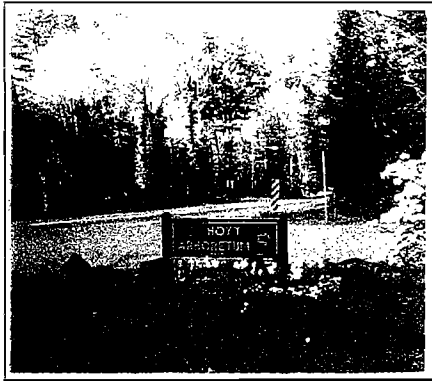
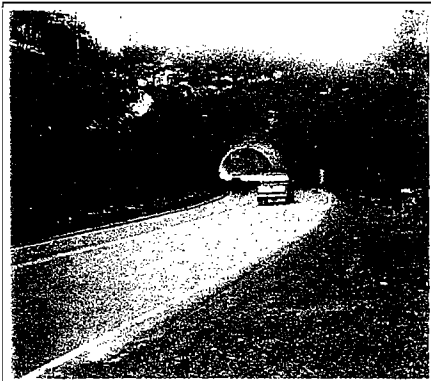


City of Portland  
Bureau of Transportation Engineering and Development  
Pedestrian Program

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# West Burnside Pedestrian Access Study



June 30, 1996

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**MURASE**  
Associates



**kpff**  
Consulting  
Engineers

### *A Note About This Study*

West Burnside is referred to as both 'Road' and 'Street' on official surveys along the length of the study area. For clarity, this study simply refers to it as West Burnside.

The West Burnside Pedestrian Access Study examines the options for providing improved pedestrian access along the West Burnside corridor.

*Part I - Planning* documents the initial part of the study and offers analysis, needs assessment and the schematic development of alternative plans and costs.

*Part II - Preliminary Engineering* develops the preferred alternative plan identified in Part I and offers additional detail and refinement of the plan and its associated costs. It is intended that Part II serve as a guide for final engineering and implementation.

**City of Portland**

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## *Summary of Findings and Recommendations*

The Transportation Element of Portland's Comprehensive Plan classifies West Burnside as a "Pedestrian Path," a "Bicycle Route," a "Regional Transitway," and a "Major City Traffic Street." Between NW 23rd Avenue and NW Skyline Boulevard (both classified as "Neighborhood Collectors"), West Burnside is reduced to a predominantly three-lane route that winds through a narrow draw in Portland's West Hills. This reach of West Burnside is one of only three routes in Northwest Portland (with Sunset Highway and Cornell Road) that carry heavy traffic through the West Hills from the growing residential neighborhoods to the west.

The draw, or canyon, that accommodates West Burnside is fairly steep, both sides are heavily wooded, and the adjacent residential development has been limited by topography. This gives the immediate environment a pleasing, semi-rural quality that is desirable to maintain. Except for the length of sidewalk below SW Tichner Drive and the narrow walkways through the tunnel, foot traffic is relegated to the uneven gravel shoulders that line much of the street. Bicycles share the motor vehicle lanes. Transit stops are identified by signs along the shoulders.

This study examines the need for improved pedestrian access along this segment of West Burnside and proposes a number of improvements, taking into account the growing demands of motor vehicle traffic and the City's strong commitment to transit and bicycle use.

A needs assessment was derived from neighborhood meetings and consultations early in the study. Current pedestrian use is low due primarily to low population density in adjacent neighborhoods; heavy, high-speed traffic; and the lack of consistent, safe pathways to encourage walking. Currently there is a greater demand to cross the street rather than to walk along any part of its length. Bicycle and transit use is also low.

Alternative plans were developed for analysis by study participants. A matrix of comparison criteria aided in this analysis. Considering West Burnside's significant pedestrian, bicycle, transit, and traffic classifications, an ideal plan would provide sidewalks and bike lanes on both sides of the street, with transit shelters and related crosswalks at specified locations. Practical concerns for demand and cost, and limitations imposed by topography, all suggest a more limited approach which has been proposed here.

The recommendations that result from this study call for a continuous paved sidewalk along one side of the roadway, taking advantage of the existing south-side sidewalk below SW Tichner Drive and the signalized crossings at the Tichner/Macleay intersection. A new north-side combined sidewalk/uphill bicycle lane is planned between the Macleay Boulevard intersection and SW Skyline Boulevard. Between SW Skyline Boulevard and NW Skyline Boulevard, topography allows a pedestrian

sidewalk and striped bike lanes on the roadway. A north-side, uphill bicycle lane will be striped from NW 23rd Avenue to the Macleay intersection. Improved transit stops and a crossing at Wildwood Trail are also recommended in order to increase pedestrian safety and provide amenities for users.

Funding for these improvements will likely come from various sources, and segments of the improvements may be developed in conjunction with other projects within the corridor, which will result in the most efficient use of limited capital resources. Acknowledging these variables, the study recommends an implementation sequence for linear improvements based upon ease of construction, cost and proximity to high-use areas. Nonlinear improvements should be implemented as funding becomes available. The total cost for all improvements proposed is \$1,840,000.

The City of Portland is committed to increasing the proportion of transit and foot traffic throughout the city. Easier, safer pedestrian, bicycle, and transit access along West Burnside is consistent with this transportation goal, as expressed in the Comprehensive Plan.

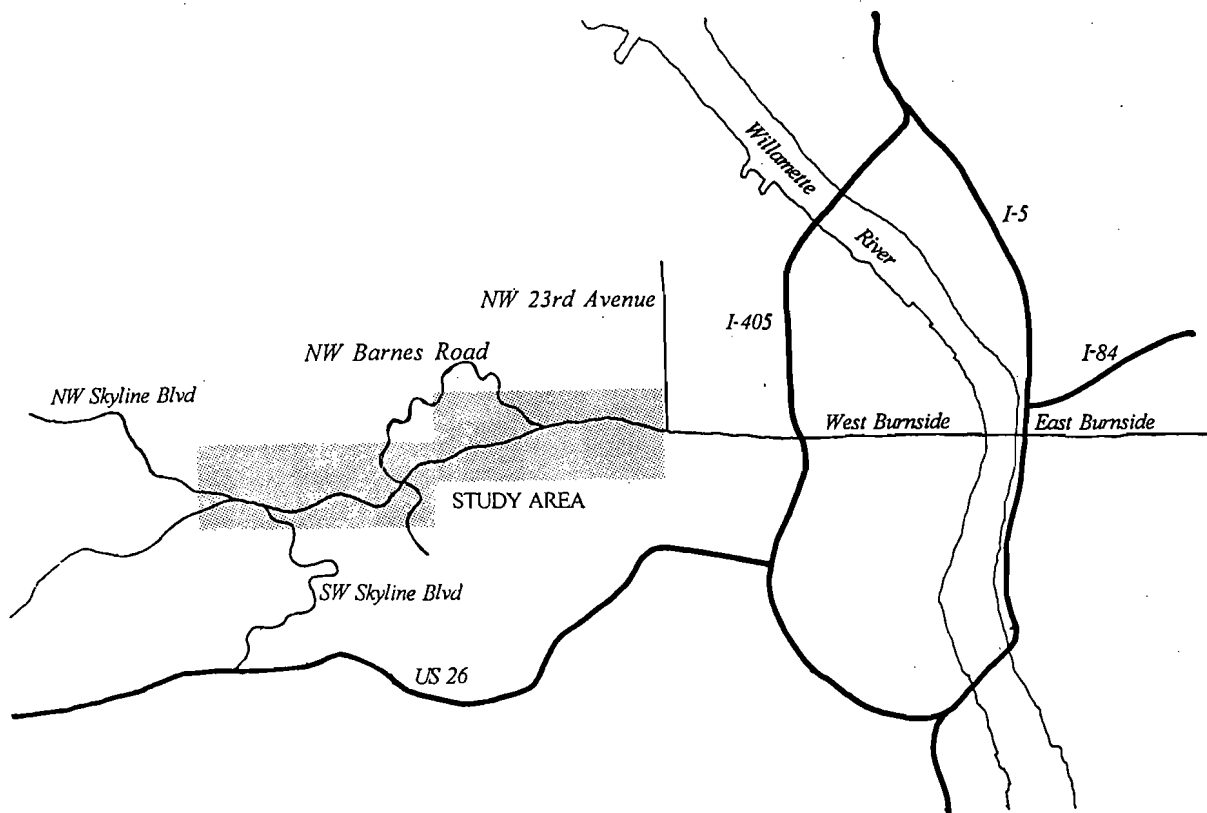
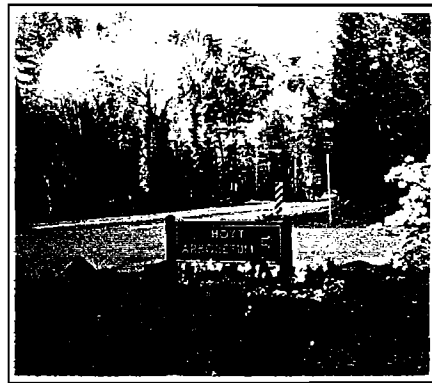
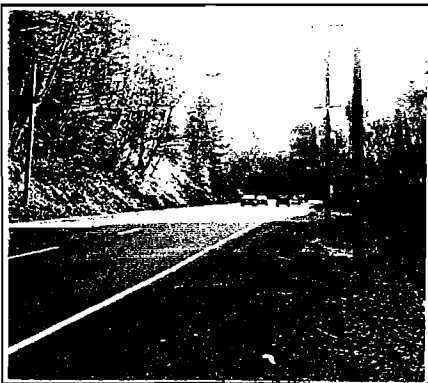
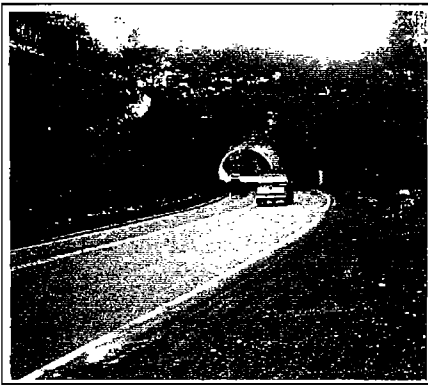


FIGURE 1

# West Burnside Pedestrian Access Study

*Part I - Planning*



## I. Introduction

### *Objectives*

West Burnside between NW 23rd Avenue and NW Skyline Boulevard is a winding, mostly three-lane arterial within a wooded canyon, one of three east/west corridors through Portland's West Hills. The Bureau of Transportation Engineering and Development is evaluating the potential for improving pedestrian and bicycle facilities and transit access along this reach of West Burnside. The objectives of the study are to:

- Identify pedestrian, bicycle, and transit user needs.
- Develop a plan which responds to user needs, estimates costs, and recommends a priority sequencing of improvements.
- Develop preliminary engineering designs and refined cost estimates for selected alternatives.

### *Methodology*

To reach the above objectives the following methodology was followed:

- *Identify and analyze existing conditions as a basis for design decisions.*

Natural conditions and improvements were inventoried including slopes, grades, soils, vegetation, drainage, and the existing paved roadway and sidewalk.

This information is summarized in an overall "Opportunities and Constraints" diagram, illustrating where natural conditions and existing construction allow feasible improvements and, conversely, where conditions for improvements are not favorable. (See Figure 3.)

- *Review current zoning and land use.*
- *Develop a user program which addresses pedestrian needs, including safety, access, and amenities; bicycle travel; and transit service enhancements.*

A Technical Advisory Committee (TAC) helped to assess user needs. The first TAC meeting was held in October, 1994 and included representatives from Neighbors West/Northwest, Bureau of Transportation Engineering and Development, Bureau of Traffic Management, Bureau of Maintenance, Hoyt Arboretum, Tri-Met, Bureau of Parks and Recreation, Bureau of Planning, and the City's Bicycle Program. Issues discussed included neighborhood values,



maintenance practices, Wildwood Trail impacts, handicap access, transit and bicycle ridership, visual quality, vegetation protection, construction concerns, watershed concerns, and impacts of new residential development. A second TAC meeting was held in January, 1995, to present and review alternative plans and associated costs. Items discussed included slope instability and the City's desire not to disturb more hillside, replacement of the stairs at SW Tichner Drive with a ramp consistent with the Americans with Disabilities Act (ADA), and the Wildwood Trail crossing, including the possible re-routing of the Wildwood Trail towards NW Barnes Road.

- *Identify needs and concerns*

A first public workshop was held on October 13, 1994, to introduce the project and to identify user needs and concerns. Comments from the public were recorded by the study team and aided in development of Section III, Needs Assessment.

- *Develop alternative concepts based on user needs, site conditions, and cost.*

Alternative plans were presented at a second public workshop on January 18, 1995. As with the first workshop, public comments were recorded. They are summarized in Section IV, Alternative Plan Development. The single most-frequently stated public concern was pedestrian safety at the Wildwood Trail crossing.

- *Recommend a preferred plan that responds to input from the community, user group, and affected public agencies.*

The preferred alternative plan was presented at a third and final public workshop on September 28, 1995.

## II. Study Area Inventory and Analysis

### *Study Area*

The study area is the corridor between NW 23rd Avenue and NW Skyline Boulevard. The corridor is approximately 10,000 lineal feet or slightly less than two miles long. The width of the study area varies with the terrain; the actual right-of-way is 80 feet wide. (See Figure 1.)

In most of the study area, West Burnside is located in the bottom of a canyon and occupies most of the width of the canyon. The most typical cross section of the corridor includes three paved traffic lanes with gravel shoulders on each side; an open, heavily-disturbed stream channel; and heavily wooded canyon walls lying at or near their maximum angle of repose. In these sections, the gravel shoulders offer the best location for the construction of facilities for pedestrians or cyclists.

In other sections, West Burnside occupies the entire width of the canyon, covering the stream channel. These will be the most challenging sections in which to provide facilities for pedestrians or cyclists.

### *Inventory of Existing Site Conditions*

The following summaries are organized on a block-by-block basis. Figures 3 and 3A graphically display this information. This information was gathered by the study team and forms the basis from which this report was developed.

- *NW 23rd Avenue to NW Uptown Terrace*

The shopping centers on both sides of West Burnside generate cross traffic. Signalized pedestrian crossings are located at NW 23rd Avenue, NW 23rd Place, and NW 24th Place.

The corner of NW 23rd Avenue and West Burnside has been redeveloped to include a new shopping complex, Thiele Square. The City of Portland recently redesigned the signaled intersection of NW 23rd Avenue. The City also installed signals at NW 23rd Place and NW 24th Place.

While there are sidewalks on both sides of the street, west of NW 24th Place the north-side sidewalk has been covered with slide debris.

An east-bound transit stop is located at the intersection of NW 23rd Avenue and West Burnside and both east- and west-bound stops are located at NW Uptown Terrace.

West Burnside has one downhill lane, a center painted median or left- turn lane, and two uphill lanes. Buses stop in the curb lane.

There are no bicycle lanes here or in any other segment of the corridor.

- *NW Uptown Terrace to NW Maywood Drive*

Multi-family dwellings have been built on the hillside, accessible only from the steep driveway that intersects with West Burnside. Topography is very steep and pedestrian use is low. A 5-foot sidewalk exists along the south side. The sidewalk on the north side is covered with slide debris.

Landslides in this location will be a continuing problem without the addition of a retaining wall. There are no marked pedestrian crossings located here.

East- and west-bound transit stops are located at NW Maywood Drive, and buses stop in the curb lane.

- *NW Maywood Drive to NW Macleay Boulevard/SW Tichner Drive Intersection*

Single-family residences and wooded open space are located north and south of the corridor. Pedestrian traffic is low. Slide activity is evident from the rip-rap on portions of the south-side slope.

The NW Macleay Boulevard/SW Tichner Drive intersection is a complex design. Traffic signals and crosswalks are located at both Tichner and Macleay. Both NW Macleay Boulevard and SW Tichner Drive serve as primary access routes to their respective neighborhoods.

The existing 5-foot sidewalk on the south side continues to the crosswalk connecting to NW Macleay Boulevard. This sidewalk is interrupted by a short length of stair. The remaining north-side sidewalk is completely covered with slide debris.

Transit stops are located at NW Macleay Boulevard (west-bound) and SW Tichner Drive (east-bound).

- *NW Macleay Boulevard-Tichner Drive to NW Hermosa Boulevard*

West Burnside at this location has one east-bound and two west-bound lanes. There are no sidewalks, marked crossings, or traffic signals. Though adjacent slopes are steep, 4-6 feet of right-of-way is available along the south side for pedestrian use. Any development along the north side would require piping for storm drainage.

- *NW Hermosa Boulevard to NW Barnes Road*

West Burnside crosses Forest Park and the heavily-used Wildwood Trail. As noted earlier, the Wildwood Trail crossing is dangerous due to horizontal sight distance limitations imposed by the curved alignment of West Burnside.

West Burnside has one east-bound and two west-bound lanes.

From 8 to 14 feet of right-of-way are available along the south side. A retaining wall would be required for sidewalk construction on the north side.

Transit stops are located at NW Hermosa Boulevard and at the intersection of NW Barnes Road. Due to a narrow shoulder and steep slopes, the east-bound NW Barnes Road transit stop would be expensive to improve due to the need for a retaining wall. The NW Barnes Road stop serves residential development on both sides of West Burnside. Pedestrian safety would be increased with the addition of a crosswalk.

- *NW Barnes to Catlin Woods*

East/west pedestrian circulation along West Burnside is low and there is limited north/south movement to access transit. There are no sidewalks, crosswalks, or signals.

West Burnside has one east-bound and two west-bound traffic lanes. An east-bound transit stop is located at the Catlin Woods development. A west-bound stop is located at the Wolf Creek pump station turnout, just west of NW Barnes Road.

Along the north side of the corridor, 10-12 feet (and in some places, up to 20 feet) of right-of-way is available for pedestrian/bicycle improvements. The steep drop-off along the north side would require a guard rail for safety.

- *Catlin Woods to NW 48th*

A mix of single-family homes and wooded open spaces is adjacent to both sides of the corridor. Residents access West Burnside on local service streets, but there are no pedestrian facilities that serve this area. Just west of Catlin Woods/Lori Lane, West Burnside is flanked by rock outcrops to the south and a rock wall to the north. As West Burnside approaches NW 48th, the steep slopes continue on the south side, while the grades drop away on the north. With the exception of north/south pedestrian circulation to access transit, pedestrian circulation is very low.

Along the north side, 4-10 feet of right-of-way is available for future pedestrian improvements. A 3-foot-wide ditch with steep slopes parallels the south side.

A west-bound transit stop is located approximately 900 feet west of the Catlin Woods development and east-bound/west-bound stops are located at NW 48th Street.

- *NW 48th to Skyline Boulevard*

Single-family homes and wooded open spaces are adjacent to both sides of the corridor. Beginning approximately 300 feet west of the tunnel, West Burnside narrows to one lane of traffic in each direction. Narrow (4-foot-wide) sidewalks extend beyond the tunnel in both directions for approximately 100 feet.

Again, with the exception of north/south pedestrian circulation to access transit, pedestrian circulation is very low.

Beginning west of the tunnel to SW Skyline Boulevard, 4 to 20 feet of right-of-way is available for improvements along the north side. A 3-foot-wide ditch with steep slopes parallels the south side.

East- and west-bound transit stops are located at SW Skyline Boulevard.

- *Skyline Boulevard Along Mount Calvary Cemetery*  
The Mount Calvary Cemetery lines both sides of West Burnside to the west end of the project boundary at NW Skyline Boulevard.

West of SW Skyline Boulevard, for about 350 feet, slopes are steep on both sides of the corridor and retaining walls would be needed to accommodate improvements. From here to the end of the project, slopes are grassed and less steep, making improvements more feasible.

### *Analysis of Natural Areas and Existing Conditions*

- *Slopes*  
The corridor has a history of slide activity which is evident in a number of locations along the right-of-way. Several substantial slope failures that occurred during the winter of 1996 demonstrate the instability of native soils within the ravine.
- *Grades*  
From a beginning elevation of 173 feet, West Burnside climbs up the canyon at grades from 6-10%, with an overall grade of 8.2% from NW 23rd Avenue to the crest near SW Skyline Boulevard. At this point the grade falls to -3.9% between SW Skyline Boulevard and NW Skyline Boulevard. Grades by segment are shown in the table below.

<u>Location</u>	<u>Elevation</u>	<u>Distance</u>	<u>Grade</u>
23rd Ave.	173	----	----
24th Pl.	220	800'	5.9%
Uptown Ter.	268	500'	9.6%
Maywood	350	1,100'	7.5%
Macleay	393	640'	6.7%
Tichner	418	400'	6.3%
Hermosa	502	950'	8.8%
Barnes	655	1,800'	8.5%
Fischer	711	570'	9.8%
48th	857	1,500'	9.7%
SW Skyline	990	1,650'	8.1%
NW Skyline	957	850'	-3.9%
		10,760'	

The steep longitudinal grade of West Burnside has several effects:

- Westbound/uphill travel speeds are constrained for motorists and cyclists. This makes West Burnside less attractive as a bicycle route, but alternative routes are even steeper.
- Eastbound/downhill travel speeds are increased and vehicle control and stopping ability are decreased.
- Horizontal and vertical sight distances are limited.

■ *Soils*

The *Soil Survey of Multnomah County*, published by the USDA Soil Conservation Service, identifies two major soil types in the West Burnside corridor. The area east of the Wildwood Trail is characterized by soils of the Wauld complex. Wauld soils are very gravelly loams formed from weathered fragments of the basalt bedrock which lies at a depth of 20 to 40 inches. Slopes are as steep as 70%, so erosion is a hazard. The soil is well-drained and moderately permeable.

The West Burnside corridor west of the Wildwood Trail is characterized by silt loams of the Goble complex. The lower part of the subsoil is fragipan, a layer of cemented sand or silt which limits permeability and strength and results in a seasonally high water table.

Transportation improvements in the West Burnside corridor are limited by steep slopes and unstable soil conditions. Any improvements that required slope excavation would be problematic from a cost and maintenance perspective. For this reason, improvements that do not require slope excavation are emphasized in this report.

- *Drainage*

In most of the study area, West Burnside is drained by roadside ditches which discharge either into the City of Portland storm drain or into the open channel that parallels much of West Burnside. In some areas, mostly in the eastern end of the corridor, drainage is controlled by curbs and gutters and collected at storm drain inlets.

The storm drain was constructed in the late 1980's and carries water from open stream channels as well as storm runoff from paved areas. During the winter of 1994/95, stabilization rock was placed in the open ditches along some sections of West Burnside to reduce erosion damage caused by storm runoff. Under any of the alternative access improvement plans discussed in this study, the width occupied by some ditch areas would be utilized for bike path or sidewalk construction; storm drains would be constructed to replace the open ditches.

The City of Portland Bureau of Environmental Services (BES) has proposed an additional storm drain system for the West Burnside corridor. The purpose of this system is to divert surface water flows from open channels, which are presently routed to a sewage treatment plant, into the drainage basin of Tanner Creek, which runs in a storm drain north of the study area. BES intends to "daylight" Tanner Creek and restore it to an open-channel condition at its confluence with the Willamette River in Northwest Portland. Surface water flows from the West Burnside corridor will be used to augment flows in Tanner Creek.

Design on the storm drain project is scheduled for completion in December, 1995; construction is scheduled to begin in July of 1998 but could be moved forward to July of 1997. The West Burnside study team has met twice with BES to identify benefits that might be realized from coordinating or combining the storm drain project with pedestrian access improvement projects.

Originally it was hoped that the storm drain and the pedestrian access improvements could share a common alignment, with direct construction economies for each project. As design of the storm drain progressed this was found to be impractical. The most significant mutual benefit will probably result from combining the two projects. This will result in economies from sharing indirect costs, such as administration, traffic control, mobilization and bonding.

- *Vegetation*

Indigenous deciduous and evergreen trees and natural understory extend to SW Skyline Boulevard. West of SW Skyline Boulevard, the tended, open lawns of Mount Calvary Cemetery are a sharp contrast to the wooded canyon.

Very little disturbance of the existing vegetation will result from the pedestrian access improvements since disturbance of the steep slopes in the corridor will

be avoided. Any disturbance of trees within the right-of-way, whether pruning or removal, requires permitting/review by City of Portland Forestry Division.

### *Zoning and Land Use*

Land uses abutting the study area have been constant for many years except at the east end of the corridor, where the commercial uses have recently been upgraded and 108 new townhouse units have been built on the hillside above Uptown Shopping Center. West of the corridor, however, high-density residential development has greatly increased, contributing to the heavy traffic volumes that characterize West Burnside today. Figures 2 and 2A show zoning in the study area.

The dominant land uses in the vicinity of NW 23rd Avenue are commercial and multi-family residential. The redevelopment of Uptown Shopping Center and other recent commercial projects have contributed to increased traffic volumes through the corridor but this increase has been offset to some extent by improvements in traffic operations resulting from the reconstruction of the West Burnside/NW 23rd Avenue intersection and the installation of traffic signals at NW 23rd Place and NW 24th Avenue.

From NW 23rd Avenue to approximately NW Hermosa Boulevard, single-family residential uses exist north and south of the corridor. Few undeveloped parcels remain and it is unlikely that significant density changes will occur.

Between NW Hermosa and SW Fischer, the corridor is primarily zoned for open space and is occupied by Pittock Acres Park to the north and Hoyt Arboretum to the south.

West of SW Fischer Avenue to SW Skyline Boulevard are neighborhoods of single family homes. Future growth here is limited by zoning and the steep terrain.

Mount Calvary Cemetery borders West Burnside from SW Skyline to the western limit of the study area.

### *Right-of-Way Improvements*

- *Travel Lanes*

West Burnside has three travel lanes--two uphill (west-bound) and one downhill (east-bound)--except at the tunnel under NW/SW Barnes Road, where the roadway is reduced to one lane in each direction. Pavement width is generally 34' and the travel lanes vary in width throughout the corridor. From NW 24th Place to NW Macleay Boulevard, the pavement is approximately 48' wide, with three lanes and a center turn lane. The outside lane has excess width (up to 17'). Traffic lanes are on the average 11'-12' wide. The lane widths are appropriate for arterial streets.



