BIGGS JUNCTION REFINEMENT PLAN

Phase 1

February 2001

Oregon Department of Transportation
Region 4
Program and Planning Section

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BIGGS JUNCTION REFINEMENT PLAN Phase 1

Implementation of the Biggs Junction Refinement Plan - Phase 1 is dependent upon the availability of funding. Adoption of the plan by the Oregon Transportation Commission does not guarantee adequate financial resources to carry out the projects nor can the Commission commit the financial resources of other agencies or public bodies.

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Executive Summary

The Oregon Department of Transportation (ODOT) initiated the Biggs Junction Refinement Plan during the spring of 2000. The purpose of this study is two-fold:

- To guide the management and development of state transportation facilities at Biggs Junction; and

- Develop short- and long-term access management strategies that will provide for the safe and efficient movement of people and goods within and through Biggs Junction.

The refinement planning process provided ODOT, Sherman County, business owners, citizens, and highway users of Biggs Junction with the opportunity to identify various access management and highway operational issues. The goals and objectives identified by the participants in the refinement planning process served as guidelines for developing and evaluating access management solutions, selecting a preferred refinement plan, and proposing a schedule and responsibility for implementing the recommendations of the refinement plan.

The refinement plan evaluated the existing and the forecast year 2020 traffic operations within Biggs Junction. Key findings from the existing and future condition analyses are as follows:

- The minimal delineation of existing accesses contributes to an environment in which highway users are faced with an abnormally high number of undefined vehicular conflict points;

- The existing geometry of the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road does not adequately accommodate the turning movements of large vehicles common to this area;

- A three-lane cross-section is required on all approaches to the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection to maintain acceptable intersection operations under year 2020 conditions; and

- Signalizing or converting the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection to all-way stop-control (AWSC) may be warranted under year 2020 conditions.

Based on the findings of the existing and future condition analyses, potential mitigation measures were developed to address identified deficiencies. The potential mitigation measures were evaluated and further refined through discussions with representatives of ODOT and Sherman County, and citizens and business owners of Biggs Junction. The resulting refinement plan addresses geometric, and operational issues; sight distance considerations; accommodation of on-street parking; and preliminary economic and environmental analyses.

This refinement plan is a guideline designed to ensure the safe and efficient operation of the state highway facilities located within Biggs Junction. The strategies and recommendations contained within were developed through a public involvement process and are consistent with the goals and objectives of the Oregon Transportation Plan, 1999 Oregon Highway Plan, Oregon Administrative Rule #51, US 97 Corridor Plan, and the Sherman County Comprehensive Plan.

Introduction

Refinement Plan Overview

The Oregon Department of Transportation (ODOT) initiated the Biggs Junction Refinement Plan in the spring of 2000. The purpose of this study is two-fold:

- To guide the management and development of state transportation facilities at Biggs Junction; and

- To develop short- and long-term solutions for identified access management issues that will provide for the safe and efficient movement of people and goods within and through Biggs Junction.

As part of this project, a refinement plan has been developed. The refinement plan is a complement to the US 97 and Interstate-84 corridor plans, incorporating the relevant strategies, goals, and/or policies of these plans. This refinement plan will play a significant role in ensuring the safe and efficient operation of local highway facilities as Biggs Junction continues to grow and its major intersection (US 97/Celilo-Wasco Highway [Oregon Highway 301 Spur]/I84 Frontage Road) experiences increasing traffic volumes. Additionally, this management plan addresses local pedestrian, bicycle, and vehicular circulation and connectivity issues.

Background

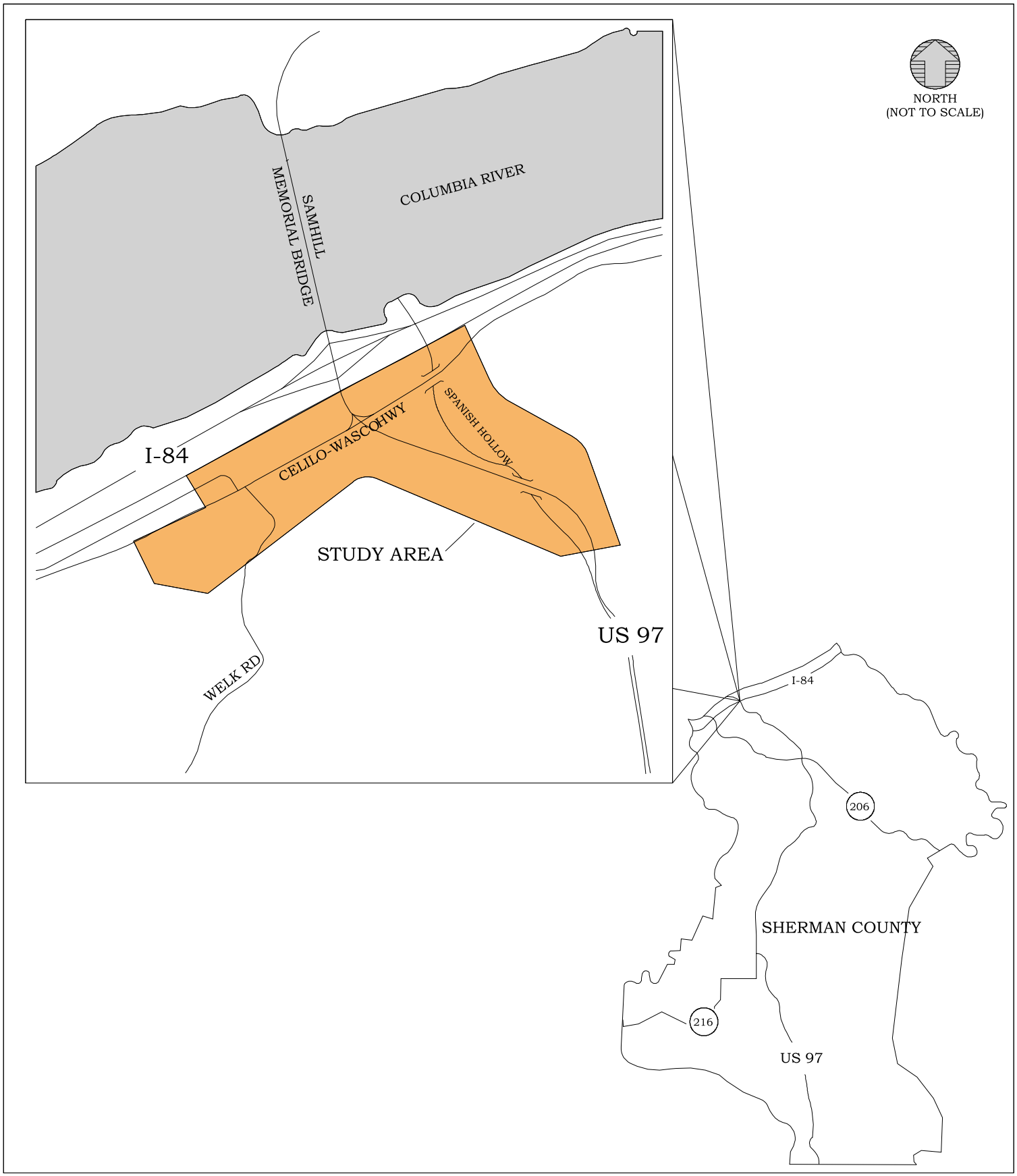
Biggs Junction is located along the southern shore of the Columbia River in northern Sherman County, Oregon. Biggs Junction is centered on the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection, just south of the Interstate-84/US 97 interchange.

As shown in Figure 1, the study area extends approximately one-half mile to the west, and one-quarter mile to the east of US 97 along Celilo-Wasco Highway Spur/I-84 Frontage Road. To the north, the study area is bounded by the Union Pacific Railroad, and to the south, the study area extends for approximately one-half mile along US 97 to where the highway crosses Spanish Hollow Creek.

The unincorporated community of Biggs Junction is located within these bounds. Official population estimates specific to Biggs Junction are unavailable; however, based upon visual inspection during an April 2000 site visit and a survey of local residents, the current population of Biggs Junction is estimated to be less than one hundred.

Biggs Junction development patterns have historically been driven by commercial development opportunities to provide highway oriented commercial services to persons traveling along state highway facilities or working/living in the surrounding area. Within the vicinity of the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection, all properties are zoned “General Commercial” (C-1) under Sherman County’s Zoning Map and Comprehensive Plan.

Based on the Sherman County Comprehensive Plan, the C-1 zone designation permits the following uses: retail trade establishments; financial institutions; business, governmental, or professional offices; service commercial establishments; manufactured home parks; personal and business services; and recreation vehicle parks. Illustrated in Figure 2 are the properties and existing land uses within the study area.



STUDY AREA MAP

BIGGS JUNCTION REFINEMENT PLAN BIGGS JUNCTION, OREGON	FIGURE 1	
DECEMBER 2000		

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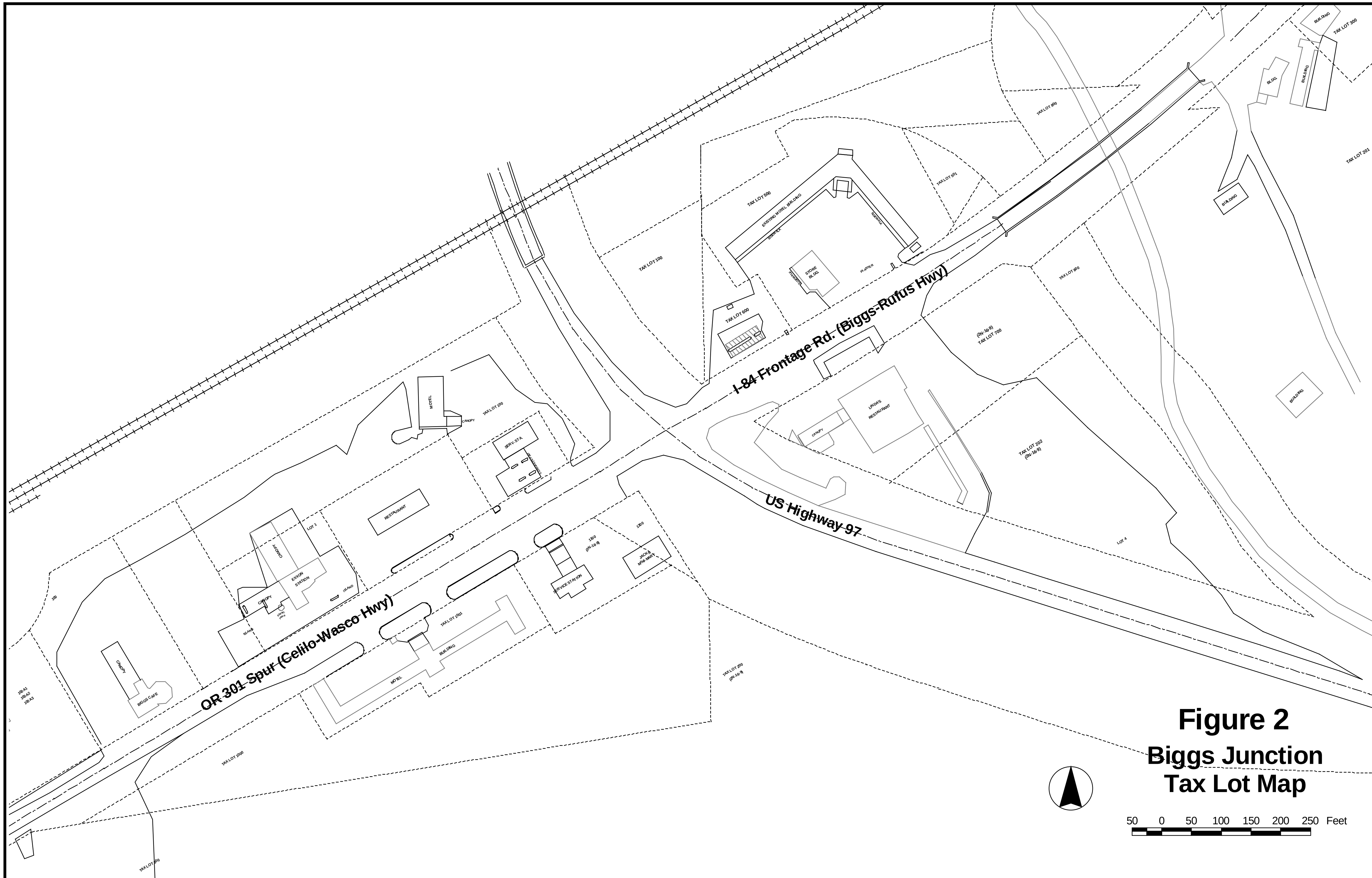


Figure 2
Biggs Junction
Tax Lot Map

Public Involvement and Study Goals

The refinement planning process has provided the Oregon Department of Transportation, Sherman County, business owners, citizens, and highway users of Biggs Junction with the opportunity to identify various access management and highway operational issues. Decisions based upon discussions regarding these issues are focused on providing for long-term economic viability of Biggs Junction and to ensure adequate and safe service for highway users.

Establishing a vision for Biggs Junction by way of goals and objectives for the Refinement Plan was a central element of the public involvement process. The goals and objectives identified by the participants in the refinement planning process served as guidelines for developing and evaluating access management solutions, selecting a preferred refinement plan, and proposing a schedule and responsibility for implementing the recommendations of the refinement plan.

A Stakeholders Group was formed to provide public input into the planning process. The Stakeholders Group was comprised of Biggs Junction business and property owners, Sherman County representatives, and ODOT staff. Kittelson & Associates, Inc. was retained as the refinement plan project consultant and was responsible for providing the Stakeholders Group with technical assistance throughout the planning process. The group convened at several key junctures of the project, including:

- Presenting the existing and future conditions analysis findings;
- Presenting the on- and off-system circulation and safety analysis findings; and
- Presenting the draft Biggs Junction Refinement Plan.

The intent of these meetings was to facilitate the local transportation planning process in such a manner that a general consensus could be achieved and maintained among all parties in attendance.

To remain consistent with previously adopted state, county, and local planning goals and objectives, the applicable goals and objectives of the following plans/policies were used as a basis from which to develop a draft set of project goals and objectives specific to Biggs Junction.

- The Oregon Transportation Plan;
- The 1999 Oregon Highway Plan;
- Oregon Administrative Rule # 51;
- The adopted US 97 Corridor Strategy Plan;
- The draft US 97 Corridor Management Plan;
- The Sherman County Comprehensive Plan; and
- Local zoning standards.

US 97 Corridor Strategy Plan objectives, specific to the Biggs Junction Phase 1 Study area are as follows[1].

1.8.A Provide for moderate-speed operations of flow in urban and urbanizing areas and rural development centers.

3.4.D Develop local access management and circulation plans to relieve localized congestion problems.

6.4.E Ensure that city and county comprehensive plans, zoning ordinances, and local transportation system plans achieve Corridor Plan objectives.

[1] US Highway 97 Corridor Plan. Volume 1: Corridor Strategy.

6.4.F Utilize access management to minimize any negative impacts of new development on US 97.

The draft goals and objectives for the Biggs Junction Refinement Plan were refined through discussions with the Stakeholders Group. The refined goals and objectives of the plan are summarized below.

Goal 1: Promote a balanced, safe, and efficient transportation system.

Objectives:

1. *Develop a multi-modal transportation system that avoids reliance upon one form of transportation as well as minimizes energy consumption and air quality impacts.*

2. *Accommodate economic development activities consistent with the adopted comprehensive plan, Oregon Highway Plan, and the US 97 Corridor Plan.*

3. *Maintain highway capacity, mobility and safety consistent with the Oregon Highway Plan.*

4. *Provide safe and effective accessibility to existing and future developments.*

5. *Balance the function of US 97/Celilo-Wasco with the needs of adjacent land uses that will minimize conflicts between the competing interests.*

Goal 2: Ensure the adequacy of the roadway network in terms of function, capacity, level of service, and safety.

Objectives:

1. *Develop local access spacing and design standards that safely balance the local access needs of highway users with the function and capacity of the highway.*

2. *Provide a level of mobility at all intersections in Biggs Junction consistent with the Oregon Highway Plan, recognizing the rural character of the area.*

Goal 3: Identify and prioritize access management improvement needs in Biggs Junction, and identify a set of reliable funding sources that can be applied to these improvements.

Objective:

1. *Develop a prioritized list of transportation improvement needs in the study area, including on- and off-system improvements.*

Existing Conditions

An operational analysis of existing weekday p.m. peak hour traffic conditions was conducted to identify the current intersection volume-to-capacity ratio (v/c) of the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection and to identify existing system deficiencies. For organizational purposes, the remainder of this *Existing Conditions* section is subdivided into five primary areas:

- Transportation Facilities;
- Travel Modes/Connectivity of Modes;
- Traffic Capacity/Operations Analysis;
- Traffic Safety Analysis; and
- Access Evaluation.

Transportation Facilities

Either ODOT or Sherman County manages all public roadways within Biggs Junction. The following paragraphs highlight the existing roadway network, which is illustrated in Figure 1.

State Facilities

Biggs Junction is located adjacent to the Interstate-84/US 97 interchange, providing Biggs Junction with direct connection to communities such as Portland, Oregon; The Dalles, Oregon; Bend, Oregon; Pendleton, Oregon; and Yakima, Washington.

US Highway 97

US 97, an ODOT maintained facility, is the primary north-south route through central Oregon. The 1999 Oregon Highway Plan (OHP) designates US 97 as both a State Freight Route and a Statewide Highway.[2] According to Action 1A.1 of the OHP:

> *Statewide Highways typically 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. A secondary function is to provide connections for intra-urban and intra-regional trips. The management objective is to provide safe and efficient, high-speed, continuous-flow operation. In constrained urban areas, interruptions to flow should be minimal. Inside Special Transportation Areas (STAs), local access may also be a priority.*[3]

US 97 has a two-lane cross-section and a posted speed of 40 miles per hour within the study area.

Celilo-Wasco Highway Spur (I-84 Frontage Road East of US Highway 97)

Celilo-Wasco Highway [Oregon Highway 301 Spur], west of US 97 and the frontage road east of US 97, are ODOT maintained facilities, running east-west paralleling Interstate-84. The 1999 Oregon Highway Plan identifies Celilo-Wasco Highway Spur as a District Highway.[4] According to Action 1A.1 of the OHP:

> *District Highways are facilities of countywide significance and function largely as county and city arterials or collectors. They provide connections and links between small-urbanized areas,*

[2] 1999 Oregon Highway Plan, p. 209.
[3] Ibid, p. 41.
[4] Ibid, p.217.

> *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. Inside Urban Business Areas, mobility is balanced with local access.*[5]

East of US Highway 97, the frontage road for I-84 is also maintained as a "District Highway." Within the study area, Celilo-Wasco Highway has a two-lane cross section and a posted speed of 40 miles per hour.

County Facilities

Welk Road, located to the west of US 97, terminates at Celilo-Wasco Highway and is the only county maintained road facility in the study area.

Welk Road

Welk Road is an un-improved, gravel road and provides a link between Biggs Junction and OR 206. The Welk Road/OR 206 junction is approximately 4 miles to the south of Biggs Junction.

Travel Modes/Connectivity of Modes

An inventory of the existing street system was conducted within the study area in April 2000 to identify the locations of sidewalks, bike lanes, on-street parking, paved/unpaved roadways, traffic control devices, signing, and posted speed limits. An overview of the analysis and results is summarized below.

Pedestrian/Bicycle System

Within the Biggs Junction Study Area, there is no developed sidewalk and bicycle system along either Celilo-Wasco Highway/I-84 Frontage Road or US Highway 97.

Observations made during two site visits in spring of 2000 revealed a low level of pedestrian and bicycle activity. Confirmed through discussions with local business owners, the low level of pedestrian and bicycle activity is typical for this area and would not be expected to fluctuate significantly throughout the year. No designated bicycle lanes are provided. However, paved shoulders along both roadways do have sufficient width, in which bicycle traffic could be accommodated (i.e. each highway maintains shoulder widths in excess of six feet). Although, the wide shoulders can effectively facilitate bicycle traffic; they are currently used for on-street parking, rendering them unusable for bicyclists.

On-Street Parking

No striped on-street parking is provided within the study area along either US 97 or Celilo-Wasco Highway Spur/I-84 Frontage Road. The west side of US 97 is currently signed for no parking. However, parking of vehicles, including large trucks, along the shoulders of Celilo-Wasco Highway Spur/I-84 Frontage Road is common due to the wide shoulders.

Parking on the shoulder results in an undesirable sight distance restriction for drivers at adjacent intersections. In addition, on-street parking in some instances impedes the egress turning movement of vehicles (especially large trucks) from local businesses.

[5] Ibid, p.41.

Public Transportation

Biggs Junction has regional and intercity bus service provided by Greyhound Lines, Inc. The daily transit schedule is summarized in Table 1[6].

Table 1 Daily Transit Schedule

Route	Highway	Origin	Destination	Departure Time
1331	Interstate-84	Biggs Junction	Portland	3:10 a.m.
5547	Interstate-84	Biggs Junction	Portland	8:00 a.m.
5535	Interstate-84	Biggs Junction	Portland	1:10 p.m.
1303	Interstate-84	Biggs Junction	Portland	4:05 p.m.
5549	Interstate-84	Biggs Junction	Portland	5:45 p.m.
1337	Interstate-84	Biggs Junction	Portland	10:35 p.m.
1380	Interstate-84	Portland	Biggs Junction	3:00 a.m.
5544	Interstate-84	Portland	Biggs Junction	10:15 a.m.
5530	Interstate-84	Portland	Biggs Junction	12:50 p.m.
1334	Interstate-84	Portland	Biggs Junction	3:40 p.m.
1422	US 97	Bend	Biggs Junction	9:45 a.m.
1422	US 97	Biggs Junction	Yakima	1:15 p.m.
1421	US 97	Yakima	Biggs Junction	3:45 p.m.
1421	US 97	Biggs Junction	Bend	6:15 p.m.

The north-south/east-west bus transfer hub is located at Grand Central Travel Stop in the southeast quadrant of the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection. Aside from the Greyhound service, there are two charter bus services operating in the corridor - Fronteras del Norte and Golden State. These two carriers carry migrant workers between Tiajuana, Mexico and Seattle, Washington. Otherwise, private transportation is the only available means of transport to the local medical, social, and retail services and the educational and employment opportunities located in adjacent communities.

Other Transportation Facilities

Air Transportation

The nearest airfield to Biggs Junction is the Wasco State Airport located approximately 10 miles to the south. A general aviation airport is located in The Dalles, approximately 25 miles to the west. Larger scale regional freight cargo and air passenger services are provided at the Yakima Air Terminal, located approximately 75 miles to the north and Portland International Airport, located approximately 80 miles to the west.

Railroad Transportation

The Union Pacific Railroad is situated along the north boundary of study area. Rail freight service is available and serves a nearby rail grain terminal located northwest of the US 97/Celilo-Wasco Highway Spur intersection. Approximately 20% of all the grain produced in Sherman County is transported out of the area via rail.

[6] Greyhound Fares & Schedules.

Marine Transportation

The Columbia River flows past Biggs Junction. Within Biggs Junction, a grain terminal (separate from the rail grain terminal) is located along its southern shore. Approximately 80% of all the grain produced in Sherman County is transported out of the area via barge.

Traffic Capacity/Operations Analysis

The US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection was selected for operational analysis under year 2000 existing conditions.

Traffic Control

The US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection is currently unsignalized and operates as a two-way stop-controlled (TWSC) intersection with a flashing yellow warning light on the US 97 approaches. Figure 3 illustrates the existing lane configurations and traffic control devices at the study intersection.

Traffic Volumes

To evaluate the current transportation system conditions within the study area, ODOT conducted weekday, 24-hour tube and manual traffic volume counts in February 2000. Copies of the tube and manual traffic volume counts are provided in Appendix "A", along with diagrams summarizing vehicle movements at the US 97/Celilo-Wasco Highway intersection for a 12-hour period. Analysis of the traffic volume counts reveals that trucks comprise approximately 50-percent of the traffic on US 97 and 25-percent of the traffic on Celilo-Wasco Highway Spur/I-84 Frontage Road.

