning vehicles. This turn lane would improve operations and allow for compliance with City mobility standards. Although mobility standards can be met through 2029 (with failure soon after) without the construction of the eastbound left turn lane, this project should still be considered.

Table 7: Proposed Intersection Improvements

Location	Improvement(s) Description
City of Sandy Intersection Improvements	
362nd Drive/ Industrial Way (West)	Construct an eastbound left turn lane with 50 feet of storage
362nd Drive/ Dubarko Road	Construct a single-lane roundabout
ODOT Intersection Improvements	
US 26/ 362nd Drive	Construct a second westbound left turn lane
	Construct an acceptance lane for second westbound left turn lane to drop at southern access to Fred Meyer property (approximately 500 ft)
	Construct a northbound through lane
	Construct a new southbound leg with through, right turn and left turn lanes (part of the 362nd Drive extension to Kelso Road)
US 26/ Industrial Way	Change southbound approach to dual left turn lanes and a shared through/right lane
	Construct a northbound left turn lane
US 26/ Ruben Lane	Change southbound approach to dual left turn lanes and a shared through/right lane
	Change northbound approach to left turn lane, and shared through/right lane (north approach may require further modification to align north and south approach lanes)
OR 211/ Proctor Boulevard (US 26)	Construct a northbound left turn lane (restriping only)
US 26/ Ten Eyck Road - Wolf Drive	Construct a northbound left turn lane
	Construct a southbound left turn lane
US 26/ Vista Loop Drive West	Realign Vista Loop Drive to be perpendicular to US 26
US 26/ Vista Loop Drive East	Realign Vista Loop Drive to be perpendicular to US 26
OR 211/ Dubarko Road	Construct a northbound right turn lane
	Construct a southbound left turn lane
	Construct a northbound left turn lane
	Construct a traffic signal
OR 211/ Bornstedt Road	Prohibit left turns out of Bornstedt Road
OR 211/ Arletha Court	Short term: Vegetation easement acquisition and tree removal. Long term: Realign intersection to create a four-legged intersection with the Gunderson Road extension.

362nd Drive/ Dubarko Road

This intersection is currently a three-way intersection with stop-control on the Dubarko Road approach. In the future, Champion Way is proposed to be extended to 362nd Drive opposite Dubarko Road. This intersection will fail to comply with City mobility standards under stop control, whether Champion Way is extended or not.

Preliminary signal warrants[5] were assessed for this intersection, assuming Champion Way was extended, to see if future traffic demands on the minor (east and west) approaches would be high enough to justify signalization of the intersection. It was found that while signalization would restore operations to within City mobility standards, the minor street traffic volumes would be too low warrant signalization.

However, analysis of this intersection under a single-lane roundabout configuration revealed that this treatment could also provide operations that would meet City mobility standards. While a preliminary layout suggested that the intersection approaches on 362nd Drive would need to be shifted approximately 40 feet to the west to avoid impacts to the neighborhood along Dubarko Road, construction would not require the realignment or replacement of the culvert crossing at Tickle Creek. It should be noted that the implementation of a roundabout at this location would require vehicles to travel at 20 to 25 mph to safely enter the roundabout.

OR 211/ Dubarko Road

The intersection on OR 211 at Dubarko Road is currently under two-way stop control, with stop signs on the Dubarko Road approaches. Due to the recent crash history, it has been placed among ODOT's highest rated Safety Priority Index System (SPIS) listings, with improvements planned through the 2010-2013 State Transportation Improvement Program (STIP). In addition to safety-related deficiencies, this intersection is projected to fail to comply with ODOT's mobility standards by 2029.

While this intersection did not meet preliminary signal warrants under the 2029 No Build condition, changes in traffic patterns associated with the construction of roadways under the Local Systems Enhancements list are such that a signal would be warranted here by 2029. The timing of signalization would likely be closely associated with the construction of the Dubarko Road extension to US 26 opposite Vista Loop Drive West and the construction of Gunderson Road between OR 211 and 362nd Drive.

As an interim improvement, the proposed turn lanes could be constructed to improve safety and mobility. The proposed turn lanes were found to meet ODOT's right turn lane and left turn lane warrants[6] by the year 2029.

A roundabout was also evaluated for this intersection, but construction does not appear to be feasible due to the steep grades in the area.

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[5] Preliminary Signal Warrants, Oregon Department of Transportation
[6] ODOT Turn Lane Criterion, Right Lane Criterion and Left Lane Criterion.

OR 211/ Bornstedt Road

While traffic volumes turning out of the Bornstedt Road approach are relatively low, the left turn out (northbound to westbound) movement fails to meet ODOT mobility standards by 2029 due to the increased traffic volumes associated with the Gunderson Road extension. Therefore, the need for mitigation at this intersection may be directly related to the timing of the Gunderson Road extension project. While signalization would not be warranted, other alternatives for mitigating intersection operations include construction of a roundabout, prohibiting northbound to westbound left turn movements, or improving alternate routes such as the OR 211/ 367th Avenue intersection or an extension of 362nd Drive south to Trubel Rd. However, the construction of a roundabout may be difficult given the slopes and grade of the highway (estimated at 7 to 8%), which may be too steep to accommodate a safe circulating roadway.

OR 211/ Arletha Court

This intersection has poor sight distance due to a horizontal curve in the roadway immediately to the west. As a safety improvement, it is proposed that the Arletha Court approach to OR 211 be realigned when the Gunderson Road extension is constructed. The realignment would reconstruct Arletha Court to be opposite from Gunderson Road and perpendicular to OR 211. While the exact alignment will need to be determined through further study, the intersection should be located and designed to optimize sight distance for all approaches. In the near term, improved sight distance could be achieved through acquisition of a vegetation management easement and the removal of trees and vegetation south and west of this intersection.

Roadway Improvements

The following three alternatives were developed and evaluated to enhance connectivity, provide access to developing lands, and address congestion in the US 26 corridor.

- Alternative 1: Local System Enhancements and Minor Highway Improvements
- Alternative 2: Local System Enhancements and US 26 Widening
- Alternative 3: Local System Enhancements and US 26 Bypass

The concepts behind each alternative ranged from relying mainly on management and enhancement of the existing transportation system to large investments in new facilities to increase corridor capacity. Table 8 describes the range of improvement projects incorporated into the alternatives considered, with individual projects illustrated in Figure 13. The key features of each alternative and their impact on study area traffic operations are discussed below.

Figure 13

Proposed Roadway Improvements

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Roadway Functional Classification

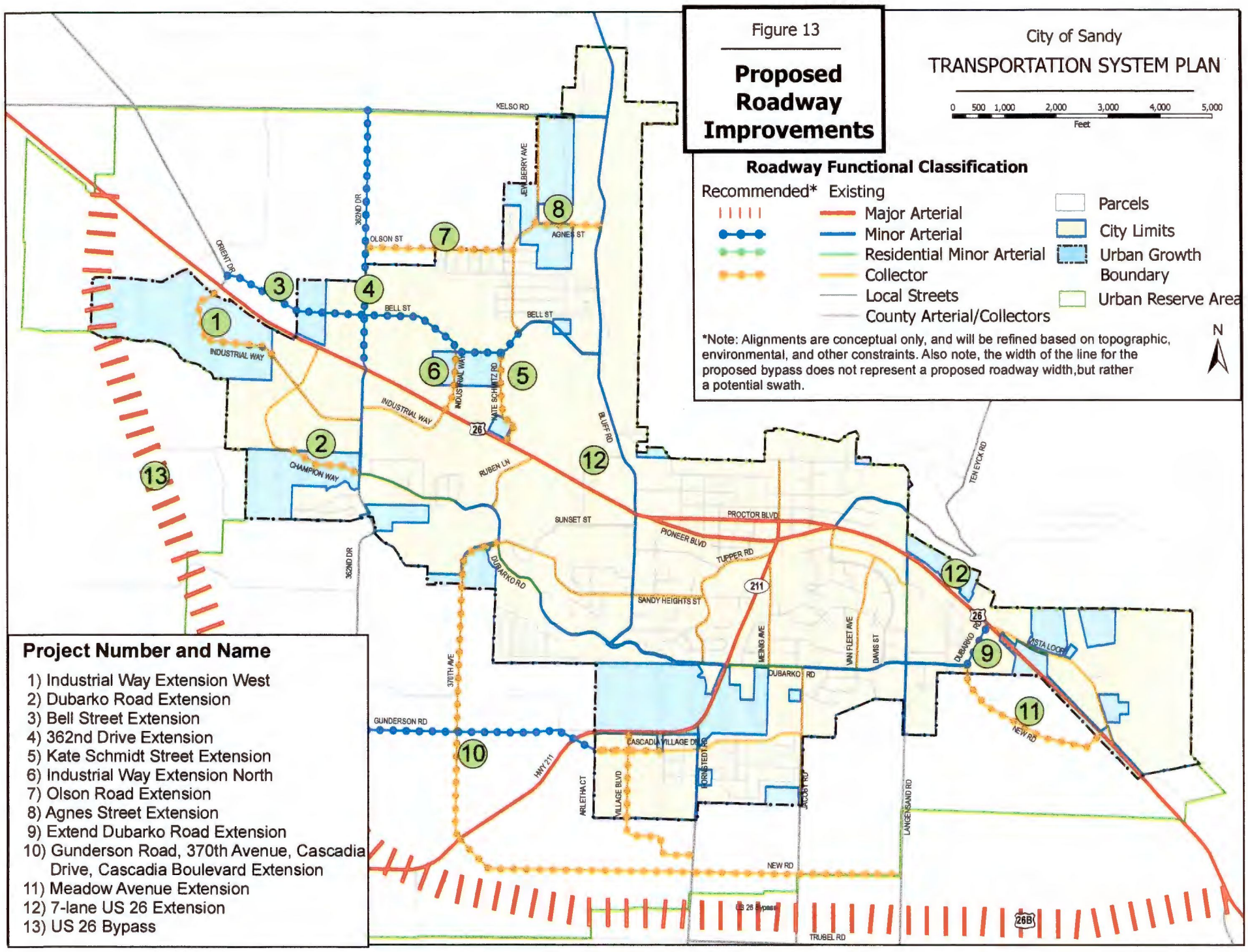
Recommended* Existing

- Major Arterial
- Minor Arterial
- Residential Minor Arterial
- Collector
- Local Streets
- County Arterial/Collectors

- Parcels
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

*Note: Alignments are conceptual only, and will be refined based on topographic, environmental, and other constraints. Also note, the width of the line for the proposed bypass does not represent a proposed roadway width,but rather a potential swath.

N



Project Number and Name

1) Industrial Way Extension West
2) Dubarko Road Extension
3) Bell Street Extension
4) 362nd Drive Extension
5) Kate Schmidt Street Extension
6) Industrial Way Extension North
7) Olson Road Extension
8) Agnes Street Extension
9) Extend Dubarko Road Extension
10) Gunderson Road, 370th Avenue, Cascadia Drive, Cascadia Boulevard Extension
11) Meadow Avenue Extension
12) 7-lane US 26 Extension
13) US 26 Bypass

Table 8: Proposed Local System Enhancements

Project Number (see Fig. 13)	Project Description
Local System Enhancements	
1	Industrial Way extension to Jarl Road/ US 26
2	Dubarko Road connection to Champion Way
3	Extend Bell Street to Orient Drive
4	Extend 362nd Drive to Kelso Road
5	Extend Kate Schmidt Street from US 26 to the proposed Bell Street extension
6	Extend Industrial Way north of US 26 to Bell Street Extension
7	Extend Olson Road from 362nd Drive to Jewelberry Avenue
8	Extend Agnes Street to Jewelberry Avenue
9	Extend Dubarko Road to US 26 opposite Vista Loop Drive (West)
10	Gunderson Road, Sandy Heights St./370th Avenue, Colorado Road, Arletha Court
11	Construct a new road from Dubarko Road to US 26 opposite Vista Loop Drive (East)
Additional Improvements to the US 26 Corridor	
12	7-lane US 26: Orient Drive to Bluff Road and Ten Eyck Road to Vista Loop Drive East
13	US 26 Bypass (west of Orient Drive to Shorty's Corner – south of the City)

Alternative 1: Local System Enhancements and Minor Highway Improvements

Alternative 1 included projects numbered 1 through 11 from Table 8, in addition to all of the intersection improvements listed in Table 7. The emphasis of this alternative was to improve overall street connectivity, provide access to lands that would develop in the future, and improve operations on US 26 by enhancing the supporting City street network so that local trips would have less need to travel on US 26.

The improvements included in Alternative 1 were analyzed with the traffic forecasting tool to assess changes in travel patterns resulting from new streets and added capacity. The modified traffic volumes at study intersections throughout the City were analyzed to assess intersection performance and were compared to applicable mobility standards and the No Build condition to gauge the level of improvement. The results are shown in Table 9.

As shown in Table 9, the proposed improvements in Alternative 1 would allow all City intersections to operate within mobility standards. Other than the intersections on 362nd Drive at Industrial Way West and Dubarko Road, which were directly mitigated, City intersections are generally not impacted or slightly improved. The exceptions are the intersections on Dubarko Road at Jacoby Road and Langensand Road, which are slightly degraded due to the increased use of Dubarko Road between OR 211 and US 26.

Table 9: 2029 Intersection Operations - Alternative 1

Intersection	Mobility Standard (LOS or v/c)	2029 No-Build			Alternative 1: Local System Enhancements and Minor Highway Improvements		
		Average Delay (seconds)	Level of Service (LOS)	volume/ capacity ratio (v/c)	Average Delay (seconds)	Level of Service (LOS)	volume/ capacity ratio (v/c)
City Intersections							
2-Way Stop Controlled Intersections							
Kelso Road/ Bluff Road	D	16.0	A/C	0.50	14.2	A/B	0.34
Green Mountain Street/ Bluff Road	D	13.3	A/B	0.15	11.7	A/B	0.20
Industrial Way East/ 362nd Drive	D	21.8	A/C	0.35	17.8	A/C	0.41
Industrial Way West/ 362nd Drive**	D	40.2	E	0.84	35.0	D	0.60
Dubarko Road/ 362nd Drive*	D	37.8	B/E	0.56	12.4	B	0.90
Dubarko Road/ Ruben Lane	D	15.0	A/B	0.23	11.2	A/B	0.24
Dubarko Road/ Tupper Road	D	10.6	A/B	0.06	9.6	A/A	0.07
Dubarko Road/ Jacoby Road	D	11.4	A/B	0.10	17.4	A/C	0.35
Dubarko Road/ Langensand Road	D	11.3	A/B	0.22	15.7	A/C	0.51
Cascadia Village Drive/ Bornstedt Road	D	13.3	A/B	0.07	11.3	A/B	0.09
ODOT Intersections							
Signal Controlled Intersections							
US 26/ Orient Drive	0.70	>80.0	F	1.16	>80.0	F	1.04
US 26/ 362nd Drive	0.70	>80.0	F	1.33	39.4	D	0.93
US 26/ Industrial Way	0.70	>80.0	F	1.36	70.4	E	1.01
US 26/ Ruben Lane	0.70	>80.0	F	1.36	>80.0	F	1.06
US 26/ Bluff Road	0.70	>80.0	F	1.30	47.4	D	1.01
OR 211/ Proctor Boulevard (US 26)	0.85	>80.0	F	1.25	74.0	E	1.09
OR 211/ Pioneer Boulevard (US 26)	0.85	>80.0	F	1.06	23.6	C	0.90
US 26/ Ten Eyck Road - Wolf Drive	0.70	>80.0	F	1.20	44.7	D	0.91
OR 211/ Dubarko Road***	0.75	>80.0	A/F	1.22	8.8	A	0.61
2-Way Stop Controlled Intersections							
US 26/ Champion Way	0.70	34.8	A/D	0.20	27.0	A/D	0.28
US 26/ Langensand Road	0.70	>80.0	A/F	>1.50	>80.0	D/F	>1.50
US 26/ Vista Loop Drive West	0.70	>80.0	A/F	>1.50	>80.0	D/F	>1.50
US 26/ Vista Loop Drive East	0.70	>80.0	C/F	1.08	>80.0	C/F	>1.50
OR 211/ Bornstedt Road	0.75	40.4	A/E	0.59	13.4	B/B	0.42

Indicates mobility standard is not met

ODOT mobility standards shown are taken from the Highway Design Manual and are applicable to build conditions only

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

* Roundabout as proposed improvement

** Intersection was 3-way stop under Future 2029 No Build and converted to 2-way stop for the alternatives

*** Intersection signalized for the alternatives

Improvement was also seen for state facilities, but the only failing intersection mitigated to comply with mobility standards was the intersection on OR 211 at Dubarko Road, which was mitigated through signalization. All other intersections that failed under the No Build condition continue to fail under Alternative 1. However, the degree to which they fail to meet mobility standards is significantly reduced in many cases with signalized intersections on US 26 showing an average reduction in volume to capacity ratio of approximately 20%, with half of them operating at volume to capacity ratios less than 1.0. Unsignalized intersections along US 26 will continue to fail, with minor street traffic experiencing long delays.

Alternative 2: Local System Enhancements and US 26 Widening

Alternative 2 included all of the same projects as Alternative 1, but added project number 12 that widened US 26 outside of the downtown couplet to seven lanes. The emphasis of this alternative was to build on the City street enhancements from Alternative 1 and add additional capacity to the US 26 corridor in an attempt to improve many of the failing intersections.

It should be noted that, while not assumed as part of this analysis, the installation of a median barrier would likely be required where the highway has been widened to seven lanes to eliminate long crossing movements from unsignalized streets and driveways. If a median barrier were installed along US 26, traffic operations and safety on the segments between intersections may improve due to the reduction and consolidation of turning movements. However, in contrast, the signalized intersections may experience increased delays if they are needed to accommodate U-turns and other displaced turning movements. Therefore, the analysis conducted as part of this plan should be considered conservative – potentially indicating the best intersection operations that should be expected for this alternative.

The highway widening improvements included in Alternative 2 were applied to the Alternative 1 scenario in the traffic forecasting tool to assess changes in travel patterns resulting from the added US 26 capacity. The modified traffic volumes at study intersections throughout the City were analyzed to assess intersection performance and were compared to applicable mobility standards and the No Build condition to gauge the level of improvement. The results are shown in Table 10. As shown in Table 10, intersections under City jurisdiction are not significantly impacted by the widening of US 26. However, it should be noted that adding capacity to US 26 actually increased traffic in the US 26 corridor by as much as 200 vehicles per hour as some local trips returned to the highway. This effect would reduce the use of some City streets.

Along US 26, most signalized intersections are operating better than under Alternative 1. With the exception of the intersection at Orient Drive, which is where the new through lanes were started, volume to capacity ratios at signalized intersections improve over the No Build scenario by an average of 26%, with only two intersections operating with volume to capacity ratios greater than 1.0. Because more traffic is attracted to the widened corridor and the intersection at Orient Drive did not receive significant improvements in capacity, operations at that location were worse than under the No Build scenario. Even though operations at most signalized intersections appear to be better than under Alternative 1, no additional intersections will be able to meet mobility standards. Unsignalized intersections would operate worse with US 26 widened to seven lanes. However, while not reflected in Table 10, it is likely that all unsignalized intersections and approaches would be converted to allow only right-in and right-out movements through construction of a median barrier.

Table 10: 2029 Intersection Operations - Alternative 2

Intersection	Mobility Standard (LOS or v/c)	2029 No Build			Alternative 2: Local System Enhancements and US 26 Widening		
		Average Delay (seconds)	Level of Service (LOS)	volume/ capacity ratio (v/c)	Average Delay (seconds)	Level of Service (LOS)	volume/ capacity ratio (v/c)
City Intersections							
2-Way Stop Controlled Intersections							
Kelso Road/ Bluff Road	D	16.0	A/C	0.50	14.2	A/B	0.34
Green Mountain Street/ Bluff Road	D	13.3	A/B	0.15	11.1	A/B	0.16
Industrial Way East/ 362nd Drive	D	21.8	A/C	0.35	20.8	A/C	0.46
Industrial Way West/ 362nd Drive**	D	40.2	E	0.84	30.3	D	0.57
Dubarko Road/ 362nd Drive*	D	37.8	B/E	0.56	8.5	A	0.80
Dubarko Road/ Ruben Lane	D	15.0	A/B	0.23	10.7	A/B	0.21
Dubarko Road/ Tupper Road	D	10.6	A/B	0.06	9.6	A/A	0.07
Dubarko Road/ Jacoby Road	D	11.4	A/B	0.10	18.5	A/C	0.24
Dubarko Road/ Langensand Road	D	11.3	A/B	0.22	24.8	A/C	0.75
Cascadia Village Drive/ Bornstedt Road	D	13.3	A/B	0.07	11.3	A/B	0.09
ODOT Intersections							
Signal Controlled Intersections							
US 26/ Orient Drive	0.70	>80.0	F	1.16	>80.0	F	1.31
US 26/ 362nd Drive	0.70	>80.0	F	1.33	39.9	D	0.93
US 26/ Industrial Way	0.70	>80.0	F	1.36	19.5	B	0.79
US 26/ Ruben Lane	0.70	>80.0	F	1.36	44.8	D	0.88
US 26/ Bluff Road	0.70	>80.0	F	1.30	55.8	E	0.99
OR 211/ Proctor Boulevard (US 26)	0.85	>80.0	F	1.25	74.3	E	1.09
OR 211/ Pioneer Boulevard (US 26)	0.85	>80.0	F	1.06	23.5	C	0.89
US 26/ Ten Eyck Road - Wolf Drive	0.70	>80.0	F	1.20	47.5	D	0.89
OR 211/ Dubarko Road***	0.75	>80.0	A/F	1.22	9.2	A	0.62
2-Way Stop Controlled Intersections							
US 26/ Champion Way	0.70	34.8	A/D	0.20	25.2	A/D	0.37
US 26/ Langensand Road	0.70	>80.0	A/F	>1.50	>80.0	D/F	>1.50
US 26/ Vista Loop Drive West	0.70	>80.0	A/F	>1.50	>80.0	D/F	>1.50
US 26/ Vista Loop Drive East	0.70	>80.0	C/F	1.08	>80.0	C/F	>1.50
OR 211/ Bornstedt Road	0.75	40.4	A/E	0.59	12.8	A/B	0.02

Indicates mobility standard is not met

ODOT mobility standards shown are taken from the Highway Design Manual and are applicable to build conditions only

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

* Roundabout as proposed improvement

** Intersection was 3-way stop under Future 2029 No Build and converted to 2-way stop for the alternatives

*** Intersection signalized for the alternatives

Alternative 3: Local System Enhancements and US 26 Bypass

Alternative 3 included all of the same projects as Alternative 1, but added a bypass of the existing US 26 corridor around the south side of the City that ran from a point west of Orient Drive to approximately Shorty's Corner. For the purpose of this analysis, the bypass was assumed to have two lanes in each direction, with travel speeds of 55 mph. It was also assumed to be a limited access facility, with interchanges at the west and east termini with US 26 and an interchange with OR 211.

The bypass improvements included in Alternative 3 were applied to the Alternative 1 scenario in the traffic forecasting tool to assess changes in travel patterns resulting from the added US 26 corridor capacity. Because the impacts on the City street network will vary significantly with the locations and types of access allowed to the bypass, only the US 26 corridor intersections were evaluated to see how much the bypass could relieve congestion. Should the bypass be studied in more detail at a later time, the locations and types of access allowed to it and the resulting impacts on City streets would need to be evaluated. The results are shown in Table 11.

Table 11: 2029 Intersection Operations - Alternative 3

Intersection	Mobility Standard (LOS or v/c)	Future 2029 No Build			Alternative 3: Local System Enhancements and US 26 Bypass		
		Average Delay (seconds)	Level of Service (LOS)	volume/ capacity ratio (v/c)	Average Delay (seconds)	Level of Service (LOS)	volume/ capacity ratio (v/c)
ODOT Intersections							
Signal Controlled Intersections							
US 26/Orient Drive	0.70	>80.0	F	**1.16**	28.5	C	**0.77**
US 26/362nd Drive	0.70	>80.0	F	**1.33**	32.5	C	0.68
US 26/Industrial Way	0.70	>80.0	F	**1.36**	34.0	D	**0.74**
US 26/Ruben Lane	0.70	>80.0	F	**1.36**	29.1	C	**0.72**
US 26/Bluff Road	0.70	>80.0	F	**1.30**	19.2	C	**0.76**
OR 211/Proctor Boulevard	0.85	>80.0	F	**1.25**	43.7	D	0.81
OR 211/Pioneer Boulevard	0.85	>80.0	F	**1.06**	22.1	C	0.85
US 26/Ten Eyck Road	0.70	>80.0	F	**1.20**	28.7	C	**0.74**
2-Way Stop Controlled Intersections							
US 26/Champion Way	0.70	34.8	A/D	0.20	17.6	A/C	0.29
US 26/Langensand Road	0.70	>80.0	A/F	**>1.50**	>80.0	B/F	**0.74**
US 26/Vista Loop West	0.70	>80.0	A/F	**>1.50**	>80.0	B/F	**>1.50**
US 26/Vista Loop East	0.70	>80.0	C/F	**1.08**	52.1	B/F	0.42

Indicates mobility standard is not met

ODOT mobility standards shown are taken from the Highway Design Manual and are applicable to build conditions only
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

As shown in Table 11, the construction of a bypass around the City of Sandy would provide a substantial amount of capacity in the US 26 corridor with all signalized intersections approaching or meeting ODOT's mobility standards. It was estimated that approximately 2,500 vehicles per hour would use the bypass during the peak period. Approximately 50% of the bypass users during the peak period would be through traffic with no origin or destination in Sandy, while the other 50% would be comprised of local trips accessing the southern end of Sandy.

If the segment of the existing US 26 corridor that would be bypassed were transferred to the City, all signalized intersections would meet City mobility standards. Unsignalized intersections would experience improved performance as well, although some minor street movements would still have long delays.

US 26 Travel Time Comparison

As an additional measure for evaluating the effectiveness of each alternative, estimated travel times along US 26 through the City were calculated using the traffic modeling tool developed to assign forecasted trips through the street network. Table 12 below shows the results for each alternative. As shown, improvements in travel times among the alternatives are generally consistent with the improvements shown for intersection operations, with the provision of a bypass around Sandy resulting in significant reductions in through travel time.

Table 12: Estimated US 26 Corridor Travel Times

Alternative	Eastbound Travel Time	Westbound Travel Time
2008 Existing No Build	13 minutes	9 minutes
2029 No Build	15 minutes	15 minutes
2029 Alternative 1	14 minutes	12 minutes
2029 Alternative 2	13 minutes	11 minutes
2029 Alternative 3		
Bypass	7 minutes	7 minutes
Existing US 26 Corridor	13 minutes	11 minutes

Bypass Considerations

The construction of a US 26 bypass around the City of Sandy represents a significant investment in public infrastructure with the potential to impact transportation, urban and rural lands, Goal 5 resources, and the local and regional economy. Because an improvement of this magnitude would require further study and analysis, including an Environmental Impact Statement, before the full range of impacts could be adequately understood, only the potential magnitude of impact on transportation operations through the US 26 corridor is being assessed in the Transportation System Plan. While this analysis has demonstrated that a bypass could provide significant improvements to transportation operations along the US 26 corridor, demonstration of compliance with several related policies and regulations will need to be addressed if further development of this alternative is pursued.

Purpose and Need

A demonstration of the purpose and need for a US 26 bypass around Sandy will not only provide a basis for gaining interest in supporting an effort for continued study of such an improvement, but is a critical first step in the decision making process of evaluating alternatives in a manner that complies with the requirements of the National Environmental Policy Act (NEPA). While the development of Purpose and Need statements for NEPA documentation would require further effort, the analysis conducted for the Transportation System Plan Update indicates that a bypass alternative is the only feasible option for US 26 to meet ODOT mobility standards.

Given that ODOT's mobility standards for the US 26 corridor through Sandy are being revised to allow for more congestion because no feasible mitigation of future operations through the year 2029 has been identified to achieve those standards, a more significant investment is being explored. Improving the level of mobility in the US 26 corridor would benefit statewide freight movement, statewide and regional travel, accessibility of local businesses, access to Mt. Hood recreation, quality of life and community growth for the City of Sandy, and travel safety.

The analysis of the bypass alternative found that:

- Approximately 3,000 trucks per day would potentially use the bypass in 2029
- Approximately 2,500 vehicles an hour would use the bypass during peak periods in 2029
- Approximately 1/3 of US 26 users through Sandy during peak periods represent through trips under existing conditions
- Approximately 50% of bypass users during peak periods would represent through trips
- Provision of a bypass would significantly improve traffic operations on the existing US 26 corridor through Sandy, nearly complying with ODOT mobility standards
- Travel times through the Sandy area for through traffic would decrease by more than 50% (approximately 8 minutes in each direction) with a bypass

1999 Oregon Highway Plan Bypass Policy

The *1999 Oregon Highway Plan* was amended in 2003 to add a policy pertaining to bypass planning and management. The objectives of the Bypass Policy are:

- To maintain and enhance the utility of the state highway investment,
- To assure land uses that are consistent and compatible with Oregon statewide land use goals,
- To identify the appropriate function of bypasses in the transportation system, and
- To guide the long-term operation of bypasses through agreement on land use and transportation management actions.

In addition, there are actions included in the policy, which require:

- ODOT and the affected local governments to identify the need for a bypass in a Transportation System Plan and/or Corridor Plan in a manner consistent with Oregon Highway Plan Policy 1G

- ODOT and the affected local governments to use a refinement plan and/or a NEPA process to consider alternatives and assess potential impacts
- Establishment of management agreements between ODOT and the affected local governments to protect the facility investment
- Design for moderate to high-speed travel, consistent with freeway or expressway facilities
- Prohibition of direct private property access and a limited number of public access points
- Development of management plans for new interchanges and other bypass elements
- Adoption of an acknowledged TSP that incorporates the Oregon Highway Plan Bypass Policies
- Local ordinances that provide for adequate connectivity to compliment the bypass
- Consideration of re-planning and re-zoning properties that could adversely impact the facility
- Potential local participation in financing
- Consideration of a jurisdictional transfer of the bypassed highway

1999 Oregon Highway Plan Major Improvements Policy

Policy 1G in the 1999 *Oregon Highway Plan* generally states that existing facilities should be maintained and enhanced to improve performance and safety before adding capacity. Furthermore, when developing transportation solutions, the priority should be on protecting the existing system first. Where this strategy is unable to meet the project objectives, the focus should then shift to improvements to efficiency and capacity of existing facilities, followed by adding capacity to existing facilities, and lastly to constructing new facilities.