- *Sidewalks*

There is a paved sidewalk along the south side of West Burnside between NW 23rd Avenue and SW Tichner Drive; a sidewalk along the north side of the right-of-way has long been covered with earth due to erosion. The remainder of the corridor lacks paved sidewalks except for a short length through the tunnel. Unprotected shoulders are wide enough in places to accommodate pedestrian traffic.

- *Lighting and Utility Poles*

The corridor is lighted by high-pressure sodium lamps placed at approximately 100'-150' intervals. The lighting meets City guidelines.

Utility poles may conflict with proposed sidewalks or other facilities. Some relocation can be expected in the design phases of this project.

- *Intersections and Pedestrian Crossings*

All of the intersections with West Burnside from NW 24th Place to NW Skyline Boulevard are T-intersections with the exception of 48th Drive/Avenue. Signals were recently installed at NW 23rd Place, NW 24th Place and at the combined NW Macleay Boulevard/SW Tichner Drive intersection. Most of the streets intersecting West Burnside are residential streets, serving local users only. These are:

*NW Uptown Terrace (private street)*  
*NW Maywood Drive*  
*NW Macleay Boulevard*  
*NW Hermosa Boulevard*  
*SW Arboretum Circle (private street)*  
*NW Lori Lane (private street)*  
*NW 48th Avenue/SW 48th Drive/NW Woodside Terrace*

Streets with higher use are:

*NW 23rd Place (commercial development)*  
*NW 24th Place (serving new commercial development)*  
*SW Tichner Drive (Washington Park access)*  
*NW Barnes Road (Pittock Mansion access)*  
*SW Fischer Avenue (Hoyt Arboretum access)*  
*SW and NW Skyline Boulevard (neighborhood collector)*

Except at the signaled intersections mentioned above, there are presently no striped cross-walks on West Burnside warning motorists of pedestrian crossings.

- *Wildwood Trail*

The Wildwood Trail is a popular regional recreation trail and the trail crossing of West Burnside may be the most heavily used crossing in the corridor. Short sight distances make this a difficult crossing. Starting at the Vietnam Memorial in Washington Park and winding north through Hoyt Arboretum, the trail crosses West Burnside just beyond Milepost 3. North of West Burnside, the trail passes Pittock Mansion before entering into Forest Park.

On the south side of West Burnside at the Wildwood Trail, a wide, flat area has been graded and graveled and is used as an informal parking area by hikers. It is also used by motorists as a turnout. Conflicts between vehicles entering and exiting the parking area, hikers and traffic on West Burnside were noted.

- *Barnes Road*

NW Barnes Road provides access to a small residential neighborhood which includes the Pittock Mansion, a regional attraction. Because of speeds along West Burnside, both vehicular and pedestrian crossings are difficult. A flashing yellow caution signal has been installed at this intersection to warn West Burnside traffic of these crossings.

- *Southwest and Northwest Skyline Boulevard*

The intersections of SW Skyline with West Burnside and NW Skyline with West Burnside are separate intersections approximately 1,000-feet apart. The SW Skyline intersection presently includes a left-turn lane to westbound West Burnside and a right-turn lane to eastbound West Burnside. The NW Skyline intersection has a "Y" configuration, with a STOP sign for the Skyline southbound-to-West Burnside-eastbound left-turn; and a right-turn spur for the Skyline southbound-to-West Burnside westbound movement. There are no pedestrian or bicycle facilities in the area. Both intersections meet warrants for signalization. A residential subdivision has been approved for the area north and east of the SW Skyline intersection, with a condition for future participation in roadway and signal improvements for the intersection. The City has completed the survey and design for the improvements.

The design was completed in 1992 and did not include sidewalks or bike lanes. The design cross-section of West Burnside at SW Skyline shows three lanes, including a 12-foot left turn lane and 15-foot traffic lanes. Outside the curbs, a minimum three-foot-wide landscape area is shown.

The intersection design assumed that two 15-foot traffic lanes would be constructed from SW Skyline east to the tunnel. This would provide adequate width for the combined north-side bike/pedestrian facility recommended later in this study.

- *Tunnel*

Sidewalks within the tunnel are relatively narrow but usable for pedestrians and cyclists; lighting is poor. Increasing the width of the tunnel to improve

access for pedestrians and cyclists would be impractical. However, it would be economical to make the tunnel more attractive to pedestrians and cyclists by cleaning and maintaining the sidewalks and improving the lighting.

■ *Transit Stops*

Bus stops are located along the corridor, at or near most street intersections, at intervals of approximately 1,000 feet. All bus stops in the corridor are unimproved. Access to bus stops is difficult due to the steep topography and the lack of protected crossings of West Burnside.

In support of this project, Tri-Met prepared a report titled "Survey of West Burnside Bus Stops for Potential Pedestrian Access and Zone Improvements", dated October, 1993. Tri-Met's conclusions are as follows:

- All of the nine stops within the study area can be characterized as low usage (ten or fewer boardings or alightings per day), according to Tri-Met's 1990 Passenger Census. A passenger count in 1995 showed no significant change.
- Due to low usage, none of the stops is eligible for Tri-Met funded shelter improvements.
- Most of the stops have poor access to adjacent residential development.
- The west-bound NW Barnes Road and east-bound Arboretum Circle stops have the greatest need for improvement.

## *Traffic*

West Burnside is classified in the Transportation Element of the Comprehensive Plan as a "Major City Street," "Major City Transit Street," "Bicycle Route," and "Pedestrian Path."

■ *Pedestrian*

While West Burnside is classified as a "Pedestrian Path" in the Transportation Element of the Comprehensive Plan, site observation and anecdotal information suggest that pedestrian traffic is low. No quantitative data exists. From the neighborhood meetings, it is apparent that pedestrian crossings are more frequent than pedestrian corridor-long usage.

■ *Bicycle*

Bicycle traffic is also low, owing certainly to the steep grades, high motor vehicle speed, and lack of paved shoulders or bike lanes. Again, no numerical data is available for bicycle ridership in the corridor.

West Burnside has been identified in the Transportation Element of Portland's Comprehensive Plan as a Bicycle Route. Other designated bicycle routes that intersect the corridor are NW and SW Skyline Boulevard, SW Barnes Road (west of SW Skyline Boulevard), NW 24th Place, and SW Vista Avenue. A

Washington Park maintenance access road south of NW 23rd Avenue Place allows direct access into the park and has been identified as a bicycle/pedestrian connection by Portland's Bicycle Program.

■ *Transit*

Transit traffic consists of Tri-Met's Bus Route 20, which serves Southwest Portland and suburban communities, and Route 18, a new commuter line serving the Hillside neighborhood.

Tri-Met has found that transit riders will generally walk about 1/4 mile to a transit stop. Using this criterion, there are 735 households within walking distance of the bus stops along the West Burnside corridor between NW 23rd Avenue and NW Skyline Boulevard. Tri-Met does not have a statistical method for estimating potential transit ridership on a per-household basis so no estimate of potential transit ridership in the West Burnside corridor has been made for this study. However, in 1994, Tri-Met measured actual ridership and counted 12 inbound and 33 outbound riders.

Statistical analysis aside, these numbers obviously indicate low transit ridership in the West Burnside corridor. This may be attributable to several factors in addition to accessibility of bus stops, including steep topography; discontinuous street systems adjacent to West Burnside; and demographics that do not fit a "high transit-ridership" profile.

■ *Motor Vehicles*

Traffic data collected in September, 1994 by the Bureau of Traffic Management indicates average daily traffic (ADT) of 17,600 vehicles per day in the corridor. The morning peak hour begins at 7:15 am, and the afternoon peak hour begins at 4:45 pm. The 85th percentile speed varies between 44 mph and 49 mph, depending on location and direction of travel. The posted speed limit is 35 mph, east of Macleay/Tichner and 40 mph west of Macleay/Tichner.

The Office of Transportation predicts a 4.7% increase in west-bound peak hour traffic by the year 2010. This increase will probably not be perceptible to pedestrians walking along the West Burnside corridor, but it may make crossings more difficult to some degree.

### III. Needs Assessment

#### ■ *Pedestrian Needs*

Several areas in the West Burnside corridor are regional pedestrian attractors, including:

- Uptown Shopping Center and other nearby stores.
- Pittock Mansion.
- Hoyt Arboretum.
- Washington Park and Zoo; OMSI's Educational Annex; and the World Forestry Center.
- Vietnam Memorial and Japanese Gardens.

Except for Uptown Shopping Center, all of these destinations are connected to West Burnside by the Wildwood Trail and therefore generate pedestrian crossings of the corridor rather than pedestrian circulation along the corridor. If pedestrian access were improved along West Burnside, Wildwood Trail would probably receive increased use by pedestrians living adjacent to the corridor.

The shopping center attracts pedestrians from east of the study area and probably attracts limited numbers of pedestrians from the study area west of Macleay Boulevard. Since there are striped crosswalks protected by a traffic signal at the Macleay/Tichner intersection and since a sidewalk is in place on the south side and ample width for pedestrians is available on the north side of this section of the corridor, it is unlikely that improved facilities would result in significantly increased pedestrian traffic between Macleay/Tichner and the vicinity of Uptown Shopping Center.

However, if such improvements were in place, they might result in significant pedestrian activity between the Uptown area and Wildwood Trail. Similarly, improved pedestrian facilities along the corridor might also result in increased pedestrian activity in the western half of the study area, since pedestrians from surrounding neighborhoods would be encouraged to walk to Wildwood Trail.

#### ■ *Bicycle Needs*

Bicyclists currently share the road with motor vehicles. To some degree, this arrangement works in the east-bound direction. Bicyclists are able to maintain a relatively high speed and are partially able to avoid typical motor vehicle/bicycle speed conflicts. West-bound bicycle traffic is another matter. Without any shoulder in most of the corridor and with steep grades (up to 10%), bicycling uphill is challenging. Needs are obvious: the addition of a bike lane striped on the street or some combined pedestrian/bicycle facility.

The section of West Burnside from SW Skyline west to the end of the study area has a downgrade of 4%. This means that the speed of westbound cyclists will be substantially higher than that of pedestrians but not high enough to share the traffic lane with cars. Eastbound cyclists, although going uphill, will also be able to travel significantly faster than pedestrians. These speed differentials create a need for separated facilities for pedestrians, cyclists and automobiles from SW Skyline west to the end of the study area.

As noted earlier, this section of West Burnside will probably be improved when a residential subdivision is developed north and east of the intersection with SW Skyline. The existing design for this improvement should be revised to provide separated facilities.

■ *Transit Needs*

All transit riders are pedestrians first, and their needs are the same as other pedestrians. Street crossings become particularly important for riders trying to cross to or from bus stops. Transit riders also need safe areas to wait for the bus. A safe waiting area is well-lit, protected from traffic, and accessible as defined by the Americans with Disabilities Act. Seating and shelter from the weather are inviting amenities.

When measured against these standards, transit facilities along the West Burnside corridor need improvement. Sidewalks leading to the bus stops are largely absent, and waiting areas are most often narrow gravel shoulders along the roadside.

Tri-Met criteria for making transit improvements are based primarily upon boarding statistics. Tri-Met surveys conducted in October, 1993 and October, 1994 characterized the use of transit in the study corridor as low (10 or fewer boardings per day). Consequently, in relation to system-wide improvements, improvements to bus stops in the West Burnside corridor are low priority, despite recognized deficiencies.

■ *Motor Vehicle Needs*

The Office of Transportation has indicated that no improvements to West Burnside are planned solely for the purpose of increasing traffic capacity. As noted earlier, traffic signals and other improvements will probably be constructed on West Burnside at the intersections with SW Skyline and NW Skyline to accommodate traffic generated by a residential subdivision that has been approved for the area.

#### **IV. Alternative Plan Development**

Four alternative plans were presented to the Pedestrian Program Citizen Advisory Committee (CAC), the Technical Advisory Committee (TAC), and affected neighborhood groups for review; they are summarized below:

- ***Alternative 1: Sidewalks and Bike Lanes Both Sides***

Providing sidewalks and bike lanes along both sides of West Burnside would be the ideal solution for this heavily-travelled urban arterial and consistent with City policies as expressed in the Comprehensive Plan. However, due to steep topography, unstable soils, fixed right-of-way, and the need for retaining walls, the cost of two 5-foot bike lanes and 6-foot sidewalks would be excessive, given the limited demand.

After discussion with the CAC, TAC, and affected neighbors, it was determined that this option should not be carried forward.

- ***Alternative 2: Existing Sidewalk and North-Side Combined Facility***

Beginning at the east end of the corridor, pedestrians would use the existing south-side sidewalk that extends to SW Tichner Drive. Using the existing signalized north/south crossing, pedestrians would cross West Burnside at the intersection with NW Macleay Boulevard to a combined 10-foot pedestrian/bicycle facility. The combined facility would begin at NW Macleay Boulevard and continue along the north side of the right-of-way to SW Skyline Boulevard. A northside sidewalk and striped bike lanes on both sides of the street would be constructed from SW Skyline to the end of the project at NW Skyline. (See Figures 4 and 4A, and Figures 5 through 10.)

A north-side, uphill bicycle lane would be striped from NW 23rd Avenue to NW Macleay Boulevard. The lane would transition to join the combined facility at NW Macleay Boulevard.

- ***Alternative 3: North Side Combined Facility, NW 24th Place to NW Skyline Boulevard***

This alternative differs from Alternative 2 in that the north-side bicycle lane from NW 23rd Avenue to NW Macleay Boulevard is replaced with a 10-foot-wide combined facility from NW 24th Place to NW Macleay Boulevard. This would provide users with a continuous north-side combined pedestrian/bicycle path west to SW Skyline Boulevard. (See Figures 11 and 11A.)

■ *Alternative 4: NW Barnes Road Crossing*

A new sidewalk would be constructed along the south side of West Burnside from SW Tichner Drive to NW Barnes Road. Pedestrians would use a new crosswalk at NW Barnes Road. The 10-foot-wide, north-side combined facility would begin at this point and continue west to SW Skyline Boulevard.

After discussion, this option was dropped due to steep slopes along the south side between the SW Tichner Drive/NW Macleay Boulevard intersection and the existing Wildwood Trail crossing. Another disadvantage to this option was that the crosswalk at NW Barnes Road could be installed only as a part of a larger, more complex signalization project, which is discussed at the end of this section.

■ *Common Elements for All Alternatives*

The following elements are common to each of the alternative plans except Alternative 1:

- The existing sidewalk on the south side of West Burnside will remain in use from SW 23rd Avenue to SW Tichner Drive.
- East-bound (downhill) bicycle traffic will continue to share the road with motor vehicles.
- The existing stairs at SW Tichner Drive will be replaced with an Americans with Disabilities Act (ADA)-compliant ramp.
- Unimproved transit stops at the south side of West Burnside will be enhanced with 5-foot by 8-foot concrete bus pads. ADA requires that slabs not exceed 2% slope in any direction. However, as provided for in the City's street design standards, many improvements in public rights-of-way must conform to the longitudinal street grade. Such improvements may be sloped steeper than 2% where the street grade exceeds 2%. Decisions on bus pad slopes along West Burnside will be made on a case-by-case basis during final design. Even where bus pad slopes must exceed 2%, handicap landing areas sloped at 2% or less can be provided.  
Due to cuts and fills in some places, retaining walls with combined seating may be incorporated into some transit pads.
- Wildwood Trail crossing improvements are common to each of the alternative plans and are discussed in V., Preferred Alternative Plan.
- A north side sidewalk and striped bike lanes are provided between SW Skyline Boulevard and NW Skyline Boulevard.

*Special Considerations for All Alternatives*

■ *Project Coordination*

During the study process the consultant team learned of an opportunity for the Bureau of Transportation and Engineering and Development to combine financial resources with the Bureau of Environmental Services (BES) as they complete plans for the Tanner Creek Stream Diversion Project, Phase IV. Combining the



two projects would be cost effective in terms of traffic control, trenching, resurfacing, contractor mobilization, and administration. Additionally, neighbors would benefit from less disruption.

■ *Intersections*

For each intersection in the study area, the feasibility of improving pedestrian crossing conditions was evaluated. Improvement options included installation of marked crosswalks; warning signs and lights; and traffic signals. In all cases, it was determined that the improvement of pedestrian crossings would be problematic due to the following considerations:

- Vehicle stopping distances are longer than available sight distances, based on the posted speed limit, actual traffic speeds and horizontal and vertical sight distance constraints imposed by the curving alignment and steep grades of West Burnside.
- Marking or designating crosswalks under these conditions could give pedestrians a false sense of security.
- Warning lights and signs warning motorists of pedestrian crossings have been shown to be ineffective.
- Traffic and pedestrian volumes on most unsignaled streets intersecting West Burnside are not high enough to warrant installation of traffic signals.

The consensus among the study team, Bureau of Transportation and Traffic Management staff and standard reference texts was that, with traffic conditions as they presently exist on West Burnside, the installation of crossing enhancement measures would be likely to give pedestrians a false sense of security and is therefore not recommended by this study.

■ *Wildwood Trail Crossing*

Several possibilities were identified for improving pedestrian safety at the Wildwood Trail Crossing:

- Installation of a striped crosswalk, possibly with warning signs and lights; this alternative was discarded based on the concerns above.
- Installation of a striped crosswalk, with the addition of a median to serve as a pedestrian refuge. This is discussed in IV., Alternative Plan Development.
- Construction of a pedestrian bridge to carry Wildwood Trail users over West Burnside. This option is also discussed in Alternative Plan Development.
- Realignment of Wildwood Trail to cross West Burnside at Barnes Road. This option was considered together with the signalization of the Barnes Road intersection, which is discussed below.

The realignment of Wildwood Trail was discarded for the following reasons:

- The realignment would result in out-of-direction travel for trail users. It would require acquisition of easements or right-of-way across private properties. Trail users would continue to use the existing parking area and would want to continue using the existing trail connection from the parking lot. The realignment would be dependent on the signalization of the Barnes Road intersection.
- The importance of the Wildwood Trail crossing is discussed in *Section III, Needs Assessment*. The installation of pedestrian crossing protection measures at Wildwood Trail was deemed by the study team to be integral to all the alternative plans that were considered. This conclusion is based on the strong support that was voiced during the public information process and on the judgement of the study team. Quantitative information on trail use has not been collected and therefore cannot be used to confirm the need for crossing protection.

■ *NW Barnes Road*

Potential pedestrian crossings at the NW Barnes Road intersection were central to two alignment alternatives. Alternative 4 calls for a sidewalk to be constructed along the south side of West Burnside, with a crossing to the north side at NW Barnes Road. Another alternative that was analyzed and then discarded was the realignment of Wildwood Trail to cross West Burnside at NW Barnes Road.

Each of these alternatives was dependent on the installation of some type of pedestrian crossing protection at NW Barnes Road. As noted earlier, simply installing a striped crosswalk would not be acceptable. Given the traffic speeds, volumes and sight distance, signalization was found to be the only acceptable method of pedestrian crossing protection.

Ultimately, the signalization of the NW Barnes Road intersection was not incorporated into the Preferred Alternative Plan but pros and cons were analyzed before this decision was made; they are summarized below.

*Pros:*

- A signal would help pedestrians to access transit, especially during peak periods.
- During peak periods, a signal might reduce delays for drivers turning on to West Burnside from NW Barnes.
- A signal would facilitate vehicle access to Pittcock Mansion.
- During peak periods, signal would provide protected crossing opportunities for pedestrians and cyclists on Major City Traffic Streets and Transit Streets.
- A signal at NW Barnes would be logically spaced relative to the existing signal at Macleay/Tichner and a potential future signal at SW Skyline Boulevard.

*Cons:*

- During off-peak periods, pedestrians and vehicles have adequate opportunities to cross or turn onto West Burnside without a signal.
- During off-peak periods, a signal would probably increase delay for drivers turning onto West Burnside from NW Barnes Road.
- A signal would cause substantial delay and queues to all modes of traffic on West Burnside, especially during peak periods.
- A signal would not comply with the Transportation Element policy which recommends that Local Service Streets should yield right-of-way or be denied access to Major City Traffic Streets.
- Drivers on NW Barnes have right-turn access onto West Burnside for either east or westbound travel because NW Barnes crosses over West Burnside at the tunnel just to the west.
- To protect motorists entering and exiting West Burnside at NW Barnes signalization would include a dedicated left-turn lane from West Burnside westbound to NW Barnes. Space for the turn lane could be obtained only by deleting one of the westbound traffic lanes.

■ *Comparison Criteria*

To aid in analysis of the four alternative plans, a matrix of evaluation criteria was developed which compares aspects of each plan. Through this, a generalized rating for each alternative was developed. The matrix is shown below.

*A Comparison of Alternatives*

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Cross-Corridor Access	3	3	3	4
Access Along Corridor	-	-	-	-
• Pedestrian	5	3	4	3
• Transit	4	3	3	4
• Bicycle	5	4	3	2
Safety	5	3	4	3
Cost/Benefit	1	4	3	2
Use of Existing Facilities	1	5	4	3
Environmental Disturbance	1	5	5	2
Average Rating	3.1	3.8	3.6	3.0

1 = Poor 2 = Below Average 3 = Average 4 = Above Average 5 = Best

## *V. Preferred Alternative Plan*

After consultation with members of the community, the TAC, and the Pedestrian Program Citizens' Advisory Committee, Alternative 2 was selected as the preferred plan. This plan best responds to site conditions, user needs, and cost concerns. The main element of Alternative 2 is a 10'-wide pathway for combined use by pedestrians and cyclists. This "combined facility" will be constructed along the north side of West Burnside; a detailed description of Alternative 2 is provided later in this section.

Typically, the combined facility will consist of a raised curb and a 10' wide pathway, with the pathway set at the same elevation as the top of the curb. In most areas, both the curb and the pathway will be constructed of concrete, although an asphalt pathway may be more appropriate in some areas. Curb ramps will be incorporated into the pathway at all street intersections.

City staff has asked about how conflicts will be resolved between the proposed pathway and existing features such as signs, utility poles or fire hydrants. As described below, the study team has anticipated these and other concerns with the development of Alternative 2.

The proposed concrete curb and pathway cross-section has several advantages over other possible cross-sections, such as a simple asphalt pathway separated from traffic with a paint stripe, raised buttons or a raised curb. These advantages are summarized below:

- Better protection and separation of pedestrians and cyclists from traffic.
- A painted stripe provides no physical protection and allows traffic to encroach on the pathway.
- Raised buttons are hazardous to cyclists.
- A raised curb, when used to separate a pathway from a roadway that is at the same grade, tends to trap automobiles that have jumped the curb and causes them to continue to travel along the pathway rather than returning to the traffic lane.
- A raised curb will trap debris and is difficult to sweep on the path side of the curb.
- Reduced maintenance and lower overall cost.
- A raised pathway is less susceptible to being littered with gravel and other debris and will require less sweeping than an at-grade pathway.
- A concrete pathway has a longer service life than an asphalt pathway and is not dependent on auto traffic to maintain its compaction and therefore its structural integrity.
- Better collection and concentration of stormwater runoff; better drainage of the pathway.
- A curb will concentrate runoff in a gutter, which requires less maintenance than a ditch.
- A curb also diverts runoff from traffic lanes away from the pathway.

- Better conformation to existing topography and less disruption of adjacent banks. A raised pathway constructed 6- or 7-inches higher than the traffic lanes and sloped toward, rather than away from the traffic lanes, will fit better into the existing cross-section. This is because the outside edge of a raised 10-foot-wide pathway is one foot higher than the outside edge of a 10-foot-wide at-grade pathway that is sloped away from the traffic lanes.

Alternative 2 was developed with close attention to minimizing disturbance of adjacent slopes by locating improvements in existing level areas. Techniques for accomplishing this include:

- Paving existing gravel shoulders.
- Using existing excess lane widths.
- Paving shoulders opposite the improvement and realigning the traffic lanes onto the new pavement.
- Piping, filling, and paving existing ditches.

The experience of the study team on previous projects indicates that piping the ditches will be acceptable to the Bureau of Transportation Engineering, which has jurisdiction over stormwater collection, as well as the Bureau of Environmental Services, which has jurisdiction over stormwater transmission and disposal. City approval of this concept will be obtained during final design.

It should be noted that the proposed pathway, when combined with piped storm drainage, will constitute a significant improvement over the existing drainage system. This could justify a request from the Bureau of Transportation Engineering for the Bureau of Environmental Services to share construction costs that are specifically related to drainage improvements.

As with the other alternative plans, Alternative 2 includes the a construction of 8-foot by 5-foot concrete pads at all unimproved bus stops. These pads will accommodate bus shelters if Tri-Met determines in the future that they are warranted. In general existing bus stop locations will be retained because they are optimally located with respect to topographic constraints. Where possible, the bus stops are at Tri-Met's preferred "far side" location. With a far side location, a bus stops after rather than before passing a given intersection.

The following narrative describes proposed pedestrian, bicycle and traffic improvements by type and location. This narrative was developed from field investigations of the West Burnside corridor; the Preferred Alternative Plan is based on these investigations. (See Figures 4 and 4A, and Figures 5 through 10.)

- *NW 23rd Avenue to NW Macleay Boulevard.*  
The existing 5-foot, south-side sidewalk in place from NW 23rd Avenue to SW Tichner will remain and pedestrians will cross at SW Macleay using the existing signalized crossing. Along the entire north side of this segment, a 5-foot-wide striped bicycle lane is proposed, taking advantage of the under-

utilized pavement there. This is the most basic option and is favored by the CAC because it can be implemented with the least expenditure. If additional construction funds are available, the study team recommends that Alternative 3 be implemented. Alternative 3 is identical to the Preferred Alternative except that the north-side bicycle lane from NW 23rd Avenue to NW Macleay Boulevard is replaced with a 10-foot-wide combined pedestrian/bicycle facility from NW 24th Place to NW Macleay Boulevard. This facility would occupy the under-utilized pavement width referred to above.

