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Methodology

This document outlines the traffic analysis and evaluation framework that will be used in the Detroit TSP update. Its intent is to state the key assumptions and methodologies that will be used as part of the traffic analysis.

Analysis Years & Time Periods

Transportation analysis will be conducted for the following years:

- Existing Conditions (2008)
- Forecast Year (2030)

The traffic analysis will be conducted for the 30th highest volume. An overall study area peak hour will be determined by 16-hour intersection turning movement counts that were provided by ODOT as part of the study. The counts did not include 15 minute volume breakdown.

Existing and Future Traffic Volumes

Turning movements over a 16-hour period were collected for each of the study area intersections by ODOT. The peak hour turning movement counts will be adjusted to account for seasonal effects according to ODOT Transportation Planning Analysis Unit (TPAU) *Analysis Procedures Manual*. The ATR Characteristic Table method or the ATR Seasonal Trend Table method will be used to develop the 30th highest peak hour traffic volumes.

The derived 30th highest hour design volumes will be balanced between adjacent study intersections as outlined by ODOT standards. The existing conditions analysis will be conducted using the 30th highest hour volumes. The goal of the study is to assign one study area peak hour for use in the traffic analysis. Based on the count data provided the peak hour from 2 pm to 3 pm was used. The counts data did not include 15 minute volume breakdown.

Forecasting/Modeling Methodology

2007 counts were adjusted to year 2008 utilizing growth factor, based on historic trending from TPAU future volume tables, calculated according to ODOT *Analysis Procedures Manual*. Detroit is small, less than 600 people. Looking at the raw traffic counts, see attached, the minor street volumes are very small. Applying the growth factor to create the 2008 volumes resulted in very little difference to the minor street movements, less than 5 trips. The difference is insignificant in light of the volume balancing required between intersections and rounding of volumes to the nearest 5 trips.

The same methodology was used to determine the 2030 Future no-build forecast volumes, although the growth factor was applied to through traffic on Hwy 22 only. Data provided by the City of Detroit and Mid-Willamette Valley Council of Governments (MWVCOG) was used to forecast future turn-movement volumes for the minor streets. The analysis followed a composite ODOT level 1 and level 2 methodology. The volumes on the minor and local streets were so low, some movements even zero trips, and erratic, that determining a growth trend required further investigation. An estimate for local minor street volumes was determined based on potential land development and population estimates, checked against trend information. There will be approximately 100 new residents over the next 20 years, based on PSU projections. The probable land development estimates about 270 new condos/single family residences over the next 20 years. Most of homes in Detroit are only seasonally occupied. The year round residents number less than 150 people, and many are seniors. The local count data indicates that the peak travel time for residents is 11 am to 1 pm. See Table B-1. Given this information, the ITE trip generation for the number of units was reduced by half and applied to the street network. See attached Table for calculations. Because the minor street volumes are so low, applying any growth factor to these volumes, in addition to the development trips, would likely result in double counting.

Mobility Standards

Mobility standards from the City of Detroit and ODOT will be used to determine acceptability of facility operations for this study. State highway mobility standards were developed for the 1999 Oregon Highway Plan (OHP) as a method to gauge reasonable and consistent standards for traffic flow along state highways. These mobility standards consider the classification (e.g., freeway, district) and location (rural, urban) of each state highway. Mobility standards are based on V/C ratios. The 1999 OHP, with amendments adopted by the Oregon Transportation Commission from November 1999 through January 2006, was released on August 23, 2006. This version of the 1999 OHP will be used in this study. Hwy 22 or the N. Santiam Hwy No. 162, is a Statewide Highway, Freight Route, within a UGB, with a posted speed of 40 mph. Tables 1 shows the mobility standards.

The 2003 Oregon Highway Design Manual (HDM) will be used in the determination of mobility standards for acceptability of future facility operations with improvements.

Table 1: Detroit TSP Mobility Standards

Roadways/Intersections	ODOT Classification	Control Type	Jurisdiction	Existing or Future No-Build Mobility Standard	Future Build Mobility Standard
Clester, Patton, 'D', Detroit, Forest	Local	Stop	City of Detroit	None	None
Hwy 22	Regional Hwy and statewide NHS freight route	Stop	ODOT	0.75	0.70

Notes:

[1] Indicates OHP Mobility Standard V/C ratio for stop-controlled roadway approach

Traffic Analysis Software and Input Assumptions

Synchro software, version 7, will be used for the intersection analysis. The reported results will be the V/C ratios and LOS from the HCM report.

Table 2: Synchro Operations Parameters/Assumptions

	Condition	
Arterial Intersection Parameters	**Existing (2008)**	**No-Build and Build Alternatives**
Peak Hour Factor	0.88	- 0.85 for side street approaches - 0.90 for State Highway
Ideal Saturation Flow Rate per Lane (for all movements)	1750	From Existing
Lane Width	12 feet	From Existing
Percent Heavy Vehicles	From traffic count, 5%	From Existing
Bus Blockages	From field visit, otherwise assume 0	From Existing
Intersection signal phasing and coordination	N/A no signalized intersections	Optimize phase and cycle length,
Intersection signal timing optimization limits	N/A no signalized intersections	60 to 120 seconds depending on the number of phases[1]
Minimum Green time	N/A no signalized intersections	If additional signal warranted, 10 seconds if no pedestrian time is required
Yellow and all-red time	N/A no signalized intersections	If additional signal warranted, (Y) = 4 seconds and (R) = 1 second
Right Turn on Red	N/A no signalized intersections	If additional signal, then "allow"

[1]Assumptions consistent with White Paper on Application of Oregon Highway Plan Mobility Standards.

Table 1:

Summary of All Turning Movements by Intersection - 2008

	Detroit Ave @ Forest Ave	Santiam HWY @ Santiam Ave	N Santiam Hwy) @ Breitenbush/Detroit Ave	Santiam HWY @ French Creek	Detroit Ave @ "D" St.	Santiam Hwy @ Forest Ave.	Patton & Clester	
11:00-12:00	125	585	868	513	151	707	32	
12:00-1:00	121	1016	1230	496	142	999	31	
1:00-2:00	140	1061	1257	491	112	1041	21	
2:00-3:00	122	1082	1382	468	143	1155	17	Peak Hour
3:00-4:00	92	1004	1332	497	124	1135	20	
4:00-5:00	97	1017	1274	382	155	1179	24	
5:00-6:00	94	838	1266	418	106	1148	18	

Table 1

RAW Count Data

INTNAME	INTID	DATE	TIME	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	Totals
Hwy 22 & French Creek	1	8/8/2007	2-3:00 PM	0	0	0	2	0	3	1	201	0	0	250	1	458
Hwy 22 & Breitenbush/Detroit	2	8/12/2007	2-3:00 PM	27	583	48	43	343	71	71	31	12	18	40	86	724
Detroit Ave & D Street	3	8/8/2007	2-3:00 PM	19	20	0	0	32	28	25	0	18	0	0	0	142
Patton & Cleator	4	8/8/2007	2-3:00 PM	1	5	0	0	2	4	1	0	4	0	0	0	17
Detroit Ave & Forest Ave	5	8/8/2007	2-3:00 PM	1	2	6	29	12	10	4	13	3	2	7	28	117
Hwy 22 & Forest	6	8/12/2007	2-3:00 PM	53	623	1	1	361	15	48	4	42	0	6	4	1158
Hwy 22 & Santiam Ave	7	8/19/2007	2-3:00 PM	4	736	0	0	327	2	1	0	10	0	0	0	1082

ADJUSTED 2008

INTNAME	INTID	DATE	TIME	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
Hwy 22 & French Creek	1	8/8/08	2-3:00 PM	0	0	0	0	0	5	0	205	0	0	255	0
Hwy 22 & Breitenbush/Detroit	2	8/8/08	2-3:00 PM	30	595	50	45	350	75	75	30	10	20	50	90
Detroit Ave & D Street	3	8/8/08	2-3:00 PM	20	20	0	0	35	30	25	0	20	0	0	0
Patton & Cleator	4	8/8/08	2-3:00 PM	0	5	0	0	0	5	0	0	5	0	0	0
Detroit Ave & Forest Ave	5	8/8/08	2-3:00 PM	0	0	5	30	10	10	5	15	5	0	5	30
Hwy 22 & Forest	6	8/8/08	2-3:00 PM	55	635	0	0	370	15	45	5	45	0	5	5
Hwy 22 & Santiam Ave	7	8/8/08	2-3:00 PM	5	735	0	0	325	0	0	0	10	0	0	0

Balanced and ADJUSTED 2008

TNAME	INTID	DATE	TIME	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR
y 22 & French Creek	1	8/8/08	2-3:00 PM						5		450			775	
:22 & Breitenbush/Detroit	2	8/8/08	2-3:00 PM	30	635	50	45	350	55	55	25	10	20	40	85
_troit Ave & D Street	3	8/8/08	2-3:00 PM	20	55			70	55	95		20			
Patton & Cleator	4	8/8/08	2-3:00 PM		5				5			5			
Detroit Ave & Forest Ave	5	8/8/08	2-3:00 PM	5	5	5	45	20	10	5	15	5	5	5	85
Hwy 22 & Forest	6	8/8/08	2-3:00 PM	55	680			385	15	30	5	30		5	5
Hwy 22 & Santiam Ave	7	8/8/08	2-3:00 PM	5	735			395				10			

Table

Seasonal Adjustment of Traffic Volumes

INTNAME	INTID	DATE	Seasonal Adjustment Factor	2008 Adjustment Factor	Total 30 HV Adjustment factor	2030 Adjustment Factor	2030 Total 30 HV Adjustment factor
Hwy 22 & French Creek	1	8/8/2007	1.0118	1.010	1.022	1.244	1.259
Hwy 22 & Breitenbush/Detroit	2	8/12/2007	1.0118	1.010	1.022	1.244	1.259
Detroit Ave & D Street	3	8/8/2007	1.0118	1.010	1.022	1.244	1.259
Patton & Clester	4	8/8/2007	1.0118	1.010	1.022	1.244	1.259
Detroit Ave & Forest Ave	5	8/8/2007	1.0118	1.010	1.022	1.244	1.259
Hwy 22 & Forest	6	8/12/2007	1.0118	1.010	1.022	1.244	1.259
Hwy 22 & Santiam Ave	7	8/19/2007	0.9844	1.010	0.994	1.244	1.224

Calculation Adjustments

2008 ATR CHARACTERISTIC TABLE										
SEASONAL TRAFFIC TREND	AREA TYPE	# OF LANES	WEEKLY TRAFFIC TREND	AADT	OHP CLASSIFICATION	ATR	COUNTY	HIGHWAY ROUTE, NAME, & LOCATION	MP	STATE HIGHWAY NUMBER
RECREATIONAL SUMMER	RURAL	3	WEEKEND	4900	STATEWIDE HIGHWAY	24-013	MARION	OR 22, NORTH SANTIAM HWY, EAST OF GATES	33.69	182
RECREATIONAL SUMMER	RURAL	2	WEEKEND	4200	STATEWIDE HIGHWAY - SCENIC BYWAY	24-015	MARION	OR 22, NORTH SANTIAM HWY, EAST OF DETROIT	51.30	182

Calculation of Seasonal Adjustments

Peak Period Season Factor	Rural 0.7654			Adjustment Factor Peak Period/Count
Count Date Seasonal Factors		Adjustment Factor	Average	date =
August (5th)	0.7714	0.992	0.7745	1.0118
August (15th)	0.7775	0.984		

Calculation of Annual Adjustments

Hwy 22(Hwy No. 182)	Mp	2007	2027	RSQ	Annual Growth	
Gates Automatic Traffic Recorder, Sta. 24-013, 0.95 mile west of Railroad Avenue S.E. (Entrance to Minto County Park	33.69	4900	5200	0.3077	0.003	0.3%
0.30 mile east of Detroit Dam	43.03	4100	4800	0.8071	0.008	0.8%
0.01 mile east of Breitenbush Road	50.08	4300	5200	0.7834	0.010	1.0%
Detroit Automatic Traffic Recorder, Sta. 24-015, 1.20 miles east of Detroit Avenue	51.3	4200	4800	0.2658	0.007	0.7%

Table

Detroit Future Trip Generation Estimates
2008-2030 Based on Key Buildable Parcels

Location	Description	# of Units	ITE Trip Rate	ADT
West of Hwy 22	Condominium/Townhous	70 units	5.86	410
	2.3 acres @ 30 units/acre			
East of Hwy 22				
	Single-family Dwelling	200 units	9.57	1914

Detroit Future Trip Generation Estimates
2008-2030 Based on Key Buildable parcels

Location	Description	# of Units	ITE Trip Rate	PM Trips
West of Hwy 22	Condominium/Townhous	70 units	0.24	17
	2.3 acres @ 30 units/acre			
East of Hwy 22				
	Single-family Dwellings	200 units	1.01	202

APPENDIX A - REVIEW OF EXISTING PLANS, POLICIES, STANDARDS, AND LAWS (10 pages)

REVIEW OF EXISTING PLANS, POLICIES, STANDARDS AND LAWS AND ASSESSMENT OF THE COMPREHSENSIVE PLAN, TRANSPORTATION ELEMENT (1978)

The purpose of this section is to identify and review existing plans, policies, and programs considered in the preparation of the Transportation System Plan (TSP) for the City of Detroit and to update the City's Comprehensive Plan, Transportation Element. Federal, state, regional, and local jurisdictions have produced a number of transportation studies, plans and other transportation-related documents in the past. This section provides a summary of the relevant transportation planning documents and identifies items and issues to be considered in updating the City's Comprehensive Plan, Transportation Element (1978/2002), and review of implementing ordinances for any applicable revisions/additions. This section includes a review of the following documents:

OREGON ADMINSTRATIVE RULES

- Oregon Administrative Rule 660-012; the Transportation Planning Rule (TPR);
- Oregon Administrative Rule 734-020; Traffic Control
- Oregon Administrative Rule 734-051; Access Management (section)

OREGON DEPARTMENT OF TRANSPORTATION DOCUMENTS:

- Oregon Transportation Plan (1992, updated 2006))
- Elements of the Oregon Transportation Plan
  - Bicycle and Pedestrian Plan (1995)
  - Transportation Safety Action Plan (2004)
  - Public Transportation Plan (1997)
  - Highway Plan (1999, Reaffirmed 2006)
- Freight Moves the Oregon Economy Report
- Statewide Transportation Improvement Program (STIP) 2008-2011
- Highway Design Manual (2003)

MARION COUNTY DOCUMENTS:

- Marion County Comprehensive Plan, Transportation Element
- Marion County Transportation System Plan

CITY OF DETROIT DOCUMENTS:

- City of Detroit Comprehensive Plan (Parts 1 and 2)
- City of Detroit Development Code

OTHER DOCUMENTS

- West Cascades National Scenic ByWay – Corridor Development Plan (2007)
- 2031 Regional Transportation Systems Plan (2007)
- Canyon Journeys – North Santiam Canyon Alternative Transportation Link Feasibility Study (2004)
- North Santiam Canyon Economic Opportunity Study - Economic Development Analysis & Plan (2000)
- Salem to Bend Corridor – Oregon Route 22 and Oregon Route 126/US Route 20 – Interim Corridor Strategy (1998)

OREGON ADMINISTRATIVE RULES

Oregon Transportation Planning Rule (1991) (OAR 660, Division 12): As applicable to the City of Detroit, the Oregon Transportation Planning Rule (TPR) requires local jurisdictions to develop a Transportation System Plan (TSP) to accommodate future travel demand resulting from adopted land uses. The plan must accommodate all travel modes in use within the City, be consistent with the Oregon Transportation Plan (OTP), and coordinated with Federal, State, and local agencies and various transportation providers.

The TPR requires every local TSP to assess existing facilities for their adequacy and deficiencies; develop and evaluate system alternatives needed to accommodate land uses in the acknowledged comprehensive plan; and adopt local land use regulations to support implementation of the TSP. The City TSP must describe public transportation services for the transportation disadvantaged and identify service inadequacies. The City TSP must also ensure its functional classification system is consistent or compatible with those applying to facilities maintained by adjacent jurisdictions.

The TPR includes a requirement for local governments to adopt land use or subdivision regulations for urban areas that, "...provide for safe and convenient pedestrian, bicycle and vehicular circulation, to ensure that new development provides on-site streets and accessways that provide reasonably direct routes for pedestrian and bicycle travel in areas where pedestrian and bicycle travel is likely if connections are provided, and which avoids wherever possible levels of automobile traffic which might interfere with or discourage pedestrian or bicycle travel." Local governments are required to establish their own standards or criteria for providing streets and accessways consistent with the TPR. Examples of these measures include standards for spacing of streets or accessways, and standards for excessive out-of-direction travel.

Traffic Control (OAR 734, Division 20): Portions of this Oregon Administrative Rule (OAR) address speed zones on public roads that are established by ODOT and other road agencies. Speed zone criteria are established and the basis for the resulting recommendations. The section also covers warrants for parking and turn lanes and prohibitions, provisions for bicycle lanes/paths, and restrictions for parking/activities within State highway rights-of-way.

Access Control (section of OAR 734, Division 51): The Oregon Department of Transportation (ODOT) manages access to the highway facilities of the State to the degree necessary to maintain functional use, highway safety, and the preservation of public investment consistent with the 1999 OHP and adopted local comprehensive plans. The purpose of Oregon's Access Management Rules are to govern the issuing of construction, operation, maintenance and use permits for approaches onto State highways, State highway rights-of-way, and properties under the State's jurisdiction. These rules also govern closure of existing approaches, spacing standards, medians, variances to the standards, appeal processes, and grants of access.

Through these rules, the State indicates its policy to manage the location, spacing and type of road and street intersections and approaches on State highways to assure the safe and efficient operation of State highways consistent with their classification, and the designation of the particular highway segment. OAR 734-051 contains policies and standards regulating access, and generally holds that access control should be considered beneficial when:

- Protecting resource lands;
- Preserving highway capacity on land adjacent to an urban growth boundary; or
- Ensuring safety on segments with sharp curves, steep grades or restricted sight distance or those with a history of accidents.

OREGON DEPARTMENT OF TRANSPORATION DOCUMENTS

Oregon Transportation Plan (1992, updated 2006): The Oregon Department of Transportation's (ODOT) Oregon Transportation Plan (OTP) utilizes several planning documents to guide transportation planning efforts and transportation system improvements in the State. The OTP is ODOT's overall policy guiding document. The OTP and its modal elements represent the State's TSP and drive all transportation planning in Oregon. The plans provide a framework for cooperation between ODOT and local jurisdictions and offer guidance to cities and counties for developing local modal plans. The following list shows some of the different modal plans that have been established and the year the plan was adopted by the Oregon Transportation Commission.

Adopted Elements (selected) of the Oregon Transportation Plan

Oregon Transportation Plan or Plan Element	Year Adopted
Bicycle and Pedestrian Plan	1995
Transportation Safety Action Plan	2004, Amended 2006
Public Transportation Plan	1997
Highway Plan	1999, Reaffirmed 2006

The Oregon Transportation Commission (OTC) originally adopted the OTP in September 1992, and an update of the OTP was adopted by the OTC in September 2006. The OTP has seven goals: (1) Mobility and Accessibility, (2) Management of the System, (3) Economic Vitality, (4) Sustainability, (5) Safety and Security, (6) Funding the Transportation System, and (7) Coordination, Communication and Cooperation. The OTP meets a legal requirement that the OTC develop and maintain a plan for a multimodal transportation system for Oregon. Additionally, the OTP implements the federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, 2005) requirements for the State transportation plan. The OTP also meets land use planning requirements for State agency coordination and the Goal 12 Transportation Planning Rule. This rule requires ODOT, the cities and counties of Oregon to cooperatively plan and develop balanced transportation systems.

The OTP also requires local governments to prepare an analysis of future city, county and state funding for the short, medium, and long term planning horizons and to develop transportation improvement alternatives given a revenue constrained funding scenario (Investment Scenario's, Level 1-3).

Oregon Bicycle and Pedestrian Plan (1995)(an element of the Oregon Transportation Plan): The Oregon Bicycle and Pedestrian Plan (OBPP) guides planning and the design and operation of facilities for bicycle and pedestrian travel. This Plan is divided into two sections, (1) Policy & Action and (2) Planning, Design, Maintenance & Safety. Section 1, Policy & Action, provides background information and addresses the goals, actions, and implementation strategies ODOT proposes to improve bicycle and pedestrian transportation. The material on Walkway Planning, Design Maintenance & Safety, provides guidelines to ODOT, cities and counties in designing, construction and maintaining pedestrian and bicycle facilities. The OBPP is often used by local governments as a guide for the planning and designing facilities for these travel modes. The 2003 Highway Design Manual (HDM) also contains sidewalk and bicycle lane standards that are inconsistent, and in some cases more stringent than those found in the 1995 OBPP. An update of the OBPP was due for completion in 2007. This update upon completion will modify the standards in the OBPP to bring them into consistency with the HDM.

Oregon Transportation and Safety Action Plan (2004, amended 2006) (an element of the Oregon Transportation Plan): The Oregon Transportation Safety Action Plan establishes the safety priorities for Oregon by identifying 70 actions relating to all modes of transportation, the roadway, drivers, and vehicle aspects. Included in the plan is a specific action regarding the way safety issues should be considered in local transportation planning.

Local transportation plans, as well as modal and corridor plans should consider the following:

- Involvement in the planning process of engineering, enforcement, and emergency service personnel as well as local transportation safety groups;
- Safety objectives; and
- Resolution of goal conflicts between safety and other issues.

Oregon Public Transportation Plan (1997) (an element of the Oregon Transportation Plan): The Oregon Public Transportation Plan is primarily focused on public transportation in metropolitan and urban areas. Detroit's most recent estimated population is 265 (PSU's 2008 Population Forecasts for Marion County, its Cities and Unincorporated Area 2010-2030). The Oregon Public Transportation Plan's minimum public transportation level of service (LOS) standards for rural communities with a population less than 2,500 applicable to the City of Detroit by the year 2015 include:

- Provide public transportation service to the general public based on locally established service and funding priorities.
- Provide an accessible ride to anyone requesting service.
- Provide a coordinated centralized scheduling system in each county and at the state level.
- Provide phone access to the scheduling system at least 40 hours weekly between Monday and Friday.
- Respond to service requests within 24 hours (not necessarily provide a ride within 24 hours).

Oregon Highway Plan (1999, Reaffirmed 2006) (an element of the Oregon Transportation Plan): The Oregon Highway Plan defines policies and investment strategies for Oregon's State highways for the a 20 year period. Additionally, it refines the goals and policies of the OTP and is part of Oregon's Statewide Transportation Plan. The OHP has three main elements:

- The Vision presents a vision for the future of the State highway system, describes economic and demographic trends in Oregon, describes future transportation technologies, summarizes the policy and legal context of the Highway Plan, and contains information on the current highway system;
- The Policy Element contains goals, policies, and actions in five policy areas: system definition, system management, access management, travel alternatives, and environmental and scenic resources; and
- The System Element contains an analysis of State highway needs, revenue forecasts, descriptions of investment strategies and implementation strategies, and performance measures.

The Highway Plan gives policy and investment direction to corridor plans and transportation system plans that are being prepared around the State, but it leaves the responsibility for identifying specific projects and modal alternatives to these plans.

Freight Moves the Oregon Economy (1999): The publication states, "Freight plays a major role in moving the Oregon economy. Most freight moves by truck, rail, waterway, air and pipeline

with trucks accounting for the greatest volume." The document notes that "freight plays a major role in moving the Oregon economy. According to the document's exhibits, Highway 22 is part of the National and State Freight Systems.

Issues related to the movement of freight include "concerns about accessibility, capacity, connectivity, environmental sensitivity, land use compatibility, reliability, and safety . . . Successfully adjusting to change circumstances is critical to efficiently moving freight."

Statewide Transportation Improvement Program (STIP) 2008-2011: The Statewide Transportation Improvement Program (STIP) is the State's transportation capital improvement program—a scheduling and funding document. It fulfills the requirements of the Federal Safe, Accountable, Flexible, Efficient, Transportation Equity Act: a Legacy for Users (2005). The STIP lists the schedule of transportation projects for the four-year period from 2008 to 2011. It is a compilation of projects utilizing various federal and State funding programs, and includes projects on the State, County, and City transportation systems as well as projects in the National Parks, National Forests, and Indian Reservations.

Highway Design Manual (2003): The document applies to design and construction standards and covers a wide variant of improvement requirements including bike and pedestrian facilities, curbs/curb extensions, speed, guardrails/barriers, intersections, medians, passing lanes, turn lanes, roadside design, rumble strips, traffic management/calming, and traffic control.

MARION COUNTY DOCUMENTS

Marion County Comprehensive Plan, Transportation Element (adopted 1998 and updated 2005): The Comprehensive Plan for Marion County establishes the official goals and objectives related to future development in the County. These goals and policies are divided into nine Sections:

- Agricultural Lands.
- Forest and Farm/Timber Lands.
- Rural Development.
- Urbanization.
- Transportation.
- Parks and Recreation.
- Economic Development.
- Environmental Quality and Natural Resources.
- Energy.

Section E, Transportation, includes a mission statement and nine goals and objectives as stated below.

MISSION STATEMENT: Develop a balanced, multi-modal transportation system to accommodate planned growth, facilitate economic development, recognize fiscal reality, and maintain a high standard of livability and safety.

GOAL 1: Improve transportation system safety.

- Objective 1.1: Improve system safety for and between all modes of transportation.
- Objective 1.2: Dedicate adequate resources to ensure that the transportation system is properly maintained and preserved.

GOAL 2: Provide an accessible, efficient and practical transportation system appropriate to both urban and rural areas throughout the County.

- Objective 2.1: Improve mobility and access options to transportation facilities throughout Marion County for transportation system users.
- Objective 2.2: Facilitate goods movement into and out of area; increase freight (truck, rail, air and water) mobility and inter-modal transfer.
- Objective 2.3: Facilitate shipping of goods by most efficient and least-impacting means possible.
- Objective 2.4: Address changing characteristics of trucking, aviation, agriculture and rail industries.
- Objective 2.5: Facilitate system connections as needed to improve efficiency and access.

GOAL 3: Provide sufficient transportation capacity.

- Objective 3.1: Address existing priorities and projected growth.
- Objective 3.2: Adequately provide for the transportation needs of residents, businesses, customers and visitors.
- Objective 3.3: Encourage and support actions that reduce demand on the transportation system.
- Objective 3.4: Encourage and support actions that maximize value and efficiency of the existing system.

GOAL 4: Recognize fiscal reality.

- Objective 4.1: Facilitate best usage of available financial resources.
- Objective 4.2: Be ready to use additional resources efficiently if they become available, and be able to show what benefit results from those resources.
- Objective 4.3: Facilitate procurement of grant funding.
- Objective 4.4: Recognize that due to financial limitations, not all goals and objectives will be met to the ideal extent.

GOAL 5: Work in partnership with communities to address needs and values.

- Objective 5.1: Minimize adverse impact of transportation system on quality of life in communities.
- Objective 5.2: Facilitate regional through movement of goods and services while minimizing conflict between through movement and livability in central city areas.
- Objective 5.3: Minimize adverse impact of transportation system on quality of life and environment in rural areas.
- Objective 5.4: Foster cooperation between the County and cities to address a wide variety of transportation issues.

