



SW CAPITOL HIGHWAY Plan Refinement Report

Prepared For:
PORTLAND BUREAU OF TRANSPORTATION
1120 SW Fifth Avenue
Portland, Oregon 97204

Prepared By:
Parametrix
700 NE Multnomah, Suite 1000
Portland, Oregon 97232
503.233.2400

Teamed With:
GeoDesign, Inc.
JLA Public Involvement
Nevue Ngan Associates

COVER IMAGE: *Capitol Highway and Lobelia Street, facing north*

PROJECT ADVISORS AND STAFF

City of Portland City Council

Mayor Sam Adams
Commissioner Amanda Fritz
Commissioner Nick Fish
Commissioner Dan Saltzman
Commissioner Randy Leonard
City Auditor Lavonne Griffin-Valade

Citizen Advisory Committee

Members

Roger Averbeck
Willamette Pedestrian Coalition
Don Baack
SW Trails Group
Randy Bonella
Multnomah Neighborhood Association
Tom Calabrese
Southwest Watershed Resource Center
Jill Crecraft
Multnomah Village Business Association
Marianne Fitzgerald
Southwest Neighborhoods Inc. (SWNI)
Monica Krueger
Crestwood Neighborhood Association
Patty Lee
Ashcreek Neighborhood Association
Keith Liden
Bicycle Transportation Alliance
Jim McLaughlin
West Portland Park Neighborhood Association
Ben Sturgill
Capitol Hill Elementary PTA
Ronda Zakocs
Maplewood Elementary PTA

Alternates

Kristi Baack
Maplewood Neighborhood Association
Lee Buhler
SW Trails Group
Kay Durtschi
Southwest Neighborhoods Inc.
Gerik Kransky
Bicycle Transportation Alliance
Darien Reece
Crestwood Neighborhood Association
Terri Preeg Riggsby
Southwest Watershed Resource Center
Phil Selinger
Willamette Pedestrian Coalition
Rob Shirley
West Portland Park Neighborhood Association

Technical Advisory Committee

April Bertelsen
*Portland Bureau of Transportation,
Pedestrian Coordinator*

Lisa Elbert
*Portland Bureau of Transportation,
Signals/Street Lights*

Roger Geller
*Portland Bureau of Transportation,
Bike Coordinator*

Cedar Heinle
*Portland Bureau of Transportation,
Engineering & Technical Services*

Brett Kesterson
*Portland Bureau of Transportation,
Civil Design Section, Engineer of Record*

Marty Maloney
*Portland Bureau of Transportation,
Right-of-Way*

Kathy Mulder
*Portland Bureau of Transportation,
Traffic Engineering*

Shannon Axtell
*Bureau of Environmental Services,
Watershed Division*

Ivy Dunlap
*Bureau of Environmental Services,
Sustainable Stormwater*

Susan Hjorten
*Bureau of Environmental Services,
Interagency Program*

Dave Nunamaker
*Bureau of Environmental Services,
Interagency Program*

Joe Hintz
*Portland Parks & Recreation,
Urban Forestry*

Cherri Warnke
*Portland Water Bureau,
Engineering Services Group*

Ben Baldwin
*TriMet,
Capital Projects*

Anthony Butzek
Metro

Project Team

Ross Swanson
*Portland Bureau of Transportation,
Project Manager*

April Keithly
*Portland Bureau of Transportation,
Project Outreach Coordinator*

Kathy Mulder
*Portland Bureau of Transportation,
Lead Traffic Engineer*

Ross Kevlin
Oregon Department of Transportation

Amy Rose
Metro

Michael Harrison
*Parametrix, Consultant
Project Manager*

Brian Bierwagen
Parametrix, Civil Engineering Lead

Doug Gates
*Parametrix,
Stormwater Engineering Lead*

George Saunders
GeoDesign, Inc., Geotechnical Services

Jeanne Lawson
*JLA Public Involvement,
Public Involvement Lead*

Kevin Perry
*Nevue Ngan Associates,
Green Streets Lead*

Jason Hirst
*Nevue Ngan Associates,
Landscape Design Services*

TABLE OF CONTENTS

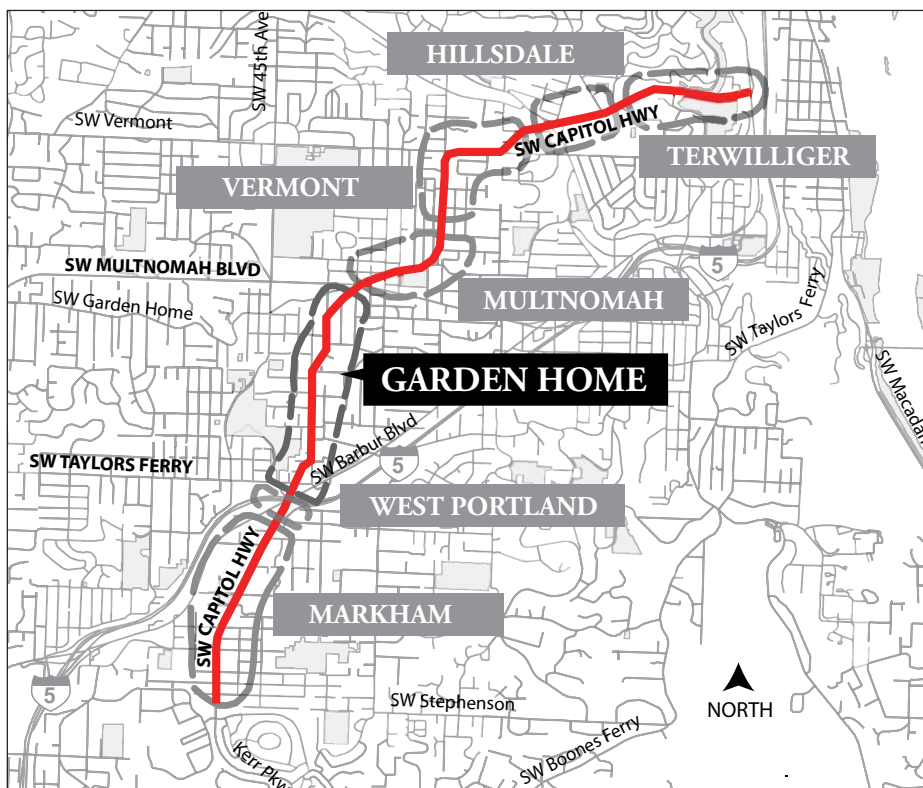
Introduction	1
1. Purpose and Need	2
2. Stakeholder and Public Outreach	4
3. Typical Cross Section Development	7
4. Plan Refinements	10
5. Preferred Stormwater Management Design	12
6. Environmental Analysis	13
7. Engineering Design Considerations	15
8. Estimate and Funding	18

Appendices

Appendix A: Preferred Streetscape Plan
Appendix B: Conceptual Stormwater Management Plan
Appendix C: Cost Estimates
Appendix D: Open House Summaries
Appendix E: Geotechnical Analysis
Appendix F: Historic Resources Analysis

INTRODUCTION

In January of 1996, the Portland City Council adopted the *Capitol Highway Plan*, identifying a conceptual multimodal street design for over four miles of SW Capitol Highway. The plan was divided into seven segments, from the Terwilliger segment in the north to the Markham segment in the south (see the map below). At the time the plan was adopted, the majority of SW Capitol Highway lacked sidewalks, bicycling infrastructure and improved bus stops, functioning poorly for pedestrians, bicyclists and transit users. To date, five of the seven segments have received improvements, including bicycle, pedestrian, and transit enhancements.



In 2010, federal funds were secured to refine the streetscape designs of the Garden Home segment of the *Capitol Highway Plan*, from SW Multnomah Boulevard to SW Taylor's Ferry Road. This project, called the *SW Capitol Highway Plan Refinement*, is the subject of this report. The plan refinement is built on the conceptual framework established in the 1996 *Capitol Highway Plan*. It develops design details for multimodal transportation and stormwater management improvements that comply with the new 2008 *Stormwater Management Manual* and the 2010 *Portland Bicycle Plan for 2030*. These refinements respond in greater detail to actual topography, drainage and other site-specific information based on survey information. The information in this report will inform the future engineering process and better positions the project for obtaining funding.

1. PURPOSE AND NEED

The Garden Home segment of the 1996 *Capitol Highway Plan* serves as an important route for reaching Multnomah Village in the north and the West Portland Town Center and Barbur Boulevard Transit Center to the south. Today, the Garden Home segment primarily consists of a 24-foot-wide two-lane asphalt roadway, with wider asphalt or unpaved shoulders in some areas providing informal vehicular parking. For most of this segment, pedestrian, bicycling, and parking improvements are nonexistent. The bus stops are generally unimproved, and travel to and from the bus stops often entails walking on narrow roadway shoulders adjacent to auto traffic. The segment also lacks stormwater treatment and detention facilities which likely contribute to stream degradation of Fanno and Tryon Creeks, both identified as Essential Salmonid Habitat by the Oregon Department of State Lands.



SW Baird Street intersection is typical of conditions in corridor—lack of formal bicycle, pedestrian and stormwater facilities.



Pedestrians walking along shoulder near SW 40th Avenue.

New stormwater management and bicycle infrastructure policies have been adopted since publication of the 1996 *Capitol Highway Plan*, and needed to be addressed in the *SW Capitol Highway Plan Refinement* before preliminary engineering could begin. The Portland Bureau of Environmental Service's *Stormwater Management Manual*, adopted in 2008, requires stormwater management facilities along roadways to retain and treat stormwater runoff. These facilities often take the form of stormwater planters located in a roadway's right-of-way and use soil and vegetation to treat roadway pollutants before the water infiltrates into the soil or enters a stormwater collection system. While the 1996 *Capitol Highway Plan* included a goal of providing a "storm drainage solution to handle runoff from existing and proposed facilities within the right-of-way," the plan did not select the type or location of these facilities. In addition, the *Capitol Highway Plan* conceptual design left little remaining public right-of-way to locate on-street stormwater management facilities consistent with the 2008 *Stormwater Management Manual*.



Informal 18-inch-wide pedestrian path near SW Spring Garden Street.



Unimproved bus stop at SW Alice Street lacks pedestrian amenities and has obscured sight lines.

In 2010, the City of Portland's Bureau of Transportation (PBOT) updated policies on bicycle infrastructure through the adoption of the *Portland Bicycle Plan for 2030*. This plan created a new classification for roadways—Major City Bikeways—intended to form the “mobility backbone” for bicycling throughout the City. This plan also changed the Garden Home segment from its prior classification as a “City Bikeway” to a “Major City Bikeway.” As defined in the *Portland Bicycle Plan for 2030*, a Major City Bikeway should be “optimized for” higher volumes of bicyclists, and “tradeoffs such as removal of travel lanes or on-street parking” can be considered to ensure bicycle travel is safe and comfortable. The 1996 *Capitol Highway Plan* identified only a five foot-wide bicycle lane along the Garden Home segment, which is one and a half feet less than the recommended minimum bike lane width based on the *Portland Bicycle Plan for 2030's* survey of best practices.

2. STAKEHOLDER AND PUBLIC OUTREACH

Extensive stakeholder and public engagement was necessary to ensure the success of the *SW Capitol Highway Plan Refinement*. Since 1996, when the *Capitol Highway Plan* was adopted, ownership of roughly half of the adjacent properties along the project corridor has changed. The proposed design changes to the right-of-way enable increased safety and convenience for those who walk, bike, use transit and drive in the corridor. The changes also propose to bring roadway improvements (sidewalks and bicycle lanes) closer to the edge of the public right-of-way, which in some locations has been encroached upon by adjacent private properties.

Stakeholder and public engagement efforts included six meetings of a project Citizen Advisory Committee (CAC), four meetings of a Technical Advisory Committee (TAC), three public open houses, and numerous one-on-one and small group meetings with property owners. These efforts ensured that project stakeholders and the public played a key role in shaping the outcome of the *SW Capitol Highway Refinement Plan*. Involvement was included in:

- Identifying corridor opportunities and constraints
- Developing project priorities
- Developing the project's typical cross section
- Modifying the design along the corridor as necessary

Citizen Advisory Committee

The CAC included representatives of neighborhoods along the project corridor, an adjacent business association, area elementary schools, and bicycle, pedestrian, and healthy streams advocacy organizations. All members are residents of SW Portland who regularly use SW Capitol Highway as pedestrians, bicyclists, transit users and/or drivers. A list of the twelve CAC members and eight alternate members is included on the inside cover of this report.

Over the course of six meetings with PBOT, the CAC was significantly involved in confirming design solutions and addressing community preferences and concerns. To ensure the CAC's deliberations were informed by the preferences and concerns of the community, public comments were accepted at each of the CAC meetings.

As a starting point, the CAC identified the following project priorities which were closely aligned with the 1996 *Capitol Highway Plan* goals. The CAC's priorities were to address:

- Safety for all transportation modes
- Walkability
- Transit access
- Traffic calming
- ADA accessibility
- Sidewalk widths and access
- Connectivity for all modes
- Creative vs. standard curb and gutter design
- Creative vs. standard sidewalk design
- Creative stormwater management
- Vehicular turning movements
- Private encroachments on public right-of-way
- Parking needs
- Green and narrow street character

The CAC dealt with complex issues regarding stormwater management and developing a multimodal streetscape within a narrow and topographically challenging public right-of-way. The design solutions were weighed against the project priorities. The endorsed transportation improvements culminated in a recommended plan refinement, which is included in Appendix A. The project's overall approach to managing stormwater is described in Appendix B.

The CAC's final formal recommendation was to request that the City of Portland pursue project construction as one project, with no phasing, to maximize multimodal safety and connectivity along the corridor.

Technical Advisory Committee

The TAC was composed of staff from six agencies (see the front page of this report for the list of members). The TAC's role was to assist the Project Team in developing a typical cross section (see Chapter 3) and in modifying bicycle, pedestrian, transit and stormwater improvements along the project corridor to address existing constraints.

Doug Gates of Parametrix discusses plans for improved stormwater management with local residents.



Public Open Houses

The project included three public open houses over the course of developing the *SW Capitol Highway Plan Refinement*. Altogether, more than 260 people participated, the majority identifying themselves as living on or near SW Capitol Highway. Each open house was designed to inform and seek feedback from the community on the progress of the plan refinements. Chapter 3 includes a discussion of how open house feedback helped inform the development of the typical cross section and summaries of each open house are included in Appendix C. The following outlines the primary purpose(s) of each open house:

July 2010 Open House

- Identify opportunities and constraints
- Develop project priorities
- Develop a typical cross section

September 2010 Open House

- Develop site-specific refinements to the typical cross section

December 2010 Open House

- Develop site-specific refinements to the draft preferred plan

Site Visits

The Project Team engaged in direct discussions with affected property owners during multiple site visits. Many of these visits were requested by the adjacent property owners along the corridor to seek solutions to site-specific design issues. Site visits helped address issues such as driveway accessibility, parking needs, and tree and landscaping screening strategies for adjacent residents and business owners.

3. TYPICAL CROSS SECTION DEVELOPMENT

The typical cross section developed for the 1996 *Capitol Highway Plan* needed rethinking in light of the 2008 *Stormwater Management Manual* requirements and the 2010 *Portland Bicycle Plan for 2030* policies. The public right-of-way for the Garden Home segment of SW Capitol Highway has the following designations:

- District Collector
- Transit Access Street
- Major City Bikeway
- City Walkway
- Truck Access Street
- Major Emergency Response Route

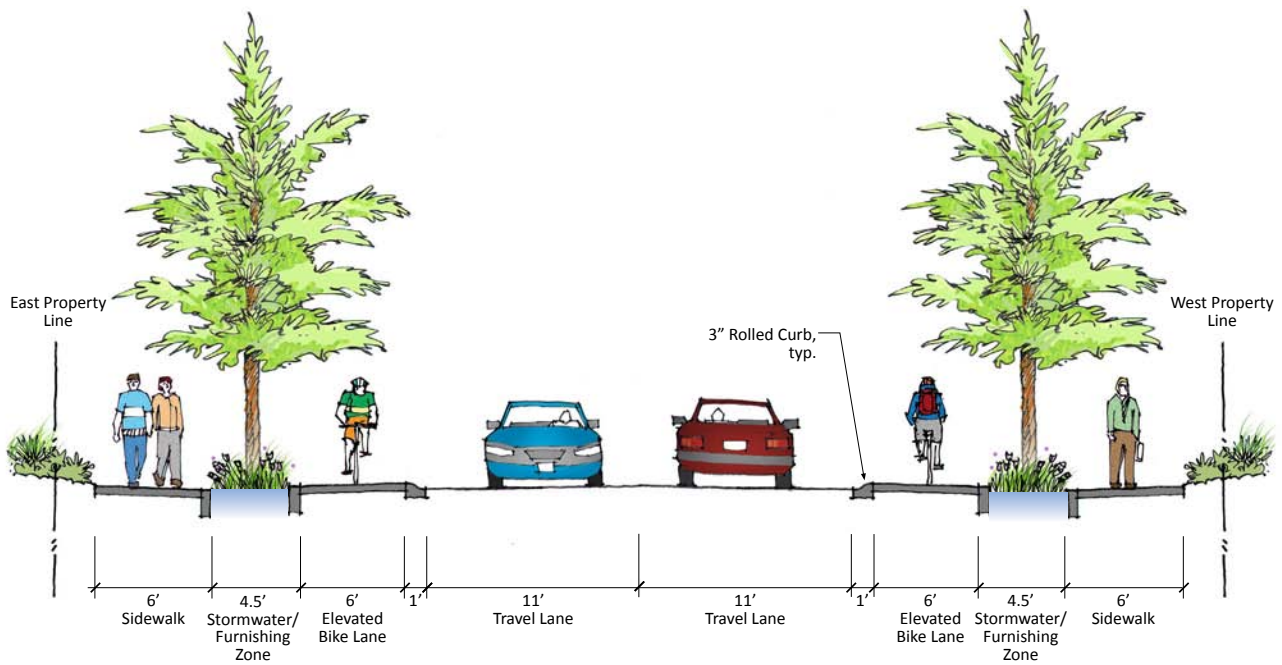
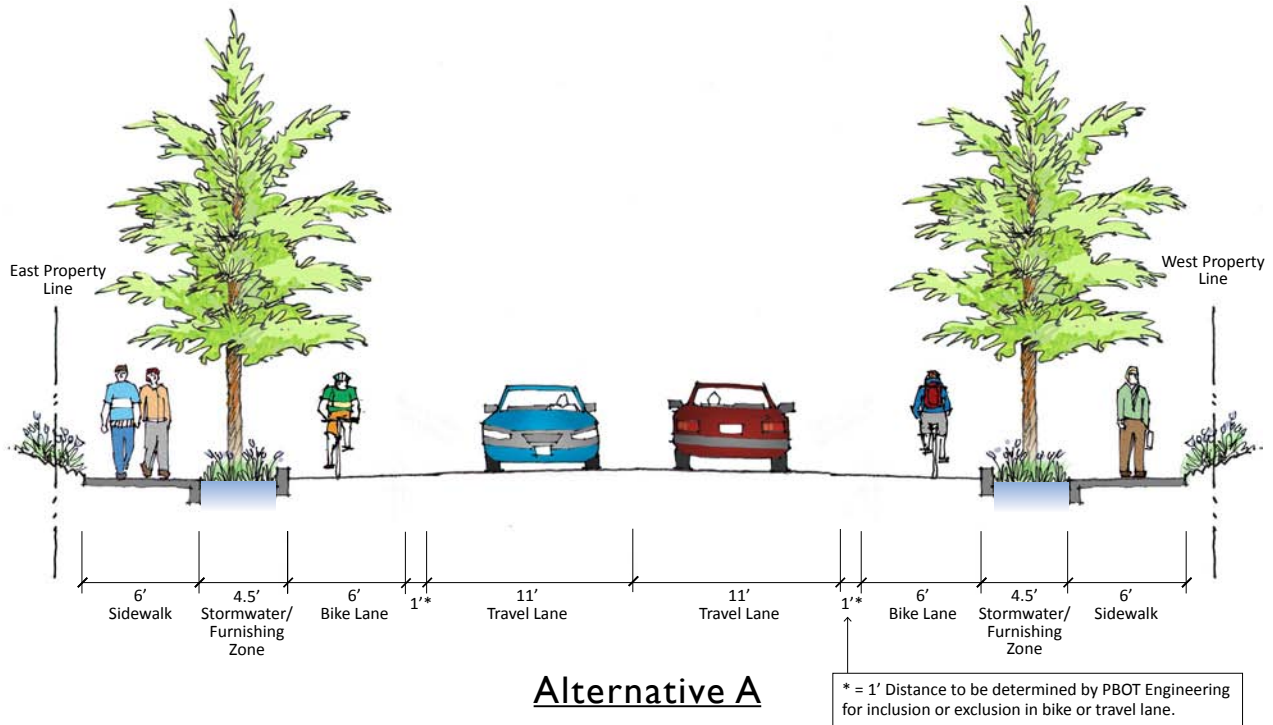
As a first step in the development of a conceptual street design, the Project Team developed three proposed alternative cross sections (see next page) that could fit within the project's approximately 60-foot right-of-way and were consistent with the roadway's designations.

These three alternatives were presented to the community at the first project open house in July 2010 for feedback. Most notably, although Alternatives A and B received the most favorable comments, these alternatives also resulted in the widest curb-to-curb roadway, which many residents felt was out of character with the neighborhood and could result in higher vehicle speeds. Alternative C, with the narrowest roadway, didn't seem well suited to the downhill slopes of SW Capitol Highway's east side, where bicyclists would:

- Travel at higher speeds adjacent to pedestrians
- Have to stop and wait at driveways for auto drivers to enter the roadway
- Be unable to safely pass slower bicyclists

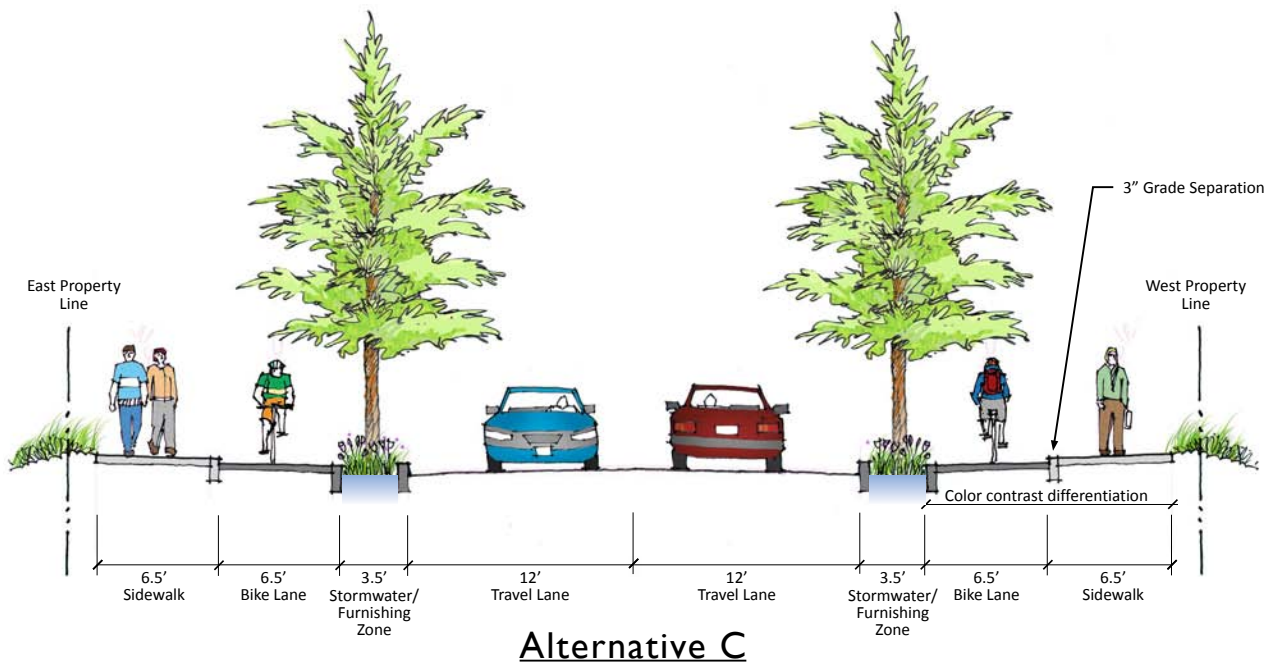
Consequently, the Project Team combined the best aspects of Alternatives A and C into a cross section design called the 2010 Typical Section (hybrid) (see page 9). Alternative A was chosen for the east side (downhill side) of the hybrid section based on feedback from the July open house. Alternative C was chosen for the west side (uphill side) of the street in an effort to balance the project goals, which include safety for all modes, stormwater management, and preserving the existing neighborhood character by keeping the street "green and narrow." This new hybrid section provides a narrower curb-to-curb distance and safely places low lying greenery at the curb's edge—simulating the roadway as it is found today. See Appendix D for the July and September Public Open House summaries, including public feedback details on the typical cross section development and the proposed hybrid section.