The short flight of steps located in the south-side sidewalk just west of the West Burnside/SW Tichner Drive intersection constitute a handicap-access barrier. They will be replaced with a ramp that complies with ADA standards.

- *NW Macleay Boulevard to Tunnel.*

A 10-foot-wide concrete, combined pedestrian/bicycle facility will begin at NW Macleay Boulevard and continue along the northern edge of the West Burnside right-of-way.

While ordinarily it is not considered good practice to combine bicycle and pedestrian traffic, the steep grades on West Burnside slow the bicyclist, reducing speed conflicts with pedestrians. To avoid disturbing the steep, rip-rapped slopes immediately adjacent to the traffic lanes in the curve just west of Lori Lane, it is recommended that the outside uphill traffic lane be dropped just west of NW Barnes Road to accommodate an 8-foot-wide shared pedestrian/bicycle facility on the north side. During Part II of this study, Preliminary Engineering, the consultant team will work with the City's Bureau of Traffic Management to verify that West Burnside can manage this traffic capacity loss while still providing an acceptable level of service. Retaining walls will be needed if the lane is not dropped, making the improvement more expensive to construct.

- *Wildwood Trail.*

At the Wildwood Trail two solutions were studied, an at-grade crossing and a pedestrian bridge. Expert analysis concluded that the at-grade crossing was not a viable solution.

The ideal solution is to construct a pedestrian bridge over West Burnside. Strong support for this concept was voiced by neighborhood residents during the public information process. It will eliminate pedestrian/vehicle conflicts and if sensitively designed will not adversely affect the visual quality of the corridor. Ideally, a bridge will serve as a gateway, notifying motorists of their entry into the more urban section of the West Burnside corridor.

- *Tunnel to NW Skyline Boulevard.*

The tunnel walls will be painted, and lighting improved. The 10-foot-wide combined pedestrian/bicycle facility will continue along the north side of the right-of-way to SW Skyline. From there to the end of the project at NW

Skyline, an 8-foot-wide sidewalk and striped bike lanes will serve pedestrians and cyclists. East bound cyclists will merge with traffic just east of the SW Skyline intersection.

## VI. Cost and Phasing of Proposed Improvements

The various project elements identified as part of this report will likely be funded separately from several sources. For example, the Wildwood pedestrian bridge may be partially funded by the Park Bureau, or transit stop improvements may be funded in part by the availability of federal monies for transit related projects.

It may be beneficial to construct discrete segments of the proposed corridor improvements in conjunction with other projects such as the Bureau of Environmental Services' Tanner Basin Storm Drain Project.

While it is difficult to predict when these related projects or funding sources may happen or become available, based upon ease of construction, cost, and proximity to existing high use areas, it is recommended that the linear segments of the project elements be implemented in the following order.

- *Striped bicycle lane from NW 23rd Avenue to NW Macleay Boulevard*

Pavement width is available for this northside, uphill-only lane without restriping the other lane markings, except near Macleay Blvd. Here, a seven foot striped median would have to be narrowed or removed.

Estimated cost: \$9,500

- *Stair replacement at SW Tichner*

The stairs located at SW Tichner can be a barrier to the physically handicapped. Replacement of the stairs with an ADA-compliant ramp can be accomplished at a modest cost.

Estimated cost: \$8,700

- *Combined pedestrian/bicycle facility from NW Macleay Blvd. to SW Skyline Blvd.*

This ten foot wide, north side facility is approximately 6000 feet long and will require the most attention in the Preliminary Engineering phase. This segment includes minor painting and lighting improvements to the existing tunnel. The narrow roadway through the blasted rock area west of SW Lori Lane will be the most significant constraint.

Estimated cost: \$966,000



- *New sidewalk and striped bike lanes SW Skyline Blvd. to NW Skyline Blvd.*

An 8-foot-wide sidewalk and striped bicycle lanes on the north and south sides of West Burnside between SW Skyline Boulevard and NW Skyline Boulevard.

Estimated Cost: \$446,000

Nonlinear elements are also an important part of the recommended improvements and should be implemented as funding becomes available.

- *Bus stop improvements*

The most significant need for bus stop improvements is an 8 foot by 5 foot, ADA-compliant, concrete pad. When the combined pedestrian/bicycle facility is constructed on the north side, these stops can be developed as part of the facility. Along the south side of West Burnside, independent, improved bus stops should be developed where they are not served by existing sidewalks.

Estimated cost: \$9,000

- *Wildwood Trail Bridge*

Neighborhood residents, the TAC, and the CAC strongly supported a pedestrian bridge to allow safe pedestrian crossing of West Burnside by users of the Wildwood Trail. (see Figure 9)

Estimated cost: \$400,000 (including approaches to and from West Burnside)

### ***Cost Summary***

The total estimated cost for implementing all of the project elements above is \$1,840,000.



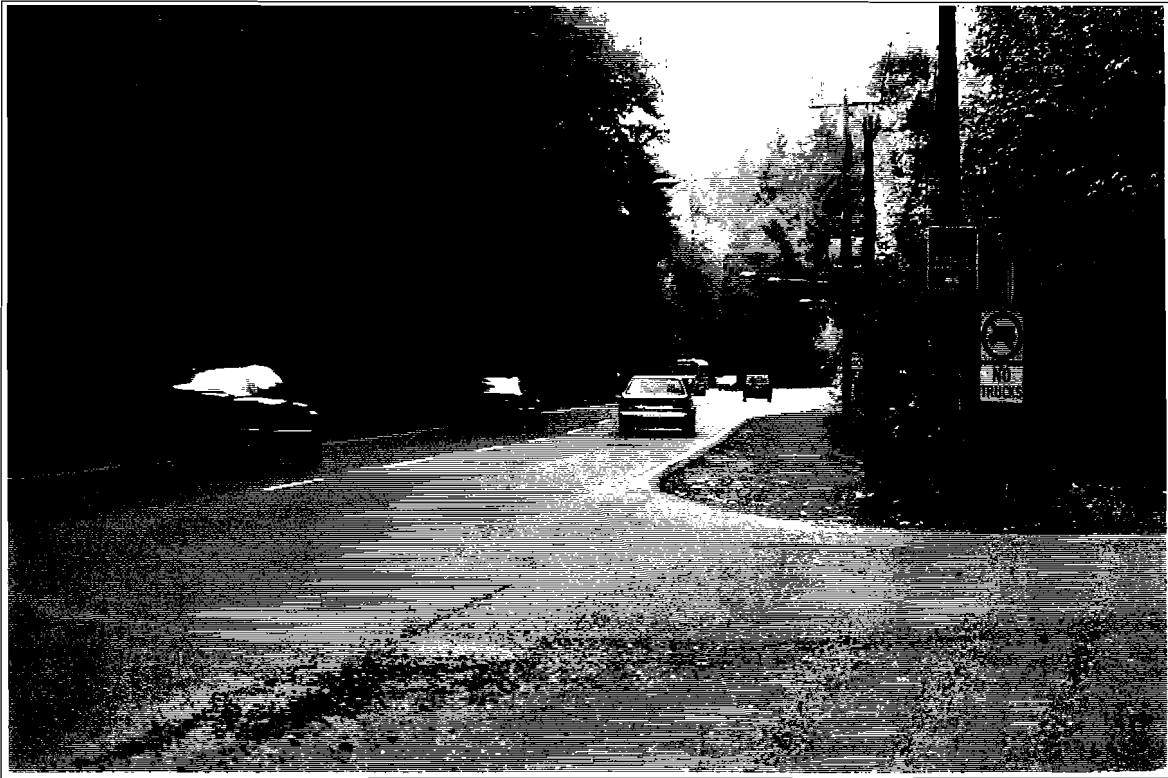
Wildwood Trail - North Side

Figure 1A



Wildwood Trail and Parking Lot - South Side

Figure 1B



West Burnside Road/NW Barnes Road - Westbound

Figure 1C



West Burnside Road/NW Barnes Road - Eastbound

Figure 1D



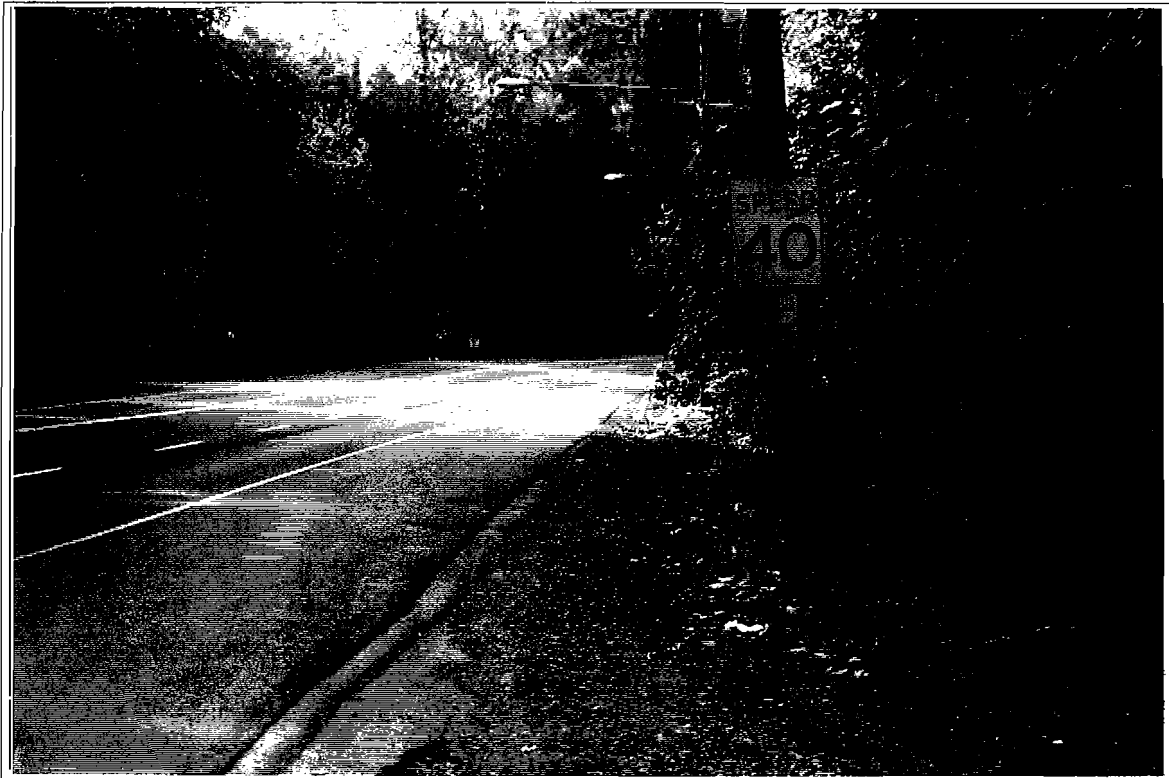
Transit Stop - West Burnside Road/NW 48th Street

Figure 1E



Tunnel - East Entrance

Figure 1F



Transit Stop - West of NW Barnes Road

Figure 1G



North Side Rip-Rap - West of Lori Lane

Figure 1H

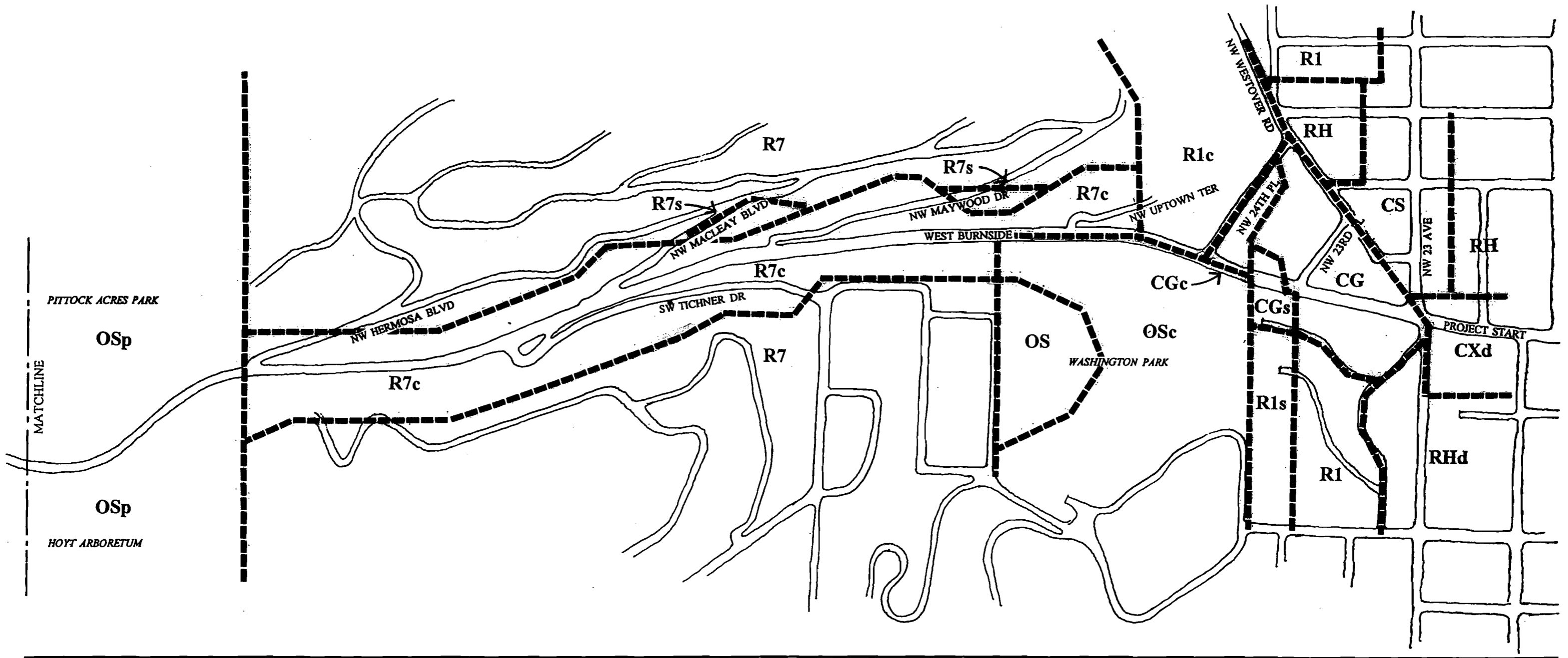
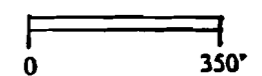


Figure 2  
West Burnside Access Study

LEGEND

CG	General Commercial
CX	Central Commercial
OS	Open Space
R1	Residential 1,000
R7	Residential 7,000
R10	Residential 10,000
R20	Residential 20,000
RF	Residential Farm/Forest
RH	High Density Residential
c	Environmental Conservation Overlay Zone
d	Design Overlay Zone
p	Environmental Protection Overlay Zone
s	Scenic Resource Overlay Zone

Zoning/Land Use  
(EAST PORTION)



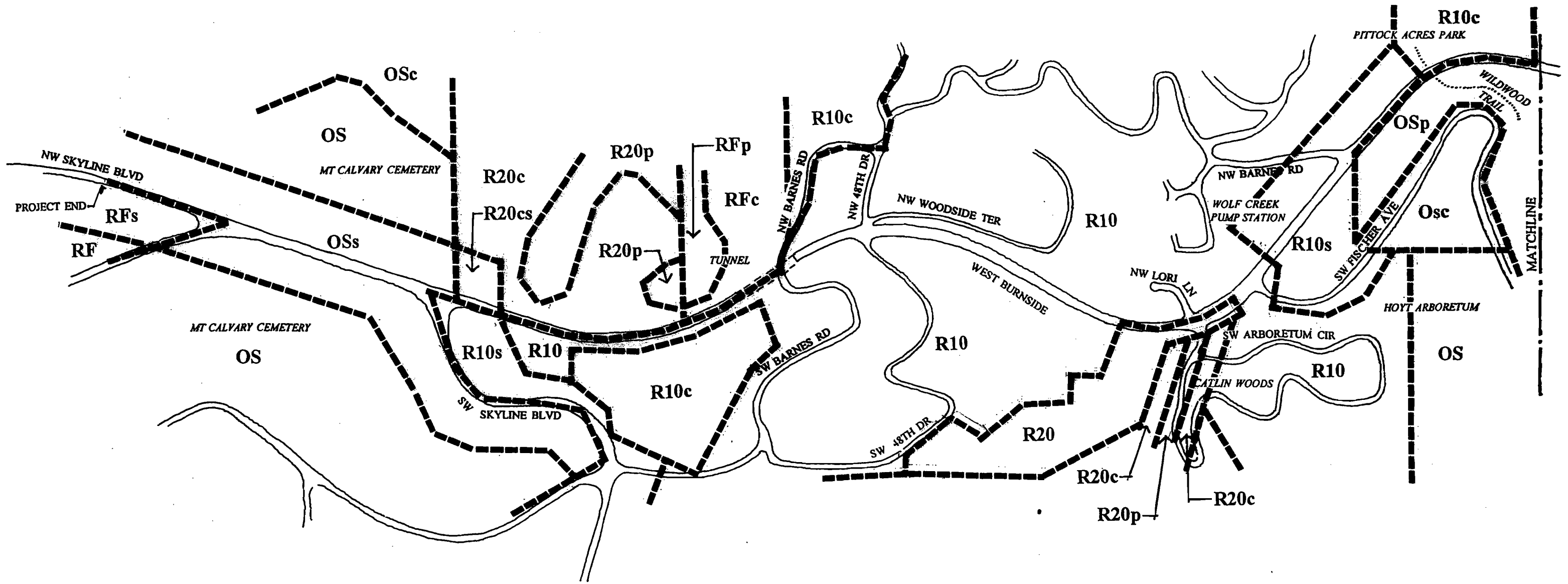
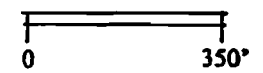


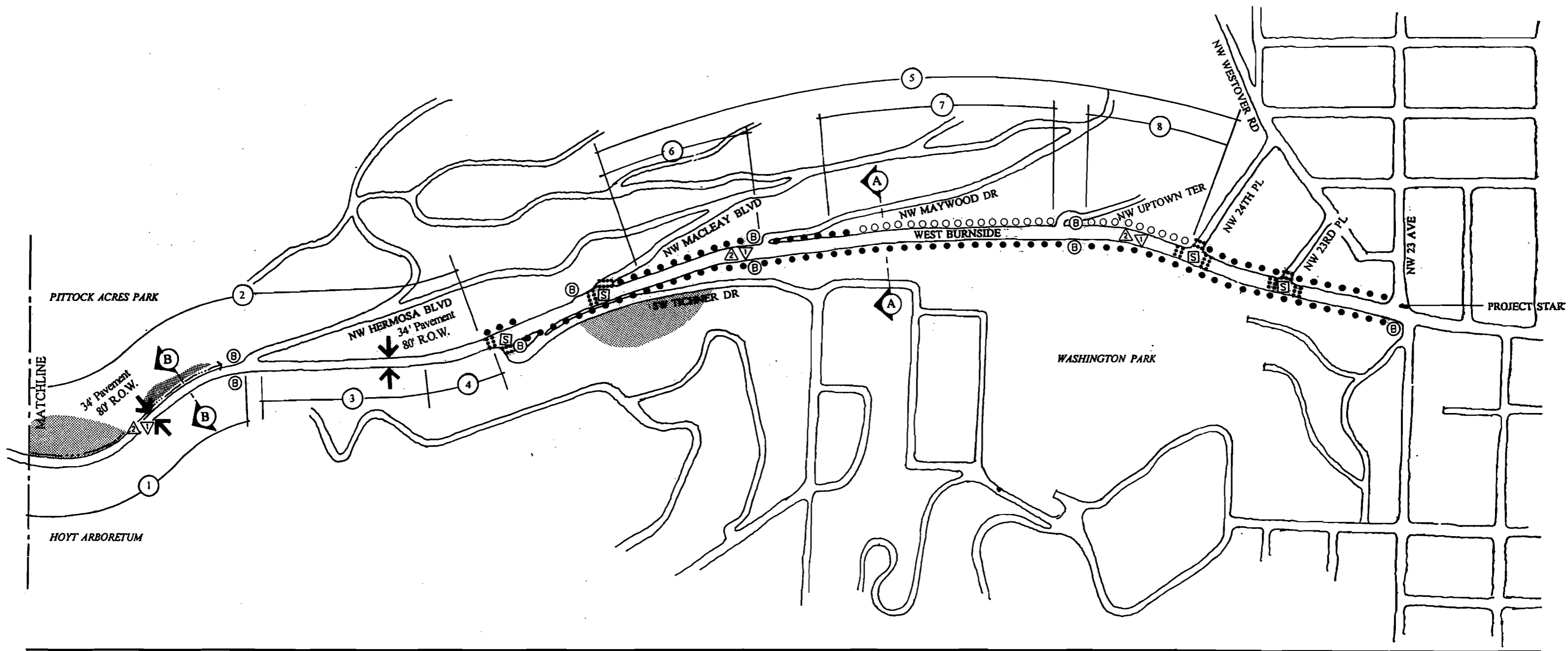
Figure 2A  
West Burnside Access Study

**LEGEND**

- |     |   |
|-----|---|
| CG  | General Commercial                      |
| CX  | Central Commercial                      |
| OS  | Open Space                              |
| R1  | Residential 1,000                       |
| R7  | Residential 7,000                       |
| R10 | Residential 10,000                      |
| R20 | Residential 20,000                      |
| RF  | Residential Farm/Forest                 |
| RH  | High Density Residential                |
| c   | Environmental Conservation Overlay Zone |
| d   | Design Overlay Zone                     |
| p   | Environmental Protection Overlay Zone   |
| s   | Scenic Resource Overlay Zone            |

**Zoning/Land Use  
(WEST PORTION)**





**LEGEND**

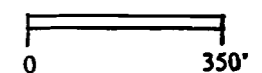
- EXISTING SIDEWALK
- EXISTING CURB AND SIDEWALK, COVERED AND DAMAGED
- Ⓟ BUS STOP
- ⋯ MARKED CROSSWALK
- Ⓢ SIGNALIZED INTERSECTION
- \* FLASHING YELLOW CAUTION SIGNAL
- △ ▽ NUMBER OF TRAVEL LANES (WESTBOUND/EASTBOUND)
- █ ROCK OUTCROP, WALL OR RIPRAP
- ... → DITCH

**NOTES**

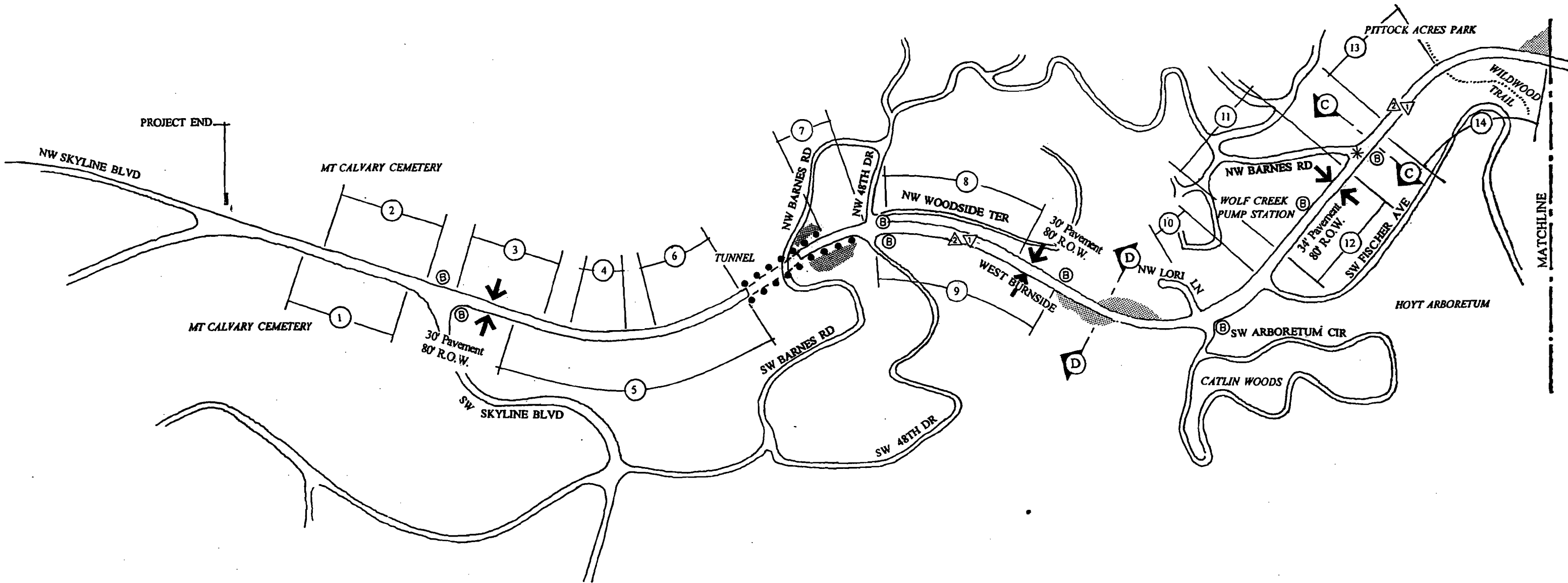
1. 8'-10' buildable shoulder area
2. Sidewalk construction requires piping of existing storm drainage
3. 4'-6' buildable shoulder area
4. 4'-6' height retaining wall required to add 5' wide sidewalk
5. Construction of new sidewalk/bikelanes requires retaining walls if travel lane width remains the same; if travel lane widths are narrowed, retaining walls may not be required
6. 8'-10' height existing retaining walls
7. 3'-4' height retaining walls required to add 5' wide sidewalk if travel lane widths unchanged
8. 6'-8' height retaining walls required to add 5' wide sidewalk if travel lane widths unchanged.