GOAL 6: Promote alternative modes of transportation.

- Objective 6.1: Facilitate provision of opportunities for a variety of transportation options.
- Objective 6.2: Reduce dependence on any one mode of transportation.
- Objective 6.3: Facilitate and support improved connections between different modes.
- Objective 6.4: Support land use planning strategies that facilitate efficient transportation system use and development.

GOAL 7: Consider land use and transportation relationships.

- Objective 7.1: Integrate land use planning and transportation planning to manage and plan the transportation system.

- Objective 7.2: Minimize detrimental effects of transportation improvements on rural land uses.
- Objective 7.3: Ensure an environmentally responsible/environmentally sound transportation system that minimizes adverse impacts on air and water.
- Objective 7.4: Ensure transportation-related activities comply with clean air and water requirements and fish and wildlife habitat management regulations.
- Objective 7.5: Protect established land uses including prime farmland, forestland and other natural resources.

GOAL 8: Address transportation policy issues and intergovernmental coordination.

- Objective 8.1: Improve coordination with all affected jurisdictions to meet future transportation needs.
- Objective 8.2: Facilitate development of coordinated transportation design standards.
- Objective 8.3: Emphasize facilitation, rather than restriction/regulation of business.
- Objective 8.4: Ensure cost-effective investment in transportation. Improvements should be fiscally responsible, economically efficient and realistic.
- Objective 8.5: Comply with applicable Transportation Planning Rule requirements for rural transportation system planning.
- Objective 8.6: Maintain an ongoing public involvement process.

GOAL 9: Provide a useful plan document.

- Objective 9.1: Accurately reflect the existing and future transportation systems, issues and needs of Marion County.
- Objective 9.2: Identify methods for funding recommended actions.
- Objective 9.3: Provide clear planning direction.
- Objective 9.4: Maintain and update a list of issues for further study.
- Objective 9.5: Extend usable life of existing facilities; provide a maintenance element.
- Objective 9.6: Provide for a periodic review and update of the Plan that allows for improvements to be made as circumstances change regarding transportation issues throughout the County.

Marion County Rural Transportation System Plan (2005): The Marion County Rural Transportation System Plan (RTSP) also serves as the Transportation Element of the County's Comprehensive Plan. The Marion County RTSP includes the physical and operational conditions of County transportation facilities including: roadways, bicycle and pedestrian facilities, traffic control devices, public transportation providers, rail crossings, airports, ferries, pipelines, and utility and communication lines. Sections are summarized as follows:

- **Marion County Transportation Projects** - The Marion County RTSP identifies a 20 year recommended improvement project list for Marion County. The project list includes existing and future needs of the Marion County rural roadway system and the improvements recommended to address those needs, as well as transportation system needs, besides roads, that move people and goods.
- **Marion County Off-Roadway Bicycle and Pedestrian Improvements** – The plan indicates areas for the development of paths and trails for use by individuals either walking or running and persons riding bicycles. The County generally supports the trail for the transportation, recreation, and economic development opportunities that come with it, provided that its impacts can be appropriately mitigated.

- **Recommended Transit Service Corridors** - While it is not a public transportation provider, Marion County supports and works with local service providers towards implementing programs for the provision of transportation services. The County works with the Chemeketa Area Regional Transportation System (CARTS) operated by the Salem-Keizer Mass Transit District. The RTSP includes an evaluation of existing public transportation services and resources, an identification of unmet transportation needs, and a list of prioritized strategies to meet the identified transportation needs. Services provided by CARTS currently terminate in the City of Gates.
- **Recommended Corridor Studies** - Corridor studies consider such items as safety, capacity, goods movement, regional traffic movement, community livability, economic vitality, and other issues. No roadways under the County's jurisdiction constitute a corridor within the area of the City of Detroit.
- **Air Plan** - The County plans to review and consider adoption of the Salem Municipal Airport Master Plan. (The Salem airport if the closest facility to the City of Detroit.)
- **Rail Plan** - Marion County supports continued and increased freight and passenger rail service along the existing rail lines in Marion County. The County generally supports improvements that would increase the efficiency of rail transportation (freight and/or passenger) as long as the impacts of these improvements can be appropriately addressed. The County also supports continuation and expansion of the existing passenger rail service through Marion County. Improvements to maintain and/or improve track speeds for freight and/or passenger service are encouraged. All railroad lines serving the Detroit area during the 19th Century were removed.

OTHER REGIONAL DOCUMENTS (with information relative to the City of Detroit's TSP)

West Cascades National Scenic ByWay – Corridor Development Plan (2007): Based upon a document prepared for the Willamette and Mt. Hood National Forests, Segment 2 (McKenzie-Santiam) of the West Cascades National Scenic ByWay (designated in the year 2000) incorporates Breitenbush Highway (Forest Service 46). The mission of the National Scenic ByWay program is to provide resources to byway communities to create "a unique travel experience and to enhance local quality of life through efforts to preserve, protect, interpret, and promote the intrinsic qualities of designated byways." However, the program should be interpreted as one providing recognition and not regulation.

For the West Cascades National ByWay, the mission is to provide "a scenic alternative to driving Interstate 5 . . . provides the visitor with exciting opportunities to experience breath-taking views of mountain landscapes, explore wilderness, fish wild and scenic rivers, camp and recreate among old growth timber stands, enjoy the rural charm of foothill communities and to participate in the many unique events and festivals available along the route."

2031 Regional Transportation Systems Plan (sections on Transportation System Efficiency Management and Regional Transportation System) (2007): A regional based document prepared as a Salem-Keizer Area Transportation Study by the Mid-Willamette Valley Council of Governments has chapters specific to transportation efficiency management and also covers public transportation services. Efficiency alternatives seek to provide "creative solutions" (other than primarily depending upon on automobiles to meet transportation needs). Such options presented include carpools, vanpools, and rideshare programs. Although there are also regional public transportation services, the study notes that only one service operates within the Santiam

Canyon—Chemeketa Area Regional Transportation Services (CARTS). The terminus of its route is within the City of Gates, east of the City of Detroit by approximately 17 miles.

Canyon Journeys – North Santiam Canyon Alternative Transportation Link Feasibility Study (2004): A document prepared for the North Santiam Economic Development Corporation surveys the North Santiam Canyon beginning 30 miles east of the City of Salem (Lyons) and continues east to Idanha. "The concept of a canyon-wide trail system to provide a safer non-motorized travel alternative to State Highway 22 has been explored many times over the last several years. As envisioned, the trail would connect the Canyon's communities to each other and with the areas' outstanding natural, recreational and cultural features." The study continues indicating that "once fully developed, the Canyons Journeys Alternative Transportation Link trail system (Canyon Journeys) will consist of a system of biking, hiking and equestrian trails that connect communities in the Highway 22 corridor . . . The system will use a range of alignments to achieve these non-motorized community connections including improved shared-use paved shoulders, logging roads and state –owned rail bed." Portions of the trail (approximately 35 miles in length) will be paved and others will consist of compacted aggregate. Ease of implementation and other factors creates a hierarchy for completion of the segments. The portion affecting the City of Detroit falls into the categories of the second and third groups to be completed: Mongold Park to Detroit (Forest Avenue) (2nd section) and Forest Avenue to Blowout Road (3rd section). Options may include connections on the north and/or south sides of Detroit Lake. A suggestion for maintenance includes initiating "strong" partnerships between "public agencies, communities, and private entities."

A proposal in the study includes a "water taxi" for overall visitor circulation at Detroit Lake that could provide "connections between the visitor facilities and camping areas on the north and south side of Detroit Lake with the City of Detroit. An additional segment of the water taxi system could be added to connect the Hoover Campground and boat dock to the system. This addition to the water taxi system would provide a unique 'trail' experience that would link Detroit to the western end of the Idanha trail system."

Other potential routes mentioned for exploration are trails options between Detroit and Gates, along the Lake's south shore line, along Front Street, and a loop through the business district. The study refers to "Canyon Hubs," of which is a water hub includes the Santiam River and Detroit Lake.

(In conjunction with the Canyons Journeys project the Forest Service is also considering a trail with use of powerline right-of-way from its facility west of the City of Detroit that would extend to the City. Crossing the Brietenbush River needs resolution in regard to either using the existing bridge, incorporating a crossing into a Highway 22 bridge replacement, or creating a separate river crossing. The Forest Service indicates the possibility of completing the trail within the next ten (10) years.)

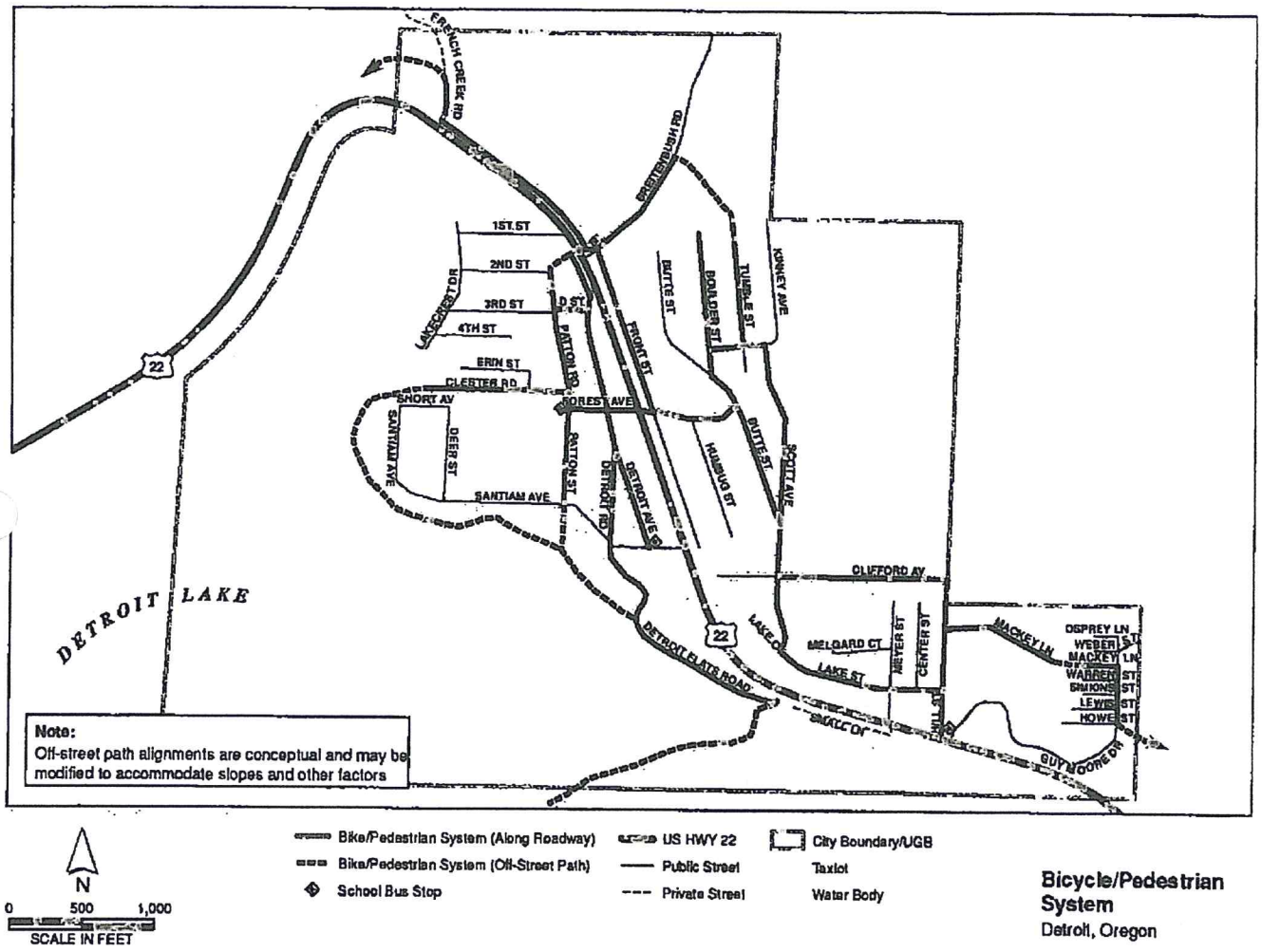
North Santiam Canyon Economic Opportunity Study (Economic Development Analysis & Plan)(2000): The Economic Opportunity Study and Plan funded by the Oregon Economic and Development Corporation provides detailed analysis of different aspects of communities within the North Santiam Canyon including as assessment of the transportation infrastructure and barriers to development. The document gives an overview of the origins of the City of Detroit, the previous railroad services in the area, and notes an airport located south of the City of Gates.

(The City of Detroit on its own has not completed an economic opportunities and analysis. There are no plans to undertake such a planning effort in the near future. Results of such a study and report is not available to use in the preparation of the City's TSP.)

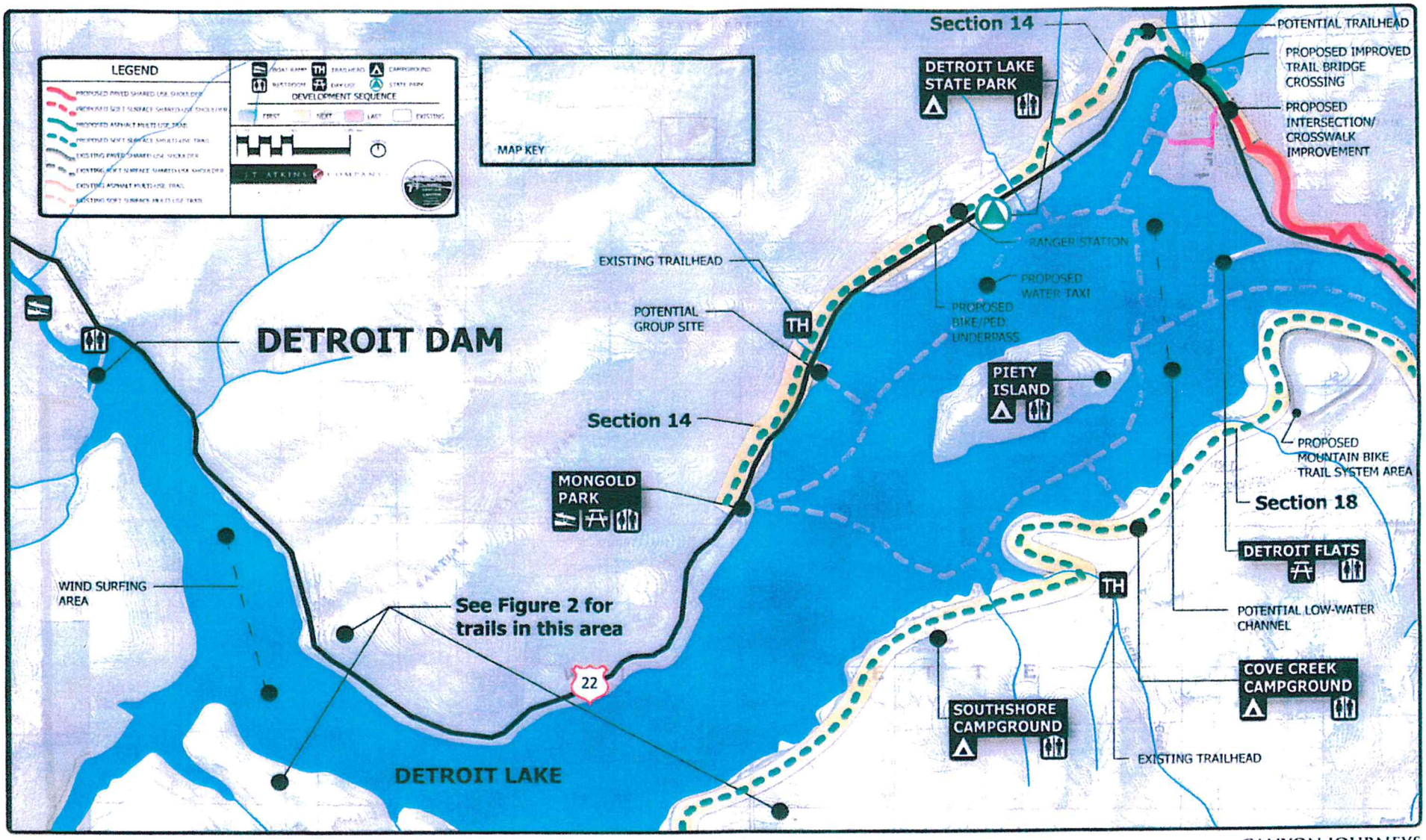
Salem to Bend Corridor – Oregon Route 22 and Oregon Route 126/US Route 20 – Interim Corridor Strategy (1998 draft): The Salem to Bend Interim Corridor Strategy study conducted by the Oregon Department of Transportation was part of a planning effort related to corridors identified "as being of statewide importance . . . A corridor plan is a long-range program for managing and improving transportation facilities and services and meet the needs for moving people and goods." The section within the area of the City of Detroit is identified in the plan as Segment 3 (milepost 39.67 through 54.09).

In addition to information related to Highway 22 and issues/items related to roadway and activities within the area and historical elements, the document indicates the operation of the Davis Airport as a "private public-use airport located one mile south of Gates in Linn County. The airport is primarily used for recreational purposes. This airport is protected by overlay zoning." FAA classifies the operation as a General Aviation Airport. Information effective September of 2008 provides details the availability of two "turf" run-ways.

APPENDIX A
BICYCLE/PEDESTRIAN MAP



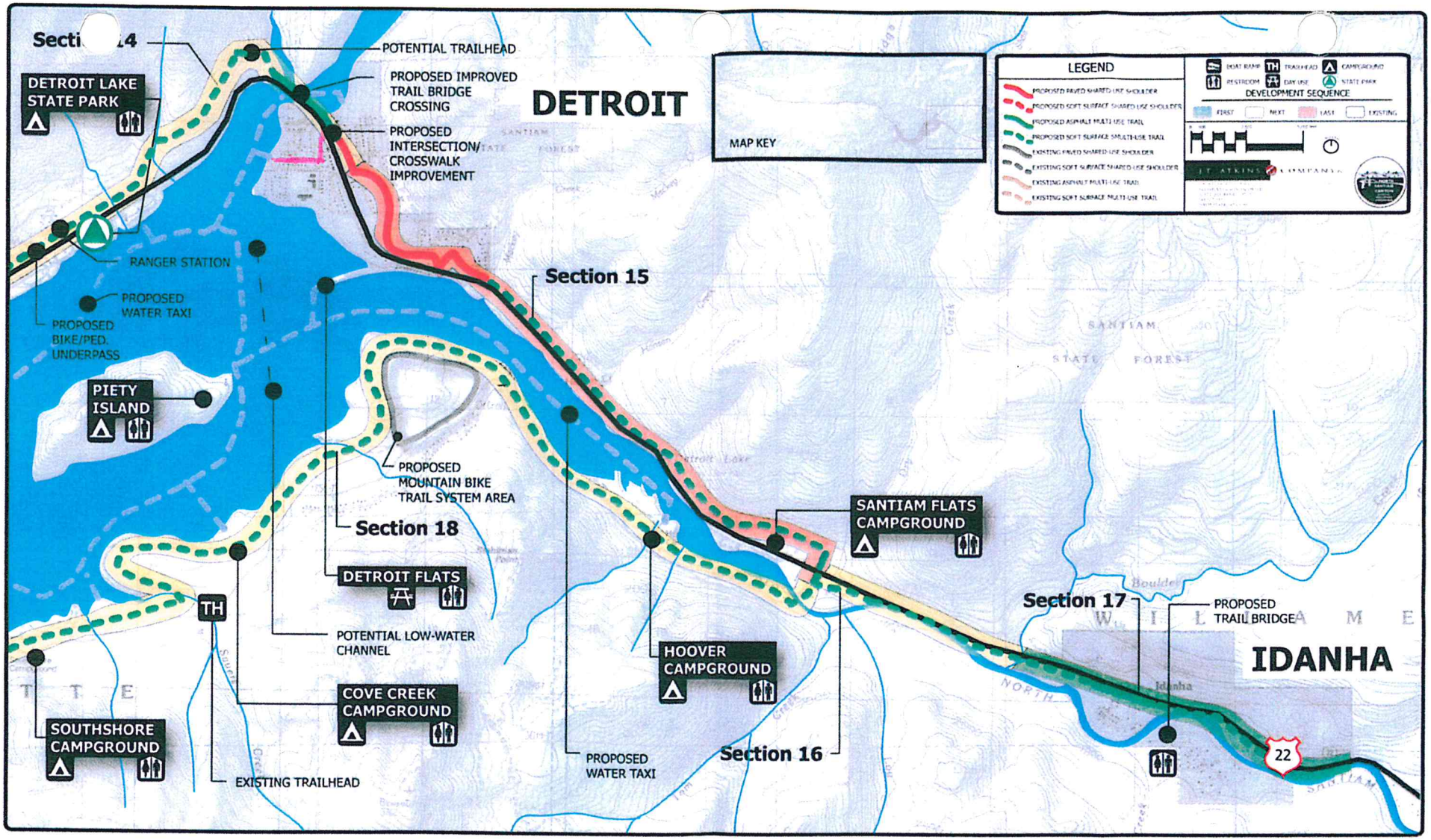
APPENDIX A - CANYON JOURNEYS MAPS (4 selected maps)



NOTE: THE INDIVIDUAL TRAIL SECTIONS SHOWN ON THIS FIGURE REQUIRE DETAILED DESIGN, REVIEW, AND COMMUNITY MEETINGS TO DETERMINE FINAL TRAIL ALIGNMENT, TRAIL CROSS SECTIONS, TRAIL ELEMENTS, AND TRAIL USER SAFETY.

CANYON JOURNEYS

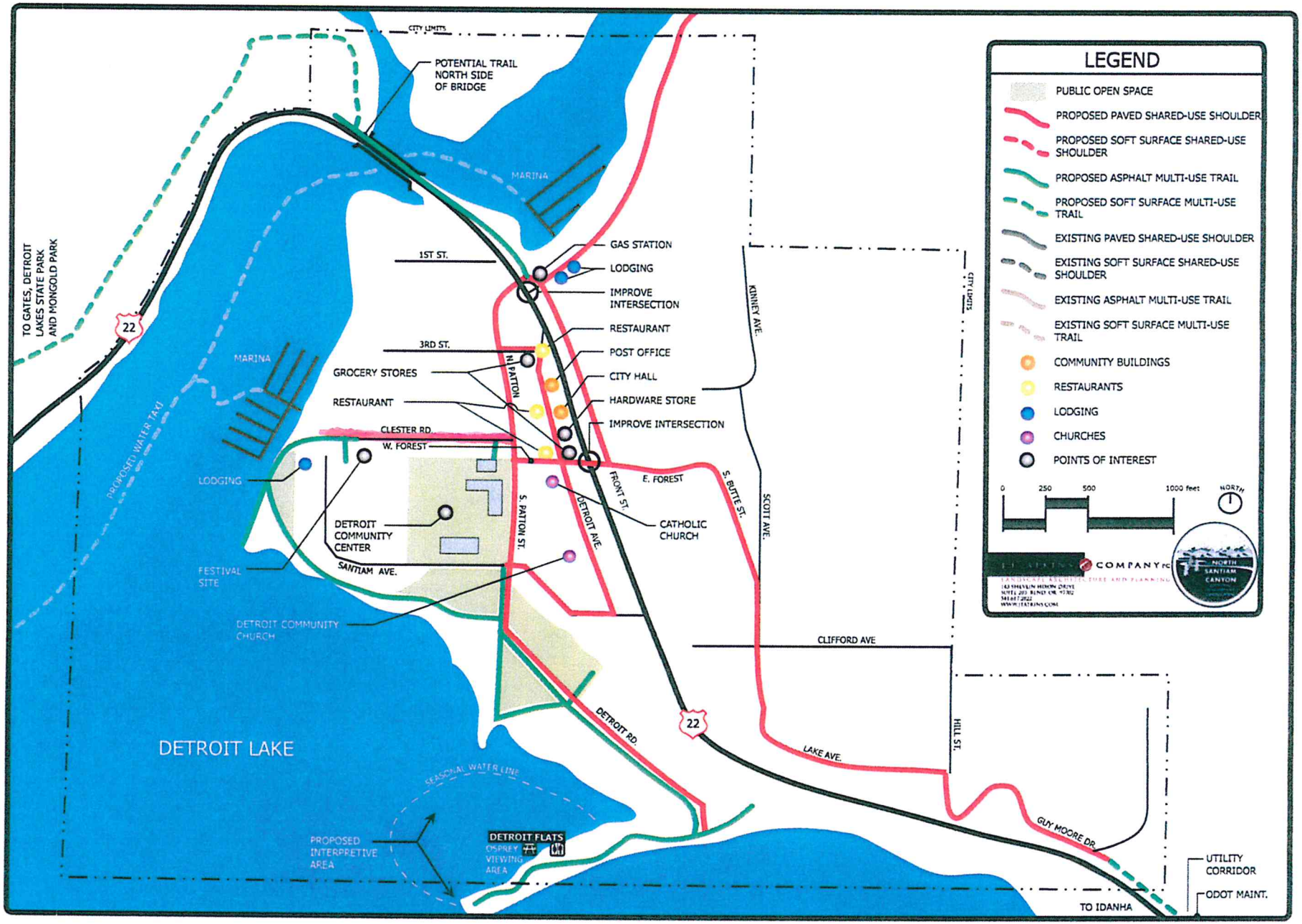
Figure 6. Canyon Connectors - Section 14



NOTE: THE INDIVIDUAL TRAIL SECTIONS SHOWN ON THIS FIGURE REQUIRE DETAILED DESIGN, REVIEW, AND COMMUNITY MEETINGS TO DETERMINE FINAL TRAIL ALIGNMENT, TRAIL CROSS SECTIONS, TRAIL ELEMENTS, AND TRAIL USER SAFETY.