Cross Sections – Alternatives A and B

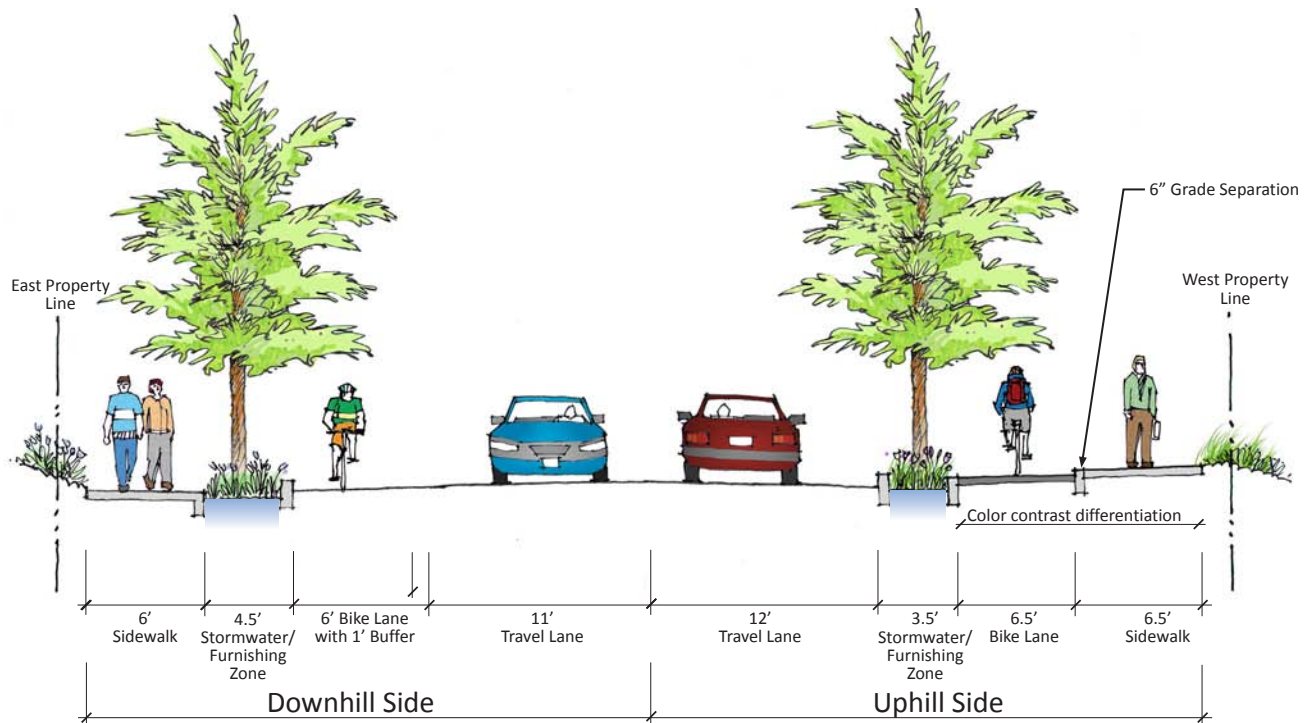


Alternative B

Cross Section – Alternative C



2010 Typical Section (Hybrid)



4. PLAN REFINEMENTS

Constraints in the Garden Home segment presented unique challenges that restricted uniform application of the hybrid section. The constraints included:

- **60-foot right-of-way.** The hybrid section's improvements span 57 feet from back of sidewalk to back of sidewalk. A cross section that uses most of the available right-of-way limits the ability to adjust the roadway horizontally to respond to site-specific constraints.
- **Driveway design and location.** The hybrid section was analyzed against existing driveway locations and slopes to ensure individual driveways were still functional and met design standards for width and slope.
- **Accommodation of on-street parking.** The hybrid section was modified to accommodate the parking needs identified in 1996, while staying within public right-of-way.
- **Preservation of existing priority trees.** The hybrid section was modified to preserve priority trees, where possible. Relative tree priority was based upon tree size and health data provided by the City of Portland's Urban Forestry Division.
- **Existing merge lane.** An existing merge lane is striped at the southern end of the Garden Home segment, between SW Taylors Ferry Road and SW 42nd Avenue. The need to accommodate this merge lane required a modification to the hybrid section.
- **Business access.** The project maintains vehicular access for existing businesses as close as possible to existing conditions, while providing new pedestrian, bicycle, and transit facilities.

In areas along the project corridor where constraints made the implementation of the hybrid section difficult or failed to maximize opportunities, site-specific design modifications were developed for consideration at the September 2010 open house. Site-specific design modifications included:

- Elimination of some stormwater planters
- Addition of larger stormwater management areas at SW 40th, SW 41st (north), and SW 41st (south)
- Limited use of shared bike and pedestrian paths
- Realigned intersections and sidewalks to protect priority trees and reduce right-of-way impacts
- Use of a boardwalk concept cross section

Although public feedback on the hybrid section was generally supportive, concerns were raised over a variety of issues, including the removal of priority trees and the potential use of shared bike and pedestrian paths. Based on

public feedback, the project team worked with the CAC and TAC to develop a more detailed recommended plan that included the following elements:

- Preserving priority trees by adjusting sidewalks and realigning the intersections at SW 39th Avenue and SW 41st Avenue
- Utilizing separate bike and pedestrian pathways
- Identifying pedestrian ADA ramp locations
- Optimizing bus stop locations to maximize sightlines between vehicles and pedestrians
- Realigning intersections at SW 41st Avenue and SW 40th Avenue to minimize private property acquisition
- Adding stormwater planters at strategic locations to increase stormwater treatment
- At the request of property owners, adding retaining walls to minimize the regrading of private property and preserve existing vegetation and trees

The recommended plan refinements were shown at the third public open house in December 2010, and received generally favorable comments. To review the public comments received at the July, September, and December public open houses, see Appendix D.

5. PREFERRED STORMWATER MANAGEMENT DESIGN

The project corridor lies within four stormwater basins, each ultimately draining to tributaries of either Fanno or Tryon Creek, themselves tributaries to the Willamette River. With few exceptions, the City of Portland's *Stormwater Management Manual* requires stormwater management facilities be installed for pollutant removal, stormwater detention, and reduction in stream erosion potential. City preferred best management practices (BMPs) include vegetated stormwater infiltration facilities. For roadway projects, these facilities are typically located along the roadside and in planter strips where they collect and manage the surface water runoff. A roadside planter was chosen as the primary best fit BMP for the *SW Capitol Highway Plan Refinement Project* (see Appendix B). Supplemental underground stormwater filters are proposed in locations not adequately served by vegetated facilities.

Geotechnical analysis indicates that the soils within the project area drain poorly (see Appendix E), therefore the stormwater planters, while providing water quality benefits, have limited infiltration capacity. In such cases, the *Stormwater Management Manual* requires detention facilities to minimize flooding and erosion of streams. As a result, this project includes oversized underground pipe detention facilities to provide the required flow control.

Appendix B identifies the project's conceptual on-street stormwater improvements, as well as the off-site facilities that the project improvements would need to connect to. Identified stormwater conveyance pipes, inlets, and manhole sizes and locations conform to the City of Portland's *Sewer and Drainage Facilities Design Manual*. The off-site improvements that the project would connect to were preliminarily identified by the Bureau of Environmental Services, and consist of both existing facilities, as well as facilities that would be part of future improvements.

6. ENVIRONMENTAL ANALYSIS

A project prospectus was completed and submitted to ODOT in the spring of 2011. The prospectus includes a preliminary environmental analysis regarding the impacts to fish species, historic and archaeological resources, and hazardous materials sites, and it recommends ways of avoiding adverse impacts to the built and natural environment. Further environmental assessment during project engineering may result in modifications to the recommended plan refinements shown in Appendix A.

Fish Species

Winter steelhead and coho salmon spawning, rearing, and migration habitat has been documented approximately 1.5 miles downstream from the project, in Fanno and Tryon Creeks. The tributaries to Fanno and Tryon Creeks that are nearest the project corridor do not support these federally protected fish species due to natural and artificial barriers downstream of the project area. The project will most likely result in improved stream water quality through significant investment in stormwater treatment, detention, and conveyance facilities. When the project moves into the design phase, impacts to protected fish species and their habitats will continue to be evaluated.

Historic Resources

The Project Team reviewed state and local databases and found no documented historic resources, including houses, along or near the Garden Home segment. However, a windshield survey resulted in the identification of 26 buildings within the corridor that are potentially eligible for listing on the National Register of Historic Places (NRHP), based primarily on the age of potential historic resources and elements that would contribute to their integrity (see Appendix F for locations of these buildings).

The recommended plan refinement identifies right-of-way acquisition of minimal portions of three parcels. Based on age and integrity, the structures on the three parcels do not appear to be eligible for NRHP listing. There may be additional acquisitions identified during project engineering, which would likely be additional small sliver acquisitions from the properties adjacent to SW Capitol Highway or the intersecting streets where intersection realignment occurs. Partial acquisitions from the potentially NRHP-eligible properties should be avoided. If avoidance is not possible, the acquisitions should be minimized and may need to be mitigated. In most cases, there would not be an adverse effect to a historic structure merely if it lost a small portion of the yard around the structure.

Archaeologic Resources

The Garden Home segment travels along a ridgeline with gentle slopes and is relatively near the headwaters of tributaries to Fanno and Tryon Creeks (within 500 and 1300 feet, respectively). It is reasonable to assume that the proposed project's excavation impacts would extend, at least in some areas, to previously undisturbed soils. Given the topographic conditions, nearby sources of water and localized areas with undisturbed soils, it is possible that native peoples may have used the area for subsistence purposes. The project will use standard procedures for avoiding, minimizing and/or mitigating any potential adverse archaeological effects.

Hazardous Materials

A Department of Environmental Quality database search indicated 29 properties listed in the leaking underground storage tank (LUST) program and one property listed in the hazardous waste generator (HAZWASTE) program. These are located within 300 feet of the project corridor. Twenty-five of the LUST sites are reported with completed clean-up activities and four have ongoing clean-up activities. The majority of LUST sites appear to be residential heating oil tanks on properties that abut the project corridor. A gas station is located adjacent to the project.

Based on the recommended plan refinement, it is assumed that no property would be acquired from the gas station or the 30 regulated sites discussed above. Based on proposed excavation and the potential for property acquisitions, a Level 1 Hazardous Material Corridor Survey will be required. The results of the Level 1 Survey may indicate the need for additional environmental assessments prior to the initiation of construction and property acquisition.

7. ENGINEERING DESIGN CONSIDERATIONS

This report is intended to inform preliminary and final engineering for improvements to the Garden Home segment along SW Capitol Highway. The following design considerations will be addressed during the project's engineering phase.

Enhanced Crossings

The purpose of an enhanced crossing is to guide pedestrians and bicyclists to a safe and visible location to cross the street. Intersections will be evaluated for potential enhanced crossings.

Parking Locations

The design team will consider additional on-street parking locations along the corridor during project engineering. These locations will need to meet the criteria outlined below and be balanced in context with other project goals. The adopted 1996 *Capitol Highway Plan* indicated where parking along the corridor should be placed and recommended that additional on-street parking be considered at the time of engineering, with the caution that parking spaces should not be misused as permanent parking by residents. The *Capitol Highway Plan* identified the following considerations for where to place additional parking:

- The current level of parking use
- Availability of off-street or side-street parking
- Existing land use (number of housing units and amount of commercial activity)
- Where adequate space can accommodate on-street parking

The final bullet regarding adequate space relates to the need to meet the project's requirements and balance its goals. On-street parking must be kept to a minimum to provide adequate bicycle, pedestrian and stormwater facilities in the corridor, all of which are adopted City policy per the *Stormwater Management Manual*, *Portland Bicycle Plan for 2030*, and the *Capitol Highway Plan*.

For the *SW Capitol Highway Plan Refinement* project, in 2010, PBOT staff conducted two documented off-street parking windshield surveys along the corridor. On-street parking locations identified in the *Capitol Highway Plan* were relatively consistent with where on-street parking was identified in the 2010 windshield surveys.

SW Taylors Ferry Road Intersection

Currently, the Oregon Department of Transportation and PBOT are conducting an intersection safety study for SW Capitol Highway at SW Barbur Boulevard and at SW Taylors Ferry Road. Both of these intersections are directly to the south of the project and will greatly influence the design of the *SW Capitol Highway Plan Refinement* at the south end. Just north of the SW Capitol Highway and SW Taylors Ferry Road intersection there is a merge lane that complicates the hybrid section and may not be necessary if the intersection to the south is simplified. Eliminating the merge lane would allow more space within the existing right-of-way for bicycle and stormwater facilities and eliminate the need for private property acquisition.

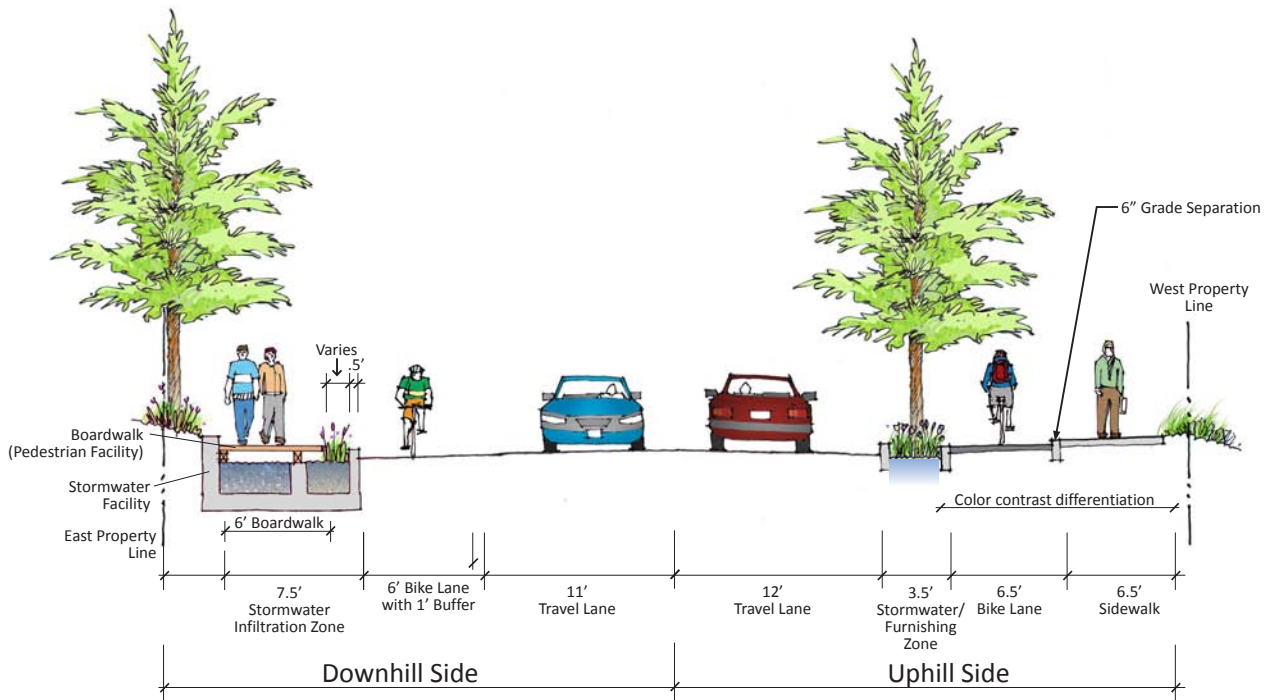
Boardwalk Concept Cross Section

Physical constraints in some areas of the Garden Home segment make it difficult to fit the hybrid section's stormwater and pedestrian facilities within the right-of-way. To address this condition, a boardwalk concept was developed which stacks pedestrian and stormwater facilities, thereby narrowing the total streetscape width. The boardwalk concept (shown on the next page) is a preliminary concept that will be explored in greater detail during preliminary engineering. Issues related to the boardwalk concept that must be resolved prior to implementation include:

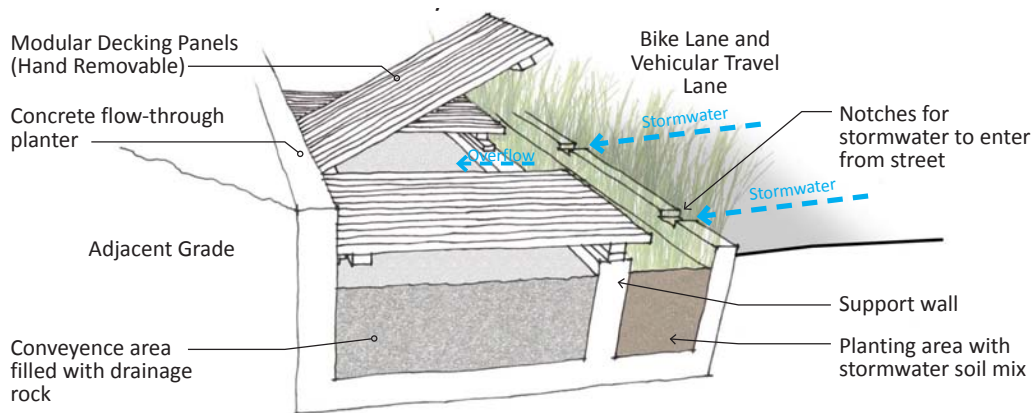
- **Maintenance.** How the area below the boardwalk deck would be cleared of debris and who would be responsible for maintaining the facility
- **Selected Materials.** Durability and safety issues related to materials chosen for decking, substructure and fastener materials
- **Longitudinal slope constraints.** For ADA purposes, determination of maximum acceptable grade of decking based on chosen decking material
- **Design Effectiveness.** Assessment of boardwalk construction and maintenance costs relative to this cross section's stormwater management benefits

The CAC requested a boardwalk concept pilot project be constructed in the Garden Home segment as a part of the overall project. The CAC requested PBOT select a pilot project location within public right-of-way that would not create maintenance responsibilities for adjacent neighbors.

Boardwalk Concept Cross Section



Boardwalk and Stormwater Facility



8. ESTIMATE AND FUNDING

The Project Team analyzed multiple implementation strategies for the project. Considering the strengths and weaknesses of each strategy, the following two strategies best maximize project benefits while providing clear choices in how to proceed.

Full Build Construction (No Phasing)

Constructing the full improvements (both sides of the roadway along the entire corridor) as one construction project was recommended by the CAC. Constructing the full project in one phase would minimize construction inconvenience to the neighborhood and would maximize safety and connectivity along the corridor. The estimated cost for this strategy is approximately \$19.1 million (see Appendix C). This estimate includes all surface, underground, and off-site infrastructure improvements needed to support the project.

Full Build Construction Costs

Assumes construction in 2013

Surface transportation improvements and green streets	\$4.8 M
Subsurface stormwater system improvements	\$3.0 M
Project/construction management, engineering	\$3.6 M
Right-of-way	\$1.3 M
Contingency and inflation	\$4.4 M
Subtotal	\$17.1 M
Off-site stormwater improvements	\$ 2.0 M
TOTAL	\$19.1 M

The key drawback to the full build strategy is finding the necessary funding to complete the project. The City of Portland is seeking future project engineering and construction funds through a \$10 million request in the current federal transportation reauthorization bill. This scenario's revenue sources could look as follows:

Full Build Funding Strategy

System development charges	\$2.0 M
Federal reauthorization request	\$10.0 M
Other source(s) to be determined	\$7.1 M
TOTAL	\$19.1 M

SW Capitol Highway is the City's top priority for this reauthorization process; however, the timing of the reauthorization bill moving forward at the federal level is undetermined.

Two Phase Construction

As an alternative approach, the Project Team looked into several options for phasing project construction. The key advantage of phasing is minimizing the need for a large one-time revenue source, allowing the City to pursue smaller sources over multiple years. As local funding may be available for a smaller project, phasing minimizes the need for uncertain federal funding. Phasing the project also takes advantage of the current momentum and project support by starting the project sooner.

Although phasing the project may allow a portion of the project to be constructed sooner, there was concern by the CAC that once the first phase of the project was completed there would be:

- A lack of complete connectivity for the project
- A lost sense of priority to complete the second phase

Phasing the project provided several viable alternatives, each providing unique benefits. One approach, however, offered the most logical and efficient method to complete the corridor. This approach would construct the full-width roadway section for the entire project length in two phases; *Phase 1 North* would begin north of SW Garden Home Road and continue south to SW Dolph Court and *Phase 2 South* would begin at SW Dolph Court and continue south to SW Taylors Ferry Road. SW Dolph Court makes for a logical phasing break because, based on roadway slope changes that occur at SW Dolph Court, this area provides a natural divide between subsurface stormwater improvements.

In order for *Phase 2 South* to be implemented, off-site stormwater improvements must first be completed near SW Dolph Court and SW Alice Drive. These off-site improvements include stormwater conveyance and management facilities. As shown in the table below, these off-site improvements account for approximately \$2 million of the total project budget.

Below is a breakdown of costs by phase for the project. Phased construction entails higher costs than constructing the improvements as a single project, in part due to increased costs for inflation and the mobilization of equipment.

Two Phase Construction Costs

	PHASE 1 – NORTH <i>Assumes construction in 2013</i>	OFF-SITE STORM DRAINAGE 2013	PHASE 2 – SOUTH <i>Assumes construction in 2017</i>
Surface transportation improvements and green streets	\$2.10 M	\$2.0 M	\$2.8 M
Subsurface stormwater system improvements	\$1.34 M		\$1.8 M
Project/construction management, engineering	\$2.35 M		\$2.7 M
Right-of-way	\$0.65 M		\$0.65 M
Contingency and inflation	\$1.84 M		\$5.0 M
TOTAL	\$8.28 M	\$2.0 M	\$12.95 M

Preferred Streetscape Plan



APPENDIX A

Exhibit ‘a’: Recommended plan refinements and key issues

The attached concept plan refines the 1996 *Capitol Highway Plan* as recommended by the *SW Capitol Highway Plan Refinement Project* Citizens Advisory Committee. Key issues are identified in text below and on the corresponding concept plan figures that follow. The key issues provide explanation for deviations from the project’s typical cross section as well as flag issues to be revisited during the project’s engineering phase.

Figure A-1

1. Access to existing business / transit enhancement. Driveway in front of dual garage doors widened to allow for continued access to exterior parking area in front of building. Wider sidewalk between driveways enhances bus stop.
2. Retaining wall. Retaining wall to address slope issues on private property.
3. Business parking. Informal business parking along Capitol Highway replaced with formal parking area on 42nd Avenue. Addresses right-of-way constraints associated with Capitol Highway merge lane and allows for placement of stormwater planter. The 1996 *Capitol Highway Plan* included on-street parking for this existing business.
4. Merge lane. Minimal use of stormwater planters, narrower sidewalks and bike lanes, and property acquisitions address right-of-way constraints resulting from existing merge lane.
5. Intersection realignment. Intersection realigned to increase multimodal safety. Centerline of 41st Avenue shifted north to preserve priority trees.
6. Closed road. Stormwater planter and sidewalk improvements at existing closed road (SW Brugger Street).
7. Stormwater feature. During engineering phase, right-of-way opportunity area to be analyzed for use as stormwater feature / boardwalk pilot project.

Figure A-2

8. Residential parking. Informal parking along Capitol Highway replaced with formal on-street parking spaces to accommodate residence that lacks a driveway (9433 SW Capitol Highway). The 1996 *Capitol Highway Plan* identified on-street parking for this existing residence. During engineering phase, analyze driveway construction for this residence in lieu of on-street parking.
9. Narrower cross section & retaining walls. Minimal use of stormwater planters and retaining wall installation to address slope issues on private property. Cross section widening as depicted will steepen and / or lengthen already steep downhill driveways (9431 and 9415 SW Capitol Highway). During engineering phase, analyze concept to ensure the design of functional driveways at these locations.

Figure A-3

10. Narrower cross section. Minimal use of stormwater planters to allow for the design of functional driveways on east and west sides of Capitol Highway between Baird and Alice Streets.

11. Multifamily parking. Informal parking along Capitol Highway replaced with formal on-street parking to accommodate parking needs of two existing multifamily complexes (9220 and 9136 SW Capitol Highway). Parking accommodated with modified cross section (minimal use of stormwater planters and narrower bike lanes, vehicular travel lanes, and narrower sidewalk on west side) and by shifting centerline to the east. The 1996 *Capitol Highway Plan* identified on-street parking for these existing residences.
12. Retaining wall. Retaining wall to address slope issues on private property. Project will also steepen the already steep upward driveway at 9139 SW Capitol Highway, immediately north of retaining wall. During the engineering phase, analyze raising the roadway in this area to allow for the design of a functional driveway north of the retaining wall.
13. Driveway removal. Removed existing driveway off of Capitol Highway to provide space for stormwater planter and improve safety for all travel modes. Property will continue to have driveway access off of Primrose Street. During engineering phase, revisit driveway closure with property owner.

