

**SR 18: 180<sup>th</sup> Avenue SE to Maple Valley (MP 12.57 to MP  
16.55) (Wetland KA) Mitigation Site  
C 6008**

**USACE IP 1999-4-00171**

**Northwest Region**

**2008 MONITORING REPORT**

**Wetland Assessment and Monitoring Program**

*Issued May 2008*



**Washington State  
Department of Transportation**

**Environmental Services Office**

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# SR 18: 180<sup>th</sup> Avenue SE to Maple Valley (Wetland KA) Mitigation Site

USACE IP Number 1999-4-00171



<b>General Site Information</b>	
<b>USACE IP Number</b>	1999-4-00171
<b>WSDOT Contract Number</b>	C6008
<b>Mitigation Location</b>	SE corner SR 18 at the Jenkins Creek Bridge, King County
<b>Construction Date</b>	2003
<b>Monitoring Period</b>	2004-2013
<b>Year of Monitoring</b>	5 of 10
<b>Area of Project Impact</b>	0.14 acre
<b>Type of Mitigation</b>	Wetland restoration
<b>Area of Mitigation</b>	0.18 acre

## Summary of Monitoring Results and Management Activities (2008)

Performance Standards	2008 Results <sup>1</sup>	Management Activities
Less than 25% aerial cover of reed canarygrass (Performance Standard 1)	17% cover (CI <sub>80%</sub> = 12-22%)	Weed control
At least 25% aerial cover of woody wetland species involving at least three species (Performance Standard 2)	47% cover (CI <sub>80%</sub> = 36-58%) 8 species	

### Report Introduction

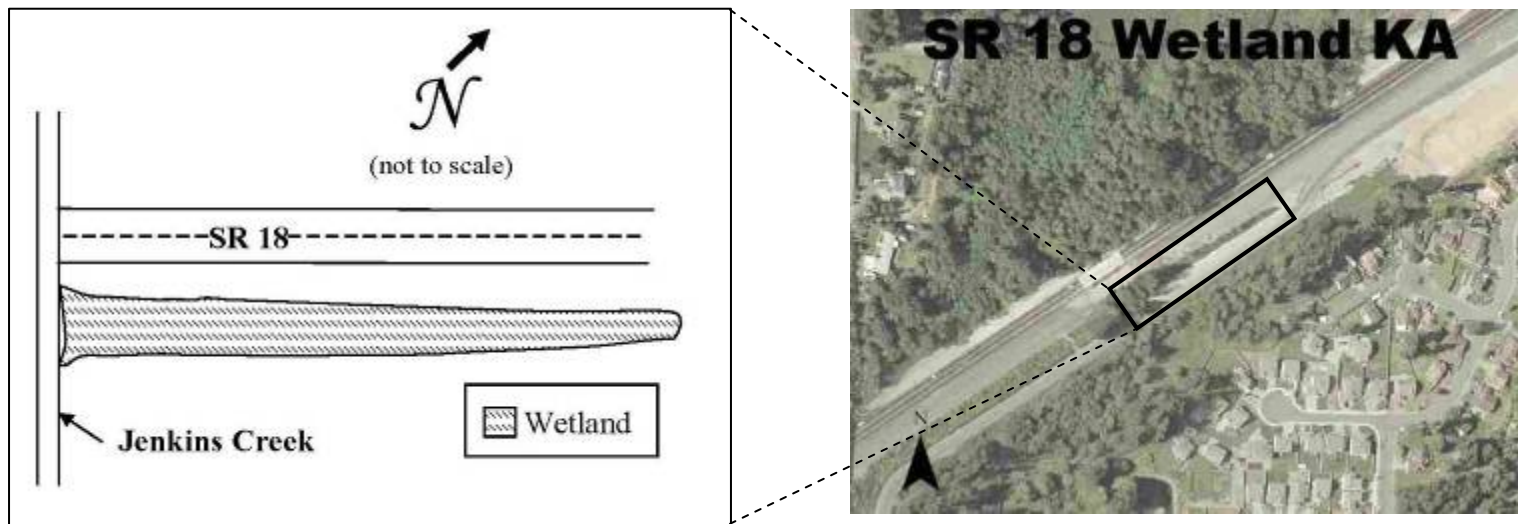
This report summarizes fifth-year (Year-5) monitoring activities at the State Route (SR) 18 180<sup>th</sup> Avenue to Maple Valley (Wetland KA) Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2007 and 2008 included vegetation surveys, photo-documentation, and assessments of wetland hydrology.

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<sup>1</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 17% cover (CI<sub>80%</sub> = 12-22%) means we are 80% confident that the true aerial cover value is between 12% and 22%.