The construction of a bypass (i.e., constructing a new facility) would clearly be categorized under the lowest level of priority under this policy. Therefore, before the construction of a bypass would be supported, it must be demonstrated that other alternatives cannot adequately support safety, growth management, and other livability and economic concerns. This would include demonstrating that:

- The improvement is needed to satisfy a state transportation objective or objectives
- The scope of the project is reasonably identified, considering the long-range projection of need
- The improvement was identified through a planning process that included:
  - Thorough public involvement

  - Evaluation of reasonable transportation and land use alternatives including measures for managing the existing transportation system and for reducing demands for highway capacity
  - Sufficient environmental analysis at the fatal flaw planning level
- The plan includes measures to manage the transportation system, but these measures will not satisfy identified highway needs during the planning period or there is a need to preserve a future transportation corridor for future needs beyond the planning period
- The improvement would be a cost-effective means to achieve the objective(s)
- The proposed timing of the improvement is consistent with priorities established in corridor plans and regional transportation plans and the financing program identifies construction as being dependent on the future availability of funds
- Funding for the project can reasonably be expected at the time the project is ready for development and construction
- The local government schedules funding for local street improvements in its local transportation financing program if these are needed to attain the objectives of the major improvement
- The plan includes policies and implementing measures that protect the corridor and its intended function

This policy also calls for the implementation of a cost-sharing agreement where major improvements benefit the local system. Furthermore, if a bypass were constructed, it is likely to be designed as a limited access facility to protect its functional life and that the existing US 26 corridor that runs through Sandy would be transferred to the City.

OAR 660-012-0070 Exceptions for Transportation Improvements on Rural Land

To construct a bypass and comply with this rule, the City of Sandy would need to demonstrate through findings adopted in the City comprehensive plan that the standards in this rule have been met. To address this exception, the general location of the needed corridor must first be identified. Then, the size, design, and capacity of the bypass would need to be described in enough detail to assess potential impacts and to justify the amount of land needed.

Part of the exception process would include a demonstration that the transportation deficiencies resulting in the need for the bypass cannot be met through other means, such as enhancement of alternative modes, traffic management, and improvements to existing facilities. Where these means are not sufficient, further evidence must be provided to show that other non-exception lands cannot be used to accommodate the proposed facility. This demonstration may consider cost, operational feasibility, economic dislocation, and other relevant factors and must compare the long-term economic, social, environmental, and energy consequences of the proposal. Through this process, it must be demonstrated that the net adverse impact of the proposed bypass, with mitigation to reduce impacts, are not significantly worse than those associated with other alternatives.

Even where a goal exception is approved, it must be demonstrated how the proposed transportation improvement is compatible with other adjacent uses or will be made so through specified measures to reduce adverse impacts. Also, the adoption of a facility design and land

use measures that minimize the accessibility of rural lands from the proposed transportation facility and that also support the continued use of surrounding rural lands may be required.

Alternate Mobility Standards

Because it has been demonstrated that it is not feasible to meet ODOT's mobility standards along US 26 through the planning horizon year of 2029, even with substantial investments in transportation infrastructure that far surpass anticipated funding levels, the adoption of alternate mobility standards in the *Oregon Highway Plan* is being pursued by the City and ODOT. Retaining the current mobility standards without being able to provide sufficient capacity could lead to barriers for development permitted under the City's adopted Comprehensive Plan. The following sections describe the factors limiting the ability to meet the current mobility standards, other strategies being implemented to enhance mobility, the proposed alternate mobility standards, and the proposed changes to City policy needed to support implementation of the new standards.

Factors Limiting the Ability to Meet Mobility Standards

There are several factors that combine to make compliance with the current mobility standards along US 26 difficult. Each of these are described below.

Environmental Factors
Located at the base of Mt. Hood, the foothills terrain presents topographic constraints to land and public infrastructure development. This limits options to provide an effective transportation network, especially on US 26, which is the primary transportation corridor in the area. Environmental/topographical constraints, many of which are illustrated in Figure 14, are described below.

- The City is bounded by steep slopes to the northeast that severely limit the expansion of transportation facilities that could provide alternate routes to US 26 east of Bluff Road.
- Tickle Creek, running parallel to US 26 along the southern end of the City, and other salmon-bearing streams and wetlands create a series of obstacles to constructing an efficient transportation network in a cost-effective manner.
- Rolling terrain and steep slopes throughout the City provide a challenging environment for transportation that can make the construction of facilities infeasible, leave roadways impassible under heavy snowfalls, and make walking or biking difficult.

Financial Factors
As is true for most agencies, funding for City and ODOT transportation improvements is limited, with revenues forecasted to fall well below what would be required to construct all city and ODOT projects identified in the Transportation System Plan. However, as previously demonstrated, traffic operations along US 26 would still fail to comply with ODOT's mobility standards even if all projects identified could be constructed.

A detailed description of the City's transportation funding outlook through the year 2029 has been provided later in this memorandum.

Competition from Multiple Users

US 26 serves a number of roles, providing access to local Sandy businesses and homes, serving as a major east/west transportation route between the Portland Metro Area, Mt. Hood, and Central Oregon resorts and recreation, and as the City's "main street" through the downtown couplet. The importance of US 26 to statewide, regional, and local traffic creates significant demands for both short and long trips in the corridor, with some users beginning and ending their trips in the city and many others only traveling through. In fact, a survey of US 26 traffic at the eastern and western limits of the urban growth boundary conducted during a peak hour on a summer afternoon found that approximately one-third of the traffic on US 26 was purely "through traffic."

In addition, US 26 is classified as a Statewide Highway on the National Highway System, a state Freight Route, and a federal Truck Route. The presence of a significant amount of heavy vehicle traffic further adds to the congestion in this corridor.

In contrast to this, the US 26 couplet of Pioneer and Proctor Boulevards downtown has been designated a Special Transportation Area (STA). In STAs, the primary objective is to provide access to community activities, businesses, and residences and to accommodate pedestrian movement along and across the highway.

Other Strategies Being Applied to Enhance Mobility

Recognizing that mobility along US 26 will be constrained, the City of Sandy and ODOT are prepared to implement several actions to relieve congestion, which have been incorporated into the City's Transportation System Plan Update.

- Transportation improvements have been identified to allow the City street network to operate at a Level of Service D through the year 2029. Maintaining good performance on the City streets will help to provide attractive travel alternatives to US 26 for local trips.
- An extensive expansion of the City street network is being developed, especially in the western end of the City, which will help remove local trips from the highway.
- In addition to the access management regulations already in place, the City and ODOT are pursuing an array of Transportation System Management (TSM) strategies, including adaptive signal timing on US 26, improved connectivity of local streets, and updated management objectives for arterial streets to help preserve the functional life of high-capacity roadways.
- The City has completed a Transit Master Plan to improve the Sandy Area Metro transit system to improve future services and provide attractive travel options.
- Improvements have been identified to fill gaps in the City's and ODOT's network of pedestrian and bicycle facilities and to provide access to major activity centers.

However, even with these actions in place, traffic operations along US 26 will not comply with ODOT's mobility standards through the planning horizon year of 2029. In fact, as previously shown, mobility standards on US 26 would still not be met even with the construction of a bypass around the south side of the City. Nevertheless, the implementation of these actions, along with the alternate mobility standards along US 26, will provide a comprehensive strategy for addressing transportation congestion through the City of Sandy.

Proposed Alternate Mobility Standards

The proposed alternate mobility standards for US 26 within the City of Sandy have been documented in the Alternate Mobility Standards Report.[7] Key components include changing the analysis time period from the 30th highest annual hour to the average annual weekday peak hour and raising the maximum volume to capacity ratio allowed to 0.85.

The average annual weekday peak hour is recommended as part of the alternate mobility standard because it is more representative of typical travel on US 26 through Sandy than the 30th highest annual hour. This would shift the corridor management emphasis away from accommodating seasonal recreational trips through the city and refocus it on conditions that are more representative of every day travel.

Being outside of the Metro area, the volume to capacity ratio requirements for US 26 through Sandy are more demanding and allow for less congestion. In comparison, the volume to capacity ratio requirements in the subject corridor range from 0.70 to 0.85, while in the Metro area, volume to capacity ratios are commonly allowed to reach as high as 0.99. Raising the volume to capacity ratio threshold in the subject corridor was applied as a complimentary measure to changing the analysis time period as described above. In fact, if the volume to capacity ratio threshold of 0.85, which is already applied to the intersections between Bluff Road and Ten Eyck Road within the Special Transportation Area, were applied to all of US 26 within the City of Sandy, it would allow every intersection in the corridor to comply with mobility standards during the average annual weekday peak hour.

The Highway Design Manual, Oregon Highway Plan, and recommended alternate mobility standards are shown below in Table 13. As shown in the rightmost column, the combination of the proposed improvements from Alternative 1 with the alternate mobility standards will accommodate all projected growth in traffic through the year 2029. However, there will be very little capacity remaining, so comprehensive corridor management, including the other strategies to enhance corridor mobility described previously, will continue to be essential.

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[7] DRAFT *Alternate Mobility Standards Report – US 26 (Mount Hood Highway): Orient Drive to Ten Eyck Road, City of Sandy*, DKS Associates, October 2010.

Table 13: Intersection Operations along US 26 within Sandy - Comparison of Mobility Standards

Intersection	Highway Design Manual Mobility Standard (v/c ratio)	Oregon Highway Plan Mobility Standard (v/c ratio)	Recommended Mobility Standard (v/c ratio)	2008 operations (v/c ratio)		2029 DHV No-Build operations (v/c ratio)		2029 DHV Alternative 1 operations (v/c ratio)	
				30HV	AWP	30HV	AWP	30HV	AWP
US 26/ Orient Drive	0.60	0.70	0.85	0.79	0.63	1.16	1.03	1.04	0.84
US 26/ 362nd Drive	0.70	0.70	0.85	0.91	0.77	1.33	1.17	0.93	0.84
US 26/ Industrial Way	0.70	0.70	0.85	0.87	0.71	1.36	1.06	1.01	0.84
US 26/ Ruben Lane	0.70	0.75	0.85	0.93	0.72	1.36	1.16	1.06	0.85
US 26/ Bluff Road	0.85	0.85	0.85	0.93	0.74	1.30	1.21	1.01	0.85
OR 211/ Proctor Boulevard (US 26)	0.85	0.85	0.85	1.00	0.77	1.25	1.05	1.09	0.85
OR 211/ Pioneer Boulevard (US 26)	0.85	0.85	0.85	0.88	0.68	1.06	0.92	0.90	0.68
US 26/ Ten Eyck Road - Wolf Drive	0.85	0.85	0.85	0.88	0.57	1.20	1.04	0.91	0.72

Shaded cell indicates mobility standard is not met.

Proposed City Policy Changes

It is proposed that the following text be inserted after item number 4 in the City *of Sandy – Minimum Requirements for Traffic Analyses* document:

4. The recommendations made in the report should be specific and based on Oregon Department of Transportation (ODOT) mobility standards for signalized and stop controlled intersections under ODOT jurisdiction. ODOT intersections must be analyzed using methodologies outlined in the Transportation Analysis Planning Unit's (TPAU) Analysis and Procedures Manual (AMP), with the exception of the calculations for the seasonal factor. The seasonal factor calculations shall use the seasonal factor table developed for the City of Sandy Transportation System Plan (TSP) Update.

It is also proposed that the following paragraph be included in the Goals, Policies and Objectives section of the City of Sandy TSP Update, and under the *Major Roadway Circulation* section of *Goal 12*: in the *City of Sandy Comprehensive Plan:*

23. Support ODOT adoption of an alternate mobility standard for US 26 that allows for increased congestion on the highway corridor, especially during peak seasonal travel periods.

Freight Mobility

ODOT has designated US 26 as a State Freight Route and Federal Truck Route in the Oregon Highway Plan. The ODOT Motor Carrier Transportation Division has identified both US 26 and OR 211 as routes for freight movement through the City of Sandy. There are several restrictions associated with each highway, with Table 14 showing a matrix identifying the differences in allowed freight movement.

Table 14: Motor Carrier Freight Route Restrictions

Route	Highway Group Number*	Route for Over-Width Loads	Route for Over-Height Loads (up to 14'06")	COVP Road Authority	Route for "Triples" Combinations	Route for Mobile Homes (12' to 14' Wide)	Route for Over-Length Loads	Route with use Restricted Bridges	Route for loads up to 14' wide
US 26	Group 1	Yes	Yes*[2]	Clackamas	Yes*[3]	Yes*[4]	Yes*[5]	None	Yes
OR 211	Group 1	Yes*[1]	No	Clackamas	No	No	No	None	No

Notes
*The Motor Carrier Division has classified highways into three groups (1-3) to indicate general length, size, and weight requirements of freight vehicles: Group 1 is the least restrictive, and Group 3 has the most restrictions on the permitted vehicle and load dimensions.
*[1]Permit required for over width operations
*[2]Permit required for heights over 14'
*[3]Holiday restrictions apply east of Sandy
*[4]Route not authorized for continuous movement east of Sandy
*[5]Permit required for over-length loads
COPV - Continuous Operation Variance Permits

As can be seen in this table, there are fewer restriction for freight movement on US 26 than on OR 211. It also is a more direct route between the freight generators in the Portland Metro region and destinations to the east. Therefore, the management of the congestion identified through the US 26 corridor will be critical to maintain efficient and reliable movement of freight through the City.

Off of the US 26 corridor, the provision of City streets that are designed to accommodate freight movement into industrial areas should be considered. This could be accomplished through the designation of truck routes that are designed to be "truck friendly." Proposed design elements for truck routes include 12-foot travel lanes (wider than the 11-foot City standard design), longer access spacing requirements, allowance for wider driveways where appropriate, larger curb radii (35 feet or larger) and tapered approaches to the curb returns, and pavement designs to support heavy vehicles.

Possible street segments for truck route designations include:

- Industrial Way (including Jarl Road connection to US 26)
- Champion Way
- 362nd Drive between US 26 and Champion Way/ Dubarko Road

Goal 5 Resources

The purpose of this section is to identify potential conflicts between the proposed capital construction projects and the Goal 5 resources within the City of Sandy. Oregon's Statewide Planning Goals & Guidelines Goal 5: Natural Resources, Scenic and Historic Areas, and Open Spaces (OAR 660-015-0000(5)) states that, "Local governments shall adopt programs that will protect natural resources and conserve scenic, historic, and open space resources for present and future generations." Resources addressed under Goal 5 include:

- Riparian corridors (including water and riparian areas and fish habitat)
- Wetlands
- Wildlife habitat
- Federal wild and scenic rivers
- State scenic waterways
- Groundwater resources
- Approved Oregon recreation trails
- Natural areas
- Wilderness areas
- Mineral and aggregate
- Energy sources
- Cultural areas
- Historic resources
- Open space
- Scenic views and sites

Figure 14 projects the proposed new street, sidewalk, trails, and bike lane projects on top of the Goal 5 Resources map. Several potential conflicts with the proposed alignments are identified in Table 15. It should be noted that although the proposed alignments currently show the potential for conflict with the City's Goal 5 resources, each project will be studied individually to mitigate or minimize any potential impact.

Table 15: Potential Goal 5 Impacts

Project Type	Location	Potential Impact
New Roadways		
362nd Drive	Intersection at Bell Street and North of Bell Street	Wetland Riparian Corridor
362nd Drive	Intersection at US 26	Historic Property
US 26 Bypass	West end of the UGB	Wetland Riparian Corridor
New Sidewalks		
362nd Drive	Between Dubarko Road and the southern UGB	Wetland Riparian Corridor
OR 211	Between Dubarko Road and Bornstedt Road, South of Tupper Road	Wetland
Bornstedt Road	South of Redwood Street	Wetland
New Bike Lanes		
Dubarko Road	Between Sandy Heights Street and Bluff Road	Wetland
OR 211	Between Dubarko Road and Bornstedt Road	Wetland
Bornstedt Road	South of Redwood Street	Wetland

Figure 14

Goal 5 Inventory & Proposed Projects

City of Sandy

TRANSPORTATION SYSTEM PLAN

0 500 1,000 2,000 3,000 4,000 5,000

Feet

Setback areas

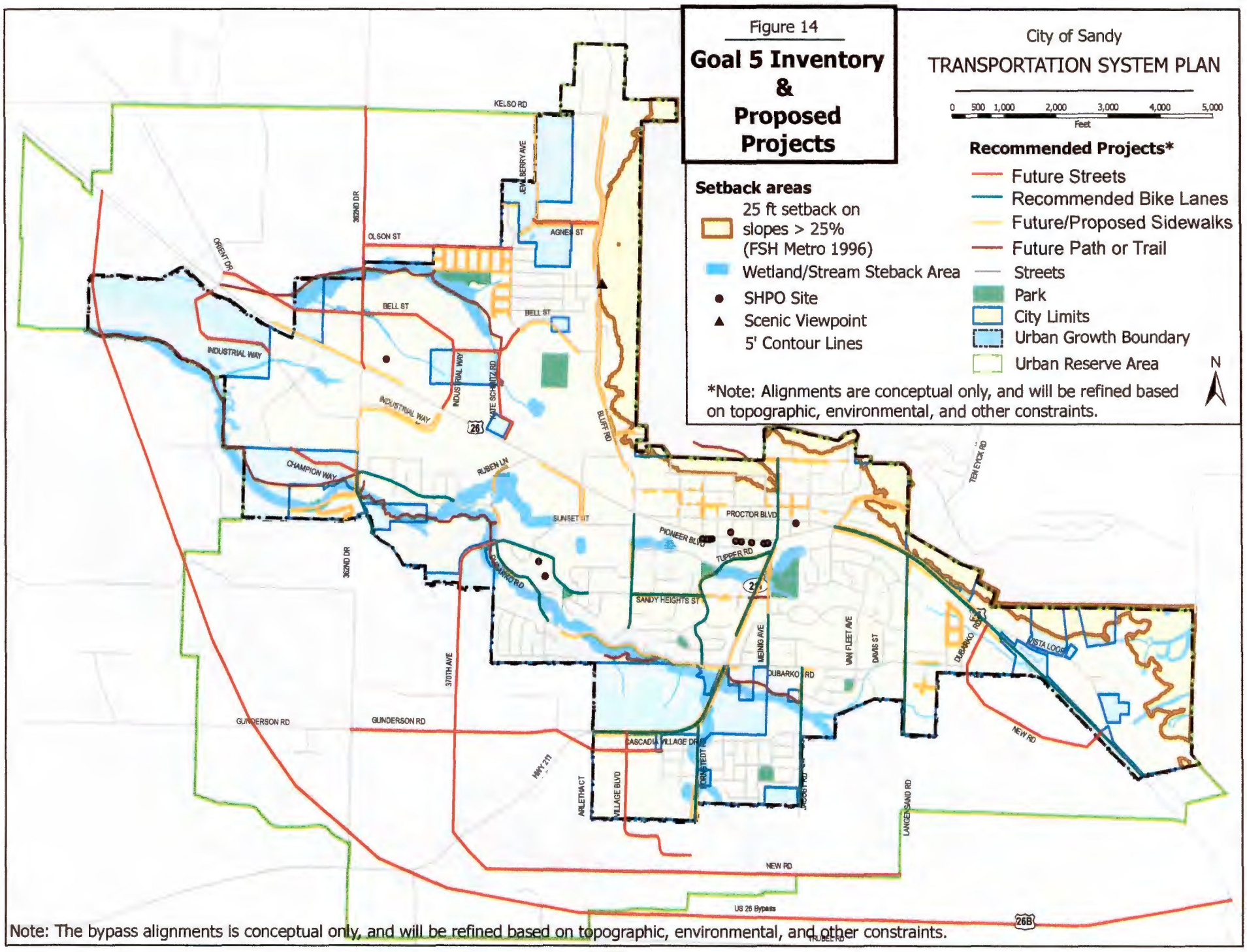
- 25 ft setback on slopes > 25% (FSH Metro 1996)
- Wetland/Stream Steback Area
- SHPO Site
- Scenic Viewpoint
- 5' Contour Lines

Recommended Projects*

- Future Streets
- Recommended Bike Lanes
- Future/Proposed Sidewalks
- Future Path or Trail
- Streets
- Park
- City Limits
- Urban Growth Boundary
- Urban Reserve Area

*Note: Alignments are conceptual only, and will be refined based on topographic, environmental, and other constraints.

N



Note: The bypass alignments is conceptual only, and will be refined based on topographic, environmental, and other constraints.

Planning-Level Cost Estimates

Planning-level project costs have been developed for the proposed pedestrian, bicycle, and motor vehicle projects. These lists create an overall plan for each mode, creating a "wish list" or Master Plan of proposed projects in Sandy. The Master Plan project lists represent the projects required to address all identified transportation needs in Sandy, but do not reflect projected funding constraints. Pedestrian projects are shown in Table 16, bicycle projects are shown in Table 17, and motor vehicle projects are shown in Tables 18 and 19.

The planning-level cost estimates provided are based on general unit costs for key project elements, using aerial photos, topography maps, and environmental resource maps, with only light field reconnaissance. Each of these project costs will need further refinement when developed and are for budgeting purposes only.

Table 16: Proposed Pedestrian System Projects and Costs

Project	Segment	Description	Project Cost (2009 Dollars)
City of Sandy Facility Pedestrian Improvements			
362nd Dr.	Chinook Dr. to Industrial Way	Infill sidewalk gaps	$1,230,000
Bluff Rd.	Hood St. to Green Mountain St.	Infill sidewalk gaps	$520,000
Bluff Rd.	Strawbridge Parkway to Nettie Connett Dr.	Infill sidewalk gaps	$505,000
Bluff Rd.	Green Mountain St. to Northern UGB	Infill sidewalk gaps	$716,000
Bornstedt Rd.	Cascadia Village Dr to UGB	Infill sidewalk gaps	$1,420,000
Dubarko Rd.	East of Melissa Ave. to East of OR 211	Infill sidewalk gaps	$3,240,000
Dubarko Rd.	Langensand Rd. to Antler Ave.	Infill sidewalk gaps	$39,000
Industrial Way	362nd Dr. to US 26	Infill sidewalk gaps	$1,790,000
Jacoby Rd.	Dubarko Rd. to Cascadia Village Dr.	Infill sidewalk gaps	$40,000
Jewelberry Rd.	Penny Ave. to Kelso Rd.	Infill sidewalk gaps	$194,000
Langensand Rd.	Dubarko Rd. to US 26	Infill sidewalk gaps	$82,000
Meinig Ave.	Scenic St. to US 26	Infill sidewalk gaps	$95,000
Pleasant St.	Beers Ave. to Revenue Ave.	Infill sidewalk gaps	$173,000
Ruben Rd.	US 26 to Dubarko Rd.	Infill sidewalk gaps	$51,000
Sandy Heights St.	Bluff Rd. to End	Infill sidewalk gaps	$176,000
Downtown Core Pedestrian	Side streets perpendicular to US 26	Infill sidewalk gaps	$287,000
University Ave.	Sunset St. to US 26	Construct sidewalk	$107,000
New Accessway / Trail	Extension of Tickle Creek Trail to Dubarko Rd.	Accessway / Trail	$1,700,000
New Accessway / Trail	Bell St. Fields to Kate Schmitz Ave.	Accessway / Trail	$230,000
New Accessway / Trail	North of Kate Schmitz Ave. to Orient Dr	Accessway / Trail	$1,520,000
New Accessway / Trail	Industrial Way to Eastern UGB	Accessway / Trail	$1,310,000
New Accessway / Trail	Marcy to Middle School Fields	Accessway / Trail	$370,000
New Accessway / Trail	Marcy to Sandy River	Accessway / Trail	$370,000
New Accessway / Trail	OR 211 to Jacoby	Accessway / Trail	$320,000
New Accessway / Trail	Meinig Memorial Park Demand Trails	Accessway / Trail	$230,000
New Accessway / Trail	Meinig Memorial Park Demand Trail to SW Corner	Accessway / Trail	$430,000

Table 16(Continued): Proposed Pedestrian System Projects and Costs

Project	Segment	Description	Project Cost (2009 Dollars)
ODOT Facility Pedestrian Improvements			
OR 211	South UGB to US 26	Construct sidewalk	**
OR 211	Sandy Heights St. to Meinig Ave.	Pedestrian Overcrossing	$4,900,000
US 26	Royal Lane to 362nd Dr.	Infill sidewalk gaps	$440,000
US 26	362nd Dr. to West UGB	Infill sidewalk gaps	$990,000
US 26	Ruben Ln. to University Ave.	Infill sidewalk gaps	$510,000
US 26	Ten Eyck Rd. to Vista Loop Dr. West	Infill sidewalk gaps	$3,260,000
		Total Pedestrian Projects	**$27,245,000**

**Note Cost is covered in the Bicycle System Project Costs.

Table 17: Bicycle System Projects and Costs

Project	Segment	Description	Project Cost (2009 Dollars)
City of Sandy Facility Bicycle Improvements			
362nd Dr.	Dubarko Rd. to UGB	Widen shoulder to 6'	$1,230,000
Bluff Rd.*	US 26 to Miller Rd.	Re-stripe/widen Rd.	$40,000
Bornstedt Rd.*	OR 211 to UGB	Re-stripe/widen Rd.	$32,000
Dubarko Rd.*	362nd Dr. to Eldridge Dr.	Re-stripe/widen Rd.	$36,000
Dubarko Rd.*	Sandy Heights St. to Melissa Ave.	Re-stripe/widen Rd.	$36,000
Langensand Rd.*	US 26 to UGB	Re-stripe/widen Rd.	$61,200
Meinig Ave.*	Scenic St. to US 26	Re-stripe/widen Rd.	$61,000
Meinig Ave.*	Barker Ct. to Dubarko Rd.	Re-stripe/widen Rd.	$17,000
Sandy Heights*	Bluff To End	Re-stripe/widen Rd.	$40,000
Tupper Rd.*	Long Circle to OR 211	Re-stripe/widen Rd.	$59,000
ODOT Facility Bicycle Improvements			
OR 211**	UGB to US 26	Widen shoulder to 6'	$28,200,000**
US 26	Ten Eyck Rd. to UGB	Widen shoulder to 6'	$3,260,000
		Total Bicycle Projects	**$33,072,200**

*Note: May require the elimination of on street parking.(Cost estimate for restripe only)
**Note Include drainage, lighting, bicycle and pedestrian elements.

Table 18: Proposed Intersection Improvement Projects and Costs

Location	Improvement(s) Description	Project Cost (2009 Dollars)
City of Sandy Intersection Improvements		
362nd Dr./ Industrial Way (West)	Remove stop signs on northbound and southbound approaches	$115,000
	Construct an eastbound left turn lane with 50 feet of storage	
362nd Dr./ Dubarko Rd.	Construct a single-lane roundabout	$1,165,000
ODOT Intersection Improvements		
US 26/ 362nd Dr.	Construct a second westbound left turn lane	$5,350,000
	Construct an acceptance lane for second westbound left turn lane to drop at southern access to Fred Meyer property	
	Construct a northbound through lane	
	Construct southbound through, right turn and left turn lanes	
US 26/ Industrial Way	Change southbound approach to dual left turn lanes and a shared through/right lane	$780,000
	Construct a northbound left turn lane	
US 26/ Ruben Lane	Change southbound approach to dual left turn lanes and a shared through/right lane	$770,000
	Change northbound approach to left turn lane, and shared through/right lane	
OR 211/Proctor Boulevard (US 26)	Construct a northbound left turn lane (restriping only)	$5,000
US 26	US 26 Adaptive Signal Timing	$400,000
US 26/ Ten Eyck Rd. – Wolf Drive	Construct a northbound left turn lane	$1,220,000
	Construct a southbound left turn lane	
OR 211/ Dubarko Rd.	Construct a northbound right turn lane	$10,150,000
	Construct a southbound left turn lane	
	Construct a northbound left turn lane	
	Construct a traffic signal	
OR 211/ Bornstedt Rd.	Prohibit left turns out of Bornstedt Rd*.	$16,000
OR 211/ Arletha Court	Realign Arletha Court approach from the south	$2,570,000
	Total Project Costs (Intersection Improvements)	**$22,541,000**

*Note: Project would be necessary only if mobility standard is not met. Potential alternative projects are available.

Table 19: Proposed Motor Vehicle Improvements Projects and Costs

New Roadways	Project Cost (2009 Dollars)
Local System Enhancements	
Industrial Way extension to Jarl Rd./ US 26	$10,800,000
Dubarko Rd. connection to Champion Way	$6,105,000
Extend Bell St. to Orient Dr.	$50,905,000*
Extend 362nd Dr. to Kelso Rd.	$26,620,000*
Extend Kate Schmidt St. from US 26 to the proposed Bell St. extension	$7,345,000
Extend Industrial Way north to Bell Street extension	$3,820,000
Extend Olson Rd. from 362nd Dr. to Jewelberry Ave.	$12,890,000
Extend Agnes St. to Jewelberry Ave.	$4,870,000
Extend Dubarko Rd. to US 26 opposite Vista Loop Dr. (West)	$3,200,000
Gunderson Rd., 370th Ave., Cascade Village Drive, Cascade Village Boulevard, New Collector	$20,000,000*
New Rd. extension to US 26 opposite Vista Loop Dr. (East)	$16,390,000*
Local System Sub-total (inside UGB)	**$101,041,000**
Local System Sub-total (outside UGB)	**$61,904,000**
Local System Total	**$162,945,000**
Additional Improvements to the US 26 Corridor	
7-lane US 26: Orient Dr. to Bluff Rd. and Ten Eyck Rd. to Vista Loop Dr. East	$62,100,000
US 26 Bypass (west of Orient Dr. to Shorty's Corner – south of the City)	$544,000,000*
US 26 Total	**$606,100,000**
Local System + US 26 (inside UGB)	***$163,141,000***
Local System + US 26 (outside UGB)	***$605,904,000***
Total Project Cost	***$769,045,000***

*Note: Sections of these projects are outside the City's UGB.

Revenue Forecast

The purpose of this section is to identify the funding framework for the City of Sandy transportation services to the year 2029. This section lists the foreseeable and potential funding sources for both capital improvements and transportation maintenance projects.

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, operation, 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 Sandy uses four regular income sources to fund and maintain public transportation infrastructure. The potential revenue generated by these sources has been forecast out to the TSP's horizon year 2029 to estimate the available resources for future capital improvement

projects and maintenance costs. The State Gas Tax, Local Option Fuel Tax, and ODOT FAU-STP Fund revenue streams were forecast by calculating the average income from these sources over the last ten years and projecting it over the next 20 years. The projected revenue stream from the SDC was calculated using the forecasted net new trips from development within the City over the next 20 years. The current SDC rates were applied to these new trips based on trip type, with 45% reduction for pass-by trips applied to the retail and service type land uses. The split between maintenance expenses and capital projects was determined by City staff and was based on the City's history of transportation expenditures. Table 20 summarizes the funding collected for transportation related costs in the year 2008, and the projected total available revenue for the period from 2009 to 2029.

Table 20: Past and Future Transportation Funding

Funding Source	2008 Total Collected	2009 to 2029* Total Forecast	2009 to 2029* Maintenance and Other Expenses	2009 to 2029* Capital Projects Only
State Shared - Gas Tax	$294,987	$ 5,900,000	$ 4,425,000	$ 1,475,000
Local Option Fuel Tax	$131,410	$ 2,482,000	$ 2,482,000	-
ODOT FAU-STP Funds	$79,500	$ 1,934,000	-	$ 1,934,000
Systems Development Charges	$338,765	$ 6,762,000	-	$ 6,762,000
Total	**$765,162**	**$ 17,078,000**	**$ 6,907,000**	**$ 10,171,000**

Note: A portion of the projected revenue will be required for the maintenance of existing facilities, street lighting, staff salaries, as well as other miscellaneous transportation expenses, and thus not available for capital projects.
* Forecast revenue is displayed in 2009 dollars.