Figure A-4

14. Narrower cross section. Minimal use of stormwater planters to allow for the design of functional driveways.
15. Retaining wall. Retaining wall to address slope issues on private property.

Figure A-5

16. Retaining wall. Retaining wall to address slope issues on private property.
17. Intersection realignment. Intersection realigned to increase multimodal safety. During engineering phase, analyze use of right-of-way opportunity area for stormwater feature / boardwalk pilot project. Intersection offset to eliminate need for acquiring private property at 8701 SW Capitol Highway. During engineering phase, revisit intersection offset decision to provide improved pedestrian crossing from 41st Avenue to Dolph Court and increase size of right-of-way opportunity area.
18. Narrower cross section. Minimal use of stormwater planters to minimize impacts to existing residence close to right-of-way (8730 SW Capitol Highway).
19. Narrower cross section & retaining wall. Minimal use of stormwater planters and retaining wall installation to address slope issues on private property.
20. Narrower cross section. Minimal use of stormwater planters to address driveway slope at 8628 SW Capitol Highway. Roadway widening will steepen this already steep downward driveway. During the engineering phase, analyze concept to ensure the design of a functional driveway at this location.

Figure A-6

21. Narrower cross section. Minimal use of stormwater planters to address slope issues on private property.
22. Retaining wall. At request of adjacent property owners, retaining wall to maximize retention of existing vegetation on private property.

Figure A-7

23. Sidewalk realignment. Realigned sidewalk to preserve priority trees. Widened cross section and realigned sidewalk will steepen the already steep downward driveway at 8234 SW Capitol Highway. During the engineering phase, analyze concept to ensure the design of a functional driveway at this location.
24. Intersection realignment. Intersection realigned to increase multimodal safety. During engineering phase, analyze use of this right-of-way opportunity area for stormwater feature / boardwalk pilot project. Centerline of 40th Avenue shifted south to eliminate need for acquiring private property at 8145 SW Capitol Highway.

Figure A-8

25. Narrower cross section. Reduced use of stormwater planters to minimize impacts to existing driveway at 8145 SW Capitol Highway. During the engineering phase, analyze lowering the roadway from 40th Avenue north to ensure the design of a functional driveway at this location.
26. Sidewalk realignment. Realigned sidewalk to preserve priority trees. Sidewalk realignment results in minor acquisition of private property at 8102 SW Capitol Highway.
27. Intersection realignment. Intersection realigned to increase multimodal safety.
28. Access to existing business. Minimal use of stormwater planters and use of mountable curb between driveways allows for continued access to exterior parking area and vehicle fueling stations for this existing business.

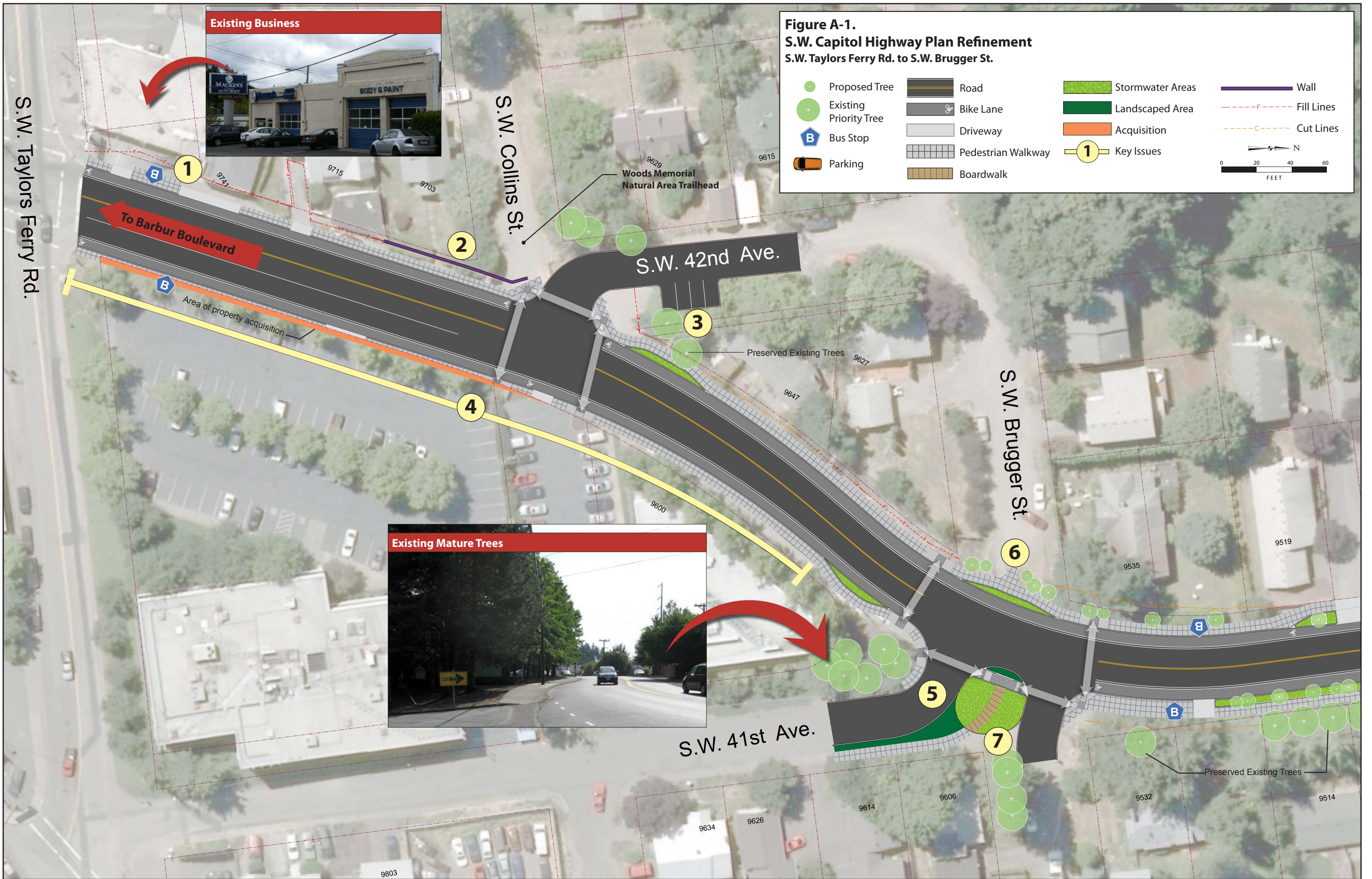


Figure A-2.
S.W. Capitol Highway Plan Refinement
S.W. Brugger St. to S.W. Baird St.

	Proposed Tree		Road		Stormwater Areas		Wall
	Existing Priority Tree		Bike Lane		Landscaped Area		Fill Lines
	Bus Stop		Driveway		Acquisition		Cut Lines
	Parking		Pedestrian Walkway		Key Issues		
			Boardwalk				

0 20 40 60
FEET



Figure A-3.
S.W. Capitol Highway Plan Refinement
S.W. Baird St. to S.W. Primrose St.

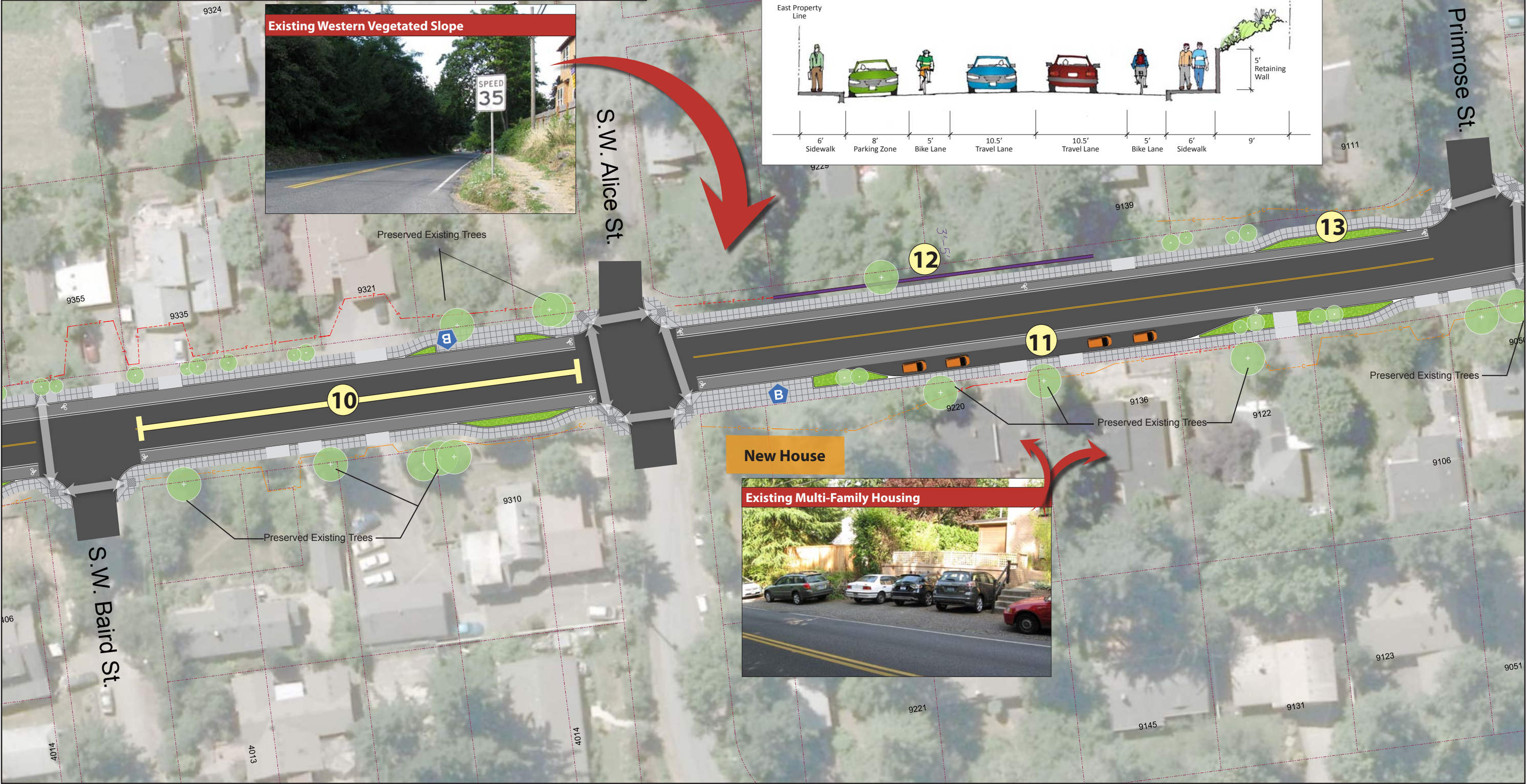
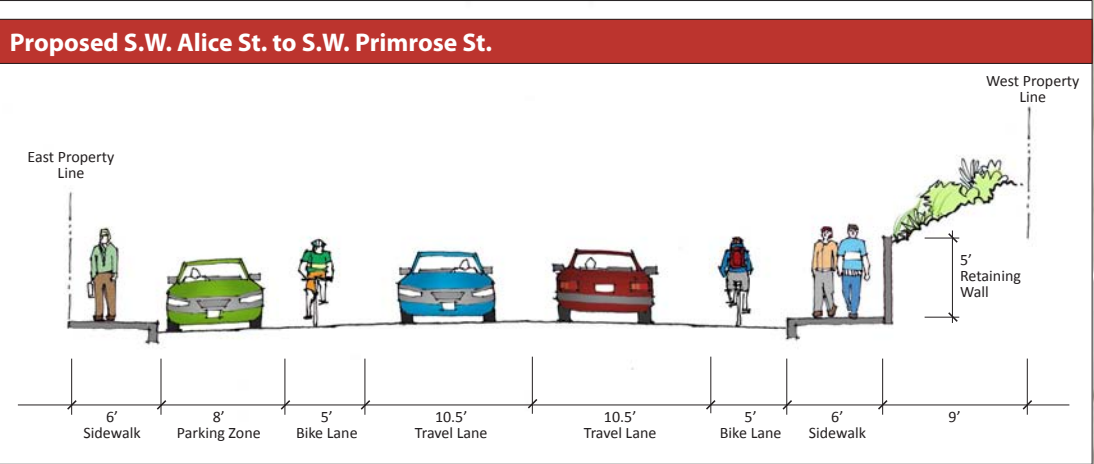
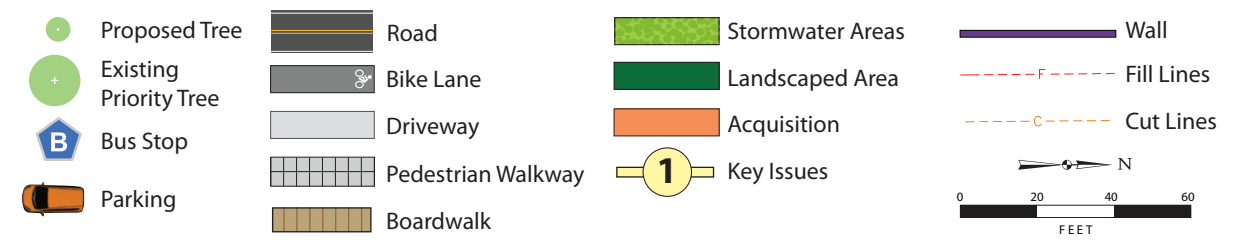










Figure A-8.
S.W. Capitol Highway Plan Refinement
S.W. 40th Ave. to S.W. Garden Home Rd.

Proposed Tree	Road	Stormwater Areas	Wall
Existing Priority Tree	Bike Lane	Landscaped Area	Fill Lines
Bus Stop	Driveway	Acquisition	Cut Lines
Parking	Pedestrian Walkway	Key Issues	
	Boardwalk		



Conceptual Stormwater Management Plan



APPENDIX B

700 NE MULTNOMAH, SUITE 1000
PORTLAND, OR 97232-4110
T. 503.233.2400 T. 360.694.5020 F. 503.233.4825
www.parametrix.com

TECHNICAL MEMORANDUM

Date: February 28, 2011

To: Ross Swanson, Project Manager, Portland Bureau of Transportation

From: Doug Gates, P.E. and Jake Hofeld, P.E., Parametrix

Subject: Capitol Highway Plan Refinement, Task 7.2: Hydrology Technical Memorandum

cc: Michael Harrison, Consultant Project Manager, Parametrix

The Capitol Highway Plan Refinement project will add multimodal improvements along Capitol Highway, from Garden Home Road to Taylors Ferry Road. The project will also include on-street and subsurface stormwater management improvements, consistent with the City of Portland 2008 Stormwater Management Manual (SWMM). The proposed conceptual stormwater management design, detailed in Attachment A of this technical memorandum, is the result of the feedback received from multiple stakeholders within and outside of the City of Portland. The purpose of this technical memorandum is to outline the methodology used in the development of this stormwater management design.

The majority of Capitol Highway from Taylors Ferry Road to Garden Home Road currently consists of a two-lane roadway on a 24-foot-wide ribbon of asphalt. This corridor has limited sidewalks, no bike lanes, and no stormwater treatment facilities. The project corridor lies within four major stormwater basins, each draining ultimately to tributaries of either Fanno or Tryon Creek. Some existing stormwater conveyance facilities are in place in major basins 1, 3, and 4; however, they are substandard in location and alignment and will conflict with proposed infrastructure improvements. See the Capitol Highway Drainage Analysis Technical Memorandum, 2009,¹ for more information on existing conditions related to stormwater infrastructure.

With few exceptions, the SWMM requires stormwater management facilities be installed for pollutant removal, detention, and receiving stream erosion potential reduction. City-preferred best management practices (BMPs) include vegetated infiltration facilities. For roadway projects, these facilities are typically located along the roadside and in planter strips where they collect and manage the surface water runoff. A roadside planter was chosen as the primary best fit BMP for the project. Supplemental proprietary stormwater filters are proposed in locations where right-of-way constraints limit the placement of planters.

¹ Bureau of Environmental Services, Capitol Highway Drainage Analysis Technical Memorandum, To: Kathryn Levine, Portland Office of Transportation, March 4, 2009.

Geotechnical analysis indicates that the soils within the project area drain poorly,² and as a result, the stormwater planters, while providing water quality benefits, are infiltration-limited by the underlying soils. In such cases, the SWMM requires detention facilities to minimize flooding and erosion of receiving streams. Thus, for this project, flow control requirement criteria are met using oversized-pipe underground detention facilities. The conceptual design of stormwater conveyance pipes, inlets, and manhole sizes and locations conform to City of Portland Sewer and Drainage Facilities Design Manual.

METHODOLOGY

The City of Portland SWMM requires, at minimum, that all improvement projects resulting in the addition or alteration of impervious surfaces provide water quality treatment for stormwater runoff prior to leaving the project area. There are also local flood and receiving stream erosion impact management requirements. With the introduction of SWMM, the City's preferred method of stormwater management is infiltration to the maximum extent practicable. In cases where stormwater cannot be fully infiltrated on-site or does not flow directly off-site into the Willamette or Columbia River, flow control is also required to manage flooding and prevent degradation of the receiving streams. On this project, because native project soils are not conducive to infiltration, flow control is required.

This project sized City-preferred Green Streets BMPs (planters) using the Presumptive Approach Calculator (PAC), a tool developed by the City of Portland. Sizing facilities in the PAC is an iterative process that includes a preliminary design that is assessed for its ability to meet pollution reduction and flow control criteria. In addition to a pass or fail determination, the PAC outputs how much of the facility capacity is used. In cases where the facility is undersized, the program outputs the volume of water that has overflowed. Facility dimensions are then iteratively modified until the optimum facility size is reached.

Facilities designed according to the SWMM fall within four hierarchical categories. The appropriate category of facilities to use is selected based on several factors, the most important of which is the infiltration rates of the native soils. Category 1 is the most ideal and preferred and 4 is the least. Categories 1 and 2 include locations containing Natural Resource Conservation Service hydrologic soils groups in A or B class and are capable of infiltrating all stormwater design flows on site. Category 3 is for locations where soils have poor infiltration potential (hydrologic soils groups C or D), and overflows may be routed to an existing storm sewer system. Category 4 is the same as Category 3 with the exception that overflows are routed to a combined sewer system.

Infiltration tests were conducted at several locations within the project corridor by GeoDesign, Inc., using an encased falling head test. The results indicated that the soils are not conducive to infiltration, with hydraulic conductivities approaching 0 inches per hour.³ Local soils cannot meet Hierarchy Category 1 or 2 criteria, and Category 4 doesn't apply because combined sewers do not exist in the area. Thus, the project stormwater management design falls within Category 3. In addition to water quality treatment, Category 3 includes designing stormwater flow controls that release runoff downstream at rates associated with predevelopment conditions. The post-construction target discharge release rates are half of the predevelopment 2-year 24-hour storm event, and the 5-, 10-, and 25-year predevelopment 24-hour storm events.

² GeoDesign Inc., Report of Geotechnical Engineering Services SW Capitol Highway Plan Refinement, Attention: Michael P. Harrison, October 26, 2010.

³ GeoDesign Inc.

To size facilities, the project corridor is divided into subbasins from the four larger basins previously delineated by the Bureau of Environmental Services (BES).⁴ Subbasin delineations are based on centerline of the roadway, high points in the longitudinal profile, and the location of roadway intersections. The areas of these subbasins are required input parameters of the PAC which sizes facilities within the subbasins. The subbasins are illustrated in Attachment B, including alphabetical labeling and a table of corresponding subbasin areas (with a number following the letter in cases where the subbasin was further subdivided).

Stormwater Pollution-Reduction Facility Sizing

The BMP facility types supported by the PAC program include swales, ponds and planters. Available space for stormwater facilities within the corridor right-of-way is limited for this project. For this reason, and because planters can effectively be sized with a narrow footprint, they were chosen as the preferred and primary BMP. Planter BMPs treat stormwater by infiltration through a compost-amended soil growing medium. Facility configuration includes a perforated underdrain and a high flow bypass that conveys treated stormwater from the treatment facility to a detention facility where it is metered out at a prescribed rate.

Site and roadway design constraints prevent planter placement to maximize overall runoff treatment (i.e., at the bottom of each basin). Where needed, supplemental StormFilter vaults are proposed within the corridor in order to maximize total subbasin runoff water quality treatment. Like the planters, StormFilter flows and overflows are conveyed to detention pipes for flow control.

General assumptions for the conceptual design of the pollution reduction facilities include the following:

- According to the project scope, pollution-reduction facilities are sized to treat only impervious areas within the project limits. Contributing flows from off-site impervious and pervious surfaces were not considered in the conceptual designs.
- Conservatively, areas from the outer edge of the sidewalk to the centerline of the road are considered impervious, including planters and landscaping. These areas were used for PAC analyses and stormwater management facility sizing. Per BES guidance, all proposed planters include underdrain and overflow pipes that connect to cleanouts tied to the conveyance system.

The following assumptions are used for the Catchment Data tab in the PAC:

- Impervious Area Curve Number (CN) = 98 (default value)
- Time of Concentration = 5 minutes (conservative value per BES)
- Infiltration Testing Procedure = Encased Falling Head
- Native Soil Field Tested Infiltration Rate parameter set to 0.1 inches per hour because PAC will not allow an entry of zero. Because the geotechnical analysis showed little or no infiltration, the PAC facility configuration includes an artificial impermeable liner effectively reducing the calculated infiltration to the desired rate of 0 inches per hour.
- All facilities meet the 5-foot separation from high groundwater requirement.

⁴ Bureau of Environmental Services 2009.

The following parameters were entered into the Facility Design Data tab of the PAC:

- Hierarchy Category 3
- Facility Type = Flat or Sloped Planter, matching the slope of the adjacent roadway
- Facility slope assumed to be the centerline slope of the adjacent roadway
- Facility Configuration = D (includes perforated underdrain, overflow pipe, and waterproof liner)
- Growing Medium Depth = 18 inches (default value)
- Bottom Width = 2.5 feet on the west side of Capitol Highway and 3.5 feet on east side
- Maximum Storage Depth of Planters = 6 inches (per City of Portland standard design detail showing this as the maximum height between the bottom of the curb and the top of the growing medium).

The parameters listed above along with a facility bottom area are needed to perform a design analysis on the flat planters. Iterations are performed on the bottom area until the minimum size is found that meets the Pollution Reduction requirement. Sloped planters require more parameters to be entered in the Sloped Facilities Worksheet tab. Parameters which remain the same regardless of the slope planter location include the following:

- Downstream Check Dam Length parameter is set to 0.5 foot (assuming concrete curb-style check dams)
- Right and Left Side Slopes = 0 (assuming vertical walls within the planter)
- Downstream Depth = 6 inches (per City of Portland standard design detail SW-312)

Other parameters, including the longitudinal facility slope, the length of facility segments, and the bottom and landscape widths, varied based on location. The longitudinal facility slope is set in all cases equal to the slope of the adjacent roadway (Capitol Highway) centerline. Facility segment lengths (in between check dams) are set to the maximum length which still allows water to pond at the downstream extent of the segment. As the longitudinal slope gets steeper, the available area for ponding is reduced, resulting in shorter segments between check dams. The bottom width of planter facilities and associated landscaping are set at either 2.5 feet on the west side of the road or 3.5 feet on the east side.

The methodology above works for determining the minimum facility size needed to treat the entire subbasin. However, in some cases, site and project constraints prevent ideal locating of facilities to capture and treat all of the runoff within subbasins. In these cases, supplemental proprietary StormFilter devices are proposed to capture and provide water quality treatment in otherwise untreated areas. StormFilter devices are sized according to manufacturer recommendations. PAC output is included in Attachment C.

Detention Facility Sizing

According to the SWMM, detention facilities must be designed to release post-development flows at rates associated with predevelopment conditions. The PAC is used to determine both the post- and predevelopment flow rates and volumes. The difference between the pre- versus post-development volumes is used for sizing detention facilities. Runoff peak flows and total volumes are reported in the Catchment Data tab of the PAC for the 2-year through the 25-year storm events. Predevelopment conditions are determined by modifying the impervious curve number (CN) to a value that represents the assumed natural land cover. For this site, BES guidance included the predevelopment input parameters of CN of 76 and a time of concentration of 5 minutes. For respective events, the post-development detention target discharge rates include the following values:

- 50 percent of the predevelopment 2-year, 24-hour peak storm event flows
- The predevelopment 5-year, 24-hour peak storm event flows

- The predevelopment 10-year, 24-hour peak storm event flows
- The predevelopment 25-year, 24-hour peak storm event flows

Parametrix was tasked with conceptual sizing of detention pipes that would meet the volume and discharge requirements listed above, and the conceptual design of the supporting conveyance infrastructure needed to manage flows through the site to off-site discharge points. Consideration was not given for potential utility conflicts with the proposed stormwater management facility layout.