**Figure 3**  
West Burnside Access Study

Existing Site Conditions  
Opportunities/Constraints  
(EAST PORTION)







**LEGEND**

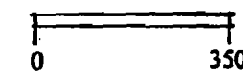
- EXISTING SIDEWALK
- ○ ○ ○ ○ EXISTING CURB AND SIDEWALK, COVERED AND DAMAGED
- Ⓟ BUS STOP
- MARKED CROSSWALK
- Ⓜ SIGNALIZED INTERSECTION
- \* FLASHING YELLOW CAUTION SIGNAL
- △ ▽ NUMBER OF TRAVEL LANES (WESTBOUND/EASTBOUND)
- █ ROCK OUTCROP, WALL OR RIPRAP
- - - - - DITCH

**NOTES**

1. 3'-4' height retaining wall required to add 5' wide sidewalk
2. 4'-6' height retaining wall required to add 5' wide sidewalk
3. 4'-6' buildable shoulder area, fill required
4. 12'-20' buildable shoulder area
5. 3' wide ditch against steep uphill slope
6. 4'-10' buildable shoulder area
7. 8'-10' buildable shoulder area
8. 4'-6' buildable shoulder area, fill required.
9. 3' wide ditch against steep downhill slope
10. 10'-2' buildable shoulder area
11. 12' buildable shoulder area, guardrail required to add sidewalk
12. 3' wide ditch
13. 12'-14' height retaining wall required to add 5' wide sidewalk
14. 8'-14' buildable shoulder area

Figure 3A  
West Burnside Access Study

Existing Site Conditions  
Opportunities/Constraints  
(WEST PORTION)



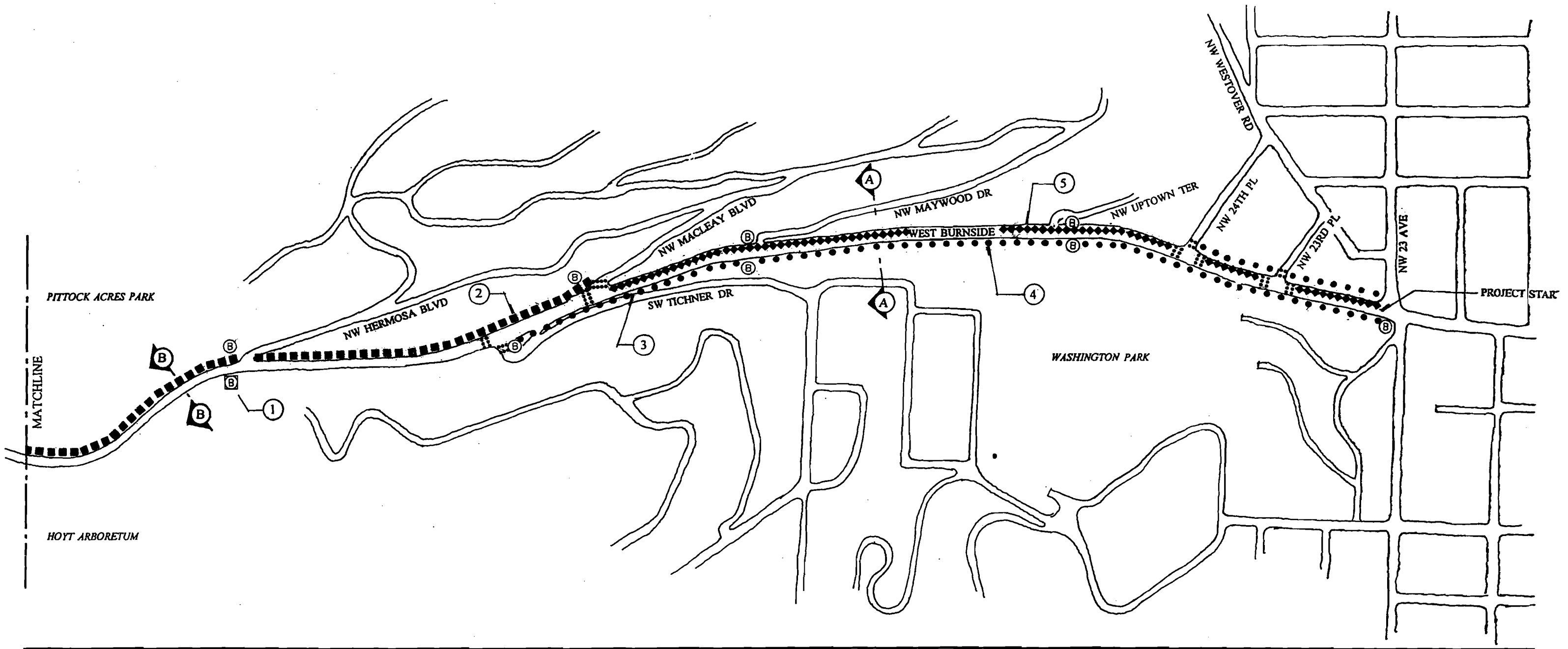


Figure 4  
West Burnside Access Study

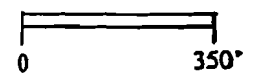
LEGEND

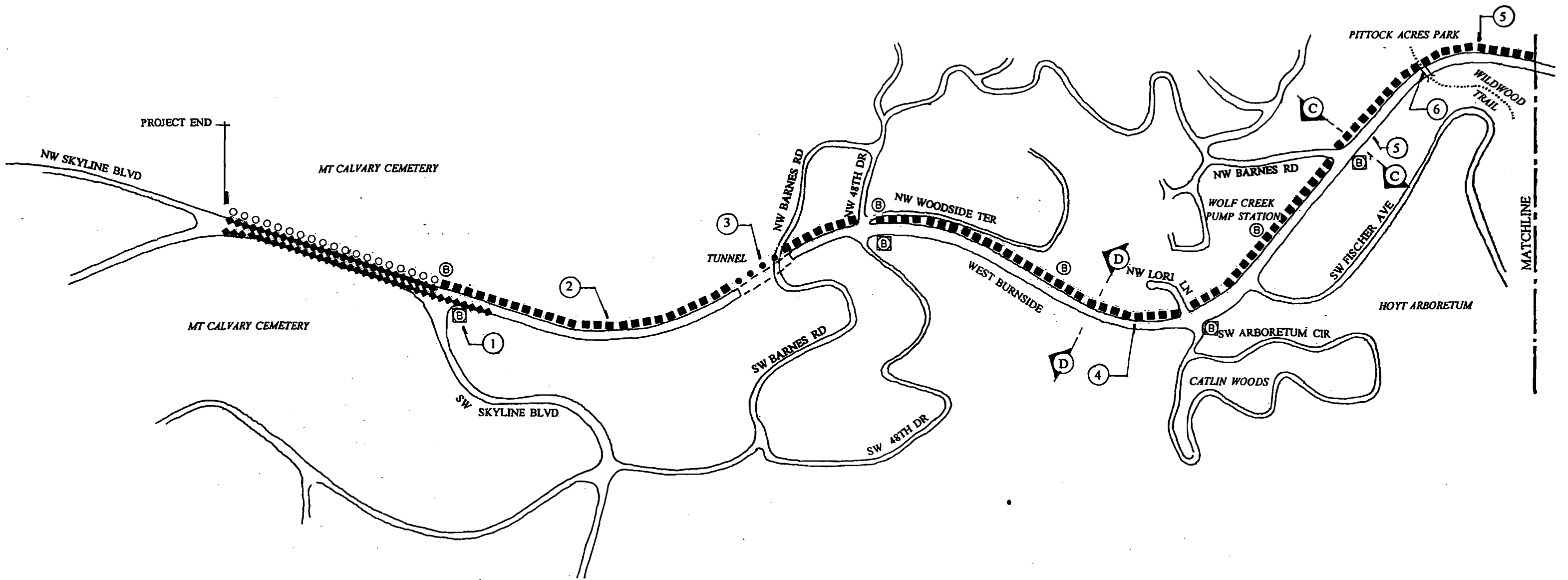
- EXISTING SIDEWALK
- NEW 10' WIDE COMBINED PEDESTRIAN/BICYCLE FACILITY
- Ⓟ BUS STOP
- Ⓢ NEW BUS STOP WITH CONCRETE PAD
- ⋯⋯⋯ MARKED CROSSWALK
- ◆◆◆◆◆ NEW 5' STRIPED BICYCLE LANE

NOTES

1. Install new bus stop with concrete pad, typical
2. Install new 10' wide combined pedestrian/bicycle facility
3. Remove existing stairs and install ramp
4. Utilize existing southside sidewalk for pedestrian connection between Macleay and 23rd
5. Install striped bike lane

Alternative 2  
(EAST PORTION)





**LEGEND**

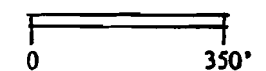
- EXISTING SIDEWALK
- ■ ■ ■ ■ NEW 10' WIDE COMBINED PEDESTRIAN/BICYCLE FACILITY
- Ⓟ BUS STOP
- Ⓛ NEW BUS STOP WITH CONCRETE PAD
- ⋯⋯⋯ MARKED CROSSWALK
- ◆◆◆◆◆ NEW 5' STRIPED BICYCLE LANE
- ○ ○ ○ ○ NEW 8' WIDE SIDEWALK

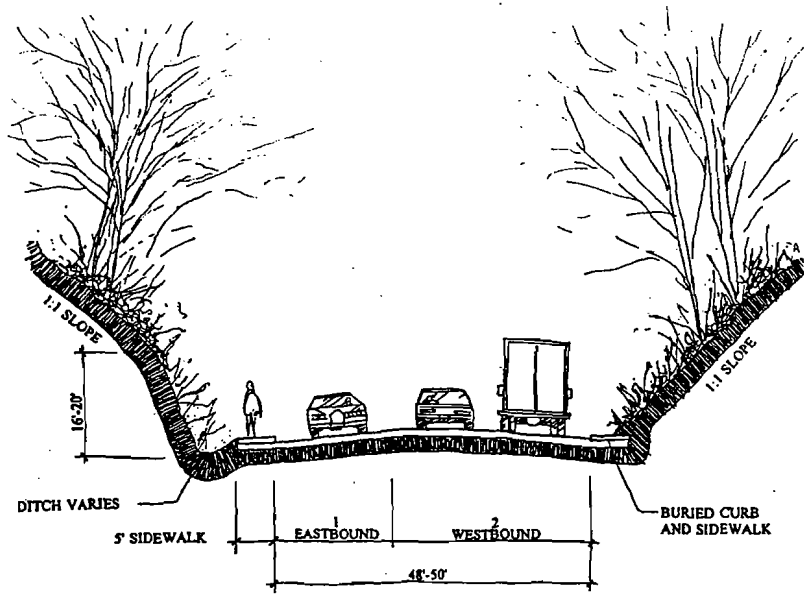
**NOTES**

1. Install new bus stop with concrete pad, typical
2. Install new 10' wide combined pedestrian/bicycle facility
3. Bicyclists walk through tunnel on existing sidewalk
4. Reduce westbound traffic from two lanes to one lane west of Lori Lane
5. Improve signage alerting traffic of Wildwood Trail
6. Improve Wildwood Trail crossing with pedestrian bridge

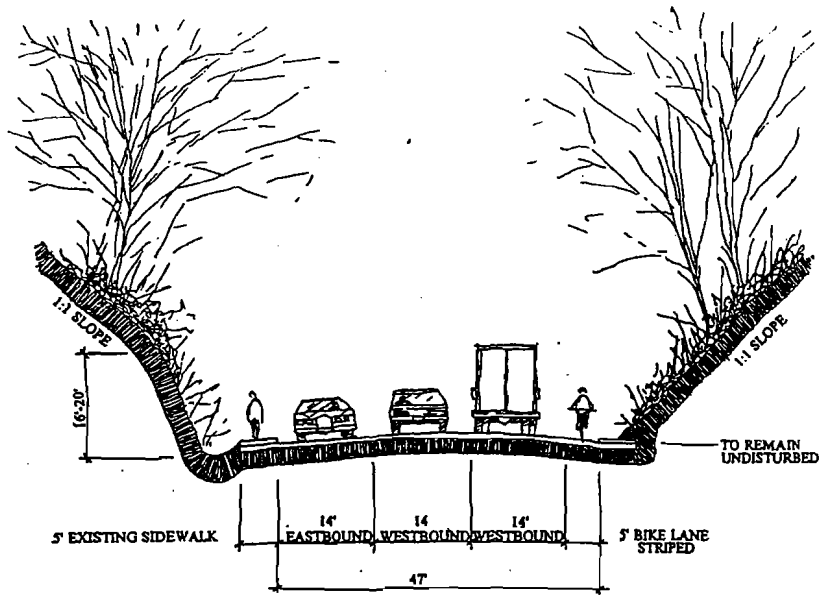
**Figure 4A**  
West Burnside Access Study