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. Like most Oregon cities, Sandy uses it primarily to fund operation and maintenance of existing facilities.

Oregon gas taxes are collected as a fixed amount per gallon of gasoline served. The gas tax in Oregon has not increased since 1993 (currently 24 cents per gallon) and does not vary with changes in gasoline prices. There is no adjustment for inflation tied to the gas tax, so the lack of change since 1993 means that the real revenue collected has gradually eroded over time as the cost to construct and repair transportation systems increase. Additionally, increased fuel efficiency in new vehicles has further reduced the ratio of revenue generated per mile traveled.

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 $15 per vehicle per year to $27 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.

The State Legislature passed legislation that would increase statewide gas tax and vehicle registration fees. The additional revenue generated from these tax increases will be made available for the state, and a portion of the new revenue will also be made available to the cities, including Sandy. However, this same legislation prohibits local governments from imposing new or increasing existing local option fuel taxes until 2011 and requires a vote for any new or increased local fuel taxes thereafter.

Last year the City of Sandy received about $320,000 in State gas tax and vehicle license fee revenue. All of these funds are available for roadway surface maintenance of local streets and/or capital projects, typically as a source for matching funds on grant-funded/federally appropriated projects. This revenue stream is expected to generate about $5.9 million for the City over the next 20 years, with about $1.4 million being available for new capital construction projects.

Local Option Fuel Tax

The Local Option Fuel Tax is collected at all gas stations within the City of Sandy. By City ordinance, the Local Option Fuel Tax may only be used for maintenance projects; therefore, none of the revenue generated may be used for capital projects. Last year the City collected $131,410 from this revenue stream for maintenance projects. The City is projected to collect an additional $2.48 million between the years 2009 and 2029 with this fuel tax.

ODOT FAU-STP Funds

The Oregon Department of Transportation (ODOT) Federal Aid Urban Streets/Surface Transportation Program (FAU-STP) funds come from the Federal Surface Transportation Program (STP), which is a federal multi-modal block grant-type program. ODOT distributes a portion of its FAU-STP funds to cities, counties, and MPOs through a cooperative process. The City of Sandy uses these funds for capital construction projects.

Last year the City accrued around $79,000 in FAU-STP funds from ODOT. Over the next twenty years, the City is projected to have $1.9 million dollars in FAU-STP funding available for capital construction projects.

System Development Charge

The System Development Charge (SDC) for streets is used as a funding source for all capacity adding projects for the transportation system. The SDC fee is collected from new developments and is based on the number of vehicle trips generated by the development. This is intended to be used to construct or improve specified, capacity adding transportation projects. The current SDC rate is $1,943 per single-family household and $203 per trip generated for all other uses. Based on the new capital project list identified in this document the City could justify an increase in the SDC rate. The City could consider increasing the SDC rate to help fund transportation needs identified through the TSP update.

Because of the difficulties associated with determining system development charges for pedestrian and bicycle impacts the City's current SDC methodology only collects impact fees for motor vehicle projects. SDC revenues may be spent on bicycle and pedestrian facilities incidental to new street construction and improvements but cannot be used for bicycle or pedestrian-only construction or improvements.

Last year the City of Sandy collected $338,766 in SDC revenue. The SDC income potential over the next 20 years was estimated to be approximately $6.7 million.

Alternatives Evaluation

To aid in the evaluation of alternatives developed, a set of concise, yet comprehensive, criterion was developed to reflect the TSP goals and objectives. As shown in Table 21, the criterion reflects a range of interests, including mobility, safety, alternative modes of travel,

environmental impacts, freight movement, accessibility, and cost-effectiveness. The evaluation criterion is intended for use only as a guide and should not be the sole basis for selecting an alternative. In any case, the reasons for selecting an alternative should be justified and well documented.

Table 21: Alternatives Evaluation Matrix

Evaluation Criteria	No Build	Alt. 1	Alt. 2	Alt. 3
Promotes multi-modal transportation	0	3	2	3
Allows for compliance with mobility standards or provides significant reduction in congestion	0	1	2	3
Enhances connectivity	0	3	2	3
Facilitates freight movement	0	1	2	3
Promotes system management or demand management over new capacity	0	2	0	0
Access is consistent with roadway functional classification and land use	0	3	2	3
Minimizes environmental impacts	3	2	2	0
Enhances transportation safety	0	1	2	3
Total	**3**	**16**	**14**	**18**

Scoring: Meets criteria very well = 3
Somewhat meets criteria = 2
Marginally meets criteria = 1
Does not meet criteria = 0

As shown above in Table 21, Alternative 3 (Local System Enhancements and US 26 Bypass) is rated the highest, followed by Alternative 1 (Local System Enhancements and Minor Highway Improvements). However, it should be noted that the scoring differential between Alternatives 1, 2, and 3 is relatively small, since all alternatives (except No Build) share many common elements. Key differences include:

- The US 26 widening included as part of Alternative 2 would exaggerate the barrier effect of US 26 and would make pedestrian and bicycle crossings less attractive and more difficult. This results in the lower scores for multi-modal transportation and connectivity.
- As previously demonstrated, Alternative 3 could provide the most system capacity, followed by Alternative 2. This accounts for the higher scores for mobility and freight movement.
- Alternative 1 relies on expanding and enhancing the City street network and does not add through lanes on US 26, resulting in a higher score for system and demand management.
- Widening US 26 as described in Alternative 2 may require installation of a median barrier, which would significantly limit direct access to commercial properties. Therefore Alternative 2 is rated lower for provision of access that is consistent with land use. To mitigate for this, Alternative 2 would have to be supplemented with a significant circulation plan to maintain access to corridor properties.
- Alternatives 1 and 2 would result in fewer lane-miles of construction, while Alternative 3 would require construction on rural lands outside of the City. Therefore, it is assumed Alternative 3 would have more environmental impacts.

- Safety along the US 26 corridor is assumed to be improved with the reduction in traffic associated with Alternative 3 and the median barrier potentially associated with Alternative 2.
- The No Build alternative would have the least amount of environmental impacts, but would do little else.

Implementation Element Memorandum – Recommended Sandy Municipal Code Amendments

Angelo planning group

LAND USE PLANNING • TRANSPORTATION PLANNING • PROJECT MANAGEMENT

Memorandum

Date: July 15, 2009

To: Project Management Team and Technical Advisory Committee

cc: John Bosket, DKS Associates

From: Darci Rudzinski, AICP, Angelo Planning Group
DJ Heffernan, Angelo Planning Group

Re: City of Sandy Transportation System Plan
DRAFT Task 5.5 Draft Implementation Element

I. Introduction

The purpose of this memorandum is to provide the City of Sandy with regulatory language that will implement the updated Transportation System Plan (TSP) pursuant to the provisions of the Oregon Transportation Planning Rule (the "TPR," as codified in OAR 660-012-0045). Recommendations contained in this memorandum will also be consistent with the policy and implementation measures of the draft Sandy Transit Master Plan, as this document, once adopted, will become an element of the TSP. Specifically, this memorandum contains recommended amendments to the Development Code (Title 17 of the City of Sandy Municipal Code).

The City's adopted TSP includes recommended changes to the Municipal Code that, now adopted, implement the TSP and are consistent with the TPR (see Appendix E, 1995 City of Sandy Transportation Plan). This memorandum acknowledges existing TPR-compliant code sections, but also includes some recommended refinements to code language, as well as specifies where code sections need to be updated to reflect the latest TSP update.

The discussion of recommended changes is generally organized in this memorandum through references to the applicable section(s) of the TPR that prompt a change in the City's implementing ordinances, followed by the recommended revisions. The TPR requirements and general recommendations for text changes to the Development Code discussion are presented in text boxes.

Recommendations for specific revisions to existing code language are presented with deletions shown ~~strikethrough~~ and additions shown underlined. Where new code language is suggested in order to better meet TPR requirements, this text also will be shown underlined. In some instances, the *Model Development Code & Users Guide for Small Jurisdictions* (2005)[1] was used as a reference document for recommended code revisions.

[1] http://www.oregon.gov/LCD/TGM/modelCode05.shtml

To the extent possible, proposed text is organized using the numbering hierarchy provided by the City's Development Code. In one instance, NEW SECTION follows a reference in the proposed text; this is an indication that the referenced section is in the body of the memorandum and does not reference an existing code section. If the City decides to use the proposed language, this marker should be deleted before adoption.

The City may find that suggested language is more appropriately placed elsewhere in the Development Code, or may wish to include reference in more than one section. In such cases, the City will need to revise the section and subsection headings and numbering accordingly. The City is advised to review the recommendations carefully to ensure that proposed language does not conflict with existing code language and, where conflicts do exist, to identify additional areas in the adopted ordinance that should be modified to better comply with the TPR. It is also possible that some additional amendments to proposed language may be necessary to more adequately express the City's needs.

Proposed Amendments to Title 17 Development Code

OAR 660-12-0045 Implementation of the Transportation System Plan (TSP)

(1) Each local government shall amend its land use regulations to implement the TSP.

(a) The following transportation facilities, services and improvements need not be subject to land use regulations except as necessary to implement the TSP and, under ordinary circumstances do not have a significant impact on land use:

(A) Operation, maintenance, and repair of existing transportation facilities identified in the TSP, such as road, bicycle, pedestrian, port, airport and rail facilities, and major regional pipelines and terminals;

(B) Dedication of right-of-way, authorization of construction and the construction of facilities and improvements, where the improvements are consistent with clear and objective dimensional standards;

(C) Uses permitted outright under ORS 215.213(1)(m) through (p) and 215.283(1)(k) through (n), consistent with the provisions of 660-012-0065; and

(D) Changes in the frequency of transit, rail and airport services.

(b) To the extent, if any, that a transportation facility, service or improvement concerns the application of a comprehensive plan provision or land use regulation, it may be allowed without further land use review if it is permitted outright or if it is subject to standards that do not require interpretation or the exercise of factual, policy or legal judgment;

Requirements: Certain transportation facilities and improvements do not need to be subject to land use regulations and may be allowed outright.

Recommendation: Currently, the city's zoning districts (Chapter 17.30) do not list transportation facilities and improvements specifically. Transportation facilities include public improvements for streets, transit, parking, and bicycle and pedestrian facilities. The City can meet this TPR requirement by including transportation facilities that do not have a significant impact on land use in the "Permitted Uses" section of each land use district chapter.

Another way to meet this requirement is to allow outright only transportation facilities that have been identified in the TSP, with all other projects subject to the city's conditional use process. Transportation facilities and improvements that are not part of the city's TSP and are not part of a subdivision or partition subject to site design review should be allowed in all districts as conditional uses. To eliminate the necessity of listing transportation facilities as a conditional use under specific zoning districts, the City should consider including a new subsection, Criteria for Certain Transportation Facilities and Improvements, in Chapter 17.68, Conditional Uses (proposed language below).

17.68.20 REVIEW CRITERIA
The Planning Commission may approve an application, approve with modifications, approve with conditions, or deny an application for a conditional use permit after a public hearing. [...]

The following criteria and compatibility factors shall be considered:

A. The use is listed as a conditional use in the underlying zoning district or has been interpreted to be similar in use to other listed conditional uses, or is subject to 17.68.80, Criteria for Certain Transportation Facilities and Improvements.

17.68.80 CRITERIA FOR CERTAIN TRANSPORTATION FACILITIES AND IMPROVEMENTS

A. Construction, reconstruction, or widening of highways, roads, bridges or other transportation facilities that are (1) not designated in the adopted City of Sandy Transportation System Plan ("TSP") or (2) not designed and constructed as part of an approved, active, development order are allowed in all zoning districts subject to the Conditional Use provisions of the Development Code and satisfaction of all of the following criteria:
   1. The project and its design are consistent with the city's adopted TSP and consistent with the State Transportation Planning Rule, OAR 660-012 ("the TPR").
   2. The project design is compatible with abutting land uses in regard to noise generation and public safety and is consistent with the applicable zoning and development standards and criteria for the abutting properties.
   3. The project design minimizes environmental impacts to identified wetlands, wildlife habitat, air and water quality, cultural resources, and scenic qualities, and a site with fewer environmental impacts is not reasonably available.
   4. The project preserves or improves the safety and function of the facility through access management, traffic calming, or other design features.
   5. The project includes provisions for bicycle and pedestrian access and circulation consistent with the comprehensive plan, the requirements of this ordinance, and the TSP.

B. State transportation system facility or improvement projects. The Oregon Department of Transportation ("ODOT") shall provide a narrative statement with the application demonstrating compliance with all of the criteria and standards in Section 17.68.80. Where applicable, an Environmental Impact Statement or Environmental Assessment may be used to address one or more of these criteria.

C. Proposal inconsistent with TSP/TPR. If the city determines that the proposed use or activity or its design is inconsistent with the TSP or TPR, then the applicant shall apply for and obtain a plan and/or zoning amendment prior to or in conjunction with conditional use permit approval. The applicant shall choose one of the following options:
   1. If the city's determination of inconsistency is made prior to a final decision on the conditional use permit application, the applicant shall withdraw the conditional use application; or
   2. If the city's determination of inconsistency is made prior to a final decision on the conditional use permit application, the applicant shall withdraw the conditional permit application, apply for a plan/zone amendment, and re-

apply for a conditional use permit if and when the amendment is approved; or

3. If the city's determination of inconsistency is made prior to a final decision on the conditional use permit application, the applicant shall submit a plan/zoning amendment application for joint review and decision with the conditional use permit application, along with a written waiver of the ORS 227.178 120-day period within which to complete all local reviews and appeals once the application is deemed complete; or
4. If the city's determination of inconsistency is part of a final decision on the conditional use permit application, the applicant shall submit a new conditional use permit application, along with a plan/zoning amendment application for joint review and decision.

> ***(c) In the event that a transportation facility, service or improvement is determined to have a significant impact on land use or to concern the application of a comprehensive plan or land use regulation and to be subject to standards that require interpretation or the exercise of factual, policy or legal judgment, the local government shall provide a review and approval process that is consistent with 660-012-0050. To facilitate implementation of the TSP, each local government shall amend its land use regulations to provide for consolidated review of land use decisions required to permit a transportation project.***
>
> **Requirements:** Local governments must provide for consolidated review of land use decisions required to permit a transportation project (OAR Section 660-12-0045(1)(c)). Related to this TPR provision is **Section 660-12-0045(2)(d)**, which states that local governments must adopt land use or subdivision ordinance standards that provide a "process for coordinated review of future land use decisions affecting transportation facilities, corridors or sites." Also related to ensuring a coordinated review for land use decisions between jurisdictions and agencies is **Section 660-12-0045(2)(f)**. This section of the TPR requires that jurisdictions adopt regulations to provide notice to public agencies providing transportation facilities of land use applications that require public hearings, subdivision and partition applications, and applications which affect private access to roads.
>
> **Compliance Discussion:** The Development Code in large part complies with these TPR requirements. The Under Chapter 17.18, Processing Applications, the City notifies referral agencies "responsible for determination of compliance with state and federal requirements" of complete applications (Section 17.18.50.A). Chapter 17.20, Public Hearings, specifies that public hearing notice of all Type II and Type III applications will be sent to "(i)nterested parties, such as counties, state agencies, public utilities, etc., that may be affected by the specific development proposal shall receive notice of the scheduled public hearing."
>
> Notification to ODOT of proposals for new or modified public and private accesses on to Highways 26 and 211is a requirement of the Development Code's Land Division Chapter (Section 17.100.90).
>
> **Recommendation:** The Development Code does not explicitly include ODOT in the notification procedures for comprehensive plan or zoning amendments that may impact state transportation facilities. Recommended language for Chapter 17.24, Comprehensive Plan Amendment Procedures, is proposed below.

CHAPTER 17.24 COMPREHENSIVE PLAN AMENDMENT PROCEDURES

17.24.40 APPLICATION REQUIREMENTS

An application may be filed jointly by any or all of the property owners of record or their authorized agents within the area of the proposed Comprehensive Plan amendment. [...] Notice shall be provided to the Land Conservation and Development Commission (LCDC) of any proposed amendment or new regulation as provided by State law. In addition, notice of any proposed amendment that may affect private access to state roads, or that may impact a state transportation facility, shall be provided to the Oregon Department of Transportation (ODOT).

OAR 660-12-0045

(2) Local governments shall 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. Such regulations shall include:

(a) Access control measures, for example, driveway and public road spacing, median control and signal spacing standards, which are consistent with the functional classification of roads and consistent with limiting development on rural lands to rural uses and densities;

Requirement: Local governments must adopt land use or subdivision ordinance regulations that protect transportation facilities for their identified functions, including access control.

Compliance Discussion: The Development Ordinance substantially meets this TPR requirement through the requirements of Chapter 17.98, Parking, Loading, and Access Requirements. In addition, Chapter 17.84 includes arterial street spacing consistent with the draft TSP ([redacted]) and traffic signal spacing standards (Subsection 17.84.50).

Recommendation: The addition of access spacing standards tables developed for the TSP ([redacted]) is recommended for inclusion in the development standards. In addition, proposed text language below provides the context for access management, details how the City or a transportation agency with jurisdiction may control access, and specifies standards related to minimizing access points onto arterials and collectors.

Recommended code amendments also include making traffic signal spacing standards consistent with the city block length standards (see Section 17.84.50 below).

17.84.50 STREET REQUIREMENTS

B. Location of new arterial streets shall conform to the Transportation System Plan in accordance with the following:
   1. Arterial streets should generally be spaced in one-mile intervals.
   2. Traffic signals should generally not be spaced closer than ~~1500~~ 400 ft. for reasonable traffic progression.

17.98.80 ACCESS ~~TO ARTERIAL AND COLLECTOR STREETS~~ MANAGEMENT

A. Access control standards apply to public, industrial, commercial and residential developments including land divisions. Access shall be managed to maintain an adequate level of service and to maintain the functional classification of roadways as required by the City of Sandy Transportation System Plan. Major roadways, including arterials and collectors, serve as the primary system for moving people and goods within and through the city. Access management is a primary concern on these roads. Local streets and alleys provide access to individual properties. If vehicular access and circulation are not properly designed, these roadways will be unable to accommodate the needs of development and serve their transportation function.
B. Access Spacing. All proposed development shall have access to a public right-of-way. Spacing requirements for access points and intersections is shown in the following two (2) tables:

[redacted]

[redacted]

C.~~A.~~ Location and design of all accesses to and/or from arterials and collectors (as designated in the Transportation System Plan) are subject to review and approval by the City Engineer. Where practical, access from a lower functional order street may be required. Accesses to arterials or collectors shall be located a minimum of 150 ft. from any other access or street intersection. Exceptions may be granted by the City Engineer. Evaluations of exceptions shall consider posted speed of the street on which access is proposed, constraints due to lot patterns, and effects on safety and capacity of the adjacent public street, bicycle and pedestrian facilities.

D.~~B.~~ No development site shall be allowed more than one access point to any arterial or collector street ([redacted]) except as approved by the City Engineer. Evaluations of exceptions shall consider posted speed of street on which access is proposed, constraints due to lot patterns, and effects on safety and capacity of the adjacent public street, bicycle and pedestrian facilities.

E.~~C.~~ When developed property is to be expanded or altered in a manner that significantly affects on-site parking or circulation, both existing and proposed accesses shall be reviewed under the standards in A and B above. As a part of an expansion or alteration approval, the City may require relocation and/or reconstruction of existing accesses not meeting those standards.

F. The City or other agency with access permit jurisdiction may require the closing or consolidating existing curb cuts or other vehicle access points, recording of reciprocal access easements (i.e., for shared driveways), developing a frontage street, installing traffic control devices, and/or other mitigation as a condition of granting an access permit to ensure the safe and efficient operation of the street and highway system. Access to and from off-street parking areas shall not permit backing onto a public street.

G. Traffic Impact Analysis Requirements. The City or other agency with access jurisdiction may require a traffic study prepared by a qualified professional to determine access, circulation and other transportation requirements. (See also, 17.84.50.A Traffic Impact Analysis.)

OAR 660-12-0045(2)
(b) Local governments shall adopt …Standards to protect future operation of roads, transit ways and major transit corridors;
(e) Local governments shall adopt …A process to apply conditions to development proposals in order to minimize impacts and protect transportation facilities, corridors or sites;

Requirements: Local governments must adopt land use or subdivision ordinance standards to protect the future operations of roadways and transit corridors (OAR Section 660-12-0045(2)(b)).

Local governments must adopt a process that allows conditioning development proposals in order to minimize impacts and protect transportation facilities (OAR Section 660-12-0045(2)(e)).

Compliance Discussion: These sections of the TPR address the need to account for potential development impacts to roadways and to ensure that transportation facilities continue to meet community needs. An effective way to ensure that roadways are protected for their planned function and capacity is to require a transportation impact analysis or impact study as part of a development application. Pursuant to existing code language, the city currently may require a "traffic evaluation" as part of any development proposal (17.84.50.A).

Recommendation: In order to better meet the TPR requirement, the Development Ordinance should require a TIA for all new development that would potentially impact the roadway system. Proposed language below also gives the City the authority to require a TIA when a development application involves a change in zoning or a plan amendment designation, prior to (or concurrently with) a proposal to subdivide the land. The following draft language for Section 17.84.50, would require a traffic study under prescribed conditions and lists the required elements of such a study. Proposed language also makes explicit that transportation-related conditions of approval may be applied to development proposals.

Outstanding Issues:

Are the thresholds suggested in 17.84.50.A.3.c appropriate for the City of Sandy?

Does the City currently accept traffic evaluations prepared by engineering professionals chosen by applicants, or does the city commission these reports and require payment from applicants (see 17.84.50.A.4)?

Does Chapter 17.64, Planned Development, need a cross-reference to the TIA submittal requirement?

17.84.50 STREET REQUIREMENTS
A. Traffic Impact Analysis. ~~evaluations may be required of all development proposals in accordance with the following:~~
~~1. A proposal establishing the scope of the traffic evaluation shall be submitted for review to the City Engineer. The evaluation requirements shall reflect the magnitude of the project in accordance with accepted traffic engineering practices. Large projects should assess all nearby key intersections. Once the scope of the traffic evaluation has been approved, the applicant shall present the results with and an overall site development proposal. If required by the City Engineer, such evaluations shall be signed by a~~

~~Licensed Professional Civil Engineer or Licensed Professional Traffic Engineer licensed in the State of Oregon.~~
~~2. If the traffic evaluation identifies level-of-service conditions less than the minimum standard established in the Transportation System Plan, improvements and funding strategies mitigating the problem shall be considered concurrent with a development proposal.~~

1. Purpose. The purpose of this section of the code is to implement Section 660-012-0045(2)(e) of the State Transportation Planning Rule that requires the City to adopt a process to apply conditions to development proposals in order to minimize adverse impacts to and protect transportation facilities. This section establishes the standards for when a proposal must be reviewed for potential traffic impacts; when a Traffic Impact Analysis must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; what must be in a Traffic Impact Study; and who is qualified to prepare the Study.
2. Typical Average Daily Trips. The latest edition of the Trip Generation manual, published by the Institute of Transportation Engineers (ITE) shall be used as standards by which to gauge average daily vehicle trips.
3. When Required. A Traffic Impact Analysis may be required to be submitted to the City with a land use application, when the development application involves one or more of the following actions:
   a. A change in zoning or a plan amendment designation;
   b. Any proposed development or land use action that ODOT states may have operational or safety concerns along a state highway; or
   c. The development shall cause one or more of the following effects, which can be determined by field counts, site observation, traffic impact analysis or study, field measurements, crash history, Institute of Transportation Engineers Trip Generation manual; and information and studies provided by the City and/or ODOT:
      i. An increase in site traffic volume generation by 250 Average Daily Trips (ADT) or more (or as required by the City Engineer); or
      ii. An increase in site traffic volume generation of 25 or more peak-hour trips; or
      iii. An increase in use of adjacent streets by vehicles exceeding the 20,000 pound gross vehicle weights by 10 vehicles or more per day; or
      iv. The location of the access driveway does not meet minimum intersection sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles queue or hesitate, creating a safety hazard; or
      v. The location of the access driveway does not meet the access spacing standard of the roadway on which the driveway is located; or
      vi. A change in internal traffic patterns that may cause safety problems, such as back up onto the highway or a local arterial or collector, or traffic crashes in the approach area.
4. Traffic Impact Analysis Requirements.
   a. Preparation. A Traffic Impact Analysis shall be prepared by a professional engineer. The City shall commission the traffic analysis and it will be paid for by the applicant.
   b. Transportation Planning Rule Compliance. See Section 17.27 Transportation Planning Rule Compliance. NEW SECTION.

c. Pre-application Conference. The applicant will meet with the City Engineer prior to submitting an application that requires a Traffic Impact Application. This meeting will determine the required elements of the TIA and the level of analysis expected.

5. Approval Criteria. When a Traffic Impact Analysis is required, approval of the development proposal requires satisfaction of the following criteria:
   a. The Traffic Impact Analysis was prepared by a professional engineer in accordance; and
   b. If the proposed development shall cause one or more of the effects in Section 17.84.50.A.3, above, or other traffic hazard or negative impact to a transportation facility, the Traffic Impact Analysis includes mitigation measures that meet the City's Level-of-Service and satisfactory to the City Engineer, and ODOT when applicable; and
   c. The proposed site design and traffic and circulation design and facilities, for all transportation modes, including any mitigation measures, are designed to:
      i. Have the least negative impact on all applicable transportation facilities;
      ii. Accommodate and encourage non-motor vehicular modes of transportation to the extent practicable;
      iii. Make the most efficient use of land and public facilities as practicable;
      iv. Provide the most direct, safe and convenient routes practicable between on-site destinations, and between on-site and off-site destinations; and
      v. Otherwise comply with applicable requirements of the City of Sandy Development Ordinance.
6. Study Area. The study area for the TIA shall include, at a minimum, all site-access points and intersections (signalized and unsignalized) adjacent to the proposed site. If the proposed site fronts an arterial or collector street; the study shall include all intersections along the site frontage and within the access spacing distances extending out from the boundary of the site frontage. Beyond the minimum study area, the transportation impact analysis shall evaluate all intersections that receive site-generated trips that comprise at least 10% or more of the total intersection volume. In addition to these requirements, the City Engineer (or his/her designee) shall determine any additional intersections or roadway links that might be adversely affected as a result of the proposed development. The applicant and the City Engineer (or his/her designee) will agree on these intersections prior to the start of the transportation impact analysis.
7. Conditions of Approval. As part of every land use action, the City of Sandy, Clackamas County (if access to a County roadway is proposed), and ODOT (if access to a state roadway is proposed) will be required to identify conditions of approval needed to meet operations and safety standards and provide the necessary right-of-way and improvements to develop the future planned transportation system. The City may deny, approve, or approve the proposal with appropriate conditions. Conditions of Approval that should be evaluated as part of subdivision and site plan reviews include:
   a. Crossover easement agreements for all adjoining parcels to facilitate future access between parcels.
   b. Conditional access permits for new developments which have proposed access points that do not meet the designated access spacing policy and/or have the ability to align with opposing access driveways.
   c. Right-of-way dedications for future planned roadway improvements.
   d. Half-street improvements along site frontages that do not have full-buildout improvements in place at the time of development.

CHAPTER 17.24 COMPREHENSIVE PLAN AMENDMENT PROCEDURES

17.24.70 REVIEW CRITERIA

Comprehensive Plan amendments shall be reviewed to assure consistency with the purposes of this chapter, policies of the Comprehensive Plan, and any other applicable policies and standards adopted by the City Council. Amendments shall be approved only when the following findings are made:

A. The change being proposed is the best means of meeting the identified public need;

B. Adequate public facilities, services, and transportation networks are in place or are planned to be provided concurrently with the development of the property. A Traffic Impact Analysis, pursuant to Section 17.84.50.A may be required to determine the adequacy of existing or planned transportation facilities and demonstrate compliance with OAR 660-012-0060; and

~~B.~~C. The change conforms to all applicable Statewide Planning Goals.

CHAPTER 17.26 ZONING DISTRICT AMENDMENTS

17.26.30 LEGISLATIVE AMENDMENT PROCEDURES

A zoning district change is considered a legislative act if the change applies uniformly to all properties in the City or to a sufficiently large number of properties as determined by contemporary legal principles.

B. Review Criteria. Legislative amendments shall be reviewed to:

1. ~~Determine the effects on City facilities and services~~ To assure adequacy of public facilities, services, and transportation networks. A Traffic Impact Analysis, pursuant to Section 17.84.50.A may be required to determine the adequacy of existing or planned transportation facilities and demonstrate compliance with OAR 660-012-0060;
2. To assure consistency with the purposes and intent of this chapter;
3. To assure consistency with the policies of the Comprehensive Plan;
4. To assure consistency with the Statewide Planning Goals as may be necessary, and any other applicable policies and standards adopted by the City Council.

17.26.40 QUASI-JUDICIAL AMENDMENT PROCEDURES

All zoning district changes not deemed legislative shall be quasi-judicial.

B. Review Criteria. Quasi-judicial zoning district changes shall be reviewed to:

1. ~~Determine the effects on City facilities and services~~ To assure adequacy of public facilities, services, and transportation networks. A Traffic Impact Analysis, pursuant to Section 17.84.50.A may be required to determine the adequacy of existing or planned transportation facilities and demonstrate compliance with OAR 660-012-0060;
2. To assure consistency with the purposes of this chapter;
3. To assure consistency with the policies of the Comprehensive Plan;
4. To assure consistency with the Statewide Planning Goals as may be necessary, and any other applicable policies and standards adopted by the City Council.

OAR 660-12-0045(2)

(g) Local governments must adopt...Regulations assuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities and levels of service of facilities identified in the TSP.

Requirements: This TPR requirement ensures that amendments to the comprehensive plan and land use regulations are reviewed for their impact on transportation facilities identified in the TSP.

Compliance Discussion: The City's current requirements do not include specific provisions for proposed development and plan or code amendments that impact transportation facilities. To better comply with the TPR, it is recommended that Development Code include clarification that approval of amendments to land use designations, densities, and design standards is contingent on findings of consistency with the planned transportation system, as adopted in the City's TSP.

Recommendation: Below is a new Chapter 17.27 Transportation Planning Rule Compliance that is recommended for inclusion in the Zone Changes and Plan Amendments section. The purpose of this subsection is to specify how proposed land use amendments and changes in land use designations or zoning are to comply with the TPR. The new subsection also discusses how to ensure that proposed amendments to the comprehensive plan or to the development code are consistent with the TSP when the amendment significantly affects a transportation facility. Please note that, while the proposed language is intended to provide guidance in determining when a code or plan amendment is considered to have an impact on transportation facilities, the Development Code currently does not have section that addresses approval requirements for proposed text amendments.