RESULTS

A project task includes incorporating the limited existing stormwater infrastructure within the project corridor into the conceptual design, to the maximum extent practicable. It became apparent early in the design process that existing facilities would likely need to be replaced based on their location relative to the proposed design needs and the substandard nature of the existing facilities. Therefore, these existing facilities were not included in the conceptual design.

Stormwater Pollution-Reduction Facility Results

Table 1 of Attachment C includes input parameters and resulting sizes of treatment planters for each subbasin (columns 1 and 2). Columns 3 through 6 are the fixed-variable parameters input into the PAC to perform design and columns 7 and 8 are the respective planter length and square foot input parameters. The column 7 cell values were iterated until a minimum planter was sized that will treat the entire corresponding subbasin. Column 9 represents the actual square feet of planter space available for each subbasin after other project features have been accommodated. For some subbasins, site limitations did not allow for planter installation (green highlighted cells) while, in other cases, the proposed facility area available is much greater than the minimum size required per the PAC. Ideally, planters would be located at the bottom of the subbasins in order to capture and treat all impervious surface runoff in the basin. However, site limitations (e.g., narrow right-of-way) and accommodating other project objectives (e.g., bus pullouts) limits ideal facility locating. Column 10 shows the impervious areas being treated within subbasins given the planter areas provided in the final roadway layout. Column 11 is the corresponding percentage of treated impervious area compared to the total impervious area. The value in the cell at the bottom of column 11 is 63 percent, reflecting the total project impervious area effectively treated given the planter locations provided in the preferred layout.

For subbasins with effectively treated areas of less than 75 percent, supplemental treatment is proposed using proprietary subsurface stormwater filtration vaults (StormFilter by Contech Stormwater Solutions) suggested by BES. Column 12 contains yellow highlighted cells indicating those subbasins with added StormFilters. These filtration vaults are primarily located at intersections and are assumed to capture 100 percent of the flow not treated by the planters described above. Column 13 represents total subbasin impervious surface runoff treatment including planters and StormFilters, where provided. In instances where two subbasins drain to a common point and a StormFilter is required for one of the basins (i.e., subbasins K and N), any flow not being treated by the planters in the other subbasin is routed through the StormFilter. There are nine locations where StormFilters of varying sizes (based on contributing area) are proposed (Attachment A). These filters result in an increase in the total effective impervious project area treated from 63 to 95 percent.

Detention Facility Results

Attachment C shows the output from the PAC with respect to pre-and post-development volumes for each subbasin (columns 1 and 2) and the associated detention pipe sizes required. Column 3 refers to the major drainage basins that the subbasins drain into. Columns 4 and 5 are the total volumes of water for predevelopment conditions for 50 percent of the 2-year event and the 25-year event. Analyses indicated that one of these two volumes would control facility sizing. Columns 6 and 7 are the respective total runoff from these subbasins for the

proposed conditions. The required detention volumes are determined from the maximum difference between post- and predevelopment volumes for all events. Column 8 is the difference between the pre- versus post-development volumes for the 25-year event, the design storm which consistently yielded the highest quantities. Columns 9 through 11 are the lengths of pipe required for detention based on pipe diameter.

Detention pipes with 72-inch diameters were selected for the conceptual design. To maximize available storage volumes, detention pipes should be installed relatively flat, and because the project is located on sloped and hilly terrain, long flat detention pipes will require deep and relatively costly excavation depths. Selecting larger diameter and shorter length pipes minimizes depth requirements and storage is accommodated by wider excavations. A preliminary comparison between various large pipes and their approximate construction costs yielded 72-inch diameter pipes as the most cost effective. To minimize the number of detention facilities required, subbasin detention is combined wherever feasible. Columns 12 and 13 indicate the basins that contribute flows to specific detention pipes and the lengths of the detention pipes. Accommodating the 72-inch diameter detention pipes within the stormwater conveyance system requires 96-inch diameter manholes at each end. Figures 1 through 4 (Attachment A) show the proposed detention, water quality treatment, and conveyance system layout within the limits of the project.

Note that subbasins E and G drain to BES major basin 3, and subbasins D and F drains to BES major basin 2, yet the proposed layout combines these flows into one detention facility in order to eliminate the need to construct two parallel detention pipes along the same alignment. To maintain balanced major basin separation, these flows will need to be split at the downstream flow control structure.

ADDITIONAL CONSIDERATIONS

The Stormwater Pollution Reduction Facility Design Table (Table 1 of Attachment C), column 8, indicates the total minimum square footage area needed to treat the runoff that can be captured by the collective individual planters within each subbasin. Column 9 indicates the total square footage planter area provided in the conceptual layout for each subbasin. Subtracting the corresponding values in column 8 from column 9 yields the excess planter area above that needed to treat what is captured. As shown in Table 1, the planter layouts for many subbasins include more planter area than needed to treat flow being directed to those planters. During design, the City could consider limiting planter area to only what is needed to treat flows from project surfaces.

Given the location of proposed detention facilities within the constrained and busy Capitol Highway right-of-way, and the lack of a convenient traffic bypass, maintenance of these facilities could be challenging along the corridor. During design, consideration could be given to relocating detention facilities outside of the project limits to areas of lower traffic volume. Such off-site underground or surface detention systems also have the potential for achieving construction, operations and/or maintenance cost savings.

Prior to project construction, additional analysis is needed to determine downstream drainage improvements necessary for compliance with the City's stormwater conveyance and discharge requirements. BES has performed a planning level analysis of these potential improvements⁵, and identified the following concerns, by basin:

⁵ Bureau of Environmental Services, SW Capitol Highway Refinement Plan Stormwater Disposal Drainage Assessment Technical Memorandum, To: Ross Swanson, Portland Office of Transportation, November 16, 2010.

Basin 1

- Based on currently available information, no drainage improvements downstream of the proposed discharge point are identified for this basin. However, the capacity and condition of stormwater infrastructure in Basin 1 has not been assessed, and ownership of all stormwater system elements has not been determined.

Basin 2

- Discharge of stormwater from the project site will require construction of storm sewer infrastructure in SW Alice and SW 42nd Avenue and stormwater outfall improvements to the Woods Creek tributary.

Basin 3

- The existing storm sewer system between SW Capitol Highway at SW Dolph Court and outfall ACW912 likely does not meet current disposal requirements. Discharge at this location will likely require downstream drainage improvements. Additional stormwater improvements may also be needed further downstream of outfall ACW912.

Basin 4

- Discharge of stormwater runoff at SW Capitol Highway at SW 40th Avenue would require extension and upgrade of the storm sewer in SW 40th Avenue. If instead, discharge were to occur at SW Capitol Highway and SW Garden Home Road, based on information currently available, no drainage improvements are identified.

Attachment A

Conceptual Stormwater Facility Layout

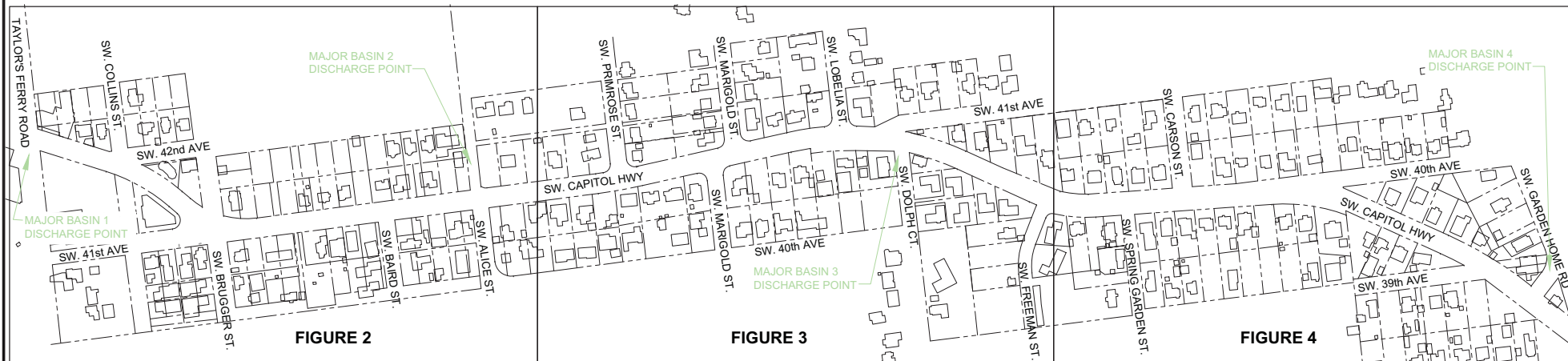
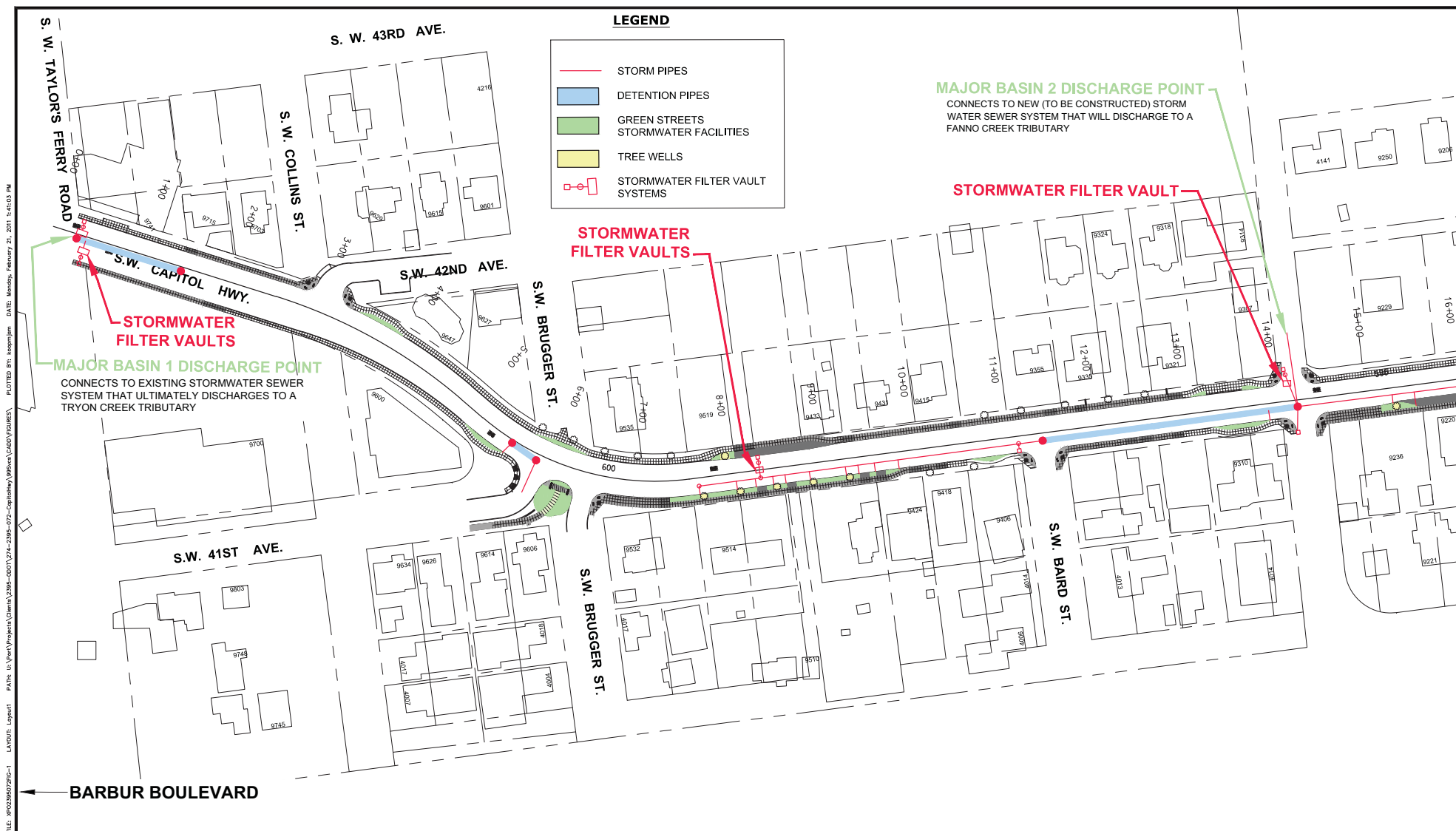


Figure 1
Capitol Highway Plan Refinement
Conceptual Stormwater Management Facility Layout
Key Map



Parametrix DATE: February 21, 2011 FILE: XPO2395072FIG-1



Figure 2
Capitol Highway Plan Refinement
Conceptual Stormwater Management Facility Layout

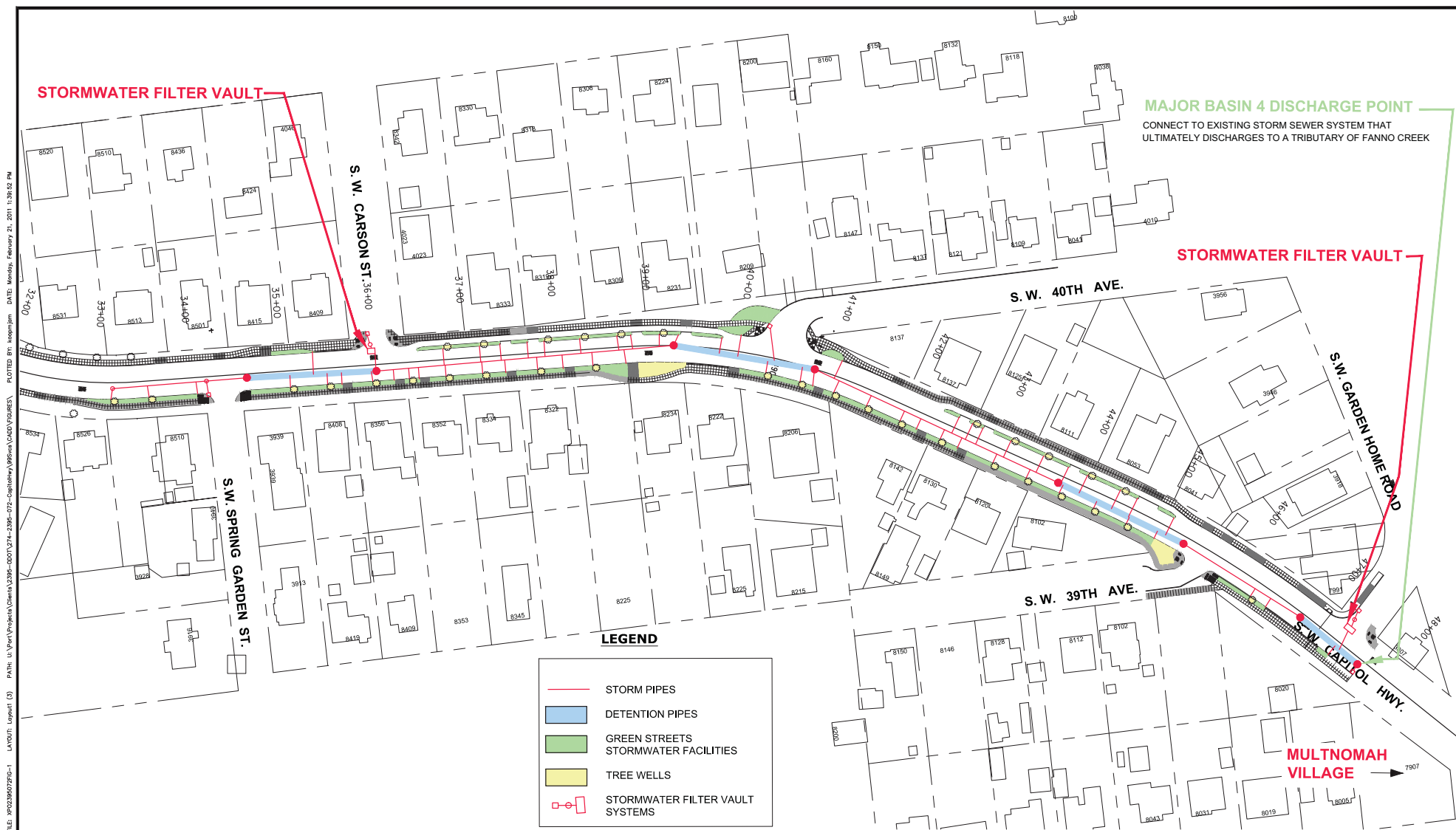
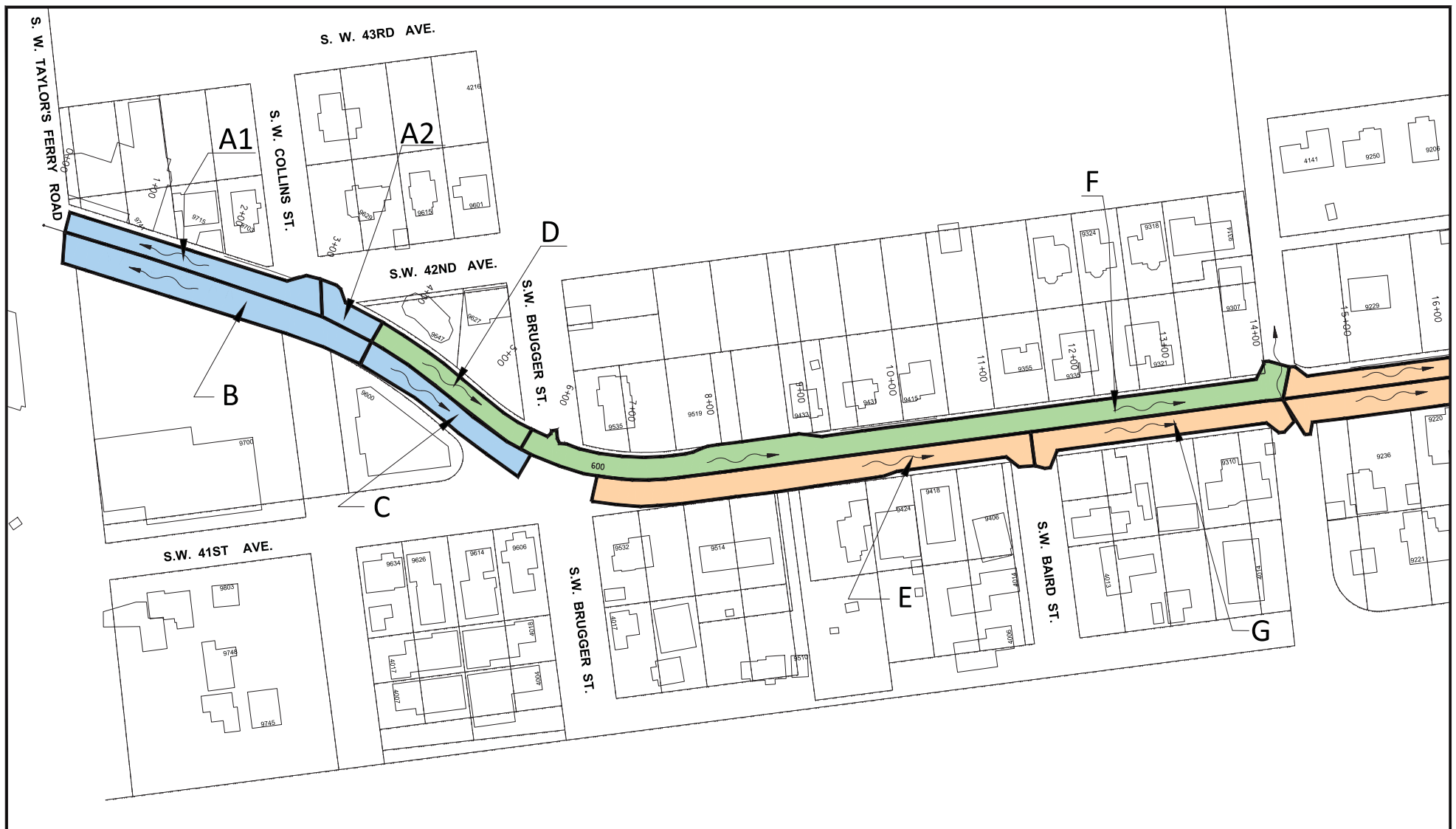


Figure 4
Capitol Highway Plan Refinement
Conceptual Stormwater Management Facility Layout

Attachment B

Corridor Basin Delineations



Parametrix DATE: February 21, 2011 FILE: XPO2395072FIG-2

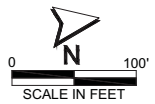


Figure B
Capitol Highway Plan Refinement
Corridor Basin Delineations

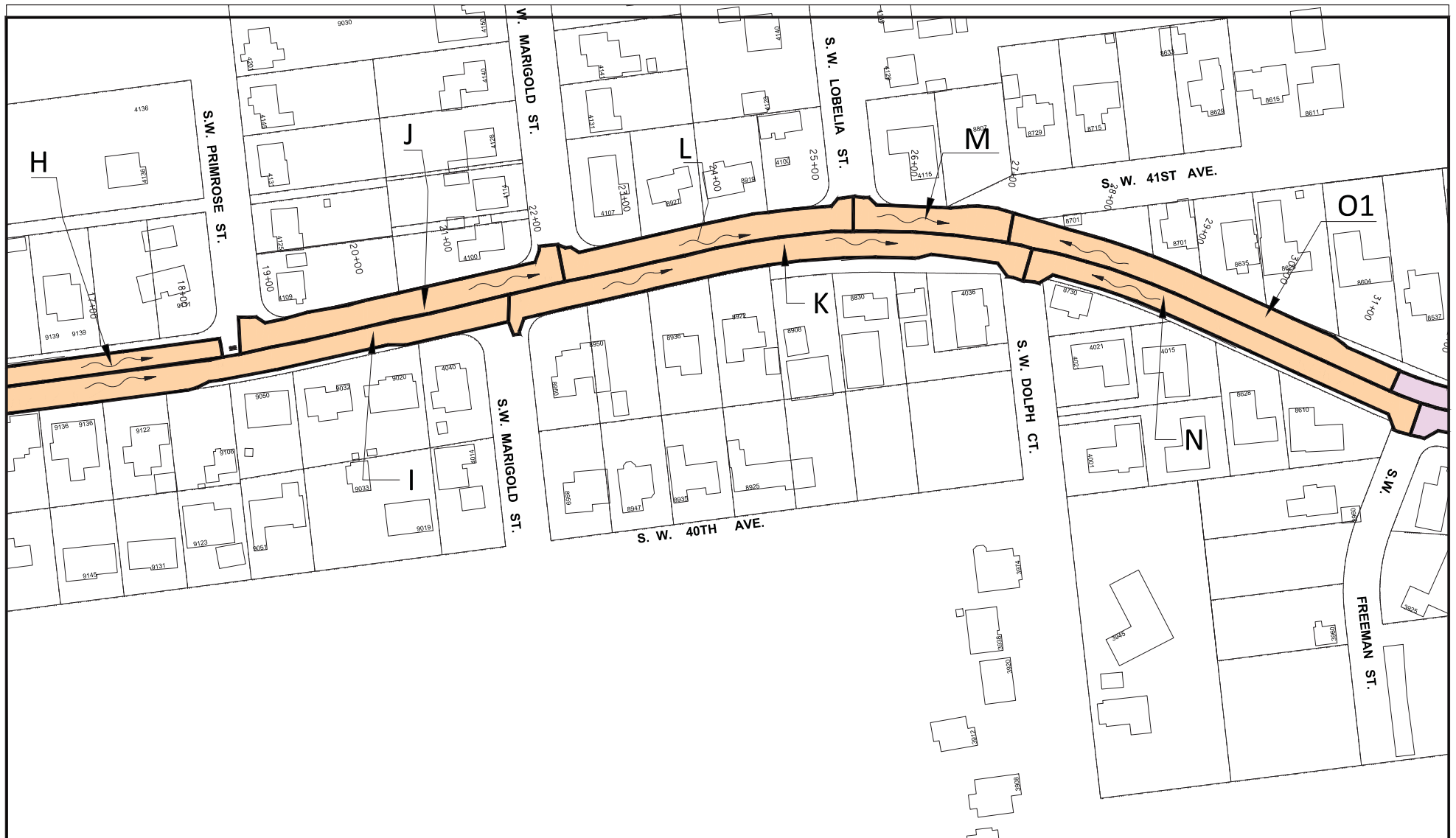


Figure C
Capitol Highway Plan Refinement
Corridor Basin Delineations



Parametrix DATE: February 21, 2011 FILE: XPO2395072FIG-2



Figure D
Capitol Highway Plan Refinement
Corridor Basin Delineations

Attachment C

PAC Output Design Tables

Table 1: Stormwater Pollution Reduction Facility Design

1	2	3	4	5	6	7	8	9	10	11	12	13
Subbasin ID	Block Description	Subbasin Impervious Area, sf	Facility Slope, %	Facility Width	Facility Type	PAC Min. Facility Length, ft	Min. Facility Size per PAC, sf	Total Proposed Facility Sizes, sf	Effectively Treated Area, sf (Planters)	% of Total Area Treated with Planters	Effectively Treated Area, sf (Planters and SWF)	Effectively Treated % (Planters & SWF)
A1	Collins to Taylors Ferry (West)	6913	2%	2.50	Sloped	55	138	0	0	0%	6913	100%
A2	Collins to High Point	2003	0%	2.50	Flat	15	38	0	0	0%	2003	100%
B	Collins to Taylors Ferry (East)	11084	2%	3.50	Sloped	65	228	0	0	0%	11084	100%
C	Brugger to Collins (East)	5392	0%	3.50	Flat	30	105	137	4413	82%	4413	82%
D	Brugger to Collins (West)	4869	0%	2.50	Flat	35	88	0	0	0%	4869	100%
E	Baird to Brugger (East)	13223	1%	3.50	Sloped	75	263	772	11917	90%	11917	90%
F	Alice to Brugger (West)	21992	1%	2.50	Sloped	170	425	0	0	0%	21992	100%
G	Alice to Baird (East)	7307	1%	3.50	Sloped	40	140	179	6189	85%	6189	85%
H	Primrose to Alice (West)	8975	6%	2.50	Sloped	96	240	244	8703	97%	8703	97%
I	Marigold to Alice (East)	20231	6%	3.50	Sloped	160	560	864	19083	94%	19083	94%
J	Marigold to Primrose (West)	10776	6%	2.50	Sloped	120	300	365	6920	64%	10776	100%
K	Dolph to Marigold (East)	16352	5%	3.50	Sloped	130	455	1111	13342	82%	16352	100%
L	Lobelia to Marigold (West)	9550	6%	2.50	Sloped	104	260	514	8176	86%	8176	86%
M	Dolph to Lobelia (West)	5450	5%	2.50	Sloped	65	163	241	4005	73%	5450	100%
N	Dolph to Freeman (East)	11527	0%	3.50	Flat	60	210	0	0	0%	11527	100%
O1	Dolph to Freeman (West)	12756	2%	2.50	Sloped	100	250	541	9546	75%	12756	100%
O2	Freeman to Carson (West)	11968	6%	2.50	Sloped	128	320	141	5222	44%	11968	100%
P	Freeman to Spring Garden (East)	6982	2%	3.50	Sloped	40	140	401	6085	87%	6085	87%
Q	Spring Garden to 39th (East)	32439	4%	3.50	Sloped	210	735	4554	30819	95%	30819	95%
R	Carson to 40th (West)	14695	4%	2.50	Sloped	135	338	767	11673	79%	11673	79%
S	40th to Garden Home (West)	17716	4%	2.50	Sloped	165	413	520	11572	65%	17716	100%
T	SW 39th to 37th (East)	7648	5%	3.50	Sloped	65	228	272	6677	87%	6677	87%
									Grand Total Treated:	63%	Grand Total Treated:	95%

Green highlighted cells indicate basins where planters were not used.