In addition to these counts, four surveillance cameras recorded travel patterns within the study area for a one-month period. A chart depicting the 24-hour traffic volume profile for all vehicles entering the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection is illustrated in Figure 4.

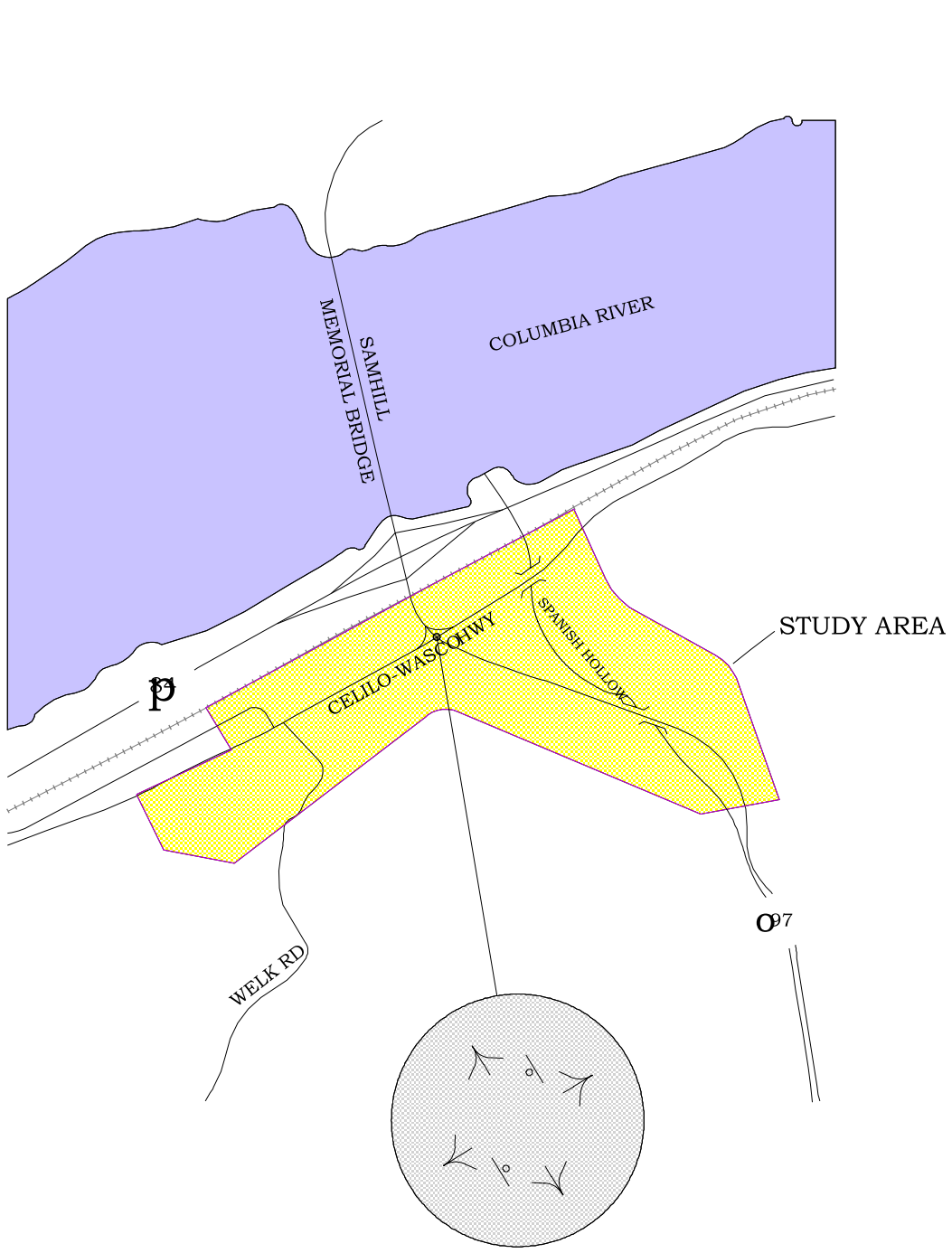
The weekday p.m. peak hour on the street system occurs between 3:00 and 4:00 p.m. To ensure the analysis represents a reasonable worst-case scenario, the February counts were increased by a 60-percent seasonal adjustment factor to reflect peak summertime conditions (which corresponds to increased recreational traffic as well as the summer harvest season). The seasonal adjustment is based on data collected between 1995-1998 at ODOT's Permanent Recorder Station #28-001 (located on US 97, approximately 0.6 miles north of Moro, Oregon). The adjusted weekday p.m. peak hour traffic volumes at the study intersection are illustrated in Figure 5. The traffic volumes have been rounded to the nearest five vehicles per hour.

Highway Performance Analysis

Using the summertime weekday p.m. peak hour turning movement volumes shown in Figure 5, an operational analysis was conducted at the study area intersection to determine the existing volume-to-capacity ratios. As defined in the 1999 Oregon Highway Plan, a volume-to-capacity (v/c) ratio is the peak hour traffic volume (vehicles/hour) on a highway section divided by the highway capacity. For example, when v/c equals 0.85, peak hour traffic uses 85-percent of a highway's capacity, 15-percent of the capacity is not used.[7]

All volume-to-capacity ratio analyses described in this study were conducted in accordance with the *1997 Highway Capacity Manual*, published by the Transportation Research Board.[8]

[7] 1999 Oregon Highway Plan, p. 72.
[8] Transportation Research Board. *Highway Capacity Manual*, Special Report No 209.



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US 97/CELILO-WASCO HWY INTERSECTION EXISTING LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

BIGGS JUNCTION REFINEMENT PLAN BIGGS JUNCTION, OREGON	FIGURE 3
DECEMBER 2000	

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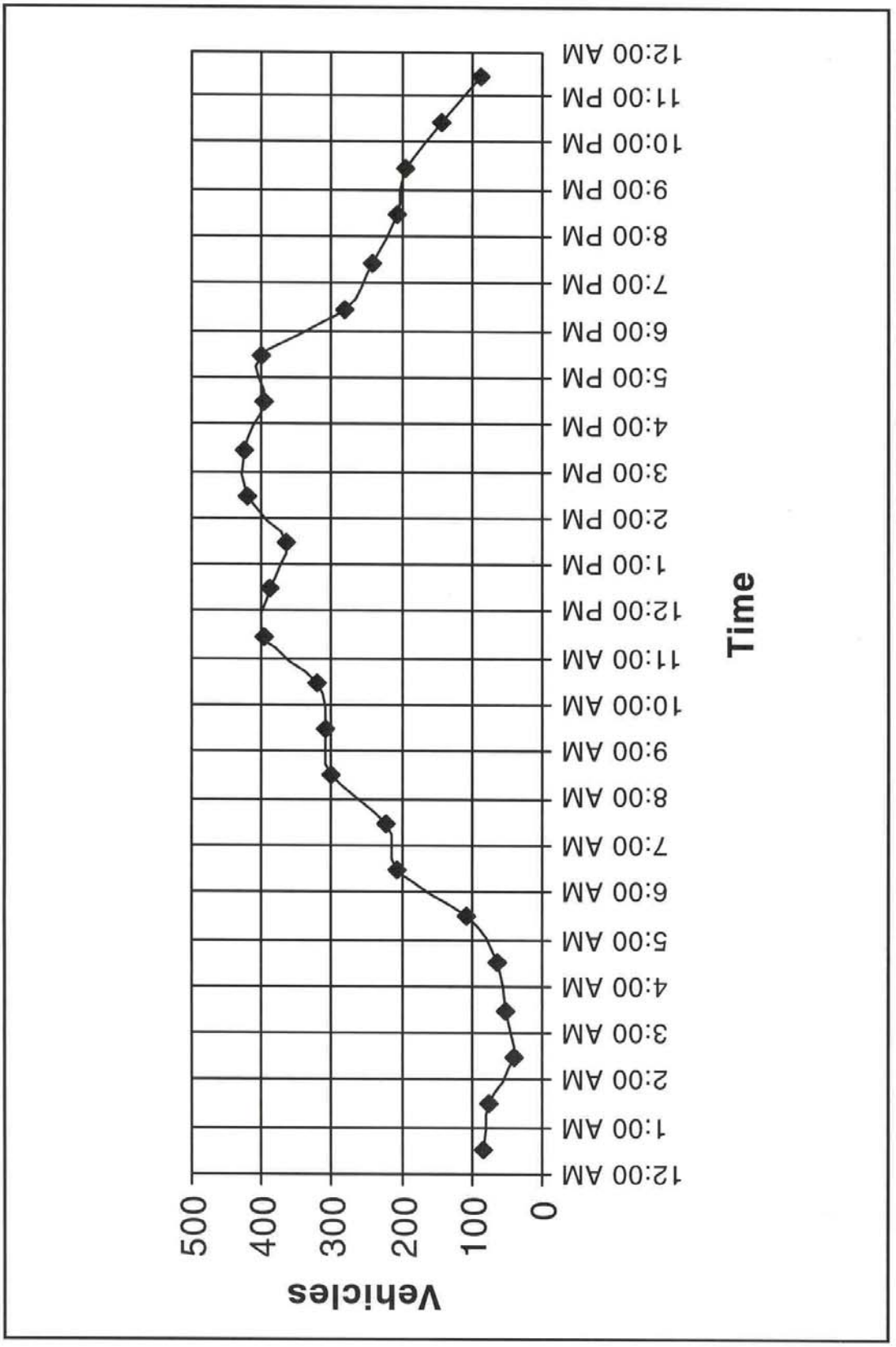

24-HOUR TOTAL ENTERING TRAFFIC VOLUME PROFILE AT THE US HWY-97/ CELILO-WASCO HWY INTERSECTION

BIGGS JUNCTION REFINEMENT PLAN
BIGGS JUNCTION, OREGON
MAY 2000

FIGURE 4

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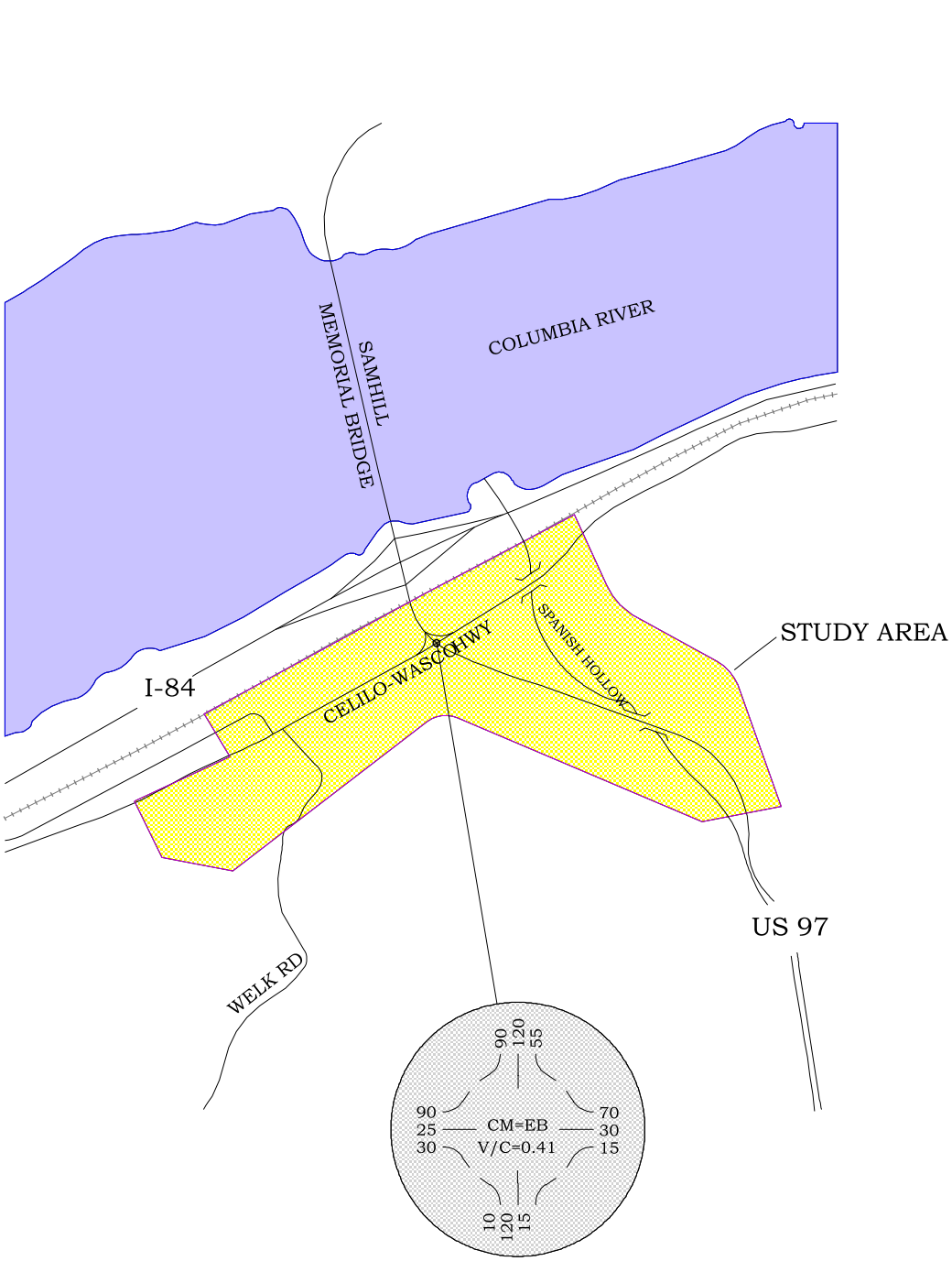

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CM = CRITICAL MOVEMENT (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

US 97/CELILO-WASCO HWY INTERSECTION
2000 EXISTING TRAFFIC CONDITIONS
WEEKDAY PM PEAK HOUR

BIGGS JUNCTION REFINEMENT PLAN BIGGS JUNCTION, OREGON	FIGURE 5
DECEMBER 2000	

Tech Memo 1\3944F005

To ensure this analysis was based on a reasonable worst case scenario, the peak 15 minute flow rate during the weekday p.m. peak hour was used in the evaluation. For this reason, the volume-to-capacity ratio analyses reflect conditions that are only likely to occur for 15 minutes out of each average weekday p.m. peak hour. Traffic conditions during all other weekday periods will likely operate under better conditions than those described in this report.

Highway mobility standards established in the Oregon Highway Plan[9] stipulate that for the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection, the facility volume-to-capacity ratios should not exceed 0.70 and 0.80, respectively.

The existing weekday p.m. peak hour highway mobility for the study intersection is shown in Figure 5. The performance measures listed in Figure 5 include the critical approach, volume-to-capacity ratio of the critical approach, average delay of the critical approach, and the corresponding level of service. As Figure 5 indicates, the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection operates at an acceptable level of mobility under existing summertime weekday p.m. peak hour conditions.

Traffic Safety Analysis

The crash history of the primary study area intersection was examined for potential and existing safety problems. ODOT crash data for the period January 1994 through December 1998 were used for this analysis.

Table 2 presents crash rates for the study intersection and the types of reported crashes are summarized in Table 3. Crash rates for intersections are calculated by relating the total entering volume of traffic at the intersection, on an average daily basis, to the number of reported crashes for a given period of time. The crash rate for intersections is expressed as the number of crashes per million entering vehicles (crashes/MEV). Generally, a crash rate higher than 1.0 crash/MEV indicates the need for further evaluation.

Table 2 Study Intersection Crash Rates

Intersection	Number of Crashes	Crashes per Year	MEV/ Year	Crashes/ MEV
US 97/Celilo-Wasco Highway Spur.I-84 Frontage Road	14	2.80	2.79	1.00

As shown in Table 2, the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection had fourteen reported crashes over the 5-year analysis period, and a crash per million entering vehicle ratio of 1.00.

Table 3 Study Intersection Crash Types

Intersection	Number of Crashes	Collision Type				Severity	
		Lane Change/ Turning	Rear -End	Angle	Other	Property Damage Only	Personal Injury
US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road	14	5	1	5	3	14	2

[9] 1999 Oregon Highway Plan, p. 80.

As summarized in Table 3, the predominant type of crash involves angle collisions or turning maneuvers. Most crashes experienced at this intersection occurred during the day, on dry pavement, and were associated with failure to yield the right-of-way. This suggests that driver judgment, as opposed to significant geometric deficiencies, is the leading cause of crashes. Restricted sight-distance (e.g. on-street parking along or near intersection approaches) is a significant factor that increases the potential for driver error.

Access Evaluation

Property access along Celilo-Wasco Highway Spur/I-84 Frontage Road and US 97 was reviewed to determine the adequacy of: property ingress/egress; on-site/off-site circulation patterns; and sight distance. In addition, existing access locations were compared to ODOT approach permit locations. The specific location of each permitted access is listed in Appendix "B".

As shown in Figures 6, there are discrepancies between the existing access locations and the approach permit locations. Potential factors that may have contributed to these discrepancies include deficient surveys and minimal regulatory enforcement.

It is desirable for accesses to be clearly defined, sized to accommodate required inbound and outbound lanes, spaced to separate turning movement conflicts with adjacent accesses, and aligned across from opposing accesses. Currently, there are few defined driveways within Biggs Junction. Many current accesses exceed sixty feet in width and are defined only by obstructions such as utility poles or buildings. Moreover, the existing access configuration does not give adequate attention to access spacing and driveway alignment considerations.

The current access configuration within Biggs Junction fosters an environment in which motorists are faced with multiple points of conflict, correlating to a greater safety risk. The wide accesses enable motorists to enter and exit a site at skewed angles (as opposed to the traditional ninety-degree angle) and encourage cut-through movements across a site. This in turn adversely affects on-site circulation due to the variability in the location and direction of vehicles entering and exiting the site.

FIGURE 6
EXISTING CONDITIONS

- Centerline
- Edge of Concrete Pad
- Curb
- Edge of Pavement
- Fence
- Island
- Permitted Approach
- Property Line
- Planter
- Railroad
- Existing Access
- No Existing Access

N
W E
S

EXISTING MOTEL BUILDING
STORE BLDG.
PLANTER
LINDA'S RESTAURANT
MOTEL
CANOPY
SERV. STA.
CONCRETE PAD
RESTAURANT
EXXON STATION
ISLAND
SEPTIC TANK
JACKS MINI-MART
SERVICE STATION
BUILDING
MOTEL
BIGGS CAFE
HOUSE
30'
21'
8'x37' MOBILE HOME
21.5'
MOTEL
110'
110
28'-5"
SHED
POMPS

100 0 100 200 300 400 500 600 Feet

Future Conditions

An operational analysis of future weekday p.m. peak hour traffic conditions was conducted to identify the forecasted intersection volume-to-capacity ratio (v/c) of the US 97/Celilo-Wasco Highway/I-84 Frontage Road intersection, to identify potential system deficiencies, and to recommend appropriate mitigation measures as necessary. For organizational purposes, the remainder of this *Future Conditions* section is subdivided into four primary areas:

- Anticipated Growth;
- Planned Transportation Improvements;
- Future Traffic Volumes; and
- Highway Mobility Analysis.

Anticipated Future Growth

A net annual growth rate was chosen to forecast the year 2020 traffic analysis. This rate was determined based on a review of historical traffic volume trends[10], regional population densities, anticipated population and employment growth[11], and local knowledge of planned development.[12] Based on the analysis, traffic volumes in the Biggs Junction study area will experience a growth rate of approximately 2-percent per year. Growth estimate calculations are provided in Appendix "C."

Planned Transportation Improvements

No planned transportation projects involving capacity improvements for the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road were identified. ODOT currently has a pavement preservation project scheduled for US 97 in 2004.

Future Traffic Volumes

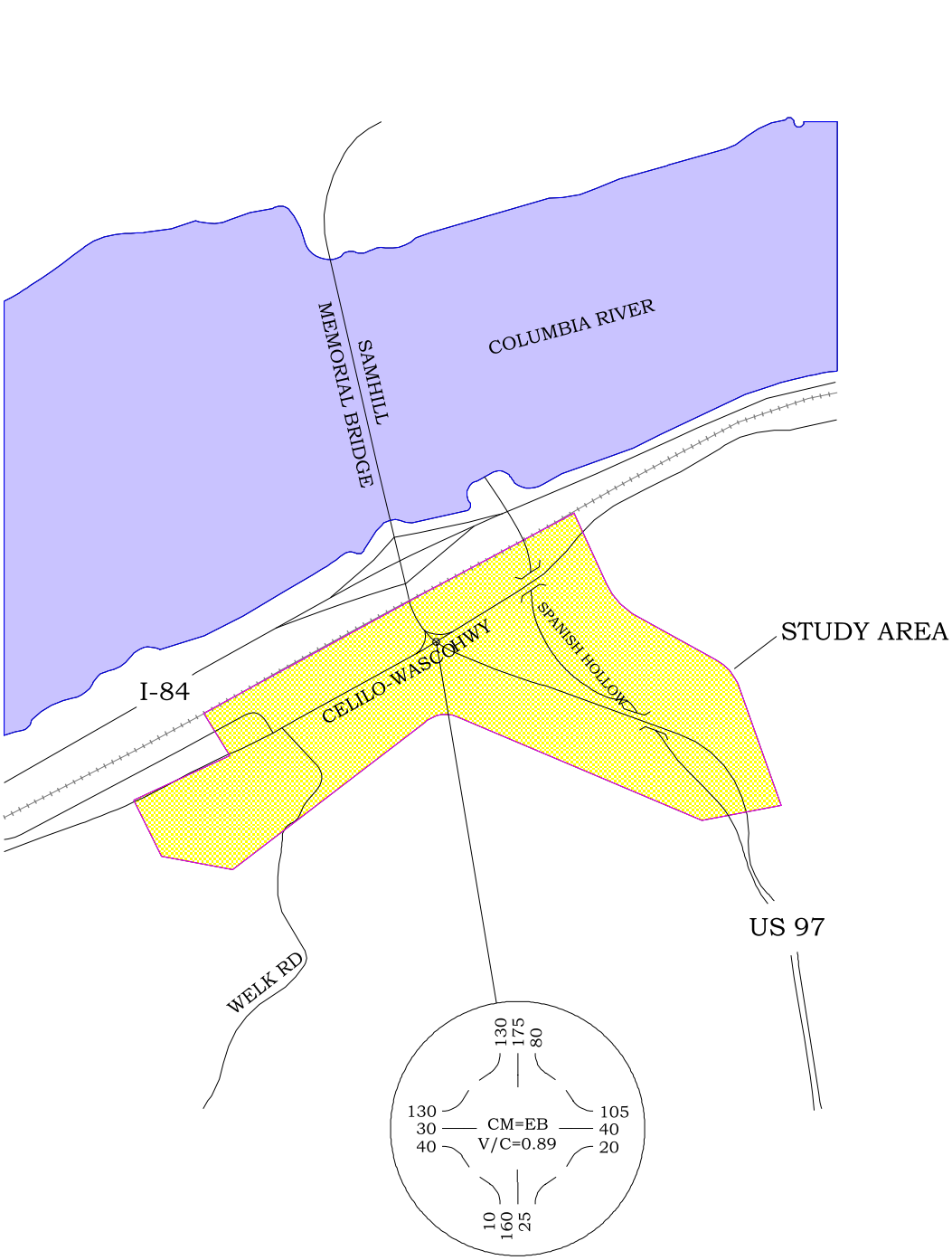
Future traffic conditions within Biggs Junction were forecast by applying the 2-percent annual growth rate assuming a "no-build" condition (i.e., no new roadways would be constructed in the 20-year horizon) to the year 2000 existing intersection traffic counts (refer to Figure 5). The 2-percent annual growth rate is slightly higher than the calculated rate (1.9-percent) based on ODOT Traffic Volume Table data, and should approximate the growth attributable to development of vacant lands within the study area. The resulting 2020 forecast volumes are estimated to be approximately 40-percent higher than existing 2000 traffic volumes. Figure 7 summarizes the forecast year 2020 weekday p.m. peak hour traffic volumes at the study intersections under the no-build condition.