CANYON JOURNEYS

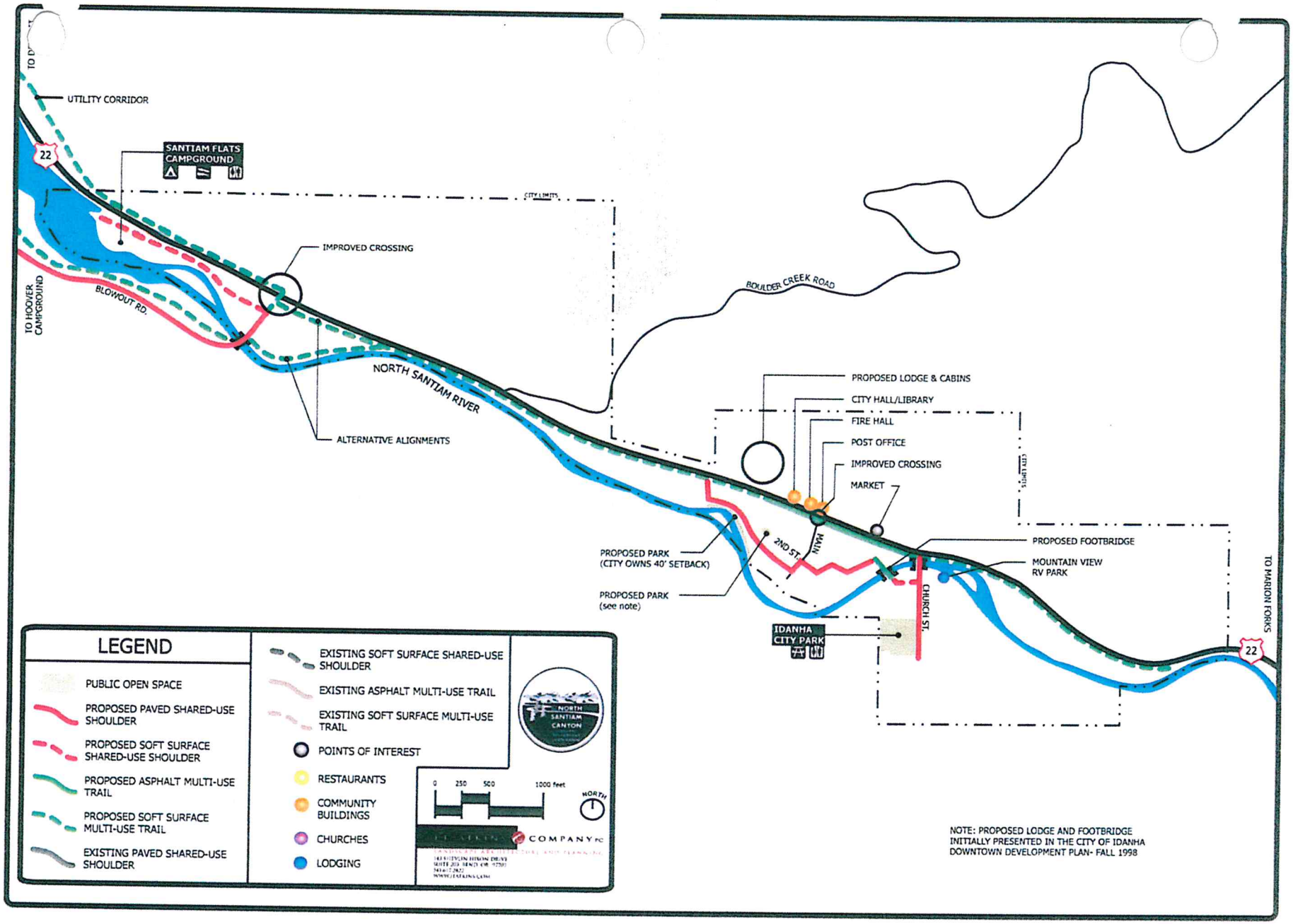
Figure 7. Canyon Connectors - Sections 15-18



NOTE: THE INDIVIDUAL TRAIL SECTIONS SHOWN ON THIS FIGURE REQUIRE DETAILED DESIGN, REVIEW, AND COMMUNITY MEETINGS TO DETERMINE FINAL TRAIL ALIGNMENT, TRAIL CROSS SECTIONS, TRAIL ELEMENTS, AND TRAIL USER SAFETY.

CANYON JOURNEYS

Figure 11. Community Trails - Detroit

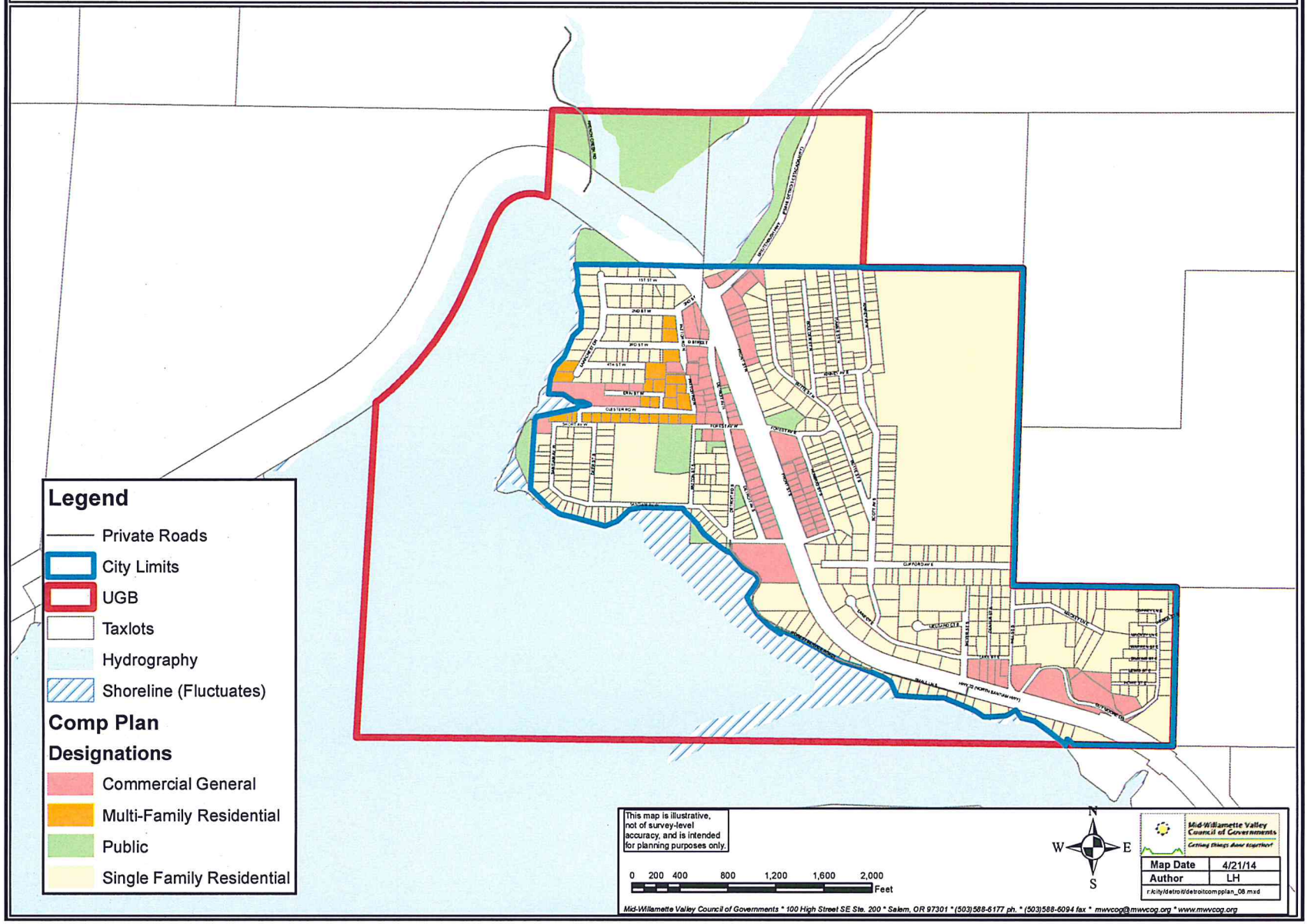


NOTE: THE INDIVIDUAL TRAIL SECTIONS SHOWN ON THIS FIGURE REQUIRE DETAILED DESIGN, REVIEW, AND COMMUNITY MEETINGS TO DETERMINE FINAL TRAIL ALIGNMENT, TRAIL CROSS SECTIONS, TRAIL ELEMENTS, AND TRAIL USER SAFETY.

CANYON JOURNEYS

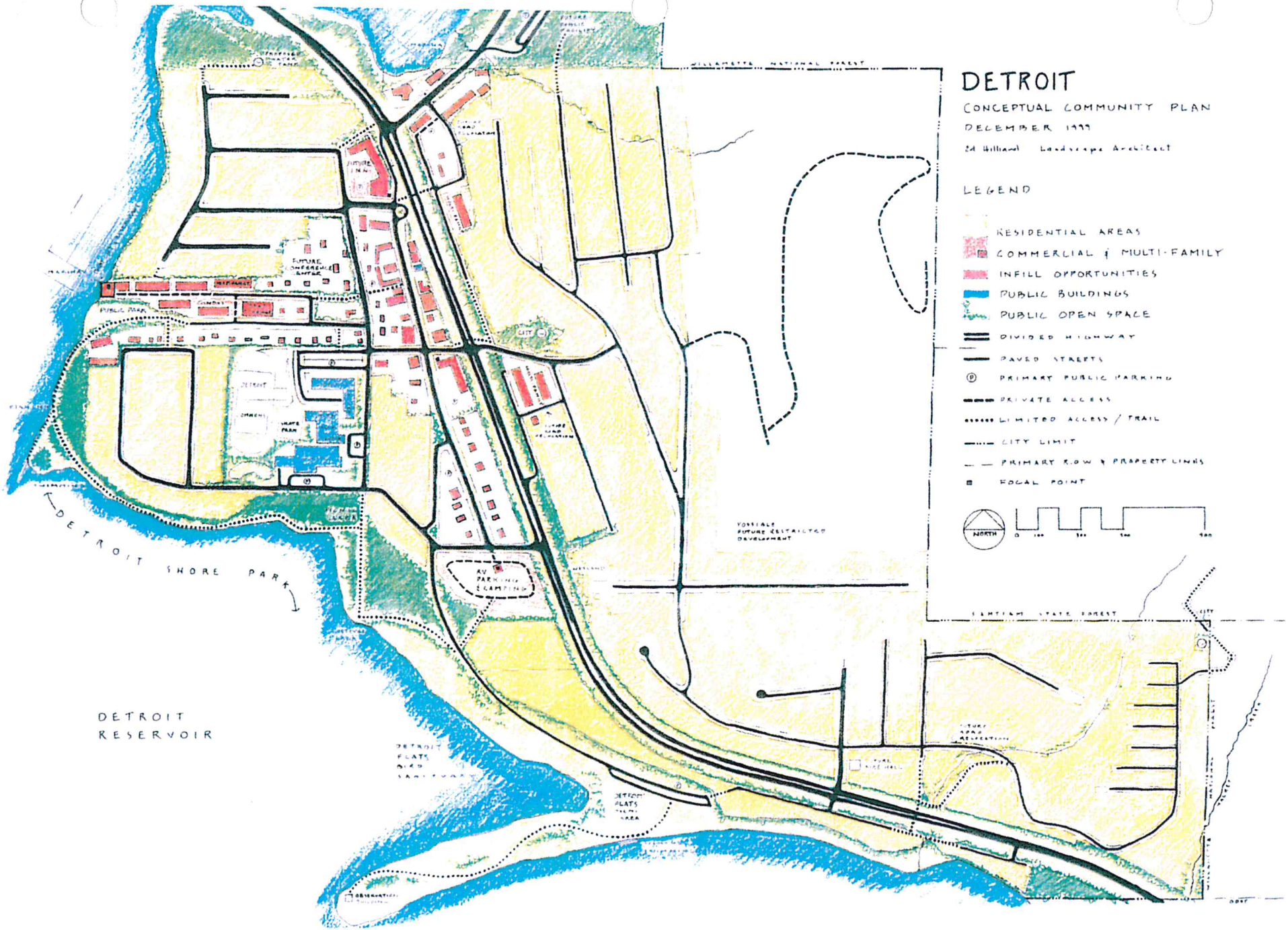
Figure 12. Community Trails - Idanha

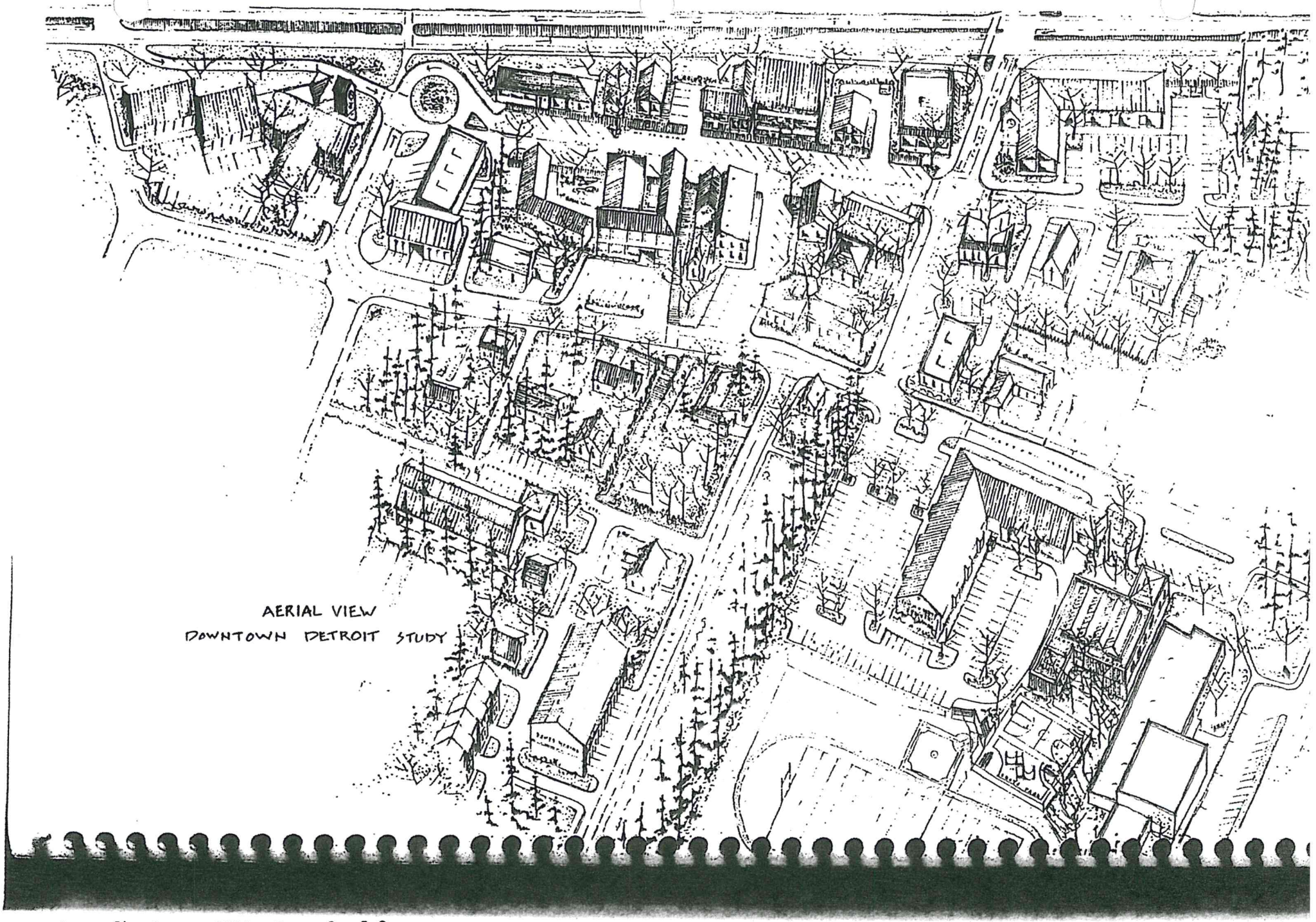
City of Detroit Comprehensive Plan and Zoning Map, 2014



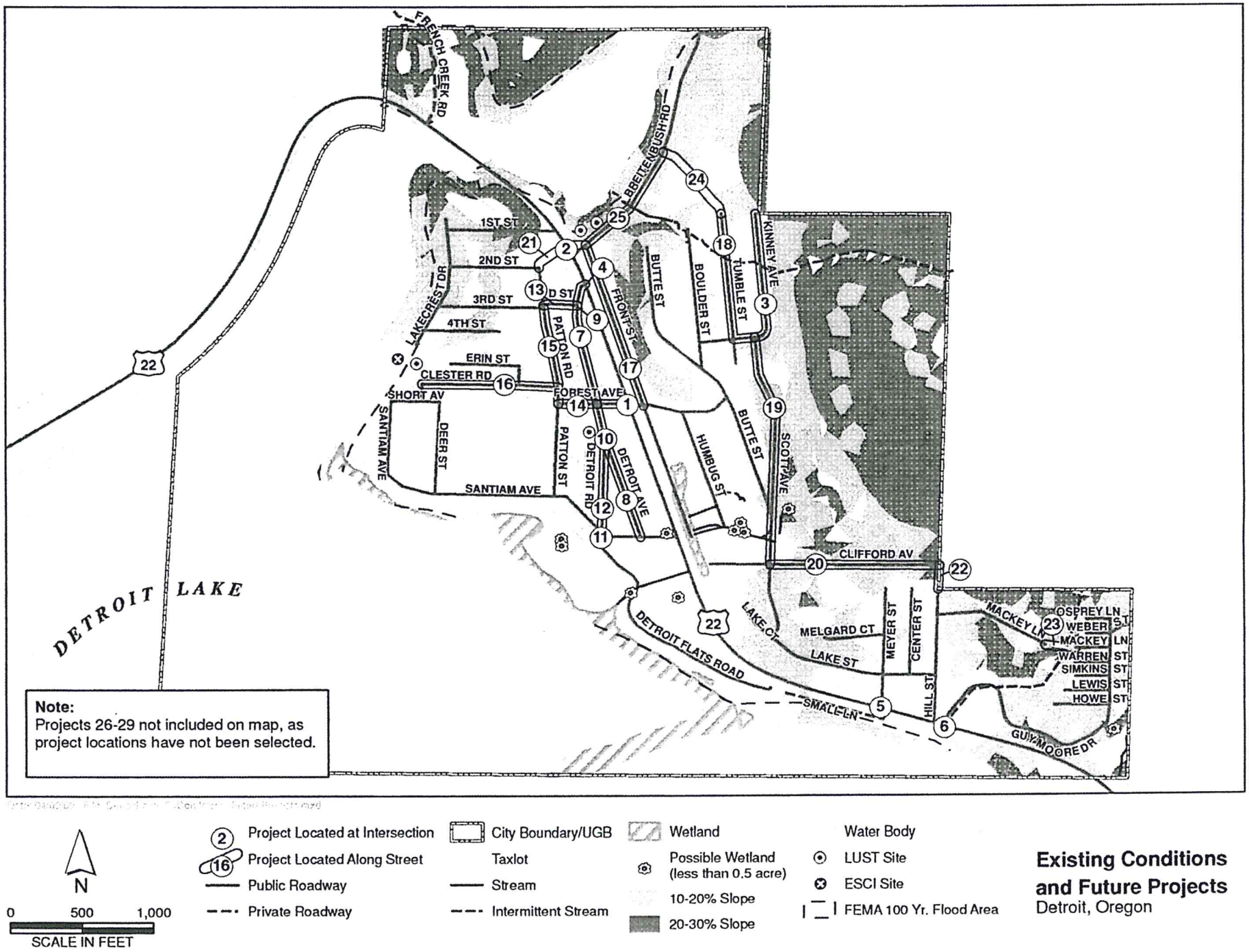
Mid-Willamette Valley Council of Governments * 100 High Street SE Ste. 200 * Salem, OR 97301 * (503)588-6177 ph. * (503)588-6094 fax * mwvcog@mwvcog.org * www.mwvcog.org

APPENDIX A - CONCEPTUAL COMMUNITY PLAN MAPS (ODDA) (2 pages)

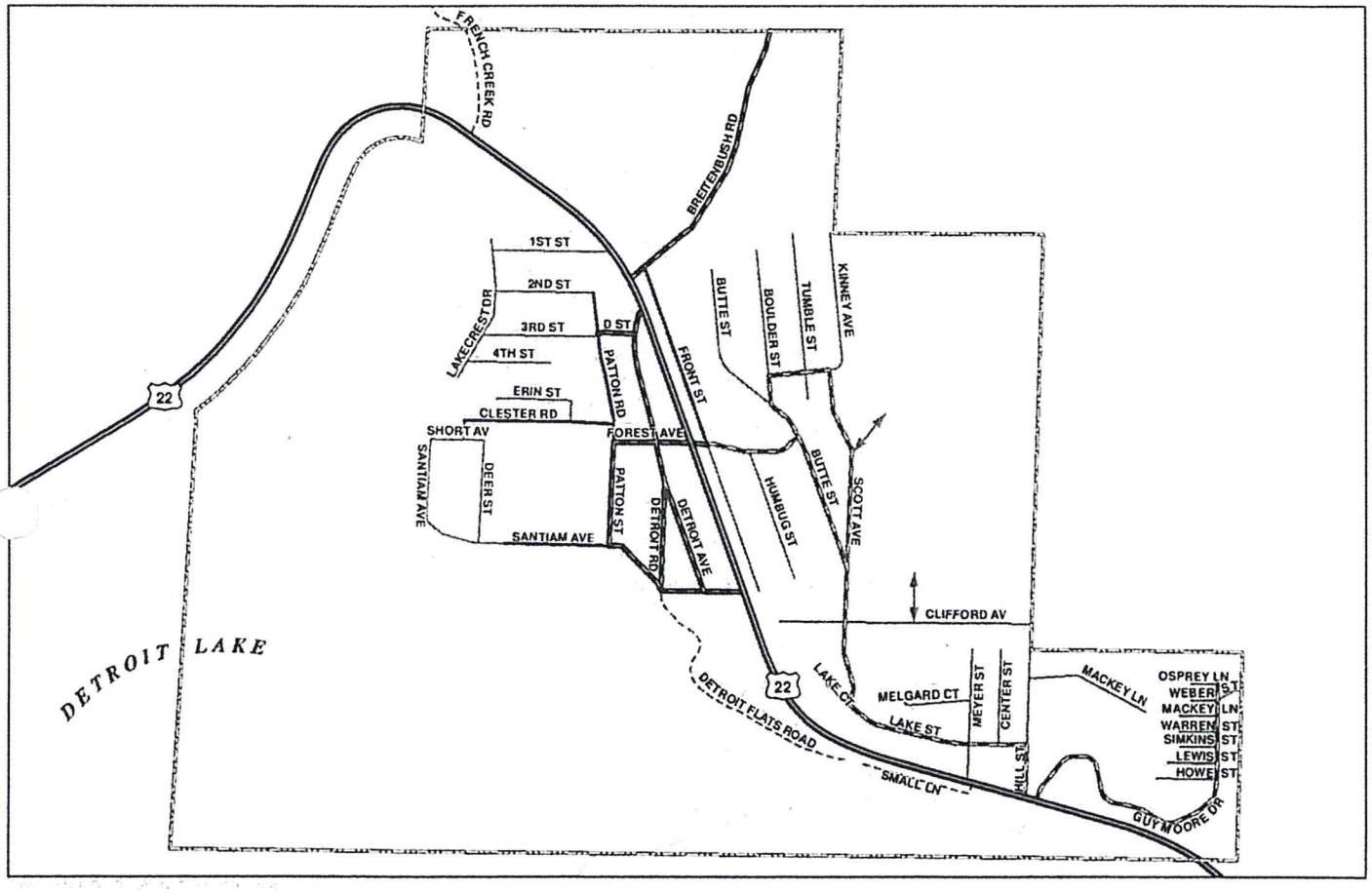



AERIAL VIEW
DOWNTOWN DETROIT STUDY

APPENDIX A - EXISTING CONDITIONS AND FUTURE PROJECTS MAP



APPENDIX A
ROADWAY FUNCTIONAL CLASSIFICATIONS MAP



N

0 500 1,000

SCALE IN FEET

Highway
Urban Collector
Neighborhood Collector
Future Local Street with Walkway Connections
Local Street with Walkway
Local Street with Shoulder
Private
City Boundary/UGB
Taxlot
Water Body

Roadway Functional Classifications
Detroit, Oregon

APPENDIX A

City of Detroit Street Network/Assessed Functional Classification
Transportation System Plan, 2009

Legend

- School Bus Stops
- City Limits/UGB
- Taxlots
- Hydrography

Functional Class

- State Hwy (Including bike lanes)
- Highway
- Collector
- Local
- Private
- Not to be Constructed

This map is illustrative, not of survey-level accuracy, and is intended for planning purposes only.

0 225 450 900 1,350 1,800 2,250 Feet

N W E S

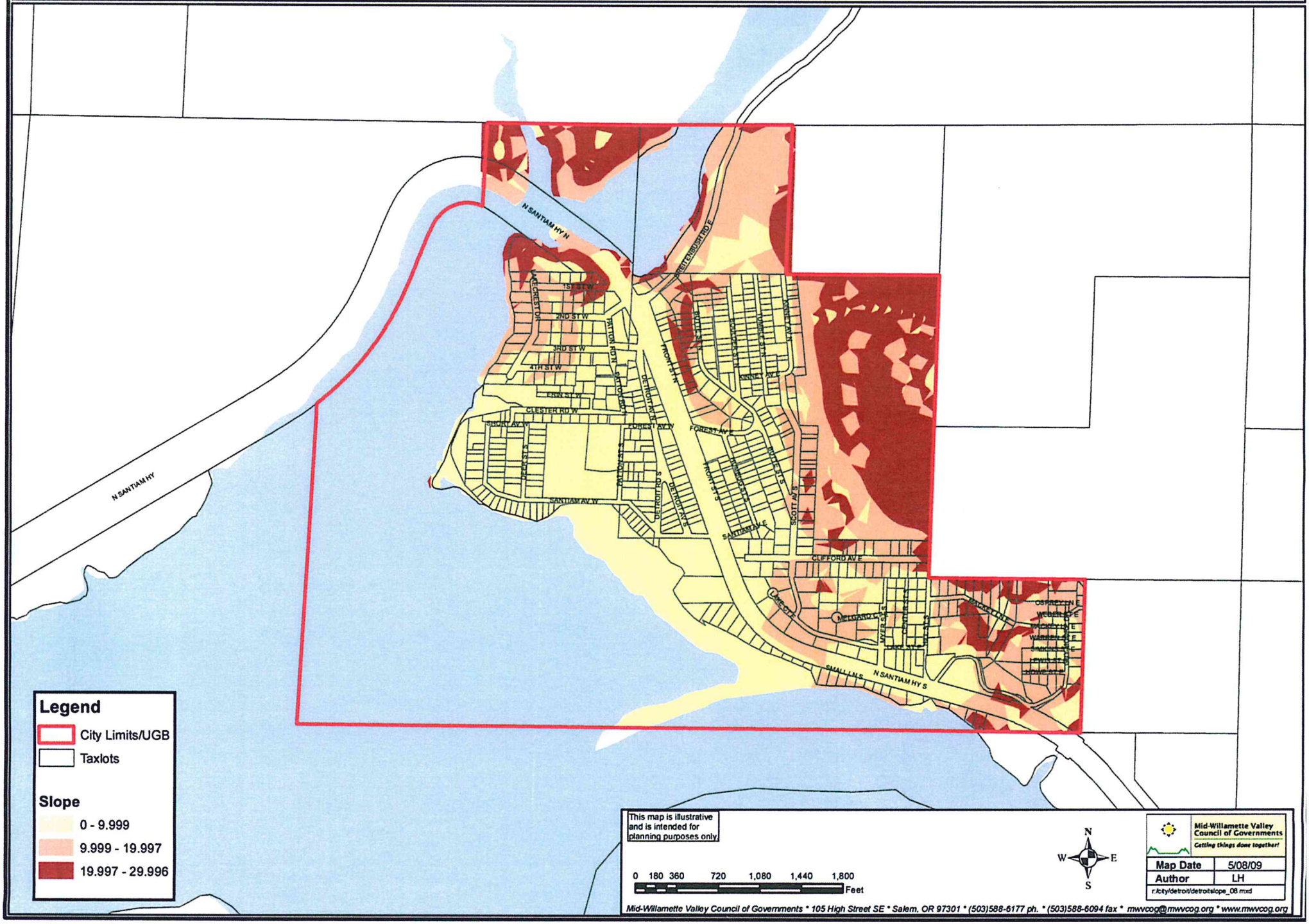
Mid-Willamette Valley Council of Governments
Getting things done together!