Yellow highlighted cells indicate basins that receive treatment from the proprietary stormwater filters (SWF).

Table 2: Detention Facility Design

1	2	3	4	5	6	7	8	9	10	11	12	13
			Pre-developed Conditions		Post-developed Conditions			Detention Volume Requirements				
Subbasin ID	Block Description	Drainage Basin	50% of 2-yr V, cf	25-yr V, cf	2-yr V, cf	25-yr V, cf	$\Delta V, cf$	48" Dia Pipe Length Req'd, ft	60" Dia Pipe Length Req'd, ft	72" Dia Pipe Length Req'd, ft	Detention Pipe Grouping, Pipe Subbasin Location Shown in Bold	72" Detention Pipe Length
A1	Collins to Taylors Ferry (West)	1	183	958	1251	2112	1154	92	59	41	A1, A2, B	118
A2	Collins to High Point (West)	1	53	277	362	612	335	27	17	12	C	32
B	Collins to Taylors Ferry (East)	1	293	1535	2006	3386	1851	147	94	65	D, E, F, G	280
C	Brugger to Collins (East)	1	142.5	747	976	1647	900	72	46	32	H, 50% I	113
D	Brugger to Collins (West)	2	129	674	881	1487	813	65	41	29	J, 50% I	123
E	Baird to Brugger (East)	3	350	1832	2393	4039	2207	176	112	78	L, 50% K	105
F	Alice to Brugger (West)	2	581.5	3046	3979	6717	3671	292	187	130	M, 50% K	80
G	Alice to Baird (East)	3	193.5	1012	1322	2232	1220	97	62	43	N , O1	143
H	Primrose to Alice (West)	3	237.5	1243	1624	2741	1498	119	76	53	O2, P, 20% Q	143
I	Marigold to Alice (East)	3	535	2803	3661	6179	3376	269	172	119	R, 40% Q	169
J	Marigold to Primrose (West)	3	285	1493	1950	3291	1798	143	92	64	70% S , 40% Q	152
K	Dolph to Marigold (East)	3	432.5	2265	2959	4995	2730	217	139	97	30% S , T	77
L	Lobelia to Marigold (West)	3	252.5	1323	1728	2917	1594	127	81	56		
M	Dolph to Lobelia (West)	3	144	755	986	1665	910	72	46	32		
N	Dolph to Freeman (East)	3	305	1597	2086	3521	1924	153	98	68		
O1	Dolph to Freeman (West)	3	337.5	1767	2308	3896	2129	169	108	75		
O2	Freeman to Carson (West)	4	316.5	1658	2166	3656	1998	159	102	71		
P	Freeman to Spring Garden (East)	4	184.5	967	1263	2133	1166	93	59	41		
Q	Spring Garden to 39th (East)	4	858	4494	5870	9908	5414	431	276	191		
R	Carson to 40th (West)	4	388.5	2036	2659	4489	2453	195	125	87		
S	40th to Garden Home (West)	4	468.5	2454	3206	5411	2957	235	151	105		
T	SW 39th to 37th (East)	4	202.5	1059	1384	2336	1277	102	65	45		

*Highlighted column represents the selected detention pipe diameter.

Cost Estimates



APPENDIX C

CITY OF PORTLAND, OREGON
BUREAU OF TRANSPORTATION
PRELIMINARY ENGINEER'S ESTIMATE
SW CAPITOL HIGHWAY PLAN REFINEMENT - SUMMARY OF IMPROVEMENTS

TOTAL CONSTRUCTION - SURFACE IMPROVEMENTS			\$	4,812,266
TOTAL CONSTRUCTION - SUBSURFACE STORMWATER IMPROVEMENTS			\$	3,027,643
TOTAL CONSTRUCTION SUBTOTAL			\$	7,839,910
DESIGN PM/ AGENCY STAFF			\$	305,000
CONSULTANT ENGINEERING (20% Construction Price)		20%		\$1,567,982
CONSTRUCTION MANAGEMENT			\$	926,000
SUBTOTAL			\$	2,798,982
PROJECT ENGINEERING & MANAGEMENT OVERHEAD			\$	810,000
TOTAL PROJECT ENGINEERING & MANAGEMENT			\$	3,608,982
RIGHT-OF-WAY LAND, IMPROVEMENTS, AND DAMAGES			\$	-
RIGHT-OF-WAY APPRAISAL, TITLE INSURANCE, AND NEGOTIATION			\$	-
RIGHT-OF-WAY CONTINGENCY		30%		-
TOTAL PROJECT RIGHT-OF-WAY			\$	1,250,000
INFLATION RATE ON CONTRACT	3	8%	\$	2,036,119
INFLATION RATE ON PERSONNEL	3	3.8%	\$	427,256
ESTIMATE CONTINGENCY FOR UNDEFINED OR CHANGE IN SCOPE		25%	\$	1,959,977.44
TOTAL PROJECT CONTINGENCY			\$	4,423,352
TOTAL PROJECT ESTIMATE			\$	17,122,244

CITY OF PORTLAND, OREGON
BUREAU OF TRANSPORTATION
PRELIMINARY ENGINEER'S ESTIMATE
SW CAPITOL HIGHWAY PLAN REFINEMENT - SURFACE IMPROVEMENTS

BID ITEMS

NO.	ITEMS OF WORK AND MATERIALS	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION (8%)	8%	LS	\$ 264,759.39	\$ 264,759.39
2	TEMPORARY PROTECTION & DIRECTION OF TRAFFIC (4%)	4%	LS	\$ 132,379.69	\$ 132,379.69
3	TEMPORARY SIGNS	600.00	SQFT	\$ 23.41	\$ 14,046.00
4	TEMPORARY BARRICADES, TYPE III	10.00	EACH	\$ 199.00	\$ 1,990.00
5	TEMPORARY PLASTIC DRUMS	125.00	EACH	\$ 70.24	\$ 8,780.00
6	TEMPORARY FLEXIBLE PAVEMENT MARKERS	1,000.00	EACH	\$ 1.99	\$ 1,990.00
7	TEMPORARY STRIPING	9,500.00	FOOT	\$ 0.23	\$ 2,185.00
8	STRIPING & STRIPE REMOVAL MOBILIZATION	3.00	EACH	\$ 403.86	\$ 1,211.58
9	FLAGGERS	2,000.00	HOUR	\$ 44.48	\$ 88,960.00
10	EROSION CONTROL (1.5%)	1.5%	LS	\$ 49,642.39	\$ 49,642.39
11	SEDIMENT FENCE, UNSUPPORTED	4,750.00	FOOT	\$ 3.51	\$ 16,672.50
12	INLET PROTECTION	34.00	EACH	\$ 105.35	\$ 3,581.90
13	POLLUTION CONTROL PLAN (0.5%)	0.5%	LS	\$ 16,547.46	\$ 16,547.46
14	REMOVAL OF STRUCTURES & OBSTRUCTIONS (3%)	3%	LS	\$ 99,284.77	\$ 99,284.77
15	CLEARING AND GRUBBING (1%)	1%	LS	\$ 33,094.92	\$ 33,094.92
16	TREE ROOT REMOVAL	40.00	HOUR	\$ 180.00	\$ 7,200.00
17	TREE TRIMMING	40.00	HOUR	\$ 350.00	\$ 14,000.00
18	TREE REMOVAL, 12 INCH	30.00	EACH	\$ 690.00	\$ 20,700.00
19	GENERAL EXCAVATION	5,970.74	CUYD	\$ 24.58	\$ 146,760.81
20	12 INCH SUBGRADE STABILIZATION	540.00	SQYD	\$ 15.22	\$ 8,218.80
21	SUBGRADE GEOTEXTILE	5,397.00	SQYD	\$ 1.76	\$ 9,498.72
22	VIDEO INSPECTION OF SEWERS, MAINLINE	2,400.00	FOOT	\$ 2.00	\$ 4,800.00
23	TRENCH EXCAVATION, COMMON	783.33	CUYD	\$ 20.00	\$ 15,666.67
24	POTHOLE EXCAVATION	3.00	EACH	\$ 250.00	\$ 750.00
25	TRENCH BACKFILL, CLASS B	678.89	CUYD	\$ 23.00	\$ 15,614.44
26	STORMWATER PLANTERS	11,520.00	SQFT	\$ 20.00	\$ 230,400.00
27	3 INCH DRAIN PIPE	9,400.00	FOOT	\$ 16.39	\$ 154,066.00
28	SUBSURFACE DRAIN OUTLETS	19.00	EACH	\$ 152.18	\$ 2,891.42
29	MINOR ADJUSTMENT OF MANHOLES	6.00	EACH	\$ 790.16	\$ 4,740.96
30	TRENCH RESURFACING	261.11	SQYD	\$ 79.60	\$ 20,784.44
31	RETAINING WALL, CAST-IN-PLACE CONCRETE	4920.00	SQFT	\$ 66.43	\$ 326,835.60
32	COLD PLANE PAVEMENT REMOVAL, 2 INCH DEEP	1,280.00	SQYD	\$ 3.00	\$ 3,840.00
33	AGGREGATE BASE	1,994.00	TON	\$ 29.27	\$ 58,364.38
34	LEVEL 3, 1/2 INCH DENSE, MHMAC MIXTURE	4,609.00	TON	\$ 85.81	\$ 395,498.29
35	EXTRA FOR ASPHALT APPROACHES	65.00	EACH	\$ 567.74	\$ 36,903.10
36	CONCRETE CURBS, STANDARD CURB	4,151.00	FOOT	\$ 18.73	\$ 77,748.23
37	CONCRETE CURBS, THICKENED CURB AND GUTTER	1,779.00	FOOT	\$ 30.00	\$ 53,370.00
38	CONCRETE DRIVEWAYS	12,770.00	SQFT	\$ 7.02	\$ 89,645.40
39	MONOLITHIC CURB AND SIDEWALKS	46,910.00	SQFT	\$ 9.66	\$ 453,150.60
40	6 INCH CONCRETE SURFACING	9,500.00	SQFT	\$ 11.12	\$ 105,640.00
41	CONCRETE SIDEWALK RAMPS	59.00	EACH	\$ 1,463.25	\$ 86,331.75
42	CONCRETE BUS SHELTER PADS	15.00	EACH	\$ 678.95	\$ 10,184.25
43	DETECTABLE WARNING SURFACE	590.00	SQFT	\$ 46.82	\$ 27,623.80
44	THERMOPLASTIC, NON-PROFILE, 120 MILS, EXTRUDED	21,930.00	FOOT	\$ 1.11	\$ 24,342.30
45	PAVEMENT LEGEND, TYPE B: BICYCLE LANE SYMBOLS	40.00	EACH	\$ 250.51	\$ 10,020.40
46	PAVEMENT BAR, TYPE A	270.00	SQFT	\$ 4.33	\$ 1,169.10
47	REMOVE & REINSTALL EXISTING SIGNS	30.00	LS*	\$ 140.00	\$ 4,200.00
48	TYPE "G" SIGNS IN PLACE	18.00	SQFT	\$ 32.78	\$ 590.04
49	TYPE "W1" SIGNS IN PLACE	48.00	SQFT	\$ 24.58	\$ 1,179.84
50	TYPE "W2" SIGNS IN PLACE	24.00	SQFT	\$ 25.58	\$ 613.92
51	PERMANENT SEEDING	2.00	ACRE	\$ 2,019.29	\$ 4,038.58
52	TOPSOIL	54.00	CUYD	\$ 32.66	\$ 1,763.64
53	SOIL CONDITIONER	27.00	CUYD	\$ 45.95	\$ 1,240.65
54	DECIDUOUS TREES, 2-1/2 INCH CALIPER	125.00	EACH	\$ 741.39	\$ 92,673.75
55	ADDITIONAL ESTABLISHMENT PERIOD	125.00	YEAR*	\$ 264.12	\$ 33,015.00
56	LANDSCAPING PLANTER	2,920.00	SQFT	\$ 10.00	\$ 29,200.00
57	CL-4R CHAIN-LINK FENCE WITH VINYL CLAD FABRIC	900.00	FOOT	\$ 20.25	\$ 18,225.00
58	SINGLE MAILBOX SUPPORTS	15.00	EACH	\$ 273.92	\$ 4,108.80
59	MULTIPLE MAILBOX SUPPORTS	10.00	EACH	\$ 389.81	\$ 3,898.10
60	MAILBOX CONCRETE COLLARS	25.00	EACH	\$ 120.57	\$ 3,014.25
61	BOARDWALK	590.00	SQFT	\$ 25.00	\$ 14,750.00
62	6 INCH DUCTILE IRON PIPE	1,725.00	FOOT	\$ 119.99	\$ 206,982.75
63	8 INCH DUCTILE IRON PIPE	900.00	FOOT	\$ 99.85	\$ 89,865.00
64	12 INCH DUCTILE IRON PIPE	900.00	FOOT	\$ 124.96	\$ 112,464.00
65	6 INCH GATE VALVE	9.00	EACH	\$ 1,002.03	\$ 9,018.27
66	8 INCH GATE VALVE	5.00	EACH	\$ 1,258.40	\$ 6,292.00
67	12 INCH GATE VALVE	5.00	EACH	\$ 1,275.95	\$ 6,379.75
68	2 INCH SERVICE LINE, SHORT RUN	56.00	EACH	\$ 1,960.76	\$ 109,802.56

* Unit Price Shown is on Each or Foot Basis

Note: Values in Blue are a Percentage of Contract

TOTAL BID ITEMS

\$ 3,905,200.96

ANTICIPATED ITEMS

NO.	ITEMS OF WORK AND MATERIALS	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
1	ADJUST WATER FACILITIES - FIRE HYDRANT	9.00	EACH	\$ 12,000.00	\$ 108,000.00
2	ADJUST WATER FACILITIES - METER	56.00	EACH	\$ 1,000.00	\$ 56,000.00
3	STREET LIGHTING - INSTALL ARMS AND LUMINAIRES	30.00	EACH	\$ 550.00	\$ 16,500.00
4	STORMWATER PLANTINGS AND PLANT ESTABLISHMENT	11,520.00	SQFT	\$ 9.00	\$ 103,680.00
5	LANDSCAPE NONSTORMWATER PLANTINGS AND PLANT ESTABLISHMENT	2920.00	SQFT	\$ 10.00	\$ 29,200.00
6	ASPHALT CEMENT ESCALATION	1.00	LS	\$ 1,000.00	\$ 1,000.00
7	FUEL ESCALATION	1.00	LS	\$ 3,000.00	\$ 3,000.00
8	BOLI FEE PAYMENT	1.00	LS	\$ 3,905.20	\$ 3,905.20
9	CONTRACT CONTINGENCY (REQUIREMENT TO ACCEPT BIDS UP TO 10% OVER	1.00	LS	\$ 390,520.10	\$ 390,520.10

TOTAL ANTICIPATED ITEMS

\$ 711,805.30

SCHEDULE SUMMARY

BID ITEMS	\$ 3,905,201
CONSTRUCTION CONTINGENCY	\$ 195,260
SUBTOTAL	\$ 4,100,461
ANTICIPATED ITEMS	\$ 711,805
TOTAL CONSTRUCTION	\$ 4,812,266

CITY OF PORTLAND, OREGON
BUREAU OF TRANSPORTATION
PRELIMINARY ENGINEER'S ESTIMATE
SW CAPITOL HIGHWAY PLAN REFINEMENT - SUBSURFACE STORMWATER IMPROVEMENTS

BID ITEMS

NO.	ITEMS OF WORK AND MATERIALS	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION (8%)	8%	LS	\$ 177,216.18	\$ 177,216.18
2	TEMPORARY PROTECTION & DIRECTION OF TRAFFIC (4%)	4%	LS	\$ 88,608.09	\$ 88,608.09
3	EROSION CONTROL (1.5%)	1.5%	LS	\$ 33,228.03	\$ 33,228.03
4	POLLUTION CONTROL PLAN (0.5%)	0.5%	LS	\$ 11,076.01	\$ 11,076.01
5	REMOVAL OF STRUCTURES & OBSTRUCTIONS (3%)	3%	LS	\$ 66,456.07	\$ 66,456.07
6	CLEARING AND GRUBBING (1%)	1%	LS	\$ 22,152.02	\$ 22,152.02
7	TRENCH EXCAVATION, COMMON	11,727.70	CUYD	\$ 20.00	\$ 234,554.07
8	TRENCH BACKFILL, CLASS B	9,922.61	CUYD	\$ 23.00	\$ 228,219.97
9	10 INCH PIPE, HDPE ASTM F714 SDR 26 BEDDING TYPE:D	2,052.00	FOOT	\$ 88.97	\$ 182,566.44
10	12 INCH PIPE, HDPE ASTM F714 SDR 26 BEDDING TYPE:D	2,335.00	FOOT	\$ 69.07	\$ 161,278.45
11	12 INCH PIPE, STEEL REINF HDPE (CONTECH)	1,384.00	FOOT	\$ 175.00	\$ 242,200.00
12	CONCRETE MANHOLES, 48 INCH, 0-8 FT DEPTH	7.00	EACH	\$ 3,160.62	\$ 22,124.34
13	CONCRETE MANHOLES, SEDIMENTATION	8.00	EACH	\$ 8,779.50	\$ 70,236.00
14	CONCRETE MANHOLES, DETENTION, 96 INCH, 15 FT DEEP	25.00	EACH	\$ 24,000.00	\$ 600,000.00
15	CONCRETE INLETS, TYPE G-1	19.00	EACH	\$ 1,551.05	\$ 29,469.95
16	STORM WATER FILTERS (CONTECH)	1.00	LS	\$ 261,000.00	\$ 261,000.00
17	TRENCH RESURFACING	22.44	SQYD	\$ 79.60	\$ 1,786.58
18	6 INCH DUCTILE IRON PIPE	575.00	FOOT	\$ 119.99	\$ 68,994.25
19	8 INCH DUCTILE IRON PIPE	300.00	FOOT	\$ 99.85	\$ 29,955.00
20	12 INCH DUCTILE IRON PIPE	300.00	FOOT	\$ 124.96	\$ 37,488.00
21	6 INCH GATE VALVE	3.00	EACH	\$ 1,002.03	\$ 3,006.09
22	8 INCH GATE VALVE	2.00	EACH	\$ 1,258.40	\$ 2,516.80
23	12 INCH GATE VALVE	2.00	EACH	\$ 1,275.95	\$ 2,551.90
24	12 INCH SERVICE LINE, SHORT RUN	19.00	EACH	\$ 1,960.76	\$ 37,254.44

* Unit Price Shown is on Each or Foot Basis

Note: Values in Blue are a Percentage of Contract

TOTAL BID ITEMS

\$ 2,613,938.68

ANTICIPATED ITEMS

NO.	ITEMS OF WORK AND MATERIALS	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL AMOUNT
1	ADJUST WATER FACILITIES - METER	19.00	EACH	\$ 1,000.00	\$ 19,000.00
2	BOLI FEE PAYMENT	1.00	LS	\$ 2,613.94	\$ 2,613.94
3	CONTRACT CONTINGENCY (REQUIREMENT TO ACCEPT BIDS UP TO 10% OVER	1.00	LS	\$ 261,393.87	\$ 261,393.87

TOTAL ANTICIPATED ITEMS

\$ 283,007.81

SCHEDULE SUMMARY

BID ITEMS		\$ 2,613,939
CONSTRUCTION CONTINGENCY	5% of Bid Items *	\$ 130,697
SUBTOTAL		\$ 2,744,636
ANTICIPATED ITEMS		\$ 283,008
TOTAL CONSTRUCTION		\$ 3,027,643

Open House Summaries



APPENDIX D

SW Capitol Highway Refinement Plan

Public Open House

July 17, 2010

Multnomah Center

SUMMARY

An open house for the SW Capitol Highway Refinement Plan was held on Saturday, July 17 from 9 a.m. to 12 p.m. at the Multnomah Center Auditorium on Capitol Highway. Over 90 people attended the event, with the majority identifying themselves as living on or near Capitol Highway. Fifty-seven (57) attendees submitted questionnaires, which were distributed at the open house.

Meeting purpose

The purpose of the meeting was to share information and gather feedback from area residents, businesses, property owners, and other roadway users on proposed streetscape improvements on SW Capitol Highway from south of the bridge over Multnomah Boulevard to Taylors Ferry Road. The proposed improvements address bicycle and pedestrian access, stormwater management, intersection realignments, and other improvements. The proposed improvements are a refinement of the 1996 *Capitol Highway Plan*. Public input from the open house will help the project team and Citizen Advisory Committee develop the *SW Capitol Highway Refinement Plan*.

Meeting notification

The Portland Bureau of Transportation mailed more than 950 invitation postcards to residents and businesses along the project corridor and encompassing approximately three blocks on either side. Advertisements were placed in the SW Connection, the Southwest Portland Post, and appeared in the SWNI's Southwest Neighborhood News. Additionally, flyers were produced and placed on display at the Multnomah Center, the Southwest Community Center, the Capitol Hill Library and the Hillsdale Library. Signs were placed in the public right-of-way along the route, and email notices were sent to neighborhood associations and other interested parties. The project webpage and SWNI's webpage listed the meeting, and the City of Portland's Office of Neighborhood Involvement listed it on their Southwest Neighborhood News and Events Calendar. Citizen Advisory Committee members distributed information to their constituents.

Open house format and attendance

Project team members were available at five information stations to discuss the project, answer questions, and encourage attendees to document their comments and ideas. Displays presented information on project purpose and objectives, project history and background of the 1996 plan, opportunities and constraints, possible streetscape design features, and three alternative options of typical cross-sections. Additional information on stormwater management, existing trees and parking was also presented.