Highway Mobility Analysis

To determine whether the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road will continue to operate at an acceptable level of mobility, the forecast future traffic volumes were analyzed. The findings of this analysis are summarized in Figure 7.

Under 2020 weekday p.m. peak hour conditions, the unsignalized study area intersection is forecast to operate at a volume-to-capacity ratio of 0.89 for the critical Celilo-Wasco Highway Spur eastbound approach. As such, mitigation would be required for this intersection to maintain operations consistent with ODOT mobility standards (volume-to-capacity ratio less than 0.80).

[10] ODOT Traffic Volume Tables, 1986-1998.
[11] Portland State University, Center for Population Research and Census.
[12] Citizens of Biggs Junction.



%%uLEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

US 97/CELILO-WASCO HWY INTERSECTION 2020 FORECAST TRAFFIC CONDITIONS WEEKDAY PM PEAK HOUR

BIGGS JUNCTION REFINEMENT PLAN BIGGS JUNCTION, OREGON	FIGURE 7
DECEMBER 2000	

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Alternatives Analysis Results

This section is a summary of future transportation improvement alternatives that could be implemented to mitigate existing and projected future transportation system deficiencies. Potential roadway improvement alternatives are presented along with recommendations based on each alternative's ability to address safety/operational issues and mobility/accessibility concerns.

For organizational purposes, the remainder of this *Alternatives Analysis Results* section is subdivided into four primary areas:

- Geometric and Operational Considerations;
- Sight Distance Considerations;
- Truck Turning Considerations; and
- On-Street Parking Considerations.

The following list summarizes the desired design, planning, and operation outcomes identified during the first Stakeholders Group meeting.

1. *The safe and effective operation of the US 97/Celilo-Wasco HighwaySpur/I-84 Frontage Road intersection under existing and future conditions;*

2. *The reduction of vehicular conflict points along US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road within the study area;*

3. *The development of an access management strategy to address property accessibility and highway mobility;*

4. *The development of viable on-site circulation patterns consistent with the proposed access management strategy;*

5. *The provision of adequate intersection sight distance at the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection; and*

6. *The accommodation of truck-turning movements at site-access driveways and at the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection.*

These desired outcomes, in conjunction with the goals and objectives identified previously in the *Introduction* section, served as the guidelines for developing potential mitigation measures and access management alternatives presented in the remainder of this section. The potential mitigation measures and access management alternatives are based on:

1. *The existing and future condition analyses results documented in the Existing Conditions and Future Conditions sections of this plan;*

2. *Evaluation of existing and permitted access locations; and*

3. *Follow-up interviews with individual business and property owners.*

Geometric and Operational Considerations

The need for mitigation of existing and future roadway/intersection operations is interrelated with pedestrian and bicycle infrastructure needs, access management issues, and accommodating truck traffic. The existing and long-term future forecast condition analyses identified specific capacity-related deficiencies at the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection. In addition, the potential impacts of the various operational improvements were identified and discussed at the Stakeholders Group meetings. The results and findings related to the potential mitigation measures are discussed below.

US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road Intersection Improvements

To meet ODOT mobility standards for the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection, all-way stop-control (AWSC) and signalization were considered. Preliminary AWSC and traffic signal warrant analysis results suggest that AWSC or a traffic signal may be warranted at the intersection within the 20-year planning horizon. The operations of the intersection under the two potential mitigation options are summarized in Table 4 and the warrant analysis worksheets are provided in Appendix "D".

Table 4 Mitigated Forecast 2020 Traffic Conditions

Intersection	V/C	Average Delay (sec/veh)
US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road *With AWSC Mitigation*	0.59	14.9
US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road *With Signal Mitigation*	0.51	11.5

As shown in Table 4, the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection is forecast to operate with acceptable operations under year 2020 weekday p.m. peak hour conditions with either the AWSC or traffic signal mitigation. To maintain acceptable operations with:

- AWSC mitigation – a right-turn lane is required on the US 97 southbound approach to the intersection; and with
- Signal mitigation – a three-lane cross-section should be constructed on all approaches of the signalized intersection, to incorporate a left-turn lane on each approach.

Although, the three-lane cross-section is not required to meet volume-to-capacity performance measures, the left-turn lanes would provide refuge for turning vehicles and would enhance the safety and efficiency of both roadway facilities.

Each mitigation measure has potential operational and safety benefits and potential drawbacks. Changing operation of the intersection to AWSC will create gaps in US 97 traffic and ease access from Celilo-Wasco Highway Spur/I-84 Frontage Road to US 97. However, the heavier north/south flow of traffic will always be forced to stop and will, consequently, experience higher delay and potentially queue traffic on US 97 back into the operational area of the I-84 interchange. Installing a traffic signal would benefit turning movements between US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road, while causing less interruption of the north/south traffic flow on US 97. The main drawback of installing a traffic signal is higher cost of implementation and operation.

An interim mitigation measure to implementing either AWSC or installing a traffic signal at this intersection is to provide left-turn lanes for both travel directions on US 97. Providing storage for the left-turn maneuvers will separate stopped vehicles from through traffic on US 97 and it will also increase the size of the intersection, thereby facilitating truck-turning movements.

In the event that signalization of the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection is warranted and recommended, approval must be obtained from the State Highway Engineer prior to its implementation. In addition, signalization of this intersection would require an exception to Oregon Administrative Rule – 51 as its close proximity to the Interstate-84 eastbound ramp terminal does not meet access spacing standards.

US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road Mitigation

A three-lane cross-section is proposed for US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road to separate turning vehicles from through traffic and to facilitate turning movements at site-accesses. The proposed three-lane cross sections would be comprised of one through lane in each direction and a continuous two-way left-turn lane. The existing US 97 cross-section would be widened between the Interstate-84 interchange bridge (northern limit) and the first Spanish Hollow bridge (southern limit). The Celilo-Wasco Highway Spur cross-section would be widened from just west of the *Biggs Café* (western limit) to US 97, and the I-84 Frontage Road cross section would be widened from US 97 to the Spanish Hollow bridge (eastern limit).

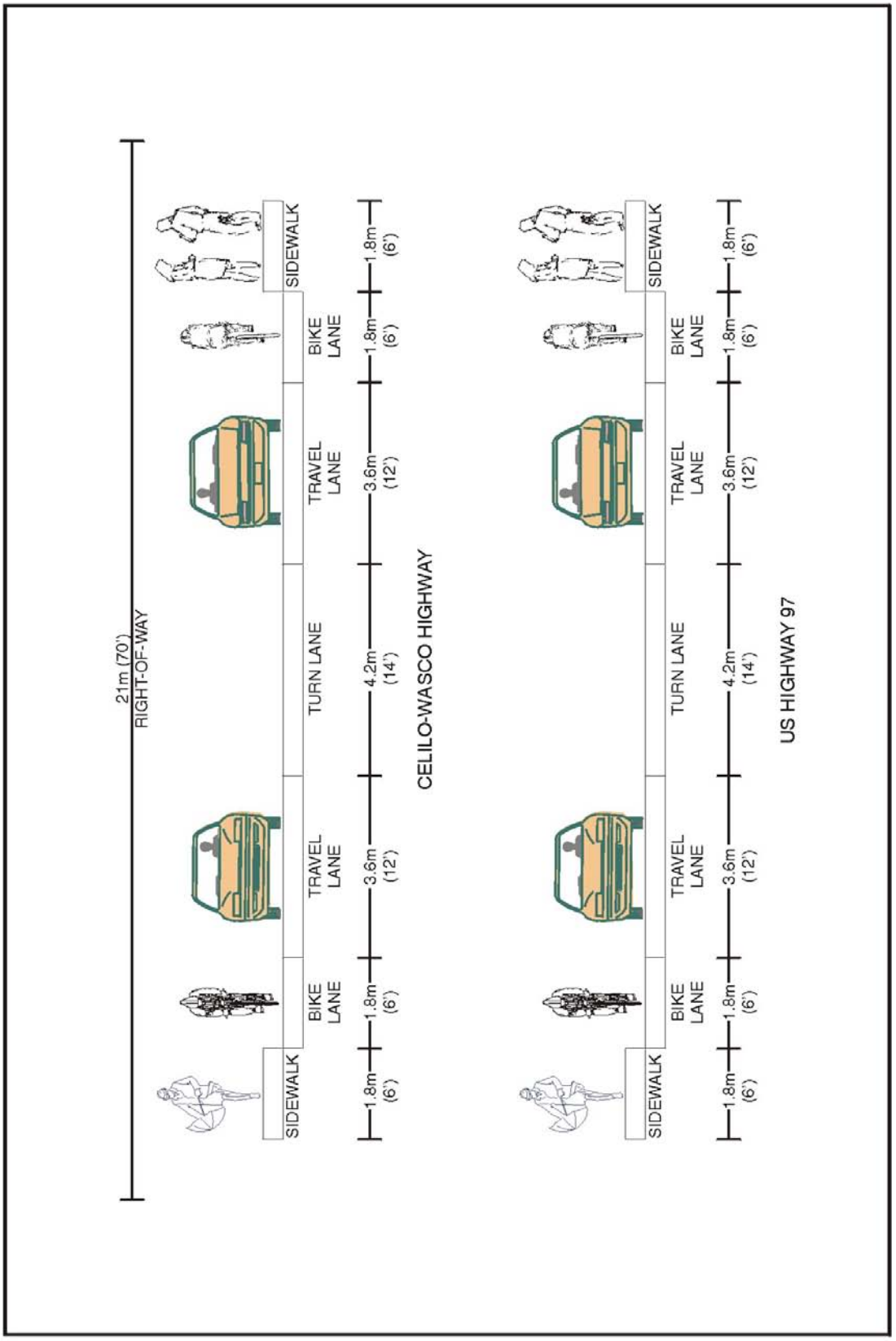
Both local access and through traffic will benefit from the widened cross-section as a result of increased carrying capacity and enhanced safety. In concert with the proposed reconstruction of Celilo-Wasco Highway Spur/I-84 Frontage Road, an opportunity exists to enhance local access and circulation.

The improved roadway section will include constructing 1.8-meter (6-foot) wide sidewalk facilities and 1.2-meter (4-foot) wide planter strips (provided behind the sidewalks), bringing the total minimum roadway right-of-way to 21 meters (70 feet). Figure 8 illustrates the proposed three-lane roadway cross-sections for the Celilo-Wasco Highway Spur/I-84 Frontage Road and US 97.

The US 97 corridor is a major north-south travel route and maintains right-of-way in excess of what is needed to accommodate the facility. However, the existing right-of-way should be preserved along the US 97 corridor to accommodate a possible future cross-section widening and/or roadway realignment that may occur beyond the year 2020 planning horizon.

Local Access Enhancements

The current configuration of existing accesses along Celilo-Wasco Highway Spur/I-84 Frontage Road and US 97 in Biggs Junction does not adequately provide a safe and efficient environment in which mobility and accessibility are balanced. The proposed infrastructure improvements on both highway facilities will provide clear delineation between the roadway, pedestrian space, and adjacent property uses by providing curbs, sidewalks, and defined driveway locations. From an operational and safety perspective, it is also necessary to properly manage the location and operation of private approaches along each highway to minimize turning movement conflicts between adjacent and opposing points of access.



PROPOSED HIGHWAY CROSS-SECTIONS AND RIGHT-OF-WAYS

BIGGS JUNCTION REFINEMENT PLAN
BIGGS JUNCTION, OREGON
MAY 2000
FIGURE 8

3944F001.CDR

Driveways should be placed appropriately to limit potential conflicting turning movements, weaving maneuvers over short distances, and to provide for safe and efficient on-site circulation. Based on these parameters a refinement plan was developed to serve the unique character of Biggs Junction. The plan was developed through meetings between representatives of ODOT and local property owners and is described below.

Proposed Local Access Locations

The locations of private approaches were determined on a parcel-by-parcel basis. Figures 9A through 9E illustrate the proposed location of private driveways, the proposed lane geometry, and proposed sidewalk locations. These plans were developed based on the constraints and opportunities associated with the existing land uses and transportation system in the corridor, and represent a "best effort" in developing consensus amongst property owners in the corridor. The intent of this alternative analysis was to define approach locations to local businesses, minimize conflict points, preserve the capacity within the junction, and maintain accessibility to each business.

The size and location of the proposed approaches have been customized to best suit the needs of existing land uses (i.e. the type(s) of vehicles primarily using each particular driveway), while also recognizing the highway needs (i.e. minimizing left-turn conflicts). The proposed approaches vary in size between 30 and 50 feet.

All of the proposed approaches are either of the Design A ("dust pan" DRG. No. RD721) or Design B ("concrete apron" DRG. No. RD715) type design. Approaches marked as "A" are the "dust pan" type design. This curb cut treatment is typically found where site-access driveways access public streets. This access design is adequate for small to medium size vehicles.

Approaches marked as "B" are the concrete apron type design. This approach treatment is typically found at heavily used approaches and consists of rounded curb returns that are separated by a concrete apron. The curb return radii of this design are based on accommodating the swept path of a turning truck. Design specifications for both types of curb cuts are provided in Appendix "E."

The proposed improvements described in the following sections balance property accessibility and highway mobility, and are designed to promote effective on-site circulation patterns. The proposed improvements have been geographically divided into five sections, beginning at the west end of the study area north of Celilo-Wasco Highway Spur, moving eastward, and ending along US 97 south and east of Celilo-Wasco highway Spur/I-84 Frontage Road.

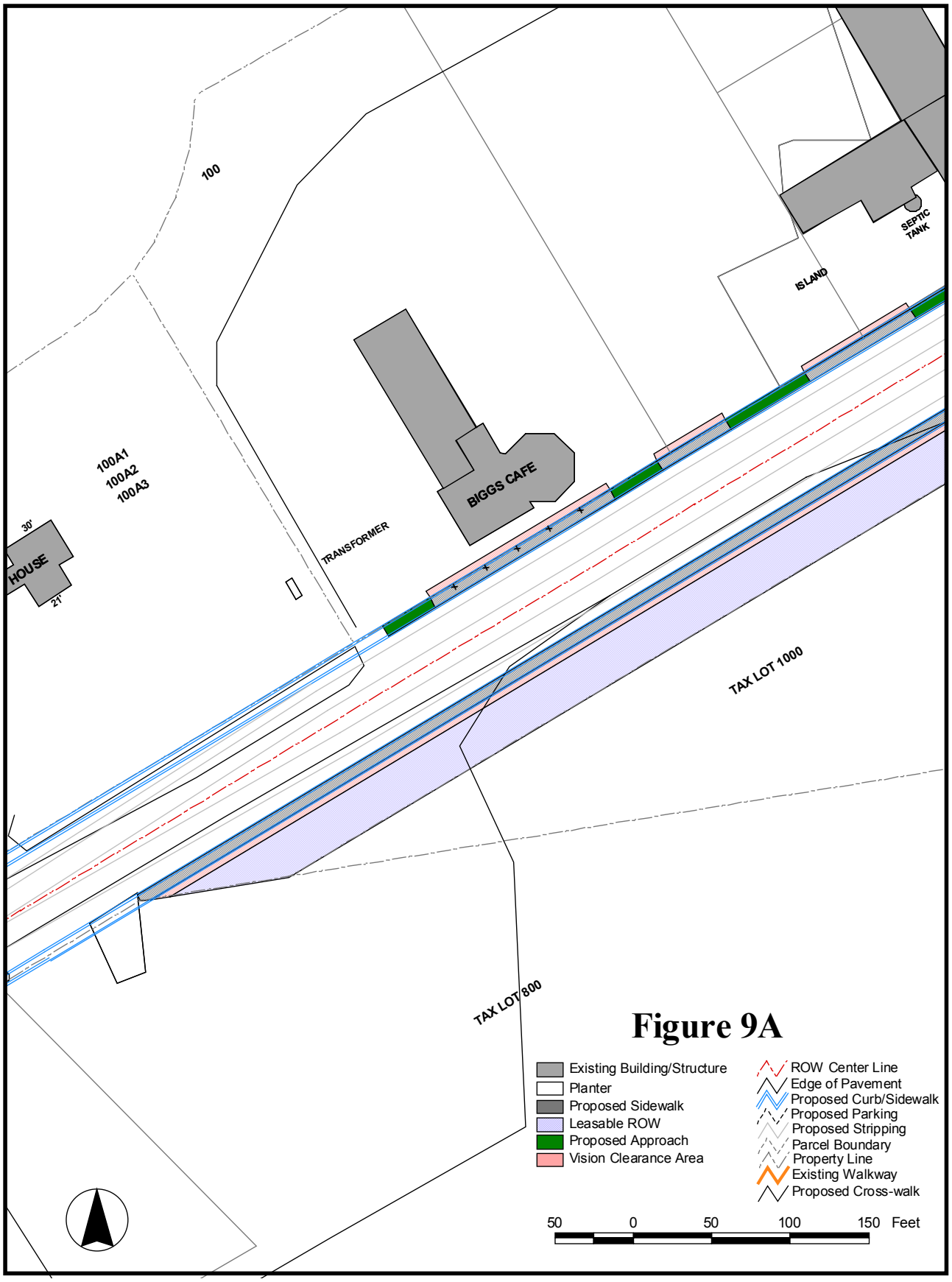

100
100A1
100A2
100A3
30'
HOUSE
21'
TRANSFORMER
BIGGS CAFE
SEPTIC TANK
ISLAND
TAX LOT 1000
TAX LOT 800
Existing Building/Structure
Planter
Proposed Sidewalk
Leasable ROW
Proposed Approach
Vision Clearance Area
ROW Center Line
Edge of Pavement
Proposed Curb/Sidewalk
Proposed Parking
Proposed Stripping
Parcel Boundary
Property Line
Existing Walkway
Proposed Cross-walk
50 0 50 100 150 Feet

Figure 9A

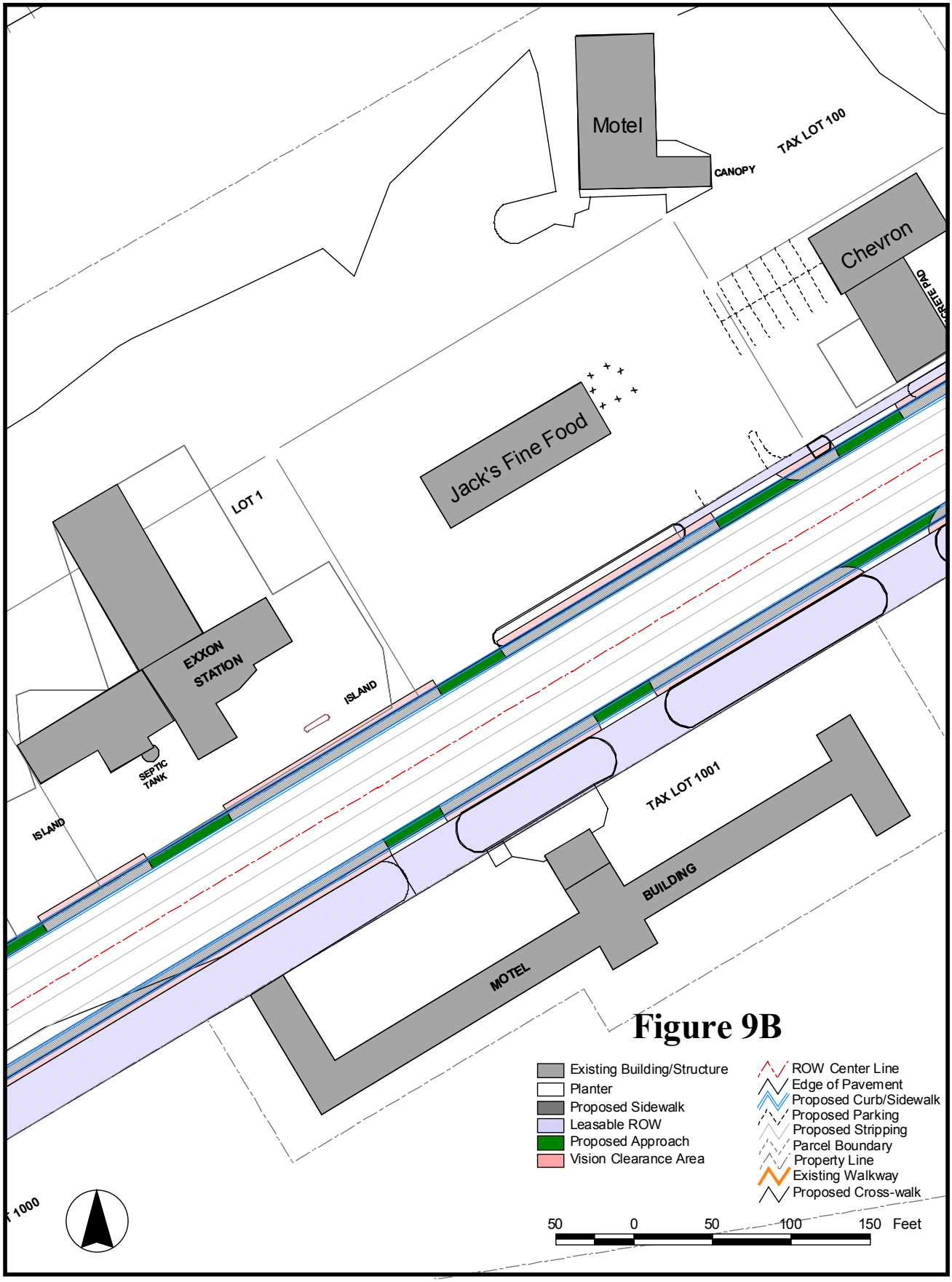

Motel
CANOPY
TAX LOT 100
Chevron
CONCRETE PAD
Jack's Fine Food
LOT 1
EXXON STATION
ISLAND
SEPTIC TANK
ISLAND
TAX LOT 1001
BUILDING
MOTEL
Existing Building/Structure
Planter
Proposed Sidewalk
Leasable ROW
Proposed Approach
Vision Clearance Area
ROW Center Line
Edge of Pavement
Proposed Curb/Sidewalk
Proposed Parking
Proposed Stripping
Parcel Boundary
Property Line
Existing Walkway
Proposed Cross-walk
50 0 50 100 150 Feet