**Alternative 2**  
(WEST PORTION)

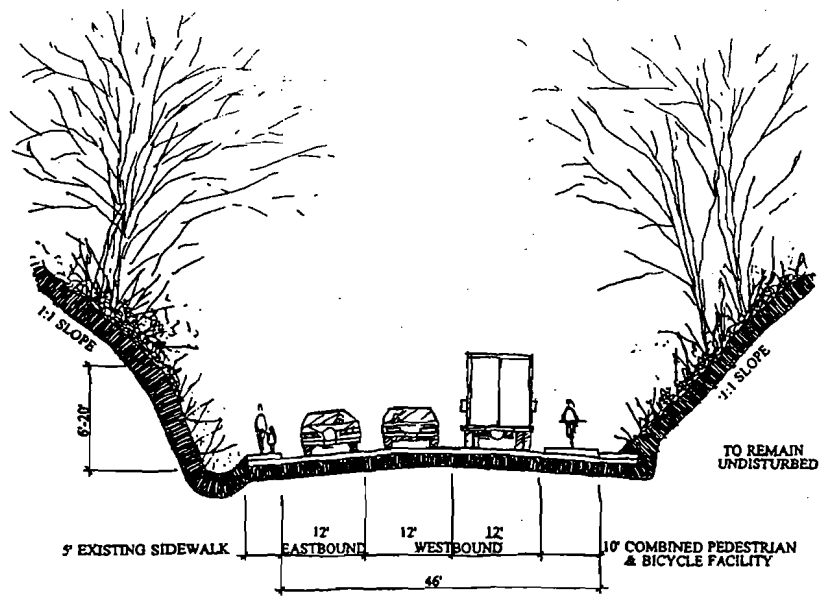




SECTION A-A EXISTING SITE CONDITIONS

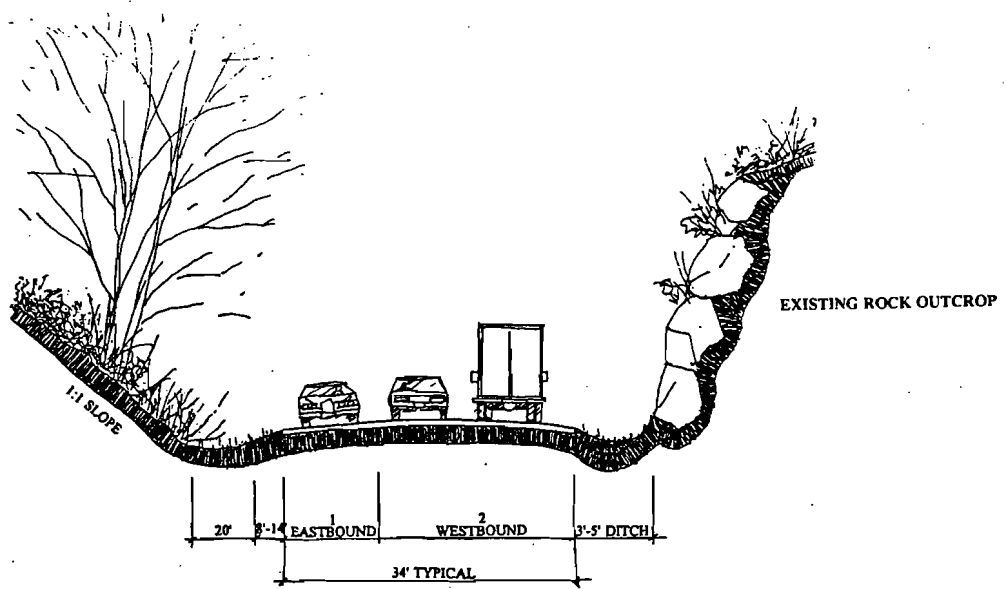


SECTION A-A ALTERNATIVE 2

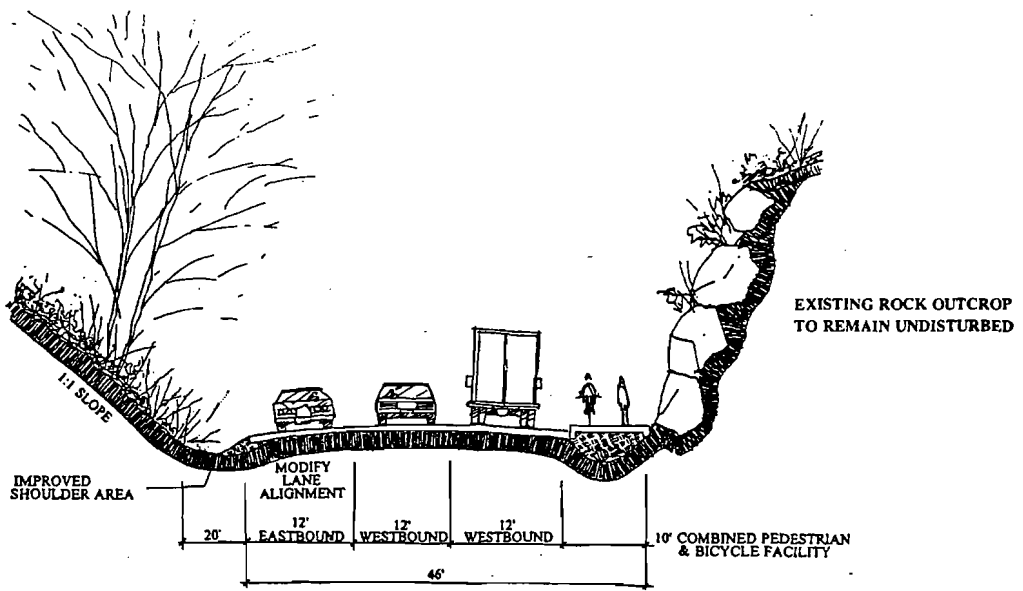


SECTION A-A ALTERNATIVE 3

FIGURE 5

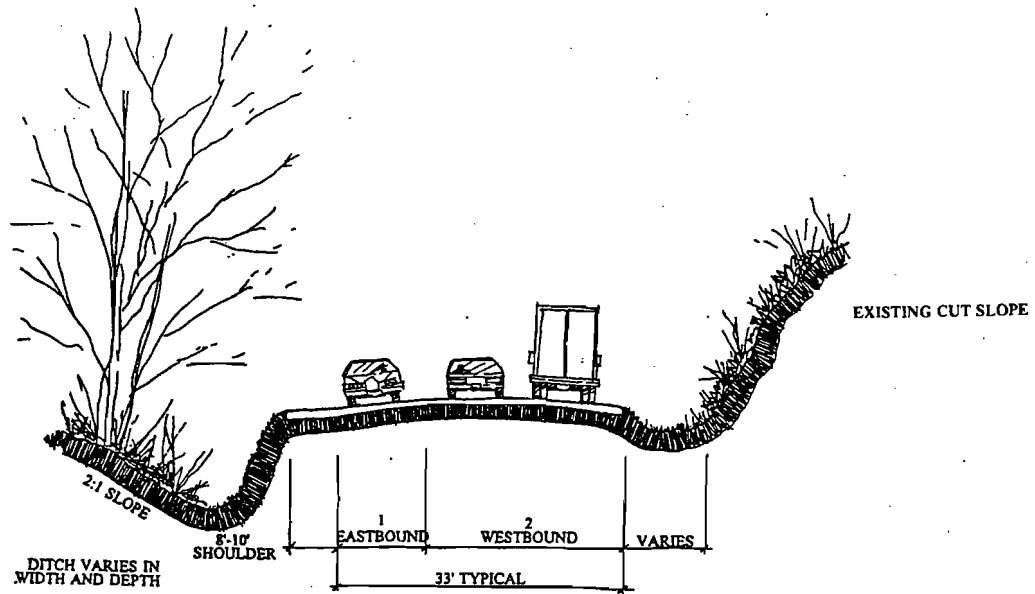


SECTION B-B      EXISTING SITE CONDITIONS

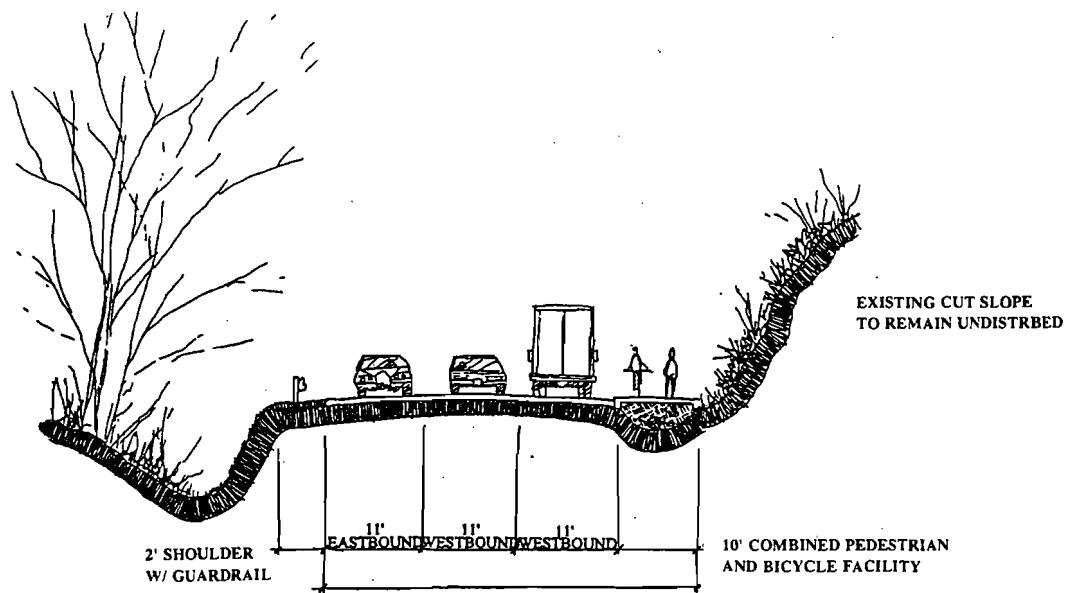


SECTION B-B      ALTERNATIVES 2 AND 3

FIGURE 6



SECTION C-C EXISTING SITE CONDITIONS



SECTION C-C ALTERNATIVES 2 AND 3

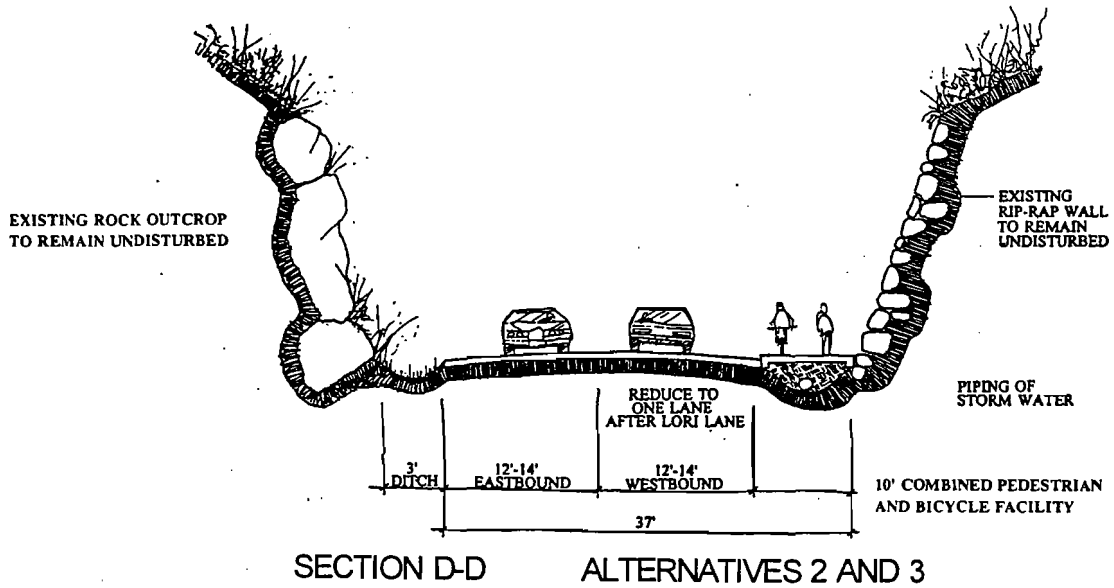
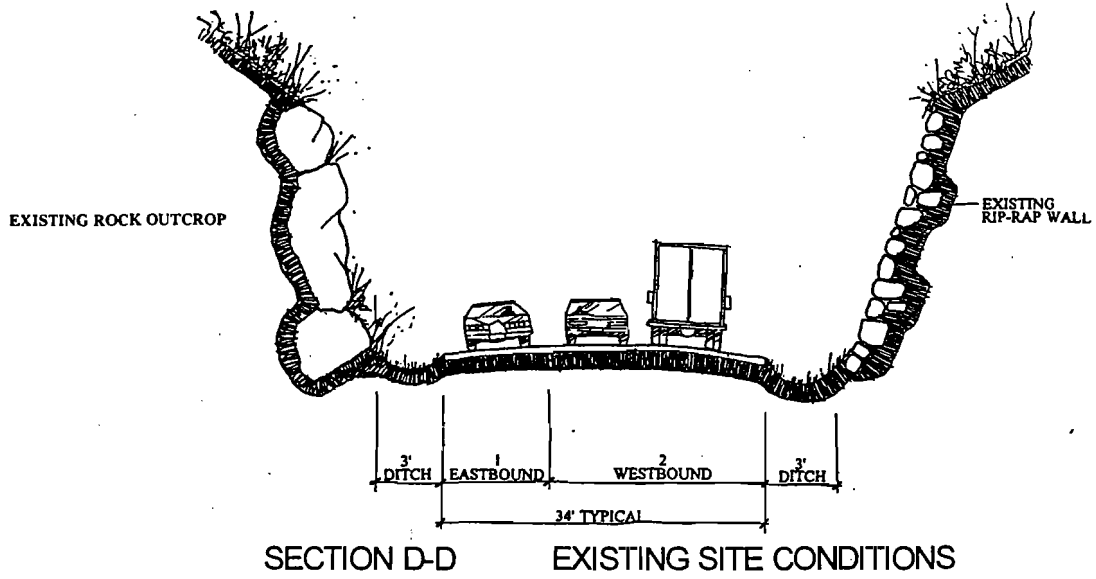
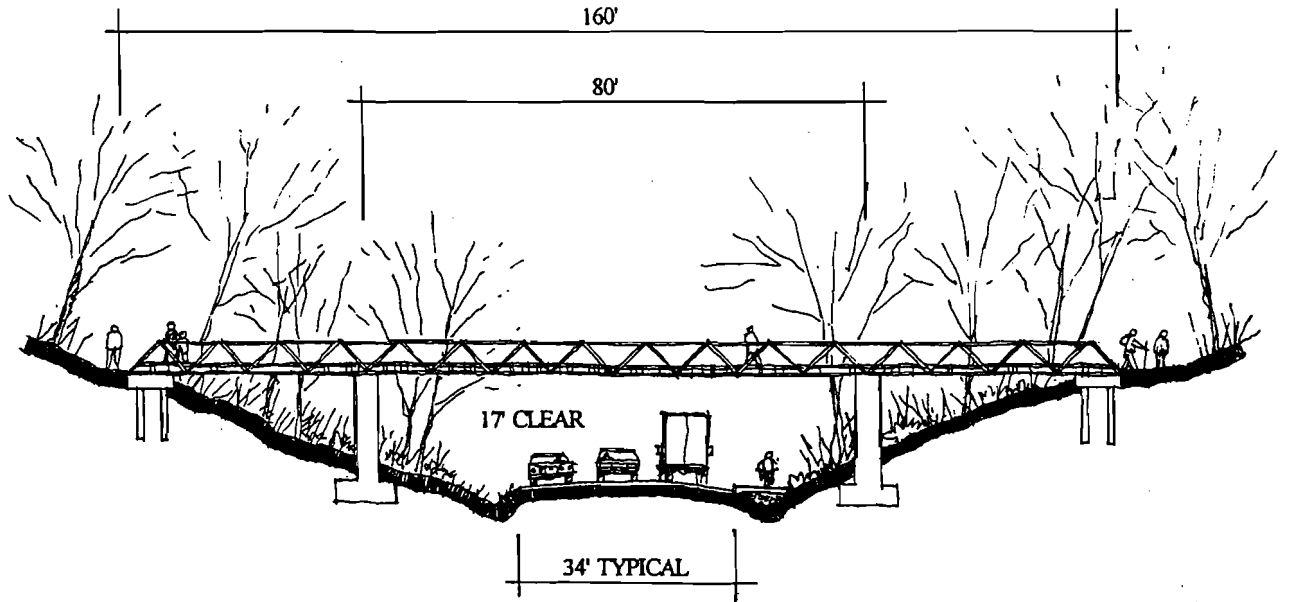
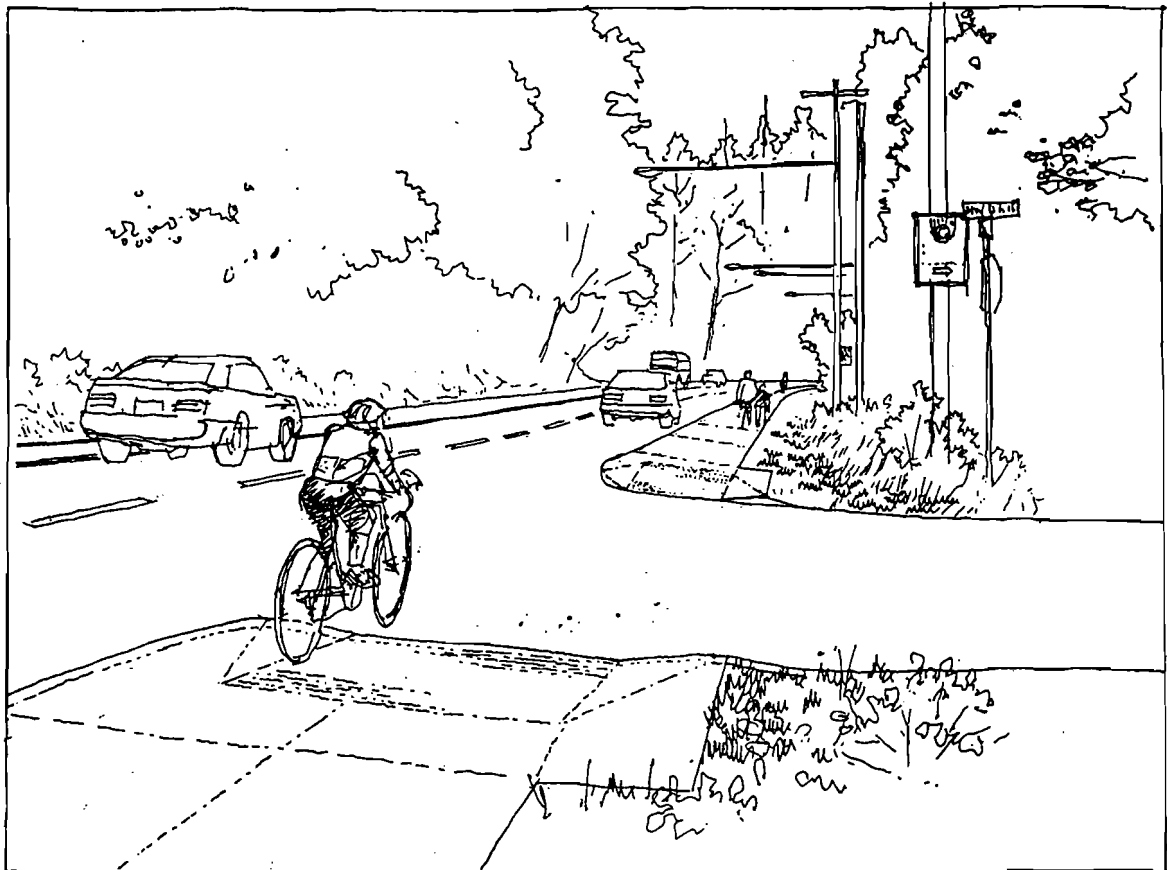


FIGURE 8



WILDWOOD TRAIL PEDESTRIAN BRIDGE - SECTION

FIGURE 9



TEN-FOOT-WIDE COMBINED PEDESTRIAN / BICYCLE FACILITY

FIGURE 10



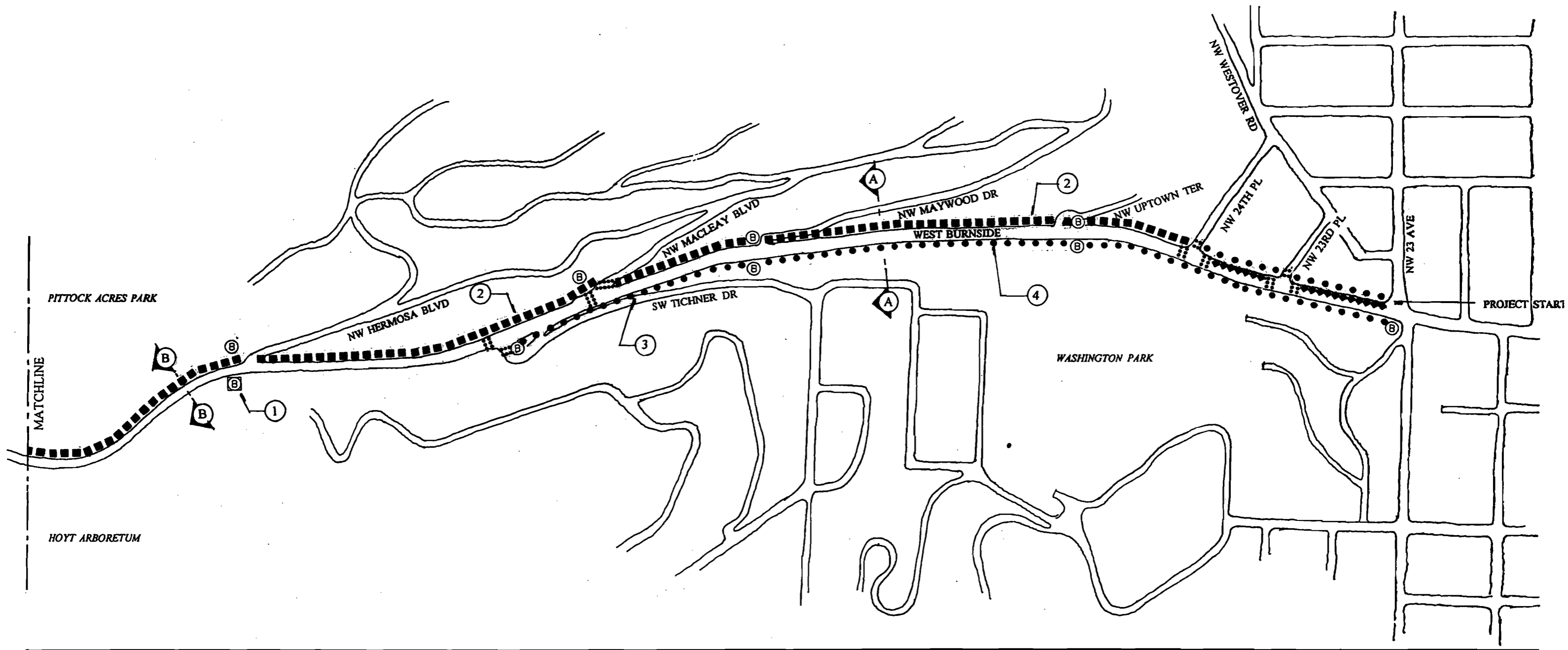


Figure 11  
West Burnside Access Study

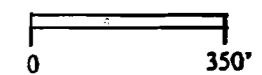
Alternative 3  
(EAST PORTION)

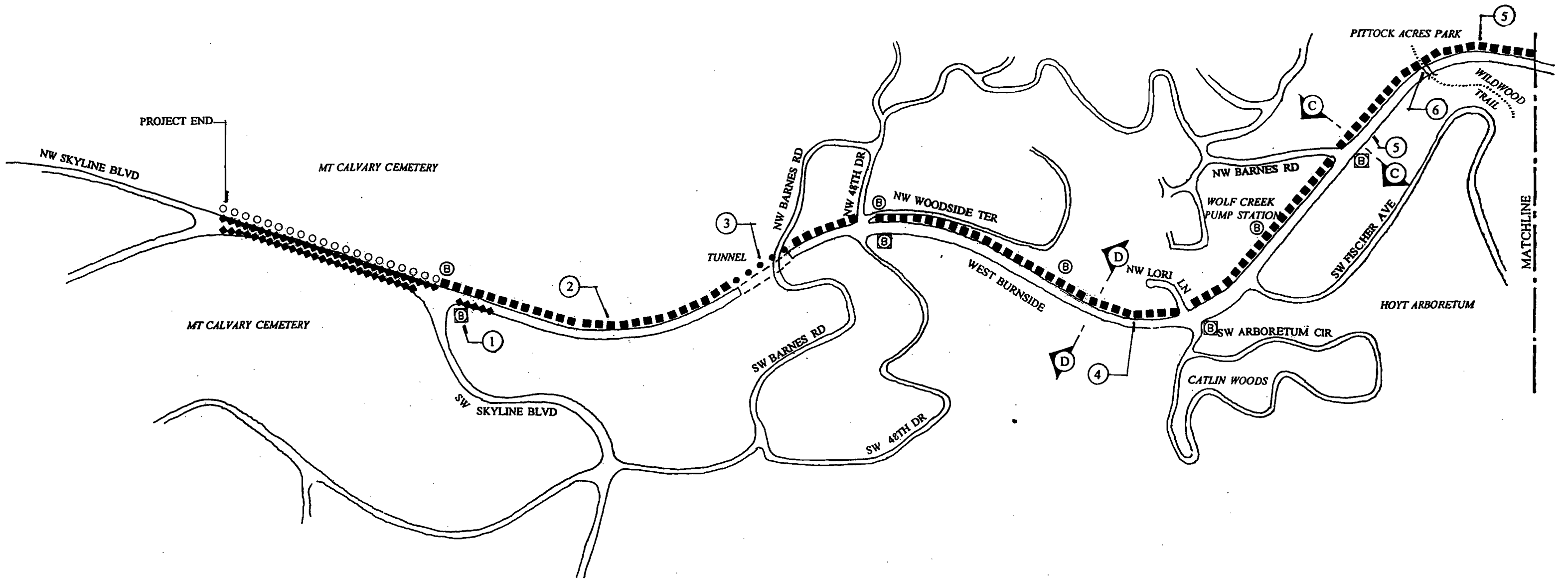
**LEGEND**

- EXISTING SIDEWALK
- NEW 10' WIDE COMBINED PEDESTRIAN/BICYCLE FACILITY
- Ⓟ BUS STOP
- Ⓠ NEW BUS STOP WITH CONCRETE PAD
- ⋯⋯⋯ MARKED CROSSWALK
- ◆◆◆◆◆ NEW 5' STRIPED BICYCLE LANE

**NOTES**

1. Install new bus stop with concrete pad, typical
2. Install new 10' wide combined pedestrian/bicycle facility
3. Remove existing stairs and install ramp
4. Existing southside sidewalk to remain





**LEGEND**

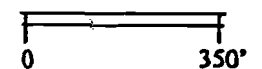
- EXISTING SIDEWALK
- NEW 10' WIDE COMBINED PEDESTRIAN/BICYCLE FACILITY
- Ⓟ BUS STOP
- Ⓢ NEW BUS STOP WITH CONCRETE PAD
- ⋯⋯⋯ MARKED CROSSWALK
- ◆◆◆◆◆ NEW 5' STRIPED BICYCLE LANE
- NEW 8' WIDE SIDEWALK

**NOTES**

1. Install new bus stop with concrete pad, typical
2. Install new 10' wide combined pedestrian/bicycle facility
3. Bicyclists walk through tunnel on existing sidewalk
4. Reduce westbound traffic from two lanes to one lane west of Lori Lane
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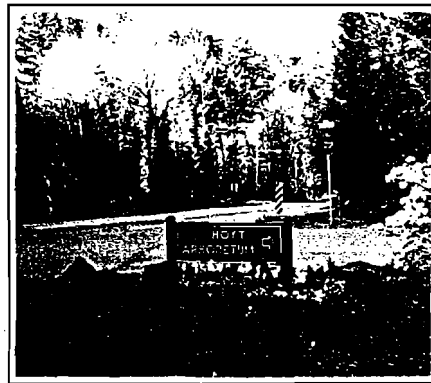
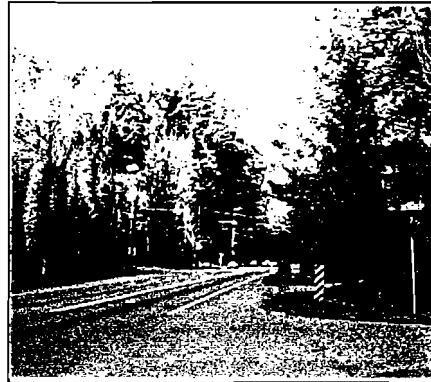
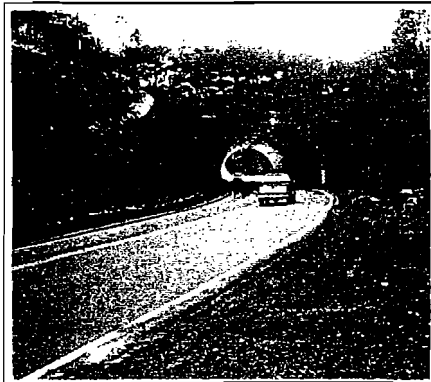
Figure 11A  
West Burnside Access Study

Alternative 3  
(WEST PORTION)



# West Burnside Pedestrian Access Study

*Part II - Preliminary Engineering*



June 30, 1996

Mr. Bill Hoffman  
City of Portland  
Office of Transportation  
Engineering and Development  
1120 SW Fifth Avenue, Room 802  
Portland, Oregon 97204-1971

RE: West Burnside Pedestrian Access Study  
Part II - Preliminary Engineering

Dear Bill:

This letter is to supplement the Part II - Preliminary Engineering drawings and cost estimate. The drawings develop in detail the preferred alternative plan based on the findings of Part I - Planning of the study. The following is a breakdown of the linear segments, and the criteria defined for the recommended pedestrian access along West Burnside. Items that do not deviate from the Part I report are not mentioned.

The proposed combined pedestrian/bike facility will be abbreviated as "facility" hereinafter.

**NW 23rd Ave to NW Macleay Boulevard/SW Tichner Drive**

Existing excess pavement width is available for the five foot bike lane without restriping the traffic lane lines until approximately 300 feet west of Macleay. A seven foot striped median will be narrowed to allow for the bike lane there. From Macleay to Tichner, traffic lane widths will also be narrowed to allow for the bike lane.

An option explored in this section was to start the combined pedestrian/bike facility at the intersection of Macleay by continuing an existing (relatively new) 60 foot length of 10 wide sidewalk. An existing retaining wall would need to be removed and rebuilt an extra six to eight feet back into the hill. Though this option would provide continuity for the pedestrians from Macleay, the cost of approximately \$115,000 would outweigh this advantage. The recommended start of the 10 foot facility is just west of the Tichner intersection.

Another option examined was to remove the existing sidewalk from 300 feet east of Macleay to provide the width for the bike lane to avoid restriping of the traffic lanes. However, this sidewalk is still in good condition and can still be used for pedestrians heading east.

#### **NW Macleay Boulevard to NW Hermosa Boulevard**

Existing shoulder width will be used for part of the width for the 10 foot facility. Pavement will be widened on the south to obtain the remaining necessary width. The majority of this segment has the available width for the ten foot combined facility. No specific areas were identified for lack of width, but small one to two foot retaining walls could possibly be required. Traffic lane restriping will be required.

#### **NW Hermosa Boulevard to NW Barnes Road**

This segment is similar to the preceding segment in that the existing shoulder width will be used, and the pavement will be widened to the south to provide space for the 10 foot facility. The facility will narrow to 8 feet for the length of the existing rip-rap wall to avoid disturbing the wall. Since there is a steep drop off on the south side of the road in the Johnson Creek area, guard rails will be installed as required by AASHTO Standards. Traffic lane restriping will be required.

#### **NW Barnes Road to Lori Lane**

Excess pavement width on the north side of the road will be used for the facility for the first 160 feet. Since this excess width is currently used for a bus turnout, a 10 foot wide turnout is proposed as a replacement. The location would be adjacent to the Wolf Creek Pump Station in an existing wide gravel area. Immediately west of this turnout, a 500 foot transition will begin to eliminate the second westbound travel lane. The single lane west bound will begin at Lori Lane. Pavement will be widened on the north side until the width for the facility becomes available through the lane drop transition.

#### **Lori Lane to Tunnel**

The 10 foot facility is continued to NW 48th Avenue by using the available excess pavement width from the lane drop. The facility will narrow to 8 feet, 110 feet east of the tunnel to avoid the existing retaining wall.

The area beginning about 315 feet east of NW 48th Avenue to the tunnel has significant physical constraints. The lane drop is recommended for the following reasons and their associated costs:

- To avoid disturbing the existing rip-rap wall and rock outcrop.
- To avoid the need for additional fill and concrete unit walls in this segment following the rock outcrop, due to existing narrow shoulder widths of four to six feet

Rock blasting, rip-rap wall removal, new retaining and concrete unit wall costs are defined in the cost estimate. A six foot facility for the length from the rock wall to 48th area would cost about an additional \$180,000 over the cost of the ten foot facility with the lane drop.

Mr. Bill Hoffman, *City of Portland*  
RE: West Burnside Pedestrian Access Study  
June 30, 1996  
Page 3

### Tunnel to NW Skyline Boulevard

Presently, one westbound lane through the tunnel turns back into two lanes after exiting the tunnel. The plan recommends keeping only one westbound lane beyond the tunnel up to the left turn lane at SW Skyline. This will provide the width required for the 10 foot facility and eliminate concerns of unsafe traffic patterns involving multiple merging. If two westbound lanes are kept from the tunnel, additional fill and guard rails will be required on the north side of the road. West of SW Skyline, the road will be widened on both the north and south sides to accommodate an 8 foot sidewalk and five foot eastbound and westbound bike lanes. More widening will occur on the south since obstacles such as grave sites and landscaping walls are further back. Retaining walls on both sides will be required regardless.

### Drainage

Existing ditches will be narrowed to accommodate slope runoff. In some areas, the raised curb of the facility will concentrate street run-off in the gutter necessitating new catch basins. Existing field inlets will be relocated to fit behind the facility. Catch basins will connect to the new storm drainage system that will be installed as part of the BES Tanner Creek Diversion project. These connections will not require piping underneath the facility since the new system runs parallel to the road. The upstream end of this new system is just west of NW Barnes Road. Disposal points for new catch basins to the west of this will need to be field-located. A storm drainage system exists in the Skyline area, but the exact locations are unknown. The cost estimate reflects this uncertainty.

### Transit Pads

Each existing bus stop was evaluated in the field. Proposed locations of the transit pads in relation to the existing bus stops were submitted to Tri-Met for review and comments were incorporated into the plans. Small retaining walls and handrails will be required at some of the transit pads as noted on plans.

If you have any questions or require further information, please call me.

Sincerely,



Susan Van Dyke  
Project Engineer

cc: *Lewis Wardrip, Bureau of Traffic Management*  
*Kim Isaacson, Murase Associates*

Enclosures

**West Burnside Pedestrian Access Study**  
*Part II - Preliminary Engineering*

**Construction Cost Estimate**

June 30, 1996

Item	Qty	Unit	Unit Price	Total
<b>1 General Corridor Costs</b>				
Mobilization, Bonding, and Insurance (15% of total)	1	LS	\$128,856	\$128,856
Traffic control (3 flaggers)	60	DAYS	\$600.00	\$36,000
Signage for bike lane and pedestrian facility	1	LS	\$2,000.00	\$2,000
Transit stop concrete pads (5 eastbound)	200	SF	\$6.00	\$1,200
Transit stop retaining walls / handrails	1	LS	\$4,000.00	\$4,000
				<u>\$172,056</u>
<b>3 23rd Ave. to 300' East of NW Macleay Blvd.</b>				
Bike lane striping on north side	2,590	LF	\$0.50	\$1,295
Crosswalk removal and restriping	7	EA	\$200.00	\$1,400
				<u>\$2,695</u>
<b>4 300' East of NW Macleay Blvd. to SW Tichner Drive</b>				
Stripe bike lane on north side	805	LF	\$0.50	\$403
Crosswalk removal and restriping	2	EA	\$200.00	\$400
Crosswalk striping	2	EA	\$150.00	\$300
Traffic lane line removal and restriping - (3) lines	260	LF	\$3.75	\$975
Traffic lane line removal and restriping - (2) lines	290	EA	\$2.50	\$725
Stair replacement with A.D.A. ramp	1	LS	\$5,000.00	\$5,000
				<u>\$7,803</u>
* See option 4a for additional cost if the retaining wall between Macleay and Tichner is demolished and rebuilt 6 to 8 feet into the hill to provide space for the combined facility.				
<b>5 SW Tichner Drive to NW Hermosa Blvd.</b>				
Sawcut A.C. pavement along north and south side	1,765	LF	\$1.50	\$2,648
A.C. pavement removal on north side	4,350	SF	\$2.00	\$8,700
A.C. pavement widening on south side	2,225	SF	\$6.25	\$13,906
10' combined pedestrian/bike facility	8,700	SF	\$3.85	\$33,495
Concrete driveway (1)	240	SF	\$4.00	\$960
Grading and subgrade preparation	322	CY	\$20.00	\$6,440
Traffic lane line removal and restriping - (3) lines	905	LF	\$3.75	\$3,394
Field inlet relocation	2	EA	\$1,000.00	\$2,000
Catch basin installation and connection to storm drain system	4	EA	\$1,500.00	\$6,000
				<u>\$77,543</u>

**West Burnside Pedestrian Access Study**  
*Part II - Preliminary Engineering*

Item	Qty	Unit	Unit Price	Total
<b>6 NW Hermosa Blvd. to NW Barnes Road</b>				
Sawcut A.C. pavement along north and south side	3,415	LF	\$1.50	\$5,123
A.C. pavement widening on south side	10,792	SF	\$6.25	\$67,450
10' combined pedestrian/bike facility	11,750	SF	\$3.85	\$45,238
8' combined pedestrian/bike facility	4,160	SF	\$3.85	\$16,016
Grading and subgrade preparation	590	CY	\$20.00	\$11,800
Traffic lane line removal and restriping - (3) lines	1,720	LF	\$3.75	\$6,450
Field inlet and catch basin relocation	3	EA	\$1,000.00	\$3,000
Catch basin installation and connection to storm drain system	3	EA	\$1,500.00	\$4,500
Guard rails on south side	1,400	LF	\$25.00	\$35,000
				<u>\$194,576</u>
<b>7 NW Barnes Road to Lori Lane</b>				
Sawcut A.C. pavement along north side	780	LF	\$1.50	\$1,170
A.C. pavement removal on north side	3,905	SF	\$2.00	\$7,810
10' combined pedestrian/bike facility	7,600	SF	\$3.85	\$29,260
Concrete pavement widening for bus turnout (north side)	1,500	SF	\$3.85	\$5,775
Grading and subgrade preparation	140	CY	\$20.00	\$2,800
Traffic lane line removal and restriping - (3) lines	795	LF	\$3.75	\$2,981
Install catch basin and connect to storm drain system	3	EA	\$1,500.00	\$4,500
Storm drainage piping	210	LF	\$30.00	\$6,300
				<u>\$60,596</u>
<b>8 Lori Lane to Tunnel</b>				
Sawcut A.C. pavement along north side	1,245	LF	\$1.50	\$1,868
A.C. pavement removal on north side	12,450	SF	\$2.00	\$24,900
10' combined pedestrian/bike facility	13,850	SF	\$3.85	\$53,323
8' combined pedestrian/bike facility	920	SF	\$3.85	\$3,542
Concrete driveway	240	SF	\$4.00	\$960
Grading and subgrade preparation	115	CY	\$20.00	\$2,300
Traffic lane line removal - (1) line	1,220	LF	\$0.40	\$488
Field inlet and catch basin relocation	1	EA	\$1,000.00	\$1,000
Catch basin installation and connection to storm drain system	3	EA	\$1,500.00	\$4,500
Storm drainage piping	700	LF	\$30.00	\$21,000
				<u>\$113,880</u>
* See option 8a for rock blasting and retaining wall construction if no lane drop occurs.				
<b>9 Tunnel</b>				
Allowance for painting and lighting improvements	1	LS	\$15,000.00	\$15,000
Temporary traffic signal for one lane traffic	1	LS	\$15,000.00	\$15,000
				<u>\$30,000</u>