Community Input

Attendees were asked to comment on the project in general and provide specific feedback on three typical cross-section alternatives. Community input was collected from 57 questionnaires, at the information stations, through a prioritization exercise, on area maps, and through discussions with project team members.

These different forms of public feedback provided the project team with a wide variety of suggestions, questions, and concerns. However, a consistent theme throughout the public comment was concern that the existing Capitol Highway has serious issues, and improvements are needed for the safety of all modes. In particular, participants were interested in safe walkways. While the responses to the priority exercise indicated a strong interest in walkways on both sides of the road, a number of other written and verbal comments suggested that, at a minimum, a walkway should be provided on one side; for some participants this was seen as preferable in order to minimize impact on neighbors, preserve existing trees and/or minimize project costs. Other key themes in the written and verbal comments included interest in roadway crossing improvements (especially if one-side-only pedestrian facilities are built), improvements to intersections, reducing car speeds, and resolving existing sightline issues related to overgrown vegetation.

Copies of all questionnaires, flipcharts, and map comments are available on the website: <http://www.portlandonline.com/transportation/index.cfm?c=51637> For privacy purposes, the questionnaire pages containing personal information have not been posted to the website.

The following is a summary of input collected at the meeting.

Mode of Travel

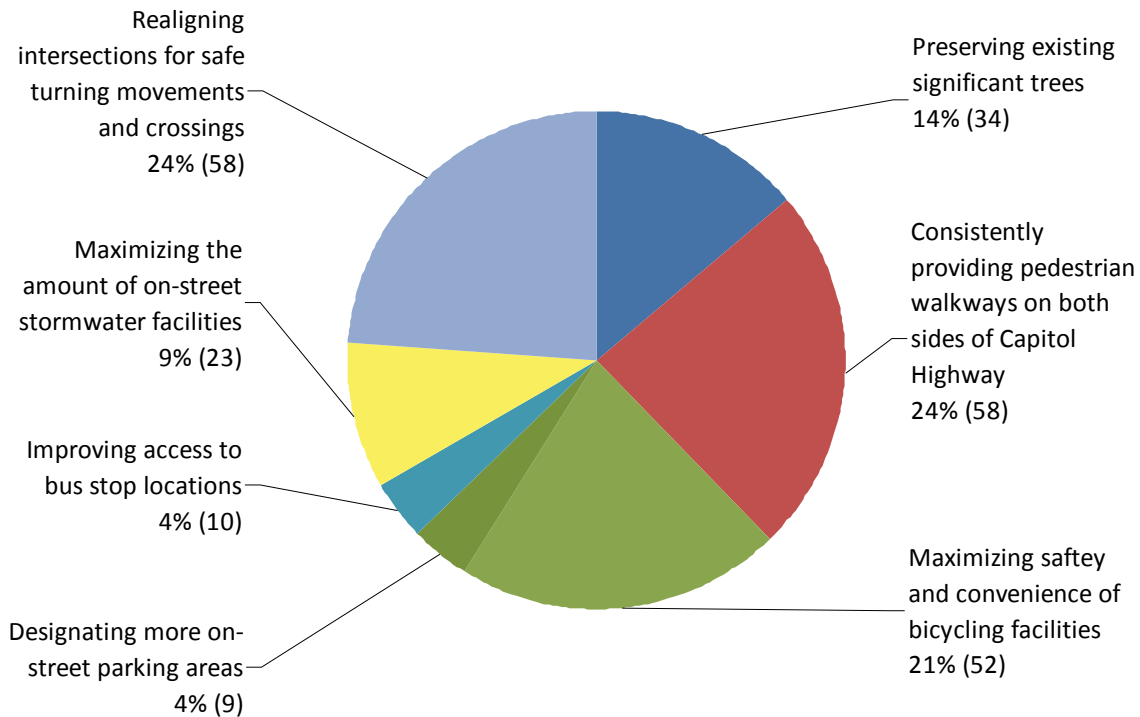
Of the 57 questionnaires collected, the majority of respondents indicated that they live near Capitol Highway (84%) and use multiple means of traveling on the roadway. *(Because multiple travel modes are used, the total exceeds 100%.)*

Modes of Travel
Walk 82%
Car 82%
Bike 43%
Bus 41%

Community Priorities

Because project constraints will require tradeoffs in the design, and possibly on near-term improvements versus long-term improvements, participants were asked to prioritize streetscape elements. Each attendee was given four dots and asked to assign them based on importance. Participants were asked to place one dot on elements they felt were important and two dots on elements that were extremely important. 61 attendees participated in the exercise, using a total of 244 dots. The following shows the summary of the dot allocation:

What are your priorities?



The top priorities of participants were pedestrian walkways on both sides, improved intersections, and safe and convenient bicycle facilities. Additional on-street parking and improved access to bus stops were less important.

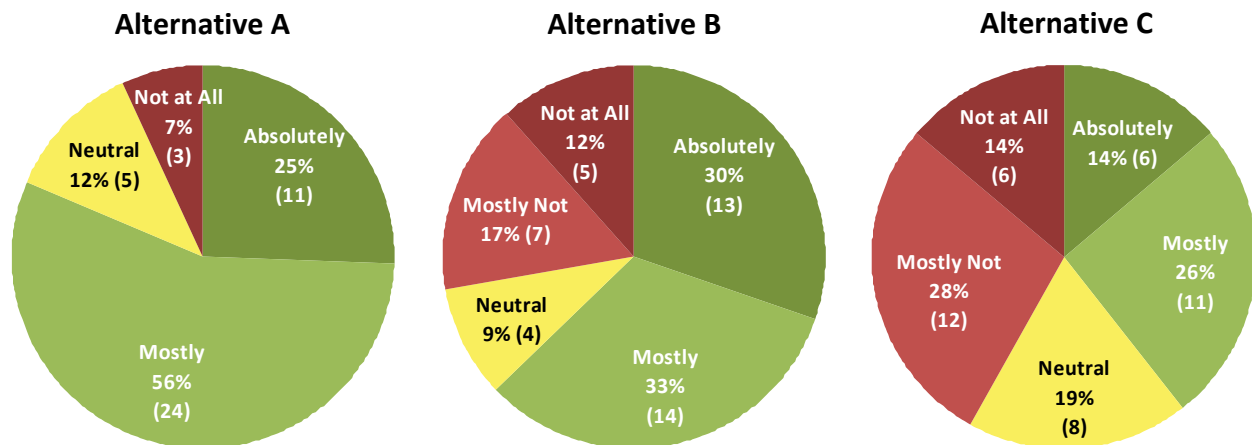
Project Alternatives

Attendees were also asked questions on how well each of the three “typical cross-section alternatives” met the project purpose and objectives. Each alternative cross-section offers a different way of meeting pedestrian, bicycle, and motor vehicle needs, as well as managing stormwater. The differences are in the size and type of facilities and in the placement of the bicycle and pedestrian improvements. The following highlights the major differences in the cross-section alternatives:

	Features of the Typical Cross-Section Alternatives			
	Pedestrian Sidewalk (both sides)	Stormwater/Furnishing Zone <i>landscaped buffer</i> (both sides)	Bicycle Lane (both sides)	Travel Lane (each direction)
Alternative A	6 foot	4.5 foot (between sidewalk & bike lane)	6 foot	11 foot
Alternative B	6 foot	4.5 foot (between sidewalk & bike lane)	6 foot elevated	11 foot
Alternative C	6.5 foot	3.5 foot (between travel lane & bike lane)	6.5 foot	12 foot

Visuals of the “typical cross-section alternatives” and details of their differences can be found at <http://www.portlandonline.com/transportation/index.cfm?c=51637&a=310825>. This is a large file and may take a couple of minutes to download. Generally, Alternative A received the greatest level of support, and Alternative C received the least.

The pie charts below represent the input of the respondents who indicated how well they believe each alternative meets the project purpose and objectives (the number in parenthesis equals the number of respondents with a particular response).



The following summarizes the primary themes in the comments on the three alternatives:

	Alternative A	Alternative B	Alternative C
Pros	<ul style="list-style-type: none"> • Traditional bicycle lanes less confusing for bicyclists and cars • Separates pedestrians from bicyclists and cars • Design less expensive to build and easier to maintain 	<ul style="list-style-type: none"> • Safe, visible bicycling facility that discourages encroachment by cars • Separates pedestrians from bicyclists and cars • (Relative to Alt. A) narrows roadway visually to discourage high car speeds 	<ul style="list-style-type: none"> • Narrow roadway preserves street character and discourages high car speeds • Separates bicyclists and pedestrians from autos • Potential for preserving existing trees by including them in new stormwater facilities
Cons	<ul style="list-style-type: none"> • Wide paved area is inconsistent with existing street character • Wide paved area encourages faster car speeds • Cars can encroach on bicycle paths 	<ul style="list-style-type: none"> • Wide paved area is inconsistent with existing street character • Could pose greater challenges to managing stormwater • Elevation makes leaving and re-entering bicycle lane difficult 	<ul style="list-style-type: none"> • Creates conflicts between bicyclists and auto traffic at driveways and intersections • Creates conflicts between pedestrians and bicyclists where paths are adjacent • Difficult for bicyclists to pass one another between stormwater facility and pedestrian walkway

Feedback on Maps

Attendees also had the opportunity to write comments and information on several maps. They identified opportunities, constraints, and made comments on stormwater management. Individuals noted specific location-based issues, such as identification of large trees and privacy concerns, speed and visibility issues, and ideas for pedestrian crossings, bike lanes, bus stops and shelters, and potential placement of speed bumps or other traffic safety/calming features. Additionally, they noted locations of potholes and other existing road conditions, including truck traffic and safety issues.

Next Steps and Additional Information

This document is a summary of comments heard and collected at the event. All the individual written comments from the questionnaires, flipcharts, and map notes can be viewed on the website: <http://www.portlandonline.com/transportation/index.cfm?c=51637>. Personal information was omitted from the web posting.

This information is being shared with the project team and Citizens Advisory Committee to inform plan development. The next CAC meeting is September 16th (the full schedule is on the website.) The *Refinement Plan* is anticipated to be complete by early 2011. If funds are allocated in the current federal funding package, construction of improvements could begin in 2012.

SW Capitol Highway Refinement Plan Open House and Comments Summary September 23, 2010

Open House Overview

The City of Portland held its second open house for the SW Capitol Highway Refinement Plan on September 23, 2010, from 4:00 p.m. until 7:00 p.m. at the Multnomah Center Auditorium located at 7688 SW Capitol Highway.

Approximately 90 people attended the open house. Participants were invited to view display boards that presented general project information and a summary of public comments from the first open house. Large maps showing the preliminary design plan were laid out on tables. These maps included five specific areas where design options were provided (Option A and B) to take advantage of opportunities and / or minimize the impacts of area constraints. Open house attendees viewed these maps, asked questions of the project team, and were invited to write their thoughts and ideas directly on the maps themselves. Participants were also invited to complete and submit comment forms. The comment form asked participants to indicate their likes and dislikes for Options A and B for the five areas in the preliminary design plan. Forty-five comment forms were submitted.

Overview of Comments

In general, respondents were supportive of maintaining and increasing the amount of vegetation in the area, and especially of saving significant trees. Most preferred separate bike lanes and sidewalks for pedestrian safety, though some did like the idea of a shared pathway. Almost all comments on stormwater features were supportive of increased natural stormwater management.

Many liked the boardwalk because of its impact on tree preservation, though a number of respondents were concerned about its maintenance. Some participants had negative reactions to retaining walls, with some indicating that if installed they should include foliage. A few specifically mentioned a preference for keeping hedges rather than retaining walls. Some respondents liked the bus stop locations, though a number indicated that they would not like the bus stop in front of their property. A few people were concerned about greater encroachment on private property.

Many commented that the speed on Capitol Highway should be reduced to 25 mph for pedestrian and cyclist safety, and to make street crossing easier. A number of people were concerned about noise, and would like to see noise mitigation efforts. A few people commented favorably for any improvements on Capitol Highway, and to move the project along quickly.

The following pages include all comments received on comment forms.

Detailed Comment Summary

The following tables include all comments received on the five project option areas, as well as additional comments and open house evaluation. Where appropriate, similar comments have been grouped together and the number of responses is indicated in parenthesis. If a comment does not include a parenthetical, only one person made that comment.

Area 1: SW 39th Ave & SW Capitol Hwy (23 responses)

Option A

Preference	<ul style="list-style-type: none"> • Prefer this option (1 response) • Do not prefer this option (1 response)
Trees/ Vegetation	<ul style="list-style-type: none"> • Dislike removal of tree (5 responses) <i>though one person did comment that fir trees are prone to falling down anyway</i>
Bike/Ped	<ul style="list-style-type: none"> • Like that bicyclists stay on road (2 responses) • Direct ped route good.
Cost	<ul style="list-style-type: none"> • Like that it is less expensive. (2 responses)
Other Comments	<ul style="list-style-type: none"> • Still needs curb ramps on west side of Capitol. • Like that this is direct. • Dislike the very vanilla linear. • No raised bike surface.

Option B

Preference	<ul style="list-style-type: none"> • Prefer this option (2 responses) • Do not prefer this option (0 responses)
Trees/ Vegetation	<ul style="list-style-type: none"> • Like that this option preserves tree (12 responses) <i>Two specifically noted that they prefer for the sidewalk to go around the tree</i> • Do not like tree preservation (1 response)
Boardwalk	<ul style="list-style-type: none"> • Like boardwalk (5 responses) <i>Specifically like that it preserves the tree, maintains greenery, and adds to stormwater feature</i> • Concern about boardwalk (3 responses) <i>General concern re boardwalk. Is it slippery? Hard to maintain both surface and swale?</i> <i>Don't like board walk; doesn't give separation for pedestrians.</i> <i>City must undertake boardwalk maintenance permanently and exclusively.</i> <i>Not fair to require property owners to improve boardwalks on their own.</i>
Bus	<ul style="list-style-type: none"> • The redesign of the bus stop a good thing,
Other Comments	<ul style="list-style-type: none"> • More attractive. • Still should accommodate ramps across Capitol Hwy at 39th. How does that interact with start of bike lane? • I like that you've drawn the sidewalk on 39th. • Keep Hardy-Andy tow trucks/vehicles etc. out of black topped area between 39th and bridge. This blacktop should be revegetated. • Keep car lanes narrow to slow traffic down. • Like the variety, good intersection footprints • Like the improved path and retaining wall and the pedestrian safety. • If a small section of SW 39th is improved, that is also good. • Like how Garden Home Rd meets Capitol Hwy.

Area 2: SW 40th Ave & SW Capitol Hwy (24 responses)

Option A

Preference	<ul style="list-style-type: none"> • Prefer this option (0 responses) • Do not prefer this option (1 response)
Trees/ Vegetation	<ul style="list-style-type: none"> • Dislike removal of tree (1 response) • Needs more vegetation (1 response) • Like the planted space between the bike lane and the sidewalk. (1 response)
Boardwalk	<ul style="list-style-type: none"> • Like boardwalk (1 response)
Bus	<ul style="list-style-type: none"> • Don't like the bus stop in front of our house. (2 responses) • Don't like bus stop location; prefer option B.
Private Property	<ul style="list-style-type: none"> • Don't want to acquire lands unless necessary. (1 response)
Other Comments	<ul style="list-style-type: none"> • Dislike that there is no left turn lane at SW 40th. • On SW 41st, I'm concerned about speeding if the street is paved. Speed bumps, with a paved street, would be a nice compromise. • Corner radii are too large at SW 40th, especially south corner. Looks like it could accommodate crossings of Capitol Hwy if ramps were built on east side. Especially important with bus stops. • Please do not increase the slope of my driveway at 8534 SW Capitol Hwy. • Like: With more of the foliage etc. removed from the side of the street I will have better clearance to make a left turn onto my driveway and onto Freeman St. • Concern: Please try to prevent more water from draining off the highway down onto my property at 8534 SW Capitol Hwy and also from draining down Freeman St. • Takes out too much land. • Dislike that it is very linear, uninteresting.

Option B

Preference	<ul style="list-style-type: none"> • Prefer this option (2 responses) • Generally like this option (6 responses) • Do not prefer this option (0 responses)
Trees/ Vegetation	<ul style="list-style-type: none"> • Like that this option preserves trees(5 responses)
Boardwalk	<ul style="list-style-type: none"> • Like boardwalk (5 responses) <i>2 specifically like the boardwalk to save trees.</i> • Boardwalks are a long term without the headache. • One person concerned about boardwalk (materials, maintenance).
Retaining Wall	<ul style="list-style-type: none"> • No retaining walls! • Concern about noise bouncing off the retaining wall. Please have the retaining wall absorb sound and plant foliage on top of it.
Sidewalks	<ul style="list-style-type: none"> • Like sidewalk curves to preserve significant trees. (2 responses) • Does not show any sidewalks on 40th. Sidewalk should be built adjacent to stormwater facility. • Like westward sidewalk at 40th. • Like sidewalk curves to preserve significant trees.

Stormwater Features	<ul style="list-style-type: none"> • Like stormwater features (3 comments) • Slow traffic down instead of the current "Y" • Put SW swale at 40th. • Like swales.
Bus	<ul style="list-style-type: none"> • Keep bus north of 40th, as in option A. • Like bus stop location to minimize bike weaving. • We live where SW 40th meets Capitol Hwy. We really don't want the bus stop in front of our house. • Seems like a better bike/bus interaction (less interaction)
Other Comments	<ul style="list-style-type: none"> • I like the tighter corner radii. Need both ramps. Don't like that it seems to eliminate both legal crossings of Capitol Hwy. Need both crossings because it is so difficult to cross 40th because of traffic. • Please watch grade of Spring Garden to Capitol Hwy when widening Capitol Hwy. It is steep now for us to go both directions (especially when icy) • Dislike that there is no left turn lane at SW 40th. • Like the good intersection footprint. • The increased green space in front is very nice.

Comment not specific to either option

- Both look good. Would like consideration of raised bike lane treatment (option B) for road sections with inside curves. Or an alternative design to discourage vehicles from drifting into bike lane.

Area 3: SW Freeman St & SW Capitol Hwy (24 responses)

Option A

Preference	<ul style="list-style-type: none"> • Prefer this option (2 responses) • Generally like this option (2 responses) • The area is good now. Proposed changes will cause traffic jams. (1 response)
Trees/Vegetation	<ul style="list-style-type: none"> • Trees can go. • Try to keep the area planted with the existing vegetation. It is the older trees that define the neighborhood. • Want to keep hedges or at least replace hedge on owners' properties to maintain neighborhood feel and protect owners' privacy.
Bike/Ped	<ul style="list-style-type: none"> • Like separate bike lanes and sidewalks. (4 responses) • Dislike separate bike lanes and sidewalks. (1 response) • Anything that improves pedestrian travel through this section is an improvement. Separating bike and pedestrians is safer. (1 response)
Retaining Wall	<ul style="list-style-type: none"> • Like limits to retaining walls (2 responses) • Retaining walls are okay. • Prefer option without retaining walls--sections on Oleson look monolithic. • Would like to replace the existing retaining wall with another retaining wall. • Want to keep retaining walls that are existing rather than come farther into yards to start slopes.
Other Comments	<ul style="list-style-type: none"> • I am concerned that the fill area for the corner house of SW Freeman and Capitol will be ugly. It would be nice if they could plant some trees in that area to make it look nice, and to help reduce the noise. Leyland: Cypress tree would be ideal. • Walkway from house is an issue and driveway. • Dislike: straighten out curve at SW Freeman. Should move roadway center westward.

Option B

Preference	<ul style="list-style-type: none"> • Prefer this option (4 responses) • Do not prefer this option (1 response)
Trees/ Vegetation	<ul style="list-style-type: none"> • Like the preservation of existing vegetation (4 responses)
Bike/Ped	<ul style="list-style-type: none"> • Dislike shared bike/ped path (10 comments) <i>Most noted that a shared path would be dangerous to pedestrians. Two noted that this would be especially problematic in downhill sections.</i> • Like shared path (3 comments)
Retaining Wall	<ul style="list-style-type: none"> • I like the retaining wall and the boardwalks regarding the east side. • Build the damn retaining wall at the outer edges of the ROW, and use the full ROW. The abutting land owners have no right to grow their landscaping in the private ROW. • Hate large concrete installations.
Stormwater Features	<ul style="list-style-type: none"> • I like the stormwater collection. This could significantly decrease drainage onto my property.
Private Property	<ul style="list-style-type: none"> • Option B is good in limiting private property.
Other Comments	<ul style="list-style-type: none"> • Dislike: straighten curve westward at SW Freeman. • I like option B because it gives a semblance of a planting strip and not just a curb tight.

Area 4: SW 41st Ave & SW Capitol Hwy (27 responses)

Option A

Preference	<ul style="list-style-type: none"> • Generally this option (2 responses) • Generally dislike this option (2 responses) <i>One noted it is very bland.</i>
Retaining Wall	<ul style="list-style-type: none"> • Dislike retaining wall between Marigold and Primrose (2 comments) <i>One noted the lack of planting strips, and resemblance to Oleson Rd.</i> • Tearing out 25' hedges will result in loss of noise buffer (2 comments) <i>One noted 5.5 foot wall for retaining is not enough, but will destroy charm of Multnomah.</i>
Stormwater Features	<ul style="list-style-type: none"> • Like that it looks like it has more stormwater control than option B. Want to minimize stormwater entering SW Carson because it runs down behind houses on SW 41st below Carson.
Bus	<ul style="list-style-type: none"> • Like bus: limits backups at crush line. • Like bus stop locations.
Other Comments	<ul style="list-style-type: none"> • Provides crossings across Capitol Hwy at both sides of intersection. Still could include planter area at city-owned triangle. • Too much pavement • Need speed control on Capitol Hwy. Slow down noise, slow down traffic, so you can safely cross the street. One side of development only needed (one sidewalk on one side). Repair pot holes and basic sidewalks for now. • Dislike nothing being done to gravel patch. • Not sure about visibility to make left hand turn from Dolph.

	<ul style="list-style-type: none"> • Like getting rid of the gravel/dust on the area near Lobelia and Capitol. • Like a pedestrian route that is safer for access to the Village. • Dislike: is too plain and linear. Curb edge between should be rolled edge.
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Option B

Preference	<ul style="list-style-type: none"> • Prefer this option (7 responses) <i>One noted that this option is more attractive and manages storm water better, but if money is an issue option A would be fine.</i> • Like this option overall (1 responses)
Trees/ Vegetation	<ul style="list-style-type: none"> • Like that it saves trees and vegetation (3 responses) • Do not need to save trees (1 response)
Boardwalk	<ul style="list-style-type: none"> • Like boardwalk (3 responses) <i>2 noted that they like that the boardwalk increases tree preservation</i>
Sidewalks	<ul style="list-style-type: none"> • How would pedestrians cross Capitol Hwy? • Do not like the fact that it eliminates crossing on Capitol Hwy at south side of Dolph. Not acceptable. Need to show where future sidewalks will be on both sides of Dolph.
Stormwater Features	<ul style="list-style-type: none"> • Like large stormwater features. (7 responses) • Wonder if option B will control stormwater entering SW Carson as well as option A.
Private Property	<ul style="list-style-type: none"> • Like that this avoids encroachment on private property. • The private owners are encroaching on the public ROW.
Capitol/Dolph intersection	<ul style="list-style-type: none"> • Like: SW Dolph/SW Capitol intersection and sidewalk. Curb between sidewalk and bike should be a rolled edge not square. • Seems to have better visibility to make left hand turn onto Capitol from Dolph. • This is the preferred option for how Dolph Ct and 39th meet Capitol hwy.
Other Comments	<ul style="list-style-type: none"> • Like dust control. • Like realignment of 41st into Capitol. • Too much disruption. Put in basics for now. • The drns. area at the NW corner of 41st & Capitol Hwy is great! • Takes out all parking.

Comments that apply to both options:

- Both look good. Watch sight distance at Dolph.

Area 5: SW Alice St to SW Primrose St (22 responses)

Option A

Preference	<ul style="list-style-type: none"> • Prefer this option (2 responses)
Trees/ Vegetation	<ul style="list-style-type: none"> • Takes out too many trees and vegetation.