Figure 9B

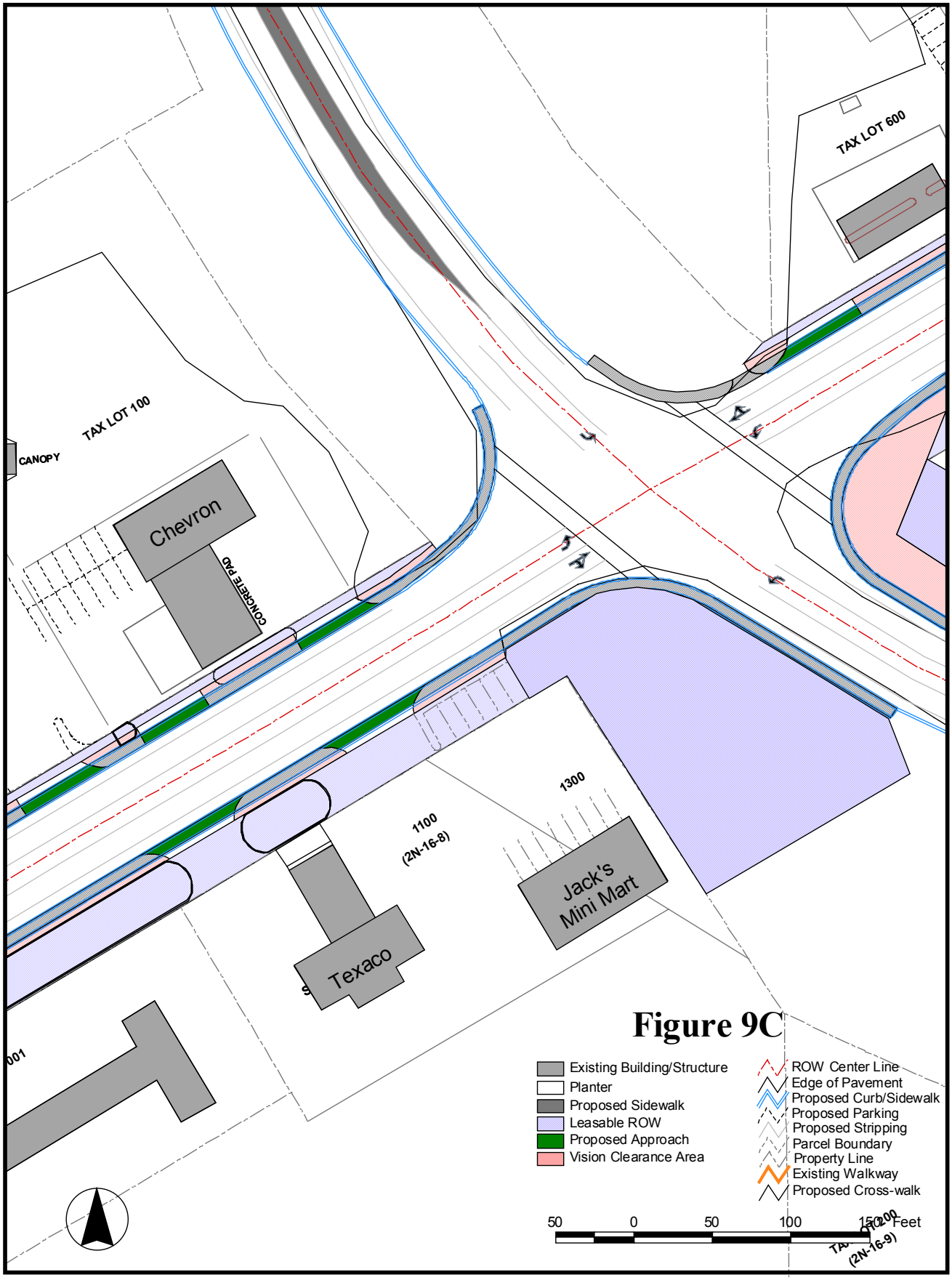
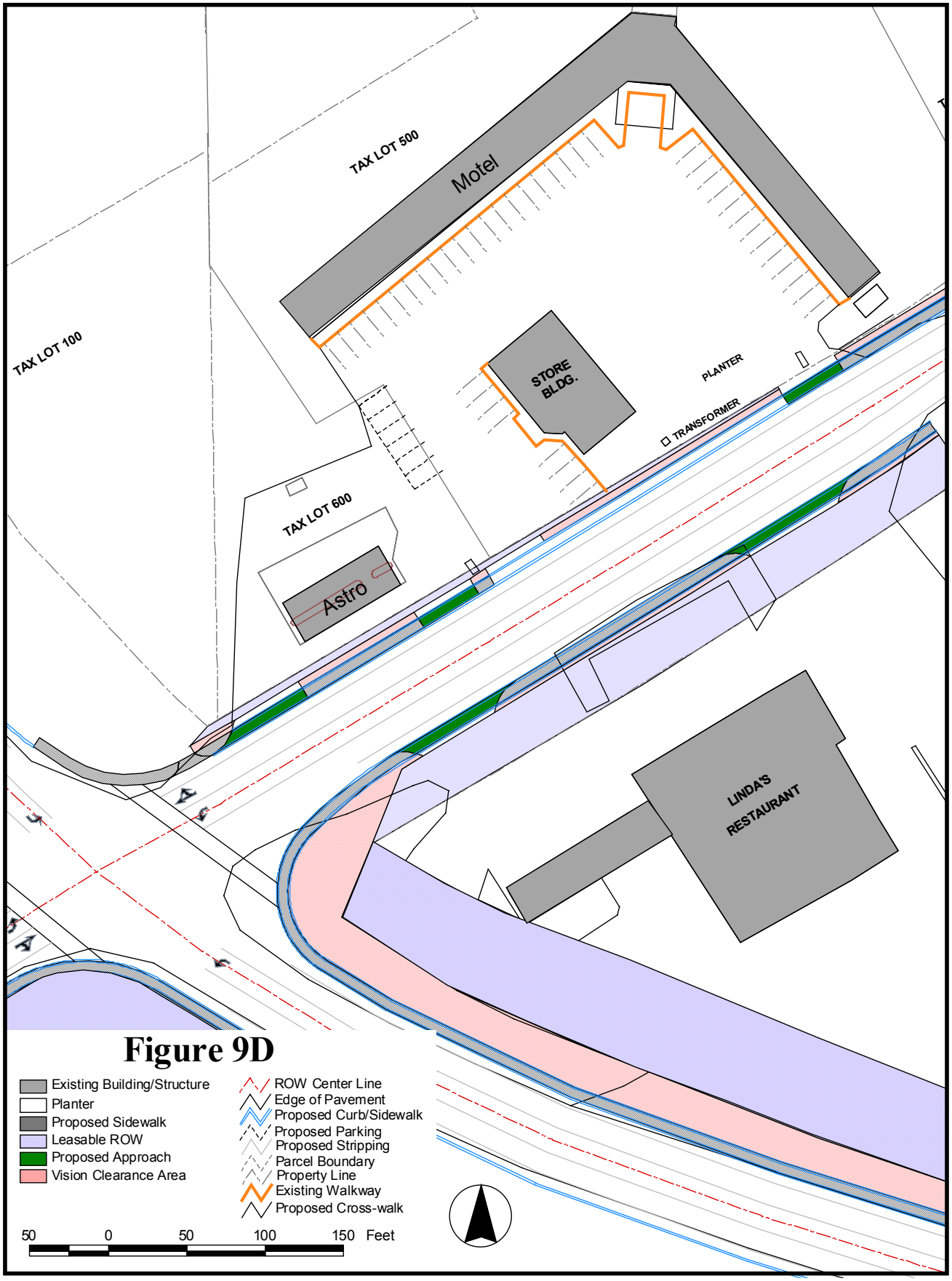

TAX LOT 600
TAX LOT 100
CANOPY
Chevron
CONCRETE PAD
1300
1100
(2N-16-8)
Jack's
Mini Mart
Texaco
001
Existing Building/Structure
Planter
Proposed Sidewalk
Leasable ROW
Proposed Approach
Vision Clearance Area
ROW Center Line
Edge of Pavement
Proposed Curb/Sidewalk
Proposed Parking
Proposed Stripping
Parcel Boundary
Property Line
Existing Walkway
Proposed Cross-walk
50
0
50
100
150
Feet
(2N-16-9)

Figure 9C


TAX LOT 500
Motel
TAX LOT 100
STORE BLDG.
PLANTER
TRANSFORMER
TAX LOT 600
Astro
LINDA'S RESTAURANT
Figure 9D
Existing Building/Structure
Planter
Proposed Sidewalk
Leasable ROW
Proposed Approach
Vision Clearance Area
ROW Center Line
Edge of Pavement
Proposed Curb/Sidewalk
Proposed Parking
Proposed Stripping
Parcel Boundary
Property Line
Existing Walkway
Proposed Cross-walk
50 0 50 100 150 Feet

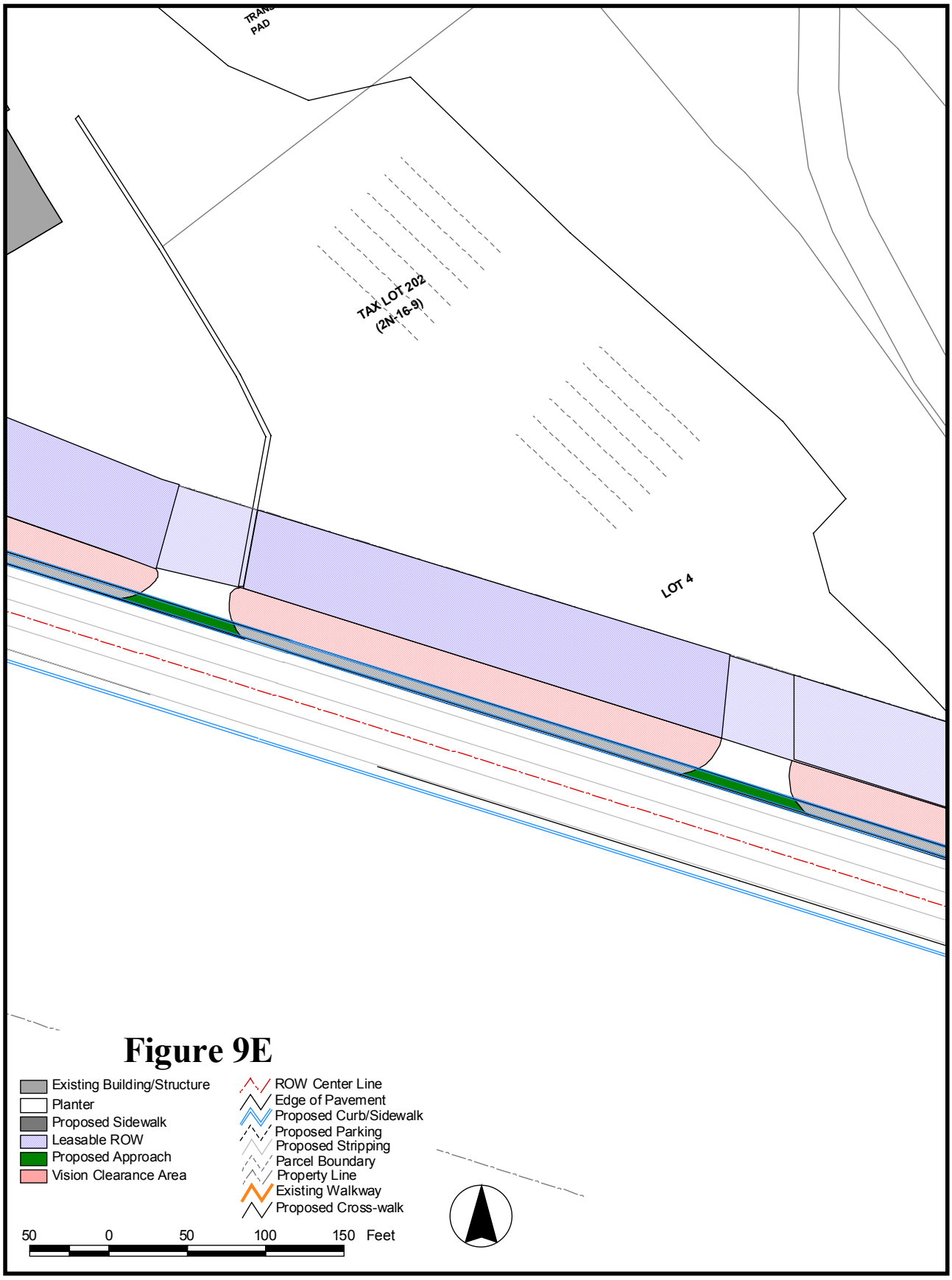

TRANS
PAD
TAX LOT 202
(2N-16-9)
LOT 4
Existing Building/Structure
Planter
Proposed Sidewalk
Leasable ROW
Proposed Approach
Vision Clearance Area
ROW Center Line
Edge of Pavement
Proposed Curb/Sidewalk
Proposed Parking
Proposed Stripping
Parcel Boundary
Property Line
Existing Walkway
Proposed Cross-walk
50 0 50 100 150 Feet

Figure 9E

Celilo-Wasco Highway (North Side, West of US 97)

Beginning on the north side of Celilo-Wasco Highway Spur, near the western boundary of the study area, Celilo-Wasco Highway Spur would transition from a two-lane cross-section to a three-lane cross-section between Welk Road and *Biggs Café*.

Biggs Café - Access would be modified from its current unrestricted frontage to two, 30-foot driveways located near the parcel's east and west boundaries. Restricting the driveways to these widths and locations would serve to define on-site circulation patterns by limiting the area in which turning maneuvers could take place; thereby encouraging the separation of passenger car and commercial truck parking.

Undeveloped Parcel - Proceeding to next lot eastward from *Biggs Café*, the existing unrestricted frontage would be restricted to a 50-foot driveway. This driveway would maintain this parcel's existing function as the main egress point for trucks visiting *Biggs Café*, the *Exxon* station, or *Jack's Fine Food*.

Installing a raised barrier, running north-south from between this parcel and the *Exxon* property, would minimize potential on-site vehicular and pedestrian conflicts by reducing the ability for drivers entering the proposed 50-foot driveway from the west to angle across the parking lot to the *Exxon* station. This would also reduce the ability of drivers entering the proposed 50-foot service-driveway to the east from angling across the parking lot westbound towards the *Biggs Café*.

Exxon Station - A 50-foot service-driveway would be constructed and aligned with the existing service aisles of the truck service canopy. This location would provide direct egress of trucks from the service center and would accommodate passenger car access to the front of the station. An additional access to *Exxon* station would be achieved via a shared driveway with *Jack's Fine Food* to the east.

Jack's Fine Food - A 40-foot driveway would be developed at the western end of the existing, curbed island in front of the restaurant. This driveway would provide shared ingress-egress for the restaurant and the *Exxon* station to the west. Near the eastern boundary of the *Jack's Fine Food* parcel, the curbed island should be extended to the east and develop a second 40-foot driveway. By extending the curbed island, additional parking will be created in front of the restaurant and entering vehicles will be directed in a defined path to the rear of the site.

The driveway alignment should be designed to serve truck-fueling operations at the rear of the *Exxon* station, access to *Biggs Café*; and access to the *Nu-Vu Motel* located at the north end of the property.

Chevron Station - Two access alternatives have been developed. The first is to maintain the existing driveway locations; however, reduce their widths to 40-feet each. The second alternative is to maintain the eastern driveway and close the western driveway, sharing the 40-foot driveway located near the eastern border of the *Jack's Fine Food* parcel.

The second alternative is shown in Figure 10. The second alternative increases queue storage for vehicles waiting at the pumps, and would reorient the existing parking stalls. On-site circulation would be enhanced by reorienting the parking stalls located between *Chevron* and *Jack's Fine Food* from their current parallel configuration to the highway to a

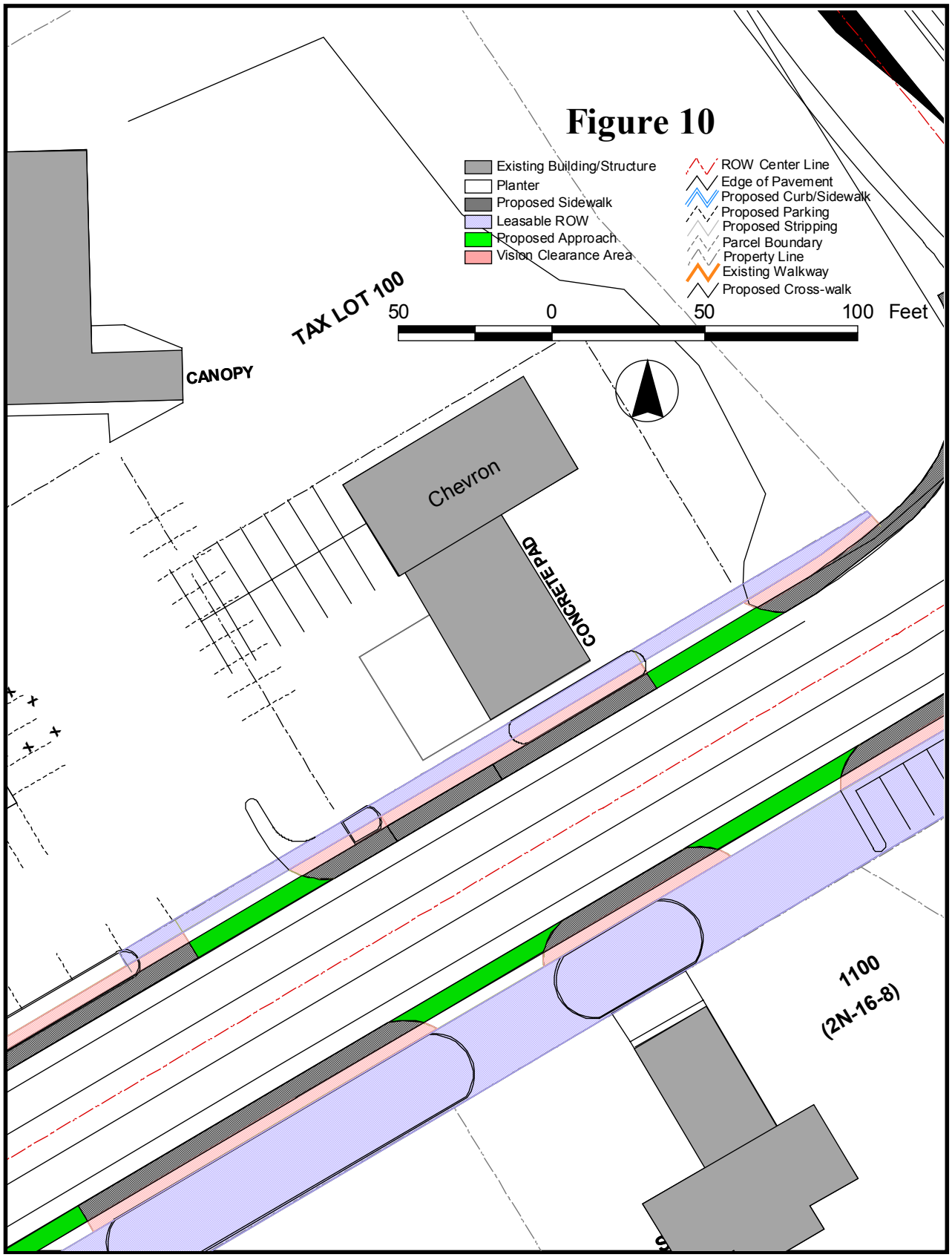


Figure 10
Existing Building/Structure
Planter
Proposed Sidewalk
Leasable ROW
Proposed Approach
Vision Clearance Area
ROW Center Line
Edge of Pavement
Proposed Curb/Sidewalk
Proposed Parking
Proposed Stripping
Parcel Boundary
Property Line
Existing Walkway
Proposed Cross-walk
50
0
50
100 Feet
TAX LOT 100
CANOPY
Chevron
CONCRETE PAD
1100
(2N-16-8)

perpendicular configuration. Vehicles leaving these stalls would no longer obstruct circulation to the motel and the back of the lots to the west.

Celilo-Wasco Highway Spur (South Side, West of US 97)

Riviera Motel - The current driveway configuration is a function of the hotel layout and the building's proximity to the highway. Although its usually preferable to align opposing driveways where possible, aligning the existing motel driveways with the proposed driveways to the north across the Celilo-Wasco Highway Spur is not practical given the on-site circulation patterns and parking configuration caused by the existing building location. Both motel site-access driveways should be constructed at their current locations to a width of 35 feet.

Texaco/Jack's Mini-Mart - Two, 40-foot driveways should be developed, centered on the existing location of the service station's fueling pumps to replace the existing, unrestricted access. To the east of the proposed eastern approach, raised curbing should be installed along the site frontage to provide a buffer between the adjacent US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection, and the first site approach.

By increasing the distance between this property's access and the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection, drivers in front of the site will be faced with fewer potential conflicts. On the south side of the proposed curbing, additional parking spaces could be developed perpendicular to the highway.

I-84 (Biggs-Rufus) Frontage Road (North Side, East of US 97)

Astro Station - Two approach alternatives have been developed to replace the current unrestricted access. The first would develop a 40-foot driveway near the western property border and a 40-foot driveway near the eastern border. The second alternative would develop the western access while closing the eastern access in lieu of a shared access with the adjoining *Dinty's Market* property (see Figure 11).

The second alternative provides additional benefits over the first. It would relocate turning movements away from the fueling positions and increase queue storage. It would also provide a single defined access between the two adjoining properties to guide entering and exiting vehicles. Striping additional parking stalls as shown in Figure 11 would help to reduce incidents of parked vehicles obstructing on-site circulation

Dinty's Market/Motor Inn - Little mitigation is required for this parcel other than defining its existing 40-foot driveways through curb and sidewalk construction. As mentioned before, developing a shared access with the *Astro* parcel would provide drivers with positive guidance into their respective properties and would set-up a natural circulation within both sites, reducing potential on-site vehicular and pedestrian conflicts.

I-84 (Biggs-Rufus) Frontage Road (South Side, East of US 97)

Grand Central Truck Stop - Two, 40-foot driveways would replace the existing two stretches of unrestricted approaches along I-84 Frontage Road. The western of these two accesses would serve as the primary approach for passenger cars, while the eastern approach would provide access to the truck parking field and bus station.

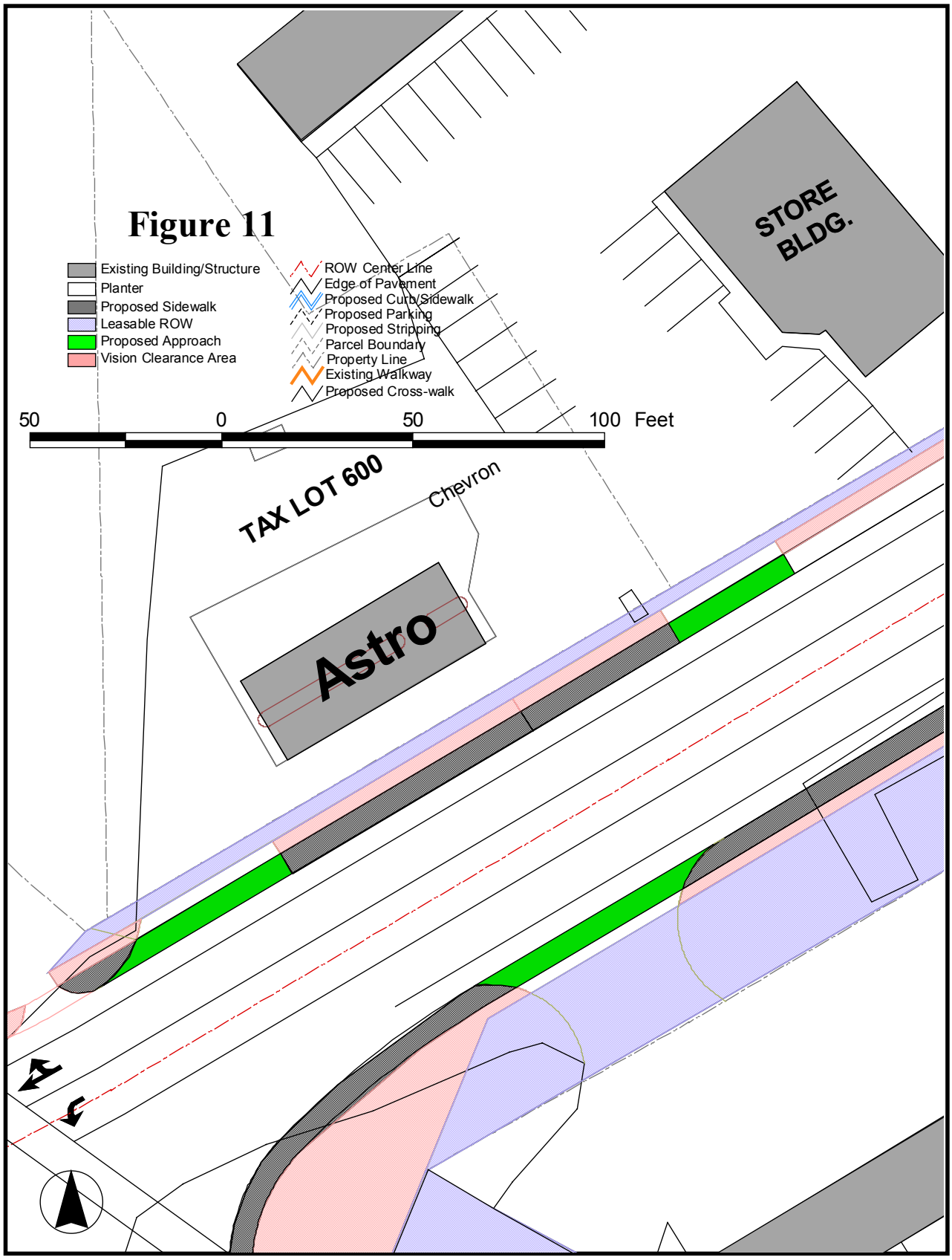


Figure 11
Existing Building/Structure
Planter
Proposed Sidewalk
Leasable ROW
Proposed Approach
Vision Clearance Area
ROW Center Line
Edge of Pavement
Proposed Curb/Sidewalk
Proposed Parking
Proposed Stripping
Parcel Boundary
Property Line
Existing Walkway
Proposed Cross-walk
50
0
50
100 Feet
STORE BLDG.
TAX LOT 600
Chevron
Astro

US 97 (East Side, South of Celilo-Wasco Highway Spur/I-84 Frontage Road)

Grand Central Truck Stop - Two, 40-foot driveways and a barrier should be installed to separate the bus terminal egress on US 97 from the truck parking to the south and east. The northern of the two US 97 driveways would serve for an ingress/egress point for cars and buses only.