Map Date	05/07/09
Author	LH
r:/city/detroit/detroit_fc.mxd	

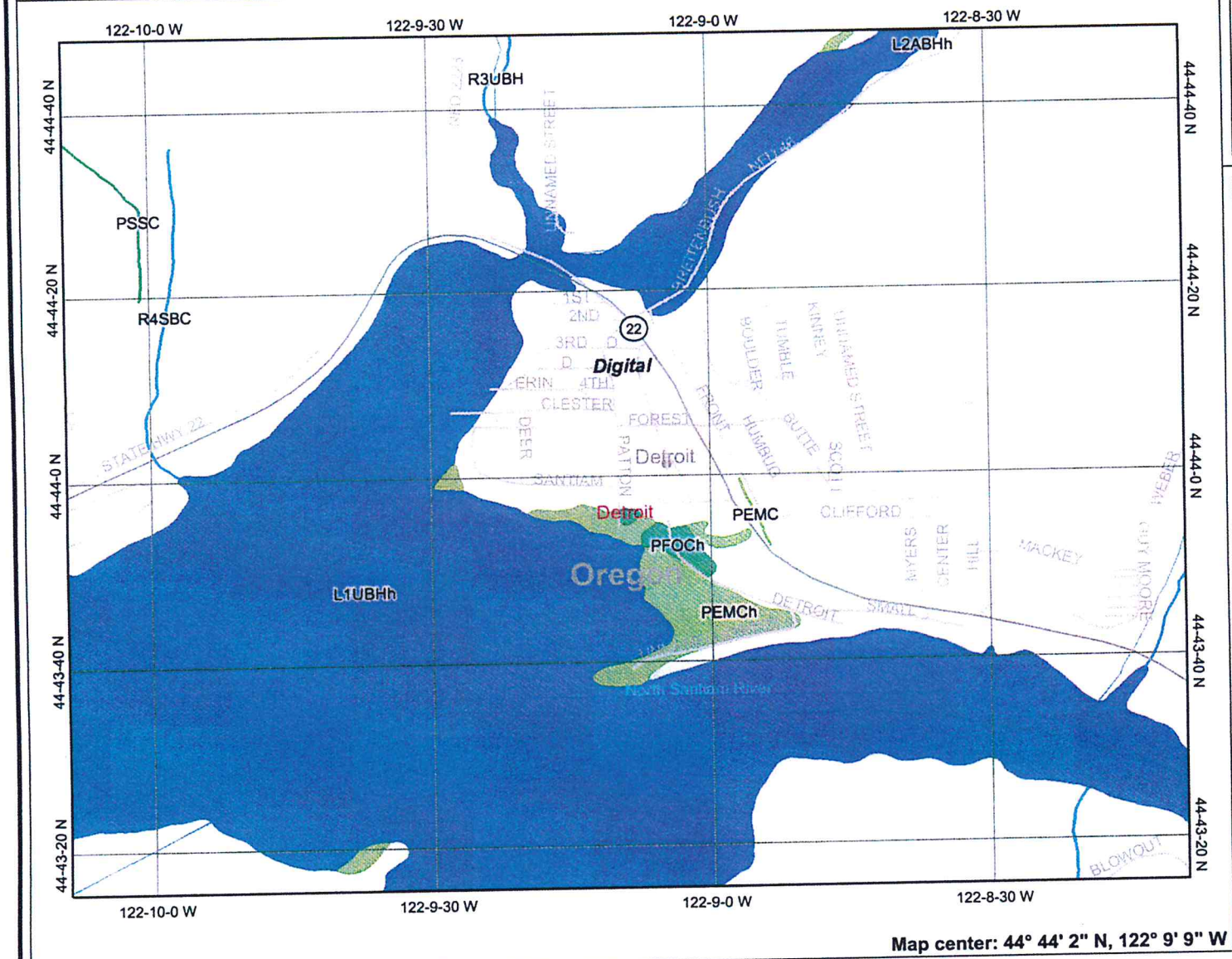
*Mid-Willamette Valley Council of Governments * 105 High Street SE * Salem, OR 97301 * (503)588-6177 ph. * (503)588-6094 fax * mwvcog@mwvcog.org * www.mwvcog.org*

APPENDIX A

City of Detroit Slope Map: 2008



Detroit - wetlands



Map center: 44° 44' 2" N, 122° 9' 9" W

Legend

Ohio_wet_scan
- 0
- 1
- Out of range

Interstate

Major Roads

Other Road
- Interstate
- State highway
- US highway

Roads

Cities

USGS Quad Index 24K

Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Lower 48 Available Wetland Data
- Non-Digital
- Digital
- No Data
- Scan

NHD Streams

Counties 100K

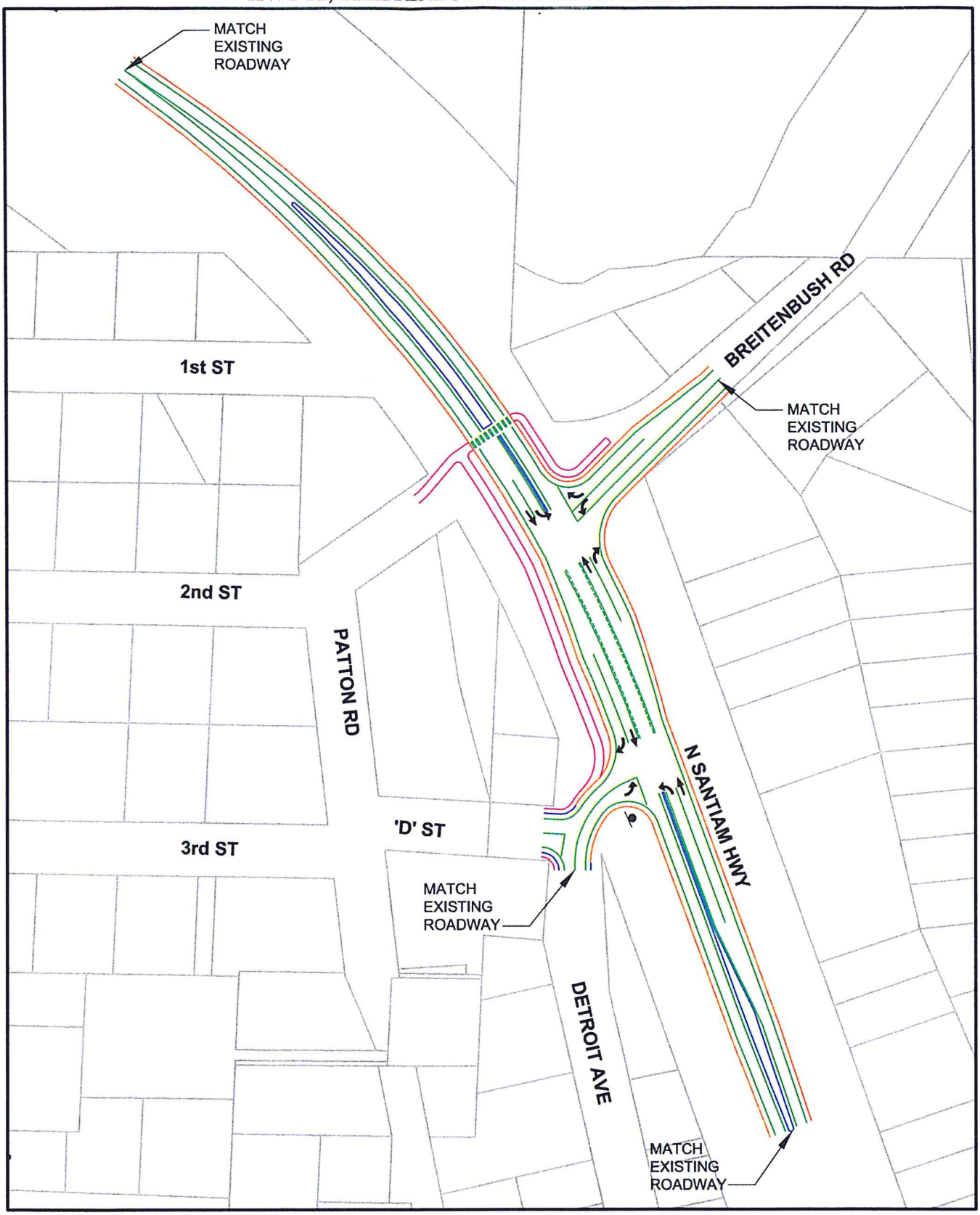
States 100K

South America

North America

Scale: 1:20,000

APPENDIX A
CONCEPTUAL INTERSECTION IMPROVEMENTS
HWY 22, BREITENBUSH & DETROIT AVENUE



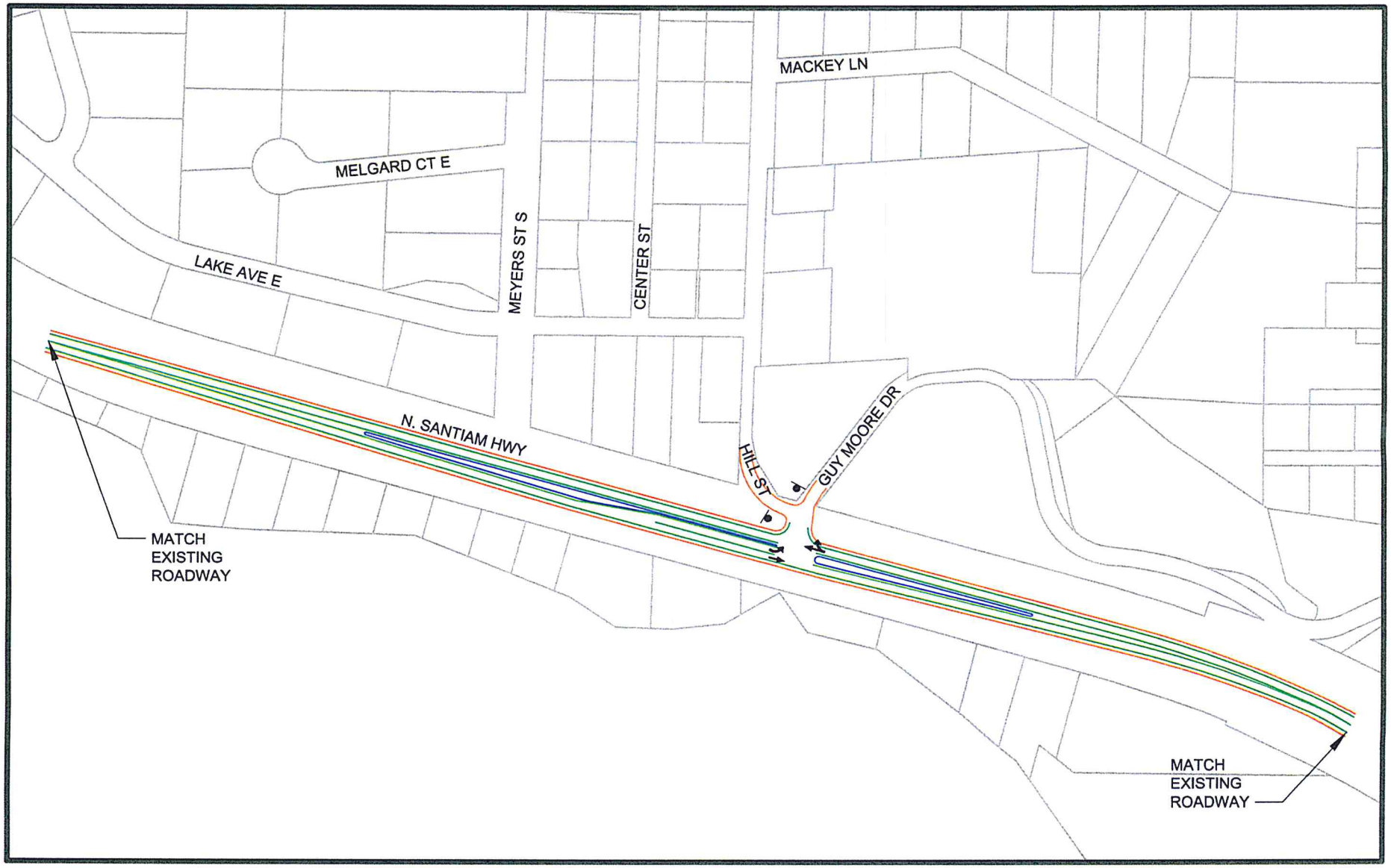
LEGEND

- MEDIAN CURB
- EDGE OF PAVEMENT
- SIDEWALK/PATH
- STRIPING

N

Conceptual Intersection Improvements
Highway 22, Breitenbush Road
& Detroit Avenue
Detroit, Oregon

APPENDIX A - CONCEPTUAL INTERSECTION IMPROVEMENTS
HIGHWAY 22, GUY MOORE DRIVE, HILL & MEYERS STREETS



LEGEND

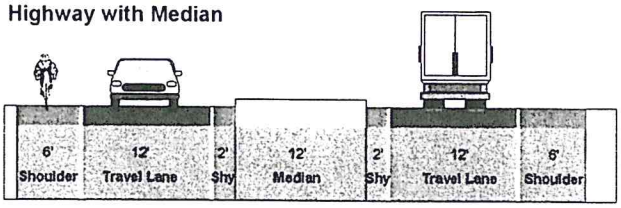
- MEDIAN CURB
- EDGE OF PAVEMENT
- SIDEWALK/PATH
- STRIPING

N

Conceptual Intersection Improvements
Highway 22, Guy Moore Drive,
Hill Street & Meyers Street
Detroit, Oregon

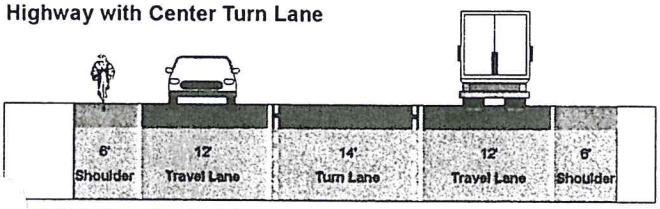
APPENDIX A
CROSS SECTION (STREET/ROADWAY)

Highway with Median



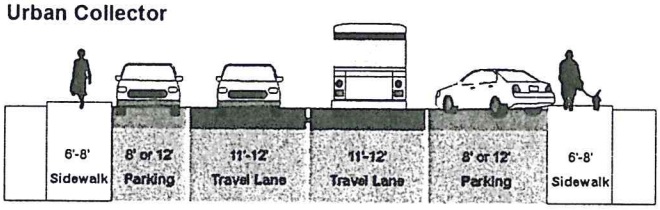
NOTE: ODOT 4R/New Urban Standards

Highway with Center Turn Lane



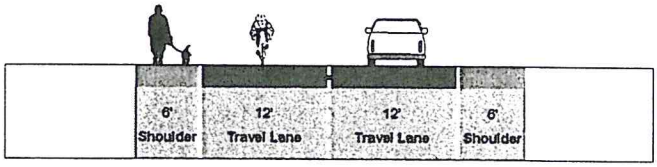
TE: ODOT 4R/New Urban Standards

Urban Collector



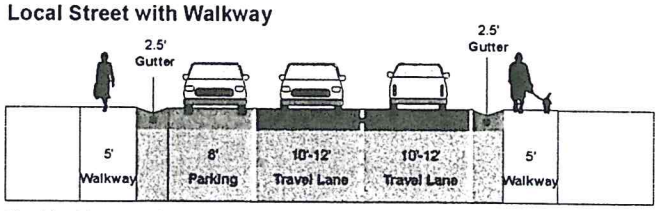
*12-foot, 45-degree, angle parking or 8-foot parallel parking, as required by city.

Neighborhood Collector



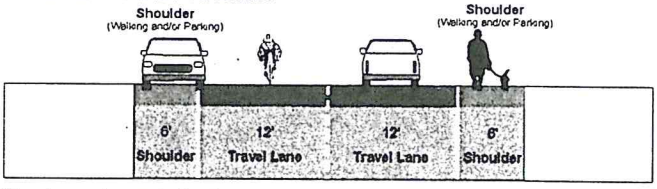
*Parking prohibited on shoulder. Optional one side only shoulder, as required by city.

Local Street with Walkway



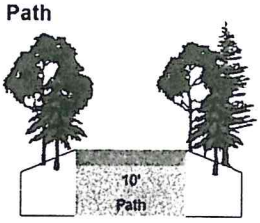
*Parallel parking, as required by city. Optional one side only walkway and gutter, as required by city.

Local Street with Shoulder



*Gravel or paved, as required by city.
*Where parking prohibited 4-foot shoulder and 11-foot travel lanes allowed with city approval.

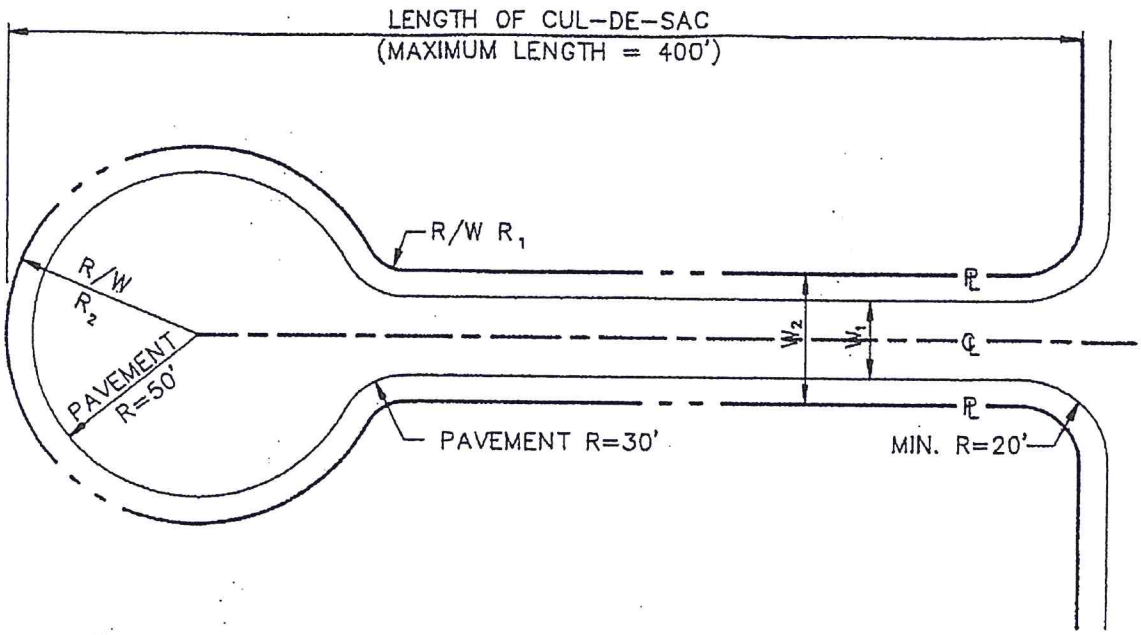
Path



Street/Roadway Cross Sections

Detroit, Oregon

APPENDIX A
CUL-DE-SAC (standard)



CUL-DE-SAC LENGTH	W_1	W_2	R_1	R_2	EASEMENT	SIDEWALK
LESS THAN 150'	28'	40'	12'	56'	5' MIN.	1 SIDE
PARKING ON BOTH SIDES GREATER THAN 150'	36'	50'	13'	56'	5' MIN.	BOTH SIDES
PARKING ON ONE SIDE GREATER THAN 150'	28'	40'	12'	56'	5' MIN.	BOTH SIDES

NOTES:

1. CUL-DE-SACS ALLOWED ON LOCAL ROADWAYS ONLY.
2. STRUCTURAL SECTION SHALL BE IN ACCORDANCE WITH LOCAL ROAD STANDARD. PER DRAWING C100
2. RURAL CUL-DE-SACS HAVE A 2 FOOT GRAVEL SHOULDER IN LIEU OF CURBS.

CLACKAMAS COUNTY
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

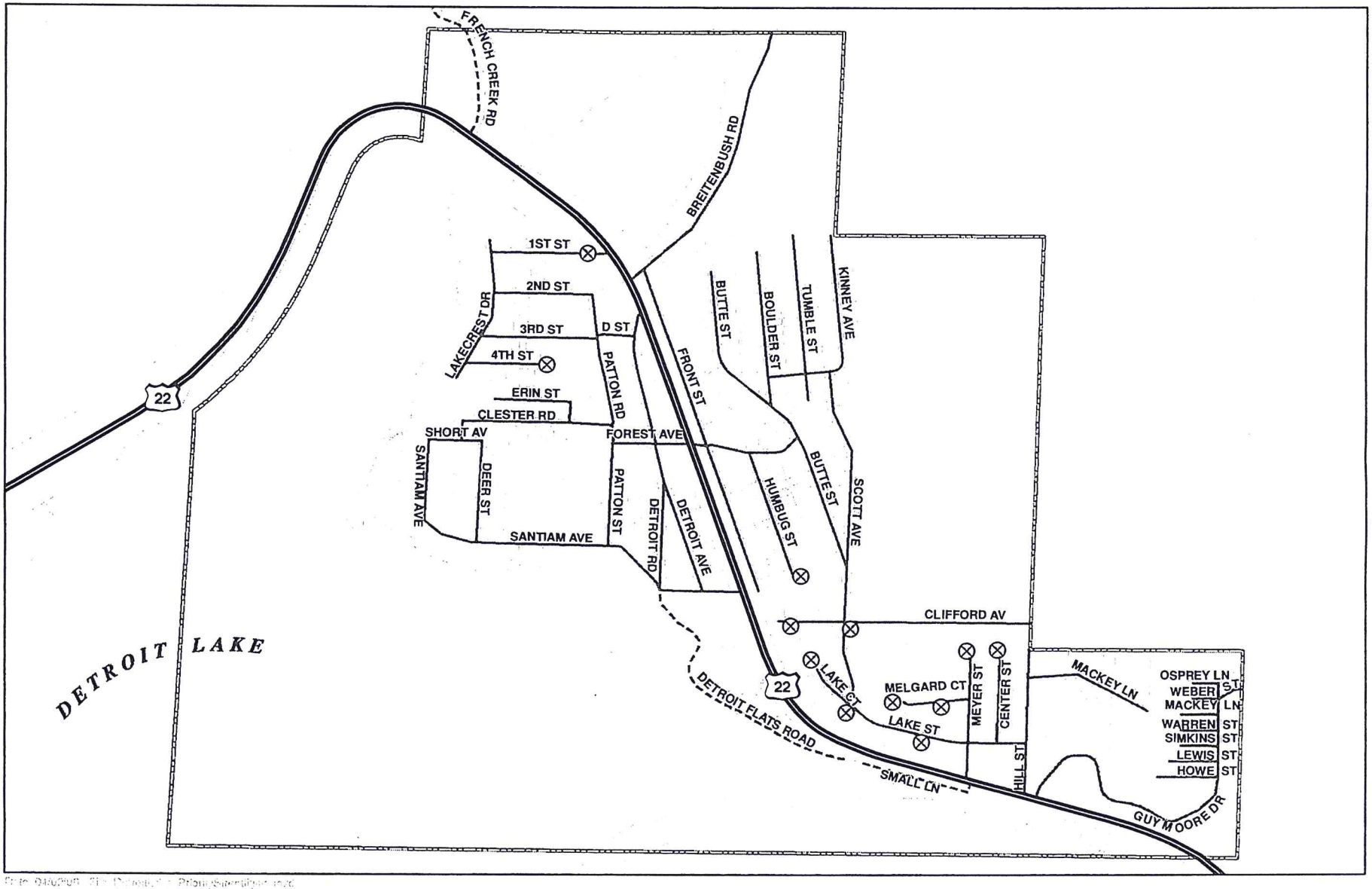
STANDARD DRAWING:
STANDARD CUL-DE-SAC LOCAL ROAD

DRAWING NO.
C300

NO.	REVISION	DATE	BY

DATE 1-1-99
SCALE N.T.S.
DESIGN | DRAWN | CHECKED

APPENDIX A - STREETLIGHTS (PRIORIZED)



N

0 500 1,000

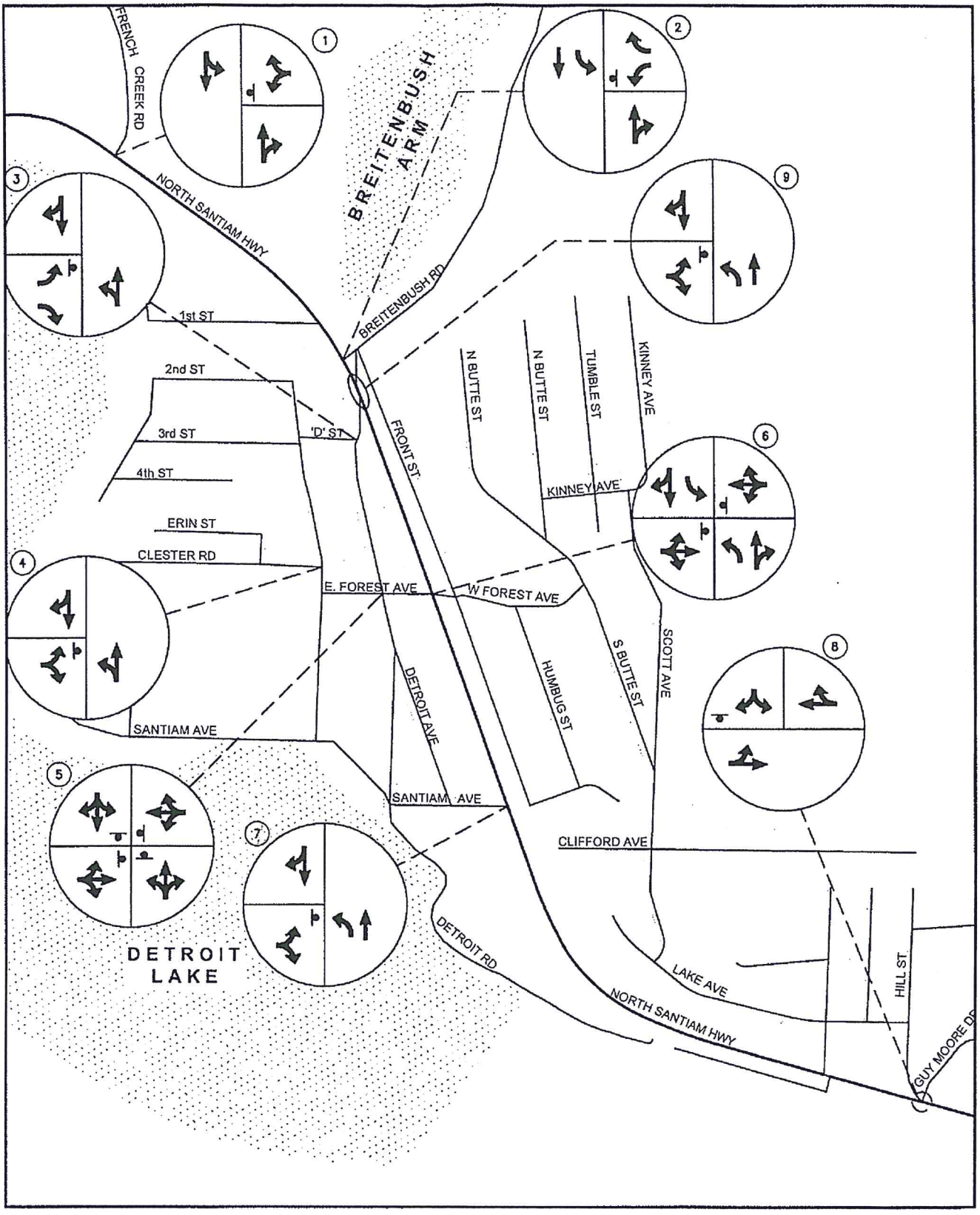
SCALE IN FEET

- Priority Streetlights
- US HWY 22
- Public Street
- Private Street
- City Boundary/UGB
- Taxlot
- Water Body