This proposed code amendment is consistent with OAR 660-12-060, which requires that amendments to functional plans, acknowledged comprehensive plans, and land use regulations that significantly affect an existing or planned transportation facility must ensure that the allowed land uses are consistent with the identified function, capacity, and performance standards of the facility.

CHAPTER 17.27 TRANSPORTATION PLANNING RULE COMPLIANCE

17.27.00 Review of Applications for Effect on Transportation Facilities

When a development application, whether initiated by the City or by a private interest, includes a proposed comprehensive plan amendment zone change, or land use regulation change, the proposal shall be reviewed to determine whether it significantly affects a transportation facility, in accordance with Oregon Administrative Rule (OAR) 660-012-0060 (the Transportation Planning Rule – "TPR"). "Significant" means the proposal would:

A. Change the functional classification of an existing or planned transportation facility (exclusive of correction of map errors in an adopted plan);
B. Change standards implementing a functional classification system; or
C. As measured at the end of the planning period identified in the adopted transportation system plan:
    1. Allow land uses or levels of development that would result in types or levels of travel or access that are inconsistent with the functional classification of an existing or planned transportation facility;
    2. Reduce the performance of an existing or planned transportation facility below the minimum acceptable performance standard identified in the TSP or comprehensive plan; or

3. Worsen the performance of an existing or planned transportation facility that is otherwise projected to perform below the minimum acceptable performance standard identified in the TSP or comprehensive plan.

17.27.10 Amendments That Affect Transportation Facilities

Amendments to the comprehensive plan and land use regulations that significantly affect a transportation facility shall ensure that allowed land uses are consistent with the function, capacity, and level of service of the facility identified in the TSP. This shall be accomplished by one or a combination of the following:

A. Adopting measures that demonstrate allowed land uses are consistent with the planned function, capacity, and performance standards of the transportation facility.
B. Amending the TSP or comprehensive plan to provide transportation facilities, improvements or services adequate to support the proposed land uses consistent with the requirements of Section -0060 of the TPR.
C. Altering land use designations, densities, or design requirements to reduce demand for automobile travel and meet travel needs through other modes of transportation.
D. Amending the TSP to modify the planned function, capacity or performance standards of the transportation facility.

17.27.20 Traffic Impact Analysis

A Traffic Impact Analysis shall be submitted with a plan amendment or land use district change application. (See Subection 17.84.50.A, Traffic Impact Analysis (TIA)).

OAR 660-12-0045(3)
Local governments shall adopt land use or subdivision regulations for urban areas and rural communities as set forth below. The purposes of this section are to provide for safe and convenient pedestrian, bicycle and vehicular circulation consistent with access management standards and the function of affected streets, to ensure that new development provides on-site streets and accessways that provide reasonably direct routes for pedestrian and bicycle travel in areas where pedestrian and bicycle travel is likely if connections are provided, and which avoids wherever possible levels of automobile traffic which might interfere with or discourage pedestrian or bicycle travel.
(a) Bicycle parking facilities as part of new multi-family residential developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park-and-ride lots;
(b) On-site facilities shall be provided which accommodate safe and convenient pedestrian and bicycle access from within new subdivisions, multi-family developments, planned developments, shopping centers, and commercial districts to adjacent residential areas and transit stops, and to neighborhood activity centers within one-half mile of the development. Single-family residential developments shall generally include streets and accessways. Pedestrian circulation through parking lots should generally be provided in the form of accessways.
(c) Where off-site road improvements are otherwise required as a condition of development approval, they shall include facilities accommodating convenient pedestrian and bicycle travel, including bicycle ways along arterials and major collectors;
(e) Internal pedestrian circulation within new office parks and commercial developments shall be provided through clustering of buildings, construction of accessways, walkways and similar techniques.

Requirements: Local governments must adopt land use or subdivision ordinance regulations that:

- require bicycle parking as part of new multi-family (four units or more), retail, office, and institutional developments.
- provide "safe and convenient" pedestrian and bicycle connections from new subdivisions/multifamily development to neighborhood activity centers; require bikeways along arterials and major collectors; and require sidewalks along arterials, collectors, and most local streets in urban areas (OAR Section 660-12-0045(3)(b)).
- require off-site road improvements as a condition of development approval that accommodate bicycle and pedestrian travel, including facilities on arterials and major collectors (OAR Section 660-12-0045(3)(c)).
- provide internal pedestrian circulation within new office parks and commercial developments (OAR Section 660-12-0045(3)(e)).

Compliance Discussion: The purpose of these sections of the TPR is to ensure that safe and convenient circulation and facilities are provided for pedestrians and bicyclists, within new residential and commercial development and on public streets.

Consistent with TPR requirements, the Development Code requires bicycle parking for multi-family, retail, office and institutional developments (Section 17.98.20, Off-Street Parking Requirements) and specifies its location and design (Section 17.98.160, Bicycle Parking Facilities).

The requirements under Chapter 17.82, Special Setbacks on Transit Streets, also meet -0045(3) requirements. Standards require that all developments must have access and parking area plans that provide efficient sidewalk and/or walkway connections between neighboring developments or land uses (Section 17.82.30.D, Parking, Loading and Service Areas). Pedestrian connectivity and internal orientation are addressed in Section 17.82.40, Access, Egress and Circulation. Because Chapter 17.82 is not limited to just development on designated transit streets (defined in the Sandy Transit Master Plan as "(a)ny street that is currently served by fixed-route transit or planned for future transit service"), it is recommended that the Chapter title be changed to "Pedestrian, Bicycle and Transit Access."

Subsection 17.84.30 contains the standards for sidewalks and bike lanes.

Recommendations: Consistent with existing City policies and the draft Transportation System Plan, Subsection 17.84.30 should include the requirement of bike lanes on all arterial and selected collector streets. Pursuant to Subsection 17.84.30.E, off-site pedestrian facilities may be required as part of development approval; it is further recommended that this requirement be expanded to include bicycle facilities.

CHAPTER 17.82 ~~SPECIAL SETBACKS ON TRANSIT STREETS~~ PEDESTRIAN, BICYCLE AND TRANSIT ACCESS

17.84.30 PEDESTRIAN AND BICYCLIST REQUIREMENTS

A. Sidewalks shall be required along both sides of all arterial, collector, and local streets, as follows:
   1. Sidewalks shall be a minimum of 5 ft. wide on local streets. The sidewalks shall be separated from curbs by a tree planting area that provides separation between sidewalk and curb, unless modified in accordance with Subsection 3 below.
   2. Sidewalks along arterial and collector streets shall be separated from curbs with a planting area, except as necessary to continue an existing curb-tight sidewalk. The planting area shall be landscaped with trees and plant materials approved by the City. The sidewalks shall be a minimum of 6 ft. wide.
   3. Sidewalk improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building. Any exceptions to the standards shall generally be in the following order.
      a) Narrow landscape strips
      b) Narrow sidewalk or portion of sidewalk to no less than 4 feet in width
      d) Narrow on-street improvements by eliminating on-street parking
      e) Eliminate sidewalks
      4. The timing of the installation of sidewalks shall be as follows:
      a) Sidewalks and planted areas along arterial and collector streets shall be installed with street improvements, or with development of the site if street improvements are deferred.

b) Sidewalks along local streets shall be installed in conjunction with development of the site, generally with building permits, except as noted in (c) below.
c) Where sidewalks on local streets abut common areas, drainageways, or other publicly owned or semi-publicly owned areas, the sidewalks and planted areas shall be installed with street improvements.

B. Bike lanes shall be required along both sides of all arterial streets, as well as collector streets if identified in the transportation system plan, as follows:
1. Bike lanes shall be a minimum of 5 ft. wide on arterial and collector streets.
2. Bike lanes shall be striped and otherwise demarcated to distinguish the bicycle travel lanes from the automobile travel lanes.
3. Bike lane improvements shall be made according to city standards, unless the city determines that the public benefit in the particular case does not warrant imposing a severe adverse impact to a natural or other significant feature such as requiring removal of a mature tree, requiring undue grading, or requiring modification to an existing building.

~~B.~~ C. Safe and convenient pedestrian and bicyclist facilities that strive to minimize travel distance to the extent practicable shall be provided in conjunction with new development within and between new subdivisions, planned developments, commercial developments, industrial areas, residential areas, public transit stops, school transit stops, and neighborhood activity centers such as schools and parks, as follows:
1. For the purposes of this section, "safe and convenient" means pedestrian and bicyclist facilities that: are reasonably free from hazards which would interfere with or discourage travel for short trips; provide a direct route of travel between destinations; and meet the travel needs of pedestrians and bicyclists considering destination and length of trip.
2. To meet the intent of "B" above, right-of-ways connecting cul-de-sacs or passing through unusually long or oddly shaped blocks shall be a minimum of 15 ft. wide with 8 feet of pavement.
3. 12 feet wide pathways shall be provided in areas with high bicycle volumes or multiple use by bicyclists, pedestrians, and joggers.
4. Pathways and sidewalks shall be encouraged in new developments by clustering buildings or constructing convenient pedestrian ways. Pedestrian walkways shall be provided in accordance with the following standards:
   a) The pedestrian circulation system shall be at least five feet in width and shall connect the sidewalk on each abutting street to the main entrance of the primary structure on the site to minimize out of direction pedestrian travel.
   b) Walkways at least five feet in width shall be provided to connect the pedestrian circulation system with existing or planned pedestrian facilities which abut the site but are not adjacent to the streets abutting the site.
   c) Walkways shall be as direct as possible and avoid unnecessary meandering.
   d) Walkway/driveway crossings shall be minimized. Internal parking lot design shall maintain ease of access for pedestrians from abutting streets, pedestrian facilities, and transit stops.
   e) With the exception of walkway/driveway crossings, walkways shall be separated from vehicle parking or vehicle maneuvering areas by grade, different paving material, painted crosshatching or landscaping. They shall

be constructed in accordance with the sidewalk standards adopted by the City. (This provision does not require a separated walkway system to collect drivers and passengers from cars that have parked on site unless an unusual parking lot hazard exists).

f) Pedestrians amenities such as covered walk-ways, awnings, visual corridors and benches will be encouraged. For every two benches provided, the minimum parking requirements will be reduced by one, up to a maximum of four benches per site. Benches shall have direct access to the circulation system.

~~C.~~ D. Where a development site is traversed by or adjacent to a future trail linkage identified within the Transportation System Plan, improvement of the trail linkage shall occur concurrent with development. Dedication of the trail to the City shall be provided in accordance with 17.84.80.

~~D.~~ E. To provide for orderly development of an effective pedestrian network, pedestrian facilities installed concurrent with development of a site shall be extended through the site to the edge of adjacent property(ies).

~~E.~~ F. To ensure improved access between a development site and an existing developed facility such as a commercial center, school, park, or trail system, the Planning Commission or Director may require off-site pedestrian and bicycle facility improvements concurrent with development.

OAR 660-12-0045 (4) To support transit in urban areas containing a population greater than 25,000, where the area is already served by a public transit system or where a determination has been made that a public transit system is feasible, local governments shall adopt land use and subdivision regulations as provided in (a)-(g) below:

(a) Transit routes and transit facilities shall be designed to support transit use through provision of bus stops, pullouts and shelters, optimum road geometrics, on-road parking restrictions and similar facilities, as appropriate;

(b) New retail, office and institutional buildings at or near major transit stops shall provide for convenient pedestrian access to transit through the measures listed in (A) and (B) below.

(A) Walkways shall be provided connecting building entrances and streets adjoining the site;

(B) Pedestrian connections to adjoining properties shall be provided except where such a connection is impracticable as provided for in OAR 660-012-0045(3)(b)(E). Pedestrian connections shall connect the on site circulation system to existing or proposed streets, walkways, and driveways that abut the property. Where adjacent properties are undeveloped or have potential for redevelopment, streets, accessways and walkways on site shall be laid out or stubbed to allow for extension to the adjoining property;

C) In addition to (A) and (B) above, on sites at major transit stops provide the following:

(i) Either locate buildings within 20 feet of the transit stop, a transit street or an intersecting street or provide a pedestrian plaza at the transit stop or a street intersection;

(ii) A reasonably direct pedestrian connection between the transit stop and building entrances on the site;

(iii) A transit passenger landing pad accessible to disabled persons;

(iv) An easement or dedication for a passenger shelter if requested by the transit provider; and

(v) Lighting at the transit stop.

(c) Local governments may implement (4)(b)(A) and (B) above through the designation of pedestrian districts and adoption of appropriate implementing measures regulating development within pedestrian districts. Pedestrian districts must comply with the requirement of (4)(b)(C) above;

(d) Designated employee parking areas in new developments shall provide preferential parking for carpools and vanpools;

(e) Existing development shall be allowed to redevelop a portion of existing parking areas for transit-oriented uses, including bus stops and pullouts, bus shelters, park and ride stations, transit-oriented developments, and similar facilities, where appropriate;

(f) Road systems for new development shall be provided that can be adequately served by transit, including provision of pedestrian access to existing and identified future transit routes. This shall include, where appropriate, separate accessways to minimize travel distances;

(g) Along existing or planned transit routes, designation of types and densities of land uses adequate to support transit.

Requirement: Because the City is currently served by transit, the Development Code must include regulations to support transit, including requiring new retail, office, and institutional buildings at or near major transit stops to provide convenient pedestrian access to transit (OAR Section 660-12-0045(4)(b)).

Compliance Discussion: The Development Code currently includes provisions for building orientation and special setbacks on transit streets (Section 17.82). Development sites located along existing or planned transit routes are required to incorporate bus pull-outs and/or shelters into the site design and to provide safe and convenient access to the transit system (Subsection 17.84.40). A reduction in required parking is also available to developers who provide transit amenities (Subsection 17.98.30). To encourage car and vanpooling, all new industrial, commercial, and community service uses with more than 50 employees must designate and sign carpool/vanpool parking spaces (Subsection 17.98.180).

Subdivision requirements include providing a transportation system that demonstrates that proposed street or street extensions are located to provide direct access to existing or planned transit stops and existing or planned neighborhood activity centers, such as schools, shopping areas and parks (Subsection 1700.100.100.E).

As highlighted in the draft Sandy Transit Master Plan, the City of Sandy Urbanization Study (ECONorthwest, 2008) forecasts an average residential density of 6.8 residential dwelling units per acre in 2029 and an average household size of 2.7. Sandy is expected to have just over 18 people per acre. While the Transit Master Plan notes that this does not represent a population density conducive to high levels of transit use, there are existing areas of Sandy where population densities approach 26 people per acre. Consistent with TPR requirement -0045(4)(g), planned land uses along existing and future transit routes consist of employment, commercial and higher density residential. Industrial, Commercial, and High Density Residential zones are the predominant zone districts along the Sandy Area Metro routes (Estacata and Sandy-Gresham) within the City of Sandy's city limits. Future high-density and intensity uses, as allowed by the existing zoning, are expected to add to existing transit demand.

Recommendation: No code amendments necessary to meet TPR requirements.

OAR 660-12-0045(6)
In developing a bicycle and pedestrian circulation plan as required by 660-012-0020(2)(d), local governments shall identify improvements to facilitate bicycle and pedestrian trips to meet local travel needs in developed areas. Appropriate improvements should provide for more direct, convenient and safer bicycle or pedestrian travel within and between residential areas and neighborhood activity centers (i.e., schools, shopping, transit stops). Specific measures include, for example, constructing walkways between cul-de-sacs and adjacent roads, providing walkways between buildings, and providing direct access between adjacent uses.

Requirement: Local governments must establish identify improvements to facilitate bicycle and pedestrian trips in developed areas and codify development requirements to provide pedestrian access within and between developments and uses.

Compliance Discussion: The City of Sandy's TSP update includes a recommended bicycle network that builds upon the system of bike lanes and shoulder bikeways already in place and a Pedestrian Plan that "focuses on pedestrian infrastructure improvements for improving walking attractiveness and the viability of walking as a mode of travel in Sandy." ([redacted] The Development Code includes development standards that require connectivity for non-motorized modes of transportation. As explored elsewhere in this memorandum, and summarized below, requirements related to bicycle and pedestrian circulation include:

- All new construction within a Commercial or Industrial Zoning District or a non-residential use in a Residential Zoning District requires a Design Review Permit; Type II and Type III Design Review applications require the submittal of a Site Plan that shows the location and dimensions of entrances and exits to the site for pedestrian and bicycle access, as well as pedestrian and bicycle circulation areas, including "sidewalks, internal pathways, pathway connections to adjacent properties, and any bicycle lanes or trails (17.90.100)."
- Downtown and Village Commercial (C-1 and C-3) Design Standards that require and specify the design of pedestrian crossings within parking areas, pedestrian connections to adjacent properties, and building orientation and entrances (17.90.110).
- Subdivision standards generally limit block length for both residential and commercial to 400 feet; any block in a residential or commercial district that exceeds 600 feet in length must have an improved pedestrian and bicycle access way (17.100.120).

Recommendation: No code amendments necessary to meet TPR requirements.

OAR 660-12-0045(7)
Local governments shall establish standards for local streets and accessways that minimize pavement width and total right-of-way consistent with the operational needs of the facility. The intent of this requirement is that local governments consider and reduce excessive standards for local streets and accessways in order to reduce the cost of construction, provide for more efficient use of urban land, provide for emergency vehicle access while discouraging inappropriate traffic volumes and speeds, and which accommodate convenient pedestrian and bicycle circulation. Not withstanding subsection (1) or (3) of this section, local street standards adopted to meet this requirement need not be adopted as land use regulations.

Requirement: Local governments must establish standards for local streets and accessways that minimize pavement width and total ROW consistent with the operational needs of the facility.

Compliance Discussion: The Development Code meets this requirement by providing a narrow local street option (28 foot pavement; 50 foot right-of-way) in Section 17.100.110.

Recommendation: No code amendments necessary to meet TPR requirements.

Public Involvement Documentation

Joint Technical Advisory Committee and Citizens Advisory Committee

- Meeting Number 1 Agenda
- Meeting Number 1 Minutes
- Meeting Number 2 Agenda
- Meeting Number 2 Minutes

Community Workshops

- Community Workshop Number 1 Agenda
- Community Workshop Number 1 Minutes
- Community Workshop Number 2 Agenda
- Community Workshop Number 2 Minutes

Sandy TSP Update
Joint Citizen and Technical Advisory Committee Meeting #1

Date: December 11, 2008
Meeting Time: 6:00 pm – 9:00 pm
Meeting Location: Sandy City Hall, Council Chambers

Topics

A	CAC Introductions/Sign In	6:00
B	Transportation Planning 101 – John Bosket, DKS Associates - Transportation planning overview - Potential applications to project	6:10
I	CAC/TAC Introductions/Sign In	7:00
II	Committee Roles & Responsibilities – Liz French, City of Sandy	7:10
III	Project Objectives & Schedule – Liz French, City of Sandy	7:15
IV	Review of Plans, Goals & Policies	7:20
V	Existing Transportation System Conditions – John Bosket	7:30
VI	Future Transportation System Conditions – John Bosket	8:00
VII	Measures of Effectiveness – John Bosket & Liz French	8:30
VIII	Public Comments	8:45
IX	Next Steps & Adjourn	8:55

Sandy TSP Update
Joint Citizen and Technical Advisory Committee Meeting #1

Date: December 11, 2008
Time: 6:00 pm – 9:00 pm
Location: Sandy City Hall, Council Chambers

Attending: **CAC:** Robert Watts, Don Allen (City Council, Transit Advisory Committee), Hollis Wenzel (Sandy Chamber), Lois Coleman (City Council), Jeremy Pietzold (City Council), Don Carlton (Planning Commission), Ron Lesowski (Planning Commission, Tollgate Inn).

TAC: Tim Belanger (Oregon Trail School District), Avi Tayar (ODOT Region 1), Christine Heycke (CPH Planning), Dan Bacon (ODOT District 2C). **Absent:** Harold Skelton (Sandy Police Department), Gary McQueen (Sandy Fire Department)

PMT: Liz French (Project Manager), Mike Walker (Public Works Director), Tracy Brown (Planning Director), John Bosket (Project Consultant), Michael Tomasini (DKS Associates), Sonya Kazen (ODOT Region 1 Planning), Julie Stephens (Sandy Transit)

Transportation Planning 101 (6:00 – 7:00 pm)

A. CAC Introductions/Sign-in – Liz French, City of Sandy
Liz welcomed the group to the Sandy Transportation System Plan Update meeting and thanked them for taking time out of their day during the busy holiday season. Liz initiated introductions, and provided an overview of the Sandy Transportation System Plan Update.

B. Transportation Planning 101 – John Bosket, DKS Associates
John used a PowerPoint presentation to provide an orientation to the principles of transportation planning as a refresher for those who do not do transportation planning on a daily basis.

The presentation began with a discussion of why we are updating our Transportation System Plan (TSP):

- Required by the Transportation Planning Rule (TPR) for cities with population greater than 10,000.
    - Although this does not apply to Sandy, most cities have adopted a Transportation System Plan for the reasons outlined below
- The TSP becomes the transportation element of the Comprehensive Plan
- Provides a long range view of needs and opportunities
- Ensures transportation systems are adequate
- Ensures the cost effective use of limited construction and maintenance funds
- Demonstrates project need & readiness (i.e. to apply for grants)

Items that the TSP must accomplish are:

- be consistent with state and regional TSPs
- provide an efficient network of streets, sidewalks, paths, bike lanes, etc.
- provide standards for streets, sidewalks, paths, bike lanes, etc.
- protect corridors and facilities for intended uses
- provide public transportation alternatives (this will be addressed in the concurrent Transit Master Plan)
- provide a network of bicycle and pedestrian amenities
- develop a list of projects that are reasonably likely to be funded
- develop implementing codes and ordinances

Items that the TSP should accomplish are:

- make decisions that are consistent with the community vision and expectations for the future
- support a variety of travel choices
- serve all the people in the community
- provide options for safe and secure travel
- support the local and state economy
- protect natural resources and the built economy

Through the project we will be developing goals and objectives, which will be used to develop evaluation criteria and then to select alternatives.

The steps to develop a TSP are:

1) Review state, regional & local regulations, policies & plans
2) Inventory of existing transportation conditions
3) Evaluate current deficiencies in the transportation system
4) Forecast growth (to year 2029)
5) Evaluate deficiencies in the future year transportation system
6) Forecast reasonable funds that will be available for transportation projects
7) Identify alternatives and match to available funding
8) Develop ordinances to support TSP
9) Adopt TSP
    a. Liz noted that the City will go through the adoption proceedings without DKS Associates

General Transportation Planning Principles:

Pedestrians

- Pedestrians use sidewalks and trails
- Prefer to avoid out of direction travel (generally willing to walk ¼ to ½ mile to get somewhere)
- Buffers should be provided in high speed corridors
- Direct access to businesses from street will encourage pedestrian traffic
- Facilities need to meet accessibility standards
- Access should be provided to transit, parks, schools, shopping

Bikes:

- Use bike lanes (~5-6 ft wide), shoulder bikeways (~6 ft wide) or shared roadways (roads with speeds <25 mph and <3,000 vehicles per day).
- Bike parking should be provided at destinations
- Well-defined, clean routes are necessary

Transit:

- Stops should be within ¼ mile of pedestrian origin or ½ mile of bicycle origin
- Need to provide walking and bike routes to stops

Functional Classification
A functional classification system is a method for categorizing roadways by the nature of service that they are intended to provide (mobility vs. access). Classifications in the current Sandy TSP are:
- Major arterial (high volume street meant to move traffic)
- Minor arterial (high volume street with limited access)
- Collector (function is to connect arterials to local streets)
- Local Streets (primary function is access to homes)

ODOT and Clackamas County also have classification systems.

There are two types of mobility standards. City uses Level of Service (LOS), which measures the delay (seconds) at intersections, and "grades" it from A, B, and C (free movement), D and E (longer delays), and F (very long delays). LOS E and F are considered failing. Oregon Department of Transportation (ODOT) uses a volume to capacity ratio (v/c ratio), which measures the actual volume using an intersection and compares it to the maximum volume that could be served. A v/c ratio greater than 1.0 indicates there is more demand for the intersection than it can adequate serve.

Safety investigates include crash history and sight distance analysis.

There are numerous strategies for mitigating congestion and other traffic problems. Transportation System Management looks at ways to improve the system:

- signal timing
- access management
- traffic calming
- increasing connectivity
- appropriate assignment of functional classification

Transportation Demand Management looks at ways to change the way the system is used:

- employee shift management (for example, having the large employers use a non-standard shift switch to reduce traffic during peak travel times)
- encouraging telecommuting
- transit
- walking and biking programs

- carpooling

John concluded the review of Transportation Planning at 6:40, opened the floor to questions, and allowed a 20 minute break until the beginning of the technical part of the meeting.

I. Introductions/Sign In – Liz French, City of Sandy
Liz welcomed the group to the Sandy Transportation System Plan Update meeting and thanked them for taking time out of their day during the busy holiday season. Liz initiated introductions, and provided an overview of the Sandy Transportation System Plan Update.

II. Committee Roles and Responsibilities – Liz French, City of Sandy
Liz discussed the roles and responsibilities of the committees, which includes reviewing materials and providing recommendations to the Project Management Team (PMT – City Staff, DKS Associates, Christine Heyke from CPH Planning, and Sonya Kazen from ODOT). All comments, questions and recommendations will be fully listened to and considered, but not all will be incorporated into the plans. The PMT will provide the final review of all documents for the TSP Update. The final proposed TSP will be reviewed and adopted by the Planning Commission and City Council.

III. Project Objectives & Schedule – Liz French, City of Sandy
Liz stated that the purpose of this project is to update the existing Transportation System Plan, adopted in 1997, to reflect current conditions and needs. Many of the projects in the TSP have already been constructed, and others are infeasible or not likely to be built in the next 10 years. The City has also taken over transit operations from Tri-Met and operates fixed route and demand service, has annexed in several large areas in the City, and has updated development standards.

John Bosket provided copies of the schedule for all attendees, and Liz discussed the tight timeline, pointing out approximate dates for future meetings and milestones for the project. At this point, Liz turned the meeting over to John.

IV. Review of Plans, Goals & Policies – John Bosket, DKS Associates
John began with a quick review of the relevant local, regional and state policies that the TSP is required to adhere to. Mike Walker stated that on page 3, the completed project should be removed from the list. Additionally, costs are based on 1994 dollars, not 2008 dollars.

On Page 24, Mike Walker clarified that the fleet replacement project listed under the 2008-2011 STIP from ODOT is for transit fleet replacement, and will not impact the Sandy transportation system.

V. Existing Transportation System Conditions - John Bosket, DKS Associates
John discussed the existing conditions of the Sandy transportation system and the methodology used to obtain the data. He noted that the existing conditions of the transit

system are being evaluated in a separate project, and will be incorporated into the final TSP.

Sonya Kazen noted that a map of the environmental resources and setbacks would be useful.

Pedestrian conditions:
Locations with sidewalk obstructions, crosswalks that don't meet ADA standards, intersections without crosswalks, and areas without sidewalks were recorded. It was noted that one of the goals should be to facilitate crossings, especially near transit stops, and to improve connectivity throughout the City. The City's development code currently requires 400 foot block spacing.

Don Allen mentioned that there is not a crosswalk at the new transit shelter on the east side of Industrial Way. Lois Coleman wondered why pedestrian counts were not done at the McCormick/Langensand intersection, since this is one of the main transit stops, and everyone walks to this stop.

John cautioned that having only a few pedestrians recorded at a location during a survey is just as significant as many vehicles recorded at the same intersection.

It was also noted that the City has received a grant from the ODOT Bike/Ped division for a pedestrian refuge (short, landscaped median with a gap in the middle to provide pedestrians some safety while trying to cross Hwy 26 at University Ave).

Other gaps in the sidewalk network that were mentioned are along the north side of Hwy 26 from the Sandy Vista Apartments to downtown Sandy, the south side of Hwy 26 between University Ave and Ruben Ln, and along Vista Loop. Lois Coleman mentioned that since Vista Loop currently gets a low amount of traffic, pedestrians walk in the middle of the road.

Bicycle Conditions:
John mentioned that bike facilities vary depending on roadway classification, and include shared roadways on local streets, bike lanes, bike shoulders, and separate bike paths. Gaps in the bicycle facilities were noted. Scott Lazenby mentioned that the vertical grade differences in Sandy can make a big difference, and are present on most North-South streets. Some bicyclists may prefer a slightly longer route that avoids the steeper hills. It was suggested to include a topographic map with the proposed alternatives.

Don Allen noted that the Sandy River Airport has an approach over the City, restricting building heights in some areas. Mike Walker asked Dan Bacon if bridge weight/size restrictions on I-84 were still in effect, and if this had skewed the freight numbers for the survey. Dan Bacon stated that very few trucks were diverted through Sandy, and would not make a difference in the survey. John Bosket mentioned that one reason for including the pavement condition information in the report is to maximize funds spent by focusing reconstruction efforts on streets already in poor condition.

VI. Future Transportation System Conditions – John Bosket
John discussed the methods used to forecast future housing and employment in the City and associated growth in transportation. Scott Lazenby wondered whether the fact that we were required to use "Safe Harbor" population growth estimates, which are lower than our historical growth rates, will be a problem for forecasting future transportation demands. How will this affect the Capital Improvement Plan (CIP)? Tracy Brown stated that since the TSP is only looking at arterial and collector streets, the lower projections shouldn't be a problem. Additionally, the only change would be to move up the timeline in the TSP and cause projects to be necessary sooner than expected. Sonya wondered if we should be using the location of vacant land to prioritize project locations.

Jeremy Pietzold wondered why we did not show the location of future streets from the current TSP. He stated that having a map of those would be helpful. John Bosket replied that we will re-evaluate all of the projects from the previous TSP and see if others are needed to meet the future demands. However, the City decided to examine future conditions based on the transportation system as it exists today since it is not possible to predict when projects might be built.

Jeremy reminded us that changes to how the Bluff Rd/Hwy 26 intersection function will occur when the new school opens off of Bell Street, and the northern leg of 362nd and connection to Bell St are constructed. CAC members stated that Dubarko Rd users are primarily locals trying to avoid getting onto Hwy 26.

VII. Measures of Effectiveness – John Bosket & Liz French
Due to time constraints, this item was not discussed in detail. Examples of potential goals and visions for the TSP are located on pages 2 and 3 of Tech Memo #1, taken from the current TSP. Liz assigned the committee members the task of reviewing these goals and visions, determining if any need to be changed or eliminated, and developing new ones.

VIII. Public Comments
No members of the public were present at the meeting.

IX. Next Steps & Adjourn
At 9 PM, Liz closed the meeting and thanked everyone again for their time. She requested that any comments or questions be submitted in 1 week (Thursday, December 18 amended to Monday, December 29th) and that the committee members review the goals from the current TSP and determine changes that need to be made.

Liz reminded the committee members that there will be a Community Workshop in January (date and location to be announced) to review the same material and get feedback on the goals and visions for the TSP.

After the meeting, Ron Lesowski expressed concern whether the survey of through traffic on Hwy 26 accurately captured the number of people not stopping in Sandy. John explained the methodology, and expressed confidence in the numbers.