The site would be reconfigured to have truck traffic enter only from the southern most approach on US 97 and the eastern most approach on I-84 Frontage Road. Between these two access points, a truck parking area would be defined so that parking stalls would be aligned in a parallel manner to US 97. The two-access concept would greatly benefit the highway systems by clearly defining the locations at which vehicles can be expected to enter or exit the site.

Sight Distance Considerations

Clear zones afford motorists areas of enhanced sight distance. This is especially important at intersection locations where it is necessary to perceive oncoming traffic. A minimum 4-foot wide buffer should be constructed between the back of sidewalk and the edge of the US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road right-of-way. Sidewalks and bike lanes will further enhance available sight distance at the local access driveways. Plantings in the buffer strips along the roadway frontage (delineated in Figures 9A through 9E) should be limited to low-growing ground cover or other non-sight-obstructing material to ensure that adequate sight distance is maintained. No signs or other sight-obstructing structures should be placed within the minimum roadway right-of-way.

No parking should be allowed within the intersection/approach influence area and landscaping and signs should be placed such that sight lines are unobstructed. Based on the posted speed of 40 miles per hour, at least 400 feet of sight distance should be provided for the Celilo-Wasco Highway approaches for a motorist desiring to cross or turn on to US 97. Allowing parking within the area needed for adequate sight distance would severely impede a driver's ability to see 400 feet of the intersecting highway/approach in either direction.

In summary, the following actions will all help to increase available sight distance and reduce potential driver error:

- Providing left-turn storage lanes on all approaches to the US 97/Celilo-Wasco highway Spur/I-84 Frontage Road intersection;
- Installing a traffic signal or implementing AWSC (future conditions mitigation);
- Restricting parking on intersection approaches; and
- Clearly delineating traffic control and travel lanes.

Truck Turning Considerations

The current cross-section and configuration of the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection can not adequately accommodate the turning movements of large trucks without the trucks traversing onto shoulders or into oncoming lanes. Curb radii should be modified to ensure that the turning movements of most trucks could be accommodated at the intersection. Compound radius curves would be provided to serve the tracking path of a WB-20 (a truck/trailer combination having a wheelbase of 20 meters [67 feet]). This vehicle's turning path and the proposed redesign of the intersection are shown in Figures 12A and 12B.

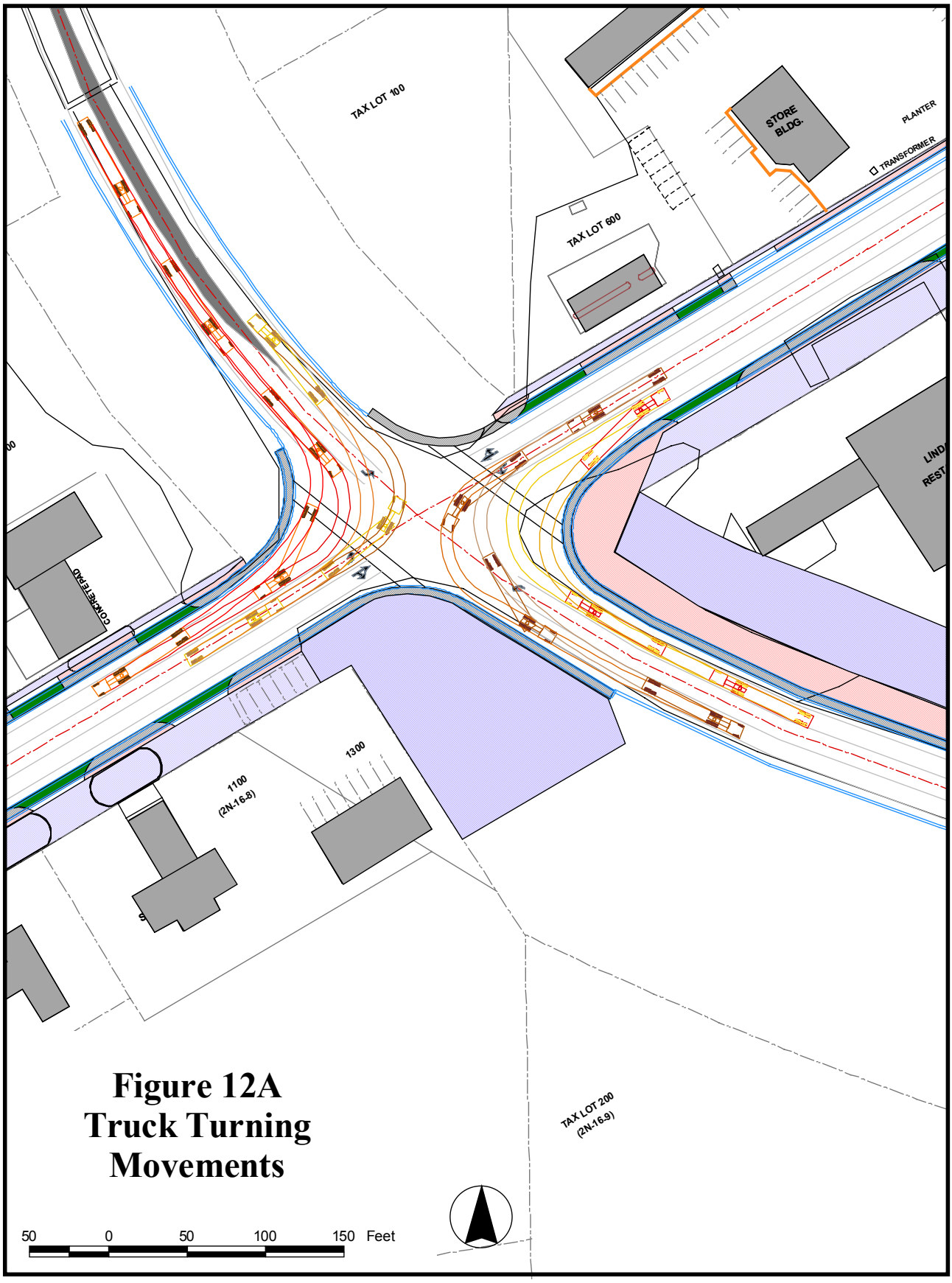


Figure 12A
Truck Turning Movements

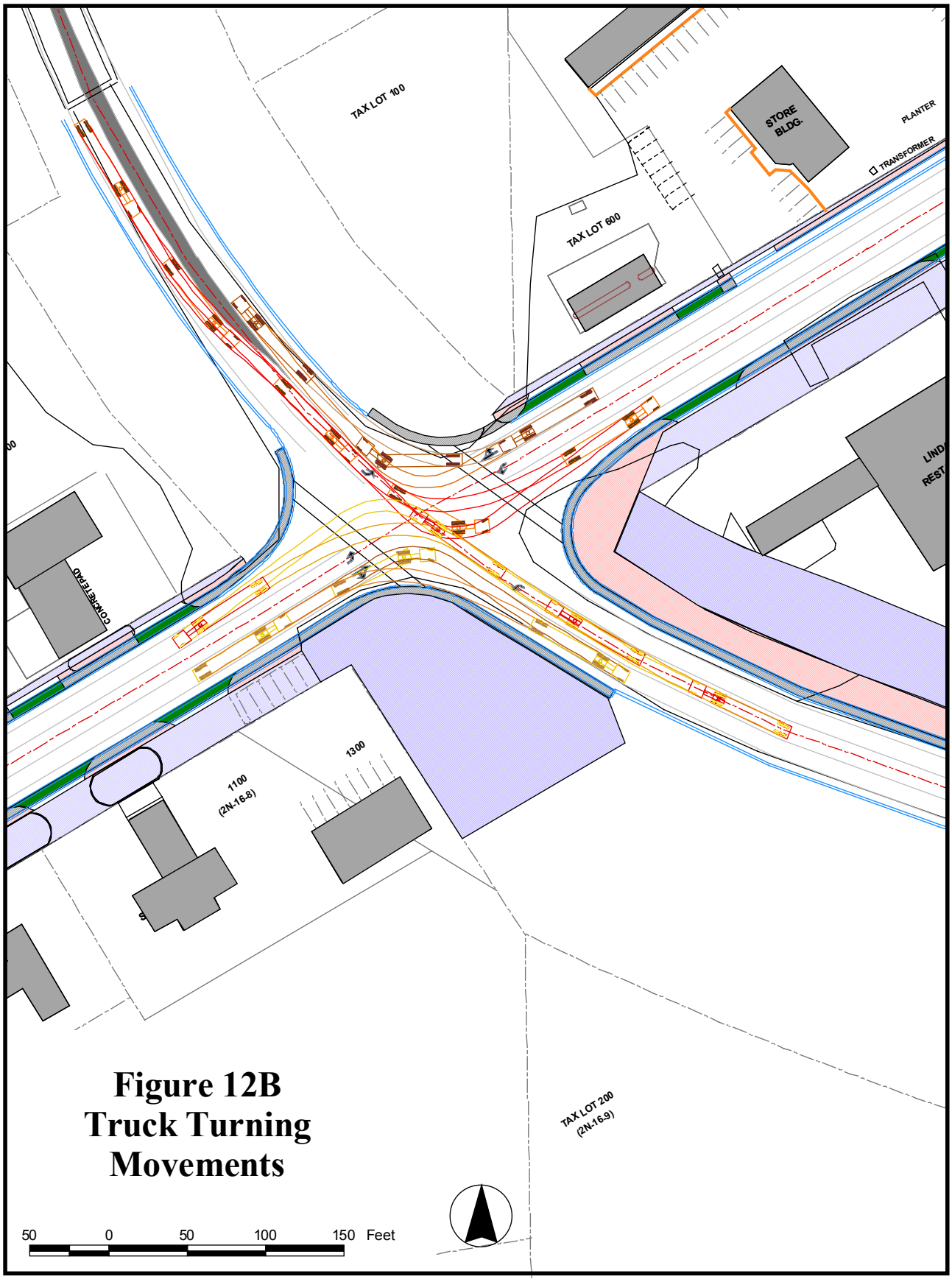


Figure 12B
Truck Turning Movements

On-Street Parking Considerations

The Celilo-Wasco Highway Spur/I-84 Frontage Road currently maintains relatively wide shoulders that are used by motorists (predominately drivers of large trucks) for local business and overnight parking. Video observation records reveal that it is common for trucks to be double-parked (side-by-side) within the shoulder itself. As a result, sight distance may be inadequate at site-access driveway locations. The inadequate sight distance may increase crash frequency as the traffic volumes increase on Celilo-Wasco Highway Spur/I-84 Frontage Road.

Unrestricted, on-street parking reduces the area in which turning movements can be made at site-access driveway intersections. Large trucks may crossover into oncoming traffic lanes or are required to make back-up maneuvers to successfully traverse the intersection. Although not desirable, on-street parking can be accommodated with minimal safety and operational impacts provided that unobstructed sight lines are maintained and that parked vehicles do not impede the movement of turning vehicles.

Due to historical business reliance on existing on-street parking, several alternatives for accommodating on-street parking were considered (Appendix "F"). After evaluating the impacts and benefits of each, the on-street parking bays as shown in Figure F1 should be implemented. As designed, the parking bays can accommodate large vehicles while ensuring that intersection sight lines and turning movements are not obstructed. Furthermore, as new development or redevelopment occurs, all parking demand generated by the development should be accommodated on-site and the existing on-street parking bays along the site frontage are removed as appropriate.

Refinement Plan

This section describes the individual elements of the Biggs Junction Refinement Plan. This refinement plan represents the preferred strategy, as selected by the Stakeholders Group, to address the goals and objectives of the project (*Introduction* section). The alternatives discussed in the *Alternatives Analysis Results* section were evaluated to develop a preferred alternative in which the desired outcomes, from mobility and an accessibility standpoint, could be achieved.

The preferred alternative presented in this plan consists of those transportation improvements necessary to support safe and efficient transportation operations within Biggs Junction. This plan provides the following three elements of the refinement plan that will be used to guide future transportation improvement projects and development within Biggs Junction:

- Roadway Functional Plan;
- Access Management Plan; and
- Parking Plan.

In addition, the refinement plan provides preliminary economic and environmental analyses of the potential impact of implementing the preferred alternative. The plan reflects the findings of the existing and forecast future conditions analyses, the alternatives analysis, and the concerns expressed by both the citizens and business owners within Biggs Junction and the public agencies that serve them.

Roadway Functional Plan

Based on the existing and anticipated operational and circulation needs, the roadway functional plan was developed. The roadway functional plan provides guidance on how to best facilitate travel within Biggs Junction by addressing two key issues:

- Roadway design standards; and
- Roadway improvements to meet future capacity, circulation, and safety needs.

Roadway Design Standards

Roadway design standards are based on the functional and operational characteristics of streets such as travel volume, capacity, operating speed, and safety. The standards are to ensure that as the area develops, the highways will be capable of safely and efficiently serving the traveling public while also accommodating the orderly development of adjacent lands.

Typical cross-sections for both Celilo-Wasco Highway Spur/I-84 Frontage Road and US 97 are shown in Figure 8 of the *Alternatives Analysis* section. The typical roadway cross-sections comprise the following elements: right-of-way, number of travel lanes, and bicycle and pedestrian facilities. The cross-sections illustrated in Figure 8 are intended for planning and design purposes for those locations where it is physically and economically feasible to improve the existing highways.

Under the roadway standards, the highways will have a minimum right-of-way requirement of 21 meters (70 feet). The roadway cross-section will consist of two 3.6-meter (12-foot) travel lanes, a 4.2-meter (14-foot) center left-turn lane, two 1.8-meter (6-foot) shoulders/bike lanes, and two 1.8-meter (6-foot) sidewalks. All existing US 97 right-of-way will be preserved for possible future realignment or cross-section enhancements.

In addition, a 1.2–meter (4-foot) landscape strip should be provided on both sides of the roadway. The landscape strips will be located behind the sidewalks to help maintain sight-distance at all access approaches. Providing a landscaping strip behind the sidewalk will allow for an area with no obstructions or impediments that would restrict sight lines. Further, because of the character and nature of the uses and traffic at Biggs, for

maintenance and aesthetic purposes, landscape strips would best be located next to the adjacent property line rather than between the roadway and the sidewalks. Although ODOT's Bicycle and Pedestrian Plan stipulates that a 1.5-meter (5-foot) planter strip be placed between the curb and sidewalk; due to the unique right-of-way issues and maintenance considerations of Biggs Junction, the "curb tight" sidewalk configuration affords adequate pedestrian safety while minimizing the maintenance requirement and right-of-way impacts.

Roadway Improvements

Several roadway improvements are necessary to mitigate existing transportation system deficiencies and to provide for acceptable traffic operations under planning year 2020 total traffic conditions. The roadway improvements are as follows:

- Provide Continuous, Two-Way Left-Turn Lanes. Providing a continuous two-way left-turn lane on US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road will separate left-turns from through traffic on both highways. Conversely, these lanes serve as a refuge whereby motorists can cross one direction of traffic, wait for an acceptable gap, and then merge with the other direction of traffic. The continuous two-way left-turn lanes also provide sufficient space to serve large truck turning movements.

- Signalize the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road Intersection. To serve forecast year 2020 traffic conditions, this intersection may require conversion to either signalization or all-way stop-control (AWSC). Signalization is recommended as it provides lower intersection delays than AWSC. To place a signal at this intersection will require the approval of the State Traffic Engineer. Prior to or in conjunction with installing the traffic signal, left-turn lanes should be developed on all approaches to the US 97/Celilo-Wasco Highway intersection.

- Increase Curb Return Radii. The current curb return radii at the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection do not accommodate the swept path of large trucks. Appropriate curb returns, based on the swept path of a WB-20 (a truck/trailer combination having a wheelbase of 20 meters (67 feet)), should be constructed to eliminate off-street tracking of truck trailers.

- Provide Clear Zones. On-street parking often obstructs existing intersection sight lines. For drivers to have sufficient visibility of oncoming traffic, sight distance needs to be maintained on intersection approaches. To provide adequate sight distance, a clear zone should be established. The clear zone is comprised of the shoulder, sidewalk, and landscape strip. On-street parking should be prohibited on intersection approaches where its presence could potentially obstruct a driver's field of vision.

- Provide Pedestrian Facilities. The existing pedestrian infrastructure does not provide for the safe and efficient circulation of pedestrians. A continuous curb tight sidewalk facility meeting ADA requirements should be established along US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road within the study area to separate pedestrian circulation from vehicular circulation. This will afford pedestrians a greater degree of safety and aid motorists by clearly defining where to expect potential pedestrian traffic.

Access Management Plan

As Biggs Junction continues to develop, the local street system will become more heavily relied upon for a variety of travel needs. As such, it will become increasingly important to manage access on the existing and future street system as new development occurs. Access locations on Celilo-Wasco Highway Spur/I-84

Frontage Road and US 97 need to be properly located to ensure safe and efficient travel along the roadway facilities. Access locations should be placed appropriately to limit potential conflicting turning movements, weaving maneuvers over short distances, and congestion along facilities.

Based on discussions with Biggs Junction citizens, local business owners, and representatives from the Oregon Department of Transportation, the following access management plan is the selected strategy to ensure the economic viability of Biggs Junction and the safe and efficient operation of its highway facilities.

The access management plan is shown in Figure 13. This plan strikes a compromise between the issues of mobility for highway users and accessibility for local property owners. Key features of the plan include:

- Upgrade of the US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road cross-sections to accommodate future travel demand;
- Reduction of potential conflict points along the highway facilities;
- Delineation of access approaches via curbs and sidewalks;
- Improved on-site circulation patterns;
- Improved sight-distance at the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection and at all access approaches; and
- Enhanced turning radii at the US 97/Celilo-Wasco Highway Spur/I-84 Frontage Road intersection.

ODOT Access Management Standards

The 1999 Oregon Highway Plan specifies an access management classification system for state facilities and has classified US 97 as being of a Statewide Level of Importance, and Celilo-Wasco Highway Spur/I-84 Frontage Road as being of a District Level of Importance.

Future developments along US 97 and Celilo-Wasco Highway Spur/I-84 Frontage Road (zone changes, comprehensive plan amendments, redevelopment, and/or new development) will be required to meet the 1999 Oregon Highway Plan Level of Importance and Access Management policies and standards.

The existing legal private approach connections and public street intersection spacing are not required to meet the spacing standards immediately. However, existing permitted connections not conforming to the design goals and objectives of the roadway classification will be upgraded as circumstances permit and during redevelopment. At any time, an approach road may need to be modified due to a safety problem or a capacity issue that exists or becomes apparent. By statute, ODOT is required to ensure that all safety and capacity issues are addressed. Proposed land use actions that do not comply with the designated access spacing policy will be required to complete a transportation impact analysis and apply for an access variance from ODOT per Oregon Administrative Rule #51.

Access deviations may be provided to parcels whose highway frontage, topography, or location would otherwise preclude issuance of a conforming permit and would either have no reasonable access or cannot obtain reasonable alternate access to the public road system. In such a situation, a conditional access permit may be issued by ODOT for a single connection to a property that cannot be accessed in a manner that is consistent with the spacing standards.

The permit may carry a condition that the access may be closed at such time that reasonable access becomes available to a local public street. Approval conditions might also require a given land owner to work in cooperation with adjacent land owners to provide either joint access points, front and rear cross-over easements, or a rear-access upon future redevelopment. Under special circumstances, ODOT may purchase property in order to prevent safety conflicts.

Parking Plan

Ideally all parking demand should be accommodated on-site. However, historical development patterns in Biggs Junction have led to local business reliance on existing on-street parking. To balance the need for on-street parking, as well as the need for sight distance at intersections, parking bays should be developed as shown in Figure 13. As designed, the parking bays can accommodate large vehicles while ensuring that intersection sight lines and turning movements are not obstructed.

It should be noted that on-street parking does create additional conflicts for highway users and its implementation is an interim solution to accommodate parking demand. As new development or redevelopment occurs, all parking demand generated by the development will be accommodated on-site and the existing on-street parking bays along the site frontage be removed as appropriate.

Preliminary Economic Analysis

A preliminary economic analysis was performed to evaluate the potential economic impact of implementing the Biggs Junction refinement plan. The plan's potential economic impact is favorable to the overall development of the Biggs Junction. By ensuring highway mobility, enhancing site-access, and improving roadway capacity, implementation of the refinement plan will result in a safer, more efficient transportation system. Consequently, the improved transportation system will increase the desirability of travel through Biggs Junction and may lead to additional development opportunities along Celilo-Wasco Highway Spur/I-84 Frontage Road.

Preliminary Environmental Analysis

The refinement plan was analyzed to determine the potential environmental impacts associated with its implementation. The preliminary environmental analysis revealed that the expansion of the highways' cross-sections, coupled with curbing along both roadway facilities, will result in increased water run-off. As a result, a curb and gutter system should be designed to effectively transport the anticipated run-off from the street system to a location where the storm water can be treated as necessary and released. Any additional environmental impacts will be addressed though final design and construction.

References

1. *Oregon Department of Transportation.* US Highway 97 Corridor Plan. Volume 1: Corridor Strategy. *1997*

2. *Oregon Department of Transportation*. Oregon Highway Plan. 1999.

3. *2000 Greyhound Lines.* Greyhound Fare Finder. *2000.*

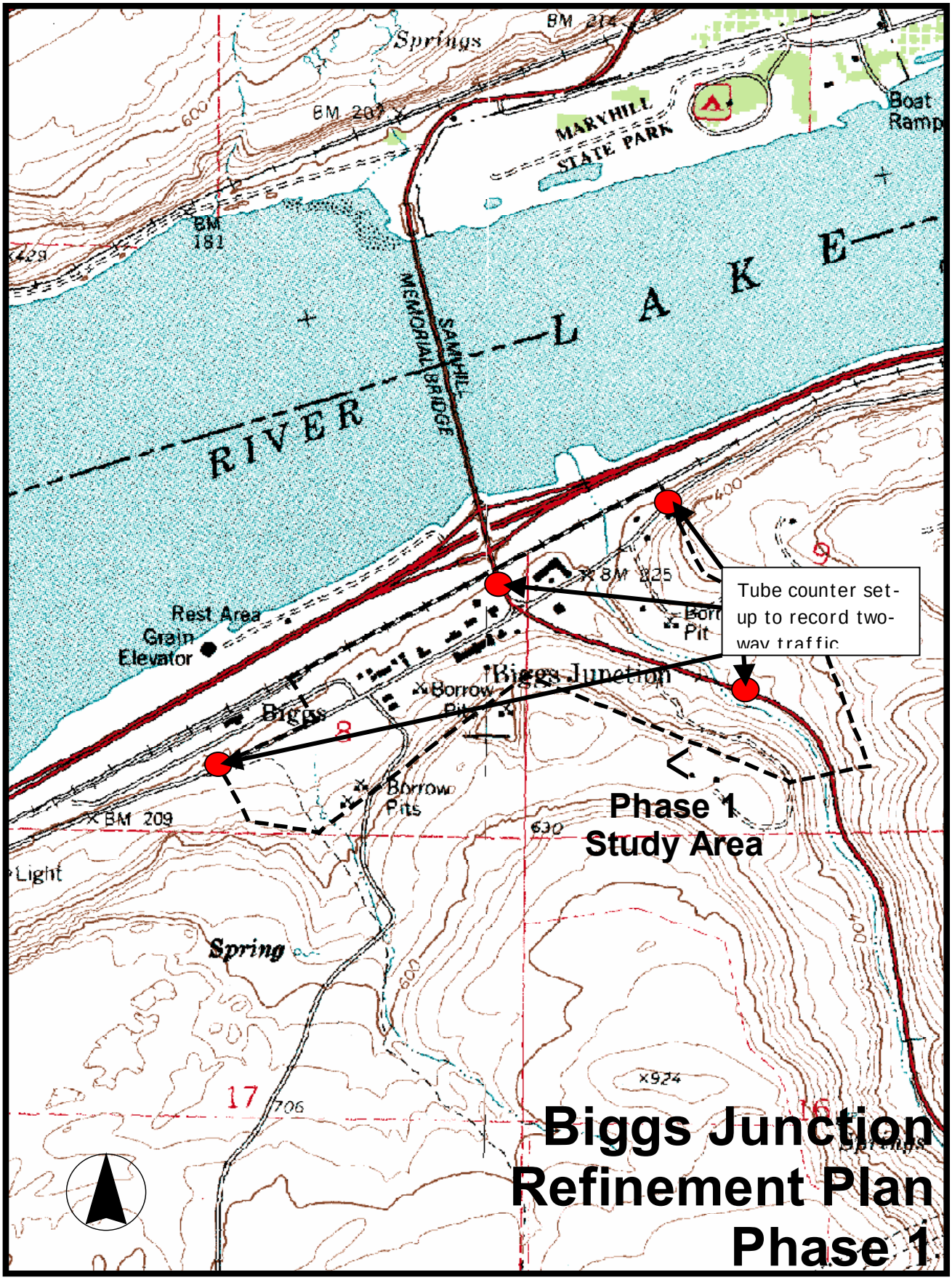
4. *Transportation Research Board*. Highway Capacity Manual, Special Report No. 209. 1997

5. *Oregon Department of Transportation*. ODOT Traffic Volume Tables 1986-1998.