**West Burnside Pedestrian Access Study**  
*Part II - Preliminary Engineering*

Item	Qty	Unit	Unit Price	Total
<b>10 Tunnel to SW Skyline Blvd.</b>				
Sawcut A.C. pavement along north side	1,180	LF	\$1.50	\$1,770
A.C. pavement removal on north side	11,548	SF	\$2.00	\$23,096
10' combined pedestrian/bike facility	11,800	SF	\$3.85	\$45,430
Bike lane striping on south side	150	LF	\$0.50	\$75
Grading and subgrade preparation	110	CY	\$20.00	\$2,200
Traffic lane line removal and restriping - (2) lines	1,180	LF	\$2.50	\$2,950
				<u>\$75,521</u>
<b>11 SW Skyline Blvd. to NW Skyline Blvd.</b>				
Sawcut A.C. pavement along north side	1,660	LF	\$1.50	\$2,490
Concrete curb removal on north and south side	1,660	LF	\$1.50	\$2,490
A.C. pavement removal on north side	2,685	SF	\$2.00	\$5,370
A.C. pavement widening on south side	12,150	SF	\$6.25	\$75,938
8' concrete sidewalk on north side	7,040	SF	\$3.85	\$27,104
Concrete driveways (4)	850	SF	\$4.00	\$3,400
Concrete curb on south side	815	LF	\$10.00	\$8,150
Grading and subgrade preparation	1,120	CY	\$20.00	\$22,400
Bike lane striping on north and south sides	2,630	LF	\$0.50	\$1,315
Traffic lane line removal and restriping - (2) lines	910	LF	\$2.50	\$2,275
Catch basin installation and disposal of storm drainage	2	EA	\$5,000.00	\$10,000
Catch basin installation and connection to storm drain system	2	EA	\$1,500.00	\$3,000
Catch basin removal	1	EA	\$500.00	\$500
Catch basin relocation	1	EA	\$1,000.00	\$1,000
Retaining wall (170 feet long, 3-5 feet high) on south side	640	SF	\$40.00	\$25,600
Retaining wall (370 feet long, 4-6 feet high) on north side	1,750	SF	\$40.00	\$70,000
				<u>\$261,032</u>
<b>Subtotal</b>				<b>\$859,042</b>
<b>Subtotal</b>				<b>\$987,899</b>
15% Estimating Contingency				\$148,185
20% Construction Engineering				\$197,580
10% Construction Contingency				\$98,790
<b>Total Preliminary Construction Cost Estimate</b>				<u><b>\$1,432,453</b></u>

**West Burnside Pedestrian Access Study**  
*Part II - Preliminary Engineering*

Item	Qty	Unit	Unit Price	Total
<b>Construction Options</b>				
<b>4a 300' East of NW Macleay Blvd. to SW Tichner Drive</b>				
10' combined pedestrian/bike facility	3,650	SF	\$3.85	\$14,053
Remove concrete curb	330	LF	\$2.00	\$660
Concrete curb	330	LF	\$6.50	\$2,145
Remove retaining wall	950	CY	\$20.00	\$19,000
Retaining wall (190 ft long - 0-12 ft high)	1,330	SF	\$60.00	\$79,800
				<b>\$115,658</b>

*\*Option does not include contingencies.*

*\*Option represents quantities and costs that are not additional to the base option.*

<b>8a Lori Lane to Tunnel (with no lane drop)</b>				
Rock blasting	667	CY	\$100.00	\$66,700
Rip-rap wall removal	333	CY	\$100.00	\$33,300
Sawcut A.C. pavement along north side	1,245	LF	\$1.50	\$1,868
A.C. pavement removal on north side	1,245	SF	\$2.00	\$2,490
10' combined pedestrian/bike facility	3,050	SF	\$3.85	\$11,743
8' combined pedestrian/bike facility	8,440	SF	\$3.85	\$32,494
Fill, grading and subgrade preparation	685	CY	\$20.00	\$13,700
Concrete driveway	240	SF	\$4.00	\$960
Traffic lane line removal and restriping - (2) lines	2,490	LF	\$2.50	\$6,225
Field inlet and catch basin relocation	2	EA	\$1,000.00	\$2,000
Catch basin installation and connection to storm drain system	2	EA	\$1,500.00	\$3,000
Storm drainage piping	700	LF	\$30.00	\$21,000
Retaining Wall (100 ft long - avg. 6 ft high)	600	SF	\$40.00	\$24,000
Concrete unit walls	3,700	SF	\$20.00	\$74,000
				<b>\$293,479</b>

*\*Option does not include contingencies.*

*\*Option represents quantities and costs that are not additional to the base option.*

**Notes:**

1. Costs are complete-in-place, including contractor's overhead and profit.
2. Costs for a consultant arborist are included in the Design Engineering estimate.
3. The Wildwood Trail Pedestrian Bridge is a separate project. Early estimate = \$400,000.
4. Proposed subdivision near SW Skyline may reduce costs of the combined ped/bike facility.
5. Cost-sharing with the BES Tanner Creek Diversion project is not reflected in this estimate.

# WEST BURNSIDE PEDESTRIAN ACCESS STUDY PART II - PRELIMINARY ENGINEERING

CITY OF PORTLAND  
BUREAU OF TRANSPORTATION ENGINEERING AND DEVELOPMENT  
PEDESTRIAN PROGRAM

## A NOTE ABOUT THIS STUDY

WEST BURNSIDE IS REFERRED TO AS BOTH "ROAD AND "STREET" ON OFFICIAL SURVEYS ALONG THE LENGTH OF THE STUDY. FOR CLARITY, THIS STUDY SIMPLY REFERS TO IT AS WEST BURNSIDE.

THE WEST BURNSIDE PEDESTRIAN ACCESS STUDY EXAMINES THE OPTIONS FOR PROVIDING IMPROVED PEDESTRIAN ACCESS ALONG THE WEST BURNSIDE CORRIDOR.

PART I - PLANNING DOCUMENTS THE INITIAL PART OF THE STUDY AND OFFERS ANALYSIS, NEEDS ASSESSMENT AND THE SCHEMATIC DEVELOPMENT OF ALTERNATE PLANS AND COSTS.

PART II -PRELIMINARY ENGINEERING DEVELOPS THE PREFERRED ALTERNATIVE PLAN IDENTIFIED IN PART I AND OFFERS ADDITIONAL DETAIL AND REFINEMENT OF THE PLAN AND ITS ASSOCIATED COSTS. IT IS INTENDED THAT PART II SERVE AS A GUIDE FOR FINAL ENGINEERING AND IMPLEMENTATION.



LANDSCAPE ARCHITECTURE  
URBAN DESIGN  
PLANNING  
1200 NW Northrup Street  
Portland, OR 97209  
(503)242-1477

DRAWN BY: SVD  
CHECKED BY: JM  
DATE: June 30, 1998  
JOB #: 94033



SCALE: 1"=50'

1 of 12

SHEET NO:



**kpff**  
 Consulting Engineers  
 707 S.W. Washington St.  
 Suite 600  
 Portland, Oregon 97205  
 503-227-3251  
 FAX 503-227-7980



LANDSCAPE ARCHITECTURE  
 TRAIL DESIGN  
 PLANNING  
 1200 NW Hawthorn Street  
 Portland, OR 97209  
 (503) 227-1477

DRAWN BY: SVD  
 CHECKED BY: JP  
 DATE: June 30, 1996  
 JOB #: 94035

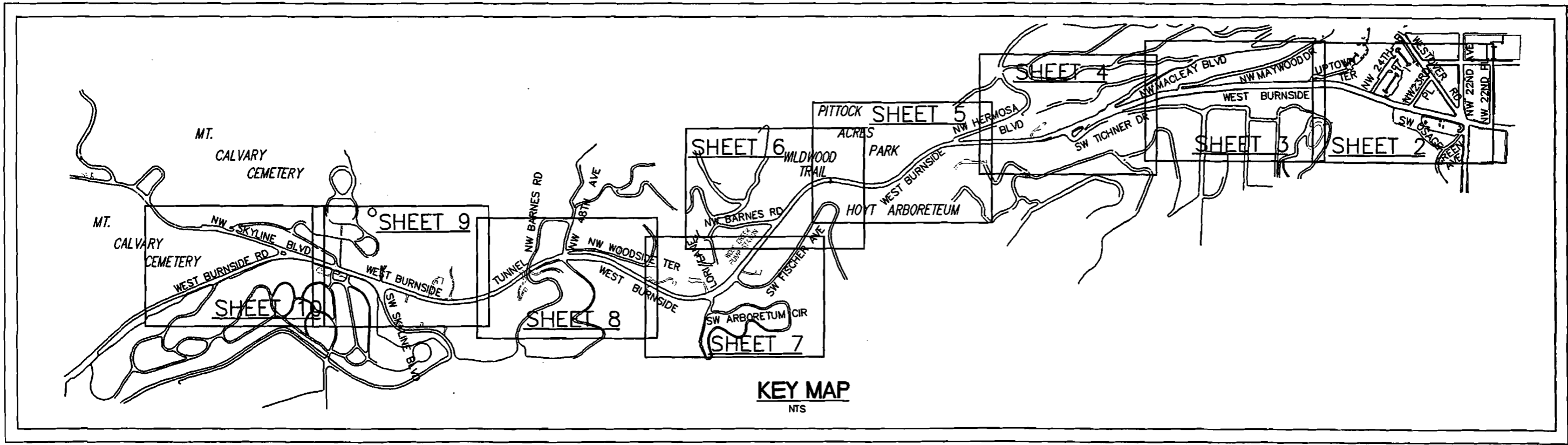


LEGEND		
EXISTING	PROPOSED	
		FENCE
		RETAINING WALL
		GUARD RAIL
		CONCRETE SIDEWALK
		CROSSWALK
		5' BIKE LANE
		COMBINED PEDESTRIAN/BIKE FACILITY (WIDTH AS NOTED ON PLANS)
		A.C. PAVEMENT WIDENING
		LIGHT POLE/TRAFFIC SIGNAL
		CATCH BASIN/FIELD INLET
		BUS STOP LOCATION
		CONCRETE TRANSIT PAD
		ROCK OUTCROP/RIP-RAP WALL

ABBREVIATIONS	
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
A.C.	ASPHALTIC CONCRETE
A.D.A.	AMERICAN DISABILITIES ACT
C.O.P.	CITY OF PORTLAND
EXIST.	EXISTING
NTS	NOT TO SCALE
PVMT.	PAVEMENT
SD	STORM DRAIN
STDS.	STANDARDS
TYP.	TYPICAL

**GENERAL NOTES**

1. THESE PLANS WERE BASED ON CITY OF PORTLAND BUREAU OF ENVIRONMENTAL SERVICES QUARTER SECTION MAPS. THE LOCATION OF UTILITIES IS FOR INFORMATION ONLY AND IS NOT GUARANTEED TO BE ACCURATE.
2. THE COMPLETED INSTALLATION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES, ORDINANCES AND REGULATIONS INCLUDING ALL NECESSARY PERMITS.
3. ALL TRANSIT STOPS AND RELATED IMPROVEMENTS SHALL COMPLY WITH TRI-MET TRANSIT DEVELOPMENT STANDARDS.
4. STORM DRAINAGE CONNECTIONS WERE BASED ON THE ASSUMPTION THAT THE PROPOSED STORM DRAINAGE SYSTEM OF THE TANNER CREEK DIVERSION PROJECT WOULD BE INSTALLED PRIOR OR IN CONJUNCTION WITH THIS PROJECT.
5. COORDINATION WITH THE BES TANNER CREEK DIVERSION PROJECT MAY REDUCE PROJECT COSTS.





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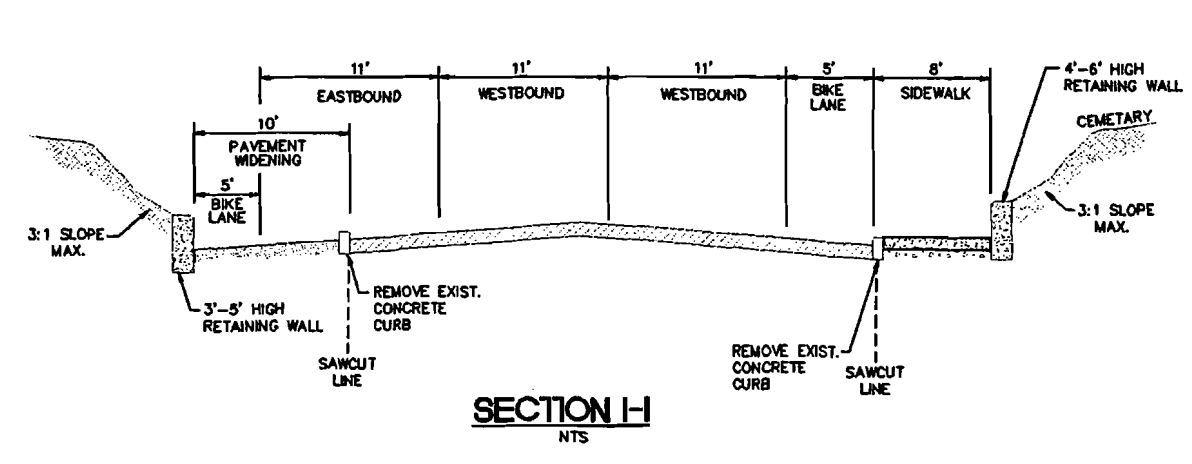
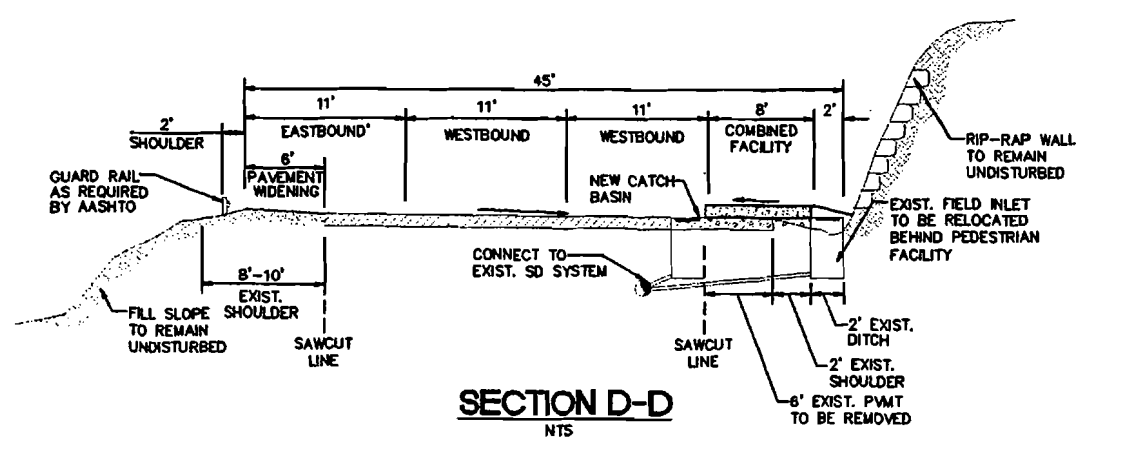
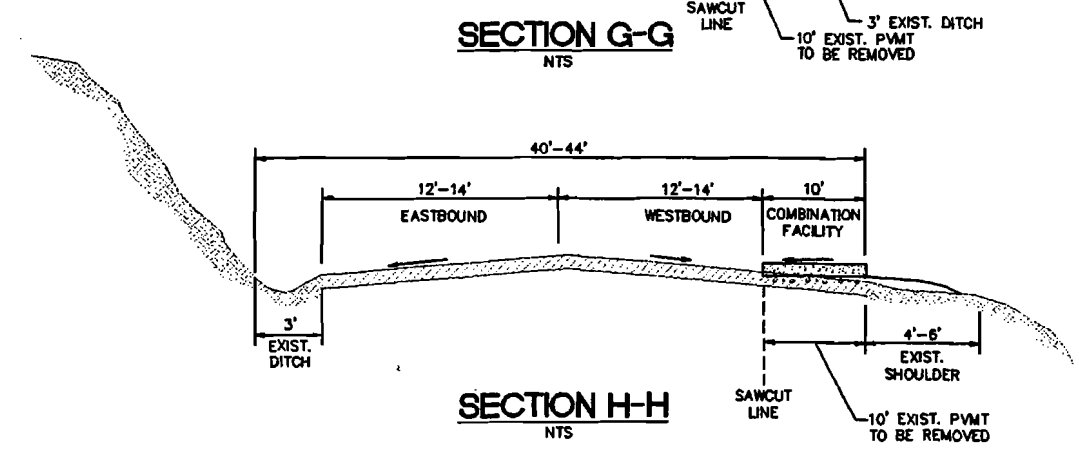
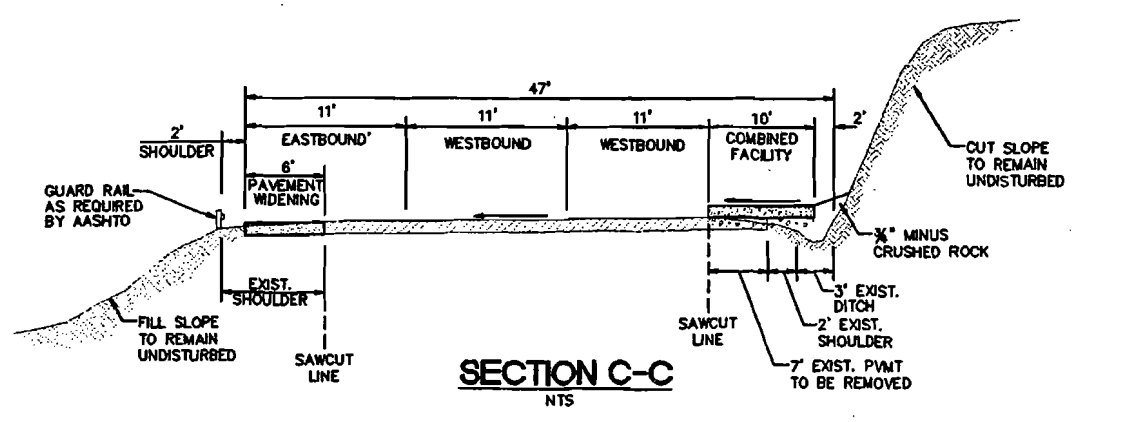
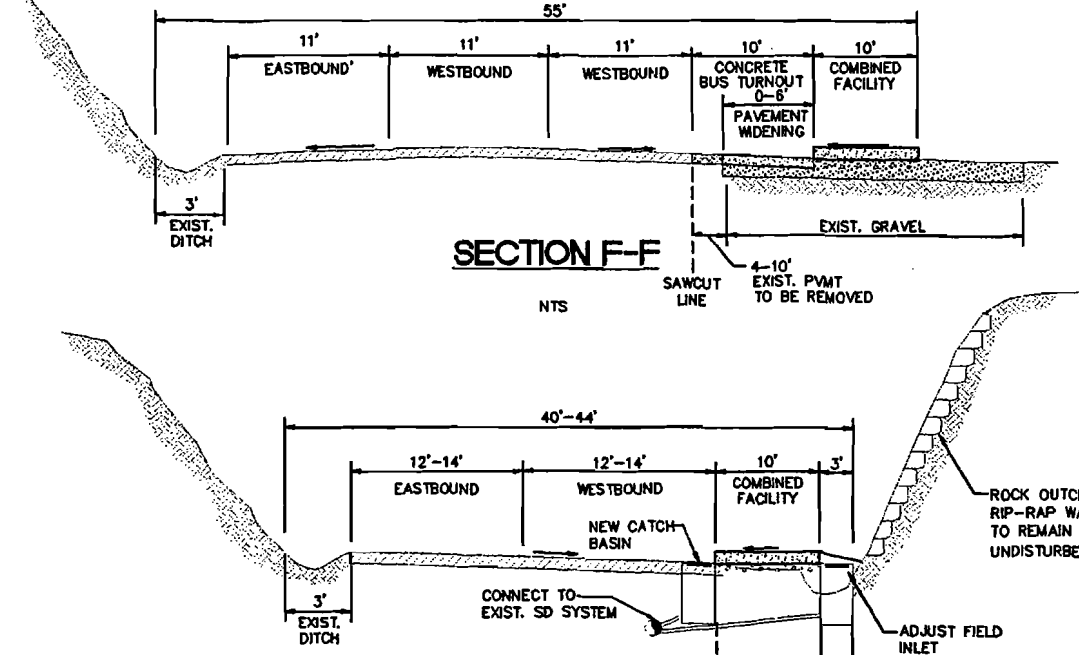
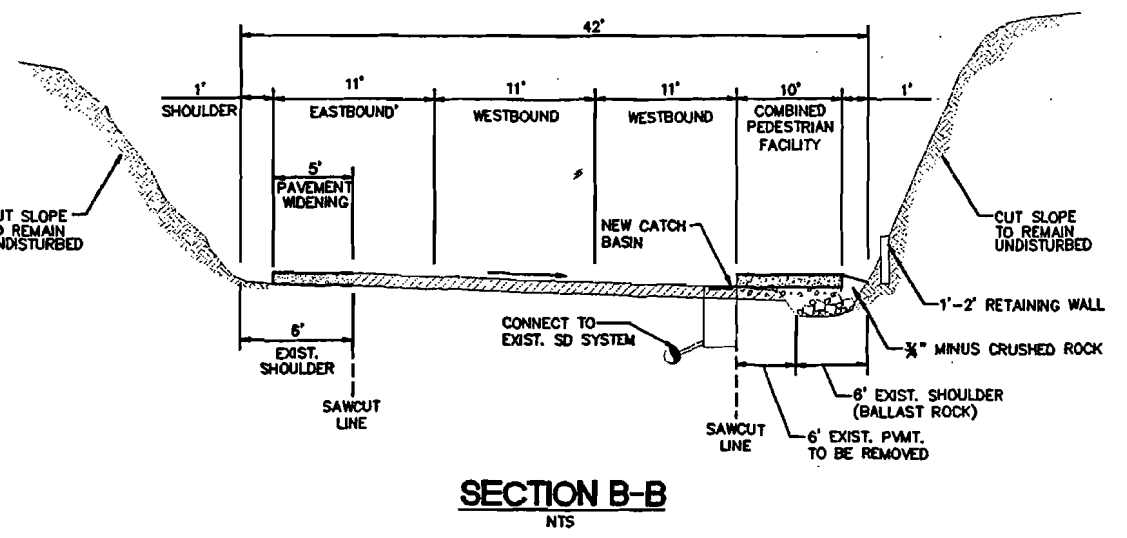
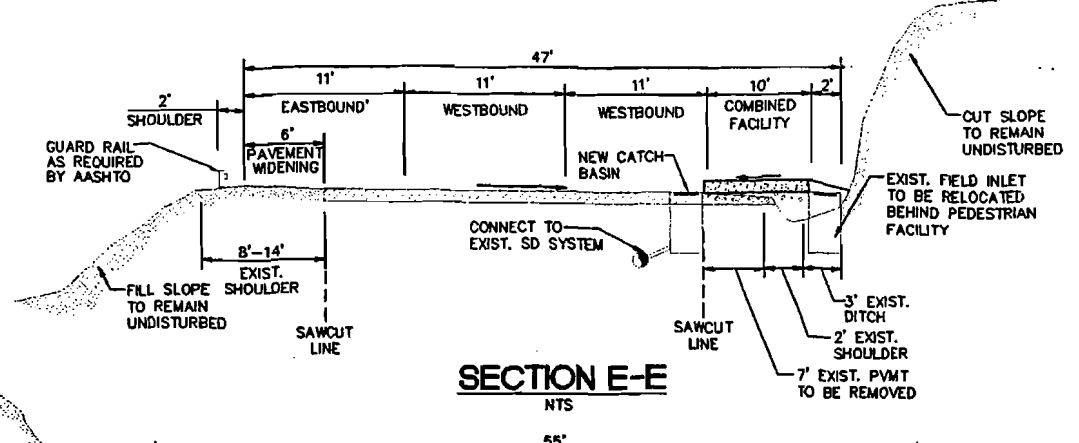
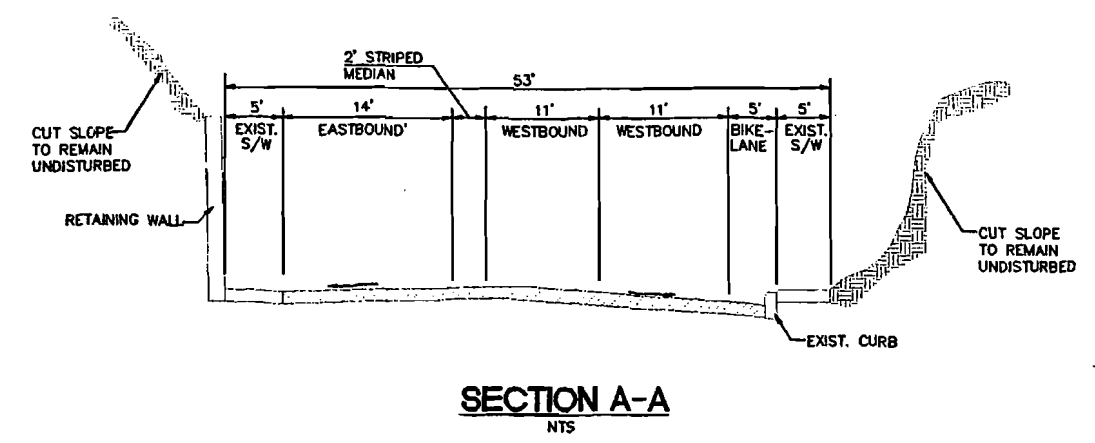
MURASE  
 associates  
 LANDSCAPE ARCHITECTURE  
 URBAN DESIGN  
 PLANNING  
 8724 NE Hartweg Street  
 Portland, OR 97208  
 (503) 242-1477