Sandy TSP Update
Joint Citizen and Technical Advisory Committee Meeting #2

Date: June 24, 2009
Meeting Time: 6:30 pm – 8:30 pm
Meeting Location: Sandy City Hall, Council Chambers

Topics

I	Introductions/Sign In – Liz French, City of Sandy	6:30
II	Project Status, Next Steps – John Bosket, DKS Associates	6:40
III	Highlights of Technical Memo #3 – John Bosket	6:55
IV	Proposed Projects – John Bosket	7:15
V	Other Comments/Questions (if time)	7:45
VI	Public Comments	8:15
VII	Next Steps & Adjourn	8:30

Sandy TSP Update
Joint Citizen and Technical Advisory Committee Meeting #2

Date: June 24, 2009
Time: 6:30-8:45pm
Location: Sandy City Hall, Council Chambers

Attending: **CAC:** Robert Watts, Don Allen (City Council, Transit Advisory Committee), Hollis Wenzel (Sandy Chamber), Jeremy Pietzold (City Council), Ron Lesowski (Planning Commission, Tollgate Inn)

TAC: Avi Tayar (ODOT Region 1), Dan Bacon (ODOT District 2C)

PMT: Liz French (Project Manager), Mike Walker (Public Works Director), Tracy Brown (Planning Director), John Bosket (Project Consultant), Michael Tomasini (DKS Associates), Sonya Kazen (ODOT Region 1 Planning), Julie Stephens (Sandy Transit)

I. Introductions/Sign In – Liz French, City of Sandy
Liz welcomed the group to the Sandy Transportation System Plan Update meeting and thanked them for taking time out of their day during the busy holiday season. Liz initiated introductions, and provided an overview of the Sandy Transportation System Plan Update.

II. Project Status & Next Steps – John Bosket, DKS Associates
John Bosket provided copies of the schedule for all attendees and discussed where we currently are in the project and steps still required before the final project. John mentioned the Community Workshop that will occur the following day (Thursday, June 25th), and then third Joint TAC/CAC meeting prior to the final presentation to the Joint Planning Commission/City Council. The next step is preparing the Implementation Element, and then all the individual elements will be combined to create the draft TSP.

John stated that the purpose of tonight's meeting is to review the proposed projects and determine priorities. Additionally, he mentioned that not much new is being added to the TSP Update. Most items are either from the current TSP or current Development Code; in general, the only new items are code-based, and are required to meet the new Transportation Planning Rule (TPR).

III. Highlights of Technical Memorandum #3 – John Bosket & Michael Tomasini, DKS Associates
John provided a review of the main topics of Technical Memorandum #3 – Alternatives Analysis:
- Transportation System Management (TSM) is a way to get more out of the existing facilities. Some of the elements include Access Management, Neighborhood Traffic Management, Adaptive Signal Systems, Local Street connectivity, Functional Classification, and Typical Roadway Sections. In terms of Access Management, the only

area where there is any change from the current TSP and existing code is the proposal to increase spacing on Minor Arterials to 300 feet between private drives and public streets. The City has an existing Neighborhood Traffic Management Program which helps manage traffic concerns (volume and speed) on local streets, and provides a method for citizens to fairly get assistance in managing perceived problems. Information in the TSP was taken from the City's program.

Adaptive Signal Systems are proposed as a method to better manage traffic on US 26. Our current signal system uses time of day plans, which change signal length based on average conditions during different times of day. While these work adequately in some areas, in areas where traffic volumes fluctuate significantly between different days and based on different conditions (such as Sandy), time of day plans may not adequately respond to conditions. Adaptive signal timing continuously measures congestion levels on every traffic lane at every intersection to adjust signal timing to minimize delay for all users while maintaining the progression of vehicles on the major route. While this system would not change capacity at peak hour, it would provide for better circulation during the rest of the time. An example is located on Burnside between Eastman & Powell.

The principles of local street connectivity are already reflected in City code, and most of the information regarding functional classification comes from either the existing TSP or current City code. Typical roadway sections were also taken from City code and the existing TSP for city streets, and from the draft Sandy Gateway Plan for US 26 (note that this was the only thing taken from the Gateway Plan – all else from the Gateway Plan is deferred until that plan is brought for adoption). The section for OR 211 from Bornstedt to Dubarko Rd was taken from the adopted Bornstedt Village Plan, and a cross-section for OR 211 from Dubarko Rd to US 26 was presented. John noted that existing streets do not need to change to meet the standards unless there is development on the street that requires street improvements.

- Transportation Demand Management (TDM) is term used to describe aeny action that removes signle occupant vehicle trips from the roadway network. This includes a variety of policies including telecommuting, compressed work week, subsidized transit and a large number of other programs. Mike Walker noted that the DEQ administrative rule cited in the memo does not apply to Sandy, nor do we have many companies large enough to meet the threshold under the DEQ program.

- Freight Mobility: US 26 is a designated freight route, and as such, freight mobility must be considered with any changes proposed on the highway. Management of congestion on US 26 will improve freight movement through the City. "Truck friendly" improvements to City streets are proposed on streets in the Industrial area.

- John briefly mentioned Goal 5 resources, the draft cost estimates and the revenue forecast.

IV. Proposed Projects – John Bosket and Michael Tomasini, DKS Associates
Michael discussed the proposed pedestrian and bicycle projects, and touched on some of the potential priority areas. For pedestrian improvements, the proposed projects include:
- Sidewalk infill along Bluff Rd –for school access and access to the Sandy Bluff neighborhood.
- Pedestrian bridge over OR 211 at Sandy Heights – this would work well with the existing grades, and allow for easy pedestrian access to Meinig Park.
- Sidewalks along OR 211 from Bornstedt Village to US 26 – currently no sidewalks
- Sidewalks along US 26 east of downtown

For bicycle improvements, the proposed projects consist of bike lanes, which are useful to get people out of travel lanes, and include bike lanes on US 26 east of Sandy and infill on sections of Dubarko. Michael noted that one problem with adding bike lanes to Dubarko is that in order to accomplish that without widening the paved area, on-street parking would need to be removed.

Hollis wondered what provisions we are making for connection to the Springwater trail. While the actual Springwater extension will be completely located outside of the City, within the City we have a good network of multi-use trails that will be able to connect with the Springwater.

Don Allen asked how we would be able to get ODOT to approve the pedestrian bridge over OR 211. John Bosket answered that since it won't touch the road, as long as we can get the necessary height, ODOT shouldn't have any problems with it. Dan Bacon followed up by saying that the required height is 17 feet. The current grade difference is approximately 15 feet. He noted that one problem that has been seen in Portland with other pedestrian bridges is that they are used by the criminal element to avoid capture. For example, a robbery takes place on one side, and the police show up to that side. Unfortunately, the robber has taken off on foot to the other side, while the police need to drive around. Mike Walker noted that we have approximately 20 feet of right of way on the east side of OR 211 that could be used for the pedestrian bridge.

Ron Lesowski stated that he would like to hear our (i.e. City staff) priorities for the projects. Liz stated that she hasn't yet reviewed them. Mike stated that in general for pedestrian projects our priorities are to provide sidewalks where there is not contiguous sidewalk on either side of the street. Otherwise, we generally try to maintain near-term list and long term sets of projects, although these can change if the opportunity arises. However, we don't want to get locked into a ranked list, as many of our projects are done when funding and the opportunity arises.

Julie Stephens stated that she will review the pedestrian improvements with an eye towards providing access to transit facilities.

Michael then reviewed the proposed motor vehicle improvements. He noted that the City intersections that fail to meet standards will be 362nd Avenue at Dubarko Road and

Industrial Way at 362nd Avenue. On the state system, nearly all of the intersections on US 26 and OR 211 will fail to meet standards by the year 2029.

To mitigate some of the problems at the intersections, improvements are proposed at nearly all of the intersections:

- 362nd at Dubarko: construct a roundabout (see Stafford Rd near I-205 for an example)
- Industrial Way West at 362nd Ave: add an eastbound left turn lane and remove the stop signs on 362nd Ave.
  Julie Stephens expressed concern about bus and truck traffic being accommodated through the roundabout. John assured her that the roundabouts are different from the traffic circle on Dubarko Rd, and are designed to accommodate buses and trucks.
- 362/US 26: add a second northbound left turn lane. Mike Walker remarked that the extra required Right of Way was dedicated as part of the Fred Meyer project.
- Industrial Way/US 26: Construct a northbound left turn lane and change the southbound approach to dual left turn lanes and a share through/right turn lane. This would enable getting rid of the split green signals, allowing for longer green on US 26.
  The question was asked whether the northern extension shown would go through the shopping center. The answer is that yes, but not until the site redevelops. This is as prime example of an opportunity-driven project.
- Ruben Lane/US 26: change southbound approach to dual left turn lanes and a shared right/through lane and change northbound approach to left turn lane with a shared through/right lane. The north approach may require further modification to align north and south approach lanes.
- OR 211/Proctor: construct a left turn lane. Ron Lesowski noted that this would need to have staggered stop bars to accommodate vehicles turning left from Proctor onto OR 211.
- Ten Eyck-Wolf Dr/US 26: construct north and south bound left turn lanes
- OR 211/Dubarko Rd: The right of way and topography eliminate the ability to put a roundabout in this location. Instead, the following lanes are recommended along with a traffic signal when signal warrants are met: northbound left and right turn lanes & southbound left turn lane.
- Bornstedt Rd/OR 211: It was noted that the No-Build condition does not show this intersection failing. However, when the new proposed roads are shown, more traffic is diverted to OR 211, which then causes the intersection to fail. The initial plan showed left turns out of Bornstedt being prohibited. Other options, such as a roundabout, are being looked at instead.
  Julie Stephens asked whether the Bornstedt Village Plan showed a signal on OR 211. The answer is yes, at Village Blvd.
  Jeremy asked why the Bluff Rd extension south to OR 211 from the original TSP wasn't shown. The answer is that there are too many topographic and Goal 5 resource issues to construct the road in this location.

- OR 211/Arletha: realign to create a regular 4-way intersection once Gunderson is constructed. In the short term, a vegetation easement should be acquired to allow for adequate sight distance.

  Jeremy asked about the proposed Vista Loop realignments as discussed in the Gateway Plan and during the Timber Valley subdivision hearings. John stated that the traffic volumes are too low at these intersections to warrant major improvements. Sonya stated that the realignment should be included in the TSP, as it will be required by ODOT for future development for safety issues.

After reviewing the proposed intersection improvements and the 11 roadway improvements, the three alternatives were discussed. Alternative 1 only includes the intersection improvements and 11 roadway improvements. This provides some benefit to the highway, as well as improving local connectivity. Alternative 2 includes everything in Alternative 1 as well as widening US 26 to 7 lanes outside of the downtown couplet. This would likely involve a median barrier the length of the City, and would also create a bigger bottleneck at the couplet. Alternative 3 includes everything in Alternative 1 and a bypass south of the City from somewhere west of Orient Dr all the way to Shorty's corner with 1 interchange for OR 211.

It was mentioned that a discussion of the recommended roadway improvements needs to be included in the report.

Don Allen asked about the purpose of the proposed Meadow Ave extension since it doesn't take much traffic off the highway, and appears to be too close to the Vista Loop West intersection. John Bosket stated that the purpose is for local connectivity and access to future developed land. John also said that the two Vista Loop intersections are plenty far apart. Mike Walker said that this project should be called "unnamed" instead of Meadow Ave.

It was noted that several of the projects are primarily located outside of the UGB, such as Gunderson and "Meadow Ave". It was noted that we probably would not be able to fund these projects with SDC's and that they could not be part of our CIP. Some more research needs to be done on this to figure out the technicalities. Sandy is unusual in that we have an agreement with the County allowing us to plan for city growth in our Urban Reserve. Mike Walker also stated that it is unlikely that we would fund a street that primarily benefits US 26.

Sonya asked whether signal warrants would be met at some intersections where they aren't met in the built-out scenario if only some of the projects were built. John said that it is possible, but it is not something that we can plan for at this stage due to the complication of determining which projects will actually be built, when.

Hollis stated that people tend to have strong reactions, either positive or negative, about the idea of the bypass. The initial Main Street studies have shown that locals don't use the downtown businesses partly because of the congestion. If we would get rid of that, it

would have a benefit for our businesses. She wondered whether the idea of a bypass is even feasible, and if so, why is it so far out. John stated that we have only done the 2nd step in a long, complicated process. The current TSP includes the conceptual idea of a bypass. The analysis for the update shows that a bypass would improve conditions on US 26 and in the City. There are still a lot of land use, environmental, and funding issues to tackle, but it's not impossible, as the recent funds dedicated to the Newberg bypass show. The bypass would end up being the freight route, and it's likely that US 26 would be dedicated back to the City once the bypass was operational.

VI. Public Comments
No members of the public were present at the meeting.

VII. Next Steps & Adjourn
At 8:45 PM, Liz closed the meeting and thanked everyone again for their time. She requested that any comments or questions be submitted in 1 week (Wednesday, July 1st) and that the committee members review the proposed projects and submit their project priorities along with projects they feel should or should not be included.

Liz reminded the committee members that there will be a Community Workshop the following day (Thursday, June 25th) to review the same material and get feedback on the priorities for projects.

Sandy Transportation System Plan Update Community Workshop #1

Date:	Thursday January 29, 2009
Time:	6:00 pm to 8:00 pm
Location:	City Operations Center
Address:	16610 Champion Way

What Is It All About? The City of Sandy is holding two community workshops to gather public input on findings and recommendations coming out of its Transportation System Plan (TSP) update project. The TSP is the transportation element of the City's Comprehensive Plan that establishes a system of facilities and services to meet local transportation needs. With the current Sandy TSP being over ten years old (1997), this update will use the most recent growth projections to addresses current transportation system needs and plans for facilities that will be required to serve growth over the next 20 years. All modes of transportation (including pedestrian, bicycle, transit, and motor vehicle) are included in the plan, with the transit element being addressed through a separate, but coordinated, Transit Master Planning effort.

What has changed since the adoption of the 1997 TSP?
Many of the projects shown in the 1997 TSP have already been constructed, and others have been determined to be infeasible due to existing and surrounding land uses and topographic and environmental constraints. Since the preparation of the 1997 TSP, the City has added approximately 73 acres into the Urban Growth Boundary and prepared the Bornstedt Village Specific Area Plan to address conceptual roadway locations and cross-sections for the added area. Additionally, the City has adopted new local street standards including "green street" options.

Furthermore, since the current TSP was completed, new projections for housing and employment in the area have been made and there have been recent updates to the Transportation Planning Rule (OAR 660-12), which include additional planning and code implementation requirements for the City. This growth has changed the baseline (i.e., existing and projected future deficiencies) that is used for planning the transportation system.

How can citizens help? Your input and participation plays a key role in shaping the future of the Sandy transportation system. Following a brief presentation, you will have the opportunity to circulate about the room to view maps displaying the existing transportation facilities in the city; highlighting the deficiencies found for all modes of travel including walking, biking, transit (see the Transit Master Plan materials), and motor vehicles. You will have an opportunity to provide your opinions and suggestions on any of the issues raised and are encouraged to add any others that you feel aren't being addressed.

City and consultant staff will be stationed around the room and will be available for answering questions about the TSP update. Your comments will be taken directly and written on posters around the room. Alternatively, comment forms are attached that provide space for input on each transportation mode. Your input is very important to us and will help us form a plan that represents the interests of the community as a whole.

What will be the outcome of the TSP Update? The recommendations collected at the community workshops will be combined with input from the Citizen Advisory Committee and the Technical Advisory Committee to finalize an updated TSP for Sandy. This TSP will go through a public adoption process with City Council sometime next winter. When adopted, the TSP will include action plans for implementing improvement projects, recommendations for funding improvements, and goal/policy changes that will be used to update City of Sandy codes and standards.

Comments

Pedestrian Facilities

Bicycle Facilities

Transit Facilities
(Please provide these comments directly to the Transit Master Plan team.)

Local Street Connectivity

Proposed Functional Classification

Needed Roadway Improvements Projects

Truck Routes or other Modes of Travel

General Comments

Goals and Objectives for the Sandy TSP Update

Establishing a clear vision and a set of guiding objectives for transportation needs that reflect the interests of the community plays a critical role in the TSP Update process - helping us to develop the right projects and prioritize them for funding in a way that gets the most important projects completed first.

Please take a moment to provide some comments and let us know what issues are most important to you and what would make the TSP Update successful.

Please give us your name and address (both mailing and email, if available) so we can include you on future mailings.

Name:

Mailing Address:

Email Address:

If you choose to fill out this form at a later time, please return to:

Liz French
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055
lfrench@cityofsandy.com

SUMMARY

Sandy TSP Update
Community Workshop #1

Meeting Date: Thursday, January 29, 2008
Meeting Time: 6:00 pm – 8:00 pm
Meeting Location: Sandy Public Works and Transit Operations Center
Project Team: Tracy Brown - Sandy Planning Director, Liz French - Sandy Project Manager, Julie Stephens – Sandy Transit Manager, Mike Walker - Sandy Public Works Director, Sonya Kazen – ODOT Region 1 Planner, Avi Tayar – ODOT Region 1 Traffic Analyst, John Bosket – DKS Associates, Christine Heycke – CPH Planning

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Sixteen people attended the First Community Workshop for the Sandy Transportation System Plan Update and the Transit Master Plan in addition to the Project Team members listed above. Citizens in attendance included local business and property owners, Planning Commissioners, members of the Sandy Chamber of Commerce, an Oregon Trail School District representative, and other citizens. A representative from Clackamas County Social Services and the Wheels manager were in attendance primarily for the Transit Master Plan.

The workshop began with a brief introduction by Liz French, City of Sandy Project Manager, describing the project goals, process, and introducing John Bosket with DKS Associates. Julie Stephens, Sandy Transit Manager, provided an introduction to the Transit Master Plan project.

John Bosket began by reviewing the project schedule, including where we are in the process, and when other opportunities for public input will occur. The time frames for the Joint Citizen and Technical Advisory Committee meetings were mentioned, as well as the 2nd Community Meeting and the Joint Planning Commission and City Council workshop. Liz interjected that after the project is completed, the TSP will still need to go through a full public process before the Planning Commission and City Council for adoption.

John discussed that the purpose of this Community Workshop was to review the existing and future conditions, examine where deficiencies are present in the system, and begin the process of proposing solutions. John provided a handout with a summary of deficiencies from the technical memos, and the following posters:

- Existing Roadway Functional Classifications
- Existing Bicycle Facilities
- Existing Pedestrian Facilities
- System Deficiencies (2008-2029)
- Streets Proposed in Current (1997) TSP

John also mentioned that we will be using a set of "goals and objectives" to rank the projects and that we are requesting input into the list. The goals and objectives from the current TSP were posted for comment. Beyond using the goals and objectives, John stated that the projects selected for the final TSP must be financially constrained – that is,

selected based on their likelihood of being constructed. While we will likely have a long list of potential projects, the financially constrained list will be much shorter.

Christine Heycke introduced the Transit Master Plan (TMP) and the schedule for that project. She discussed that although the TMP is a separate project from the TSP, it will be incorporated into the TSP as the Transit Section.

After the introduction from Christine, the floor was opened for review of the posters, comments and discussion.

Comments received at the workshop are summarized below; no surveys have been returned yet:

Pedestrian Network

- Need more pedestrian crosswalks on Proctor Blvd.
- Extend Tickle Creek Trail east to City Limits.
- Connect east end of town with a trail to Sandy River Park
- Connect Sandy River Park trails to Fish Hatchery
- Extend the Tickle Creek Trail to Springwater Corridor
- Get easements for Tickle Creek Trail over private property & reroute off sidewalk
- Narrow sidewalks currently on Bluff Rd. Need contiguous sidewalks on at least 1 side.
- Connect Sandy Bluff Park trails to 362nd Ave
- Negotiate with School District for a common corridor easement for bikes & dogs on leash on central road through nature trail & connect behind athletic club & BiMart shopping center.
- Need more trails throughout the City.
- Need a sidewalk on US 26 from Ruben to University
- Need better/protected pedestrian crossings downtown on US 26 (between Strauss & Shelley) and on Proctor near library – preference for signals with pedestrian push-buttons.
- People don't just need to get downtown on foot, but need to be able to walk to individual destinations within it as well (better crossing of US 26)

Natural Resources

- Protect existing parks & green space from arterials & collectors. Keep traffic on Bell, Jewelberry & 362nd, and consider Green Mountain or Agnes as alternate to extending Bell St.

Future Streets

- "With the passage of the high school bond, does the need for completion of Bell Street to the west become more pressing? I would think so."
- The future Meeker St/Ruben Ln alignment from the 1997 TSP does not appear practical or useful. The street appears to go through the Safeway shopping center and run along the High School trail.

SUMMARY

- Need to look at a public street between Orient & 362nd to relieve traffic pressure at 362nd Ave intersection.
- Look at a frontage road alignment for Industrial to Jarl Rd.
- Tunnel under the City as a US 26 bypass.

Traffic

- People drive too fast on Ruben Lane.

Other

- Move Expressway Designation on US 26 back to light at Orient/Jarl Rd since this section of highway doesn't meet conditions for a typical expressway.

Other discussions not documented included whether there was truly a need for a bypass, and if so, where should it be located. One comment that was received was that we should move forward with plans for a bypass and/or truck route to limit trucks from going through downtown.

Several people were surprised with the through-traffic counts and how low the numbers seemed; there was a general feeling that through traffic makes up a much larger amount of the traffic on US 26 than was shown in the vehicle counts. However, one business owner who had earlier expressed surprise at the low amount of through-traffic on US 26 spent some time watching cars on the highway and noticed that there were a large number of cars turning on and off the highway as compared to through-traffic.

Roundabouts were mentioned as an idea for intersections that currently fail to meet mobility standards to one business owner who liked the idea and stated that he is a fan of roundabouts in general.

<u>Transit</u>

The Transit Master Plan outreach included a dot exercise. Participants were each given four dots that they could use to identify their top priorities on a wall poster. Participants were able to write their own priorities or use ones already listed. The listed priorities were ones that had been identified by current bus riders and the general public in earlier surveys. The intent of the dot exercise was to refine the information collected in the surveys. For instance, the surveys indicated a demand for Sunday service, but not specific to one route.

The following priorities are listed in the order of most dots received:

- Service on Sundays – SAM Gresham – 7
- Add service to Government Camp – 5
- Later service weekdays on SAM-Gresham – 3
- Later service Saturdays on SAM Gresham – 3
- Earlier service on Saturdays on SAM Gresham – 2
- Transit to Ski Bowl & Timberline to reduce congestion and skier traffic – 2

There were also a number of priorities that received one dot, including:

SUMMARY

Later service on Saturdays on STAR, earlier service on Saturdays on STAR, Sunday service on STAR, Later weekday service on STAR, later service on Mtn. Express, more frequent service on SAM-Gresham, and additional bus stops.

Three written comments were received:

1. I would like to make a comment on fares. I would like to see an affordable and reasonable fare for the Sam busses. I would hope this would help offset the rising costs but in addition aid in keeping the current services to their existing standards. As a driver I believe it would cut down on Gresham passengers commuting only in Gresham for the free ride. Some schedules are very tight and stopping for people to go 10-15 blocks really adds on time. We also seem to end up transporting some of the more undesirable troublemakers. Feedback from passengers for me has gone both ways.
2. Comments: I like the Mountain Express. I X-country ski at Lolo Pass, so I go to ZigZag, then bike 4 miles on Lolo Pass Road. Suggestions: If you can get a route to Gov't Camp for the skiers, that would be awesome.
3. Cookies are good. Yum

Sandy Transportation System Plan Update Community Workshop #2

Date:	Thursday June 25, 2009
Time:	6:30 pm to 8:30 pm
Location:	City Operations Center
Address:	16610 Champion Way

What Is It All About? The City of Sandy is having its second community workshop to gather public input on findings and recommendations coming out of its Transportation System Plan (TSP) update project. The TSP is the transportation element of the City's Comprehensive Plan that establishes a system of facilities and services to meet local transportation needs. With the current Sandy TSP being over ten years old (1997), this update will use the most recent growth projections to addresses current transportation system needs and plans for facilities that will be required to serve growth over the next 20 years. All modes of transportation (including pedestrian, bicycle, transit, and motor vehicle) are included in the plan, with the transit element being addressed through a separate, but coordinated, Transit Master Planning effort.

What has changed since the adoption of the 1997 TSP?
Many of the projects shown in the 1997 TSP have already been constructed, and others have been determined to be infeasible due to existing and surrounding land uses and topographic and environmental constraints. Since the preparation of the 1997 TSP, the City has added approximately 73 acres into the Urban Growth Boundary and prepared the Bornstedt Village Specific Area Plan to address conceptual roadway locations and cross-sections for the added area. Additionally, the City has adopted new local street standards including "green street" options.

Furthermore, since the current TSP was completed, new projections for housing and employment in the area have been made and there have been recent updates to the Transportation Planning Rule (OAR 660-12), which include additional planning and code implementation requirements for the City. This growth has changed the baseline (i.e., existing and projected future deficiencies) that is used for planning the transportation system.

How can citizens help? Your input and participation plays a key role in shaping the future of the Sandy transportation system. Following a brief presentation, you will have the opportunity to circulate about the room to view maps displaying the proposed projects for all modes of travel including walking, biking, and motor vehicles. You will have an opportunity to provide your opinions and suggestions on any of the issues raised and are encouraged to add any others that you feel aren't being addressed.

City and consultant staff will be stationed around the room and will be available for answering questions about the TSP update. Your comments will be taken directly and written on posters around the room. Alternatively, comment forms are attached that provide space for input on each transportation mode. Your input is very important to us and will help us form a plan that represents the interests of the community as a whole.

What will be the outcome of the TSP Update? The recommendations collected at the community workshops will be combined with input from the Citizen Advisory Committee and the Technical Advisory Committee to finalize an updated TSP for Sandy. This TSP will go through a public adoption process with City Council sometime this winter. When adopted, the TSP will include action plans for implementing improvement projects, recommendations for funding improvements, and goal/policy changes that will be used to update City of Sandy codes and standards.

Comments

Pedestrian Facilities: *Please give us your feedback on the proposed pedestrian projects (Also, please list your top 5 preferred projects)*

1 ***4***

2 ***5***

3

Bicycle Facilities: *Please give us your feedback on the proposed bicycle projects (Also, please list your top 5 preferred projects)*

1 ***4***

2 ***5***

3

Needed Roadway Improvements Projects: *Please give us your feedback on the proposed roadway projects (Also, please list your top 5 preferred projects)*

1 ***4***

2 ***5***

3

How would you feel about widening US 26 to 3 lanes in each direction? (east and west of downtown only)

How would you feel about a bypass of US 26 around the south end of Sandy?

General Comments

Please give us your name and address (both mailing and email, if available) so we can include you on future mailings.

Name:

Mailing Address:

Email Addess:

If you choose to fill out this form at a later time, please return by July 2, 2009 to:

Liz French
City of Sandy
39250 Pioneer Blvd.
Sandy, OR 97055
lfrench@cityofsandy.com

Table 1: Recommended Pedestrian System Projects

Project	Segment	Description
City of Sandy Facility Pedestrian Improvements		
362nd Dr.	Chinook Dr. to Industrial Way	Infill sidewalk gaps
Bell St.	Jewelberry Rd. to Bluff Rd.	Infill sidewalk gaps
Bluff Rd.	Hood St. to Green Mountain St.	Infill sidewalk gaps
Bluff Rd.	Strawbridge Parkway to Nettie Connett Dr.	Infill sidewalk gaps
Bluff Rd.	Green Mountain Rd. to Northern UGB	Infill sidewalk gaps
Bornstedt Rd.	Cascade Village Dr to UGB	Infill sidewalk gaps
Dubarko Rd.	East of Melissa Rd. to East of OR 211	Infill sidewalk gaps
Dubarko Rd.	Langensand Rd. to Antler Ave.	Infill sidewalk gaps
Industrial Way	362nd Dr. to US 26	Infill sidewalk gaps
Jacoby Rd.	Dubarko Rd. to Cascade Village Dr.	Infill sidewalk gaps
Jewelberry Rd.	Penny Ave. to Kelso Rd.	Infill sidewalk gaps
Langensand Rd.	Dubarko Rd. to US 26	Infill sidewalk gaps
Meinig Ave.	Scenic St. to US 26	Infill sidewalk gaps
Pleasant Ave.	Beers Ave. to Revenue Ave.	Infill sidewalk gaps
Ruben Rd.	US 26 to Dubarko Rd.	Infill sidewalk gaps
Sandy Heights St.	Bluff Rd. to End	Infill sidewalk gaps
Downtown Core Pedestrian	Side streets perpendicular to US 26	Infill sidewalk gaps
University Ave.	Sunset St. to US 26	Construct sidewalk
New Accessway / Trail	Extension of Tickle Creek Trail to Dubarko Rd.	Accessway / Trail
New Accessway / Trail	Yocum Loop to Ruben Ln.	Accessway / Trail
New Accessway / Trail	Bell St. Fields to Kate Schmitz Ave.	Accessway / Trail
New Accessway / Trail	North of Kate Schmitz Ave. to Orient Dr	Accessway / Trail
New Accessway / Trail	Industrial Way to Eastern UGB	Accessway / Trail
New Accessway / Trail	Marcy to Middle School Fields	Accessway / Trail
New Accessway / Trail	Marcy to Sandy River	Accessway / Trail
New Accessway / Trail	OR 211 to Jacoby	Accessway / Trail
New Accessway / Trail	Meinig Memorial Park Demand Trails	Accessway / Trail
New Accessway / Trail	Meinig Memorial Park Demand Trail to SW Corner	Accessway / Trail
ODOT Facility Pedestrian Improvements		
OR 211	South UGB to US 26	Construct sidewalk
OR 211	Sandy Heights St. to Meinig Ave.	Pedestrian Overcrossing
US 26	Royal Lane to 362nd Dr.	Infill sidewalk gaps
US 26	362nd Dr. to East UGB	Infill sidewalk gaps
US 26	Reuben Ln. to University Ave.	Infill sidewalk gaps
US 26	Ten Eyck Rd. to Vista Loop Dr. West	Infill sidewalk gaps

Table 2 - Bicycle System Projects

Project	Segment	Description
City of Sandy Facility Bicycle Improvements		
362nd Dr.	Dubarko Rd to UGB	Widen shoulder to 6'
Bluff Rd.	US 26 to Miller Rd.	Re-stripe/widen Rd
Bornstedt Rd	OR 211 to UGB	Widen shoulder to 6'
Dubarko Rd.	362nd Dr. to Eldridge Dr.	Re-stripe/widen Rd
Dubarko Rd.	Sandy Heights St. to Melissa Ave.	Re-stripe/widen Rd
Langensand Rd.	US 26 to UGB	Widen shoulder to 6'
Meinig Ave	Scenic St. to US 26	Re-stripe/widen Rd
Meinig Ave	Barker Ct. to Dubarko Rd.	Re-stripe/widen Rd
Sandy Heights	Dubarko to Nettie Connett	Re-stripe/widen Rd
Sandy Heights	Bluff To Tupper	Re-stripe/widen Rd
Tupper Rd.	Dubarko Rd to OR 211	Re-stripe/widen Rd
ODOT Facility Bicycle Improvements		
OR 211	UGB to US 26	Widen shoulder to 6'
US 26	Ten Eyck Rd. to UGB	Widen shoulder to 6'
362nd Dr.	Dubarko Rd to UGB	Widen shoulder to 6'

Table 3 - Recommended New Roadway Projects

New Roadways
Local System Enhancements
Industrial Way extension to Jarl Rd./ US 26
Dubarko Rd. connection to Champion Way
Extend Bell St. to Orient Dr.
Extend 362nd Dr. to Kelso Rd.
Extend Kate Schmidt St. from US 26 to the proposed Bell St. extension
Extend Industrial Way north to Bell Street extension
Extend Olson Rd. from 362nd Dr. to Jewelberry Ave.
Extend Agnes St. to Jewelberry Ave.
Extend Dubarko Rd. to US 26 opposite Vista Loop Dr. (West)
Gunderson Rd., 370th Ave., Cascade Village Drive, Cascade Village Boulevard, New Collector
Meadow Ave. extension to US 26 opposite Vista Loop Dr. (East)
Additional Improvements to the US 26 Corridor
7-lane US 26: Orient Dr. to Bluff Rd. and Ten Eyck Rd. to Vista Loop Dr. East
US 26 Bypass (west of Orient Dr. to Shorty's Corner – south of the City)

Table 4 - Recommended Intersection Improvement Projects

Location	Improvement(s) Description
City of Sandy Intersection Improvements	
362nd Dr./ Industrial Way (West)	Construct an eastbound left turn lane with 50 feet of storage
362nd Dr./ Dubarko Rd.	Construct a single-lane roundabout
ODOT Intersection Improvements	
US 26/ 362nd Dr.	Construct a second westbound left turn lane
	Construct an acceptance lane for second westbound left turn lane to drop at southern access to Fred Meyer property
	Construct a northbound through lane
	Construct southbound through, right turn and left turn lanes
US 26/ Industrial Way	Change southbound approach to dual left turn lanes and a shared through/right lane
	Construct a northbound left turn lane
US 26/ Ruben Lane	Change southbound approach to dual left turn lanes and a shared through/right lane
	Change northbound approach to left turn lane, and shared through/right lane
OR 211/Proctor Boulevard (US 26)	Construct a northbound left turn lane (restriping only)
US 26/ Ten Eyck Rd. – Wolf Drive	Construct a northbound left turn lane
	Construct a southbound left turn lane
OR 211/ Dubarko Rd.	Construct a northbound right turn lane
	Construct a southbound left turn lane
	Construct a northbound left turn lane
	Construct a traffic signal
OR 211/ Bornstedt Rd.	Prohibit left turns out of Bornstedt Rd.
OR 211/ Arletha Court	Realign Arletha Court approach from the south

SUMMARY

Sandy TSP Update
Community Workshop #2

Meeting Date: Thursday, June 25, 2009
Meeting Time: 6:30 pm – 8:00 pm
Meeting Location: Sandy Public Works and Transit Operations Center
Project Team: Suzanne Hicks - Sandy Associate Planner, Liz French - Sandy Project Manager, Mike Walker - Sandy Public Works Director, John Bosket – DKS Associates, Michael Tomasini – DKS Associates.