Priority Streetlights

Detroit, Oregon

APPENDIX A - TRAFFIC MOVEMENT - EXISTING LANE CHARACTERISTICS



DATE: Mar 16, 2009 FILE: PO2395051P12F-02

LEGEND

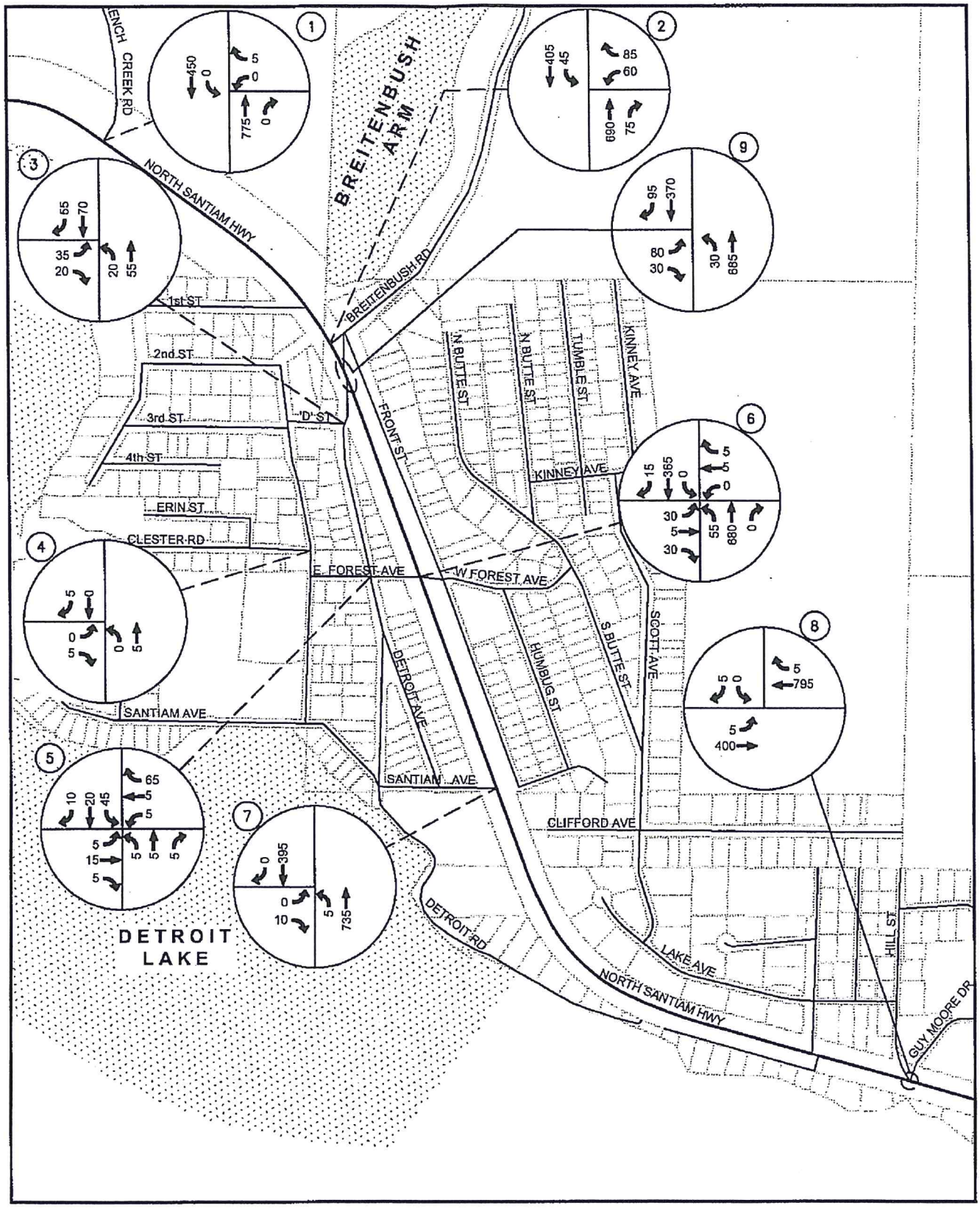
DIRECTION OF TRAFFIC MOVEMENTS

STOP SIGN CONTROLLED INTERSECTION

N

Existing Lane Characteristics

APPENDIX A - TRAFFIC MOVEMENT - 2008 (30TH HV) VOLUMES



DATE: Mar 11, 2009 FILE: PO2395051P12F-03

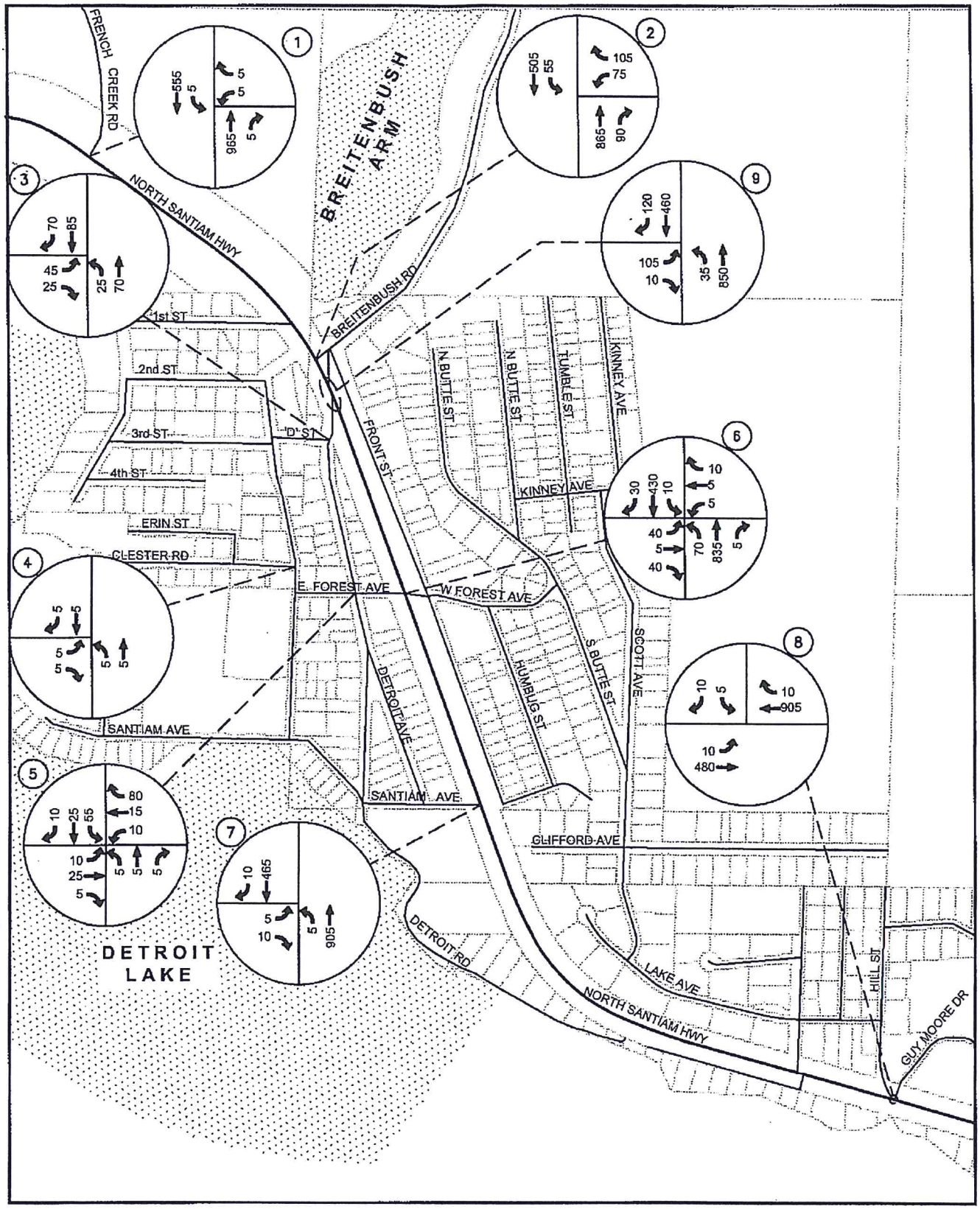
LEGEND

XXX → TURNING MOVEMENT BY VOLUME BY DIRECTION OF TRAFFIC

N

2008 (30th HV) Volumes

APPENDIX A - TRAFFIC MOVEMENT - 2030 NO BUILD (30TH HV) VOLUMES



DATE: Mar 11, 2009 FILE: PO2385051P12F-04

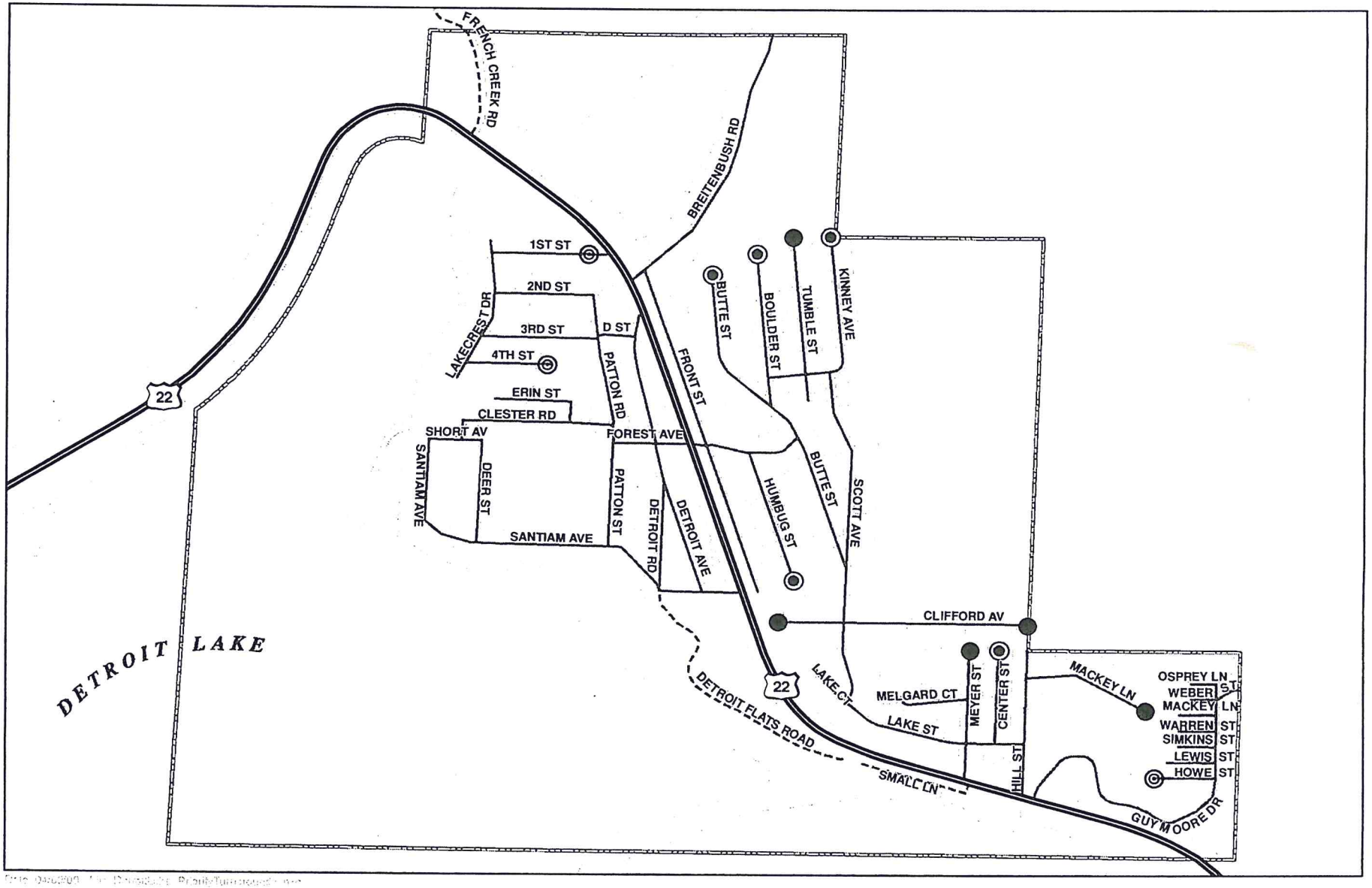
N

LEGEND

XXX → TURNING MOVEMENT BY VOLUME BY DIRECTION OF TRAFFIC

2030 No Build (30th HV) Volumes

APPENDIX A - TURNAROUDS (PRIORITIZED)



N

0 500 1,000

SCALE IN FEET

First Priority Turnaround

Second Priority Turnaround

Third Priority Turnaround

US HWY 22

Public Street

Private Street

City Boundary/UGB

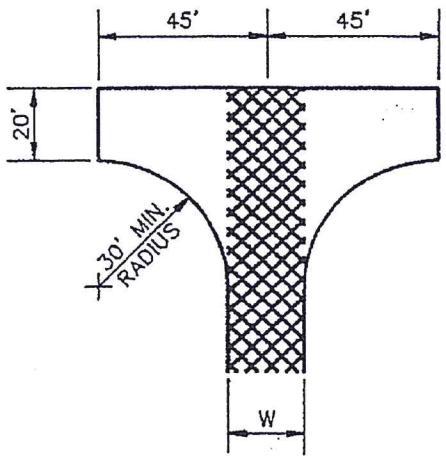
Taxlot

Water Body

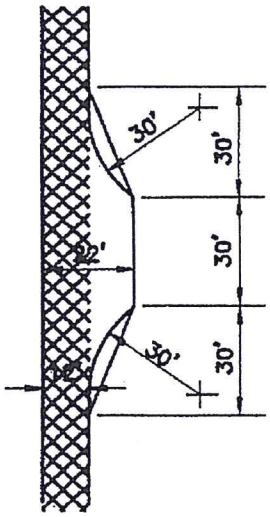
Priority Turnarounds

Detroit, Oregon

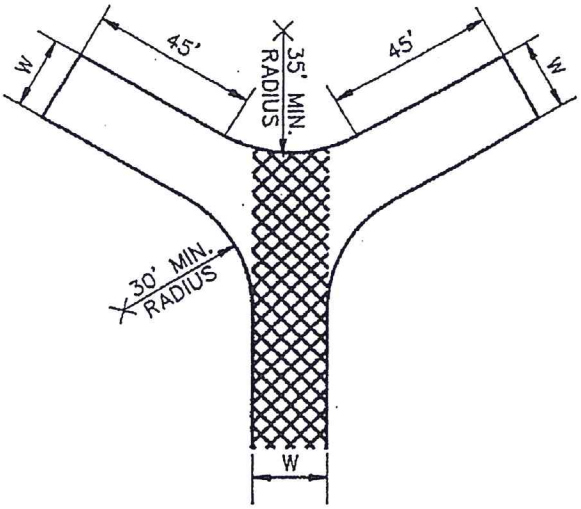
APPENDIX A
TURNAROUND (standard)



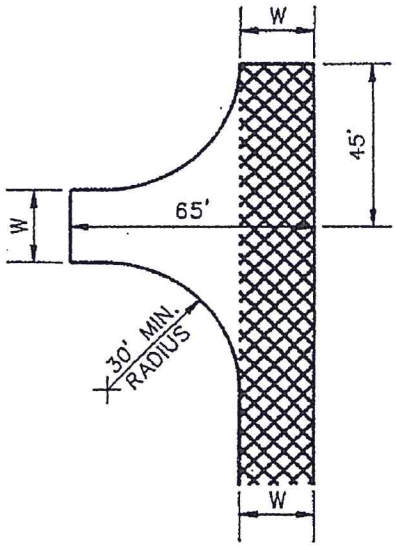
HAMMERHEAD



TURNOUT



ALTERNATIVE 1



ALTERNATIVE 2

NOTES:
A) W=DRIVABLE WITH
12' SERVING 1 OR 2 DWELLINGS W/4' CLEAR ZONES EACH SIDE
20' SERVING 3 OR MORE DWELLINGS OR ANY COMMERCIAL USE
B) ALL RADIUS CURVES SHALL HAVE 50 FT OUTSIDE EDGE

CLACKAMAS COUNTY DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT	STANDARD DRAWING: EMERGENCY SERVICES PRIVATE ROAD/DRIVEWAYS TURNAROUNDS & TURNOUTS	DRAWING NO. C350	
	NO. / REVISION / DATE / BY	DATE: 1-1-99	SCALE: N.T.S.
		DESIGN:	DRAWN: CHECKED:

APPENDIX A
CRASH RECORDS AND ODOT CRASH LISTINGS
(5 pages)

Detroit
Crash Records and Crash Rate Calculations 1/1/2003 - 12/31/2007

Variables		
	Peak hour to Percent ADT Hwy:	23 per 2007 Historical Traffic Data for ATR 24-015
	Peak hour to Percent ADT- Local:	10 per count data
Sorted by Accident Rate	ADT to annual traffic	365
2003-2007 Accidents	No of Data Years	5
	Segment Length	1.43 miles
	AADT	4,300 per ODOT 2007 Volume Table Mp 50.08

Mp49.73 to Mp 51.16

Intersections	5-year Accident Total	DHV Approach Volumes NB	WB	SB	EB	TOTAL	ADT=Total Approch Volume/Peak Hr % of ADT		5-year Accident Rate
Hwy 22 & French Creek	0	0	775	5	205	985	4283		0.00
Hwy 22 & Breitenbush/Detroit	1	715	145	450	115	1425	6196		0.09
Detroit Ave & D Street	0	45	0	125	45	215	2150		0.00
Patton & Clester	0	5	0	5	5	15	150		0.00
Detroit Ave & Forest Ave	3	15	75	75	25	190	1900		0.87
Hwy 22 & Forest	3	735	10	380	95	1220	5304		0.31
Hwy 22 & Santiam Ave	0	740	0	395	10	1145	4978		0.00
Hwy 22 & Guy Moore Dr	1	745	0	395	15	1150	5000		0.11
Hwy 22 Segment -Non Intx	4						4300		0.07
Hwy 22 Segment TOTAL	9						4300		0.56

	Crash Type					Crash Severity			Total		
Intersections	Rear-end	Turn	Angle	Side-swipe	Other	PDO	Injury	Fatal	Reported Crashes	Crash Rate/ MVMT	DATA SOURCE
Hwy 22 & French Creek	0	0	0	0	0	0	0	0	0	0.00	ODOT
Hwy 22 & Breitenbush/Detroit	0	1	0	0	0	1	0	0	1	0.09	ODOT
Detroit Ave & D Street	0	0	0	0	0	0	0	0	0	0.00	ODOT/County
Patton & Clester	0	0	0	0	0	0	0	0	0	0.00	ODOT/County
Detroit Ave & Forest Ave	1	0	2	0	0	3	0	0	3	0.87	County
Hwy 22 & Forest	1	0	2	0	0	3	0	0	3	0.31	ODOT
Hwy 22 & Santiam Ave	0	0	0	0	0	0	0	0	0	0.00	ODOT
Hwy 22 & Guy Moore Dr	1	0	0	0	0	1	0	0	1	0.11	County
Hwy 22 Segment Non-Intx	2	1	0	0	1	2	2	0	4	0.07	ODOT
Hwy 22 Segment Total	4	2	2	0	1	7	2	0	9	0.56	County/ODOT

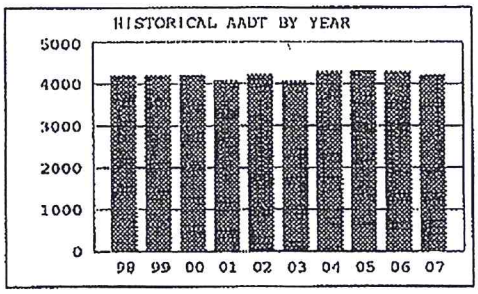
Milepoint	2007 AADT All Vehicles	Location Description
		NORTH SANTIAM HIGHWAY NO. 162
		Milepoint indicates distance from E. State Street and Airport Road in Salem
1.21	59200	0.21 mile west of Pacific Highway (I-5)
1.71	44400	0.20 mile west of Lancaster Drive Interchange
2.82	26000	* North Santiam Automatic Traffic Recorder, Sta. 24-004, 0.91 mile east of Lancaster Drive Interchange
4.13	25800	0.10 mile east of Deer Park Drive Interchange
5.54	25200	0.10 mile east of Joseph Street Interchange
6.98	22500	0.50 mile east of Silver Creek Falls Highway (OR214) Interchange
10.02	20600	* Aumsville Automatic Traffic Recorder, Sta. 24-005, 3.35 miles east of Silver Creek Falls Highway No. 163 (OR214)
11.63	12800	0.10 mile east of Golf Club Road Interchange
13.53	8300	0.30 mile east of Cascade Highway
14.32	8400	0.02 mile east of Fern Ridge Road
15.78	10300	0.10 mile east of Old Mehama Road
22.41	9900	0.01 mile west of Albany-Lyons Highway (OR226), at Mehama
22.43	7600	0.01 mile east of Albany-Lyons Highway (OR226), at Mehama
23.24	5900	0.01 mile east of North Fork Road
		West city limits of Mill City
30.04	6200	0.01 mile east of N.W. 2nd Avenue, connection to Santiam River Bridge
30.38	6000	0.01 mile east of N.E. 4th Avenue
32.09	5400	West city limits of Gates
33.09	5300	0.02 mile west of Horeb Street
33.69	4900	* Gates Automatic Traffic Recorder, Sta. 24-013, 0.95 mile west of Railroad Avenue S.E. (Entrance to Minto County Park)
43.03	4100	0.30 mile east of Detroit Dam
		West city limits of Detroit
50.08	4300	0.01 mile east of Breitenbush Road
51.30	4200	* Detroit Automatic Traffic Recorder, Sta. 24-015, 1.20 miles east of Detroit Avenue
52.56	4200	West city limits of Idanha
54.55	4100	0.01 mile east of Main Street
		Marion - Linn County Line, MP 60.79
65.48	3600	On Minto Creek Bridge
69.45	2600	0.01 mile west of Downing Creek Falls Road
81.51	2700	0.30 mile north of Santiam Highway (US20)
		SILVER CREEK FALLS HIGHWAY NO. 163
		Milepoint indicates distance from Center Street in Salem via OR22
9.18	1700	0.40 mile northeast of North Santiam Highway (OR22)
10.65	1100	0.01 mile west of Howell Prairie Road at Shaw
11.07	450	0.01 mile east of Shaw Highway S.E.
15.53	1000	0.06 mile west of Cascade Highway S.E.
15.66	960	0.07 mile east of Cascade Highway S.E.
17.47	710	0.01 mile east of Victor Point Road
19.36	510	0.01 mile east of Drift Creek Road
28.01	420	0.01 mile north of Hult Road
31.08	500	0.01 mile south of Powers Creek Loop
31.15	900	0.01 mile north of road to Powers Creek Loop
37.49	1600	0.01 mile east of Forest Ridge Road

Location: OR22 MP 51.30, NORTH SANTIAM HIGHWAY, NO. 162
1.20 miles east of Detroit Avenue

Recorder: DETROIT, 24-015
Installed: May, 1997

HISTORICAL TRAFFIC DATA

Year	Average Daily Traffic	Percent_of_ADT Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
1998	4190	263	29.2	25.7	24.2	23.1
1999	4202	251	28.0	25.1	24.2	23.3
2000	4205	253	26.9	25.3	24.0	23.4
2001	4076	255	27.6	24.6	23.9	22.4
2002	4224	254	28.1	25.8	23.9	22.3
2003	4055	268	30.7	27.2	25.3	24.3
2004	4294	240	27.4	24.5	23.3	22.8
2005	4307	250	26.6	24.4	23.6	22.5
2006	4283	240	26.7	24.1	22.8	21.8
2007	4194	242	27.5	25.0	24.2	23.4



2007 TRAFFIC DATA

	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	2325	55	2724	65
February	2275	54	2846	68
March	2881	69	3463	83
April	2829	67	3633	87
May	3723	89	4725	113
June	4081	97	5157	123
July	4937	118	6297	150
August	5067	121	6566	157
September	4086	97	5094	121
October	3073	73	3869	92
November	2765	66	3253	78
December	2400	57	2700	64

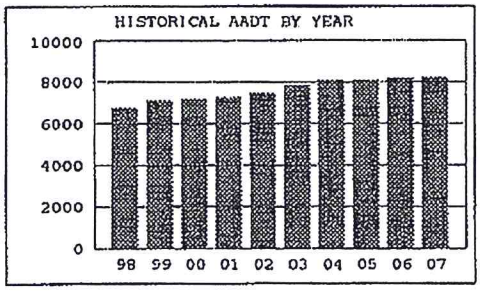
Classification Breakdown	Percent of ADT
Passenger Cars	61.7
Other 2 axle 4 tire vehicles	23.8
Single Unit 2 axle 6 tire	3.7
Single Unit 3 axle	1.2
Single Unit 4 axle or more	0.1
Single Trailer Truck 4 axle or less	1.0
Single Trailer Truck 5 axle	5.5
Single Trailer Truck 6 axle or more	1.1
Dbl-Trailer Truck 5 axle or less	0.1
Dbl-Trailer Truck 6 axle	0.0
Dbl-Trailer Truck 7 axle or more	0.9
Triple Trailer Trucks	0.1
Buses	0.6
Motorcycles & Scooters	0.1

Location: OR551 MP 3.70, WILSONVILLE-HUBBARD HIGHWAY, NO. 51
0.22 mile south of Ehlen Road

Recorder: HUBBARD, 24-016
Installed: January, 1954

HISTORICAL TRAFFIC DATA

Year	Average Daily Traffic	Percent_of_ADT Max Day	Max Hour	10TH Hour	20TH Hour	30TH Hour
1998	6748	133	12.6	11.1	11.0	10.9
1999	7109	137	14.3	11.3	11.0	10.9
2000	7160	***	****	****	****	****
2001	7261	127	12.9	11.1	10.8	10.7
2002	7437	144	18.4	11.3	11.0	10.8
2003	7823	125	11.5	10.7	10.5	10.5
2004	8095	144	13.9	11.1	10.8	10.6
2005	8074	133	15.2	11.0	10.7	10.5
2006	8167	136	16.5	10.7	10.4	10.3
2007	8210	126	11.6	10.7	10.5	10.4