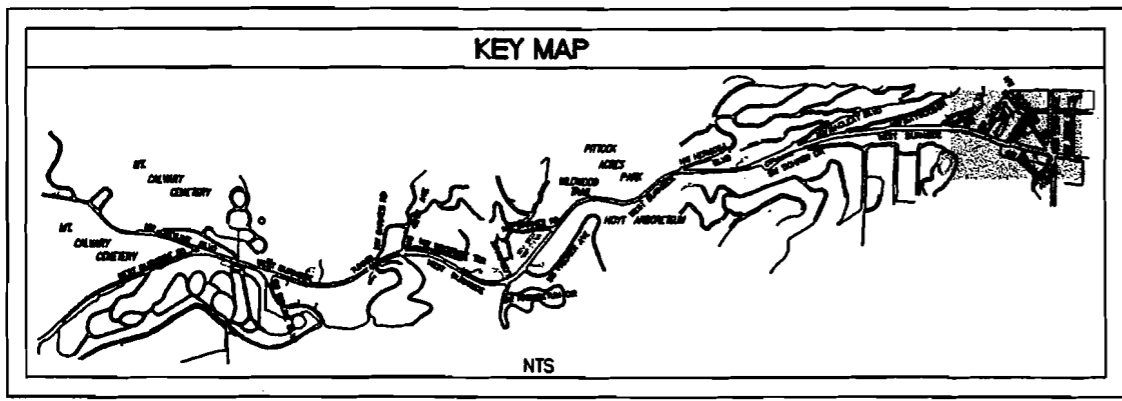
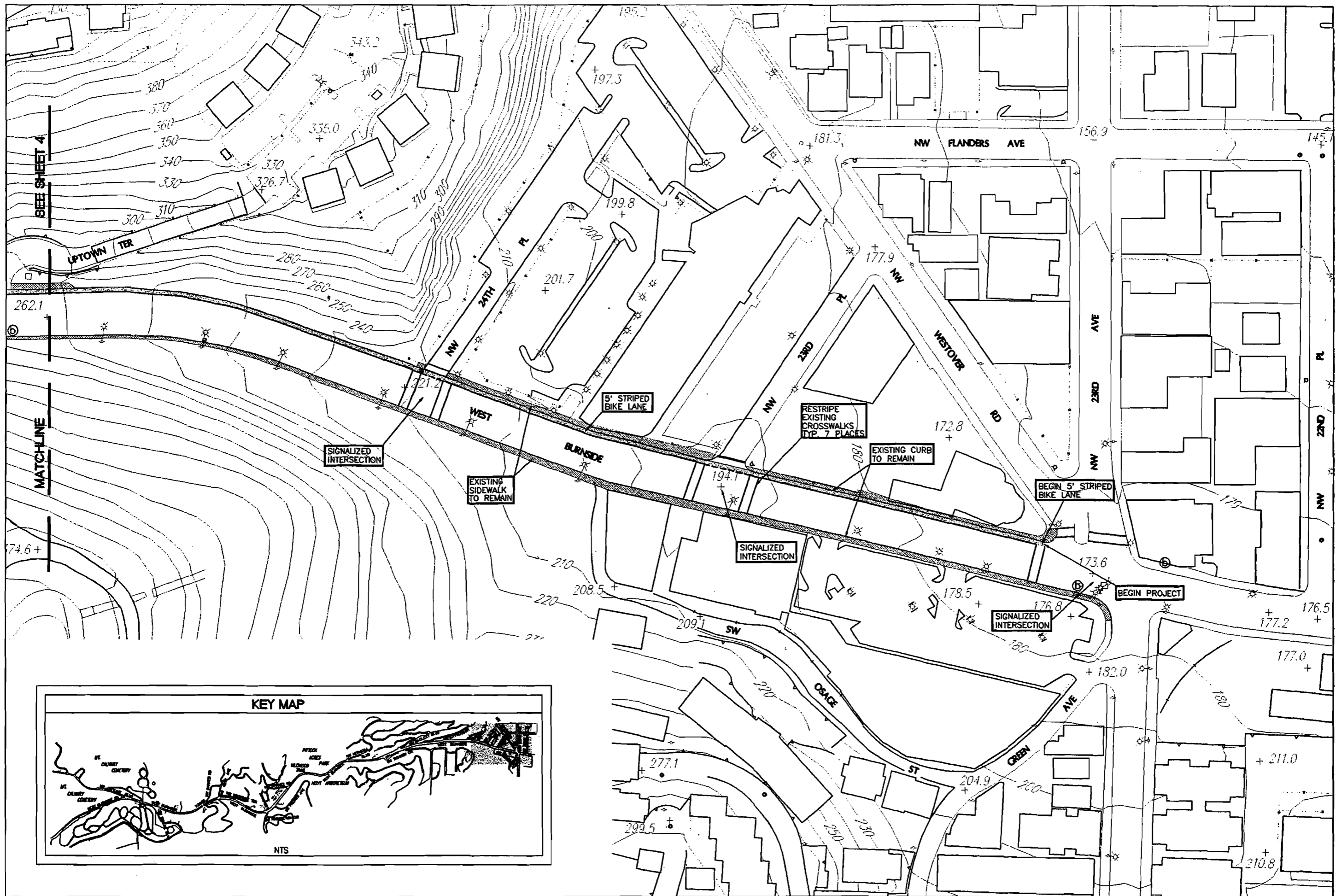
DRAWN BY: SVD  
 CHECKED BY: JM  
 DATE: June 30, 1998  
 JOB #: 84033

SCALE: 1"=50'

SECTION SHEET LEGEND	
<b>EXISTING</b>	
	PAVEMENT
	CONCRETE
<b>PROPOSED</b>	
	CONCRETE
	A.C. PAVEMENT
	DRAINAGE ARROW

NOTE: COMBINED PEDESTRIAN/BIKE FACILITY SHALL HAVE A MINIMUM OF 6' CLEAR SPACE.





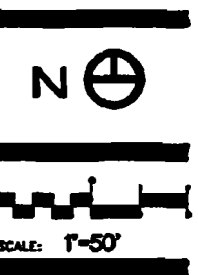
**West Burnside  
Pedestrian Access Study  
Part II - Preliminary Engineering**

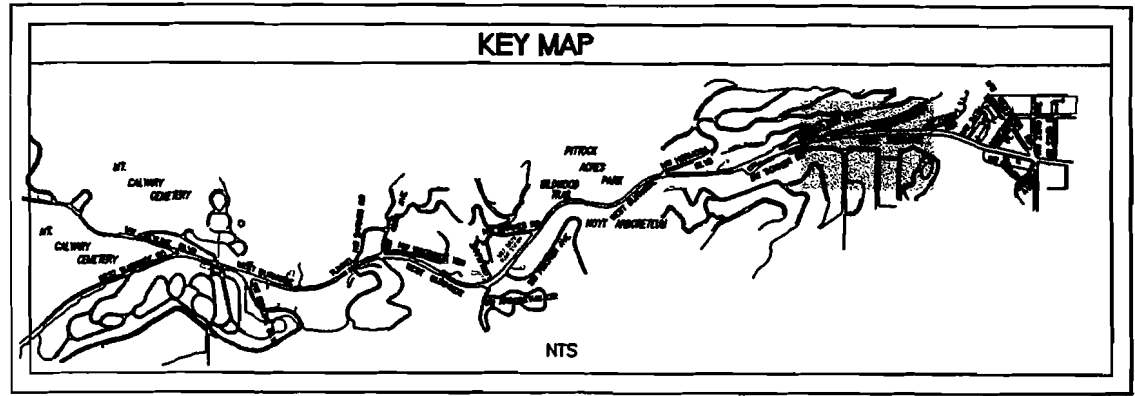
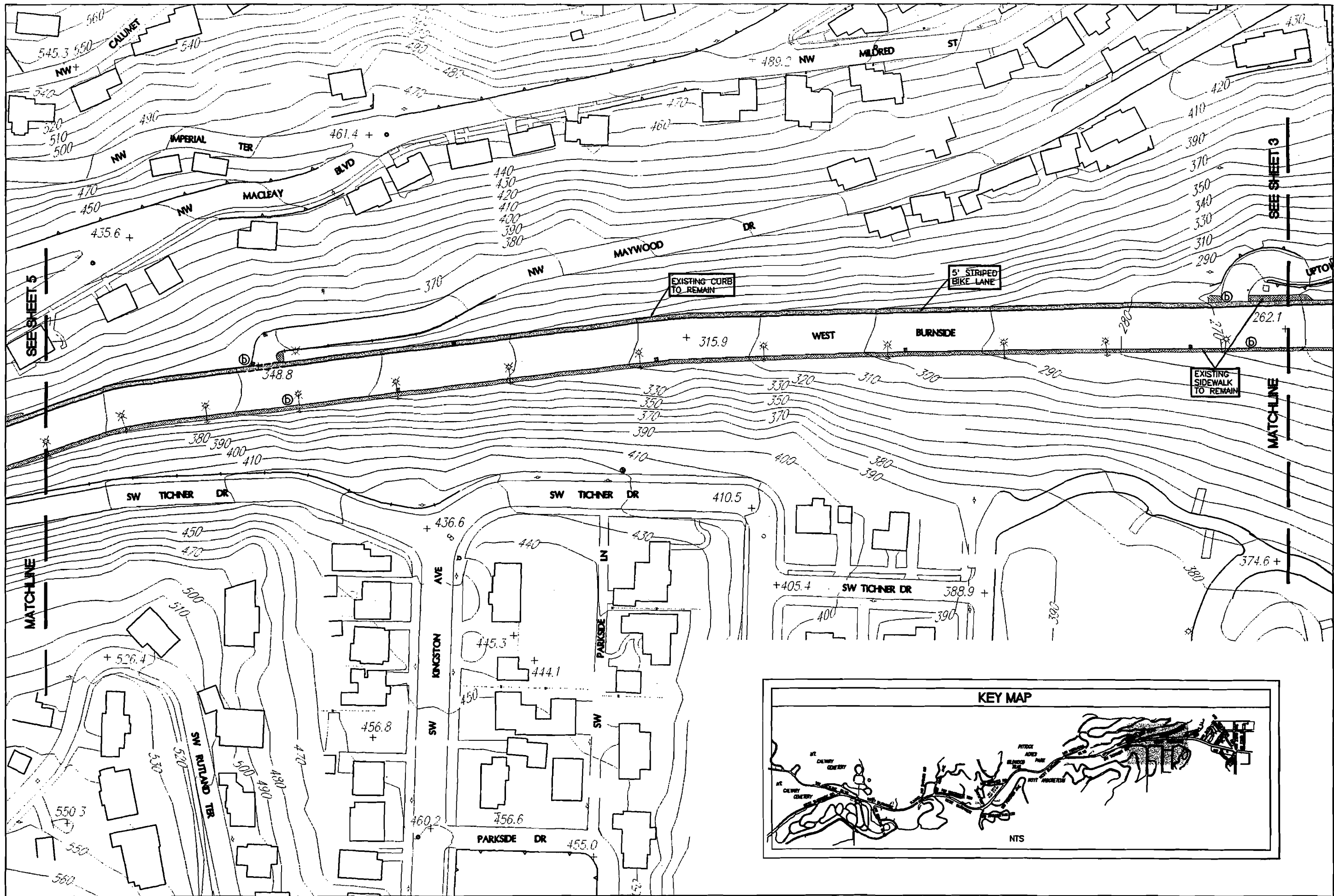


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 Portland, Oregon 97205  
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 FAX 503-227-7980

**MURASE**  
 Landscape Architecture  
 URBAN DESIGN  
 PLANNING  
 1500 SW Hawthorne Street  
 Portland, OR 97205  
 (503)222-5177

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 JOB #: 94053





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Pedestrian Access Study  
Part II - Preliminary Engineering**



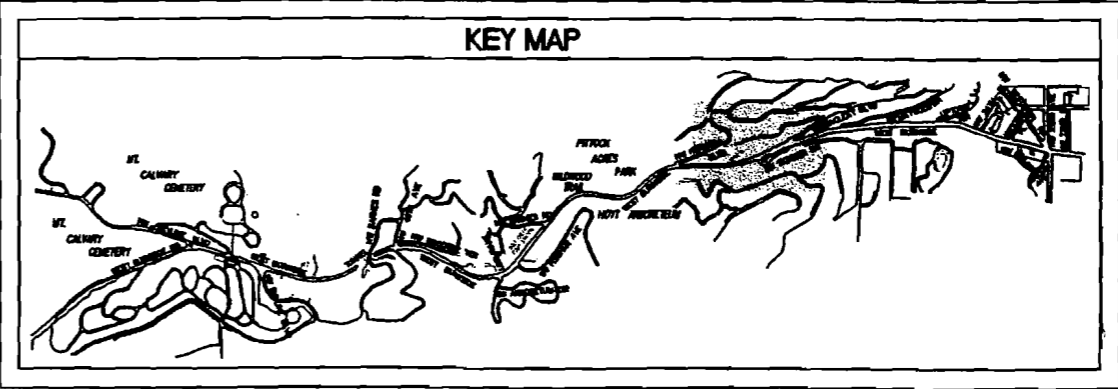
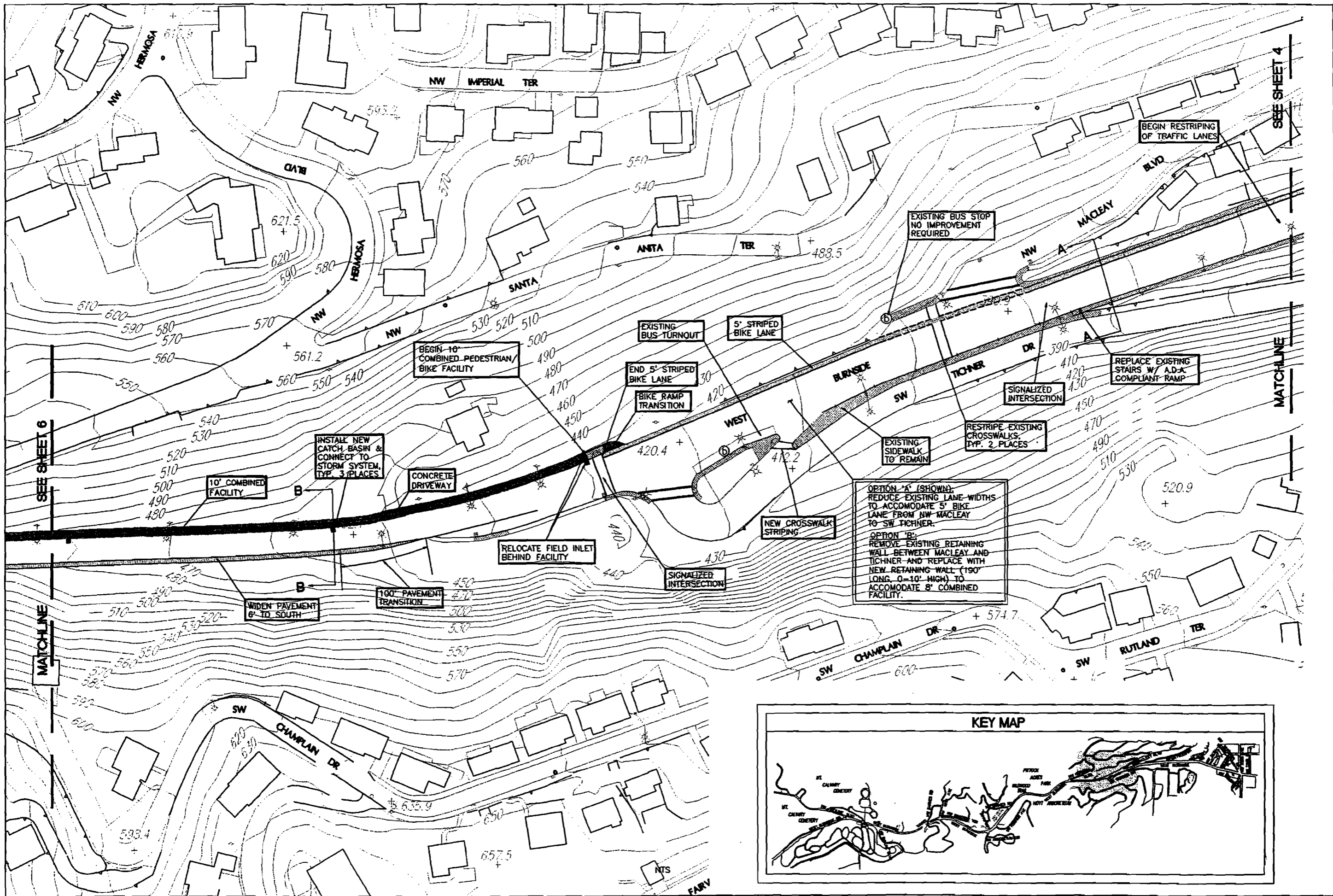
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 Consulting Engineers  
 707 S.W. Washington St.  
 Suite 600  
 Portland, Oregon 97209  
 503-227-3251  
 FAX 503-227-7980



LANDSCAPE ARCHITECTURE  
 Urban DESIGN  
 PLANNING  
 570 NE Broadway Street  
 Portland, OR 97209  
 (503)425-1477

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 DATE: June 30, 1998  
 JOB #: 94033





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Pedestrian Access Study  
Part II - Preliminary Engineering**



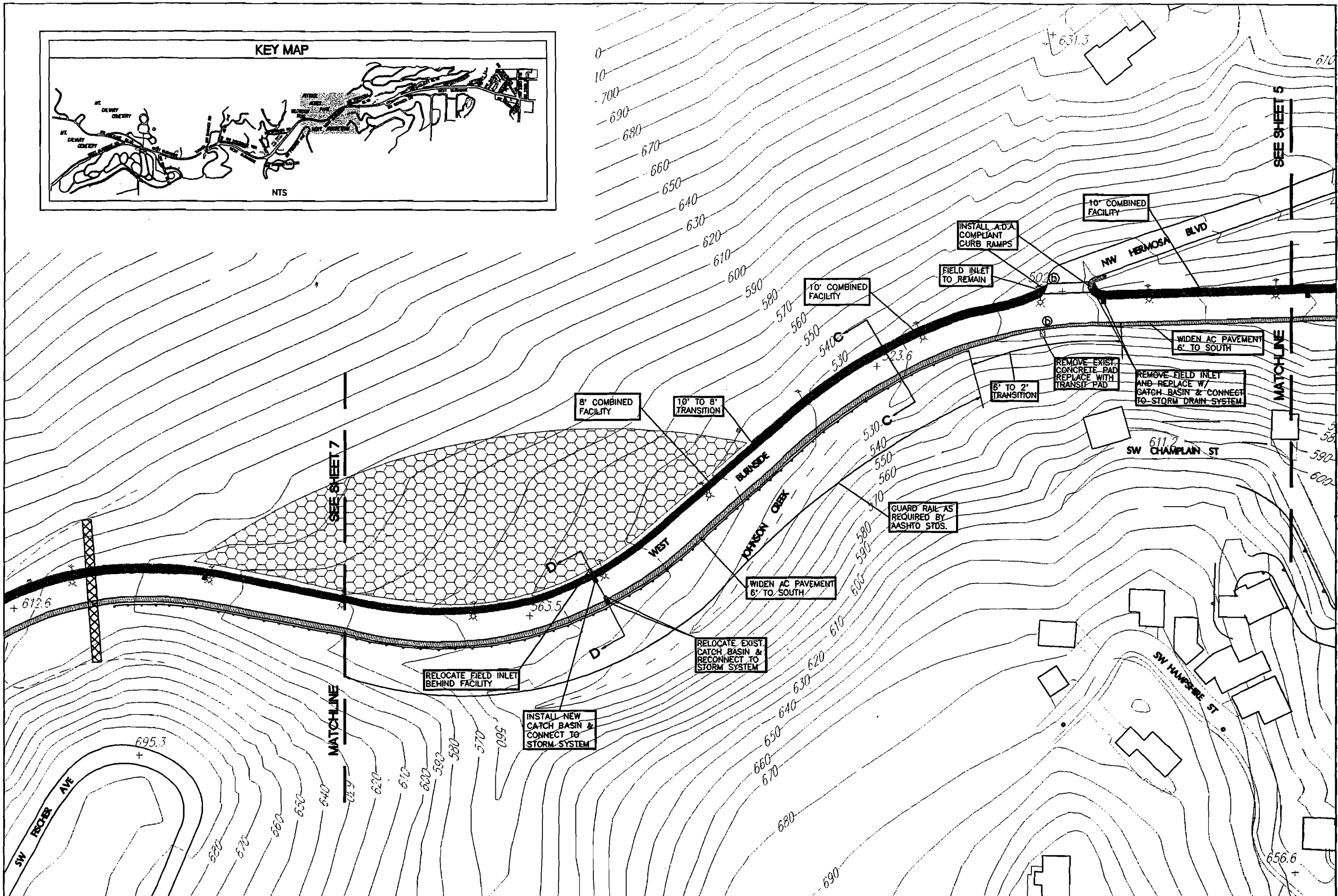
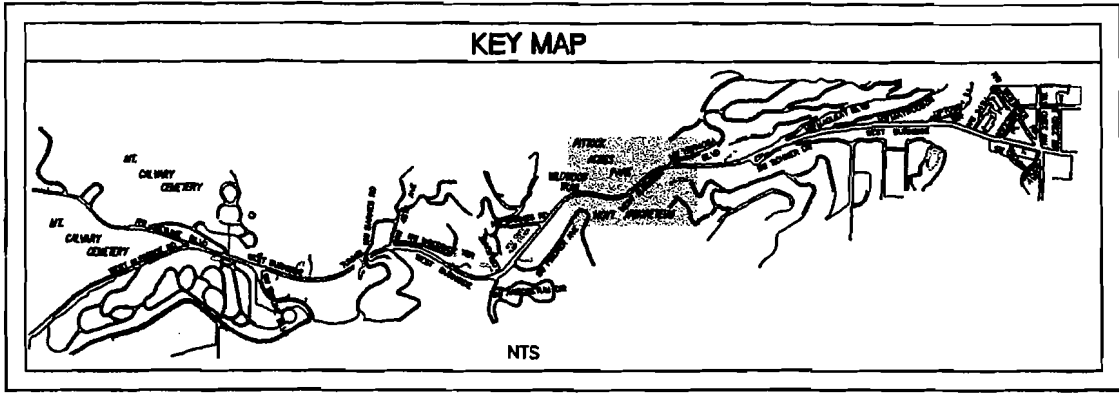
**kpff**  
Consulting Engineers  
707 S.W. Washington St.  
Suite 600  
Portland, Oregon 97205  
503-227-3251  
FAX 503-227-7980

**MURASE**  
associated inc.  
LANDSCAPE ARCHITECTURE  
THREAT REDUCTION  
PLANNING  
2204 NW Northern Street  
Portland, OR 97209  
(503)242-1477

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CHECKED BY: JR  
DATE: June 30, 1998  
JOB #: 94033

N  
SCALE: 1"=50'





**West Burnside  
Pedestrian Access Study  
Part II - Preliminary Engineering**



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Consulting Engineers  
707 S.W. Washington St.  
Suite 600  
Portland, Oregon 97205  
503-227-3251  
FAX 503-227-7980