Bike/Ped	<ul style="list-style-type: none"> Like separated sidewalk and bike lane (7 responses) <i>One noted that this gives more room for cyclists and pedestrians.</i> <i>One noted that this is necessary for safety as well as comfort.</i> Do not like separated sidewalk and bike lane (3 responses) <i>One would prefer more parking.</i> <i>One commented that this takes up too much land. Why so much land for both a bike path and ped path? One should be enough.</i>
Retaining Wall	<ul style="list-style-type: none"> Like retaining wall (2 responses) Don't like retaining wall. Takes up too much room. Has negative impact to steep driveways. I think that a retaining wall is going to be necessary. One of my concerns would be who is responsible for maintaining the retaining wall. Graffiti magnet (negative)
Stormwater Features	<ul style="list-style-type: none"> Consider porous pavement for stormwater.
Private Property	<ul style="list-style-type: none"> Dislike the lack of planting strip on each side. Seems the City is reluctant to impact adjacent property owners and use available right of way.
Other Comments	<ul style="list-style-type: none"> Too much lopped off There needs to be a balance with general appearance of "maximizing" comfort. Dislike: very plain and linear. Could be poured concrete, with a "panel" treatment for interest (drawing)

Option B

Preference	<ul style="list-style-type: none"> Prefer this option (4 responses) Do not prefer this option (1 response)
Trees/Vegetation	<ul style="list-style-type: none"> Like more vegetation (4 responses) Trees are unnecessary (1 response)
Bike/Ped	<ul style="list-style-type: none"> Dislike shared bike/ped path (8 responses) <i>Most noted that this would be a safety concern, and that the path is not wide enough to share.</i> Like shared bike/ped path (2 responses) <i>Noted that cyclists and pedestrians should be able to share, and the road is too narrow here for separate paths.</i>
Retaining Wall	<ul style="list-style-type: none"> Why doesn't retaining wall show on your cross-section? It is misleading!
Bus	<ul style="list-style-type: none"> Like redesigned bus stop
Private Property	<ul style="list-style-type: none"> Prefer limiting impact on or near private property.
Other Comments	<ul style="list-style-type: none"> I like option B because it limits the increase of slope to the driveway on the west side. Like preserved/improved aesthetics (2 comments)

Area 6 (3 comments)

- Develop parking at SW Collins and unnamed road intersection.
- I live in Area 6. I would like to have a crosswalk near the bend at Brugger, and some attention given to the sight lines at that bend, so that drivers heading south on Capitol (towards Barbur) can see a bit past that bend.
- Area 6: Corner radii at 41st is too large. 15' radius max to improve pedestrian safety.

Other and General comments (29 comments)

- "None of the above." I prefer keeping vehicle lanes narrow to keep speeds down. Adding adjacent bike lanes will increase vehicle speeds. Keep it simple. Make it feasible. Plant new trees to replace the few which must be cut down. Shade for pedestrians is very important.
- Put up signs with a phone number to call if cars are parked illegally (in bike lanes) similar to the pothole phone number signs.
- *5 part comment:*
 1. It is better to start on one section at a time (the most dangerous/needed parts) and complete or stash some improvements on the highway than to wait and do nothing. Small things can be done in the interim.
 2. Please put in speed signs now, especially after bridge going south (near Hardy Andy's) and pedestrian crossings (priority) even if work not started/completed.
 3. Please work on "sidewalks." Priority! Even if work not started/completed: i.e., even the ground flattened so it is safe and stable to walk on.
 4. Please advise police to ticket speeders and cell phone users. I see this daily. This will teach people to obey laws.
 5. Please advise Trimet if possible to put in bus shelters and benches for safety."
- Abandon the 1996 plan. It is too old and does not recognize current Multnomah Village traffic density nor Trimet's abandonment of effective mass transit in the PCC-Wilson-Downtown corridor.
- All retaining walls shall have sound diffusing surfaces.
- Any raised bicycle lane with rolled curb is unsafe simply because if a cyclist rolls off the raised surface, the cyclist goes down. If this happens in the dark and there is no lighting plan for this project, the cyclist goes down. If there are cars coming, the cyclist gets injured.
- Bike/ped connections to and from Taylors Ferry.
- Cars rush by my corner at high speeds. I don't understand why the speed is 35 mph in a totally residential area. Should be 25 mph. Capitol is not a freeway. Sometimes, I wait many minutes to ever cross from SW Primrose to a bus stop. Crossing the street is risky at Alice & Primrose when the cars go downhill. Very hard at rush hour. Use traffic-calming devices to create safe crosswalks.
- Concerned of increased traffic—if so speed bumps will be needed (please)
- Consider maximizing use of porous pavement to manage stormwater. Don't combine bike/ped paths.
- For all segments, I support preserving as many significant trees as possible. Replanting new trees to replace those removed, if approved. Try to accommodate adjacent property owners' needs as much as possible. Try to find creative "least cost" solutions so the project remains financially feasible and gets built.
- I don't live on Capitol, though I do live in the area and I'm so glad to imagine sidewalks on Capitol.
- I would like to see alternative A on both sides of the highway, to protect the pedestrians from the bicyclists. The bicyclists can be speeding down the road and a pedestrian could be unaware.
- If we could get funding more easily--save money. Sidewalks on one side with bike lane on both sides and stormwater on both sides.
- If you wanted this state to look like California why don't you move there! Why bike lanes AND sidewalks?
- Increasing noise levels for people along Capitol Hwy. Removing hedges on Marigold Street and putting up a short retaining wall will not help extreme traffic noise. Will worsen sound that is already bad.
- More on-street parking.

- Need wheel chair ramps to cross Capitol Hwy at all tee-intersections. Corners should wrap around onto side streets and connect to location where side street sidewalks will eventually be. Need 2 ramps at tees on busier side streets. Boardwalks seem to not have much vegetation between peds and curb.
- One of my long standing concerns has always been traffic noise. I think that the project will increase the noise due to removing vegetation, increasing hardscape and encouraging higher speeds. What are some ways that noise can be mitigated?
- Overall this is a great job--I could like with any of the options and all are a vast improvement. Thanks for all your hard work!
- Please call 503-244-9735. I would like to talk with someone. I live on 8408 SW Capitol hwy (Area 3)
- Please work on reducing the speed limit from 35 to 25 mph. Please consider marked crosswalks at Alice and Dolph Ct crossings.
- Put money in budget for hedge replacement, not just tree replacement.
- Reduced speed limits all along Capitol Hwy is crucial. The 40th and Capitol Hwy intersection needs a flashing yellow light! (if not a turn lane as well).
- Thank you for the opportunity to learn.
- The 40th & Capitol Hwy intersection needs at least a blinking yellow caution light.
- The beauty of this street is the trees, shade and greenery. All will be ripped out. I'd known few preserved but for years it will look like crap--just like the widening of Oleson. Years in, ugh! In the rush to make bike lanes (which I support) I think we sometimes ruin what we love.
- To the extent possible, the road should be rural to help reduce speed of cars. This is an opportunity to improve safety and appearance leading to the Village.
- We don't need improvements on both sides. Bikes and peds can share! We need a hedge replacement fund--don't take the hedges out! We hate the retaining walls! You are taking out too much of the look, charm, feel of Multnomah Village! Misleading graphics! Cross-section graphics are misleading. They show evergreen trees--nature trees--in the planting strips. These ""strips"" may be storm drains with no trees!
- Yes, no on-street parking!! As the property owner on 8922 SW Capitol Hwy, I believe the big fir tree should be taken out.

Open House Evaluation

Was the information presented clear and helpful?

- Yes (31 responses) *Additional comments:*
 - Except hard to read maps for novice. Would help to have a colorful boundary to see what property disappears.
 - It took a while to get visually oriented. I'm not sure I understood the storm drain proposals.
 - For the most part--did get differing opinions depending on staff people spoken to.
- No (2 responses) *Additional comment:*
 - It was not that easy to understand the concept of "options"
- Other responses: (2)
 - Too many choices.
 - Mostly. An illustration with measurements would have helped more to gain insight into how much land, trees and vegetation is going to be killed. The areas map was confusing and hard to visualize changes from one another.

Were you able to get your questions answered?

- Yes (29 responses) *Additional Comments:*
 - Want to hear much more about stormwater control.
 - You will do what you want despite the input.
 - Committees and project staff were helpful.
- No (1 response)
- Other responses (3)
 - At some tables...
 - Some
 - Is there anything we can do to ensure the project will happen?

How did you hear about the public open house?

- Postcard (22 responses)
- Flyer (7 responses)
- Friend/Neighbor (5 responses)
- CAC Member (3 response)
- Newspaper (8 responses)
- Other responses:
 - Email (2)
 - Sign on road
 - Liked lawn signs along Capitol Hwy

Do you live or work near SW Capitol Hwy?

- Yes (30 responses)
- No (5 responses) *Additional Comments:*
 - No, but I definitely will use the pedestrian and bike lanes. I would love safe access to Barbur World Foods. We live just north of Multnomah Village. Only drive this road, never walk or bike now.
 - No, but I look forward to using the new road, sidewalk and bike lanes. I live near Vermont and 34th.
 - No, about 2 miles away

Which intersection?

- Spring Garden (4 responses)
- Marigold & Capitol Hwy (4 responses)
- Lobelia & Capitol Hwy (3 responses)
- Carson (2 responses)
- Primrose St & Capitol Hwy (2 responses)
- Taylors Ferry Rd & Capitol Hwy (2 responses)
- Brugger & Capitol Hwy (2 responses)
- 40th & Capitol Hwy (2 responses)
- 30th
- 31st
- 35th
- 36th
- 41st and Capitol Hwy
- Alice & Capitol Hwy (west side)
- Freeman & Capitol Hwy
- Dolph Ct
- Vesta
- 35th & Carson

SW Capitol Highway Refinement Plan

Open House Summary & Comments

December 14, 2010

Open House Overview

The City of Portland held its third and final open house for the SW Capitol Highway Refinement Plan on December 14, 2010, from 4:00 p.m. until 7:00 p.m. at the Multnomah Center Auditorium located at 7688 SW Capitol Highway.

Approximately 86 people attended the open house. Participants were invited to view display boards which presented general project information and a description of the public involvement process and outcomes to date. Large maps showing the recommended design plan were laid out on tables, including a map showing the below and aboveground stormwater facilities. Open house attendees viewed these maps, asked questions of the project team, and were invited to complete comment cards. The comment cards asked for a) site specific issues that should be addressed during final project engineering and b) any general thoughts or comments. Thirty-five comment cards were submitted.

Overview of Comments

Commenters generally favored the project design. Common general comments included:

- Desire to reduce vehicle speeds on Capitol Highway
- Improve only one side of Capitol Highway to reduce regrading on private property
- Allow for more on-street parking for visitors
- Concerns about the ability to raise the necessary project funds
- Bureau of Environmental Services should help fund the stormwater design elements

A broad range of site-specific issues were raised, including:

- Concern about the removal of vegetation in the right-of-way and on private property
- Recommended locations for enhanced crossings

Please see the attached document for transcripts of all comments received.

Geotechnical Analysis



APPENDIX E

October 26, 2010

Parametrix
700 NE Multnomah, Suite 1000
Portland, OR 97232

Attention: Mr. Michael P. Harrison

Report of Geotechnical Engineering Services

SW Capitol Highway Plan Refinement

PA #27452 WOC #3

Portland, Oregon

GeoDesign Project: ODOT-47-01

INTRODUCTION

GeoDesign, Inc. is pleased to submit this report providing the results of our geotechnical engineering services associated with the proposed SW Capitol Highway project. The portion of SW Capitol Highway included in this project extends between SW Garden Home Road and SW Taylors Ferry Road.

The project involves improving the road to support transit, pedestrian, and bicycle travel and help reduce single occupancy vehicle trips. The existing system consists of a two-lane roadway on an approximately 24-foot-wide corridor of asphalt. The current plan (1996 Capitol Highway Plan) calls for travel lanes, bike lanes, and sidewalks on both sides of the street as well as options for landscape and stormwater features, also on both sides of the street. The resulting profile for the roadway is approximately 60 feet wide. Accordingly, if all options are included, considerable widening of the roadway will be required.

PURPOSE AND SCOPE

The purpose of our services was to explore subsurface conditions in order to provide geotechnical engineering recommendations for the project. The specific scope of our services is summarized as follows:

- Reviewed 1996 Capitol Highway Plan.
- Attended May 5, 2010 project walk-through/kick-off meeting.
- Reviewed U.S. Department of Agriculture (USDA) soil survey maps of the area.

- Relative to the current plans and site observations, identified geotechnical constraints and provided a discussions regarding their impact on the current design and need for additional testing/analysis.
- Completed hand explorations and infiltration tests at four locations.
- Provided this written report summarizing the results of our geotechnical evaluation.

SOIL CONDITIONS

GENERAL

The USDA soil map of the area indicates that the majority of the near-surface soils consist of "Cascade-Urban" soils, which are described as a silty loam that extend below a depth of 5 feet.

SITE EXPLORATIONS

We completed four hand augers (B-1 through B-4) along the roadway on September 16, 2010 to a maximum depth of 4.5 feet below the ground surface (BGS). A copy of the boring logs is attached. The approximate location of the hand augers is as follows:

- B-1: East side of SW Capitol Highway, approximately 40 feet south of SW Baird Street
- B-2: West side of SW Capitol Highway, approximately 20 feet north of SW Primrose Street
- B-3: West side of SW Capitol Highway, approximately 30 feet north of SW Dolph Court
- B-4: West side of SW Capitol Highway, within grass area between and approximately 20 feet north of SW Capitol Highway and SW 40th Avenue intersection

Fill, consisting of variable amounts of silt, sand, gravel and cobble, was encountered at each exploration and extends to depths varying between 0.7 and 2.5 feet BGS. The underlying native soil consists of medium stiff to very stiff silt with fine sand. Medium stiff to stiff, sandy silt to silty sand was also encountered between the fill and the underlying silt at B-3 and B-4.

INFILTRATION

This soil unit is described in the USDA soil map as "somewhat poorly drained" with moderately low to moderately high saturated infiltration (0.06 to 0.020 inch per hour). We completed infiltration tests at each of the hand auger explorations by embedding a 4-inch-diameter PVC pipe approximately 3 to 4 inches into the native soils at a depth of 4 feet BGS and allowing a one-hour saturation period prior to completing the test. Extremely low infiltration rates were observed at all locations, with between 0.05 and 0.1 inch per hour at B-3 and B-1, respectively, and no noticeable infiltration at B-2 and B-4.

The current plan identifies stormwater areas within the project. A copy of the current plan is attached. In addition to narrow systems incorporated into the roadway section, the plan identifies the following larger stormwater areas.

- West side of SW Capitol Highway, south of the intersection between SW Capitol Highway and SW 40th Avenue intersection
- West side of SW Capitol Highway, south of the intersection between SW Capitol Highway and SW 41st Avenue intersection
- East side of SW Capitol Highway, between SW 41st Avenue and SW Brugger Street

The infiltration test results indicated that marginal infiltration should be expected from these systems. We recommend that infiltration systems not be installed above slopes extending down to residences or above and within the influence zone of retaining structures.

RETAINING WALLS AND SLOPES

The May 5, 2010 project walk-through extended from approximately roadway Station 0+00 to 47+50. In general, no fatal geotechnical flaw was identified during our evaluation of the site. The roadway generally follows a ridgeline that slopes down toward the north, with gentle slopes to the east and west depending on the segment of roadway under consideration.

The project will require several small (generally less than 8 feet) cut and fill retaining walls to accommodate the proposed roadway section. To limit the impact to the adjacent properties, we assume that the cut walls will be constructed using segmental gravity walls, such as Ultra Blocks. Either segmental gravity walls (Ultra Blocks) or reinforced mechanically stabilized walls, such as Keystone walls, can be used for fill walls. Within the constraints of the conceptual level of the current project, we did not observe areas where there will likely be slope stability issues with the project. We recommend that a geotechnical engineer review the final plans to identify areas where explorations will be necessary to adequately design the retaining walls for the project.

♦ ♦ ♦

We appreciate the opportunity to work with you on this project. If you have questions concerning the information provided, please call.

Sincerely,

GeoDesign, Inc.


George Saunders, P.E., G.E.
Principal Engineer



GPS:kt









Attachments

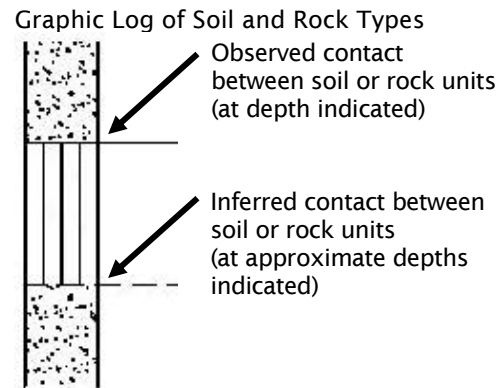
One copy submitted (via email only)

Document ID: ODOT-47-01-102610-geolr.doc

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ATTACHMENT

SYMBOL	SAMPLING DESCRIPTION
	Location of sample obtained in general accordance with ASTM D 1586 Standard Penetration Test with recovery
	Location of sample obtained using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D 1587 with recovery
	Location of sample obtained using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample obtained using Dames & Moore or 3-inch-O.D. split-spoon sampler and 140-pound hammer or pushed with recovery
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown




GEOTECHNICAL TESTING EXPLANATIONS

ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density	RES	Resilient Modulus
DS	Direct Shear	SIEV	Sieve Gradation
HYD	Hydrometer Gradation	TOR	Torvane
MC	Moisture Content	UC	Unconfined Compressive Strength
MD	Moisture-Density Relationship	VS	Vane Shear
OC	Organic Content	kPa	Kilopascal

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
ppm	Parts per Million	MS	Moderate Sheen
		HS	Heavy Sheen

RELATIVE DENSITY - COARSE-GRAINED SOILS									
Relative Density		Standard Penetration Resistance		Dames & Moore Sampler (140-pound hammer)		Dames & Moore Sampler (300-pound hammer)			
Very Loose		0 - 4		0 - 11		0 - 4			
Loose		4 - 10		11 - 26		4 - 10			
Medium Dense		10 - 30		26 - 74		10 - 30			
Dense		30 - 50		74 - 120		30 - 47			
Very Dense		More than 50		More than 120		More than 47			
CONSISTENCY - FINE-GRAINED SOILS									
Consistency		Standard Penetration Resistance		Dames & Moore Sampler (140-pound hammer)		Dames & Moore Sampler (300-pound hammer)		Unconfined Compressive Strength (tsf)	
Very Soft		Less than 2		Less than 3		Less than 2		Less than 0.25	
Soft		2 - 4		3 - 6		2 - 5		0.25 - 0.50	
Medium Stiff		4 - 8		6 - 12		5 - 9		0.50 - 1.0	
Stiff		8 - 15		12 - 25		9 - 19		1.0 - 2.0	
Very Stiff		15 - 30		25 - 65		19 - 31		2.0 - 4.0	
Hard		More than 30		More than 65		More than 31		More than 4.0	
PRIMARY SOIL DIVISIONS				GROUP SYMBOL		GROUP NAME			
COARSE-GRAINED SOILS (more than 50% retained on No. 200 sieve)		GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)		CLEAN GRAVELS (< 5% fines)		GW or GP		GRAVEL	
				GRAVEL WITH FINES (≥ 5% and ≤ 12% fines)		GW-GM or GP-GM		GRAVEL with silt	
						GW-GC or GP-GC		GRAVEL with clay	
				GRAVELS WITH FINES (> 12% fines)		GM		silty GRAVEL	
						GC		clayey GRAVEL	
						GC-GM		silty, clayey GRAVEL	
		SAND (50% or more of coarse fraction passing No. 4 sieve)		CLEAN SANDS (<5% fines)		SW or SP		SAND	
				SANDS WITH FINES (≥ 5% and ≤ 12% fines)		SW-SM or SP-SM		SAND with silt	
						SW-SC or SP-SC		SAND with clay	
				SANDS WITH FINES (> 12% fines)		SM		silty SAND	
						SC		clayey SAND	
						SC-SM		silty, clayey SAND	
FINE-GRAINED SOILS (50% or more passing No. 200 sieve)		Liquid limit less than 50		ML		SILT			
				CL		CLAY			
				CL-ML		silty CLAY			
				OL		ORGANIC SILT or ORGANIC CLAY			
		Liquid limit 50 or greater		MH		SILT			
				CH		CLAY			
				OH		ORGANIC SILT or ORGANIC CLAY			
HIGHLY ORGANIC SOILS				PT		PEAT			
MOISTURE CLASSIFICATION			ADDITIONAL CONSTITUENTS						
TermField Test			Secondary granular components or other materials such as organics, man-made debris, etc.						
			Silt and Clay In:		Sand and Gravel In:				
dryvery low moisture, dry to touch			Percent	Fine-Grained SoilsCoarse-Grained Soils		Percent	Fine-Grained SoilsCoarse-Grained Soils		
moistdamp, without visible moisture			< 5	trace	trace	< 5	trace	trace	
			5 - 12	minor	with	5 - 15	minor	minor	
wetvisible free water, usually saturated			> 12	some	silty/clayey	15 - 30	with	with	
						> 30	sandy/gravelly	sandy/gravelly	
 15575 SW Sequoia Parkway - Suite 100 Portland OR 97224 Off 503.968.8787 Fax 503.968.3068			SOIL CLASSIFICATION SYSTEM					TABLE A-2	

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT %	COMMENTS
B-1							
0.0		Loose to medium dense, brown, silty SAND with gravel (SM); moist (3-inch-thick root zone) - FILL .	0.7				3-inch penetration with foundation probe at surface Foundation probe; stiff to very stiff at 1.0 foot Foundation probe, stiff to very stiff at 2.0 feet Infiltration test: 0.1 inch/hour at 4.3 feet Surface elevation was not measured at the time of exploration.
2.5		Stiff to very stiff, light brown, sandy SILT to fine, silty SAND (ML/SM); moist, low plasticity.	2.5				
5.0		Stiff to very stiff, light brown SILT with fine sand (ML); moist, low plasticity.	4.5				
7.5		Exploration completed at a depth of 4.5 feet.					
B-2							
0.0		Stiff to very stiff, light brown, sandy SILT to fine, silty SAND with gravel (ML/SM), trace organics (rootlets); moist (2.5 inch-thick root zone) - FILL .	0.8				Foundation probe, very stiff at 0.5 foot Infiltration test: ~0 inches/hour at 4.0 feet Surface elevation was not measured at the time of exploration.
2.5		Medium dense to dense, light brown COBBLES with gravel, silt, and sand (GP); moist - FILL .	2.5				
5.0		Medium stiff to stiff, brown SILT with fine sand (ML); moist, low plasticity, blocky texture.	4.5				
7.5		Exploration completed at a depth of 4.5 feet.					
DRILLED BY: GeoDesign, Inc. staff LOGGED BY: JGH COMPLETED: 09/16/10 BORING METHOD: hand-auger (see report text) BORING BIT DIAMETER: 4 1/2-inch							
		ODOT-47-01	BORING				
15575 SW Sequoia Parkway - Suite 100 Portland OR 97224 Off 503.968.8787 Fax 503.968.3068		OCTOBER 2010	SW CAPITOL HIGHWAY PLAN REFINEMENT PORTLAND, OR				FIGURE A-1

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT %	COMMENTS
B-3							
0.0		Very stiff to medium dense, light brown, silty GRAVEL to SILT with gravel with sand (GM/ML); moist (3-inch-thick root zone) - FILL .				0 50 100	Foundation probe; very stiff at surface
1.3		Stiff to very stiff, light brown, sandy SILT to fine, silty SAND (ML/SM); moist, low plasticity.	1.3				Foundation probe, stiff to very stiff at 1.5 feet
2.5		grades to light brown-orange; blocky mottled texture at 2.0 feet	2.5				
4.5		Stiff, orange-gray mottled light brown SILT with fine sand (ML); moist, low plasticity.	4.5				Infiltration test: ~0.05 inch/hour at 4.3 feet
5.0		Exploration completed at a depth of 4.5 feet.					Surface elevation was not measured at the time of exploration.
7.5							
B-4							
0.0		Medium dense, brown, silty GRAVEL with sand (GM), trace organics (roots); moist (2.5-inch-thick root zone) - FILL .				0 50 100	Foundation probe; medium stiff to stiff at 1.0 foot
1.0		Medium stiff to stiff, light brown-orange, sandy SILT to fine, silty SAND (ML/SM), trace organics (roots up to 3-inch diameter); moist, low plasticity.	1.0				Foundation probe, stiff to very stiff at 2.0 feet
2.5		with orange-gray mottles at 2.5 feet	2.7				
4.5		Stiff, orange-gray mottled brown SILT with fine sand (ML); moist, low plasticity.	4.5				Infiltration test: ~0 inches/hour at 4.0 feet
5.0		Exploration completed at a depth of 4.5 feet.					Surface elevation was not measured at the time of exploration.
7.5							
<div> <div>DRILLED BY: GeoDesign, Inc. staff</div> <div>LOGGED BY: JGH</div> <div>COMPLETED: 09/16/10</div> </div>							
<div> <div>BORING METHOD: hand-auger (see report text)</div> <div>BORING BIT DIAMETER: 4 1/2-inch</div> </div>							
		ODOT-47-01	BORING (continued)				
15575 SW Sequoia Parkway - Suite 100 Portland OR 97224 Off 503.968.8787 Fax 503.968.3068		OCTOBER 2010	SW CAPITOL HIGHWAY PLAN REFINEMENT PORTLAND, OR			FIGURE A-2	

BORING LOG - 2 PER PAGE ODOT-47-01-B1_4.GPJ GEODESIGN.GDT PRINT DATE: 9/30/10:KT

Historic Resources Analysis



APPENDIX F

700 NE MULTNOMAH, SUITE 1000
PORTLAND, OR 97232-4110
T. 503.233.2400 T. 360.694.5020 F. 503.233.4825
www.parametrix.com

TECHNICAL MEMORANDUM

Date: January 19, 2011
To: Ross Swanson, Project Manager, Portland Bureau of Transportation
From: Derek Chisholm, Architectural Historian, Parametrix
Subject: Capitol Highway Plan Refinement, Task 8.1: Historic Resources Memorandum
cc: Michael Harrison, Consultant Project Manager, Parametrix

Federally funded transportation projects must comply with Section 106 of the National Historic Preservation Act (NHPA). To comply, such projects must seek to avoid impacts, minimize unavoidable impacts, and mitigate for adverse impacts to historic properties. This memorandum presents an initial identification and evaluation of potential impacts to National Register of Historic Places-listed or -eligible historic resources that could result from the proposed SW Capitol Highway Plan Refinement project. This memorandum includes discussion of methods used to assess potential project impacts to historic resources, the local historical and regulatory context, study findings, a generalized discussion of potential effects, and a recommended course of action needed for a successful Section 106 review.