6. *Portland State University. Center for Population Research and Census. 19*

Appendix A

Traffic Volume Data


Springs
BM 214
BM 207
MARYHILL STATE PARK
Boat Ramp
BM 181
RIVER
LAKE
MEMORIAL BRIDGE
SAMMAMISH
Tube counter set-up to record two-way traffic
BM 225
Rest Area
Grain Elevator
Biggs Junction
Biggs
Borrow Pits
BM 209
Phase 1 Study Area
Light
Spring
17
706
924
Biggs Junction Refinement Plan Phase 1

Biggs Junction Refinement Plan

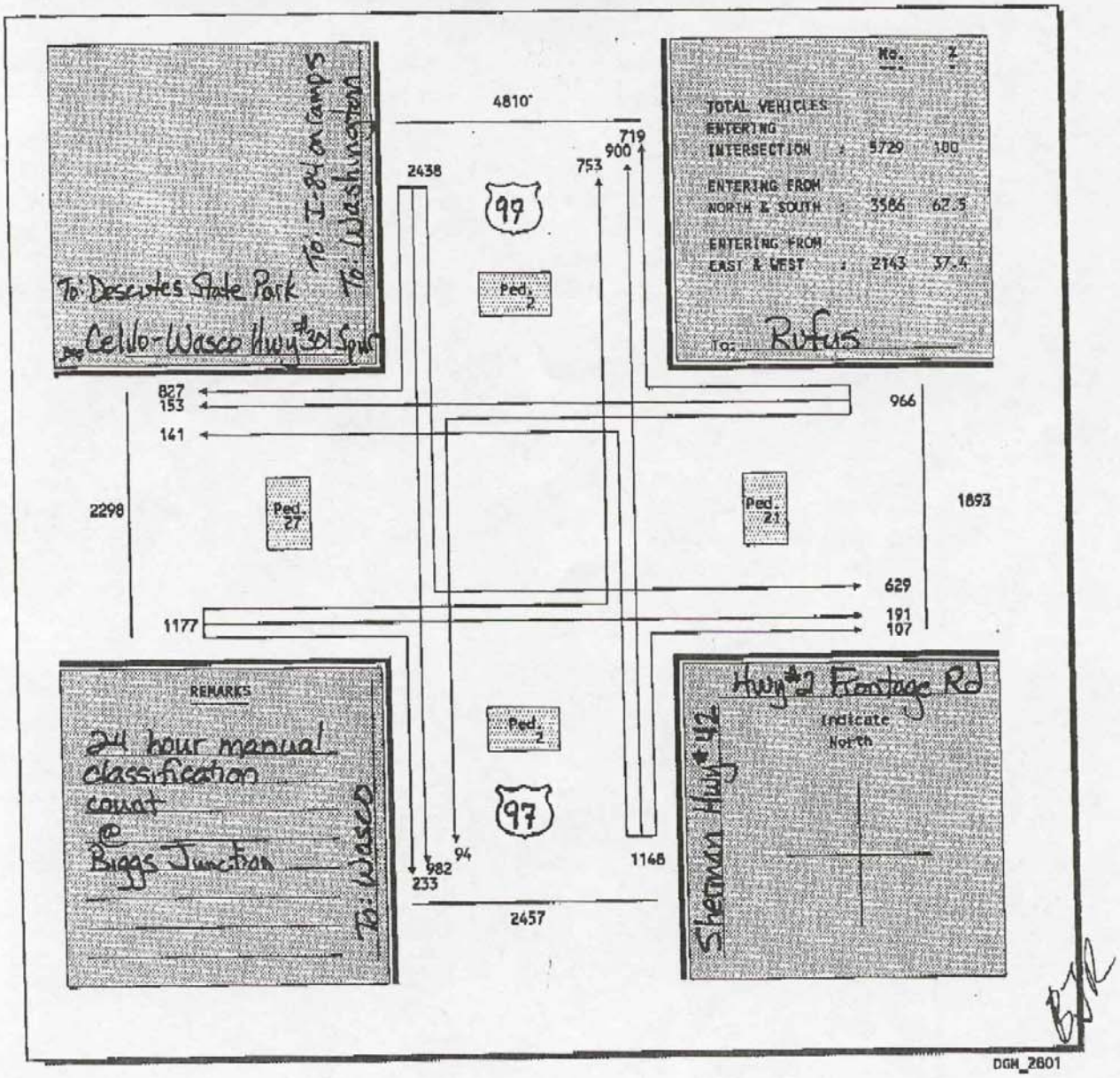
Traffic Tube Counts

Location	Dir.	Ct.	Vol.	Ct. #	Count Period
US 97 So. of Spanish	NB	2974	6609	86	2.22.00/1220 hrs. -2.24.00/1220 hrs.
Hollow Creek	SB	3635		120	2.22.00/1215 hrs. -2.24.00/1215 hrs.
US 97 No. of US 30	NB	8281	18862	119	2.22.00/1245 hrs. -2.24.00/1245 hrs.
on RR Bridge	SB	10581		294	2.22.00/1240 hrs. -2.24.00/1240 hrs.
US 30 East of Biggs	EB	423	851	116	2.22.00/1320 hrs. -2.24.00/1320 hrs.
US 30 East of Biggs	WB	428		91	2.22.00/1310 hrs. -2.24.00/1310 hrs.

TRANSPORTATION DEVELOPMENT BRANCH
TRANSPORTATION SYSTEM MONITORING UNIT
VEHICULAR VOLUME

DATE : FEB 23/24, 2000
DAY WEEK : WED/THURS
ACT COUNT: 24
HRS COUNT: 6AM - 6AM
PED COUNT: 24
HRS COUNT: 6AM - 6AM
WEATHER : CLEAR/CLOUDY

CITY OR COUNTY : SHERMAN
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST: (#42=D.03)(#301=Y7.62)(#2=F104.56)
CLASSIFICATION : All vehicles



DGH_2601

SUMMARY OF TRAFFIC COUNT
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000 | DAY : WED/THURS | COUNTY : SHERMAN | CITY:
HOURS : 6AM - 6AM | WEATHER: CLEAR/CLOUDY | INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
Tab by: | Chk. by: | MILE POST : (#42=0.03)(#301=97.62)(#2=F106.56)

TIME OF DAY	SUMMARY BY MOVEMENTS													NORTH AND SOUTH	PERCENT OF TOTAL	EAST AND WEST	PERCENT OF TOTAL	ENTERING VOLUMES BY LEGS			
	N-E	N-S	N-W	E-N	E-S	E-W	S-N	S-E	S-W	W-N	W-E	W-S	TOTAL					NORTH	EAST	SOUTH	WEST
06:00-07:00A	22	35	34	30	2	7	27	6	6	24	4	8	205	130	63.4	75	36.6	91	39	39	36
07:00-08:00A	24	35	35	30	2	1	34	2	8	32	10	9	222	138	62.2	84	37.8	94	33	44	51
08:00-09:00A	36	34	55	31	5	7	60	6	3	42	9	15	303	194	64.0	109	36.0	125	43	69	66
09:00-10:00A	29	50	49	35	2	7	59	5	7	50	6	12	311	199	64.0	112	36.0	128	44	71	68
10:00-11:00A	34	57	20	41	2	9	56	16	13	45	9	19	321	196	61.1	125	38.9	111	52	85	73
11:00-12:00A	41	66	58	39	3	13	76	9	10	56	6	18	395	260	65.8	135	34.2	165	55	95	80
12:00-01:00P	44	67	52	53	6	14	60	5	11	42	19	14	387	239	61.8	148	38.2	163	73	76	75
01:00-02:00P	40	58	57	45	2	10	61	4	11	50	14	13	365	231	63.3	134	36.7	155	57	76	77
02:00-03:00P	32	70	76	48	8	8	70	8	8	66	17	10	421	264	62.7	157	37.3	178	64	86	93
03:00-04:00P	36	77	57	47	8	19	73	10	5	57	16	18	423	258	61.0	165	39.0	170	74	88	91
04:00-05:00P	42	68	56	46	4	15	72	5	14	48	11	16	397	257	64.7	140	35.3	166	65	91	75
05:00-06:00P	51	86	61	46	7	8	50	5	11	48	12	16	401	264	65.8	137	34.2	198	61	66	76
06:00-07:00P	39	55	44	30	4	4	33	2	7	45	3	14	280	180	64.3	100	35.7	138	38	42	62
07:00-08:00P	28	49	35	25	9	9	21	6	6	37	6	13	244	145	59.4	99	40.6	112	43	33	56
08:00-09:00P	20	32	44	29	1	8	19	3	4	24	13	9	206	122	59.2	84	40.8	96	38	26	46
09:00-10:00P	21	40	28	21	8	7	13	2	4	30	11	11	196	108	55.1	88	44.9	89	36	19	52
10:00-11:00P	18	26	9	30	10	3	19	2	3	9	7	6	142	77	54.2	65	45.8	53	43	24	22
11:00-12:00P	18	14	8	13	4	1	12	3	2	6	3	2	86	57	66.3	29	33.7	40	18	17	11
12:00-01:00A	4	20	9	12	2	2	13	1	4	11	5	2	85	51	60.0	34	40.0	33	16	18	18
01:00-02:00A	15	8	10	18			12		1	5	4	3	76	46	60.5	30	39.5	33	18	13	12
02:00-03:00A	8	2	8	12	1		4		1	3		1	40	23	57.5	17	42.5	18	13	5	4
03:00-04:00A	6	11	1	7	2	1	12	2		8	1		51	32	62.7	19	37.3	18	10	14	9
04:00-05:00A	8	7	5	12	1		22	2	2	3	2	1	65	46	70.8	19	29.2	20	13	26	6
05:00-06:00A	13	15	16	19	1		22	3		12	3	3	107	69	64.5	38	35.5	44	20	25	18
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]									
	SBLT	SBTH	SBRT	WBRT	WBLT	WBTH	NBTH	NBRT	NBLT	EBLT	EBTH	EBRT									
TOTAL COUNT	629	982	827	719	94	153	900	107	141	753	191	233	5729	3586	62.6	2143	37.4	2438	966	1148	1177
24HR FACTOR	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00									
24HR VOLUME	629	982	827	719	94	153	900	107	141	753	191	233	5729	3586	62.6	2143	37.4	2438	966	1148	1177

North and South is: SHERMAN HWY #42 (US97)

East and West is: CELILO-WASCO HWY #301 SPUR (W) & HWY#2 FRONTAGE RD (E)

SUM_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : NORTH

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) & CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=7.62)(#2=F104.56)
TO : EAST

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	WTrln	Other	WTrln	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl					
06:00-07:00A	9		6		1				3	2			1						22		
07:00-08:00A	9		7		2				4	1							1		24		
08:00-09:00A	10	1	11	2	4				8										36		
09:00-10:00A	8		8		3	1			7	1			1						29		
10:00-11:00A	12		8	1	3	1		1	5		1	1	1						34		
11:00-12:00A	18		12		2	2			4	2								1	41		
12:00-01:00P	20		9	2	3			1	6	2							1		44		
01:00-02:00P	25		8		1		1		4								1		40		
02:00-03:00P	18		8	1	2				2								1		32		
03:00-04:00P	19		10		2	1			4										36		
04:00-05:00P	19		13	1	2				6								1		42		
05:00-06:00P	29		7	1	2				9	1							2		51		
06:00-07:00P	13		15	1					10										39		
07:00-08:00P	11		9		1				2			4	1						28		
08:00-09:00P	8		1	1	1	1			8										20		
09:00-10:00P	9		5		1				6										21		
10:00-11:00P	5		2	2	3				5				1						18		
11:00-12:00P	7		2						5		2	1	1						18		
12:00-01:00A	1		1								2								4		
01:00-02:00A	4				2				5		1	2	1						15		
02:00-03:00A	2		2		1	1		1			1								8		
03:00-04:00A									2			1	2				1		6		
04:00-05:00A	2		2		1				2		1								8		
05:00-06:00A	9		1						2	1									13		
24 HOUR	267	1	147	12	37	7	1	3	109	10	8	9	9				8	1	629		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : NORTH

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=Y7.62)(#2=F104.56)
TO : SOUTH

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	VTrlr	Other	VTrlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>6Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl					
06:00-07:00A	10		5						17	2		1							35		
07:00-08:00A	6		9		1	1	1	1	14				2						35		
08:00-09:00A	8		13		1				11			1							34		
09:00-10:00A	17	1	5	1	4				17	2		1	2						50		
10:00-11:00A	18		5	3	6	1			15	3			5				1		57		
11:00-12:00A	16	1	14	1	4	3		2	18	2			4				1		66		
12:00-01:00P	24		8	1	4	1		1	23	2		1	2						67		
01:00-02:00P	21		11		1			1	18	2		1	3						58		
02:00-03:00P	24		8	2	1	1		3	27	2			2						70		
03:00-04:00P	20		15	1	1	1			33	4			2						77		
04:00-05:00P	21		12		1	1	1		27	2		2			1				68		
05:00-06:00P	29		4		1	1	1	1	41			3	5						86		
06:00-07:00P	17		5	1	1				24	1			6						55		
07:00-08:00P	13		7						26				2				1		49		
08:00-09:00P	5		4						21				1	1					32		
09:00-10:00P	7		8	1	2	1			19	1			1						40		
10:00-11:00P	5		2						16			1	1		1				26		
11:00-12:00P			2		1				7		1		2		1				14		
12:00-01:00A	2		3		7	1		1	1		2	1	1	1					20		
01:00-02:00A	2		2						4										8		
02:00-03:00A												2							2		
03:00-04:00A	1		2		5						1		1		1				11		
04:00-05:00A	1		1		1				3				1						7		
05:00-06:00A	3		3		1				6					1	1				15		
24 HOUR	270	2	148	11	43	12	3	10	388	23	4	14	43	3	5		3		982		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : NORTH

COUNTY : SHERMAN
CITY:
INTERSECTION OF: SHERMAN HWY #42 (OS 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=Y7.62)(#2=F104.56)
TO : WEST

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	Utrlr	Other	Utrlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>6Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl					
06:00-07:00A	8		3	1	1	1		1	16	1	1		1						34		
07:00-08:00A	16		5		2	1			7	3			1						35		
08:00-09:00A	28		8	1	1	1	1	1	12	1							1		55		
09:00-10:00A	25		6		1	1			12	2	1		1						49	1	
10:00-11:00A	7	1	1	1		3		1	2	2		1					1		20		
11:00-12:00A	17		9	3	4	2		1	12	6		2	4						58		
12:00-01:00P	21		15	1		1			14										52		
01:00-02:00P	27	1	12	1	2	1			4	4	3	1	1						57		
02:00-03:00P	33		16	2	4	1			16	2		1						1	76		
03:00-04:00P	24		14		1	2			14				2						57		
04:00-05:00P	21	1	8		2	1			19	1			1					2	56		
05:00-06:00P	18	1	10	1	3				24	3							1		61		
06:00-07:00P	21		3					1	16	2			1						44		
07:00-08:00P	9		5			1		2	15	3									35		
08:00-09:00P	12		7	1					21				3						44		
09:00-10:00P	11		5	1					9	1					1				28		
10:00-11:00P	3		1						4	1									9		
11:00-12:00P	5							1		2	1	1							8		
12:00-01:00A	2		3						1	1		2							9		
01:00-02:00A	1				1				6			2							10		
02:00-03:00A								1	7										8		
03:00-04:00A												1							1		
04:00-05:00A			2	1		1			1										5		
05:00-06:00A	7		2	2					4	1									16		
24 HOUR	314	4	135	16	22	17	1	9	236	34	6	11	15		1		3	3	827	1	

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : EAST

COUNTY : SHERMAN
CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=17.62)(#2=F104.56)
TO : NORTH

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	WTrlr	Other	WTrlr	2 Axl	3 Axl	>3Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>8Axl					
06:00-07:00A	14		9		1				3		1		2						30		
07:00-08:00A	10		10		1				7	1			1						50		
08:00-09:00A	12	1	8		2				7			1							31		
09:00-10:00A	11		10		2	1			10	1									35		
10:00-11:00A	14	1	7	2	1				12	3			1						41		
11:00-12:00A	16		6		3	2			9				1				1	1	39		
12:00-01:00P	26		13					1	10	2			1						53		
01:00-02:00P	23		8	1	1			1	5	1	2	1	2						45		
02:00-03:00P	21		11		3	3		1	8				1						48		
03:00-04:00P	23		14		1	1	1		7										47		
04:00-05:00P	22		10	2	2				8	1		1							46		
05:00-06:00P	23		11		1				7	1			2		1				46		
06:00-07:00P	15		5	1		1		1	7										30		
07:00-08:00P	8		8						7				1				1		25		
08:00-09:00P	10		2	1	1	1			11				3						29		
09:00-10:00P	9		4	1		1		1	5										21		
10:00-11:00P	8	1	3		1				10	2			4		1				30		
11:00-12:00P	6		3						2			2							13		
12:00-01:00A	3		2						3			2	1		1				12		
01:00-02:00A	5		5						6		1	1							18		
02:00-03:00A	2		1			2			3		1	3							12		
03:00-04:00A	1		1						4						1				7		
04:00-05:00A	1		3		2				3			1	2						12		
05:00-06:00A	11		2		3				2	1									19		
24 HOUR	294	3	156	8	29	12	1	5	156	13	5	12	22		4		2	1	719		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000		COUNTY :	SHERMAN
DAY OF WEEK : WED/THURS		INTERSECTION OF:	SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
HOURS COUNTED: 6AM - 6AM			CITY:
WEATHER : CLEAR/CLOUDY		MILE POST :	(#42=0.03)(#301=V7.62)(#2=F104.56)
FROM : EAST		TO	SOUTH

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE
	Cars	VT/Tr	Other	WTrlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>6Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl				
06:00-07:00A			2																2	
07:00-08:00A	1		1																2	
08:00-09:00A	2		2									1							5	
09:00-10:00A	1		1																2	
10:00-11:00A	2																		2	
11:00-12:00A	1		2																3	
12:00-01:00P	1		2		2				1										6	
01:00-02:00P	1								1										2	
02:00-03:00P	3		3					1	1										8	
03:00-04:00P	2		2		1	1			2										8	
04:00-05:00P	2				1				1										4	
05:00-06:00P	4				1			1	1										7	
06:00-07:00P			1	1					2										4	
07:00-08:00P	3		2						3				1						9	
08:00-09:00P									1										1	
09:00-10:00P	1		1						5				1						8	
10:00-11:00P	5		2	1	1								1						10	
11:00-12:00P	2		1						1										4	
12:00-01:00A	1								1										2	
01:00-02:00A																				
02:00-03:00A									1										1	
03:00-04:00A			1						1										2	
04:00-05:00A			1																1	
05:00-06:00A	1																		1	
24 HOUR	33		24	2	6	1		2	22			1	3						94	

Summarized by:_______________ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : EAST

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND
COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=Y7.62)(#2=F104.56)
TO : WEST

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	VFelr	Other	VTelr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>8Axl					
06:00-07:00A	1		4		1				1										7		
07:00-08:00A			1																1		
08:00-09:00A	4		2		1														7		
09:00-10:00A	2		1	3	1														7		
10:00-11:00A	4		4			1													9		
11:00-12:00A	10		3																13		
12:00-01:00P	10		4																14		
01:00-02:00P	6		3		1														10		
02:00-03:00P	5		3																8		
03:00-04:00P	9		8		2														19		
04:00-05:00P	6		5		3												1		15		
05:00-06:00P	5		3																8		
06:00-07:00P	1		2						1										4		
07:00-08:00P	5		2						2										9		
08:00-09:00P	6		1						1										8		
09:00-10:00P	3		2		1							1							7		
10:00-11:00P	2								1										3		
11:00-12:00P	1																		1		
12:00-01:00A	1		1																2		
01:00-02:00A																					
02:00-03:00A																					
03:00-04:00A	1																		1		
04:00-05:00A																					
05:00-06:00A																					
24 HOUR	82		49	3	10	1			6			1					1		153		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : SOUTH

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=Y7.62)(#2=F104.56)
TO : NORTH

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE
	Cars	W Trlr	Other	W Trlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl				
06:00-07:00A	5		3						16	2	1								27	
07:00-08:00A	16		4						11	1			2						34	
08:00-09:00A	23		13		1	1			20	1							1		60	
09:00-10:00A	22		9	1	4				19			1	1				2		59	
10:00-11:00A	20		7	2	3	2		1	20				1						56	
11:00-12:00A	23	1	13	1	3	1	1	2	26	1		1	3						76	
12:00-01:00P	20		16	2	2	1		1	17				1						60	
01:00-02:00P	20		14		1	4			16			1	3				2		61	
02:00-03:00P	22		20	1	2	1		1	15	2	1		3				2		70	
03:00-04:00P	15		17	1	2			1	31	2			2				2		73	
04:00-05:00P	27		7	1	1	1			28	1		3	2				1		72	
05:00-06:00P	20		10	2	2		1		14								1		50	
06:00-07:00P	9		6	1					14	1			1				1		33	
07:00-08:00P	5		6					1	8	1									21	
08:00-09:00P	6		3						8			1		1					19	
09:00-10:00P	4		2		1	1			3				2						13	
10:00-11:00P	3		4	1				1	9	1									19	
11:00-12:00P	3								7	1					1				12	
12:00-01:00A			1					1	6		1	1	3						13	
01:00-02:00A	1		2	1					6	1			1						12	
02:00-03:00A	1		1						2										4	
03:00-04:00A	2		4		2	2			1								1		12	
04:00-05:00A	2		1						16		1		2						22	
05:00-06:00A	6								13	2					1				22	
24 HOUR	275	1	163	14	24	14	2	9	326	17	4	8	27	1	2		13		900	

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : SOUTH

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #2 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#2+0.05)(#301+Y7.62)(#2+F104.56)
TO : EAST

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	Wtrlr	Other	Wtrlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl					
06:00-07:00A	2		4																6		
07:00-08:00A	2																		2		
08:00-09:00A			3		1				1			1							6		
09:00-10:00A	2		2						1										5		
10:00-11:00A	8		2		2	1			1	1							1		16		
11:00-12:00A	6		2						1										9		
12:00-01:00P	1		2						1								1		5		
01:00-02:00P	2		2																4		
02:00-03:00P	3		3		1	1													8		
03:00-04:00P	7		1			1	1												10		
04:00-05:00P	2		3																5		
05:00-06:00P	2		2		1														5		
06:00-07:00P	1			1															2		
07:00-08:00P	3		2						1										6		
08:00-09:00P									3										3		
09:00-10:00P	1		1																2		
10:00-11:00P	1								1										2		
11:00-12:00P	1		2																3		
12:00-01:00A									1										1		
01:00-02:00A																					
02:00-03:00A																					
03:00-04:00A									2										2		
04:00-05:00A	2																		2		
05:00-06:00A	3																		3		
24 HOUR	49		31	1	5	3	1		13	1		1					2		107		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : SOUTH