Three people attended the Second Community Workshop for the Sandy Transportation System Plan Update in addition to the Project Team members listed above. Citizens in attendance included a local property owner, a land use lawyer, and a City Councilor.

The workshop began with a brief introduction by Liz French, City of Sandy Project Manager, describing the project goals, process, and introducing John Bosket with DKS Associates.

John Bosket began by reviewing the project schedule, including where we are in the process, and when other opportunities for public input will occur. The time frame for the last Joint Citizen and Technical Advisory Committee meeting and the Joint Planning Commission and City Council workshop was mentioned. Liz interjected that after the project is completed, the TSP will still need to go through a full public process before the Planning Commission and City Council for adoption.

John discussed that the purpose of this Community Workshop was to review the proposed projects and develop a list of priorities to help select the projects that will be on the financially constrained project list in the TSP (while we will have a long list of potential projects, we will have a much shorter "action plan" of projects that we reasonably expect can be built in the next 20 years. These projects will be programmed into the Capital Improvement Plan).

John and Michael presented the various projects under consideration in the Pedestrian, Bicycle, and Vehicle transportation system. Proposed Pedestrian and Bicycle projects are relatively straight-forward and generally include eliminating gaps in the City's current systems. Three alternative sets of projects were proposed for the Vehicular transportation system. In all three sets of projects, geometric improvements at failing intersections on US 26 and on the City transportation system would occur. Additionally, local collector and arterial connections (listed as projects 1-11) would occur. The first alternative only includes the geometric improvements and arterial and collector roadway connections. This alternative improved conditions on US 26 approximately 20% over the No-Build conditions, although most state intersections continue to fail to meet mobility standards.

Alternative 2 includes the above improvements with the addition of expanding US 26 to 7 lanes (3 in each direction with a median/turn lane). Conditions on state facilities improved approximately 26% over the No-Build condition; conditions on City facilities

were not significantly impacted by adding capacity to US 26, although some traffic was shown to return to US 26 and leave the local streets. No additional intersections on state facilities (beyond those in Alternative 1) met mobility standards.

The third alternative included all of the projects in Alternative 1, but added a bypass around the south side of Sandy from a point west of Orient Drive to approximately Shorty's Corner. In this scenario, conditions on US 26 improve greatly, and 5 intersections meet ODOT mobility standards. If, after construction of a bypass, US 26 were transferred to City jurisdiction, all intersections would meet City standards.

It was mentioned that the discussion of a bypass in the TSP Update is only the first step in a long, difficult process. The TSP shows the need for a bypass, but does not do any of the required analysis for location, environmental impacts, and land use planning.

Comments received at the workshop and from the public are summarized below:

Funding for Proposed Projects

- There was concern about how these improvements will be paid for. Liz noted that as is true with the current TSP, they will be paid for through SDCs and by the property owners. There was the reminder that the amount paid by the property owners must pass the Dolan rough proportionality test.
- It was also mentioned that projects #10 and 11 are outside of the City's UGB, so funding for those should be dealt with differently. John Bosket agreed, and stated that the City has an unusual agreement with the County allowing for City planning to occur outside of the UGB.

Bypass

- One person is excited about the potential for the bypass.
- Another stated that in his experience the bypass is almost impossible to get approved, and is unlikely to happen. John remarked that while that is often true, the example of Newberg, who just got $200 million for their bypass, shows that it is possible.
- A local property owner who was not at the meeting stated that he doesn't feel that a bypass is feasible

7-lane US 26

- A local property owner who was not at the meeting stated that he has had car dearlerships on 7-lane highways that worked quite well. The highways used a grass-median and allowed left turns into properties, but restricted turns out to right only, with U-turns allowed at the signalized intersections. He is in favor of 7-laning the highway, but is concerned that widening the streets in the couplet would require removal of on-street parking which would not be politically feasible.

Other

- Remove the Urban Expressway designation from US 26 within the city limits
- Explore the positive/negative impact on the community and business by requesting that ODOT adopt the Urban Business Area (UBA) for all property that

is within the city limits and 362nd Ave. It should provide for a more cohesive long term circulation.

- The City should move quickly and aggressively to construct Industrial Way to Orient Drive.
- See the attached pdf file for additional comments submitted by fax.

Alternate Mobility Standards Report

Alternate Mobility Standards Report

US 26 (Mount Hood Highway): Orient Drive to Ten Eyck Road

City of Sandy

Prepared for:
Oregon Department of Transportation
City of Sandy

Prepared by:
DKS Associates

June 2011

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Executive Summary

This report documents the investigation into the need to develop alternate mobility standards for US 26 in the City of Sandy and describes the proposed new standards to address that need. The segment of US 26 under consideration is bounded by Orient Drive on the west (near the City's western urban growth boundary) and Ten Eyck Road on the east (at the east end of the downtown couplet).

The many competing uses for the US 26 corridor result in a significant amount of demand for the available roadway capacity. During the process of updating the City's Transportation System Plan, it became apparent that under existing conditions the Oregon Department of Transportation's mobility standards for US 26 are not being met at any of the signalized intersections. Furthermore, even with full build-out of the proposed Transportation System Plan improvements, these standards still couldn't be met in the future, with some intersections failing to meet the standards by more than 30%. Therefore, retaining the current mobility standards could present a barrier for development within Sandy.

The proposed alternate mobility standard for US 26 in the corridor of interest consists of two components: 1) the replacement of the 30th highest annual hour of traffic analysis time period with the average annual weekday peak hour and 2) new maximum volume to capacity ratio thresholds to balance mobility with local growth projections. In this corridor, the 30th highest annual hour of traffic represents a time period when recreational and commuting traffic peaks coincide. The average annual weekday peak hour was chosen for the alternate mobility standard time period because it is more representative of typical travel conditions experienced through Sandy. To compliment this, the maximum volume to capacity ratio of 0.85 that is currently allowed in Sandy's downtown Special Transportation Area would be extended through all intersections within the corridor. Together, these changes in approach result in a new mobility standard that very closely matches conditions that are anticipated to result from forecasted growth through 2029 if the city's Transportation System Plan is fully implemented (see Figure 1).

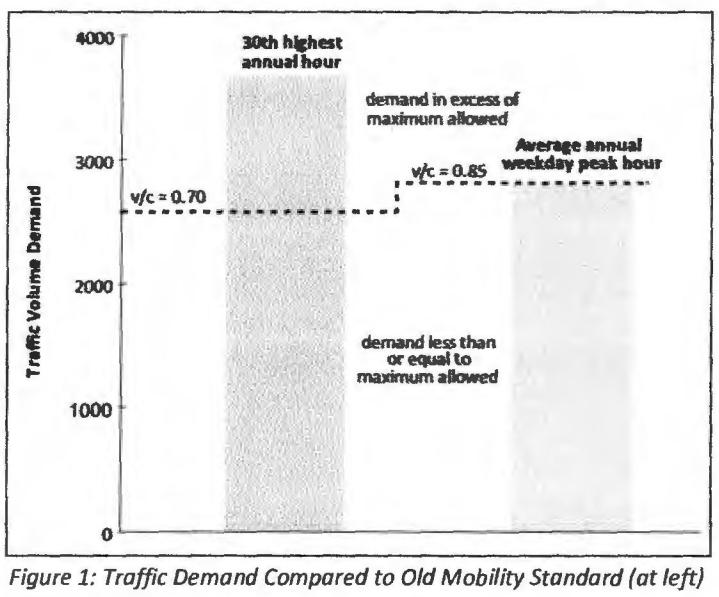

Figure 1: Traffic Demand Compared to Old Mobility Standard (at left) and New Mobility Standard (at right)

The key to accommodating future growth will be in generating funding to construct improvement projects when and where needed. The construction of off-highway improvements will be the responsibility of the City of Sandy and will likely occur as opportunities arise related to development activity in that area. However, because US 26 serves local, regional, and statewide travel, the responsibility for funding improvements within the highway corridor should be shared between ODOT and the City of Sandy. ODOT and the City of Sandy will strive to obtain needed funding and will coordinate to prioritize projects when the City Capital Improvement Program (CIP) and STIP are updated.

The alternate mobility standards will be effective following adoption of the updated City of Sandy Transportation System Plan and an amendment of the Oregon Highway Plan by the Oregon Transportation Commission. At that time, where development applications that are consistent with the currently adopted Comprehensive Plan are required to address mobility standards and safety, planned improvement projects may only be relied upon if they will be constructed prior to occupancy or programmed in the City Capital Improvement Program or Statewide Transportation Improvement Program. For proposed Comprehensive Plan amendments and Conditional Use applications, the adoption of the alternate mobility standards will change the thresholds by which adequacy of transportation conditions are measured within the affected corridor on US 26, but not the decision-making process.

The proposed alternate mobility standard for US 26 in the City of Sandy would include the following amendment the 1999 Oregon Highway Plan[1]:

Add a note to Table 6, page 83:

- The maximum peak hour volume to capacity ratios for intersections on US 26 in and near the City of Sandy from Orient Drive through Ten Eyck Road will be 0.85. For the purposes of this policy, the peak hour shall be the average annual weekday peak hour.

[1] *1999 Oregon Highway Plan Including amendments November 1999 through January 2006*, Oregon Department of Transportation, p. 83.

Introduction

This report documents the investigation into the need to develop alternate mobility standards for US 26 in the City of Sandy and describes the proposed new standards to address that need. The segment of US 26 under consideration, as illustrated in Figure 2, is bounded by Orient Drive on the west (near the City's western urban growth boundary) and Ten Eyck Road on the east (at the east end of the downtown couplet).

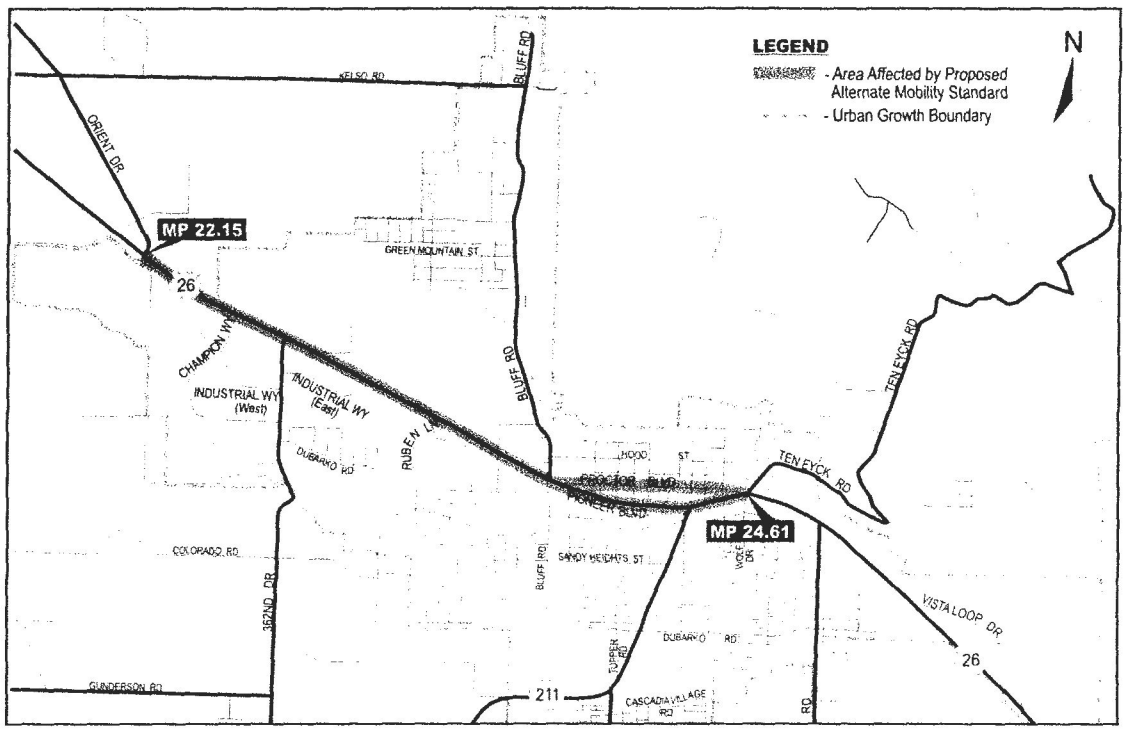

Figure 2: US 26 corridor under consideration for alternate mobility standards

Through the City of Sandy, US 26 serves a number of roles: providing access to local Sandy businesses and homes, serving as a major east/west transportation route between the Portland Metro Area, Mt. Hood, and Central Oregon resorts and recreation, and as the City's "main street" through the downtown couplet. Between Orient Drive and Bluff Road (the beginning of the downtown couplet), US 26 maintains two travel lanes in each direction and a center turn lane, with posted speeds ranging from 55 mph to 40 mph. As the highway passes through the downtown (Bluff Road to Ten Eyck Road), posted speeds are reduced to 25 mph, and the highway is divided among two one-way streets (Proctor Boulevard for westbound traffic and Pioneer Boulevard for eastbound traffic) with two travel lanes, a bike lane, and curbside parking on each.

ODOT has classified US 26 as a Statewide Highway. The management objectives for such facilities are typically to provide inter-urban and inter-regional mobility and provide connections to larger urban areas, ports, and major recreation areas that are not directly served by Interstate Highways. In doing so, the intent is to provide for safe and efficient, high-speed, continuous-flow operation.

In addition, US 26 is designated as part of the National Highway System, a state Freight Route, and a federal Truck Route. It is also designated as an Expressway by ODOT from 362nd Drive to the west. However, the City has expressed a desire to re-evaluate the Expressway designation for US 26 within the

Sandy urban growth boundary (e.g., moving the eastern terminus to Orient Drive). These additional designations and their associated management objectives further emphasize a need to prioritize transportation mobility.

In contrast to this, the downtown area encompassing the US 26 couplet of Pioneer and Proctor Boulevards has been designated a Special Transportation Area (STA). In STAs, the primary objective is to provide access to community activities, businesses, and residences and to accommodate pedestrian movement along and across the highway. Public street connections and on-street parking are encouraged and local auto, pedestrian, bicycle, and transit movements to the business district or community center is generally as important as through movement of traffic. West of the downtown, there are also needs for accessibility to highway-adjacent commercial and industrial properties, as well as the need for US 26 to support future traffic growth within the city and the Portland metro region as a critical east-west major arterial route.

The many competing uses for the US 26 corridor result in a significant amount of demand for the available roadway capacity. Through the process of updating the City's Transportation System Plan, it was found that under existing conditions the Oregon Department of Transportation's mobility standards for US 26 are not being met at any of the signalized intersections. Furthermore, even with full build-out of the proposed Transportation System Plan improvements, these standards still couldn't be met in the future as local and through traffic growth are added over the next 20 years. Therefore, retaining the current mobility standards could continue to present a barrier for development within Sandy.

The Need for Alternate Mobility Standards

Prior to exploring alternatives to the current mobility standards, the need for such action was first confirmed by evaluating the disparity between the current standards and forecasted traffic operations, then assessing the potential to mitigate conditions through other means. The findings of that evaluation are described below.

The Current Mobility Standard

The current mobility standards for US 26 within the corridor of interest are defined in Table 6 of the 1999 Oregon Highway Plan (OHP) – including amendments through January 2006.[2] These standards vary throughout the corridor as highway designations and posted speeds change. Table 1 below lists the applicable mobility standard for each signalized intersection within the corridor of interest.

Note that the measure of effectiveness being used by ODOT to assess adequate operations is the intersection volume to capacity (v/c) ratio. Also, the OHP specifies that the analysis time period during which these standards are to be applied shall be the 30th highest annual hour of traffic volume.

Table 1: Current Mobility Standards for US 26 Intersections

Intersection on US 26	Classification/ Designation	Posted Speed	Maximum Volume to Capacity Ratio Allowed
Orient Drive	Statewide Expressway	55 mph	0.70
362nd Drive	Freight Route/ Statewide Highway	45 mph	0.70
Industrial Way	Freight Route/ Statewide Highway	45 mph	0.70
Ruben Lane	Freight Route/ Statewide Highway	40 mph	0.75
Bluff Road	STA/ Freight Route/ Statewide Highway	25 mph	0.85
OR 211/ Proctor Boulevard	STA/ Freight Route/ Statewide Highway	25 mph	0.85
OR 211/ Pioneer Boulevard	STA/ Freight Route/ Statewide Highway	25 mph	0.85
Ten Eyck Road	STA/ Freight Route/ Statewide Highway	25 mph	0.85

[2] *1999 Oregon Highway Plan Including amendments November 1999 through January 2006*, Oregon Department of Transportation, p. 83

Existing and Future Highway Operations

Existing (year 2008) and future (year 2029) traffic operations along US 26 were analyzed during the 30th highest annual hour of traffic volume. Within this corridor, the 30th highest annual hour of traffic occurs during Friday p.m. peak periods in August, when both commuting and recreational traffic are peaking.

This analysis was completed as part of the City of Sandy TSP update, which considered three different future year scenarios including increasing levels of investment in new infrastructure. These three alternatives are described below.

Alternative 1: Local System Enhancements and Minor Highway Improvements
Alternative 1 consisted mainly of intersection configuration enhancements and the provision of new local system roadways to improve connectivity within the city and reduce reliance on US 26 for local trips. Intersection improvements on US 26 were included, but these were mainly turning lane additions or modifications rather than increases in through lanes. This alternative was preferred by the City because it represents the most reasonable level of investment and avoids widening US 26.

Alternative 2: Local System Enhancements and US 26 Widening (includes 7-lane US 26)
This alternative was the same as Alternative 1, but also included widening of US 26 to three through lanes in each direction (outside of the downtown couplet). Because such widening would worsen pedestrian crossing ability, have significant impacts on adjacent commercial property accessibility, and would create a barrier dividing the north and south halves of the city, it was not considered to be acceptable by the community.

Alternative 3: Local System Enhancements and US 26 Bypass
Like Alternative 2, this alternative also used Alternative 1 as a starting point, but added a US 26 bypass of Sandy rather than highway widening. The community expressed some interest in this alternative, but acknowledged that the TSP should not rely on such improvements because of the required environmental process and level of financial commitment.

The results revealed that all signalized intersections analyzed on US 26 within the city were currently failing to meet ODOT's mobility standards and would continue to do so in the future, even with recommended improvements to the transportation system in place, regardless of the Alternative considered.[3] Table 2 summarizes the results from that analysis, using Alternative 1 to represent the highest level of system capacity and connectivity that would be expected through the planning horizon year of 2029.

Both the Highway Design Manual and the Oregon Highway Plan mobility standards are shown in Table 2. Typically, the Highway Design Manual mobility standard is applied to the evaluation of highway improvements and the Oregon Highway Plan mobility standard is used in the assessment of development proposals and determining when facilities will be in need of mitigation. As can be seen in the table, none of the intersections would meet either mobility standard in 2008 or 2029, even with proposed improvements in place.

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[3] *City of Sandy TSP Update: Draft Technical Memorandum #3 - Transportation Alternatives and Improvement Strategies,* DKS Associates, June 17, 2009

With Alternative 1 improvements in place, intersection operations are significantly improved (by as much as 30 to 40% in some locations). However, even with that improvement, the study intersections remain well out of range of meeting the mobility standards, with deficiencies of 30% or more remaining. Given the level of additional improvement that would be required to meet the current mobility standards, it is clear that it is no longer feasible to comply with them in this corridor.

Table 2: Intersection Operations along US 26 within Sandy

Intersection	Highway Design Manual Mobility Standard (v/c ratio)	Oregon Highway Plan Mobility Standard (v/c ratio)	2008 Existing operations (v/c ratio)	2029 No-Build operations (v/c ratio)	2029 Alternative 1 operations (v/c ratio)
US 26/ Orient Drive	0.60	0.70	0.79	1.16	1.04
US 26/ 362nd Drive	0.70	0.70	0.91	1.33	0.93
US 26/ Industrial Way	0.70	0.70	0.87	1.36	1.01
US 26/ Ruben Lane	0.70	0.75	0.93	1.36	1.06
US 26/ Bluff Road	0.85	0.85	0.93	1.30	1.01
OR 211/ Proctor Boulevard (US 26)	0.85	0.85	1.00	1.25	1.09
OR 211/ Pioneer Boulevard (US 26)	0.85	0.85	0.88	1.06	0.90
US 26/ Ten Eyck Road – Wolf Drive	0.85	0.85	0.88	1.20	0.91

Shaded cells indicate mobility standard is not met.
Analysis reflects the 30th highest annual hour of traffic/ Design Hour

Effect of Highway Through Traffic Growth

The need for alternate mobility standards is not just driven by local growth. To demonstrate this, the effect of through traffic growth on intersection operations was evaluated by removing development-based traffic growth from the forecasting tool developed for the City of Sandy TSP update. Assuming all of the improvements identified in Alternative 1 were in place, the operations at the signalized intersections on US 26 were recalculated using these new volumes where growth was based purely on through trips.

The results of this analysis are shown in Table 3, demonstrating that even if no further land development were to occur in the City of Sandy through the year 2029, through traffic growth alone would degrade operations such that all but one of the signalized intersections on US 26 would not meet the current mobility standard.

Table 3: Effect of Through Traffic Growth on US 26 Intersection Operations

Intersection	Highway Design Manual Mobility Standard (v/c ratio)	Oregon Highway Plan Mobility Standard (v/c ratio)	2008 Existing (v/c ratio)	2029 Alternative 1 w/ all traffic (v/c ratio)	2029 Alternative 1 w/ no local growth (v/c ratio)
US 26/ Orient Drive	0.60	0.70	**0.79**	**1.04**	**0.82**
US 26/ 362nd Drive	0.70	0.70	**0.91**	**0.93**	**0.94**
US 26/ Industrial Way	0.70	0.70	**0.87**	**1.01**	**0.88**
US 26/ Ruben Lane	0.70	0.75	**0.93**	**1.06**	**0.96**
US 26/ Bluff Road	0.85	0.85	**0.93**	**1.01**	**0.99**
OR 211/ Proctor Boulevard (US 26)	0.85	0.85	**1.00**	**1.09**	**0.92**
OR 211/ Pioneer Boulevard (US 26)	0.85	0.85	**0.88**	**0.90**	**0.88**
US 26/ Ten Eyck Road – Wolf Drive	0.85	0.85	**0.88**	**0.91**	0.78

Shaded cells indicate mobility standard is not met.
Analysis reflects the 30th highest annual hour of traffic/ Design Hour

Duration of Congestion

The fact that the current mobility standards can no longer be met is an indication that traffic growth is outpacing the ability to add capacity. Examining the duration of congestion that may be experienced provides another perspective on the overall quality of service that will result.

The duration of congestion experienced at an intersection or along a corridor is related to the vehicle demand compared to the capacity of the facility serving it. Where the demand exceeds system capacity, congested conditions can last for multiple hours, with excess demand spilling over from the peak hour into adjacent hours. However, where congestion becomes a regular occurrence, motorists may respond by shifting their time of travel or switching to an alternate mode of transportation altogether. Because US 26 is already reaching capacity during the 30th highest annual hour of traffic in Sandy and has been projected to operate well over capacity by the year 2029, the duration of peak period congestion experienced by travelers in the corridor will likely increase over time.

Intersection operations on the US 26 Corridor in Sandy are a good indicator of the level of congestion currently experienced during the peak hour. The v/c ratios shown above in Tables 2 and 3 relate the peak demand to the intersection capacity. For simplicity's sake, congestion in this exercise is defined as an intersection v/c ratio equal to or greater than 1.0. Under today's conditions, the intersection of OR 211/Proctor Boulevard (US 26) operates with a v/c ratio equal to 1.0. Since none of the other study intersections have a higher v/c ratio, it is assumed that this intersection is the controlling capacity point for the corridor.

Figure 3 shows a volume graph of a forecasted day reflecting a peak hour equivalent to the 30th highest annual hour of traffic for the years 2008 and 2029 (i.e., an August Friday). In this figure it can be seen that the existing traffic demand during a peak day is approximately equal to the corridor capacity during the peak hour. If no further capacity improvements are made into the future, it can be expected that the traffic demand would exceed corridor capacity for at least seven hours by 2029. However, this excess demand could spill over into adjacent hours, causing congestion for as many as 10 hours. If the intersection improvements identified under Alternate 1 are constructed, the duration of congestion can be reduced to approximately five hours.

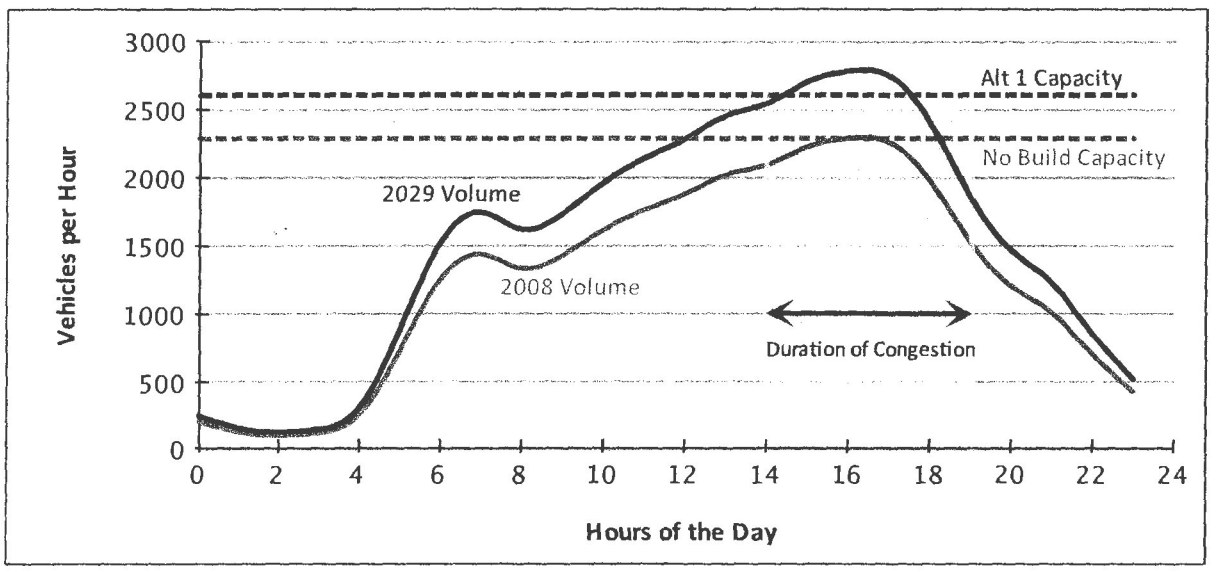

Figure 3: Forecasted 24-Hour Volume Profiles

Figure 4 illustrates the extent of congestion experienced over an entire year. Under current conditions, traffic demand exceeds system capacity for approximately 30 hours over the course of the year. However, by the year 2029, if growth occurs without any improvement to the highway, there would be more than 1,000 hours where demand exceeds capacity. With the improvements identified in Alternative 1 in place, this would decrease to approximately 100 hours.