2007 TRAFFIC DATA

	Average Weekday Traffic	Percent of ADT	Average Daily Traffic	Percent of ADT
January	7828	95	7367	90
February	8692	106	7928	97
March	8902	109	8254	101
April	9358	114	8583	105
May	9331	114	8541	104
June	9354	114	8528	104
July	9226	112	8411	102
August	9407	115	8575	104
September	8889	108	8281	101
October	9171	112	8382	102
November	8721	106	7963	97
December	8206	100	7701	94

Classification Breakdown	Percent of ADT
Passenger Cars	50.1
Other 2 axle 4 tire vehicles	41.7
Single Unit 2 axle 6 tire	2.4
Single Unit 3 axle	0.7
Single Unit 4 axle or more	0.0
Single Trailer Truck 4 axle or less	0.8
Single Trailer Truck 5 axle	2.7
Single Trailer Truck 6 axle or more	0.5
Dbl-Trailer Truck 5 axle or less	0.1
Dbl-Trailer Truck 6 axle	0.0
Dbl-Trailer Truck 7 axle or more	0.5
Triple Trailer Trucks	0.0
Buses	0.4
Motorcycles & Scooters	0.1

CDS380 1/9/2009

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

162 NORTH SANTIAM

North Santiam Hwy #162 (OR 22) MP 49.70 to MP 51.60
January 1, 2003 Through December 31, 2007

SER# / INVEST	SPEED	ALCOHOL	DRUGS	SCHL	WORK	DATE / DAY / TIME	COUNTY / CITY / URBAN AREA	RD# / COMPNT / MLG MILEPNT	FC / TYP	CONN # / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN	EVENT	CAUSE
02132	Y	N	N	Y	Y	06/14/2006	MARION	1	02		STRGHT		N		Y	RAIN	FIX OBJ	01	NONE	STRGHT										079,062	01
NONE						Wed	DETROIT	0 0		01601	NW	(NONE)	UNKNOWN		N	WET	FIX		PRVTE	SE NW								000	079,062	00
						6P		50.00		00204	01				N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	32	F	OR-Y		047,081	017		01
												(02)															OR>25				
																					02	PSNG	NO<5	01	F			000	000		00
01935	N	N	N	Y	Y	05/26/2006	MARION	1	02		STRGHT		N		N	CLR	O-1TURN	01	NONE	STRGHT											08
NONE						Fri	DETROIT	0 0		01601	NW	(NONE)	UNKNOWN		N	DRY	TURN		PRVTE	SE NW								000		00
						3P		50.02		00204	04				N	DAY	INJ		PSNGR CAR		01	DRVR	INJC	30	M	OR-Y		000	000		00
												(02)															OR>25				
																					02	PSNG	INJC	28	M			000	000		00
																					03	PSNG	NO<5	04	M			000	000		00
																		02	NONE	U-TURN											
																			PRVTE	NW NW								000		00
																			PSNGR CAR		01	DRVR	NONE	54	M	OR-Y		008	000		08
																										OR>25				
03436	N	N	N			07/05/2003	MARION	1	02		INTER	3-LEG	N		N	CLR	ANGL-STP	01	NONE	TURN-L											08
NONE						Sat	DETROIT	0 0		BREITENBUSH RD	NE		STOP SIGN		N	DRY	TURN		PRVTE	NW NE								000		00
						7P		50.07		NORTH SANTIAM HY	06	99			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	U	UNK		002	000		08
																										UNK				
																		02	NONE	STOP											
																			PRVTE	NE SW								012		00
																			PSNGR CAR		01	DRVR	NONE	46	F	OR-Y		000	000		00
																										OR<25				
01090	N	N	N			03/22/2005	MARION	1	02		INTER	CROSS	N		N	RAIN	ANGL-OTH	01	NONE	STRGHT											03
COUNTY						Tue	DETROIT	0 0		FOREST AVE	CN		STOP SIGN		N	WET	ANGL		PRVTE	E W								000		00
						2P		50.28		NORTH SANTIAM HY	01	99			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	51	M	OR-Y		021	000		03
																										OR<25				
																		02	NONE	STRGHT											
																			PRVTE	NW SE								000		00
																			PSNGR CAR		01	DRVR	NONE	47	F	OR-Y		000	000		00
																										OR>25				
03524	N	N	N			09/11/2004	MARION	1	02		INTER	CROSS	N		N	CLR	S-1STOP	01	NONE	STRGHT											07
NONE						Sat	DETROIT	0 0		FOREST AVE	CN		UNKNOWN		N	DRY	REAR		PRVTE	SE NW								000		00
						12P		50.28		NORTH SANTIAM HY	02	99			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	27	M	OR-Y		026	000		07
																										OR>25				
																		02	NONE	STOP											
																			PRVTE	SE NW								011		00
																			PSNGR CAR		01	DRVR	NONE	00	F	UNK		000	000		00
																										OR<25				
02018	N	N	N	Y	Y	06/01/2006	MARION	1	02		INTER	CROSS	N		N	RAIN	ANGL-OTH	01	NONE	STRGHT											02
NONE						Thu	DETROIT	0 0		FOREST AVE	CN		STOP SIGN		N	WET	ANGL		PRVTE	E W								015		00
						11A		50.28		NORTH SANTIAM HY	03	99			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	77	M	OR-Y		028	000		02
																										OR<25				

CDS380 1/9/2009

OREGON DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
CONTINUOUS SYSTEM CRASH LISTING

162 NORTH SANTIAM

North Santiam Hwy #162 (OR 22) MP 49.70 to MP 51.60
January 1, 2003 Through December 31, 2007

SER# / INVEST	SPEED	DALCS	DRSLK	SWCOR	DATE / DAY / TIME	COUNTY / CITY / URBAN AREA	RD# / COMPNT / MLG / MILEPNT	FC / TYP	CONN # / FIRST STREET / SECOND STREET	RD CHAR / DIRECT / LOCTN	INT-TYP (MEDIAN) / LEGS / (#LANES)	INT-REL / TRAF- / CNTL	OFFRD / RNDBT / DRVWY	WTHR / SURF / LIGHT	CRASH TYP / COLL TYP / SVRTY	V#	SPCL USE / TRLR QTY / OWNER / VEH TYPE	MOVE / FROM / TO	P#	PRTC TYPE	INJ SVRTY	AGE	SEX	LICNS RES	PED LOC	ERROR	ACTN EVENT	CAUSE
																02	NONE PRVTE PSNGR CAR	STRGHT NW SE									000 000	00 00
																			01	DRVR	NONE	57	M	OR-Y OR>25		000		
03337	N	N	N	Y	Y	09/01/2007 Sat 12P	MARION DETROIT	1 02 0 0 50.29		01601 00601	STRGHT SE 04	(NONE) (02)	Y UNKNOWN	N CLR N DRY N DAY	S-1STOP REAR PDO	01	NONE PRVTE PSNGR CAR	STRGHT SE NW									000 000	07 00 07
																			01	DRVR	NONE	00	F	UNK UNK		026		
																02	NONE PRVTE PSNGR CAR	STOP SE NW									011 000	00 00
																			01	DRVR	NONE	59	M	OR-Y OR>25		000		
02297	Y	N	N	N	N	06/25/2006 Sun 4P	MARION DETROIT	1 02 0 0 50.94		GUY MOORE DR WARREN ST	INTER W 06	4-LEG 99	N STOP SIGN	N CLR N DRY N DAY	S-1STOP REAR INJ	01	NONE PRVTE PSNGR CAR	STRGHT W E									000 000	01 00 01
STATE																			01	DRVR	INJB	30	F	OR-Y OR>25		026,047		
																			02	PSNG	INJB	34	F			000	000	00
																			03	PSNG	INJB	01	F			000	000	00
																			04	PSNG	INJC	18	F			000	000	00
																02	NONE PRVTE PSNGR CAR	STOP W E									012 000	00 00
																			01	DRVR	INJC	59	M	OR-Y OR<25		000		
																			02	PSNG	INJC	65	F			000	000	00
02980	N	N	N			06/08/2003 Sun 12P	MARION DETROIT	1 02 0 0 50.98		01601 00801	STRGHT E 04	(NONE) (02)	N UNKNOWN	N CLR N DRY N DAY	S-1STOP REAR PDO	01	NONE PRVTE PSNGR CAR	STRGHT E W									000 000	07 00 07
NONE																			01	DRVR	NONE	19	F	OR-Y OR>25		026		
																02	NONE PRVTE PSNGR CAR	STOP E W									011 000	00 00
																			01	DRVR	NONE	32	F	OR-Y OR<25		000		
03743	Y	N	N			09/25/2004 Sat 1P	MARION	1 02 0 0 51.25			ALLEY UN 03	(NONE) (02)	N UNKNOWN	N CLR N DRY N DAY	S-1STOP REAR INJ	01	NONE PRVTE PSNGR CAR	STRGHT W E									000 000	01 00 01
NONE																			01	DRVR	NONE	22	M	OR-Y OR>25		026,047		
																02	NONE PRVTE PSNGR CAR	STOP W E									012 000	00 00
																			01	DRVR	INJC	26	M	OR-Y OR>25		000		
																			02	PSNG	INJC	25	F			000	000	00

APPENDIX A
HIGHWAY 22, NORTH AND SOUTHBOUND
(12 pages)

Phone:
E-Mail:

Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	12/8/2008
Analysis Time Period	30 HV
Highway	Hwy 22 Santiam Highway
From/To	French Creek Rd to Santiam Ave
Jurisdiction	ODOT
Analysis Year	2008
Description	Northbound

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	5	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	6	/mi

Analysis direction volume, Vd 700 veh/h
Opposing direction volume, Vo 390 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.995		0.990	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	799	pc/h	448	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h

Estimated Free-Flow Speed:

Base free-flow speed, (note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	0.0	mi/h
Adj. for access points, (note-3) fA	1.5	mi/h
Free-flow speed, FFSd	43.5	mi/h
Adjustment for no-passing zones, fnp	2.5	mi/h
Average travel speed, ATSd	31.3	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		0.995	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	795	pc/h	445	pc/h
Base percent time-spent-following, (note-4) BPTSFd	65.9	%		
Adjustment for no-passing zones, fnp	28.9			
Percent time-spent-following, PTSFd	76.2	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.47	
Peak 15-min vehicle-miles of travel, VMT15	199	veh-mi
Peak-hour vehicle-miles of travel, VMT60	700	veh-mi
Peak 15-min total travel time, TT15	6.3	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	31.3	mi/h
Percent time-spent-following, PTSFd (from above)	76.2	
Level of service, (note-1) LOSd (from above)	E	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.70	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane, (note-2) ATSpl	33.8	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	5.03	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-4.03	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane, (note-3) PTSFpl	50.1	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	5.9	veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone:
E-mail:
Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	12/8/2008
Analysis Time Period	30 HV
Highway	Hwy 22 Santiam Highway
From/To	French Creek Rd to Santiam Ave
Jurisdiction	ODOT
Analysis Year	2008
Description	Soutbound

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	5	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	6	/mi

Analysis direction volume, Vd 390 veh/h
Opposing direction volume, Vo 700 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.2		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.990		0.995	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	448	pc/h	799	pc/h

Free-Flow Speed from Field Measurement:

Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	0.0	mi/h
Adj. for access points, (note-3) fA	1.5	mi/h
Free-flow speed, FFSd	43.5	mi/h
Adjustment for no-passing zones, fnp	1.2	mi/h
Average travel speed, ATSd	32.6	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.0	
E for RVs, ER	1.0		1.0	
avy-vehicle adjustment factor, fHV	0.995		1.000	
de adjustment factor, (note-1) fG	1.00		1.00	
ctional flow rate, (note-2) vi	445	pc/h	795	pc/h
Base percent time-spent-following, (note-4) BPTSFd	51.4	%		
Adjustment for no-passing zones, fnp	31.0			
Percent time-spent-following, PTSFd	71.3	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.26	
Peak 15-min vehicle-miles of travel, VMT15	111	veh-mi
Peak-hour vehicle-miles of travel, VMT60	390	veh-mi
Peak 15-min total travel time, TT15	3.4	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

otal length of analysis segment, Lt	1.0	mi
ength of two-lane highway upstream of the passing lane, Lu	0.0	mi
th of passing lane including tapers, Lpl	0.0	mi
ge travel speed, ATSd (from above)	32.6	mi/h
Percent time-spent-following, PTSFd (from above)	71.3	
Level of service, (note-1) LOSd (from above)	E	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.70	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane, (note-2) ATSpl	34.9	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	7.74	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-6.74	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane, (note-3) PTSFpl	45.3	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	5.9	veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone:
E-Mail:
Fax:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	12/8/2008
Analysis Time Period	30 HV
Highway	Hwy 22 Santiam Highway
From/To	French Creek Rd to Santiam Ave
Jurisdiction	ODOT
Analysis Year	2030
Description	Northbound

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	5	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	6	/mi

Analysis direction volume, Vd 870 veh/h
Opposing direction volume, Vo 470 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.2	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.995		0.990	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	994	pc/h	539	pc/h

Free-Flow Speed from Field Measurement:		
Field measured speed, (note-3) S FM	-	mi/h
Observed volume, (note-3) Vf	-	veh/h
Estimated Free-Flow Speed:		
Base free-flow speed, (note-3) BFFS	45.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS	0.0	mi/h
Adj. for access points, (note-3) fA	1.5	mi/h
Free-flow speed, FFSd	43.5	mi/h
Adjustment for no-passing zones, fnp	2.1	mi/h
Average travel speed, ATSd	29.5	mi/h

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.0		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adjustment factor, fHV	1.000		0.995	
Grade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	989	pc/h	537	pc/h
Base percent time-spent-following, (note-4) BPTSFd	73.7	%		
Adjustment for no-passing zones, fnp	23.4			
Percent time-spent-following, PTSFd	82.0	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.58	
Peak 15-min vehicle-miles of travel, VMT15	247	veh-mi
Peak-hour vehicle-miles of travel, VMT60	870	veh-mi
Peak 15-min total travel time, TT15	8.4	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	29.5	mi/h
Percent time-spent-following, PTSFd (from above)	82.0	
Level of service, (note-1) LOSd (from above)	E	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.70	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.11	
Average travel speed including passing lane, (note-2) ATSpl	31.8	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	3.68	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-2.68	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.62	
Percent time-spent-following including passing lane, (note-3) PTSFpl	55.1	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	7.8	veh-h

Notes:

If LOSd = F, passing lane analysis cannot be performed.

If Ld < 0, use alternative Equation 20-22.

If Ld < 0, use alternative Equation 20-20.

v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Phone: Fax:
E-Mail:

Directional Two-Lane Highway Segment Analysis

Analyst	Parametrix
Agency/Co.	
Date Performed	12/8/2008
Analysis Time Period	30 HV
Highway	Hwy 22 Santiam Highway
From/To	French Creek Rd to Santiam Ave
Jurisdiction	ODOT
Analysis Year	2030
Description	Soutbound

Input Data

Highway class	Class 1		Peak-hour factor, PHF	0.88	
Shoulder width	6.0	ft	% Trucks and buses	5	%
Lane width	12.0	ft	% Trucks crawling	0.0	%
Segment length	1.0	mi	Truck crawl speed	0.0	mi/hr
Terrain type	Level		% Recreational vehicles	2	%
Grade: Length		mi	% No-passing zones	100	%
Up/down		%	Access points/mi	6	/mi

Analysis direction volume, Vd 470 veh/h
Opposing direction volume, Vo 870 veh/h

Average Travel Speed

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.2		1.1	
PCE for RVs, ER	1.0		1.0	
Heavy-vehicle adj. factor, (note-5) fHV	0.990		0.995	
Grade adj. factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	539	pc/h	994	pc/h

Free-Flow Speed from Field Measurement:			
Field measured speed, (note-3) S FM		-	mi/h
Observed volume, (note-3) Vf		-	veh/h
Estimated Free-Flow Speed:			
Base free-flow speed, (note-3) BFFS		45.0	mi/h
Adj. for lane and shoulder width, (note-3) fLS		0.0	mi/h
Adj. for access points, (note-3) fA		1.5	mi/h
Free-flow speed, FFSd		43.5	mi/h
Adjustment for no-passing zones, fnp		1.1	mi/h
Average travel speed, ATSd		30.5	mi/h

Percent Time-Spent-Following

Direction	Analysis (d)		Opposing (o)	
PCE for trucks, ET	1.1		1.0	
E for RVs, ER	1.0		1.0	
avy-vehicle adjustment factor, fHV	0.995		1.000	
rade adjustment factor, (note-1) fG	1.00		1.00	
Directional flow rate, (note-2) vi	537	pc/h	989	pc/h
Base percent time-spent-following, (note-4) BPTSFd	59.2	%		
Adjustment for no-passing zones, fnp	25.2			
Percent time-spent-following, PTSFd	75.5	%		

Level of Service and Other Performance Measures

Level of service, LOS	E	
Volume to capacity ratio, v/c	0.32	
Peak 15-min vehicle-miles of travel, VMT15	134	veh-mi
Peak-hour vehicle-miles of travel, VMT60	470	veh-mi
Peak 15-min total travel time, TT15	4.4	veh-h

Notes:
1. If the highway is extended segment (level) or rolling terrain, fG = 1.0
2. If vi (vd or vo) >= 1,700 pc/h, terminate analysis-the LOS is F.
3. For the analysis direction only.
4. Exhibit 20-21 provides factors a and b.
5. Use alternative Equation 20-14 if some trucks operate at crawl speeds on a specific downgrade.

Passing Lane Analysis

Total length of analysis segment, Lt	1.0	mi
Length of two-lane highway upstream of the passing lane, Lu	0.0	mi
Length of passing lane including tapers, Lpl	0.0	mi
Average travel speed, ATSd (from above)	30.5	mi/h
Percent time-spent-following, PTSFd (from above)	75.5	
Level of service, (note-1) LOSd (from above)	E	

Average Travel Speed

Downstream length of two-lane highway within effective length of passing lane for average travel speed, Lde	1.70	mi
Length of two-lane highway downstream of effective length of the passing lane for average travel speed, Ld	-0.70	mi
Adj. factor for the effect of passing lane on average speed, fpl	1.10	
Average travel speed including passing lane, (note-2) ATSpl	32.7	

Percent Time-Spent-Following

Downstream length of two-lane highway within effective length of passing lane for percent time-spent-following, Lde	7.00	mi
Length of two-lane highway downstream of effective length of the passing lane for percent time-spent-following, Ld	-6.00	mi
Adj. factor for the effect of passing lane on percent time-spent-following, fpl	0.61	
Percent time-spent-following including passing lane, (note-3) PTSFpl	48.1	%

Level of Service and Other Performance Measures (note-4)

Level of service including passing lane, LOSpl	E	
Peak 15-min total travel time, TT15	4.1	veh-h

Notes:

1. If LOSd = F, passing lane analysis cannot be performed.
2. If Ld < 0, use alternative Equation 20-22.
3. If Ld < 0, use alternative Equation 20-20.
4. v/c, VMT15 , and VMT60 are calculated on Directional Two-Lane Highway Segment Worksheet.

Detroit TSP Update
Detroit Ave/Breitenbush Rd/Hwy 22

2030 Mitigated

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	75	30	10	25	50	105	35	790	60	55	435	70
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	88	35	12	29	59	124	39	878	67	61	483	78
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						3						
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1252	1667	522	1624	1672	472	561			944		
vC1, stage 1 conf vol	644	644		989	989							
vC2, stage 2 conf vol	608	1022		635	683							
vCu, unblocked vol	1252	1667	522	1624	1672	472	561			944		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)	6.5	5.5		6.5	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	54	84	98	85	76	77	96			92		
cM capacity (veh/h)	193	218	505	203	249	544	1020			735		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	88	47	212	39	585	359	61	561
Volume Left	88	0	29	39	0	0	61	0
Volume Right	0	12	124	0	0	67	0	78
cSH	193	254	561	1020	1700	1700	735	1700
Volume to Capacity	0.46	0.19	0.38	0.04	0.34	0.21	0.08	0.33
Queue Length 95th (ft)	54	17	44	3	0	0	7	0
Control Delay (s)	38.4	22.4	20.2	8.7	0.0	0.0	10.3	0.0
Lane LOS	E	C	C	A			B	
Approach Delay (s)	32.8		20.2	0.3			1.0	
Approach LOS	D		C					

Intersection Summary				
Average Delay	5.0			
Intersection Capacity Utilization	54.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	75	0	35	850	510	70
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	88	0	39	944	567	78
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1589	567	644			
vC1, stage 1 conf vol	567					
vC2, stage 2 conf vol	1022					
vCu, unblocked vol	1589	567	644			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	70	100	96			
cM capacity (veh/h)	299	527	950			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	88	39	944	567	78
Volume Left	88	39	0	0	0
Volume Right	0	0	0	0	78
cSH	299	950	1700	1700	1700
Volume to Capacity	0.30	0.04	0.56	0.33	0.05
Queue Length 95th (ft)	30	3	0	0	0
Control Delay (s)	22.0	9.0	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	22.0	0.4		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	15	480	905	10	10	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.85	0.85
Hourly flow rate (vph)	17	533	1006	11	12	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1017				1578	1011
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1017				1578	1011
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				90	96
cM capacity (veh/h)	682				117	291

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	11	539	1017	24
Volume Left	11	6	0	12
Volume Right	0	0	11	12
cSH	682	682	1700	167
Volume to Capacity	0.02	0.02	0.60	0.14
Queue Length 95th (ft)	2	2	0	12
Control Delay (s)	10.4	0.5	0.0	30.0
Lane LOS	B	A		D
Approach Delay (s)	0.7		0.0	30.0
Approach LOS				D

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	400	745	5	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.85	0.85
Hourly flow rate (vph)	6	444	828	6	0	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	833				1286	831
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	833				1286	831
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				100	98
cM capacity (veh/h)	800				180	370

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	450	833	6
Volume Left	6	0	0
Volume Right	0	6	6
cSH	800	1700	370
Volume to Capacity	0.01	0.49	0.02
Queue Length 95th (ft)	1	0	1
Control Delay (s)	0.2	0.0	14.9
Lane LOS	A		B
Approach Delay (s)	0.2	0.0	14.9
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	80	10	30	685	370	95
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	91	11	34	778	420	108
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1321	474	528			
vC1, stage 1 conf vol	474					
vC2, stage 2 conf vol	847					
vCu, unblocked vol	1321	474	528			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	75	98	97			
cM capacity (veh/h)	365	594	1049			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	102	34	778	528
Volume Left	91	34	0	0
Volume Right	11	0	0	108
cSH	381	1049	1700	1700
Volume to Capacity	0.27	0.03	0.46	0.31
Queue Length 95th (ft)	27	3	0	0
Control Delay (s)	17.9	8.5	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	17.9	0.4		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	450	775	0	0	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	511	881	0	0	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	881				1392	881
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	881				1392	881
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	98
cM capacity (veh/h)	776				158	349

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	511	881	6
Volume Left	0	0	0
Volume Right	0	0	6
cSH	776	1700	349
Volume to Capacity	0.00	0.52	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	15.5
Lane LOS			C
Approach Delay (s)	0.0	0.0	15.5
Approach LOS			C

Intersection Summary			
Average Delay		0.1	
Intersection Capacity Utilization		54.3%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	35	20	20	55	70	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	40	23	23	62	80	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	219	111	142			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	219	111	142			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	98	98			
cM capacity (veh/h)	762	948	1453			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	40	23	85	142
Volume Left	40	0	23	0
Volume Right	0	23	0	62
cSH	762	948	1453	1700
Volume to Capacity	0.05	0.02	0.02	0.08
Queue Length 95th (ft)	4	2	1	0
Control Delay (s)	10.0	8.9	2.1	0.0
Lane LOS	A	A	A	
Approach Delay (s)	9.6		2.1	0.0
Approach LOS	A			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	25.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	5	0	5	0	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	6	0	6	0	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	9	3	6			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	9	3	6			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	1017	1087	1629			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	6	6	6
Volume Left	0	0	0
Volume Right	6	0	6
cSH	1087	1629	1700
Volume to Capacity	0.01	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	8.3	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.3	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	15	5	5	5	65	5	5	5	45	20	10
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	6	17	6	6	6	74	6	6	6	51	23	11

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	28	85	17	85
Volume Left (vph)	6	6	6	51
Volume Right (vph)	6	74	6	11
Hadj (s)	-0.08	-0.51	-0.13	0.04
Departure Headway (s)	4.1	3.6	4.1	4.2
Degree Utilization, x	0.03	0.09	0.02	0.10
Capacity (veh/h)	844	956	845	835
Control Delay (s)	7.3	7.0	7.2	7.6
Approach Delay (s)	7.3	7.0	7.2	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.3		
HCM Level of Service	A		
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	5	30	0	5	5	55	680	0	0	365	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	34	6	34	0	6	6	62	773	0	0	415	17
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1330	1321	423	1349	1330	773	432			773		
vC1, stage 1 conf vol	423	423		898	898							
vC2, stage 2 conf vol	906	898		452	432							
vCu, unblocked vol	1330	1321	423	1349	1330	773	432			773		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	88	98	95	100	98	99	95			100		
cM capacity (veh/h)	282	311	635	279	305	402	1139			852		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	11	62	773	0	432
Volume Left	34	0	62	0	0	0
Volume Right	34	6	0	0	0	17
cSH	383	347	1139	1700	1700	1700
Volume to Capacity	0.19	0.03	0.05	0.45	0.00	0.25
Queue Length 95th (ft)	18	3	4	0	0	0
Control Delay (s)	16.6	15.7	8.3	0.0	0.0	0.0
Lane LOS	C	C	A			
Approach Delay (s)	16.6	15.7	0.6		0.0	
Approach LOS	C	C				

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	62.9%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	10	5	735	395	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	0	11	6	835	449	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1295	449	449			
vC1, stage 1 conf vol	449					
vC2, stage 2 conf vol	847					
vCu, unblocked vol	1295	449	449			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	99			
cM capacity (veh/h)	376	614	1122			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	11	6	835	449
Volume Left	0	6	0	0
Volume Right	11	0	0	0
cSH	614	1122	1700	1700
Volume to Capacity	0.02	0.01	0.49	0.26
Queue Length 95th (ft)	1	0	0	0
Control Delay (s)	11.0	8.2	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.0	0.1		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	60	85	690	75	45	405
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	71	100	812	88	53	476
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1438	856			900	
vC1, stage 1 conf vol	856					
vC2, stage 2 conf vol	582					
vCu, unblocked vol	1438	856			900	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	72			93	
cM capacity (veh/h)	345	361			763	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	71	100	900	53	476
Volume Left	71	0	0	53	0
Volume Right	0	100	88	0	0
cSH	345	361	1700	763	1700
Volume to Capacity	0.20	0.28	0.53	0.07	0.28
Queue Length 95th (ft)	19	28	0	6	0
Control Delay (s)	18.1	18.8	0.0	10.1	0.0
Lane LOS	C	C		B	
Approach Delay (s)	18.5		0.0	1.0	
Approach LOS	C				

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	5	555	965	5	5	5
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.85	0.85
Hourly flow rate (vph)	6	617	1072	6	6	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1078				1703	1075
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1078				1703	1075
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	98
cM capacity (veh/h)	655				101	269