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=17.62)(#2=F104.56)
TO : WEST

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	WTrlr	Other	WTrlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>8Axl					
06:00-07:00A	1		4							1									6		
07:00-08:00A	3		2						2								1		8		
08:00-09:00A	3																		3		
09:00-10:00A	2		2						2				1						7		
10:00-11:00A	4		3						5	1									13		
11:00-12:00A	5		2		1				2										10		
12:00-01:00P	7		3						1										11		
01:00-02:00P	7		2						1	1									11		
02:00-03:00P	2		3						1	1			1						8		
03:00-04:00P	2		2							1									5		
04:00-05:00P	5		3	1				1	3				1						14		
05:00-06:00P	2		1			1			6			1							11		
06:00-07:00P	4								3										7		
07:00-08:00P	3		2	1															6		
08:00-09:00P	1		1						2										4		
09:00-10:00P	2								1	1									4		
10:00-11:00P	1		1						1										3		
11:00-12:00P						1			1										2		
12:00-01:00A			1						2	1									4		
01:00-02:00A						1													1		
02:00-03:00A									1										1		
03:00-04:00A																					
04:00-05:00A			1						1										2		
05:00-06:00A																					
24 HOUR	54		33	2	1	3		1	35	2		1	3				1		141		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : WEST

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) & CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=Y7.62)(#2=E104.56)
TO : K NORTH

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	W/Trlr	Other	W/Trlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>8Axl					
06:00-07:00A	5		7	1	2	1			4	3		1							24		
07:00-08:00A	10		4	1				1	12	1	2		1						32		
08:00-09:00A	19		5	1	2	1	1		7	5			1						42		
09:00-10:00A	20		6	4	2	1		1	10	1	1	1	2				1		50		
10:00-11:00A	19		8		3	2		1	8	2							2		45		
11:00-12:00A	19		6	2	3	2			16	3		1	4						56		
12:00-01:00P	19		8	1	1			1	10	1		1							42		
01:00-02:00P	27	1	8	1		2			9				2						50		
02:00-03:00P	36	1	11	2	3	1			9	2		1							66		
03:00-04:00P	21		19		1				11	3		1	1						57		
04:00-05:00P	21	1	5		3	1		1	13	2			1						48		
05:00-06:00P	20	1	11		5				9	1			1						48		
06:00-07:00P	15		3		1				18	6		1			1				45		
07:00-08:00P	15		4	1			1	1	11	1		1	2						37		
08:00-09:00P	11		2	1					9				1						24		
09:00-10:00P	12		3		1				11	1			2						30		
10:00-11:00P	3		2						3						1				9		
11:00-12:00P	2		1					1	1		1								6		
12:00-01:00A	3		3						4	1									11		
01:00-02:00A			2						2			1							5		
02:00-03:00A									3										3		
03:00-04:00A									6	1		1							8		
04:00-05:00A						1			2										3		
05:00-06:00A	1		1						8				2						12		
24 HOUR	298	4	119	13	27	12	2	7	196	34	4	10	20		2		3		753		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6AM
WEATHER : CLEAR/CLOUDY
FROM : WEST

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND
COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=97.62)(#2=F104.56)
TO : EAST

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	Wtr	Other	Wtr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl					
06:00-07:00A	1		3																4		
07:00-08:00A	4		3		1	1											1		10		
08:00-09:00A	5		2			1			1										9		
09:00-10:00A	2		4																6		
10:00-11:00A	6		2			1													9		
11:00-12:00A	2		4																6		
12:00-01:00P	13		6																19		
01:00-02:00P	7		5		1					1									14		
02:00-03:00P	7		9															1	17		
03:00-04:00P	10		5		1														16		
04:00-05:00P	4		4	1	1					1									11		
05:00-06:00P	8		2	1					1										12		
06:00-07:00P	2		1																3		
07:00-08:00P	5								1										6		
08:00-09:00P	11		1						1										13		
09:00-10:00P	7		1					1	2										11		
10:00-11:00P	4		1						1				1						7		
11:00-12:00P	3																		3		
12:00-01:00A	4		1																5		
01:00-02:00A	1		1								1	1							4		
02:00-03:00A																					
03:00-04:00A	1																		1		
04:00-05:00A	1		1																2		
05:00-06:00A	2		1																3		
24 HOUR	110		57	2	4	3		1	7	2	1	1	1				1	1	191		

Summarized by:_____ | 02/29/00

WORK_2801

TRAFFIC COUNT SUMMARY SHEET
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
DAY OF WEEK : WED/THURS
HOURS COUNTED: 6AM - 6PM
WEATHER : CLEAR/CLOUDY
FROM : WEST

COUNTY : SHERMAN CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) & CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=17.62)(#2=104.56)
TO : SOUTH

TIME OF DAY	PASSENGER		OTHER 2 AXLE		SGL UNIT TRUCK			SGL TRAILER TRUCKS			DBL TRAILER TRUCKS			TRP TRAILER TRUCKS			BUSES	MOTOR CYCLE SCOOT	TOTAL ALL VEHICLE	BI CY CLE	
	Cars	Mtrlr	Other	Mtrlr	2 Axl	3 Axl	>4Axl	4 Axl	5 Axl	>5Axl	5 Axl	6 Axl	>7Axl	7 Axl	8 Axl	>9Axl					
06:00-07:00A	1		4						2			1							8		
07:00-08:00A	1		2						6										9		
08:00-09:00A	7		3						4	1									15		
09:00-10:00A	6		1	1		1			5										12		
10:00-11:00A	8	1	2			3			3	2									19		
11:00-12:00A	4		6	2	1				3	1		1							18		
12:00-01:00P	9		2			1			2										14		
01:00-02:00P	5		4		1				3										13		
02:00-03:00P	4		4						2										10		
03:00-04:00P	9		3						6										18		
04:00-05:00P	6		3		1				5								1		16		
05:00-06:00P	8		2						5								1		16		
06:00-07:00P	4		3					1	4			2							14		
07:00-08:00P	6		1						5				1						13		
08:00-09:00P	4		3						2										9		
09:00-10:00P	3		2						5										11		
10:00-11:00P	1		1						3	1									6		
11:00-12:00P	1								1										2		
12:00-01:00A			1							1									2		
01:00-02:00A			1						2										3		
02:00-03:00A									1										1		
03:00-04:00A																					
04:00-05:00A									1										1		
05:00-06:00A	1								2										3		
24 HOUR	84	1	48	3	3	5		1	73	6		4	1				2		233		

Summarized by:_____ | 02/29/00

WORK_2801

SUMMARY OF BICYCLE COUNT
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000 | DAY : WED/THURS | COUNTY : SHERMAN | CITY:
HOURS : 6AM - 6AM | WEATHER: CLEAR/CLOUDY | INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
Tab by: | Chk. by: | MILE POST : (#42=0.03)(#301=Y7.62)(#2=F104.56)

TIME OF DAY	BICYCLES MOVING WITH VEHICULAR TRAFFIC																BICYCLES USING CROSS WALKS				
	N-E	N-S	N-W	E-N	E-S	E-W	S-N	S-E	S-W	W-N	W-E	W-S				TOTAL	NORTH	EAST	SOUTH	WEST	
06:00-07:00A																					
07:00-08:00A																					
08:00-09:00A																					
09:00-10:00A			1													1					
10:00-11:00A																					
11:00-12:00A																					
12:00-01:00P																					
01:00-02:00P																					
02:00-03:00P																					
03:00-04:00P																					
04:00-05:00P																					
05:00-06:00P																					
06:00-07:00P																					
07:00-08:00P																					
08:00-09:00P																					
09:00-10:00P																					
10:00-11:00P																					
11:00-12:00P																					
12:00-01:00A																					
01:00-02:00A																					
02:00-03:00A																					
03:00-04:00A																					
04:00-05:00A																					
05:00-06:00A																					
TOTAL VOLUME			1													1					

North and South is: SHERMAN HWY #42 (US97)

East and West is: CELILO-WASCO HWY #301 SPUR (W) & HWY#2 FRONTAGE RD (E)

BIKE_2801

SUMMARY OF PEDESTRIAN COUNT
TRANSPORTATION DEVELOPMENT BRANCH - RESEARCH SECTION

DATE : FEB 23/24, 2000
HOURS : 6AM - 6AM
Tab by:

DAY : WED/THURS
WEATHER: CLEAR/CLOUDY
Chk. by:

COUNTY : SHERMAN
CITY:
INTERSECTION OF: SHERMAN HWY #42 (US 97) @ CELILO-WASCO HWY #301 SPUR AND COLUMBIA RIVER HWY #2 FRONTAGE RD
MILE POST : (#42=0.03)(#301=Y7.62)(#2=F104.56)

TIME OF DAY	STUDENT PEDESTRIANS					OTHER PEDESTRIANS					STUDENT AND OTHER PEDESTRIAN				
	NORTH	EAST	SOUTH	WEST	TOTAL	NORTH	EAST	SOUTH	WEST	TOTAL	NORTH	EAST	SOUTH	WEST	TOTAL
06:00-07:00A							1		1	2		1		1	2
07:00-08:00A															
08:00-09:00A							2		2	4		2		2	4
09:00-10:00A									1	1				1	1
10:00-11:00A		6		6	12							6		6	12
11:00-12:00A									1	1				1	1
12:00-01:00P															
01:00-02:00P							1			1		1			1
02:00-03:00P							3		4	7		3		4	7
03:00-04:00P						1		1	2	4	1		1	2	4
04:00-05:00P							4			4		4			4
05:00-06:00P							1		7	8		1		7	8
06:00-07:00P							1			1		1			1
07:00-08:00P						1	1	1	2	5	1	1	1	2	5
08:00-09:00P							1			1		1			1
09:00-10:00P									1	1				1	1
10:00-11:00P															
11:00-12:00P															
12:00-01:00A															
01:00-02:00A															
02:00-03:00A															
03:00-04:00A															
04:00-05:00A															
05:00-06:00A															
TOTAL VOLUME		6		6	12	2	15	2	21	40	2	21	2	27	52

North and South is: SHERMAN HWY #42 (US97)

East and West is: CELILO-WASCO HWY #301 SPUR (W) & HWY#2 FRONTAGE RD (E)

PED_2801

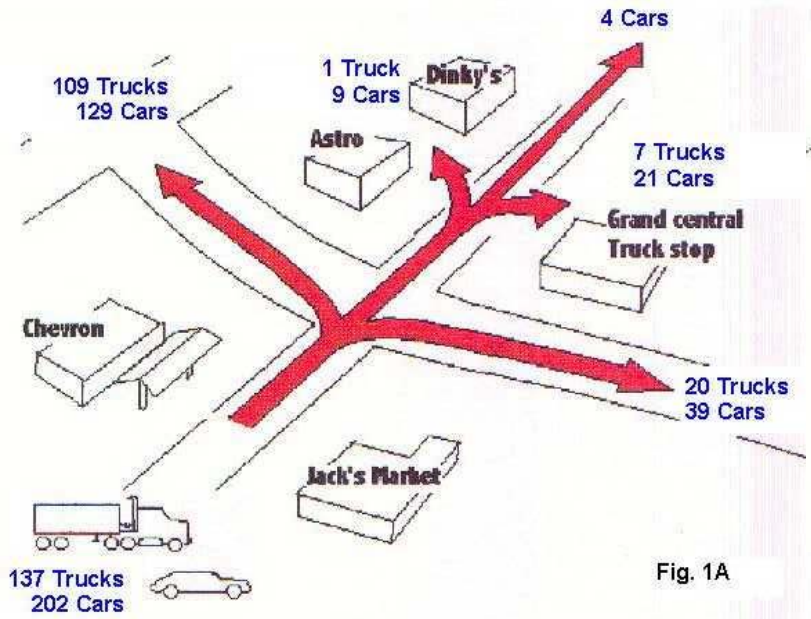


Fig. 1A

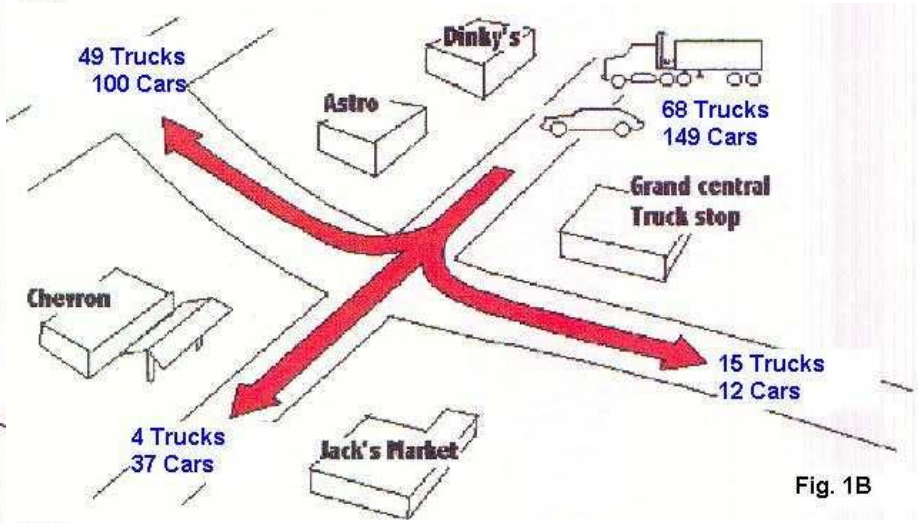


Fig. 1B

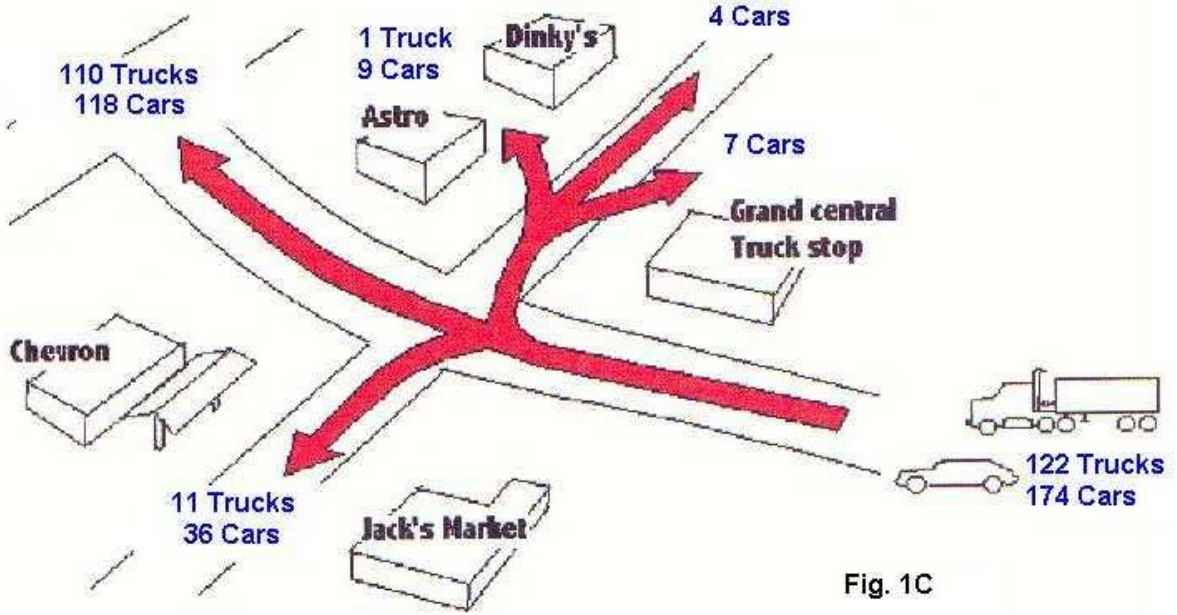


Fig. 1C

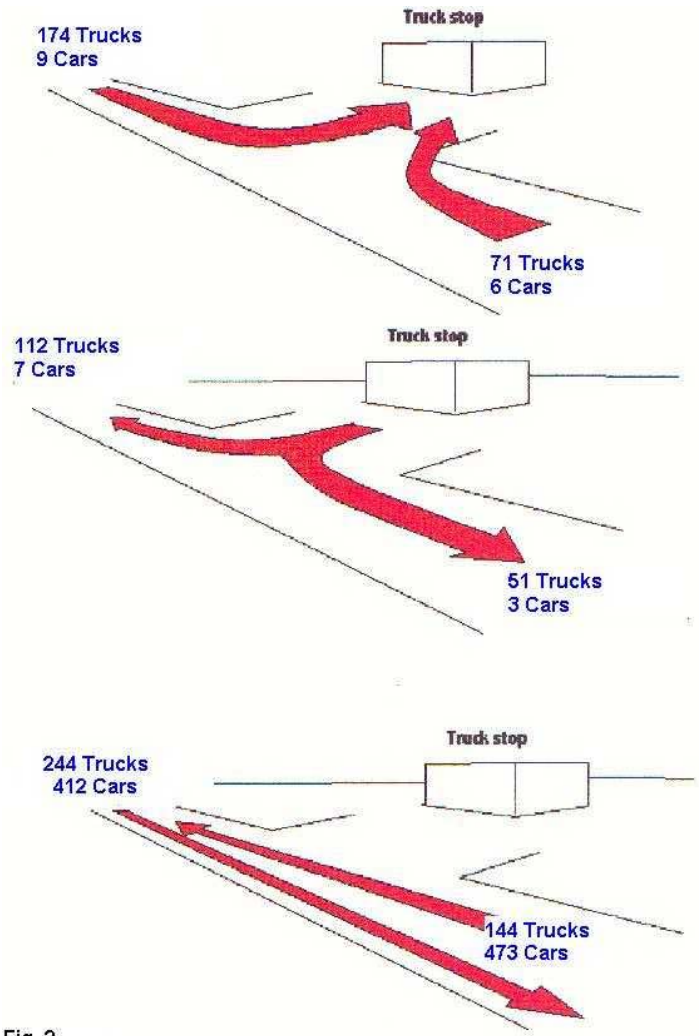


Fig. 2

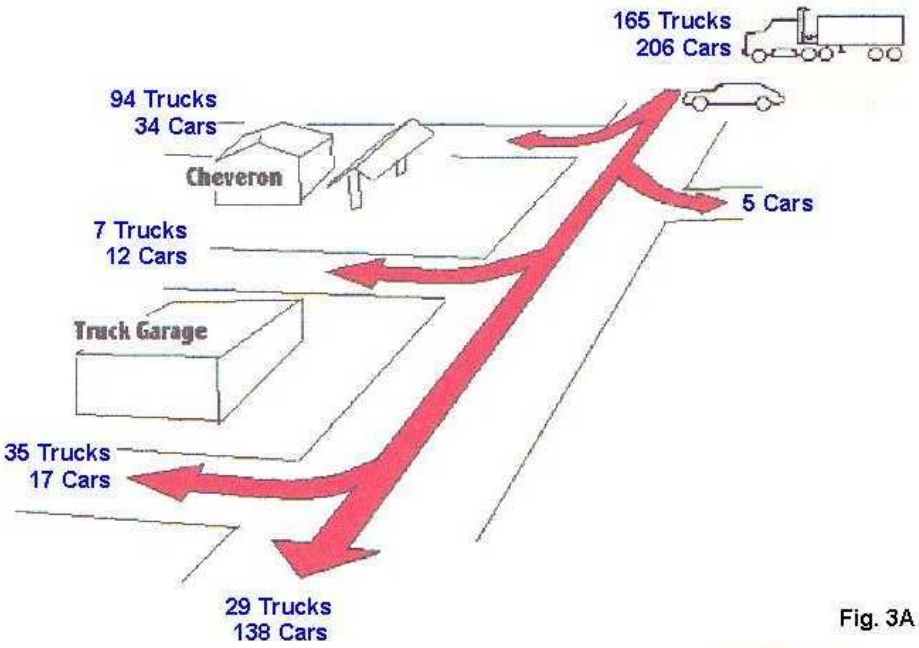


Fig. 3A

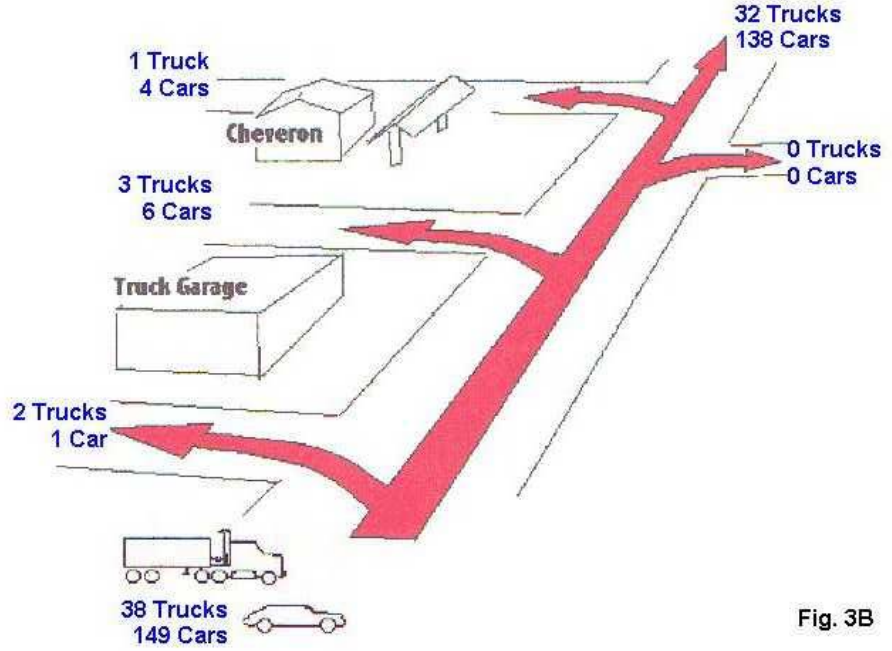


Fig. 3B

Appendix B

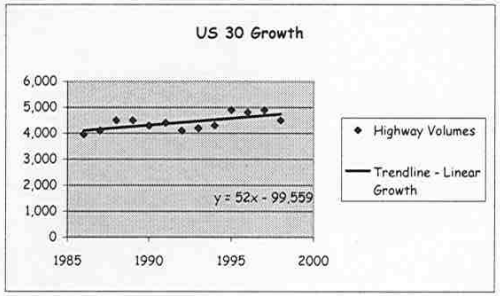
Permitted Access Location Data

Wasco-Celilo Highway Accesses		
Station	Side	Size
277+15	South	35'
276+70	North	50'
276+00	South	35'
274+51	North	50'
274+00	South	35'
273+85	North	50'
273+05	South	35'
272+80	North	50'
269+05	North	35'
268+80	South	30'
268+35	North	35'
267+90	North	35'
266+72	South	30'
266+18	North	35'
US Highway 97 Accesses		
15+00	East	50'
17+50	East	50'

Appendix C

Future Growth Calculations

US Route	Highway	Mile Post	Year	Highway Volumes
Celilo-Wasco highway	Hwy. 301	7.61	1998	4,500
			1997	4,900
			1996	4,800
0.01 mile west of US 97			1995	4,900
			1994	4,300
			1993	4,200
			1992	4,100
			1991	4,400
			1990	4,300
* Volume Reported as 5,400			1989	4,500
* Volume Reported as 5,400			1988	4,500
			1987	4,100
			1986	3,950