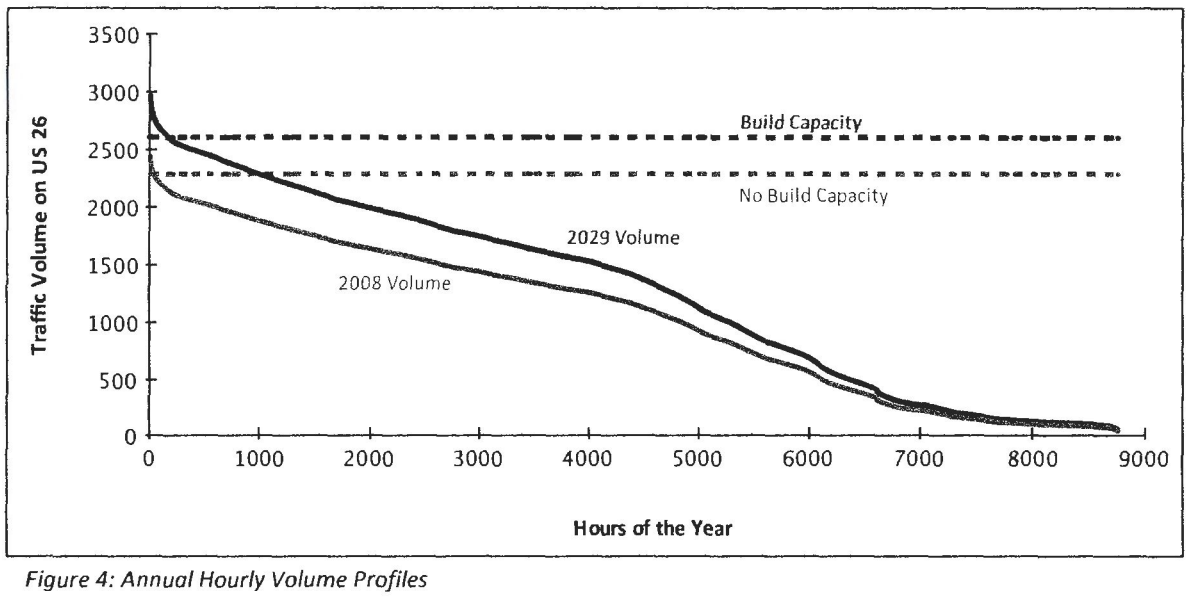

Figure 4: Annual Hourly Volume Profiles

Factors Limiting the Ability to Meet Mobility Standards

There are several factors that combine to make compliance with the current mobility standards along US 26 difficult. Each of these factors is described below.

Environmental Factors

Located at the base of Mt. Hood, the foothills terrain presents topographic constraints to land and public infrastructure development. This limits options to provide an effective transportation network, especially on US 26, which is the primary transportation corridor in the area. Environmental/ topographical constraints include:

- The City is bounded by steep slopes to the north and east that severely limit the expansion of transportation facilities that could provide alternate routes to US 26 east of Bluff Road
- Tickle Creek, running parallel to US 26 along the southern end of the City, supports an anadromous fishery and wetlands creating a series of obstacles to constructing an efficient transportation network in a cost-effective manner
- Rolling terrain and steep slopes throughout the City provide a challenging environment for transportation that can make the construction of facilities costly, and make walking or biking difficult

Financial Factors

As is true for most agencies, funding for City and ODOT transportation improvements is limited, with revenues forecasted to fall well below what would be required to construct all city and ODOT projects identified in the City of Sandy Transportation System Plan. However, as previously demonstrated, traffic operations along US 26 would still fail to comply with ODOT's mobility standards even if all projects identified could be constructed.

Competition from Multiple Users

US 26 serves a number of roles, providing access to local Sandy businesses and homes, serving as a major east/west transportation route between the Portland Metro Area, Mt. Hood, and Central Oregon resorts and recreation, and as the City's "main street" through the downtown couplet. The importance of US 26 to statewide, regional, and local traffic creates significant demands for both short and long trips in the corridor, with some users beginning and ending their trips in the city and many others only traveling through. In fact, a survey of US 26 traffic at the eastern and western limits of the urban growth boundary conducted during a peak hour on a summer afternoon found that approximately one-third of the traffic on US 26 was purely "through traffic."

In addition, US 26 is classified as a Statewide Highway on the National Highway System, a state Freight Route, and a federal Truck Route. The presence of a significant amount of heavy vehicle traffic further adds to the congestion in this corridor.

In contrast to this, the US 26 couplet of Pioneer and Proctor Boulevards downtown has been designated a Special Transportation Area (STA). In STAs, the primary objective is to provide access to community activities, businesses, and residences and to accommodate pedestrian movement along and across the highway.

Other Strategies Being Applied to Enhance Mobility

Recognizing that mobility along US 26 will be constrained, the City of Sandy and ODOT are prepared to implement several actions to relieve congestion, which are being incorporated into the City's Transportation System Plan.

- Transportation improvements have been identified to allow the City street network to operate at a Level of Service D through the year 2029. Maintaining good performance on the City streets will help to provide attractive travel alternatives to US 26 for local trips
- An extensive expansion of the City street network is being developed, especially in the western end of the City, which will help remove local trips from the highway
- In addition to the access management regulations already in place, the City and ODOT are pursuing an array of Transportation System Management (TSM) strategies, including adaptive signal timing on US 26, improved connectivity of local streets, and updated management objectives for arterial streets to help preserve the functional life of high-capacity roadways
- The City has completed a Transit Master Plan to improve the Sandy Area Metro transit system to improve future services and provide attractive travel options
- Improvements have been identified to fill gaps in the City's and ODOT's network of pedestrian and bicycle facilities and to provide access to major activity centers

However, even with these actions in place, traffic operations along US 26 will not comply with ODOT's mobility standards through the planning horizon year of 2029. In fact, as previously shown, mobility standards on US 26 would still not be met even with the construction of a bypass around the city. Nevertheless, the implementation of these actions, along with the alternative mobility standards for US 26, will provide a comprehensive strategy for addressing transportation congestion and future growth through the City of Sandy.

Proposed Alternate Mobility Standard

The proposed alternate mobility standard for US 26 in the corridor of interest consists of two components: 1) the replacement of the 30th highest annual hour of traffic analysis time period with the average annual weekday peak hour and 2) new maximum v/c ratio thresholds to balance mobility with local growth projections. This chapter describes the proposed standard in detail, including the associated analysis methodology and guidance on how it would be implemented in the future.

Applying the Average Annual Weekday Peak Hour

One characteristic of the current mobility standard that makes it difficult to comply with through Sandy is the requirement to use the 30th highest annual hour of traffic as the design period. In many larger urbanized areas, this time period is roughly equivalent to the average weekday p.m. peak hour. However, in this area, US 26 also serves significant demand from recreational trips. Because of this, the 30th highest annual hour of traffic occurs on a summer Friday afternoon, when commuting traffic peaks coincide with recreational traffic peaks. Therefore, the approach to establish a new mobility standard for US 26 through Sandy begins with using a design period that is more representative of typical travel.

Figure 5 illustrates the difference in traffic volumes on US 26 during an average weekday compared to average Fridays and average weekends. The 30th highest annual hourly volume for this year (2009) is also shown for reference. As shown, traffic volumes on Friday afternoons are commonly higher than those experienced during other weekday afternoons, with the average Friday p.m. peak hour volume found to be 11% higher than that during the average p.m. peak hour of Tuesdays, Wednesdays, or Thursdays. Furthermore, the average weekday p.m. peak hour (Tuesday through Thursday) volume was found to be 23% lower than the 30th highest annual hourly volume.

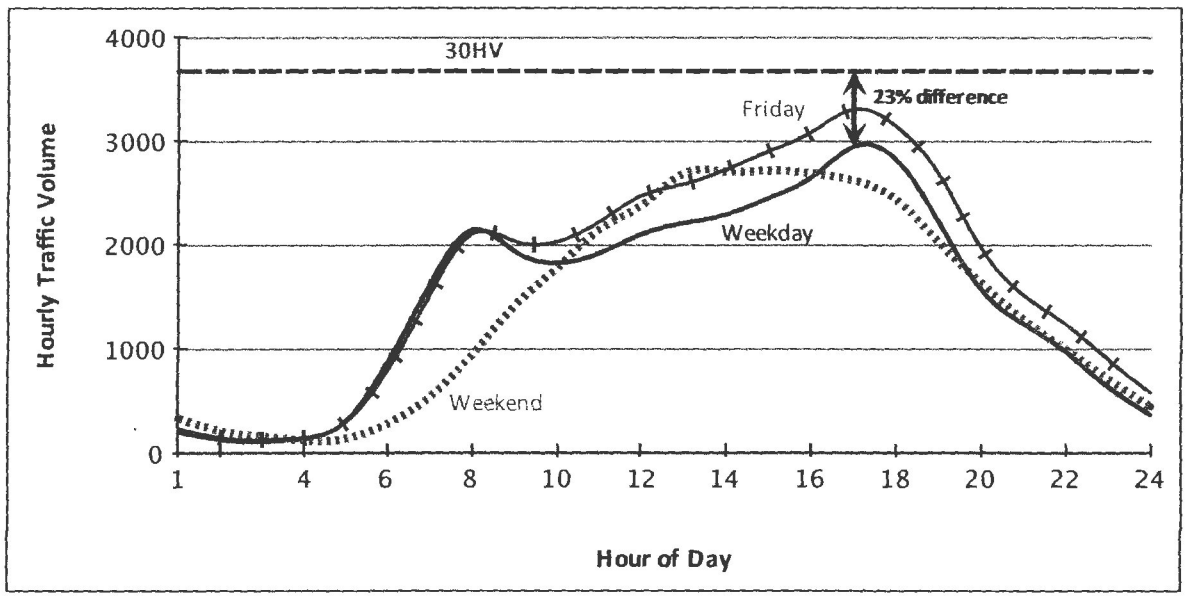

Figure 5: 2009 Average Annual Daily Traffic Volumes on US 26

Because the average annual weekday p.m. peak hour may be more representative of typical travel on US 26 through Sandy than the 30th highest annual hour, this time period is recommended for consideration as part of the alternate mobility standard. This would shift the corridor management emphasis away from accommodating seasonal recreational trips through the city and refocus it on conditions that are more representative of every day travel. Furthermore, the potential 23% allowance for additional traffic that could result from using that time period is close to the roughly 30% differential between the current standard and projected operations in the future under the Alternative 1 build out scenario.

Assigning New Maximum V/C Ratio Thresholds

As noted above, the substitution of the average annual weekday p.m. peak hour for the 30th highest annual hour could have as much as a 23% allowance for additional traffic if applied to this corridor. However, with a differential between the current mobility standards and projected operations of more than 30% at some locations, this approach alone would not be sufficient.

Being outside of the Metro area, the v/c ratio requirements for US 26 through Sandy are more demanding and allow for less congestion. In comparison, the v/c ratio requirements in the subject corridor range from 0.70 to 0.85, while in the Metro area, they are commonly allowed to reach as high as 0.99. Raising the v/c ratio threshold in the subject corridor could be considered as a complimentary measure to changing the analysis time period as described above. In fact, if the v/c ratio threshold of 0.85, which is already applied to the intersections between Bluff Road and Ten Eyck Road within the Special Transportation Area, were applied to all of US 26 within the City of Sandy, it may allow every intersection in the corridor to comply with mobility standards during the average annual weekday p.m. peak hour.

US 26 Operations under the Proposed Alternate Mobility Standard

The analysis of US 26 traffic operations was revisited using the average annual weekday peak hour for comparison against the previously completed analysis that used the 30th highest annual hour. The results provided in Table 4 show that all intersections would be able to comply with the proposed mobility standard through 2029, with little room to spare at many locations. This means that there would be adequate allowance for anticipated future growth consistent with the Sandy Comprehensive Plan. It should also be acknowledged that implementation of transportation projects identified in the Sandy TSP (Alternative 1 scenario) will be necessary to allow system capacity to keep pace with growth.

Table 4: Intersection Operations along US 26 – Comparison of Mobility Standards

Intersection	Highway Design Manual Mobility Standard (v/c ratio)	Oregon Highway Plan Mobility Standard (v/c ratio)	Recommended Mobility Standard (v/c ratio)	2008 Existing operations (v/c ratio)		2029 No-Build operations (v/c ratio)		2029 Alternative 1 operations (v/c ratio)	
				30HV	AWP	30HV	AWP	30HV	AWP
US 26/ Orient Drive	0.60	0.70	0.85	0.79	0.63	1.16	1.03	1.04	0.84
US 26/ 362nd Drive	0.70	0.70	0.85	0.91	0.77	1.33	1.17	0.93	0.84
US 26/ Industrial Way	0.70	0.70	0.85	0.87	0.71	1.36	1.06	1.01	0.84
US 26/ Ruben Lane	0.70	0.75	0.85	0.93	0.72	1.36	1.16	1.06	0.85
US 26/ Bluff Road	0.85	0.85	0.85	0.93	0.74	1.30	1.21	1.01	0.85
OR 211/ Proctor Boulevard (US 26)	0.85	0.85	0.85	1.00	0.77	1.25	1.05	1.09	0.85
OR 211/ Pioneer Boulevard (US 26)	0.85	0.85	0.85	0.88	0.68	1.06	0.92	0.90	0.68
US 26/ Ten Eyck Road – Wolf Drive	0.85	0.85	0.85	0.88	0.57	1.20	1.04	0.91	0.72

Shaded cells indicate mobility standard is not met.
30HV = 30th highest annual hour; AWP = Average annual weekday peak hour

Implementation

Applying the proposed alternate mobility standard will require an understanding of how it should be used in traffic analysis to support land use proposals and project development, as well as how it affects the decision-making process and where agency responsibilities lie.

Calculating Average Annual Weekday Peak Hour Traffic Volumes

The calculation of the average annual weekday peak hour is very similar to the procedure outlined by the Oregon Department of Transportation's Transportation Planning Analysis Unit (TPAU) *Analysis Procedure's Manual* (APM) for the 30th highest annual hourly volume.[4] There are four areas where the average annual weekday peak hour methodology deviates from the TPAU AMP methods, including:

- Traffic Count Collection
- Seasonal Factor Calculation
- Average Annual Weekday Peak Hour Calculation
- Design Hour Volume Calculation

Traffic Count Collection

For the 30th highest annual hourly volume calculations, traffic counts are conducted as close to the actual 30th highest annual hourly volume as possible. In the City of Sandy, this time normally coincides with a Friday afternoon in the summer. Traffic counts for the calculation of the average annual weekday peak hour, however, should be conducted on a Tuesday through Thursday afternoon. Because seasonal variations during the p.m. peak hour on Tuesdays through Thursdays are relatively low (generally no more than 10%), the actual traffic count month is less critical than calculating the 30th highest annual hourly volume.

Seasonal Factor Calculation

The purpose of a seasonal factor is to convert manual counts taken during times of the year other than the average weekday to average annual weekday peak hour volumes. As with the calculation of the seasonal factor for the 30th highest annual hourly volume, this step is accomplished with the use of ODOT Automatic Traffic Recorder (ATR) station data.

There are no ATR station locations on US 26 in the City of Sandy. The two closest ATR stations are in Gresham to the west and Rhododendron to the east. The travel patterns for each of these ATR stations are partially representative of travel patterns seen in the City of Sandy. The Gresham ATR shows predominantly commuter based travel patterns and the travel patterns recorded at the Rhododendron ATR are highly recreational in nature. This mix of two distinctly different travel patterns lends to the use of both ATR stations in the calculation of a seasonal factor to convert existing traffic counts to average annual weekday peak hour volumes.

The determination of how to best combine the data from these two ATR stations was based in part on an origin/destination study, which was performed in 2008, to determine the number of vehicles traveling through the City on US 26 (i.e., through trips). This data shows an approximate split between

[4] ODOT, TPAU, Analysis Procedures Manual, Section 4 Developing Design Hour Volumes

the people driving to Sandy, and those who are just traveling through to destinations beyond the City. This survey revealed that during the weekday p.m. peak hour, roughly 30% of the drivers on US 26 are traveling through the City.

The through trips (not associated with the City of Sandy) were assumed to be more influenced by seasonal trends, while trips beginning or ending in Sandy were assumed to be more reflective of commuter traffic. Therefore, a weighted average was used to combine the data from the two ATR stations using a 70/30 ratio between the Gresham and Rhododendron ATRs, respectively. Table 5 shows the resulting weekday and Friday seasonal factors for US 26 in the City of Sandy for each month of the year. The weekday factor is based on counts collected on a Tuesday through Thursday for the appropriate month, while the Friday factors are based on counts taken on a Friday for the given month.

Table 5: Average Annual Weekday Peak Hour Seasonal Factors – US 26 in the City of Sandy

Month	*Weekday Seasonal Factor	Friday Seasonal Factor
January	1.019	0.912
February	1.002	0.896
March	1.000	0.908
April	1.015	0.923
May	1.046	0.939
June	1.035	0.942
July	1.045	0.955
August	1.029	0.917
September	1.041	1.005
October	1.042	0.966
November	1.086	1.013
December	1.090	1.004

** Tuesday, Wednesday, or Thursday only*

Average Annual Weekday Peak Hour Volume Calculation

The average annual weekday peak hour volume is calculated using the factors shown in Table 5, depending on whether the count was conducted on a Tuesday through Thursday, or a Friday. For instance, if a count were to be conducted on a Tuesday in January, then the intersection turn movement volumes would be multiplied by 1.019 to calculate the average annual weekday peak hour volume.

Turn movement counts should not be taken on a Friday. The Friday seasonal factor is provided for use on past studies where counts were taken for the calculation of the 30th highest annual hour volume.

Design Hour Volume Calculation

The design hour volume calculation for US 26 in the City of Sandy differs from TPAU methodology only in the fact that the average annual weekday peak hour volumes are used instead of the 30th highest annual hour volume. All other steps in the design hour volume calculations are the same.

Funding Improvements to Maintain Highway Capacity

While the proposed alternate mobility standard was set to align with anticipated traffic growth, this relies on continued provision of the highway and local system transportation improvements identified in the City of Sandy Transportation System Plan (Alternative 1 scenario) through the year 2029. While the advancement of non-auto oriented strategies, such as pedestrian and bicycle projects and improving the City transit system, are also important to the overall quality of transportation, operations at the US 26 intersections are particularly reliant on the highway intersection improvements and local improvements that improve connectivity (e.g., new road extensions). Therefore, the level of traffic growth that is accommodated by the proposed alternate mobility standard may only be achieved if these needed improvements keep pace with development activity.

The key to this will be generating needed funding to construct improvement projects when and where needed. The construction of off-highway improvements will be the responsibility of the City of Sandy and will likely occur as opportunities arise related to development activity in that area. However, because US 26 serves local, regional, and statewide travel, the responsibility for funding improvements within the highway corridor should be shared between ODOT and the City of Sandy.

Due to anticipated limitations in state funding, ODOT is likely to prioritize statewide allocation of funding based on safety performance and pavement condition. The City should take advantage of ODOT grant opportunities as they arise for highway enhancements. Contributions from the City toward highway improvements are likely to improve the chance that projects would be funded through the Statewide Transportation Improvement Program (STIP) and that programed projects could be enhanced to address multiple objectives.

Table 6 shows the proposed improvements to US 26 intersections, including a description and project costs. The source of funding for needed projects should remain flexible to help provide improvements in a timely manner. ODOT and the City of Sandy will strive to obtain needed funding and will coordinate to prioritize projects when the City Capital Improvement Program (CIP) and STIP are updated.

Table 6 – Recommended Motor Vehicle Improvements Projects and Costs (2009 Dollars)

Location	Improvement(s) Description	Project Cost
US 26/ 362nd Dr.	Construct a second westbound left turn lane Construct an acceptance lane for second westbound left turn lane to drop at southern access to Fred Meyer property Construct a northbound through lane Construct southbound through, right turn and left turn lanes	$5,350,000
US 26/ Industrial Way	Change southbound approach to dual left turn lanes and a shared through/right lane Construct a northbound left turn lane	$780,000

US 26/ Ruben Lane	Change southbound approach to dual left turn lanes and a shared through/right lane Change northbound approach to left turn lane, and shared through/right lane	$770,000
OR 211/Proctor Boulevard (US 26)	Construct a northbound left turn lane (restriping only)	$5,000
US 26/ Ten Eyck Rd. – Wolf Drive	Construct a northbound left turn lane Construct a southbound left turn lane	$1,220,000
	Total Project Costs (Intersection Improvements)	**$8,125,000**

The projects listed in Table 6 represent those identified through the City of Sandy Transportation System Plan (TSP) as needed to comply with the alternate mobility standards. This list is not intended to preclude any other improvements found to be needed through future analysis, such as Traffic Impact Studies for proposed developments, which are able to refine land use assumptions by accounting for actual trip generation from a particular use.

Timing of Improvements

The alternate mobility standards will be effective following adoption of the updated City of Sandy TSP and an amendment of the Oregon Highway Plan by the Oregon Transportation Commission. However, because the improvements to US 26 intersections are needed to accommodate planned development through the year 2029, the timely delivery of the projects listed in Table 6 is critical for meeting the new mobility standards. The approval of new development, therefore, is predicated on the following conditions.

Allowed Uses Consistent with the Comprehensive Plan

Where development applications that are consistent with the currently adopted Comprehensive Plan are required to address mobility standards and safety, the projects in Table 6 may only be relied upon if they will be constructed prior to occupancy or programmed in the City CIP or STIP. The City and ODOT will work together to consider the impacts and options for mitigation of traffic impacts associated with proposed development.

Comprehensive Plan Amendments and Conditional Uses

Comprehensive Plan amendments and Conditional Use applications will be evaluated in accordance with City approval criteria. In addition, Comprehensive Plan amendments must address the Transportation Planning Rule (TPR) OAR 660-012-0060 requirements. The adoption of the alternate mobility standards will change the threshold by which adequacy of transportation conditions are measured within the affected corridor on US 26, but not the decision-making process.

The TPR requires local governments to assure land uses are consistent with the identified function, capacity, and performance standards of facilities that are significantly affected. The road authority will make the determination whether TSP improvement projects necessary to address projected significant effects are reasonably likely to be put in place within the required analysis horizon year.

Conditional Use applications are addressed by Chapter 17.68 of the City of Sandy Development Code. Among other factors, the City of Sandy Planning Commission is required to consider whether the proposed use is timely with respect to the adequacy of the transportation systems, public facilities and services existing or planned for the area affected by the proposed use. Unlike comprehensive plan amendments, conditional use applications focus on the adequacy of facilities in the near term rather than those at the end of the planning period. Therefore, the improvements in Table 6 will only be considered to be in place and available to serve site traffic if they are funded and expected to be in place by opening day of the proposed development.

While the alternate mobility standards allow for a greater amount of congestion on US 26, this plan anticipates there will be very limited reserve capacity in the highway corridor after buildout of the planned uses in the current Comprehensive Plan. Therefore, the potential to preclude development of allowed uses that are consistent with the Comprehensive Plan by granting a share of highway capacity to development approved through Comprehensive Plan amendments or Conditional Use applications should be publically acknowledged at the time such actions are under consideration.

Recommended City Policy Changes

It is recommended that the following statement be included in the Goals, Policies and Objectives section of the City of Sandy TSP, and under the *Major Roadway Circulation* section of *Goal 12*: in the *City of Sandy Comprehensive Plan:*

> Support ODOT adoption of an alternate mobility standard for US 26 that allows for efficient use of capacity in the highway corridor, especially during peak seasonal travel periods.

Agency Roles and Responsibilities

The City of Sandy and ODOT have an excellent working relationship and will continue to cooperate to implement the projects associated with the alternate mobility standards for US 26 contained in the City's TSP adopted in 2011. City and ODOT agree to the following roles and responsibilities for successful implementation of the alternate mobility standards:

City

- Construct and/or require through the land development process, improvements and extensions to the local street network to reduce reliance on US 26 for local traffic
- Identify and apply for grants and other funding for improvements to fill gaps in the City and ODOT's bicycle and pedestrian system
- Champion, apply for and /or contribute to funding capacity and safety improvements on US 26
- Notify and coordinate with ODOT for land use applications abutting or affecting US 26
- Participate in Clackamas County transportation system planning to address regional performance on US 26, which impacts performance within the City of Sandy
- Require construction of or funding contribution for improvements on US 26 as a condition of land use approval as appropriate and proportionate to mitigate for development impacts

- Assess current and future safety performance when evaluating anticipated impacts of proposed land use development. Require safety improvements as conditions of land use approval as appropriate and proportionate
- Continue to improve the Sandy Area Metro transit system and coordinate with regional transit systems

ODOT

- Champion and support City applications for ODOT funding for proposed improvements on US 26 and OR 211 identified in the City's TSP
- Pursue implementation of adaptive signal timing for US 26 as a way to maximize available highway capacity
- Coordinate with the City on highway projects within the City's urban growth boundary
- Monitor performance and safety on US 26

Appendix

Appendix A - Technical Memorandum #4: Intersection Deficiency and Annual Hourly Traffic Volume Evaluation

Appendix B - Technical Memorandum #5: Average Annual Weekday P.M. Peak Hour Design Period

Appendix C - City of Sandy Staff Report from City Council Workshop (January 18, 2011)

Appendix A

Technical Memorandum #4

DATE: August 12, 2010

TO: Liz Storn – City of Sandy
Sonya Kazen – ODOT

FROM: John Bosket, PE – DKS Associates

SUBJECT: **City of Sandy TSP Update:** P06097-017-006
Intersection Deficiency and Annual Hourly Traffic Volume Evaluation

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The purpose of this memorandum is to establish the need for alternate mobility standards for US 26 within the City of Sandy and to investigate potential approaches to creating new standards based on traffic characteristics in the highway corridor. This includes a summary of the findings of deficiencies in the corridor, an examination of historical traffic volumes through the corridor, and a recommendation for a new mobility standard approach for further analysis.

Existing and Future Operational Deficiencies

The need for this investigation arose from the findings of the intersection analysis conducted as part of the update to the City of Sandy Transportation System Plan. This analysis revealed that all signalized intersections analyzed on US 26 within the city were currently failing to meet ODOT's mobility standards and would continue to do so in the future, even with recommended improvements to the transportation system in place.[1]

In evaluating future conditions (year 2029), one No Build and three Build alternatives were developed. These alternatives are listed below and described in detail in *Technical Memorandum #3*.

- Alternative 1: Local System Enhancements and Minor Highway Improvements
- Alternative 2: Local System Enhancements and US 26 Widening (includes 7-lane US 26)
- Alternative 3: Local System Enhancements and US 26 Bypass

Alternative 2 and 3 include all of the improvements identified in Alternate 1, but add other elements such as widening the US 26 corridor to seven lanes (Alternative 2) or constructing a bypass around the south end of the city (Alternative 3). However, even with the added capacity offered by these improvements, the mobility standards on US 26 could not be met. Furthermore, the ability to fund the construction of a bypass around Sandy within the planning horizon is questionable and the proposal to widen US 26 through the city received a significant amount of negative feedback from the public. Therefore, Alternative 1 was chosen as the preferred alternative for the Transportation System Plan and will be used in this evaluation of alternative mobility standards for US 26.

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[1] *City of Sandy TSP Update: Draft Technical Memorandum #3 - Transportation Alternatives and Improvement Strategies,* DKS Associates, June 17, 2009

Table 1 summarizes the results from previous analysis that was conducted as part of the update to the City of Sandy's TSP. Note that while the intersection on US 26 at Orient Drive is not within the City's urban growth boundary, it has been included in this evaluation due to its importance on the subject corridor's overall operation.

Table 1: Intersection Operations along US 26 within Sandy

Intersection	Highway Design Manual Mobility Standard (v/c ratio)	Oregon Highway Plan Mobility Standard (v/c ratio)	2008 30HV operations (v/c ratio)	2029 DHV No-Build operations (v/c ratio)	2029 DHV Alternative 1 operations (v/c ratio)
US 26/ Orient Drive	0.60	0.70	0.79	1.16	1.04
US 26/ 362nd Drive	0.70	0.70	0.91	1.33	0.93
US 26/ Industrial Way	0.70	0.70	0.87	1.36	1.01
US 26/ Ruben Lane	0.70	0.75	0.93	1.36	1.06
US 26/ Bluff Road	0.85	0.85	0.93	1.30	1.01
OR 211/ Proctor Boulevard (US 26)	0.85	0.85	1.00	1.25	1.09
OR 211/ Pioneer Boulevard (US 26)	0.85	0.85	0.88	1.06	0.90
US 26/ Ten Eyck Road - Wolf Drive	0.85	0.85	0.88	1.20	0.91

Shaded cell indicates mobility standard is not met.

Both the Highway Design Manual and the Oregon Highway Plan mobility standards are shown above in Table 1. Typically, the Highway Design Manual mobility standard is applied to the evaluation of highway improvements and the Oregon Highway Plan mobility standard is used in the assessment of development proposals and determining when facilities will be in need of mitigation. As can be seen in the table, none of the intersections would meet either mobility standard in 2008 or 2029, even with proposed improvements in place.

With Alternative 1 improvements in place, intersection operations are significantly improved (by as much as 30 to 40% in some locations). However, even with that improvement the study intersections remain well out of range of meeting the mobility standards, with deficiencies of 30% or more remaining. Given the level of additional improvement that would be required to meet the current mobility standards, it is clear that it is no longer feasible to comply with the mobility standards for US 26 within the urban area of Sandy.

US 26 Annual Traffic Volume Characteristics

ODOT's mobility standards for US 26, as documented in the 1999 Oregon Highway Plan (amended 2006), are based on operations occurring under the 30th highest hourly traffic volumes of the year. In Sandy, this time period was found to be associated with Friday afternoons in August, where commuting traffic is combined with heavy flows of recreational traffic. While commuting activity is relatively steady throughout the year, recreational trip activity can vary significantly. Therefore, this condition may not be representative of typical travel through the corridor.

To better understand how traffic volumes through Sandy on US 26 vary throughout the year and how the 30th highest hourly volume compares to average peak hour travel conditions, traffic

volume data from two nearby Automatic Traffic Recorder (ATR) stations was obtained and analyzed. This included the Gresham ATR (26-003) approximately eight miles to the west and the Rhododendron ATR (03-006) approximately 19 miles to the east. These ATR stations were also used to develop seasonal factors for US 26 traffic volumes collected for the TSP update analysis. For that effort, the Gresham ATR, which is strongly characterized by commuting trips (up to 13% seasonal volume variation), was applied to the west side of Sandy, while the Rhododendron ATR, which is strongly characterized by recreational trips (up to 75% seasonal volume variation), was applied to the east side of Sandy.

Because all of the intersections of interest along US 26 in Sandy are in the west and central areas of the city between Orient Drive and Ten Eyck Road, only the Gresham ATR was considered. This would be consistent with assumptions applied to the TSP update analysis and may provide a conservatively low estimate of seasonal variations in traffic since Sandy is well outside of the Metro area and should experience a stronger influence from recreational trips.

Figure 1 illustrates the difference in traffic volumes on US 26 during an average weekday, compared to average Fridays and average weekends using data collected by the Gresham ATR. The 30th highest hourly volume for this year (2009) is also shown for reference. As shown, traffic volumes on Friday afternoons are commonly higher than those experienced during other weekday afternoons, with the average Friday p.m. peak hour volume found to be 11% higher than that during the average p.m. peak hour of Tuesdays, Wednesdays, or Thursdays. Furthermore, the average weekday p.m. peak hour (Tuesday through Thursday) volume was found to be 23% lower than the 30th highest hourly volume of the year.