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	622	1078	12
Volume Left	6	0	6
Volume Right	0	6	6
cSH	655	1700	147
Volume to Capacity	0.01	0.63	0.08
Queue Length 95th (ft)	1	0	6
Control Delay (s)	0.2	0.0	31.6
Lane LOS	A		D
Approach Delay (s)	0.2	0.0	31.6
Approach LOS			D

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	105	10	35	850	460	120
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	124	12	39	944	511	133
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				TWLTL	TWLTL	
Median storage veh)				2	2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1600	578	644			
vC1, stage 1 conf vol	578					
vC2, stage 2 conf vol	1022					
vCu, unblocked vol	1600	578	644			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	58	98	96			
cM capacity (veh/h)	298	519	950			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	135	39	944	644
Volume Left	124	39	0	0
Volume Right	12	0	0	133
cSH	309	950	1700	1700
Volume to Capacity	0.44	0.04	0.56	0.38
Queue Length 95th (ft)	53	3	0	0
Control Delay (s)	25.4	9.0	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	25.4	0.4		0.0
Approach LOS	D			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	45	25	25	70	85	70
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	53	29	29	82	100	82
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	282	141	182			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282	141	182			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	97	98			
cM capacity (veh/h)	697	912	1405			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	53	29	112	182
Volume Left	53	0	29	0
Volume Right	0	29	0	82
cSH	697	912	1405	1700
Volume to Capacity	0.08	0.03	0.02	0.11
Queue Length 95th (ft)	6	2	2	0
Control Delay (s)	10.6	9.1	2.1	0.0
Lane LOS	B	A	A	
Approach Delay (s)	10.0		2.1	0.0
Approach LOS	B			

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	28.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	5	5	5	5	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	6	6	6	6	6	6
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	26	9	12			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	9	12			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	99	100			
cM capacity (veh/h)	990	1079	1620			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	12	12	12
Volume Left	6	6	0
Volume Right	6	0	6
cSH	1033	1620	1700
Volume to Capacity	0.01	0.00	0.01
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.5	3.6	0.0
Lane LOS	A	A	
Approach Delay (s)	8.5	3.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	15.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	25	5	10	15	80	5	5	5	55	25	10
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	12	29	6	12	18	94	6	6	6	65	29	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	47	124	18	106
Volume Left (vph)	12	12	6	65
Volume Right (vph)	6	94	6	12
Hadj (s)	-0.03	-0.44	-0.13	0.06
Departure Headway (s)	4.3	3.8	4.2	4.3
Degree Utilization, x	0.06	0.13	0.02	0.13
Capacity (veh/h)	809	916	802	790
Control Delay (s)	7.5	7.4	7.3	8.0
Approach Delay (s)	7.5	7.4	7.3	8.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.6		
HCM Level of Service	A		
Intersection Capacity Utilization	23.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	5	40	5	5	10	70	835	5	10	430	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	6	47	6	6	12	78	928	6	11	478	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1615	1606	494	1636	1619	931	511			933		
vC1, stage 1 conf vol	517	517		1086	1086							
vC2, stage 2 conf vol	1098	1089		550	533							
vCu, unblocked vol	1615	1606	494	1636	1619	931	511			933		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	98	92	97	98	96	93			99		
cM capacity (veh/h)	202	240	579	211	241	327	1064			742		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	100	24	78	933	11	511
Volume Left	47	6	78	0	11	0
Volume Right	47	12	0	6	0	33
cSH	295	267	1064	1700	742	1700
Volume to Capacity	0.34	0.09	0.07	0.55	0.01	0.30
Queue Length 95th (ft)	36	7	6	0	1	0
Control Delay (s)	23.3	19.8	8.6	0.0	9.9	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	23.3	19.8	0.7		0.2	
Approach LOS	C	C				

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	71.0%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	10	5	905	465	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.85	0.85	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	12	6	1006	517	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	TWLTL	
Median storage veh)					2	
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1539	522	528			
vC1, stage 1 conf vol	522					
vC2, stage 2 conf vol	1017					
vCu, unblocked vol	1539	522	528			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	98	99			
cM capacity (veh/h)	314	558	1050			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	18	6	1006	528
Volume Left	6	6	0	0
Volume Right	12	0	0	11
cSH	443	1050	1700	1700
Volume to Capacity	0.04	0.01	0.59	0.31
Queue Length 95th (ft)	3	0	0	0
Control Delay (s)	13.5	8.4	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	13.5	0.0		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	75	105	865	90	55	505
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.85	0.85	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	88	124	961	100	61	561
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1694	1011			1061	
vC1, stage 1 conf vol	1011					
vC2, stage 2 conf vol	683					
vCu, unblocked vol	1694	1011			1061	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	69	58			91	
cM capacity (veh/h)	288	293			664	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	88	124	1061	61	561
Volume Left	88	0	0	61	0
Volume Right	0	124	100	0	0
cSH	288	293	1700	664	1700
Volume to Capacity	0.31	0.42	0.62	0.09	0.33
Queue Length 95th (ft)	32	50	0	8	0
Control Delay (s)	23.0	25.9	0.0	11.0	0.0
Lane LOS	C	D		B	
Approach Delay (s)	24.7		0.0	1.1	
Approach LOS	C				

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	10	480	905	10	5	10
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	533	1006	11	6	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1017				1567	1011
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1017				1567	1011
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				95	96
cM capacity (veh/h)	682				120	291

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	544	1017	17
Volume Left	11	0	6
Volume Right	0	11	11
cSH	682	1700	197
Volume to Capacity	0.02	0.60	0.08
Queue Length 95th (ft)	1	0	7
Control Delay (s)	0.5	0.0	24.9
Lane LOS	A		C
Approach Delay (s)	0.5	0.0	24.9
Approach LOS			C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	58.2%	ICU Level of Service	B
Analysis Period (min)	15		

APPENDIX A - ITEMIZED PROJECT COSTS (13 pages)

1
Forest Ave @ Hwy 22
Provide crosswalk with pedestrian activated illumination and construct sidewalk to Front St

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$8,953
AGGREGATE BASE	15	TON	20	$300
LANDSCAPING-SEEDING	1	LS	1,000.00	$1,000
EARTHWORK	20	CY	12	$240
EROSION CONTROL	0.1	AC	5,000.00	$500
LEVEL 2, 1/2 INCH DENSE HMAC	12	TON	80	$960
CONCRETE CURB AND SIDEWALK	80	LF	50	$4,000
PAVEMENT STRIPING	100	LF	0.25	$25
ADA SIDEWALK RAMPS (DUAL)	4	EACH	2,000.00	$8,000
ILLUMINATED CROSSING SIGN	1	EACH	50,000.00	$50,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	80	LF	45	$3,600
CLEARING AND GRUBBING	5%	LS	1	$3,791
SIGNING	5%	LS	1	$3,981
TRAFFIC CONTROL	2%	LS	1	$1,672
SURVEYING	5%	LS	1	$4,263
ROADWAY CONSTRUCTION SUBTOTAL				$98,486
CONTINGENCY(35%)				$34,470
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$33,239
TOTAL				$166,195

2
Breitenbush Rd @ Hwy 22
Provide crosswalk with pedestrian activated illumination and median island

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$13,781
AGGREGATE BASE	30	TON	20	$600
LANDSCAPING-SEEDING	1	LS	1,000.00	$1,000
EARTHWORK	50	CY	12	$600
EROSION CONTROL	0.1	AC	5,000.00	$500
LEVEL 2, 1/2 INCH DENSE HMAC	12	TON	80	$960
CONCRETE CURB AND SIDEWALK	160	LF	50	$8,000
CONCRETE MEDIAN ISLANDS	3000	SF	12	$36,000
PAVEMENT STRIPING	1000	LF	0.25	$250
ADA SIDEWALK RAMPS (DUAL)	4	EACH	2,000.00	$8,000
ILLUMINATED CROSSING SIGN	1	LS	50,000.00	$50,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	80	LF	45	$3,600
CLEARING AND GRUBBING	5%	LS	1	$5,836
SIGNING	5%	LS	1	$6,127
TRAFFIC CONTROL	2%	LS	1	$2,573
SURVEYING	5%	LS	1	$6,562
ROADWAY CONSTRUCTION SUBTOTAL				$151,589
CONTINGENCY(35%)				$53,056
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$51,161
TOTAL				$255,807

3
Kinney Ave
Pave Roadway to Local St with Shoulder standard

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$7,521
AGGREGATE BASE	120	TON	20	$2,400
SEEDING-LANDSCAPING	1	LS	1,000.00	$1,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.1	AC	5,000.00	$500
LEVEL 2, 1/2 INCH DENSE HMAC	720	TON	80	$57,600
DITCH INLET	2	EACH	1,800.00	$3,600
CLEARING AND GRUBBING	5%	LS	1	$3,375
SIGNING	2%	LS	1	$1,418
TRAFFIC CONTROL	2%	LS	1	$1,446
SURVEYING	2%	LS	1	$1,475
ROADWAY CONSTRUCTION SUBTOTAL				$82,734
CONTINGENCY(35%)				$28,957
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$27,923
TOTAL				$139,614

4
Hwy 22 @ Detroit Ave
Build sidewalk connection between Detroit Ave and the Hwy 22/Brietenbush Rd intersection. Revise turn movements from Detroit Ave to Hwy 22 to left turn only, provide right turn deceleration lane on Hwy 22

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$17,443
AGGREGATE BASE	350	TON	20	$7,000
LANDSCAPING-SEEDING	1	LS	3,000.00	$3,000
EARTHWORK	300	CY	12	$3,600
EROSION CONTROL	0.1	AC	5,000.00	$500
LEVEL 2, 1/2 INCH DENSE HMAC	225	TON	80	$18,000
8' CONCRETE SIDEWALK	6800	SF	15	$102,000
PAVEMENT STRIPING	1600	LF	0.25	$400
CONCRETE INLET	2	EACH	1,800.00	$3,600
12 INCH DRAIN PIPE, 5 FT DEPTH	120	LF	45	$5,400
CLEARING AND GRUBBING	5%	LS	1	$7,175
SIGNING	5%	LS	1	$7,534
TRAFFIC CONTROL	5%	LS	1	$7,910
SURVEYING	5%	LS	1	$8,306
ROADWAY CONSTRUCTION SUBTOTAL				$191,868
CONTINGENCY(35%)				$67,154
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$64,755
TOTAL				$323,777

5
Hwy 22 @ Guy Moore Drive
Construct southbound left turn lane on Hwy 22

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$17,416
AGGREGATE BASE	680	TON	20	$13,600
LANDSCAPING-SEEDING	1	LS	4,000.00	$4,000
EARTHWORK	700	CY	12	$8,400
EROSION CONTROL	1	AC	5,000.00	$5,000
LEVEL 2, 1/2 INCH DENSE HMAC	400	TON	80	$32,000
CONCRETE MEDIAN ISLANDS	6000	SF	12	$72,000
PAVEMENT STRIPING	10000	LF	0.25	$2,500
GATE	1	EACH	1,800.00	$1,800
CLEARING AND GRUBBING	8%	LS	1	$11,144
SIGNING	5%	LS	1	$7,522
TRAFFIC CONTROL	5%	LS	1	$7,898
SURVEYING	5%	LS	1	$8,293

ROADWAY CONSTRUCTION SUBTOTAL	$191,574
CONTINGENCY(35%)	$67,051
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)	$64,656
TOTAL	$323,280

6
Hill Street/Guy Moore Drive
Guy Moore Drive Approach improvements: realign Hill/Guy Moore intersection, provide bus stop pad, illumination, sight distance improvements

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$4,584
AGGREGATE BASE	200	TON	20	$4,000
SEEDING-LANDSCAPING	1	LS	3,000.00	$3,000
EARTHWORK	250	CY	12	$3,000
EROSION CONTROL	0.2	AC	5,000.00	$1,000
LEVEL 2, 1/2 INCH DENSE HMAC	180	TON	80	$14,400
BUS SHELTER	1	EACH	1,800.00	$1,800
LUMINAIRES	4	EACH	1,200.00	$4,800
CONCRETE BUS SHELTER PAD	100	SF	9	$900
PAVEMENT STRIPING	800	LF	0.25	$200
CONCRETE INLET	2	EACH	1,800.00	$3,600
12 INCH DRAIN PIPE, 5 FT DEPTH	40	LF	45	$1,800
CLEARING AND GRUBBING	8%	LS	1	$3,080
SIGNING	5%	LS	1	$2,079
TRAFFIC CONTROL	5%	LS	1	$2,183
SURVEYING	5%	LS	1	$2,292

ROADWAY CONSTRUCTION SUBTOTAL	$41,134
CONTINGENCY(35%)	$14,397
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)	$13,883
TOTAL	$69,414

7	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detroit Ave (Hwy 22 to Forest Ave)					
Add sidewalks consistent with urban collector standard as well as curbs, parking, and streetscape amenities	MOBILIZATION	10%	LS	1	$20,154
	AGGREGATE BASE	500	TON	20	$10,000
	LANDSCAPING-PLANTERS	1	LS	4,000.00	$4,000
	EARTHWORK	200	CY	12	$2,400
	EROSION CONTROL	0.1	AC	5,000.00	$500
	LEVEL 2, 1/2 INCH DENSE HMAC	600	TON	80	$48,000
	CONCRETE CURB AND SIDEWALK	1600	LF	50	$80,000
	PAVEMENT STRIPING	1600	LF	0.25	$400
	ADA SIDEWALK RAMPS (DUAL)	8	EACH	2,000.00	$16,000
	CONCRETE INLET	4	EACH	1,800.00	$7,200
	12 INCH DRAIN PIPE, 5 FT DEPTH	160	LF	45	$7,200
	CLEARING AND GRUBBING	5%	LS	1	$8,785
	SIGNING	2%	LS	1	$3,690
	TRAFFIC CONTROL	2%	LS	1	$3,763
	SURVEYING	5%	LS	1	$9,597
	ROADWAY CONSTRUCTION SUBTOTAL				$221,689
	CONTINGENCY(35%)				$77,591
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$74,820
	TOTAL				$374,100

8	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detroit Ave (Forest to Santiam Ave)					
Add sidewalks consistent with urban collector standard as well as curbs, parking, and streetscape amenities	MOBILIZATION	10%	LS	1	$23,895
	AGGREGATE BASE	600	TON	20	$12,000
	LANDSCAPING-PLANTERS	1	LS	4,000.00	$4,000
	EARTHWORK	260	CY	12	$3,120
	EROSION CONTROL	0.1	AC	5,000.00	$500
	LEVEL 2, 1/2 INCH DENSE HMAC	700	TON	80	$56,000
	CONCRETE CURB AND SIDEWALK	2000	LF	50	$100,000
	PAVEMENT STRIPING	2000	LF	0.25	$500
	ADA SIDEWALK RAMPS (DUAL)	8	EACH	2,000.00	$16,000
	CONCRETE INLET	4	EACH	1,800.00	$7,200
	12 INCH DRAIN PIPE, 5 FT DEPTH	200	LF	45	$9,000
	CLEARING AND GRUBBING	5%	LS	1	$10,416
	SIGNING	2%	LS	1	$4,375
	TRAFFIC CONTROL	2%	LS	1	$4,462
	SURVEYING	5%	LS	1	$11,379
	ROADWAY CONSTRUCTION SUBTOTAL				$262,847
	CONTINGENCY(35%)				$91,996
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$88,711
	TOTAL				$443,554

9
D @ Detroit Ave
Construct sidewalks and define right of way and review traffic control

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$8,195
AGGREGATE BASE	200	TON	20	$4,000
LANDSCAPING-PLANTERS	1	LS	3,000.00	$3,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.1	AC	5,000.00	$500
LEVEL 2, 1/2 INCH DENSE HMAC	400	TON	80	$32,000
CONCRETE CURB AND SIDEWALK	300	LF	50	$15,000
ADA SIDEWALK RAMPS (DUAL)	4	EACH	2,000.00	$8,000
CONCRETE INLET	2	EACH	1,800.00	$3,600
12 INCH DRAIN PIPE, 5 FT DEPTH	50	LF	45	$2,250
CLEARING AND GRUBBING	5%	LS	1	$3,538
SIGNING	3%	LS	1	$2,229
TRAFFIC CONTROL	2%	LS	1	$1,530
SURVEYING	5%	LS	1	$3,902
ROADWAY CONSTRUCTION SUBTOTAL				$90,144
CONTINGENCY(35%)				$31,550
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$30,423
TOTAL				$152,117

10
Detroit Road @ Detroit Ave
Realign Detroit Rd to create a 'T' intersection at Detroit Ave

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$10,077
AGGREGATE BASE	400	TON	20	$8,000
LANDSCAPING-PLANTERS	1	LS	3,000.00	$3,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.15	AC	5,000.00	$750
LEVEL 2, 1/2 INCH DENSE HMAC	550	TON	80	$44,000
CONCRETE CURB AND SIDEWALK	280	LF	50	$14,000
ADA SIDEWALK RAMPS (DUAL)	2	EACH	2,000.00	$4,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	100	LF	45	$4,500
CLEARING AND GRUBBING	5%	LS	1	$4,393
SIGNING	2%	LS	1	$1,845
TRAFFIC CONTROL	2%	LS	1	$1,882
SURVEYING	5%	LS	1	$4,798
ROADWAY CONSTRUCTION SUBTOTAL				$110,844
CONTINGENCY(35%)				$38,796
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$37,410
TOTAL				$187,050

11	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detroit Ave @ Santiam Ave/Flats Access					
Modify intersection for traffic circle	MOBILIZATION	10%	LS	1	$4,634
	AGGREGATE BASE	200	TON	20	$4,000
	SEEDING-LANDSCAPING	1	LS	3,000.00	$3,000
	EARTHWORK	200	CY	12	$2,400
	EROSION CONTROL	0.2	AC	5,000.00	$1,000
	LEVEL 2, 1/2 INCH DENSE HMAC	180	TON	80	$14,400
	TRAFFIC CIRCLE WITH CONCRETE CURB	1	LS	10,000.00	$10,000
	PAVEMENT STRIPING	800	LF	0.25	$200
	CONCRETE INLET	2	EACH	1,800.00	$3,600
	12 INCH DRAIN PIPE, 5 FT DEPTH	40	LF	45	$1,800
	CLEARING AND GRUBBING	5%	LS	1	$2,020
	SIGNING	2%	LS	1	$848
	TRAFFIC CONTROL	2%	LS	1	$865
	SURVEYING	5%	LS	1	$2,207
	ROADWAY CONSTRUCTION SUBTOTAL				$50,975
	CONTINGENCY(35%)				$17,841
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$17,204
	TOTAL				$86,019

12	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Detroit Road					
Add sidewalks consistent with urban collector standard as well as curbs, parking, and streetscape amenities	MOBILIZATION	10%	LS	1	$15,720
	AGGREGATE BASE	400	TON	20	$8,000
	LANDSCAPING-PLANTERS	1	LS	3,000.00	$3,000
	EARTHWORK	200	CY	12	$2,400
	EROSION CONTROL	0.15	AC	5,000.00	$750
	LEVEL 2, 1/2 INCH DENSE HMAC	550	TON	80	$44,000
	CONCRETE CURB AND SIDEWALK	1300	LF	50	$65,000
	PAVEMENT STRIPING	800	LF	0.25	$200
	ADA SIDEWALK RAMPS (DUAL)	1	EACH	2,000.00	$2,000
	CONCRETE INLET	4	EACH	1,800.00	$7,200
	12 INCH DRAIN PIPE, 5 FT DEPTH	100	LF	45	$4,500
	CLEARING AND GRUBBING	5%	LS	1	$6,853
	SIGNING	2%	LS	1	$2,878
	TRAFFIC CONTROL	2%	LS	1	$2,936
	SURVEYING	5%	LS	1	$7,486
	ROADWAY CONSTRUCTION SUBTOTAL				$172,922
	CONTINGENCY(35%)				$60,523
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$58,361
	TOTAL				$291,806

13
D Street
Add sidewalks consistent with urban collector standard as well as curbs, parking, and streetscape amenities

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$8,110
AGGREGATE BASE	100	TON	20	$2,000
LANDSCAPING-PLANTERS	1	LS	2,000.00	$2,000
EARTHWORK	100	CY	12	$1,200
EROSION CONTROL	0.1	AC	5,000.00	$500
LEVEL 2, 1/2 INCH DENSE HMAC	200	TON	80	$16,000
CONCRETE CURB AND SIDEWALK	600	LF	50	$30,000
PAVEMENT STRIPING	800	LF	0.25	$200
ADA SIDEWALK RAMPS (DUAL)	4	EACH	2,000.00	$8,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	80	LF	45	$3,600
CLEARING AND GRUBBING	5%	LS	1	$3,535
SIGNING	2%	LS	1	$1,485
TRAFFIC CONTROL	2%	LS	1	$1,514
SURVEYING	5%	LS	1	$3,862
ROADWAY CONSTRUCTION SUBTOTAL				$89,205
CONTINGENCY(35%)				$31,222
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$30,107
TOTAL				$150,534

14
Forest Ave
Add sidewalks consistent with urban collector standard as well as curbs, parking, and streetscape amenities

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$9,612
AGGREGATE BASE	300	TON	20	$6,000
SEEDING-LANDSCAPING	1	LS	1,000.00	$1,000
EARTHWORK	100	CY	12	$1,200
EROSION CONTROL	0.2	AC	5,000.00	$1,000
LEVEL 2, 1/2 INCH DENSE HMAC	320	TON	80	$25,600
CONCRETE CURB AND SIDEWALK	600	LF	50	$30,000
PAVEMENT STRIPING	800	LF	0.25	$200
ADA SIDEWALK RAMPS (DUAL)	4	EACH	2,000.00	$8,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	80	LF	45	$3,600
CLEARING AND GRUBBING	5%	LS	1	$4,190
SIGNING	2%	LS	1	$1,760
TRAFFIC CONTROL	2%	LS	1	$1,795
SURVEYING	5%	LS	1	$4,577
ROADWAY CONSTRUCTION SUBTOTAL				$105,734
CONTINGENCY(35%)				$37,007
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$35,685
TOTAL				$178,427

15
Patton Street
Improve street to Local Street with Walkway section

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$14,281
AGGREGATE BASE	600	TON	20	$12,000
LANDSCAPING-PLANTERS	1	LS	2,000.00	$2,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.25	AC	5,000.00	$1,250
LEVEL 2, 1/2 INCH DENSE HMAC	310	TON	80	$24,800
CONCRETE GUTTER AND SIDEWALK	1400	LF	50	$70,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	100	LF	45	$4,500
PAVEMENT STRIPING	1400	LF	0.25	$350
CLEARING AND GRUBBING	5%	LS	1	$6,225
SIGNING	2%	LS	1	$2,615
TRAFFIC CONTROL	2%	LS	1	$2,667
SURVEYING	5%	LS	1	$6,800
ROADWAY CONSTRUCTION SUBTOTAL				$157,087
CONTINGENCY(35%)				$54,981
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$53,017
TOTAL				$265,085

16
Clester Street
Improve street to Local Street with Walkway section

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$21,553
AGGREGATE BASE	1000	TON	20	$20,000
SEEDING-LANDSCAPING	1	LS	2,000.00	$2,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.25	AC	5,000.00	$1,250
LEVEL 2, 1/2 INCH DENSE HMAC	500	TON	80	$40,000
CONCRETE GUTTER AND SIDEWALK	2200	LF	50	$110,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	100	LF	45	$4,500
PAVEMENT STRIPING	2200	LF	0.25	$550
CLEARING AND GRUBBING	5%	LS	1	$9,395
SIGNING	2%	LS	1	$3,946
TRAFFIC CONTROL	2%	LS	1	$4,025
SURVEYING	5%	LS	1	$10,263
ROADWAY CONSTRUCTION SUBTOTAL				$237,082
CONTINGENCY(35%)				$82,979
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$80,015
TOTAL				$400,076

17
Front Street
Provide walkway per Local Street with Walkway standard and explore making Front Street one-way.

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$23,778
AGGREGATE BASE	1100	TON	20	$22,000
SEEDING-LANDSCAPING	1	LS	2,000.00	$2,000
EARTHWORK	300	CY	12	$3,600
EROSION CONTROL	0.5	AC	5,000.00	$2,500
LEVEL 2, 1/2 INCH DENSE HMAC	550	TON	80	$44,000
CONCRETE GUTTER AND SIDEWALK	2400	LF	50	$120,000
CONCRETE INLET	4	EACH	1,800.00	$7,200
12 INCH DRAIN PIPE, 5 FT DEPTH	120	LF	45	$5,400
PAVEMENT STRIPING	2400	LF	0.25	$600
CLEARING AND GRUBBING	5%	LS	1	$10,365
SIGNING	2%	LS	1	$4,353
TRAFFIC CONTROL	2%	LS	1	$4,440
SURVEYING	5%	LS	1	$11,323
ROADWAY CONSTRUCTION SUBTOTAL				$261,560
CONTINGENCY(35%)				$91,546
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$88,276
TOTAL				$441,382

18
Tumble
Pave Roadway to Local St with Shoulder standard

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$7,298
AGGREGATE BASE	100	TON	20	$2,000
SEEDING-LANDSCAPING	1	LS	1,000.00	$1,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.1	AC	5,000.00	$500
LEVEL 2, 1/2 INCH DENSE HMAC	700	TON	80	$56,000
DITCH INLET	2	EACH	1,800.00	$3,600
CLEARING AND GRUBBING	5%	LS	1	$3,275
SIGNING	2%	LS	1	$1,376
TRAFFIC CONTROL	2%	LS	1	$1,403
SURVEYING	2%	LS	1	$1,431
ROADWAY CONSTRUCTION SUBTOTAL				$80,283
CONTINGENCY(35%)				$28,099
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$27,096
TOTAL				$135,478

19
Scott Ave
Add pedestrian dedicated shoulder and pave street consistent with neighborhood collector standard

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$17,260
AGGREGATE BASE	500	TON	20	$10,000
SEEDING-LANDSCAPING	1	LS	2,000.00	$2,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.5	AC	5,000.00	$2,500
LEVEL 2, 1/2 INCH DENSE HMAC	1500	TON	80	$120,000
DITCH INLET	10	EACH	1,800.00	$18,000
CLEARING AND GRUBBING	5%	LS	1	$7,745
SIGNING	2%	LS	1	$3,253
TRAFFIC CONTROL	2%	LS	1	$3,318
SURVEYING	2%	LS	1	$3,384
ROADWAY CONSTRUCTION SUBTOTAL				$189,860
CONTINGENCY(35%)				$66,451
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$64,078
TOTAL				$320,389

20
Clifford Ave (Scott Ave to East)
Pave Roadway

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$9,789
AGGREGATE BASE	200	TON	20	$4,000
SEEDING-LANDSCAPING	1	LS	1,000.00	$1,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.25	AC	5,000.00	$1,250
LEVEL 2, 1/2 INCH DENSE HMAC	900	TON	80	$72,000
DITCH INLET	4	EACH	1,800.00	$7,200
CLEARING AND GRUBBING	5%	LS	1	$4,393
SIGNING	2%	LS	1	$1,845
TRAFFIC CONTROL	2%	LS	1	$1,882
SURVEYING	2%	LS	1	$1,919
ROADWAY CONSTRUCTION SUBTOTAL				$107,677
CONTINGENCY(35%)				$37,687
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$36,341
TOTAL				$181,705