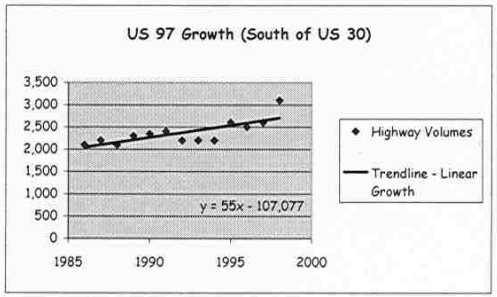
2020 Growth Projection:

y = 52x - 99,559
y = 5,481

y = 5,500

Base Year	2000	4,441
Future Year	2020	5,481
Average Growth		1.2%

US Route	Highway	Mile Post	Year	Highway Volumes
US 97	Hwy. 42	0.04	1998	3,100
			1997	2,600
			1996	2,500
0.01 mile south of Celilo-Wasco Highway Spur			1995	2,600
			1994	2,200
			1993	2,200
			1992	2,200
			1991	2,400
			1990	2,350
			1989	2,300
			1988	2,100
			1987	2,200
			1986	2,100



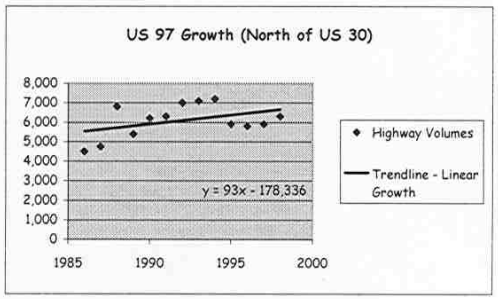
2020 Growth Projection:

y = 55x - 107,077
y = 4,023

y = 4,000

Base Year	2000	2,923
Future Year	2020	4,023
Average Growth		1.9%

US Route	Highway	Mile Post	Year	Highway Volumes
US 97	Hwy. 42	X0.06	1998	6,300
			1997	5,900
0.07 mile south of Columbia River Highway (I-84)			1996	5,800
			1995	5,900
			1994	7,200
			1993	7,100
			1992	7,000
			1991	6,300
			1990	6,200
			1989	5,400
			1988	6,800
			1987	4,750
			1986	4,500



2020 Growth Projection:

y = 93x - 178,336
y = 9,524

y = 9,500

Base Year	2000	7,664
Future Year	2020	9,524
Average Growth		1.2%

Appendix D

Signal Warrant Analysis

ODOT SIGNAL WARRANT ANALYSIS

Project Name: Biggs Junction Refinement Plan
Project Number: 3944
Analyst: ELW
Date: **********
Filename: H:\PROJFILE\3944\142UNS.WB2

KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230
Fax: (503) 273-8169

Intersection: US 97/Celilo-Wasco Hwy
Conditions (yr, alt., etc.): 2020 Forecast Conditions

PRELIMINARY TRAFFIC SIGNAL WARRANT CALCULATION
ADT VOLUMES REQUIRED TO MEET SIGNALIZATION

Number of Lanes for Moving Traffic on Each Intersection Approach		ADT on Major St. Approaching Both Directions		ADT on Minor St. Highest Approaching Volume	
Major St.	Minor St.	100% Warrants	70% Warrants	100% Warrants	70% Warrants
WARRANT 1					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
1	2 or more	8,850	6,200	3,550	2,500
2 or more	2 or more	10,600	7,400	3,550	2,500
WARRANT 2					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
1	2 or more	13,300	9,300	1,750	1,250
2 or more	2 or more	15,900	11,100	1,750	1,250

Warrant Factor: 70% **70 percent of standard warrants used due to 85th percentile speed in excess of 40 MPH, or isolated community with population less than 10,000.**

Traffic Data Used for Calculation:

	# of Lanes	Right-Turn Factor	PH/ADT	Peak Hour Approach Volume Left	Thru	Right	Total	Warrant Volume	Warrant Met?
WARRANT 1 (Minimum Vehicular Volume)									
Major Street:	1	100%	10.0%	12	182	25			
		100%	10.0%	90	192	142	6430	6200	
Minor Street:	1	100%	10.0%	142	40	45			
		100%	10.0%	20	47	117	2270	1850	YES
WARRANT 2 (Interruption of Continuous Traffic)									
Major Street:							6430	9300	
Minor Street:							2270	950	NO

Calculation Method:
Approach volume = (Left+Thru+(Right*Right Turn Factor)) / ratio of peak hour volume to ADT
Major Street volume = Sum of approach volumes
Minor Street volume = Higher approach volume

OREGON DEPARTMENT OF TRANSPORTATION -- HIGHWAY DIVISION
Project Management Branch -- Urban Studies Unit

MUTCD Signal Warrant Analysis

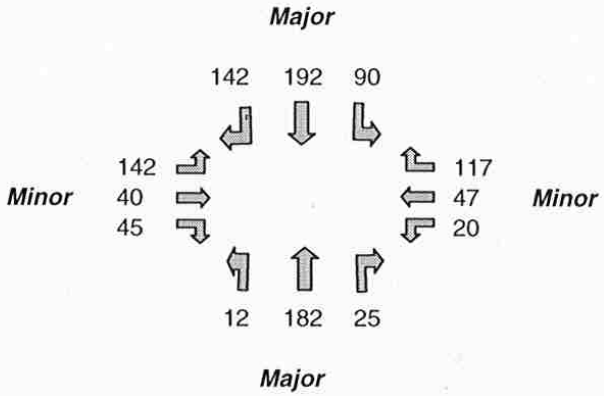
Project #:	3944
Project Name:	Biggs Junction Refinement Plan
Analyst:	ELW
Intersection:	US-97/Celilo-Wasco Hwy.
Scenario:	2020 Forecast Condtions
Date:	5/17/00
File:	H:\projfile\3944\excel\[MUTCD.XLS]Main

KITTELSON & ASSOCIATES, INC.
610 SW Alder, Suite 700
Portland, Oregon 97205
(503) 228-5230
Fax: (503) 273-8169

Input Data:

North-South Approach =	Major
East-West Approach =	Minor
Major Street Thru Lanes =	1
Minor Street Thru Lanes =	1
8th Highest/Peak Hour (Major) =	70%
8th Highest/Peak Hour (Minor) =	70%
Speed > 40 mph?	No
Population < 10,000?	Yes
Warrant Factor	70%

Turning Movement Volumes:

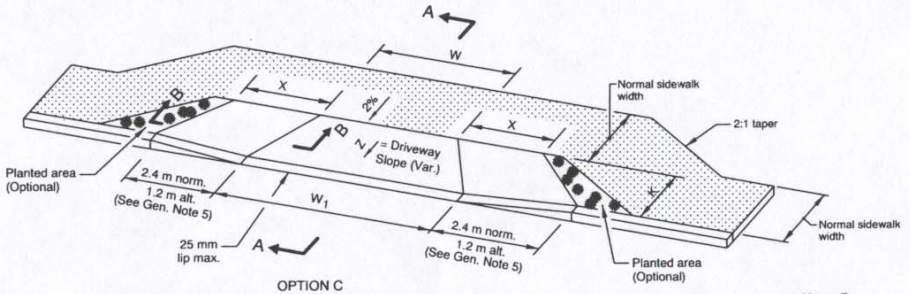


Signal Warrant Analysis Results

Warrant	Approach	Actual Volumes	Required Volumes	Met?
1 - Minimum Vehicular Volume	Major Street	450	350	Yes
	Minor Street	159	105	
2 - Interruption of Continuous Traffic	Major Street	450	525	No
	Minor Street	159	53	
11 - Peak Hour Volume	Major Street	643	643	Yes
	Minor Street	227	170	

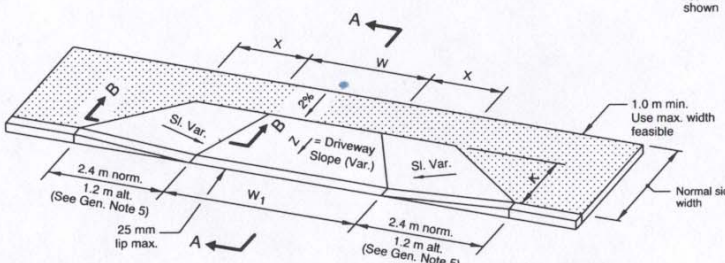
Appendix E

Access Design Specifications



OPTION C

SIDEWALK WRAPPED AROUND DRIVEWAY



OPTION D

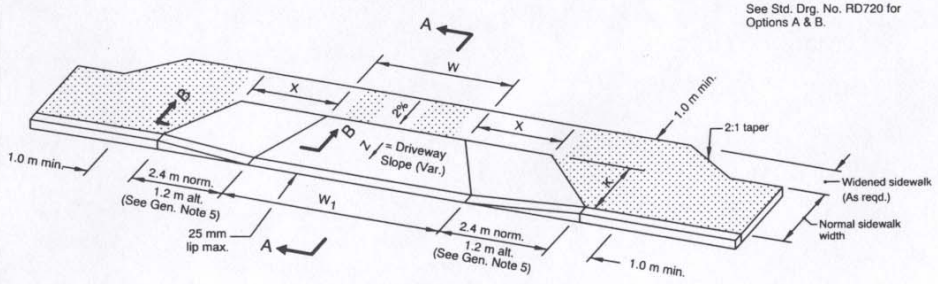
DRIVEWAY IN WIDE SIDEWALK

$$K = \frac{\text{Curb Exposure - Lip}}{Z}$$

(See Section A-A & Gen. Note 2)

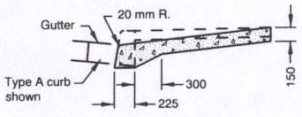
NOTE:
Tooled joints are required at all driveway slope break lines.

See Std. Drg. No. RD720 for Options A & B.

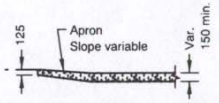


OPTION E

WIDENED SIDEWALK BEHIND DRIVEWAY

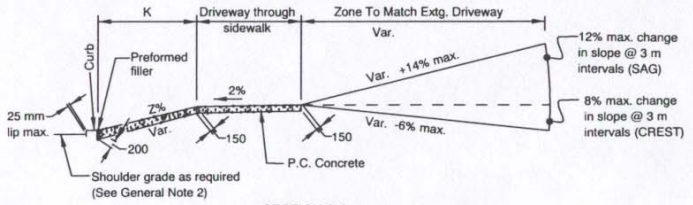


FOR DRIVEWAYS
WITH MONOLITHIC CURB & SIDEWALK
(For details not shown, see
Drg. No. RD700 & Section A-A)



SECTION B-B

Concrete thicknesses shown also apply to walk adjacent to apron.



SECTION A-A

TABLE A

W	X	K In meters						
		0.6	0.9	1.2	1.5	1.8	2.4	3.0
m	m	W1 in meters						
3.6		4.5	4.5	4.5	4.5	4.5	4.5	4.5
4.2		5.1	5.1	5.1	5.1	5.1	5.1	5.1
4.8	0.9	5.7	5.7	5.7	5.7	5.7	5.7	5.7
5.4		6.3	6.3	6.3	6.3	6.3	6.3	6.3
6.0		6.9	6.9	6.9	6.9	6.9	6.9	6.9
6.6		7.6	7.8	8.0	8.2	8.4	8.7	9.0
7.2		8.2	8.4	8.6	8.8	9.0	9.3	9.6
7.8	1.2	8.8	9.0	9.2	9.4	9.6	9.9	10.2
8.4		9.4	9.6	9.8	10.0	10.2	10.5	10.8
9.0		10.0	10.2	10.4	10.5	10.8	11.1	11.4
9.6		11.4	11.7	12.0	12.3	12.6	13.2	13.8
10.2	1.5	12.0	12.3	12.6	12.9	13.2	13.8	14.4
10.8		12.6	12.9	13.2	13.5	13.8	14.4	15.0

Where a travel lane is constructed adjacent to the curb line, use 4.8 m W minimum for residence and 9.0 m W minimum for light commercial, add 1.5 m to W1 for both. Do not add the 1.5 m to W1 when 1.2 m minimum shoulder or bikeway is included in the typical.

GENERAL NOTES:

1. 1.0 m min. sidewalk width with slope of 2% is required through driveways.
2. Z% - shoulder grade = 12% max. in sag and 8% max. in crest.
3. Width of driveway (W) as shown on plans or as directed.
4. Where existing driveway is in good condition, and meets slope requirements construct only as much as required for satisfactory connection with new work.
5. "Alternate Apron Slope" 1.2 m is used only where plans designate. Alternate Apron Slope may also be used at local jurisdictions request and/or when approved by the Project Manager.
6. Equations may be calculated using either meters or millimeters. Use same unit throughout equation.

- All dimensions are in mm unless otherwise noted.

NOTE: All material and workmanship shall be in accordance with the current State of Oregon Standard Specifications for Highway Construction.

OREGON
DEPARTMENT OF TRANSPORTATION
STANDARD

CURB LINE SIDEWALK DRIVEWAYS

JUNE 1997

REVISIONS		APPROVED
DATE	DESCRIPTION	STANDARDS ENGINEER
		DRG. NO. RD721

7-25-97

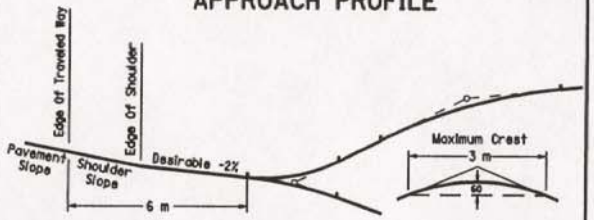
n:\7360a\rd721.met

RD721

m7360a/usr/metric/rd715.met 10-19-99

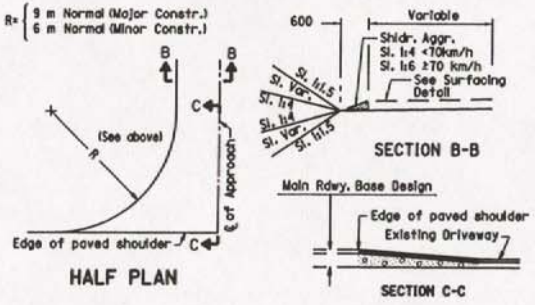
NON-SIDEWALK DRIVEWAYS

APPROACH PROFILE



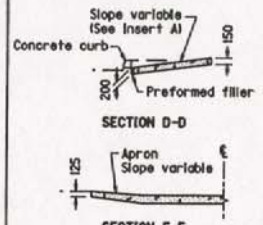
Note: When grades on approaches meet without vertical curves the maximum algebraic difference on crests should be 8% and on sags 12%. Grades steeper than 15% should not be used without prior approval of the Road Design Engineer. Any driveways with slopes exceeding 12% shall be paved.

APPROACH

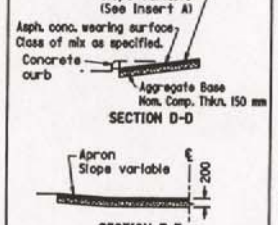


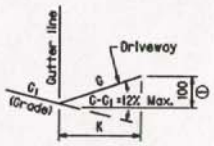
Note:
Normal paving limits to extend 6 m* from the edge of pavement or to the end of the radius, whichever is greater. Approach surfacing and width to then match existing approach. * 9 m for Public Road connections.

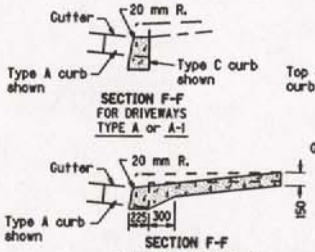
TYPE A
PORTLAND CEMENT CONCRETE

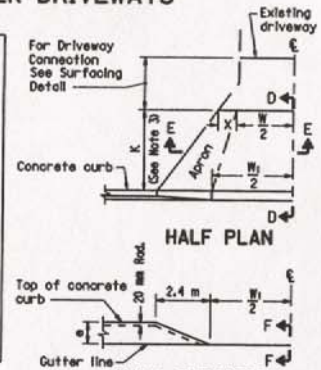


TYPE A-1
ASPHALT CONCRETE









NOTE: See "Table A" for dimensions not shown

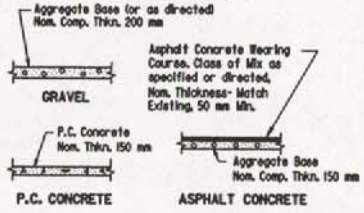
TABLE A

W	X	K in meters			
		1.5	1.8	2.4	3.0
m	m	W1 in meters			
3.6		4.5	4.5	4.5	4.5
4.2		5.1	5.1	5.1	5.1
4.8	0.9	5.7	5.7	5.7	5.7
5.4		6.3	6.3	6.3	6.3
6.0		6.9	6.9	6.9	6.9
6.6		8.1	8.4	8.7	9.0
7.2		8.7	9.0	9.3	9.6
7.8	1.2	9.3	9.6	9.9	10.2
8.4		9.9	10.2	10.5	10.8
9.0		10.5	10.8	11.1	11.4
9.6		12.3	12.6	13.2	13.8
10.2	1.5	12.9	13.2	13.8	14.4
10.8		13.5	13.8	14.4	15.0

Where a travel lane is constructed adjacent to the curb line, use 4.8 m W minimum for residence and 9.0 m W minimum for light commercial, add 1.5 m to W1 for both. Do not add the 1.5 m to W1 when 1.2 m minimum shoulder or bikeway is included in the typical.

* Curb exposure "e" = 175 mm normal, vary as shown on plans or as directed.

APPROACH AND DRIVEWAY CONNECTION
SURFACING



GENERAL NOTES:

1. Driveway details shown on this drawing are to be used on roadways where there are no existing or planned sidewalks in driveway vicinity. For driveways located in a sidewalk see Std. Drg. No. RD720, RD721 and/or RD722
2. Width of driveway (W) as shown on plans or as directed.
3. K is the distance from back of curb to back of driveway (3 m max.)
4. Where existing driveway is in good condition, construct only as much as required for satisfactory connection with new work.
5. "Alternate Apron Slope" used only where plans designate. Alternate Apron Slope may also be used at local jurisdictions request when approved by the Project Manager.
6. Increase thickness of asphalt concrete and stone base where shown on plans.

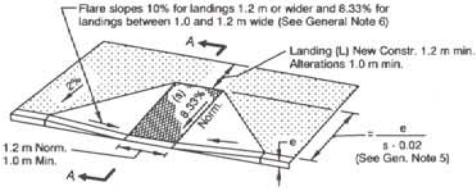
• All dimensions are in mm unless otherwise noted.

NOTE: All material and workmanship shall be in accordance with the current State of Oregon Standard Specifications for Highway Construction.

OREGON
DEPARTMENT OF TRANSPORTATION
STANDARD
APPROACHES AND NON-SIDEWALK DRIVEWAYS
JANUARY 1996

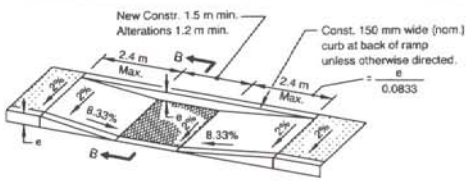
REVISIONS		APPROVED
DATE	DESCRIPTION	
4-98	ADDED SHLDR. ROCK DETS. TO SECTION B-B	STANDARDS ENGINEER
10-99	REVISE NOTES AND DETAIL	DRG. NO. RD715

RD715

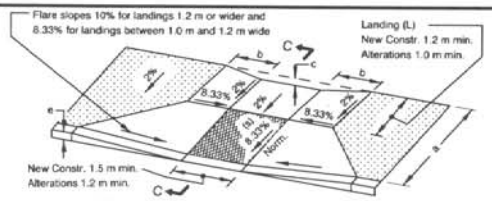


PERPENDICULAR SIDEWALK RAMP DETAIL

(Use "Parallel or Combined Ramp Detail" when reqd. landing cannot be obtained)



PARALLEL SIDEWALK RAMP DETAIL



COMBINATION SIDEWALK RAMP DETAIL

c=e-[(a-L)(s-0.02)]

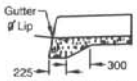
b=c/0.0833

b=2.4 m max.

SECTION A-A

SECTION A-A WITH MONOLITHIC CURB & SIDEWALK

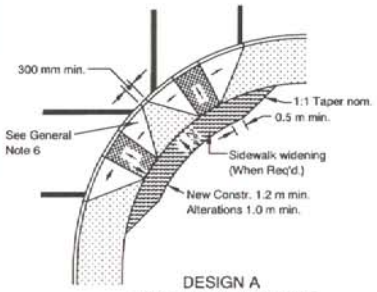
SECTION B-B



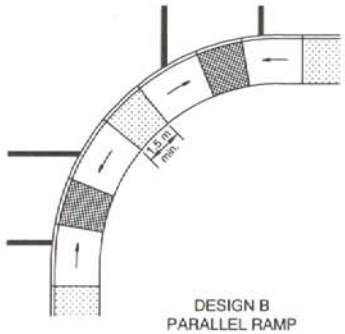
SECTION B-B WITH MONOLITHIC CURB & SIDEWALK

SECTION C-C

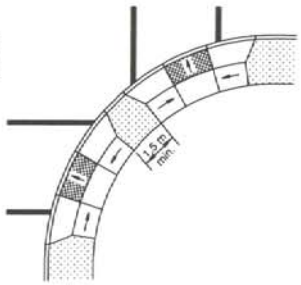
SECTION C-C WITH MONOLITHIC CURB & SIDEWALK



DESIGN A
PERPENDICULAR RAMP



DESIGN B
PARALLEL RAMP

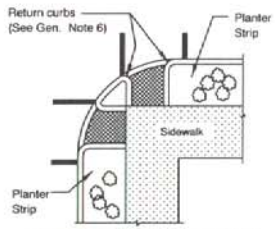


DESIGN C
COMBINATION RAMP

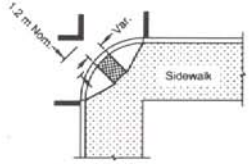
GENERAL NOTES:

1. Place diamond ramp texture in throat of ramp only. Ramp texturing is to be done with an expanded metal grate or other approved method placed and removed from wet concrete to leave a diamond pattern as shown. The long axis of the diamond pattern may be perpendicular or parallel to the curb. Groove depth is 3 mm nominal.
2. Sidewalk curb ramp slopes shown are relative to horizontal.
3. Dimensions derived by equation are nominal. Construct ramps to meet required slopes and existing conditions.
4. New construction is defined as projects completely within new R/W. In alterations, conform to new construction requirements to the maximum extent feasible.
5. In alterations curb ramp slope(s) may be 10% for a max. rise of 150 mm or 12.5% for a max. rise of 75 mm. Curb ramps, in alterations, need not exceed 1.8 m in length.
6. Side flares, that are not part of the 1.0 m continuous passage may be of any slope.
7. Ramps for bikeways to be full width of bikeway when approaching bikeway is perpendicular to the curb and a minimum of 2.4 m when the approaching bikeway is parallel and adjacent to the curb. Do not apply diamond texture to ramps for bikeways parallel to curbs.
8. Sidewalk ramp details are based on ORS 447.310 & Americans With Disabilities Act of 1990 reqmnts.
9. Equations may be calculated using either meters or millimeters. Use same unit throughout equation.

• All dimensions are in mm unless otherwise noted.



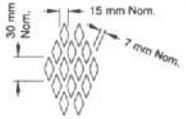
RAMPS WITH PLANTER STRIP



SINGLE DIAGONAL RAMP

Use in alterations only and when site constraints prohibit installing two ramps. Diagonal ramp may be perpendicular, parallel or combination.

NOTE:
Tooled joints are required at all sidewalk ramp slope break lines.



RAMP TEXTURE DETAIL

(Broom area to be textured prior to placing ramp texture)

CORNER SIDEWALK RAMP DETAILS
(See "Sidewalk Ramp Details" for additional requirements)

NOTE: All material and workmanship shall be in accordance with the current State of Oregon Standard Specifications for Highway Construction.

OREGON
DEPARTMENT OF TRANSPORTATION
STANDARD

SIDEWALK RAMPS

JANUARY 1996

REVISIONS	
DATE	DESCRIPTION
8-96	MOD. ALT. RAMP NOTE
4-97	REVISED DETAILS

APPROVED
STANDARDS ENGINEER

DRG. NO. RD725

RD725

nt7360a/rd725.met 7-29-97

Appendix F

Off Street Parking Alternatives

On-Street Parking Alternative #1

On-Street Parking Alternative #2

On-Street Parking Alternative #3

Appendix G

Public Involvement Program