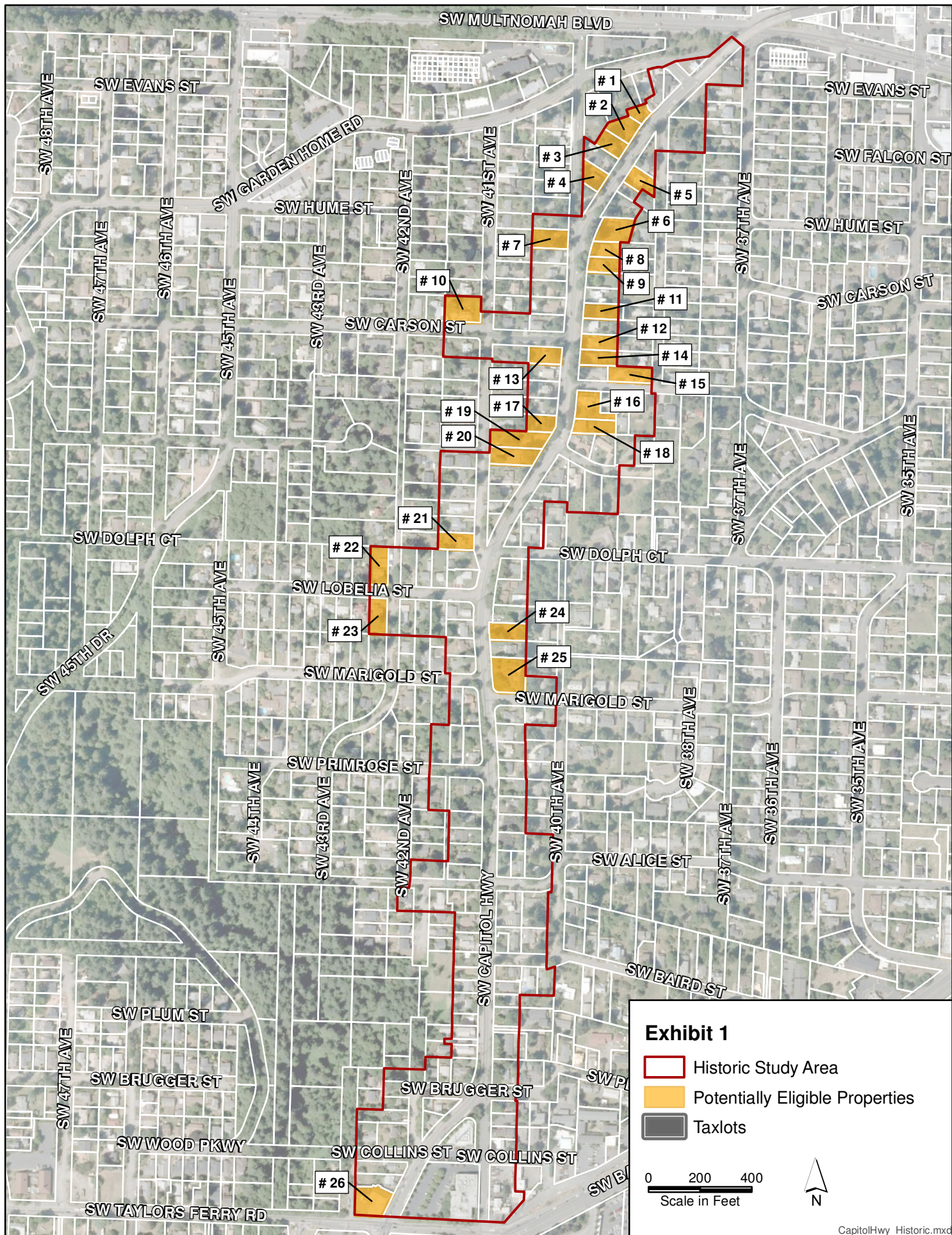
METHODS

Study Area

The SW Capitol Highway Plan Refinement project will add multi-modal and on-street stormwater improvements along Capitol Highway, from south of the existing bridge over Multnomah Boulevard to Taylors Ferry Road. In addition, the project may include new multi-modal and stormwater improvements (including intersection realignments) that could impact properties along small sections of streets intersecting with Capitol Highway. As shown in Exhibit 1, the study area includes the tax lots adjacent to those areas of Capitol Highway where project improvements may occur, as well as tax lots near side streets that may also receive project improvements.

Historic Determination

Consistent with Section 106, to assess effects to historic properties, one first has to determine if historic resources are listed on, or eligible for, the National Register of Historic Places (NRHP). To determine whether NRHP-listed or –eligible resources are located within the project study area, the project team used two approaches. The team reviewed information from the Oregon State Historic Preservation Office (SHPO) and the City of Portland’s Historic Resources Inventory (HRI). Resources included on a local inventory are very likely eligible for NRHP designation. Following the review of state and local inventories, the team completed a “windshield survey” of properties in the study area.



For the windshield survey, the project team determined NRHP eligibility based on the criteria set forth in 36 CFR¹ part 800 (Section 106) and detailed in National Register Bulletin 15 – *How to Apply the National Register Criteria for Evaluation*. Typically, a historic resource is a site, structure, building, or object 50 years in age or older. In some situations, the historic resources may be combined into a historic district, provided there is close continuity in theme association between the individual resources. To be determined eligible, a historic resource must have maintained its integrity with respect to original design and construction and satisfy one or more of the Criteria for Evaluation (a), (b), (c), or (d). These criteria are detailed below.

Criteria for Evaluation. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

- (a) That are associated with events that have made a significant contribution to the broad patterns of our history; or
- (b) That are associated with the lives of persons significant in our past; or
- (c) That embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (d) That have yielded, or may be likely to yield, information important in prehistory or history.

These criteria provide an analytical framework for eligibility determinations. If the Capitol Highway Plan Refinement project requires the acquisition of right-of-way at the site of a potentially historic structure identified in this report, or otherwise proposes an action that might impact a potentially historic structure, these criteria will be employed to make a formal Determination of NRHP Eligibility.

On its own, a windshield survey cannot, for example, determine if a structure may be associated with the life of a famous person or event. As such, the windshield survey focused on identifying potential NRHP-eligible historic resources based upon readily available information and the personal observations of an architectural historian. This included determining the resource's age (identifying resources constructed prior to 1963 - which would be at least 50 years old by the time project construction commences in 2013) and an initial assessment of resource integrity.

According to National Register Bulletin 15, historic resource integrity depends on the following considerations:

- Location - The place where the historic property was constructed or the historic event occurred.
- Design - The combination of elements that create the form, plan, space, structure, and type of site.
- Setting - The physical environment of the resource.
- Materials - The construction elements as they were combined during a particular period of time or configuration.
- Workmanship - The physical evidence of the crafts used (e.g., manufacturing techniques) of a culture or people, provided they are matched by one or more of the previous four integrity factors.
- Feeling - Presence of physical features that evoke a sense of the resource's character or underlying life pattern.
- Association - A direct link between an important event or person and the resource's attributes.

¹ Code of Federal Regulations

The windshield survey provided an initial assessment of integrity in terms of design, setting, materials, workmanship, and feeling, as possible to determine from viewing the properties from the public right-of-way. The windshield survey was unable to make assumptions as to resource integrity in terms of location or association.

The boundary of a historic property is generally based on the tax lot on which the structure, building, or object rests. Historic property boundaries are sometimes reduced if the entire lot does not contribute to the NRHP-eligibility of a historic property. Potential NRHP district boundaries are based on groupings of resources on tax lots. The boundaries are adjusted where empirical evidence and professional judgment suggest different geographic distribution of the attributes that renders a resource significant pursuant to Section 106 procedures.

Assessing Effects

The Capitol Highway Plan Refinement project will attempt to avoid impacts, minimize unavoidable impacts, and mitigate for adverse impacts to historic properties. According to Section 106, an “adverse effect” to an individual property would result if the project caused direct loss, destruction, or alteration of the historic character or integrity of the significant (or NRHP-listed or -eligible) historic property. Indirect impacts (such as changes in visual setting, aesthetics, noise, traffic, or use) that affect the integrity of the property’s location, setting, feeling, or association may also result in an adverse effect, as specified in 36 CFR 800.5. An adverse effect finding may be minimized and/or mitigated through implementation measures in a Memorandum of Agreement (MOA) between SHPO and the City of Portland. These procedures for determining eligibility and assessing effects satisfy both the NHPA requirements and the National Environmental Policy Act (NEPA) requirements for a project.

A federally funded project must also comply with The Department of Transportation Act (DOT Act) of 1966, Section 4(f). Section 4(f) stipulates that the Federal Highway Administration (FHWA) and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent alternative to the use of land.
- The action includes all possible planning to minimize harm to the property resulting from use.

Historic properties that are NRHP-listed or determined to be NRHP-eligible are also subject to Section 4(f) provisions of the Department of Transportation Act of 1966. In addition, properties that are protected by state or local regulations (such as Oregon Statewide Planning Goal 5) but that are determined to be ineligible for NRHP listing may still be subject to Section 4(f) evaluation requirements.

The formal Finding of Effect to each historic property will be completed at later stage of project design, if warranted, based on the nature of property acquisitions or other significant impacts. The assessment will be based on project mapping, potential design refinements, and ongoing coordination with SHPO, the City of Portland, and potentially local historic societies, tribes, and others.

LOCAL CONTEXT

Historic Overview

This section provides a brief overview of the historic resources and historic environment in the study area. Much of this information was gathered from the 1996 Capitol Highway Plan, the plan that is being refined through this project.

Following centuries of habitation by native peoples, settlement in the Willamette Valley accelerated through the early 1800’s. Spurred by the growth of the lumber industry, Portland was incorporated in 1851. The Northern Pacific Railroad arrived in Portland in 1883, leading to greater growth and development. Capitol Highway was built as a wagon road connecting Portland to Salem, the state capitol. Except for a few changes and extensions, the current Capitol Highway follows the same basic route as it did in 1892.

The first section of Capitol Highway, extending from Terwilliger Boulevard to Bertha Boulevard, was originally called Slavin Road. This was named after John Slavin, one of the early West Hills pioneers who lived near the area now called Hillsdale. In addition to operating a blacksmith shop, John Slavin operated a rock quarry near his home. Since access to the quarry required a good, all-weather road, Slavin joined with his son-in-law, a local roadmaster, in the late 1800's to improve the existing log road.

The second section of Capitol Highway, which stretches from Vermont Street and 30th Avenue to Taylors Ferry Road, was originally part of Dosch Road. The last part of Capitol Highway in Southwest Portland was part of the original Taylors Ferry Road, providing another critical link in Southwest Portland.

Before 1915, Capitol Highway was only a fair quality macadam road. A macadam road was state-of-the-art for its time, and consisted of a layer of stones of the same size mixed with a cementing agent. The Carl Rakeman painting below, courtesy of the Federal Highway Administration, shows construction of the first macadam road in the United States (1823). The workers are breaking stones into consistent size.

After the arrival of the Oregon Electric Railway, the paving of Capitol Highway was *the* big event in the area. As told in *The Building of a Community: A History of Multnomah Village* (Marguerite Norris Davis and Cecil R. Tulley, 1976):



“There had been county-wide agitation for the paving of several miles of arterial highways, and the County Commissioners, with limited funds, were beset from all sides by groups, each favoring its particular area. Bitter conflicts sprung up between the concrete and asphalt advocates, with the former finally winning out. It is of interest that the concrete surfacing of Southwest Capitol Highway was one of the first laid out in the entire state, being largely in the nature of an experiment.”

Since 1892, less than a mile of new road has been added to alter Capitol Highway's initial routing. A small extension was built to connect Capitol Highway between Slavin

Road and 30th, and, in 1932, another extension was built to connect Capitol Highway to Barbur Boulevard at the time of Barbur Boulevard's construction.

Local Regulatory Context

The methods section of this memorandum introduced the major federal legislation and procedural guidance applicable to historic resources along Capitol Highway. This section discusses local regulatory provisions and processes; specifically, historic resources-related provisions of Portland's Zoning Code (Title 33: Planning and Zoning). Relevant sections are found throughout the Code, but are primarily contained in Chapter 445 – Historic Resource Protection Overlay Zone and Chapter 846 – Historic Reviews.

The City provides the following categories of previously identified historic resources: Conservation Districts, Historic Districts, Conservation Landmarks, Historic Landmarks, and Properties listed on the Historic Resources Inventory (HRI). The City of Portland adopted a citywide inventory of more than 5,000 potentially significant properties in 1984. Being listed in the HRI is not a true historic designation, as additional documentation and evaluation is required before official designation or National Register listing is warranted for these properties. However, as mentioned earlier, listing on the HRI suggests NRHP-eligibility is likely.

Historic and conservation landmarks and historic and conservation districts are designated by the Portland Historic Landmarks Commission through either a quasi-judicial Historic Designation Review process [a land use review administered by the Bureau of Development Service (BDS) and usually initiated by a property owner for a single or small number of properties] or a legislative procedure (generally for a larger number of properties and led by the Bureau of Planning and Sustainability, sometimes as part of a broader land use process such as an area planning initiative). As required by State statute, local landmark designations require the affirmative consent of the property's owner(s). Local historic and conservation district designations require the affirmative consent of all property owners within the district. The procedures and approval criteria for designating individual landmarks and districts are provided primarily in Zoning Code Chapters 33.445 and 33.846.

Approval criteria and requirements for local designation are based, in part, on those used for National Register nominations. The criteria are the same for historic landmarks, conservation landmarks, historic districts, and conservation districts. There are 12 general approval criteria, of which at least three must be met, requiring evaluation of the resource's significance in terms of its: architectural values; historical associations; physical integrity; contributions to the area's or city's character; and/or its contribution to a grouping of related resources. A "Level of Protection" criterion determines which type of designation is applied, based on the historic value of the resource.

As the City's long-range planning agency, the Bureau of Planning and Sustainability is responsible for developing and amending the Zoning Code, while BDS is responsible for implementing it (i.e., applying its provisions to specific projects). The complete Zoning Code, maps showing the location of historic resources, adopted design guidelines, and other relevant documents are available from the Bureau of Planning and Sustainability. Many are available on the City's Web site. Consult with BDS about interpreting and applying the code to specific situations and about land use review processes, such as historic design review.

FINDINGS

The City of Portland's Bureau of Transportation (PBOT) is planning improvements from Multnomah Boulevard to Taylors Ferry Road, along SW Capitol Highway. A significant element of this project will be incorporating stormwater, pedestrian, and bicycling facilities along the roadway and potentially along small segments of intersecting streets. Other changes include potential intersection realignments and traffic safety improvements. In order to achieve the project's goals for safety, bicycle and pedestrian mobility, and sustainable stormwater management, there will be an increased footprint to the streetscape. This increased footprint may result in the acquisition of new right-of-way which may indirectly impact NRHP-listed or -eligible buildings.

Section 106 requires federal agencies to take into account the effects of federal projects on historic properties and to provide the Advisory Council on Historic Preservation (ACHP) reasonable opportunity to comment on the proposed project and its effects to historic resources. For final design and reconstruction of Capitol Highway, it is likely that federal funds would be used and that a full Section 106-compliant analysis would be completed. However, this memorandum only sought to identify listed and potentially NRHP-eligible historic resources which should be considered during concept planning.

Results from Search of Existing Inventories

The project team reviewed the SHPO database and found no listed NRHP resources within the study area. A review of the City of Portland HRI was also conducted. The City of Portland provides the following categories of previously identified historic resources: Conservation Districts, Historic Districts, Conservation Landmarks,

Historic Landmarks, and Properties Listed on the HRI. No resources within the study area are included in the HRI. The project team only found properties listed on the HRI that are outside the study area, and unlikely to be affected by the project. These included the following sites, which are mostly early 20th century buildings (for example, a 1927 English Cottage at 6171 SW Capitol Highway and a zigzag modern structure at 7812 SW Capitol Highway):

- 6390 SW Capitol Highway
- 6171 SW Capitol Highway
- 7812 SW Capitol Highway
- 7814 SW Capitol Highway
- 10542 SW Capitol Highway
- 10606 SW Capitol Highway

There are limitations to the City of Portland's HRI. Not only is the inventory incomplete, but it categorically excludes certain property groups. For example, early modern/mid-century structures were not systematically evaluated in surveys until the later 1990s. But

now, significant examples of early modern houses, such as 8950 Capitol Highway (shown above) are NRHP eligible and require consideration in studies such as this one.



Results from Windshield Survey

The following potentially NRHP-eligible properties were identified during the windshield survey conducted in May of 2010. These resources are identified by number in Exhibit 1. As discussed above, this assessment was based primarily on the age of potential historic resources and elements that would contribute to their integrity.

Potentially eligible properties within the study area (North to South)

1. 8041 SW Capitol Highway, built 1914
2. 8053 SW Capitol Highway, built 1919
3. 8111 SW Capitol Highway, built 1919 (shown to right, with the front shed dormer and full-length front porch)
4. 8137 SW Capitol Highway, built 1917
5. 8120 SW Capitol Highway, built 1922 (shown following page, with two bay windows flanking a front porch with a rounded roof gable)
6. 8206 SW Capitol Highway, built 1920
7. 8209 SW Capitol Highway, built 1921
8. 8222 SW Capitol Highway, built 1921
9. 8234 SW Capitol Highway, built 1927
10. 8339 SW 41st Avenue, built 1926



11. 8334 SW Capitol Highway, built 1923
12. 8356 SW Capitol Highway, built 1922
13. 8409 SW Capitol Highway, built 1914
14. 8408 SW Capitol Highway, built 1922
15. 3913 SW Spring Garden Street, built 1924
16. 8510 SW Capitol Highway, built 1922
17. 8531 SW Capitol Highway, built 1920
18. 8526 SW Capitol Highway, built 1921
19. 8537 SW Capitol Highway, built 1926
20. 8604 SW 41st Avenue, built 1970
21. 8729 SW 41st Avenue, built 1926
22. 4203 SW Lobelia Street, built 1930
23. 4206 SW Lobelia Street, built 1931
24. 8922 SW Capitol Highway, built 1927
25. 8950 SW Capitol Highway, built 1950
26. 9731 SW Capitol Highway, built 1931



These structures are almost exclusively houses. They are well-maintained and residents may have information which would aid in making final Determinations of NRHP-eligibility. Some of the potentially eligible structures listed above were behind thick hedge rows or were otherwise visually obscured. A closer inspection of these structures may reveal limitations to their integrity resulting in their being potentially ineligible for NRHP listing. Other structures on this list may have been significantly altered from their original design. Such alterations will frequently undermine the NRHP-eligibility of the structures. Such may be the case for the house at 8120 Capitol Highway (shown top of page). This photo shows how, if the house is found to be eligible, that features such as stairs may be much nearer to the right of way than the house itself. Though no character defining features were identified in the settings of the houses listed above, some features may exist which warrant protection under the NHPA.



Lastly, one commercial structure was found which may have a potential for NRHP listing. The northern side of the Mackey Auto Body facility, shown above, was built in 1931. The garage bay doors do not appear to be original, and since they are such a significant part of the structure, the eligibility has likely been lost. However, with restoration of the bay doors, the eligibility could be restored. It is not clear without additional research whether the entire structure (shown following page) is of the same vintage.

GENERALIZED EFFECTS

The following section is a discussion of potential effects, derived from an understanding of similar projects. There are many types of effects a project may have on a historic property. The effects made by transportation projects are often visual (placing an interchange in front of a historic district), audible (increasing traffic levels near a quiet historic farmstead), or direct (disturbing an archaeological site or demolishing a property). Based on criteria found within the ACHP regulation 36 CFR Part 800, there are three possible effect findings:



1. No historic properties affected - this finding is appropriate when it is determined that no historic properties are present in the APE or there are historic properties present, but the undertaking will not have any effect on them.
2. No adverse effect – this finding is appropriate when the undertaking may impact a historic property, but that impact will not alter the characteristics (directly or indirectly) that qualify a property for listing on the NRHP
3. Adverse effect - a finding of adverse effect is appropriate when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register.

A discussion of the likelihood of potential project effects is as follows, based on potential project actions:

Full acquisitions and full displacements

It is not likely that there will be any parcels which are fully acquired or any structures displaced as a result of the Capitol Highway Refinement Plan project.

Partial Acquisitions

Although the project has yet to enter the engineering phase, the final refinement plan identifies minimal right-of-way acquisition. The right-of-way acquisition affects three parcels that appear, based on age and integrity, not to be eligible for listing. There may be additional acquisitions required by the final design. Such acquisitions would likely be additional small “sliver” acquisitions from the properties adjacent to Capitol Highway or the intersecting streets where intersection realignment occurs. Partial acquisitions from the potentially eligible properties identified herein should be avoided. If avoidance is not possible, the acquisitions should be minimized, and may need to be mitigated. In most cases, there would not be an Adverse Effect to a historic structure merely if it lost a small portion of the yard around the structure. However, though not readily apparent based on the windshield survey, it is possible that the surrounding property of a potentially eligible structure is of great significance or may include character defining features. In these cases, even a small acquisition could result in a finding of adverse effect.

Temporary Impacts

There would likely be temporary construction easements required at locations that have been determined potentially eligible. Temporary construction easements on private property may be necessary, for example, to build sidewalks and construct retaining walls in the right-of-way. Such impacts would likely be found to have no effect or no adverse effect on a historic resource. The project may also have the temporary effects listed below:

- Noise impacts during construction.
- Vibration from construction.
- Traffic spillover during construction.
- Traffic detours and delays during construction.

However, these effects would similarly be unlikely to have an effect or adverse effect on historic resources.

FUTURE COURSE OF ACTION

The windshield survey covered Capitol Highway from Multnomah Boulevard to Taylor's Ferry Road, as well as sections of side streets as shown in Exhibit 1. The windshield survey provided an initial determination of NRHP-eligible resources that could potentially be adversely impacted by the SW Capitol Highway Plan Refinement project.

Once the refinement process is complete, the project will move into preliminary and final design. Changes resulting during the design phase may require the acquisition of additional tax lots or portions of tax lots where potentially NRHP-eligible resources have been identified. In such cases, additional historic built environment research is recommended. In cases where the right of way acquisition is very small and no potentially historic site features (fences, stairs, etc.) are affected, no additional research is recommended. However, where potentially historic features would be affected or the public right of way would significantly encroach on a historic building's property, additional research is recommended to determine the likely NRHP-eligibility of affected site features as well as the likelihood that the project would adversely affect these resources and require avoidance, minimization, and/or mitigation measures in accordance with Section 106 of the NHPA.

Upon completion of the refinement planning phase of this project and prior to final project design and construction, additional action is required by Section 106. Specifically, the project would establish an Area of Potential Effect (APE) and begin formal consultation with the SHPO and other Consulting Parties (local historic societies, tribes, etc.) as needed. The project team would revisit the findings of this initial windshield survey, and be sure to survey any properties previously not surveyed but occupying land within the established APE (if the APE encompasses areas not yet studied). Specific tasks may include preparing Section 106 Determination of Eligibility Forms and Finding of Effect Forms, as-needed. An intensive level survey and accompanying historic research would only be necessary to determine the eligibility or contributing status of stairs, fences or other property features that appear to be more than 50 years old and are located on an eligible property.