21
2nd St (D St to Hwy 22)
Pedestrian and bicycle connection that would direct users to designated crossing location on Hwy 22 (Project #2)

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$4,316
AGGREGATE BASE	200	TON	20	$4,000
SEEDING-LANDSCAPING	1	LS	2,000.00	$2,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.15	AC	5,000.00	$750
PAVEMENT STRIPING	800	LF	0.25	$200
FENCING	200	LF	55	$11,000
LEVEL 2, 1/2 INCH DENSE HMAC	150	TON	80	$12,000
CLEARING AND GRUBBING	10%	LS	1	$3,235
SIGNING	5%	LS	1	$1,779
TRAFFIC CONTROL	5%	LS	1	$1,868
SURVEYING	10%	LS	1	$3,923
ROADWAY CONSTRUCTION SUBTOTAL				$47,471
CONTINGENCY(35%)				$16,615
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$16,022
TOTAL				$80,108

22
Hill-Clifford Path connection
Path/Trail Connection

BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
MOBILIZATION	10%	LS	1	$1,177
AGGREGATE BASE	60	TON	20	$1,200
SEEDING-LANDSCAPING	1	LS	1,000.00	$1,000
EARTHWORK	200	CY	12	$2,400
EROSION CONTROL	0.15	AC	5,000.00	$750
LEVEL 2, 1/2 INCH DENSE HMAC	50	TON	80	$4,000
CLEARING AND GRUBBING	10%	LS	1	$935
SIGNING	2%	LS	1	$206
TRAFFIC CONTROL	2%	LS	1	$210
SURVEYING	10%	LS	1	$1,070
ROADWAY CONSTRUCTION SUBTOTAL				$12,948
CONTINGENCY(35%)				$4,532
PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$4,370
TOTAL				$21,849

23	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Mackey Path Connection & Bridge					
Path/Trail Connection					
with bridge over ravine	MOBILIZATION	10%	LS	1	$19,240
	AGGREGATE BASE	200	TON	20	$4,000
	SEEDING-LANDSCAPING	1	LS	2,000.00	$2,000
	EARTHWORK	100	CY	12	$1,200
	EROSION CONTROL	0.5	AC	5,000.00	$2,500
	BRIDGE STRUCTURE (100 ft)	1	LS	140,000.00	$140,000
	LEVEL 2, 1/2 INCH DENSE HMAC	150	TON	80	$12,000
	CLEARING AND GRUBBING	5%	LS	1	$8,085
	SIGNING	1%	LS	1	$1,698
	TRAFFIC CONTROL	2%	LS	1	$3,430
	SURVEYING	10%	LS	1	$17,491
	ROADWAY CONSTRUCTION SUBTOTAL				$211,644
	CONTINGENCY(35%)				$74,075
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$71,430
	TOTAL				$357,149

24	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Tumble to Breitenbush Connection					
Path/Trail Connection					
	MOBILIZATION	10%	LS	1	$3,914
	AGGREGATE BASE	275	TON	20	$5,500
	SEEDING-LANDSCAPING	1	LS	6,000.00	$6,000
	EARTHWORK	200	CY	12	$2,400
	EROSION CONTROL	0.5	AC	5,000.00	$2,500
	LEVEL 2, 1/2 INCH DENSE HMAC	200	TON	80	$16,000
	CLEARING AND GRUBBING	5%	LS	1	$820
	SIGNING	5%	LS	1	$1,661
	TRAFFIC CONTROL	2%	LS	1	$698
	SURVEYING	10%	LS	1	$3,558
	ROADWAY CONSTRUCTION SUBTOTAL				$43,050
	CONTINGENCY(35%)				$15,068
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$14,529
	TOTAL				$72,647

25	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Breitenbush Road 900 ft					
Roadway reconstruction, sidewalks, curbs, parking, and streetscape improvements consistent with Urban Collector standard	MOBILIZATION	10%	LS	1	$26,780
	AGGREGATE BASE	990	TON	20	$19,800
	SEEDING-LANDSCAPING	1	LS	2,000.00	$2,000
	EARTHWORK	200	CY	12	$2,400
	EROSION CONTROL	0.5	AC	5,000.00	$2,500
	LEVEL 2, 1/2 INCH DENSE HMAC	1090	TON	80	$87,200
	ADA SIDEWALK RAMPS (DUAL)	4	EACH	2,000.00	$8,000
	CONCRETE CURB AND SIDEWALK	1800	LF	50	$90,000
	12 INCH DRAIN PIPE, 5 FT DEPTH	100	LF	45	$4,500
	DITCH INLET	4	EACH	1,800.00	$7,200
	PAVEMENT STRIPING	4000	LF	0.25	$1,000
	CLEARING AND GRUBBING	5%	LS	1	$11,230
	SIGNING	3%	LS	1	$7,075
	TRAFFIC CONTROL	5%	LS	1	$12,145
	SURVEYING	5%	LS	1	$12,753
	ROADWAY CONSTRUCTION SUBTOTAL				$294,583
	CONTINGENCY(35%)				$103,104
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$99,422
	TOTAL				$497,109

26 & 27	BID ITEM DESCRIPTION	TOTAL
Gateway Treatment	To be determined	$10,000 - $50,000
Bike Route Signage	To be determined	$5,000 - $15,000

28	BID ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
Parking lot					
	MOBILIZATION	10%	LS	1	$9,793
	LEVEL 2, 1/2 INCH DENSE HMAC	400	TON	80	$32,000
	AGGREGATE BASE	700	TON	20	$14,000
	CONCRETE SIDEWALK	500	LF	50	$25,000
	CONCRETE INLET	4	EACH	1,800.00	$7,200
	PAVEMENT STRIPING	500	LF	0.25	$125
	SEEDING-LANDSCAPING	1	LS	2,000.00	$2,000
	EARTHWORK	200	CY	12	$2,400
	EROSION CONTROL	0.2	AC	5,000.00	$1,000
	CLEARING AND GRUBBING	5%	LS	1	$4,186
	SIGNING	3%	LS	1	$2,637
	TRAFFIC CONTROL	5%	LS	1	$2,716
	SURVEYING (5%)	5%	LS	1	$4,663
	ROADWAY CONSTRUCTION SUBTOTAL				$107,721
	CONTINGENCY(35%)				$37,702
	PRELIMINARY & CONSTRUCTION ENGINEERING (25%)				$36,356
	TOTAL				$181,779

29	BID ITEM DESCRIPTION	TOTAL
Guide-Wayfinding Signage	To be determined	$10,000 - $50,000

APPENDIX A - (10 pages)

2008 STREET INVENTORY
City of Detroit Transportation System Plan

Street Segment	Jurisdiction	Classification	Speed Limit (mph)	ROW Width (feet)	Street Width (feet)	# of Travel Lanes	Curbs	On-Street Parking	Sidewalk	Street Surface	Pavement Condition	Through	Topography
1st Street W													
Highway 22 to Lakecrest Dr	City	local	25	30-60	30-40	2	none	varies	none	gravel	good	no	See Slope Map
2nd Street W													
Patton to Lakecrest Drive	City	local	25	60	30	2	none	both	none	paved	poor	yes	See Slope Map
3rd Street W													
Patton to Lakecrest Drive	City	local	25	60	30	2	none	both	none	paved	fair	yes	See Slope Map
4th Street W													
W of Patton Road to Lakecrest Dr	City	local	25	60	30	2	none	both	none	gravel	fair	no	See Slope Map
Boulder Street N													
North of Butte Street	City	local	25	40	20	2	none	one side	none	gravel	poor	no	
Breitentbush Road (FS #46)													
N and E of Hwy 22 to City limits	USFS	highway - FS	25	60	40	2	none	both	none	paved	good	yes	See Slope Map
Butte Street N													
North of Forest Avenue	City	local	25	40	20	2	none	one side	none	paved/gravel	poor	no	See Slope Map
Butte Street S													
South of Forest Avenue	City	collector	25	40-60	20	2	none	varies	none	paved	fair	yes	See Slope Map
Center Street S													
Lake Ave E to dead end	City	local	25	30	20	2	none	none	none	gravel	poor	no	
Clester Road W													
Patton Rd to lake	City	local	25	40	30	2	none	one side	none	paved	fair	yes	
Cifford Ave													
E-W from Scott dead ends	City	local	25	60	20	2	none	both	none	gravel	good	no	See Slope Map

2008 STREET INVENTORY

City of Detroit Transportation System Plan

D Street W													
Detroit Ave to Patton RD	City	collector	25	60	40	2	none	both	none	paved	good	yes	
Deer Street S													
Short Ave W to Santiam Ave	City	local	25	40	20	2	none	one side	none	paved	poor	yes	
Detroit Avenue N													
Hwy 22 to Forest Ave W	City	collector	25	60	40	2	none	both	none	paved	good	yes	
Detroit Avenue S													
Forest Ave W to Santiam Ave W	City	collector	25	60	40	2	none	both	none	paved	good	yes	
Detroit Road S													
Detroit Ave S to intersection with Santiam Ave W	City	local	25	50	40	2	none	both	none	paved	good	yes	
Erin Street W													
Clester to west dead-end	City	local	25	40	20	2	none	one side	none	paved	poor	no	
Forest Avenue E													
Butte St S & N to Hwy 22	City	collector	25	40	20	2	none	one side	none	paved	poor	no	
Forest Avenue W													
Hwy 22 to Patton Rd S	City	collector	25	40	30	2	none	one side	none	paved	fair	yes	
Front Street N													
Breitenbush Rd to Forest Ave E	city	local	25	40	20	2	none	one side	none	paved	fair	no	
Front Street S													
Forest Ave E to Hwy 22	city	local	25	40	20	2	none	one side	none	paved	fair	yes	
Guy Moore Drive													
Hwy 22 to Howe St E	City	collector	25	30	20	2	none	none	none	paved	poor	no	See Slope Map
Howe to Lewis St E	City	collector	25	30	20	2	none	none	none	paved	poor	no	See Slope Map
Lewis to Simkins St E	City	collector	25	30	20	2	none	none	none	paved	poor	no	See Slope Map
Simkins to Warren St E	City	collector	25	30	20	2	none	none	none	paved	poor	no	See Slope Map
Warren to Mackey Lane E	City	collector	25	30	20	2	none	none	none	paved	poor	no	See Slope Map

2008 STREET INVENTORY

City of Detroit Transportation System Plan

	Mackey Lane E to Weber St E	City	collector	25	30	20	2	none	none	none	paved	poor	no	See Slope Map
	Weber to Osprey Ln E	City	collector	25	30	20	2	none	none	none	gravel	poor	no	See Slope Map
	Weber to UGB line	City	collector	25	30	20	2	none	none	none	gravel	poor	no	See Slope Map
Hill Street S														
	Hwy 22 to Lake St E	City	collector	25	20-40	30	2	none	varies	none	paved	fair	no	
	Lake to Mackey Lane E	City	local	25	20-40	30	2	none	varies	none	paved	fair	no	
	Mackey to UGB line	City	local	25	20-40	30	2	none	varies	none	paved	fair	no	
Howe Street E														
	Guy Moore Dr to west dead-end	City	local	25	25	20	2	none	none	none	gravel	poor	no	See Slope Map
Humbug Street S														
	Forest Ave E to linear end	City	local	25	40	20	2	none	one side	none	gravel	poor	no	
	jog to Hwy 22	City	local	25	40	not improved	0	none	none	none	none	N/A	no	
Hwy 22 (North Santiam Highway) *														
	UGB line to 1st Street W	State	highway - ODOT	40	150	28-36	2	none	none	none	paved	From ODOT	yes	See Slope Map
	1st to Breitenbush Rd	State	highway - ODOT	40	150	50	2	none	none	none	paved	From ODOT	yes	See Slope Map
	Breitenbush to Detroit Ave N	State	highway - ODOT	40	150	50	2	none	none	none	paved	From ODOT	yes	
	Detroit to Forest Ave E & W	State	highway - ODOT	40	150	46-50	2	none	none	none	paved	From ODOT	yes	
	Forest Ave E & W to Santiam Ave W	State	highway - ODOT	40	150	46-50	2	none	none	none	paved	From ODOT	yes	
	Santiam to Meyer St S	State	highway - ODOT	45	150	28-49	2	none	none	none	paved	From ODOT	yes	
	Meyer to Hill St S/Guy Moore Dr	State	highway - ODOT	45	150	28	2	none	none	none	paved	From ODOT	yes	See Slope Map
	Hill/Guy Moore to UGB line	State	highway - ODOT	45	150 - 180	26	2	none	none	none	paved	From ODOT	yes	See Slope Map
Kinney Avenue E														
	Kinney Ave N to Boulder St N	City	collector	25	40	20	2	none	one side	none	paved/gravel	fair	yes	

Kinney Avenue N													
dead-end at north to Kinney Ave E	City	local	25	40	20	2	none	one side	none	gravel	fair	no	
Lake Street E													
Hill St S to Scott Ave S	City	collector	25	30	20	2	none	none	none	paved	fair	yes	See Slope Map
Lake Court E													
Lake St E to bulb of cul-de-sac (radius = 45)	City	local	25	40	20	2	none	one side	none	paved	good	no	See Slope Map
Lakecrest Drive													
bulb to 1st St W (bulb radius = 30)	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
1st to 2nd St W	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
2nd to 3rd St W	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
3rd to 4th St W	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
4th to south bulb	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
Lewis Street E													
Guy Moore Dr to W dead-end	City	local	25	25	20	2	none	none	none	gravel	poor	no	See Slope Map
Mackey Lane E													
east dead-end to Hill St S	City	local	25	40	30	2	none	one side	none	paved	good	no	See Slope Map
Guy Moore to dead-end	City	local	25	25	20	2	none	none	none	gravel	poor	no	See Slope Map
Melgard Court E													
Meyer St S to west bulb (radius = 45)	City	local	25	40	30	2	none	one side	none	paved	good	no	See Slope Map
Meyer (Myer) Street S													
north dead-end to Lake St E	City	local	25	30-60	30	2	none	varies	none	paved/gravel	good	no	
Lake to Hwy 22	City	collector	25	30-60	30	2	none	varies	none	paved/gravel	good	no	
Osprey Lane E													
Guy Moore west end	City	local	25	30	20	2	none	none	none	gravel	poor	no	See Slope Map
Patton Road N													
2nd St to Forest Ave W	City	collector	25	30-60	30-40	2	none	varies	none	paved	poor	yes	

2008 STREET INVENTORY
City of Detroit Transportation System Plan

Kinney Avenue N													
dead-end at north to Kinney Ave E	City	local	25	40	20	2	none	one side	none	gravel	fair	no	
Lake Street E													
Hill St S to Scott Ave S	City	collector	25	30	20	2	none	none	none	paved	fair	yes	See Slope Map
Lake Court E													
Lake St E to bulb of cul-de-sac (radius = 45)	City	local	25	40	20	2	none	one side	none	paved	good	no	See Slope Map
Lakecrest Drive													
bulb to 1st St W (bulb radius = 30)	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
1st to 2nd St W	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
2nd to 3rd St W	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
3rd to 4th St W	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
4th to south bulb	City	local	25	60	30	2	none	both	none	paved	good	no	See Slope Map
Lewis Street E													
Guy Moore Dr to W dead-end	City	local	25	25	20	2	none	none	none	gravel	poor	no	See Slope Map
Mackey Lane E													
east dead-end to Hill St S	City	local	25	40	30	2	none	one side	none	paved	good	no	See Slope Map
Guy Moore to dead-end	City	local	25	25	20	2	none	none	none	gravel	poor	no	See Slope Map
Melgard Court E													
Meyer St S to west bulb (radius = 45)	City	local	25	40	30	2	none	one side	none	paved	good	no	See Slope Map
Meyer (Myer) Street S													
north dead-end to Lake St E	City	local	25	30-60	30	2	none	varies	none	paved/gravel	good	no	
Lake to Hwy 22	City	collector	25	30-60	30	2	none	varies	none	paved/gravel	good	no	
Osprey Lane E													
Guy Moore west end	City	local	25	30	20	2	none	none	none	gravel	poor	no	See Slope Map
Patton Road N													
2nd St to Forest Ave W	City	collector	25	30-60	30-40	2	none	varies	none	paved	poor	yes	

Patton Road S														
	Forest Ave W to Santiam Ave W	City	collector	25	30-40	30	2	none	varies	none	paved	good	yes	
Santiam Avenue W														
	Hwy 22 to Detroit Ave S	City	collector	25	40	30	2	none	one side	none	paved	poor-fair	yes	
	Detroit Ave to Detroit Rd S	City	collector	25	40	30	2	none	one side	none	paved	poor-fair	yes	
	Detroit Rd to Patton Rd S	City	collector	25	40	30	2	none	one side	none	paved	poor-fair	yes	
	Patton to Deer St S	City	local	25	40	30	2	none	one side	none	paved	poor-fair	yes	
	Deer to Short Ave W	City	local	25	40	30	2	none	one side	none	paved	poor-fair	no	
Scott Avenue S														
	Kinney Ave E to Butte St S	City	local	25	40-60	30	2	none	varies	none	paved/gravel	fair	yes	See Slope Map
	Butte to Clifford Ave E	City	collector	25	40-60	30	2	none	varies	none	paved/gravel	fair	yes	See Slope Map
	Clifford to Lake St E	City	collector	25	40-60	30	2	none	varies	none	paved/gravel	fair	yes	See Slope Map
Short Avenue W														
	Deer St S to Santiam Ave W	City	local	25	40	30	2	none	none	none	paved	poor	yes	
Simkins Street E														
	Guy Moore Dr to west end	City	local	25	25	20	2	none	none	none	gravel	poor	no	See Slope Map
Tumble Street N														
	north end to Kinney Avenue E	City	local	25	40	20	2	none	none	none	gravel	poor	no	
	Kinney to to south end	City	local	25	40	20	2	none	none	none	paved	good	no	
Warren Street E														
	Guy Moore Drive to west end	City	local	25	24	20	2	none	none	none	gravel	poor	no	See Slope Map
Weber Street E														
	UGB line to Guy Moore Drive	City	local	25	30	30	2	none	none	none	gravel	fair	no	See Slope Map
	Guy Moore to west end	City	local	25	30	24	2	none	none	none	gravel	fair	no	See Slope Map
*	***Shared shoulder bike lanes (east and west sides of roadway)***													

ROW Details

Street	Direction	Map	ROW	Description	Through	Details
1st St W	E-W	10 5e 02ad	60		no	physical end block before Hwy 22
2nd St W	E-W	10 5e 02ad	60		yes	physical end block before Hwy 22
Boulder St N	N-S	10 5e 01bc	40	additional ROW at intersection Butte	no	N dead-end; S to Butte St N
Breitenbush Hwy	NE	10 5e 01 & 10 5e 01bc	60	Hwy 22 to NE and extends beyond city limits; wider at intersection Hwy 22; narrows against 1 lot past intersection	yes	
Butte St N	N-S	10 5e 01bc	40	additional ROW at intersection Forest	no	N dead-end; S to intersect Forest Ave
Butte St S	N-S	10 5e 01ca & 10 5e 01cb	40-60	40 ROW to south line 105e01ca TL 601, with parking on one side; 50 ROW from south line TL 601 to south line 105e01ca TL 1000 & 105e01cb TL 11000; 60 ROW from TLs 1000 & 11000 to Scott Ave; additional ROW at intersection; parking on both sides for portions with 50+ ROW	yes	through Forest S to Scott
Center St S	N-S	10 5e 01cd	30		no	dead-end at city/UGB line S to Lake St E
Clester Rd W	E-W	10 5e 02ad	40	distortions near Patton; jog south to Short Ave W	yes	through Patton to Short curve
Clifford Ave E	E-W	10 5e 01ca & 10 5e 01cb	60		no	E end at city/UGB line; W end (physical) at intersection with Scott Ave
Detroit Rd S	N-S	10 5e 01cb	50	City owns 11600	yes	private Forest Service Road to "flats"
Erin St W	E-W	10 5e 02ad	40	30 ROW off Clester	no	not a through street N off Clester to physical end at west
Forest Ave E	E-W	10 5e 01bc	40	Hwy 22 to Butte	no	
Front Street N	N-S	10 5e 01bc	40	Breitenbush south to Forest Ave and from Forest Ave to Hwy 22 and parallels Hwy 22	no	
Guy Moore Drive	N-S/E-W	10 5e 01dc	30	narrows adjacent 105e01dc TL 2900	no	N at Osprey Lane intersection; S at Hill Street/Hwy 22
Lake Street E	E-W	10 5e 01cd	30-40	40 ROW from Scott Ave S to Myers St; 30 ROW Myers St to Hill St	yes	through Scott Ave S to Hill St S
Mackey Lane E	E-W	10 5e 01dc	25-40	40 ROW westerly portion; 25 ROW W off Hill St, W of GM Drive to dead-end at west	no	dead-end west to Hill St
Melgard Ct E	E-W	10 5e 01cd	40	cul-de-sac R=45	no	not through W from Myers St to end
Myers St S	N-S	10 5e 01cd	30-60	60 row; 30' at north line 105e01cd TL 5900	no	dead at N city/UGB line
Patton N	N-S	10 5e 02ad	30-60	60 ROW at Second St; not physically constructed; vacate? With exception intersect 2nd and Patton; 60 ROW south to approx TL 5500; distorted ROW south from approx TL 5500 to north line TL 5800 & 5900; 40 ROW with a jog to Clester with parking on one side; 30 ROW Clester to Forest with no parking; for portions with 50+ ROW parking is allowed on both sides	yes	through 2nd St to Forest Ave W
Patton S	N-S	10 5e 02da & 10 5e 01cb	30-40	City conveying for use for ROW more at partition TL 100; 30 ROW from Forest to south line TL 8300; 40 ROW south to Santiam	yes	through Forest to Santiam
Santiam W	E-W/NW	10 5e 01cb & 10 5e 02da	40	e-w to Detroit Rd; nw Detroit Rd to Patton; e-w Patton to west end (physical); n-s to Short Ave	yes	through Hwy 22 to Short Ave
Scott Ave.S	N-S	10 5e 01bc & 10 5e 01ca & 10 5e 01cd	40-60	60 ROW south to 105e01cd TLs 5300 & 5700; 40 ROW TLs 5300 & 5700 south to Lake Street E	yes	through Kinney Ave E/Ave N to Lake Street E

Turn Lane Details

Street	Lane Type	Traffic direction	Turn direction	Location detail
Highway 22	Turn lane	Southbound	Left	Intersection with Breitenbush Road
Breitenbush Road	Entrance lane			for traffic entering Highway 22 (northbound)
Highway 22	Exit lane	Northbound	Left	for traffic entering Breitenbush Road
Highway 22	Turn lane	Northbound	Left	Intersection with Detroit Ave
Highway 22	Turn lane	North & South	Right & Left	Intersection with Forest Avenue
D Street	Turn lane	Eastbound	Right & Left	Intersection with Detroit Ave
Highway 22	Turn lane	Northbound	Left	Intersection with Santiam Ave

Parking Notes

Less than 40 ROW = no parking allowed
40-50 ROW = parking on one side only
More than 50 ROW = parking on both sides

Selected Features of the City's Transportation System

Turn Lanes. The majority of streets within the City's UGB have two travel lanes. Several intersections have designated turn lanes. A list of the intersections are as follows:

Street Description	Right Turn	Left Turn
Highway 22 for southbound traffic at intersection with Breitenbush Road		X
Entrance lane on Breitenbush Road for traffic northbound on Highway 22	X	
Exit lane on Highway 22 for northbound traffic entering Breitenbush Road	X	
Highway 22 at intersection with Detroit Avenue for northbound traffic		X
Highway 22 at intersection with Forest Avenue for both north and southbound traffic		X
"D" Street at intersection with Detroit Avenue for eastbound traffic	X	X
Highway 22 for northbound traffic at the intersection with Santiam Avenue		X

Driveway and intersection approaches including **geometrics** and vehicle storage for the following listed intersections are utilized by the consulting firm (Parametrix) in completing the engineering analysis. The intersections included are as follows:

- Hwy 22/Breitenbush Rd (Highway)/Detroit Avenue intersection,
- Forest Avenue/Highway 22 intersection,
- Santiam Avenue/Highway 22 intersection,
- French Creek Road/Highway 22 intersection,
- Forest Avenue/Detroit Avenue intersection,
- D Street/Detroit Avenue intersection,
- Clester Road/Patton Street intersection, and
- Guy Moore Drive/Hill Street/Highway 22 intersection.

Stop signs are located on listed streets at the following intersections:

Street	Direction(s)	Cross-street
Breitenbush Road	west and north bound	Highway 22
Clester Road W	east bound	Patton Road N
"D" Street	east and west bound	Detroit Avenue N
Detroit Avenue N	north bound	Highway 22
Detroit Avenue N/S	north and south bound	Forest Avenue W
Forest Avenue W	east and west bound	Detroit Avenue N/S
Forest Avenue E/W	east and west bound	Highway 22
Patton Road N	south bound	Clester Road W
Patton Road N/S	north and south bound	Forest Avenue W
Santiam Avenue W	east bound	Highway 22
Detroit Avenue N/S	A flashing light is located at the four-way intersection	Forest Avenue W

Crosswalks are located as follows:

Street Name	Location	Cross Street
Breitenbush Road	east of its intersection	Highway 22
Detroit Avenue	south of its intersection	"D" Street
"D" Street	at its intersection	Detroit Avenue
"D" Street	at its intersection	Patton Road
Highway 22	where Forest Avenues E and W cross the Highway	

Slope hazard areas are located on the east side of Highway 22 within generally described areas as follows:

- north City limit line in the location of French Creek Road, the bank of the Breitenbush River,
- in the vicinity of 1st Street to 4th Street W to Detroit Lake,
- both sides of Breitenbush Road,
- between Front Street N and west of Butte Street,
- Scott Avenue S and further east north of Clifford Street,
- between Clifford Street and south of Highway 22, and
- east of Hill Street S and south across Highway 22.

(See **Inventory - Figure 1.3** that presents a draft slope hazard map for the City of Detroit. The map and any implementing ordinance need adoption through a legislative process prior to its use in conjunction with reviewing land use applications.)

Geometrics of selected intersections (being completed by staff from the City of Detroit and Parametrix)
To be inserted upon completion. (See **Figure 1.5** [in process])

Appendix

Street Name List
August 2008

Boulder Street N Breitenbush Road (Highway) Butte Street N Butte Street S
Center Street S Clester Road W Clifford Avenue E
D Street W Deer Street S Detroit Avenue N Detroit Avenue S Detroit Road S
Erin Street W
Forest Avenue E Forest Avenue W Front Street N Front Street S
Guy Moore Drive
Hill Street S Howe Street E Humbug Street S
Highway 22 (North Santiam Highway)
Kinney Avenue E Kinney Avenue N
Lake Street E Lake Court E Lakecrest Drive N Lewis Street E

Mackey Lane E (2 separated sections) Melgard Court E Meyer (Myer) Street S
Osprey Lane E
Patton Road N Patton Road S
Santiam Avenue W Scott Avenue S Short Avenue W Simkins Street E Small Lane (private) Sunro Lane (private)
Tumble Street N
Warren Street E Weber Street E
1st Street W 2nd Street W 3rd Street W 4th Street W