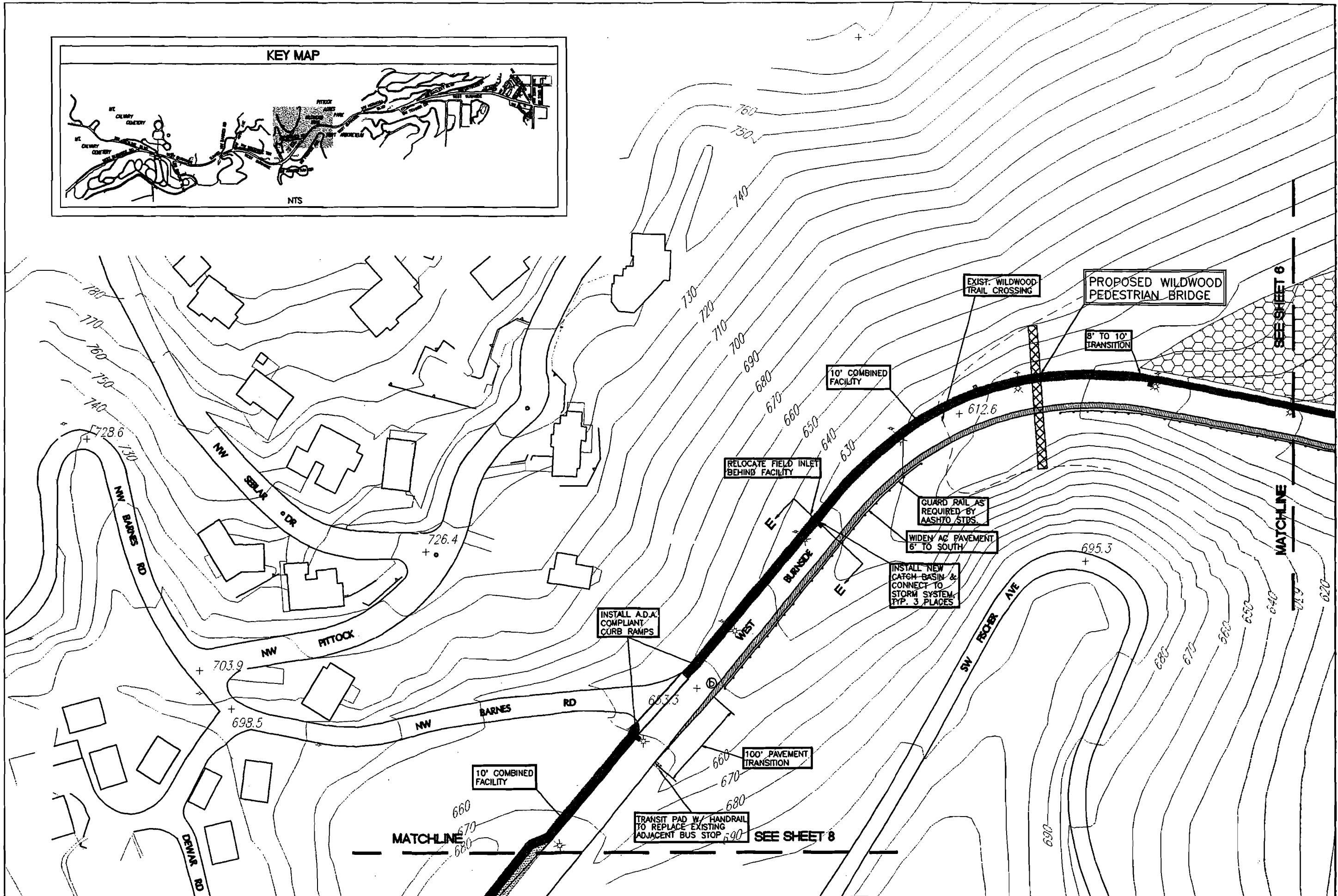
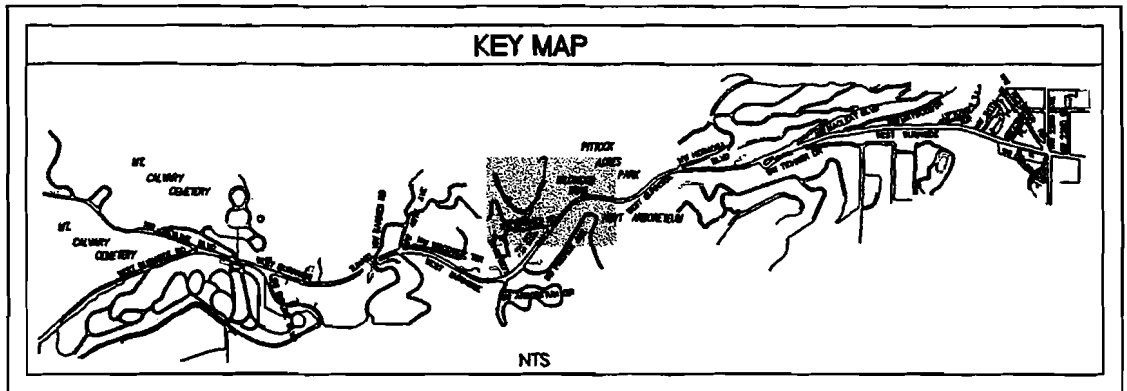


LANDSCAPE ARCHITECTURE  
URBAN DESIGN  
PLANNING  
3000 SW Northwest Street  
Portland, OR 97209  
(503)227-1477

DRAWN BY: SYD  
CHECKED BY: JM  
DATE: June 30, 1998  
JOB #: 94053



SCALE: 1"=50'



EXIST. WILDWOOD TRAIL CROSSING

PROPOSED WILDWOOD PEDESTRIAN BRIDGE

8' TO 10' TRANSITION

10' COMBINED FACILITY

RELOCATE FIELD INLET BEHIND FACILITY

GUARD RAIL AS REQUIRED BY AASHTO STRS.

WIDEN AC PAVEMENT 6' TO SOUTH

INSTALL NEW CATCH-BASIN & CONNECT TO STORM SYSTEM TYP. 3 PLACES

INSTALL A.D.A. COMPLIANT CURB RAMPS

100' PAVEMENT TRANSITION

TRANSIT PAD W/ HANDRAIL TO REPLACE EXISTING ADJACENT BUS STOP

SEE SHEET 8

SEE SHEET 6

MATCHLINE

MATCHLINE

**West Burnside Pedestrian Access Study**  
Part II - Preliminary Engineering



**k p f i**  
Consulting Engineers  
707 S.W. Washington St.  
Suite 600  
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503-227-3251  
FAX 503-227-7900

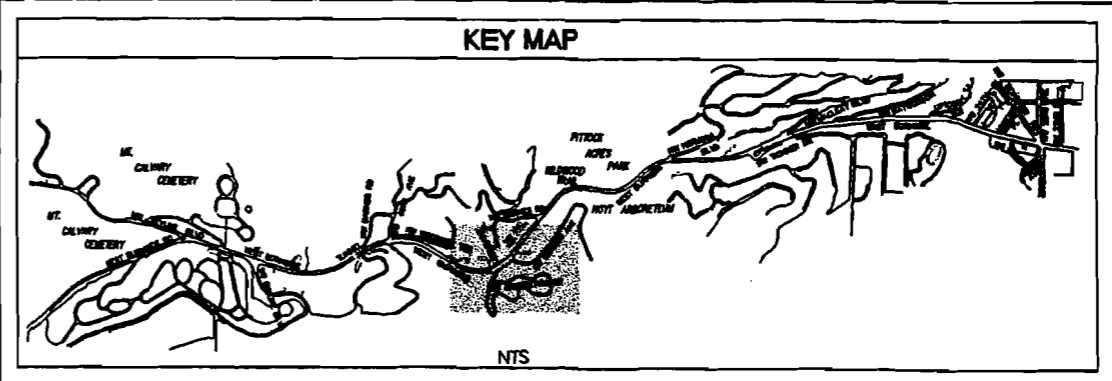
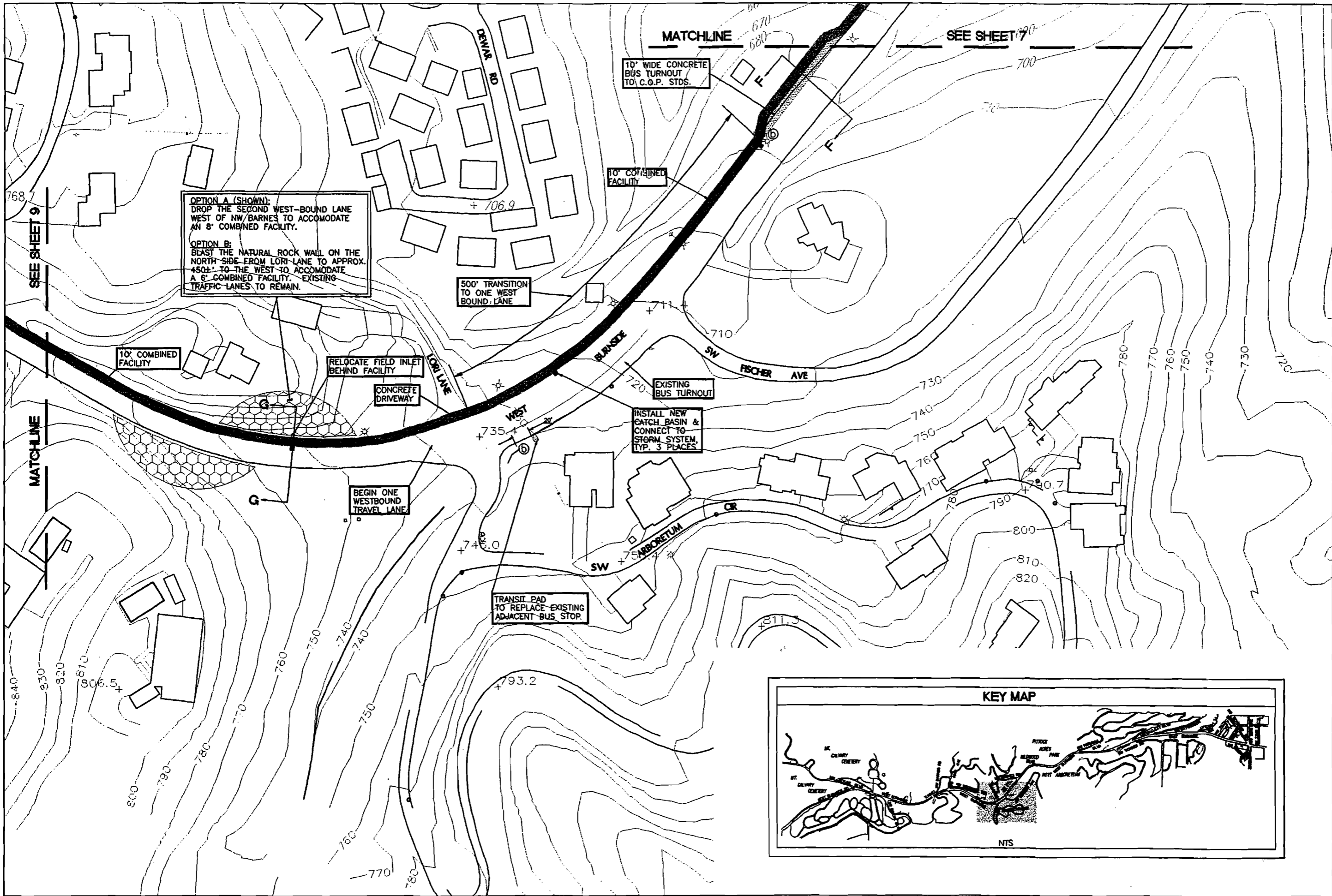


LANDSCAPE ARCHITECTURE  
URBAN DESIGN  
PLANNING  
1204 NW Burnside Street  
Portland, OR 97209  
1982/2002-1997

DRAWN BY: SVD  
CHECKED BY: JM  
DATE: June 30, 1998  
JOB #: 94033



SCALE: 1"=50'



**West Burnside  
Pedestrian Access Study  
Part II - Preliminary Engineering**



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Consulting Engineers  
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Suite 600  
Portland, Oregon 97205  
503-227-3251  
FAX 503-227-7980

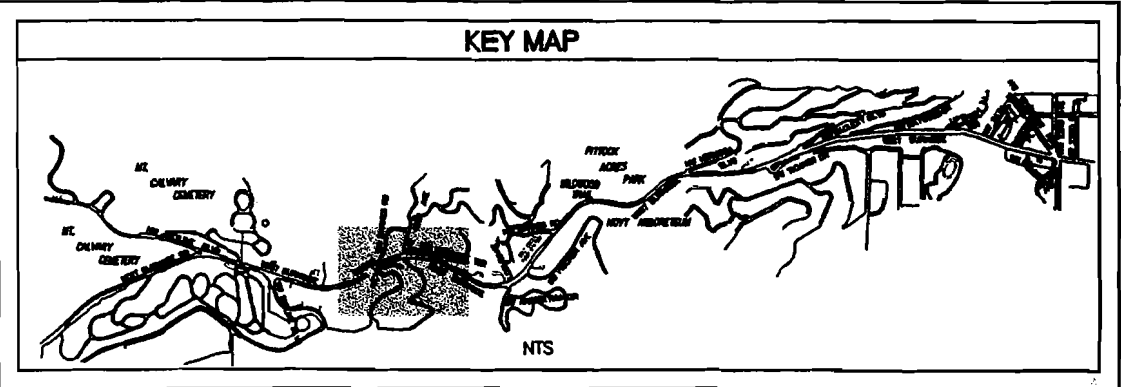
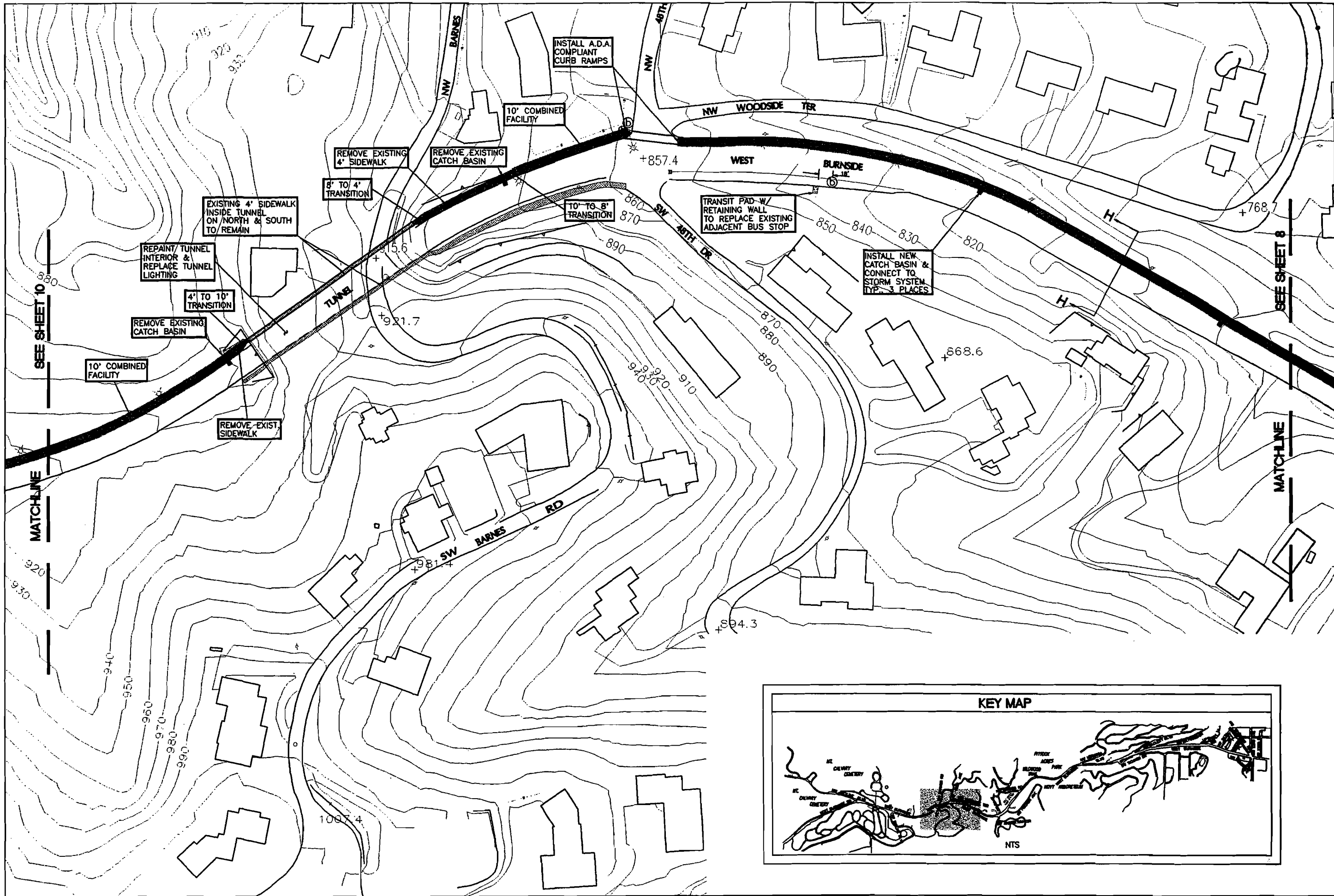
**MURASE**  
associates

LANDSCAPE ARCHITECTURE  
TIMOTHY LEECH  
PLANNERS  
830 NW Harney Street  
Portland, OR 97209  
503-227-1177

DRAWN BY: SVD  
CHECKED BY: JM  
DATE: June 30, 1988  
JOB #: 84333



SCALE: 1"=50'



**West Burnside  
Pedestrian Access Study  
Part II - Preliminary Engineering**



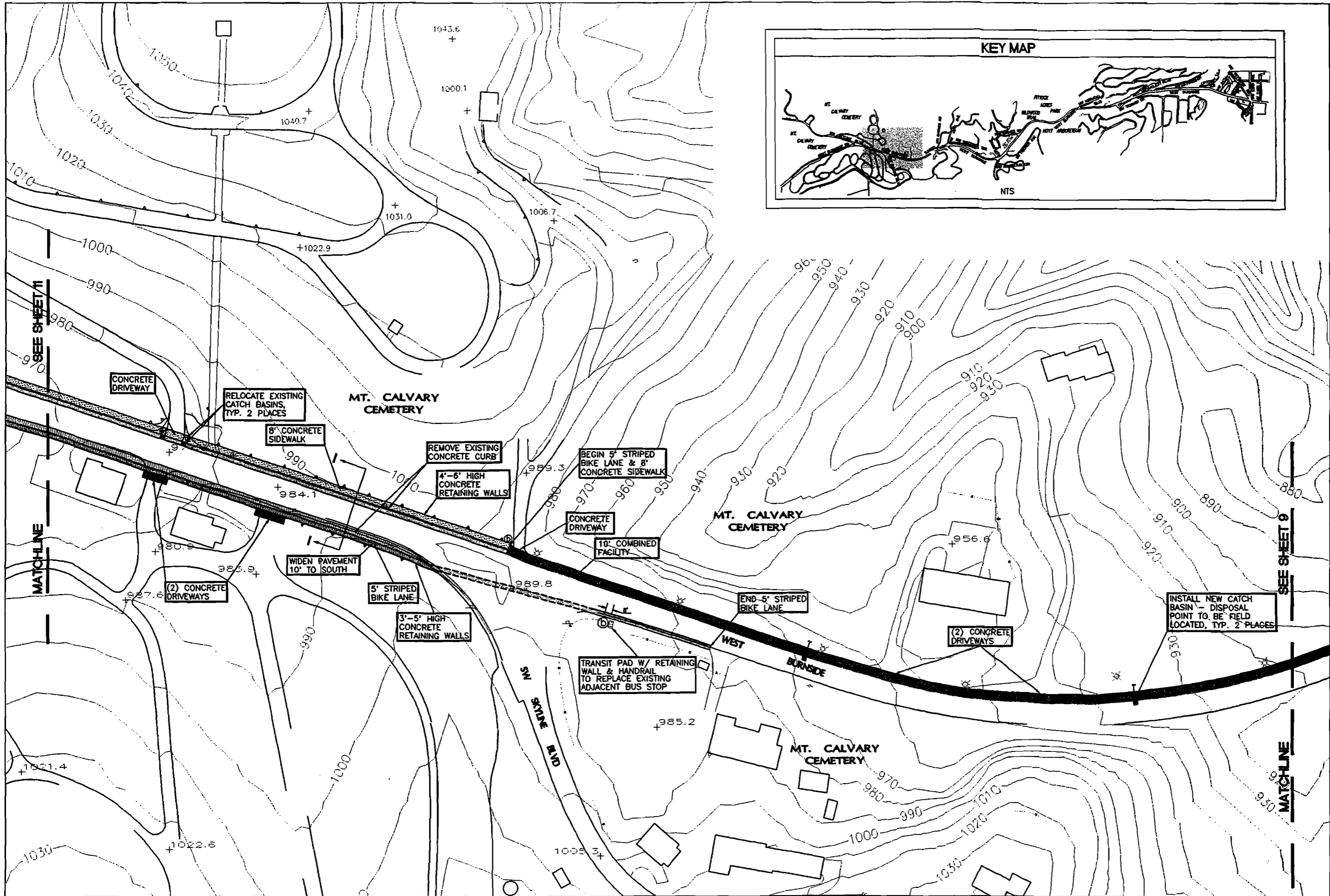
**kptf**  
Consulting Engineers  
707 S.W. Washington St.  
Suite 800  
Portland, Oregon 97205  
503-227-3281  
FAX 503-227-7980



LANDSCAPE ARCHITECTURE  
URBAN DESIGN  
PLANNING  
380 NE Mortenson Street  
Portland, OR 97209  
503-227-1477

DRAWN BY: SVD  
CHECKED BY: JH  
DATE: June 30, 1998  
JOB #: 94033





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Part II - Preliminary Engineering**

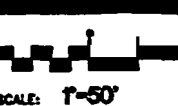


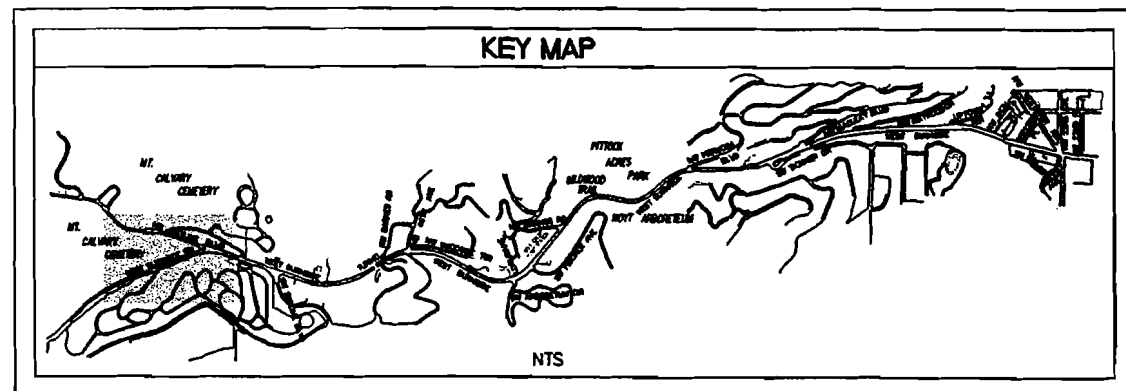
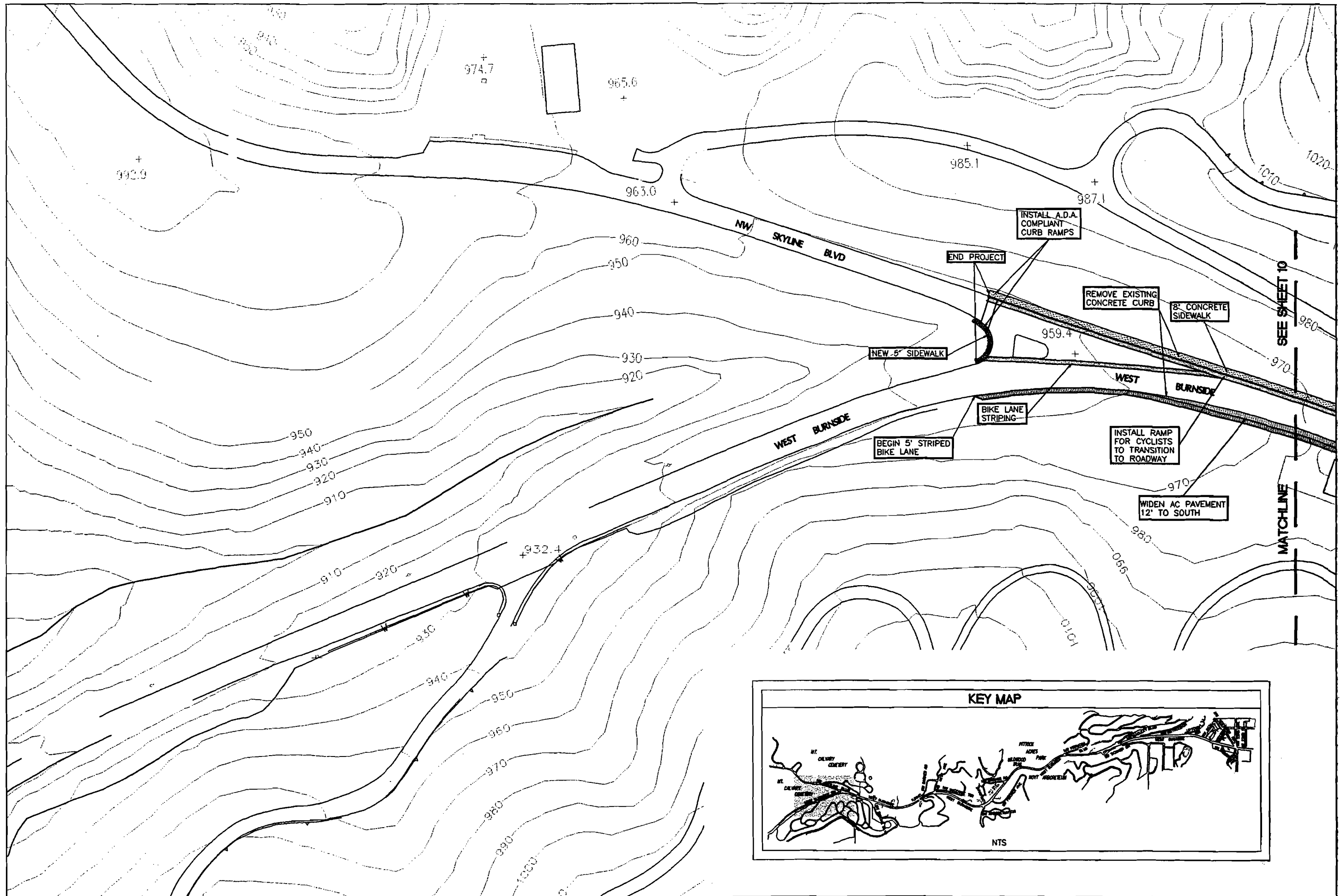
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503-227-3251  
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LANDSCAPE ARCHITECTURE  
URBAN DESIGN  
PLANNING  
8300 NW Westbury Street  
Portland, OR 97229  
(503)242-1477

DRAWN BY: SVD  
CHECKED BY: JM  
DATE: June 30, 1996  
JOB #: 94033





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Portland, Oregon 97205  
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**MURASE**  
Associates  
LANDSCAPE ARCHITECTURE  
URBAN DESIGN  
PLANNING  
1201 NW Hawthorne Street  
Portland, OR 97209  
(503) 242-1477

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DATE: June 30, 1998  
JOB #: 94033