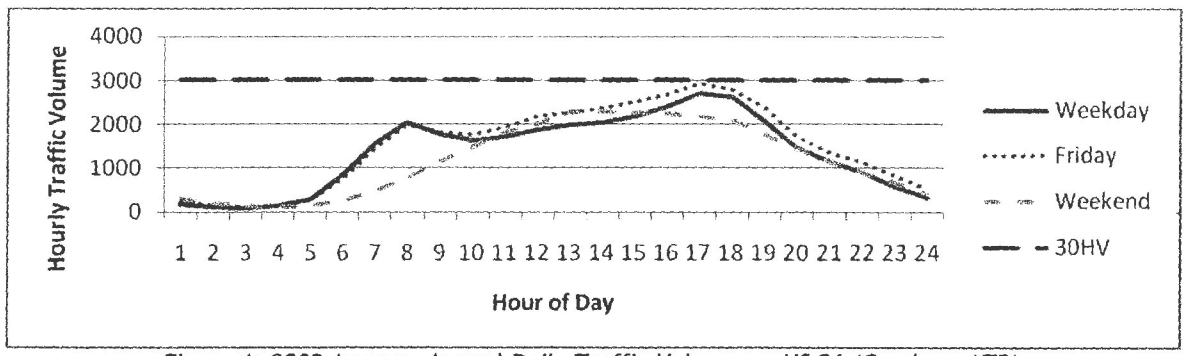

Figure 1: 2009 Average Annual Daily Traffic Volume on US 26 (Gresham ATR)

Because the average weekday p.m. peak hour may be more representative of typical travel on US 26 through Sandy than the 30th highest annual hour, this time period is recommended for consideration as part of an alternate mobility standard. This would shift the corridor management emphasis away from accommodating seasonal recreational trips through the city and refocus it on conditions that are more representative of every day travel. Furthermore, the potential 23% allowance for additional traffic that could result from using that time period is close to the roughly 30% differential between the current standard and projected operations in the future under the Alternative 1 build out scenario.

Potential Alternate Mobility Standard and Measures of Effectiveness

As noted above, the substitution of the average annual weekday p.m. peak hour for the 30th highest annual hour in the volume to capacity ratio calculation could have as much as a 23% allowance for additional traffic if applied to this corridor. However, with a differential between the current mobility standards and projected operations of more than 30% at some locations, this approach alone would not be sufficient.

Being outside of the Metro area, the volume to capacity ratio requirements for US 26 through Sandy are more demanding and allow for less congestion. In comparison, the volume to capacity ratio requirements in the subject corridor range from 0.70 to 0.85, while in the Metro area, volume to capacity ratios are commonly allowed to reach as high as 0.99. Raising the volume to capacity ratio threshold in the subject corridor could be considered as a complimentary measure to changing the analysis time period as described above. In fact, if the volume to capacity ratio threshold of 0.85, which is already applied to the intersections between Bluff Road and Ten Eyck Road within the Special Transportation Area, were applied to all of US 26 within the City of Sandy, it may allow every intersection in the corridor to comply with mobility standards during the average annual weekday p.m. peak hour.

Therefore, the following strategies for amending the mobility standards for US 26 within the City of Sandy are recommended for further consideration:

1. Use the average annual weekday p.m. peak hour for analysis purposes in place of the 30th highest annual hour.
2. Change the volume to capacity ratio requirement to 0.85 for all intersections within the corridor.

In the following stages of analysis to assess the impacts of such alternate mobility standards, other factors and refinements could come into consideration. A preliminary list of such issues is provided below for later reference as this process evolves.

Increased Congestion: Amending the mobility standards as described will allow for more development and will better align with reasonable transportation funding and improvement opportunities, but will also result in more congestion within the city. Before such action is taken, an assessment of the difference in allowed congestion compared to the current standard should be provided to allow for an informed decision with respect to the trade-offs involved.

Motorist Safety: More congestion at intersections is likely to result in longer vehicle queues that could spill back and block access to turn lanes and driveways or even block adjacent intersections. This could not only have secondary impacts on mobility, but could compromise safety as well. An evaluation of the impacts on vehicle queuing should be conducted as part of this process.

Corridor Average Mobility: The current standard evaluates mobility at every intersection, with each intersection expected to comply with mobility standards. As an alternative consideration, the use of a corridor average volume to capacity ratio could be evaluated, where the volume to capacity ratio requirement would be applied to the average volume to capacity ratio of a group of adjacent intersections in a corridor. Under this scenario, all intersections would benefit from capacity improvements made at a single location or even from improvements made to a parallel

local facility. This allows for greater flexibility in where capacity improvements can be made. However, it could also result in very poor operations at some intersections unless a higher maximum volume to capacity threshold is required for individual locations.

Unique Intersection Standards: As proposed, the volume to capacity ratio of 0.85 would be applied to all intersections in the corridor. However, another option could be to establish unique volume to capacity ratio standards for each intersection to match location-specific needs.

Overall Corridor Delay: The delay incurred by through traffic, especially freight, may be the most significant measure of the impact of allowing for more congestion. This should not only be evaluated a part of this process, but could even be included as part of the alternate mobility standard itself. This could be done by adding a maximum amount of delay allowed for through traffic between defined points during specified travel periods.

Appendix B

Technical Memorandum #5

DATE: September 2, 2010

TO: Liz Storn – City of Sandy
Sonya Kazen – ODOT

FROM: John Bosket, PE – DKS Associates
Michael Tomasini, PE – DKS Associates

SUBJECT: **City of Sandy TSP Update:** P10068-001
Average Annual Weekday P.M. Peak Hour Design Period

The purpose of this memorandum is to report on the results of the analysis of the recommended approach to developing an alternate mobility standard for US 26 in the City of Sandy, as described in *Technical Memorandum #4*.[1] The primary purpose for developing an alternate mobility standard for this area is the need to provide a reasonable management objective for the highway corridor given the level of forecasted traffic demand and funding constraints that limit the ability to serve it as currently required. In that memorandum, two strategies were recommended for amending the mobility standard:

1. Use the average annual weekday p.m. peak hour for analysis purposes in place of the 30th highest annual hour, and
2. Change the volume to capacity (v/c) ratio requirement to 0.85 or lower for all intersections within the corridor – matching the current standard in the downtown.

Technical Memorandum #5 provides further analysis of the problem being addressed, describes the process for developing the average annual weekday p.m. peak hour volumes, the measures of effectiveness used (i.e., v/c ratio), and the recommended City policy changes necessary to implement the alternate mobility standard.

Understanding the Problem

The need to develop and adopt an alternate mobility standard for this area is driven by the fact that system capacity cannot keep pace with projected traffic demand. The following exercises provide additional information regarding the extent of the problem and how it might impact travelers in the future.

Effect of Through Traffic Growth

The effect of through traffic growth on intersection operations was evaluated as part of the analysis to establish an achievable management objective for US 26 in the City of Sandy. To establish the growth in through traffic, development-based growth in the City, as evaluated in the City of Sandy TSP update, was "stripped out" of the 2029 model. Assuming all of the

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[1] *City of Sandy TSP Update: Intersection Deficiency and Annual Hourly Traffic Volume Analysis*, dated June 21, 2010

improvements identified in Alternative #1 were in place, the operations at the signalized intersections on US 26 were recalculated using these new volumes where growth was based purely on through trips. The results of this analysis are shown in Table 1. The table shows that even if no further land development were to occur in the City of Sandy through the year 2029, through traffic growth alone would degrade operations such that all but one of the signalized intersections on US 26 would not meet the current mobility standard.

Table 1: Effect of Through Traffic Growth on US 26 Intersection Operations

Intersection	Highway Design Manual Mobility Standard (v/c ratio)	Oregon Highway Plan Mobility Standard (v/c ratio)	2008 operations (v/c ratio)	2029 operations (v/c ratio)	2029 operations (v/c ratio)
			Existing	Alternative #1 (All Traffic)	Alternative #1* (No Local Growth)
US 26/ Orient Drive	0.60	0.70	0.79	1.04	0.82
US 26/ 362nd Drive	0.70	0.70	0.91	0.93	0.94
US 26/ Industrial Way	0.70	0.70	0.87	1.01	0.88
US 26/ Ruben Lane	0.70	0.75	0.93	1.06	0.96
US 26/ Bluff Road	0.85	0.85	0.93	1.01	0.99
OR 211/ Proctor Boulevard (US 26)	0.85	0.85	1.00	1.09	0.92
OR 211/ Pioneer Boulevard (US 26)	0.85	0.85	0.88	0.90	0.88
US 26/ Ten Eyck Road - Wolf Drive	0.85	0.85	0.88	0.91	0.78

*This scenario represents existing traffic volumes with only growth from through traffic included.
Shaded cell indicates mobility standard is not met.

Duration of Congestion

The duration of congestion experienced at an intersection or along a corridor is related to the vehicle demand compared to the capacity of the facility serving it. Where the demand exceeds system capacity, congested conditions can last for multiple hours, with excess demand spilling over from the peak hour into adjacent hours. However, where congestion becomes a regular occurrence, motorists may respond by shifting their time of travel or switching to an alternate mode of transportation altogether.

Because US 26 is already reaching capacity during the 30HV in Sandy and has been projected to operate well over capacity by the year 2029, the duration of peak period congestion experienced by travelers in the corridor will likely increase over time. This exercise attempts to quantify the potential duration of congestion in this corridor that may be experienced as a result of accepting the level of capacity provided by the Alternative 1 package of improvements and the proposed alternate mobility standard.

Intersection operations on the US 26 Corridor in Sandy are a good indicator of the level of congestion currently experienced during the peak hour. The v/c ratios shown above in Table 1 relate the peak demand to the intersection capacity. For simplicity's sake, congestion in this exercise is defined as an intersection v/c ratio equal to or greater than 1.0. Under today's conditions, the intersection of OR 211/Proctor Boulevard (US 26) operates with a v/c ratio equal to 1.0. Since none of the other study intersections have a higher v/c ratio, it is assumed that this intersection is the controlling capacity point for the corridor. This and other assumptions are summarized on the next page in Table 2.

To calculate the duration of congestion on US 26 in Sandy, it is also important to understand how traffic volumes fluctuate throughout the day and throughout the year. This data is best collected from ODOT's ATR sites. However, as noted previously, there are no ATR sites in the City of Sandy. Therefore, a combination of the Gresham and Rhododendron ATRs are used as a proxy to represent the hourly and yearly change in traffic volume for the City.

Table 2: Duration of Congestion Assumptions

Assumption	Sandy Related Input & Assumptions
Representative existing demand and capacity	Intersection of OR 211/US 26: • the worst operating signalized intersection for the US 26 corridor in the City of Sandy • v/c ratio = 1.0 during 30HV (volume = capacity) • 30 HV volumes developed from ATR data • By proxy, 30 HV ATR volume is equivalent to corridor level demand • Because v/c ratio = 1.0 during the 30 HV, the 30 HV ATR volume is also equivalent to the corridor level capacity
Representative future demand and capacity	Intersection of OR 211/US 26: • Alt 1 Improvements increase intersection capacity

Figure 1 shows a volume graph of a forecasted day reflecting a peak hour equivalent to the 30HV for the years 2008 and 2029 (i.e., an August Friday). In this figure it can be seen that the existing traffic demand during a peak day is approximately equal to the corridor capacity during the peak hour. If no further capacity improvements are made into the future, it can be expected that the traffic demand would exceed corridor capacity for at least seven hours. However, this excess demand could spill over into adjacent hours, causing congestion for as many as 10 hours. If the intersection improvements identified under Alternate 1 are constructed, the duration of congestion can be reduced to approximately five hours.

If this same graph were made for an average weekday (representing the proposed alternate mobility standard time period), the forecasted demand would be adequately served by system capacity during all hours of the day.

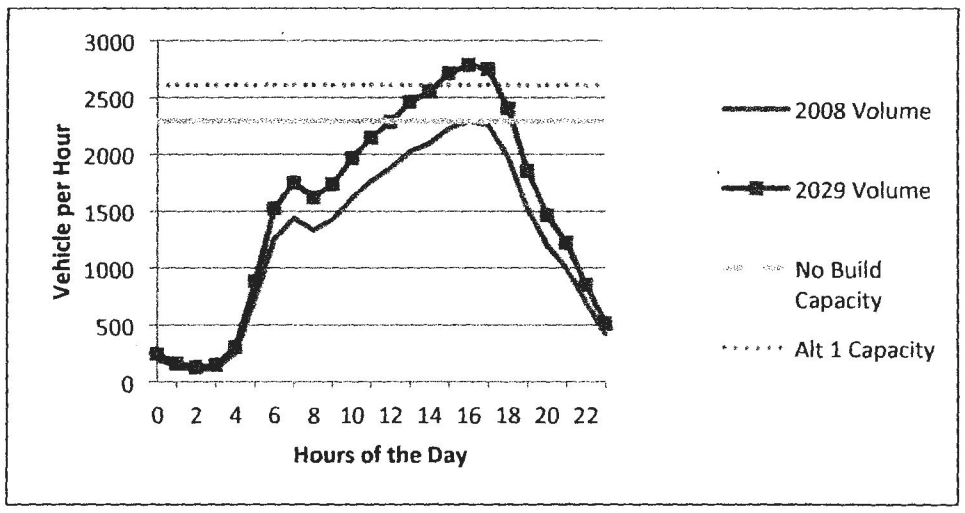

Figure 1: Forecasted 24-Hour Volume Profiles

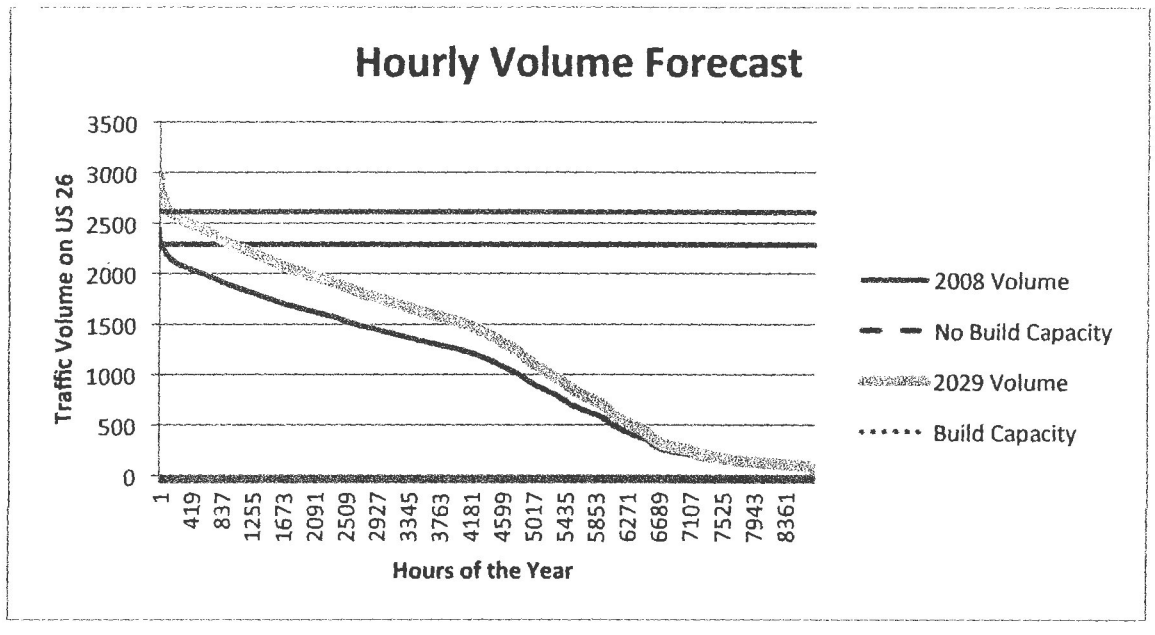

Figure 2: Annual Hourly Volume Profiles

Figure 2 illustrates the extent of congestion experienced over an entire year. Under current conditions, traffic demand exceeds system capacity for approximately 30 hours over the course of the year. However, by the year 2029, if growth occurs without any improvement to the highway, there would be more than 1,000 hours where demand exceeds capacity. With the improvements identified in Alternative 1 in place, this would decrease to approximately 100 hours.

Average Annual Weekday P.M. Peak Hour

The 30th highest hourly volume (30HV) is a commonly used design parameter and is the basis for ODOT's current mobility standard. In the City of Sandy, the 30HV is higher than typical conditions due to the distinct travel patterns that result from the City's proximity to the City of Portland and the many recreational areas to the east.

As discussed in *Technical Memorandum #4,* the average annual weekday p.m. peak (AWP) hour is more representative of typical travel on US 26 through Sandy, than the 30th highest annual hour. The calculation of the AWP is very similar to the procedure outlined by the Oregon Department of Transportation's (ODOT) Transportation Planning Analysis Unit (TPAU) *Analysis Procedure's Manual* (APM) for the 30HV.[2] There are four sections where the AWP methodology deviates from the TPAU AMP methods, including:

[2] ODOT, TPAU, Analysis Procedures Manual, Section 4 Developing Design Hour Volumes

- Traffic Count Collection
- Seasonal Factor Calculation
- AWP Calculation
- Design Hour Volume Calculation

TRAFFIC COUNT COLLECTION

For the 30HV calculations, traffic counts are conducted as close to the actual 30HV as possible. In the City of Sandy, this time normally coincides with a Friday afternoon in the summer. Traffic counts for the calculation of the AWP, however, should be conducted on a Tuesday through Thursday afternoon. Because seasonal variations during the p.m. peak hour on Tuesdays through Thursdays are relatively low (generally no more than 10%), the actual traffic count month is less critical than when using the 30HV.

SEASONAL FACTOR CALCULATION

The purpose of a seasonal factor is to convert manual counts taken during times of the year other than the average weekday to AWP volumes. As with the calculation of the seasonal factor for the 30HV, this step is accomplished with the use of ODOT Automatic Traffic Recorder (ATR) station data.

There are no ATR station locations on US 26 in the City of Sandy. The two closest ATR stations are in Gresham to the west and Rhododendron to the east. The travel patterns for each of these ATR stations are partially representative of travel patterns seen in the City of Sandy. The Gresham ATR shows predominantly commuter based travel patterns and the travel patterns recorded at the Rhododendron ATR are highly recreational in nature. This mix of two distinctly different travel patterns lends to the use of both ATR stations in the calculation of a seasonal factor to convert existing traffic counts to AWP volumes.

In the Sandy TSP Update, the Gresham ATR was used to calculate the seasonal factor and 30HV for all US 26 intersections west of downtown, while the Rhododendron ATR was used for all intersections east of the downtown. These calculations were based on TPAU methodology. The calculation of the seasonal factor for the AWP departs from the methodology for 30HV seasonal factors by blending the two sets of ATR data.

The data blending is based on an origin/destination study, which was performed in 2008 to determine the number of vehicles traveling through the City on US 26 (i.e., through trips). This data shows an approximate split between the people driving to Sandy, and those who are just traveling through to destinations beyond the City. This survey revealed that during the weekday p.m. peak hour, roughly 30 percent of the drivers on US 26 are traveling through the City. Based on this local versus through split of vehicles recorded during the origin-destination study, the seasonal factor calculations use a weighted average dependent on this ratio. This equates to a factor of 0.7 being applied to the data from the Gresham ATR, and a factor of 0.3 being applied to the Rhododendron ATR. Table 3 shows the resulting weekday and Friday seasonal factors for US 26 in the City of Sandy for each month of the year. The weekday factor is based on counts collected on a Tuesday through Thursday for the appropriate month, while the Friday factors are based on counts taken on a Friday for the given month.

Table 3: AWP Seasonal Factors - US 26 in the City of Sandy

Month	*Weekday Seasonal Factor	Friday Seasonal Factor
January	1.019	0.912
February	1.002	0.896
March	1.000	0.908
April	1.015	0.923
May	1.046	0.939
June	1.035	0.942
July	1.045	0.955
August	1.029	0.917
September	1.041	1.005
October	1.042	0.966
November	1.086	1.013
December	1.090	1.004

* Tuesday, Wednesday, or Thursday only

AWP CALCULATION

The AWP is calculated using the factors shown in Table 3, depending on whether the count was conducted on a Tuesday through Thursday, or a Friday. For instance, if a count were to be conducted on a Tuesday in January, then the intersection turn movement volumes would be multiplied by 1.019 to calculate the AWP.

Turn movement counts should not be taken on a Friday. The Friday seasonal factor is provided for use on past studies where counts were taken for the calculation of the 30HV.

DESIGN HOUR VOLUME CALCULATION

The design hour volume calculation for US 26 in the City of Sandy differs from TPAU methodology only in the fact that the AWP volumes are used instead of the 30HV. All other steps in the design hour volume calculations are the same.

Measure of Effectiveness

The measure of effectiveness used for evaluating the effect of the AWP and the alternate mobility standard will continue to be the intersection volume to capacity (v/c) ratio. This is the adopted standard measure of effectiveness that is applied as a mobility standard for all ODOT intersections. The goal of this exercise is to establish an achievable management objective within the context of US 26 intersections in the City of Sandy. Table 4 (on the following page) summarizes the intersection capacity analysis results conducted as part of the update to the City of Sandy's TSP, and the revised analysis based on the AWP design hour volumes.

Table 4: Intersection Operations along US 26 within Sandy

Intersection	Highway Design Manual Mobility Standard (v/c ratio)	Oregon Highway Plan Mobility Standard (v/c ratio)	Recommended Mobility Standard (v/c ratio)	2008 operations (v/c ratio)		2029 DHV No-Build operations (v/c ratio)		2029 DHV Alternative 1 operations (v/c ratio)	
				30HV	AWP	30HV	AWP	30HV	AWP
US 26/ Orient Drive	0.60	0.70	0.85	0.79	0.63	1.16	1.03	1.04	0.85
US 26/ 362nd Drive	0.70	0.70	0.85	0.91	0.77	1.33	1.17	0.93	0.84
US 26/ Industrial Way	0.70	0.70	0.85	0.87	0.71	1.36	1.06	1.01	0.84
US 26/ Ruben Lane	0.70	0.75	0.85	0.93	0.72	1.36	1.16	1.06	0.85
US 26/ Bluff Road	0.85	0.85	0.85	0.93	0.74	1.30	1.21	1.01	0.85
OR 211/ Proctor Boulevard (US 26)	0.85	0.85	0.85	1.00	0.77	1.25	1.05	1.09	0.85
OR 211/ Pioneer Boulevard (US 26)	0.85	0.85	0.85	0.88	0.68	1.06	0.92	0.90	0.68
US 26/ Ten Eyck Road - Wolf Drive	0.85	0.85	0.85	0.88	0.57	1.20	1.04	0.91	0.72

Shaded cell indicates mobility standard is not met.

The Highway Design Manual, Oregon Highway Plan, and recommended new mobility standards are shown above in Table 3. As can be seen in the table, none of the intersections would meet the current mobility standard in 2008 or 2029, even with proposed improvements in place. The combination of the proposed improvements from Alternative 1 and the selection of the AWP design hour, allow all of the intersections to meet the proposed alternate mobility standard; a v/c ratio of 0.85 or lower.

Recommended City Policy Changes

It is recommended that the following text be inserted after item number 4 in the City *of Sandy – Minimum Requirements for Traffic Analyses* document:

4. The recommendations made in the report should be specific and based on Oregon Department of Transportation (ODOT) mobility standards for signalized and stop controlled intersections under ODOT jurisdiction. ODOT intersections must be analyzed using methodologies outlined in the Transportation Analysis Planning Unit's (TPAU) Analysis and Procedures Manual (AMP), with the exception of the calculations for the seasonal factor. The seasonal factor calculations shall use the seasonal factor table developed for the City of Sandy Transportation System Plan (TSP) Update.

It is also recommended that the following paragraph be included in the Goals, Policies and Objectives section of the City of Sandy TSP Update, and under the *Major Roadway Circulation* section of *Goal 12*: in the *City of Sandy Comprehensive Plan:*

23. Support ODOT adoption of an alternate mobility standard for US 26 that allows for increased congestion on the highway corridor, especially during peak seasonal travel periods.

Appendix C

CITY OF SANDY STAFF REPORT
FROM: Mike Walker, Public Works Director; Liz Storn, Engineering Technician
SUBJECT: Council Workshop – Transportation System Plan

In September of 2008 the City began the process of updating our Transportation System Plan (TSP). Our current TSP was prepared in 1995 and adopted in 1998. A TSP is required for all cities over 2,500 population and is intended to coordinate land use planning with transportation planning.

ODOT has established mobility standards for intersections on state highways to ensure a minimum performance level. These standards are determined using a ratio of traffic volume to intersection capacity (volume to capacity ratio, or "v/c" ratio), which is measured during the 30th highest hour of traffic during the year. In Sandy, the 30th highest hour occurs on a Friday afternoon in August, when commuter traffic combines with recreational traffic. The v/c ratio requirement varies based on roadway conditions and classifications, as shown in the table below:

Intersection with US 26	Classification/ Designation	ODOT Standard v/c Ratio	Current v/c Ratio	v/c Ratio in 2029 with no Improvements
Orient Drive	Statewide Expressway	0.70	0.79	1.16
362nd Drive	Freight Route/ Statewide Highway	0.70	0.91	1.33
Industrial Way	Freight Route/ Statewide Highway	0.70	0.87	1.36
Ruben Lane	Freight Route/ Statewide Highway	0.75	0.93	1.36
Bluff Road	STA/ Freight Route/ Statewide Highway	0.85	0.93	1.30
OR 211/ Proctor Boulevard	STA/ Freight Route/ Statewide Highway	0.85	>1.0	1.25
OR 211/ Pioneer Boulevard	STA/ Freight Route/ Statewide Highway	0.85	0.88	1.06
Ten Eyck Road	STA/ Freight Route/ Statewide Highway	0.85	0.88	1.20

Table 1. Current v/c ratios for US 26 intersections

During the course of updating the TSP, it was determined that all signalized intersections in the City failed to meet ODOT's mobility standards, and would continue to do so in the future, even if improvements were made to the City street network and to the state highway system. When an intersection's v/c ratio is greater than 1.0, it means that the traffic demand exceeds the capacity of the intersection, and traffic backups occur. Currently, none of the intersections have a v/c ratio greater than 1.0, but in 2029

without any improvements to the system, all of the signalized intersections will have v/c ratios greater than 1.0.

In some cases the highway itself may have adequate capacity but the signalized intersections are at or above capacity. In some cases it may be just one movement (a left turn) that pushes the intersection above the acceptable v/c standard and the rest of the intersection may function at or below the standard. The City uses a different standard to evaluate capacity; referred to as Level of Service, (LOS) where a street or intersection is 'graded' based on the amount of delay. The levels start at A, (no delay) and go to 'F' where the delay is unacceptable to motorists. The City has established a mobility standard of LOS D for all City intersections. Currently, intersections on US 26 are rated as shown using the City's LOS standard.

Intersection with US 26	**Current LOS**	**LOS in 2029 with no Improvements**
Orient Drive	N/A*	F
362nd Drive	D	F
Industrial Way	C	F
Ruben Lane	C	F
Bluff Road	C	F
OR 211/ Proctor Boulevard	E	F
OR 211/ Pioneer Boulevard	E	F
Ten Eyck Road	D	F

*Information was not provided in technical memorandum

Table 2. Current LOS for US 26 Intersections

Even the construction of a bypass (for which there is certainly no current funding and probably no chance of future funding) will not allow the all of the US 26 intersections to meet ODOT standards, although conditions would significantly improve. Therefore, the only solution is to come up with an 'alternate' mobility standard. This is largely a paper exercise to satisfy ODOT requirements.

An Alternate Mobility Standard (AMS) would increase the maximum v/c ratio to 0.85 for all signalized intersections, and would analyze the average annual weekday PM peak hour instead of the 30th highest annual hour. This reduces the impact of recreational traffic on City standards. Combined with certain street network and highway intersection improvements to be included in the TSP Update the revised v/c ratio would be adequate through 2029. As part of the TSP update process ODOT will prepare and submit a request for an AMS on US 26 in Sandy to the Oregon Transportation Commission.

ODOT has hinted that they could appeal or intervene in future land use approvals if the

City does not support an AMS. As a practical matter only significant land use actions like zone changes or Comp Plan changes would likely attract close ODOT scrutiny. These are relatively rare in Sandy. However even outright permitted uses that generate or attract a lot of traffic might be more vulnerable to an appeal if the v/c ratio at an affected intersection exceeded ODOT's standard and the applicant was unable or unwilling to foot the bill for the entire intersection improvement.

Before we proceed further staff needs policy direction from the Council on three key items:

- **Alternate Mobility Standard** – Submittal of an AMS application would require the support of the City Council in the form of a resolution which would include acknowledgment of v/c ratio issues, agreement with the proposed solution(s) and an intent to contribute toward improvements to the City street network and highway intersections.

- **Financial Participation in Projects to Improve Intersections** – Currently, the estimated cost of the intersection improvements is $8.125 M. The proposed improvements are described in Table 3. If the City chose to participate in these projects a way to equitably distribute the costs among each agency is needed.

  Based on an earlier survey to distinguish 'through' traffic from 'local' traffic performed as part of the TSP an estimate of 70% 'local' trips and 30% 'through' trips was developed. For various reasons staff does not feel that this method accurately reflects the balance of local vs. through trips and that a different way of apportioning these costs must be developed.

Location	**Improvement(s) Description**	**Project Cost**
US 26/ 362nd Dr.	Construct a second westbound left turn lane	$5,350,000
	Construct an acceptance lane for second westbound left turn lane to drop at southern access to Fred Meyer property	
	Construct a northbound through lane	
	Construct southbound through, right turn and left turn lanes	
US 26/ Industrial Way	Change southbound approach to dual left turn lanes and a shared through/right lane	$780,000
	Construct a northbound left turn lane	
US 26/ Ruben Lane	Change southbound approach to dual left turn lanes and a shared through/right lane	$770,000
	Change northbound approach to left turn lane, and shared through/right lane	
OR 211/Proctor	Construct a northbound left turn lane (restriping	$5,000

Boulevard (US 26)	only)	
US 26/ Ten Eyck Rd. – Wolf Drive	Construct a northbound left turn lane	$1,220,000
	Construct a southbound left turn lane	
Total Project Costs (Intersection Improvements)		**$8,125,000**

Table 3. Recommended Motor Vehicle Improvement Projects and Costs (2009 Dollars)

- **Funding Options for Intersection Improvements** – If the Council determines it is appropriate to participate in these projects where should the funding come from? Currently, Systems Development Charges (SDCs) are the primary source of funding for capacity increasing capital projects. Our SDCs need to be updated regardless but if we include an additional $8.125 M in US 26 intersection improvements the Transportation SDC may rise considerably.

  We can spread these costs over new development City-wide or we can determine "areas of influence" around each intersection and develop an SDC surcharge on top of the base SDC for new development in these areas. The first method would probably generate more funding more rapidly than the latter method but may not accurately reflect the use of each intersection by City residents. The latter method is probably more accurate but would generate revenue much more slowly.

Once we have Council direction on these issues we will meet with ODOT and work out the details. There will be one more public meeting on the TSP in March 2011 and then it will be forwarded to Planning Commission and City Council for recommendation and adoption. This will likely happen in April 2011. The Alternate Mobility Standard process will pursue a separate track with ODOT and the Oregon Transportation Commission.

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