## What is the SR 18 Wetland KA mitigation site?

The Wetland KA mitigation site is intended to provide 0.14 acre of wetland restoration. This site was replanted after a group of trees in Wetland KA was inadvertently cut during project construction. The removal of these trees was an unintentional deviation from the project permit. The replanting and restoration of this site provides partial compensation for the violation. Additional compensation is provided at the SR 18: 180<sup>th</sup> Avenue SE to Maple Valley (Kendal 2) mitigation site.



**Figure 1 Site Sketch**

The site is a replanted forested wetland adjacent to Jenkins Creek and SR 18 in King County. A planting plan is attached in Appendix 4 and permanent photo point images are included in Appendix 5. Appendix 1 includes site directions.

## What are the performance criteria for this site?

### Permit Requirement

The monitoring reports you submit for this project must also describe the replanting success of the restoration of Wetland KA.

The following performance standards were excerpted from the SR 18 180<sup>th</sup> Avenue to Maple Valley (Jenkins Creek) Mitigation Plan.

### Performance Standard 1

The enhancement and restoration areas shall contain no more than 25 percent areal (*sic*) cover by reed canarygrass at any point during the lifetime of the monitoring period.

### Performance Standard 2

Forested wetland mitigation areas will be comprised of a planted and native naturally colonizing plant community with 25 percent or more areal (*sic*) cover involving at least three species of woody plant species adapted for life in saturated soil conditions (facultative or wetter).

Appendix 1 provides the complete text of the performance criteria for this project, and Appendix 4 shows the planting plan (Cleveland 2003).

## How were the performance criteria evaluated?

To evaluate standards for vegetative cover, a baseline was established parallel to SR 18 (Figure 2). Sampling transects were established perpendicular to the baseline using a systematic random sampling method.

The line intercept method was used to estimate woody cover, and the point intercept method was used to estimate invasive species cover (Performance Standards 1 and 2).

For additional details on the methods, see Appendix 2 of this report or view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2007).

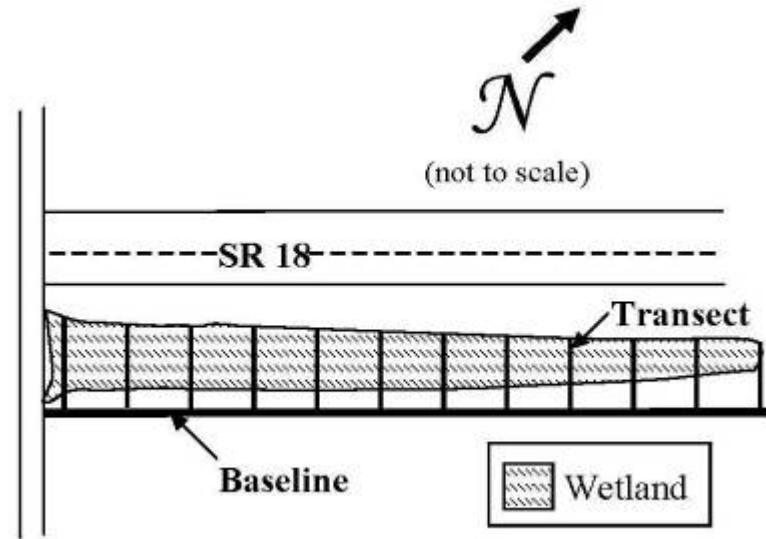


Figure 2 Site Sampling Design (2007)

## How is the site developing?

The site is developing as intended. Wetland KA now has the potential to provide lost wetland functions through re-establishment of native vegetation. A connection to the creek and cover by woody species provides flood flow attenuation and exports organic material. The cover of herbaceous plants provides nutrient, toxicant, and sediment retention. Aerial cover of native woody species exceeds the threshold of the performance standard. Aggressive weed control efforts have successfully lowered the aerial cover of *Phalaris arundinacea* (reed canarygrass). Data suggest wetland hydrology is present in all intended areas of the site. A mid-term delineation conducted in March 2006 determined 0.18 acre of wetland is present, achieving the intended 0.14 acre of restored wetland.

Permit Requirement:

(Describe the replanting success of the restoration of Wetland KA):

Many of the plantings appear to be well established and have grown vigorously over the last five years. Along with replacement plantings (planted in 2005) and natural recruitment, the site has achieved a fairly even distribution of native woody plants. Many of the original plants have reached heights ranging between two and four meters, while the replacement plantings are less than one meter tall. Continued weed control to limit competition is recommended.

Results for Performance Standard 1

(Less than 25% aerial cover of reed canarygrass):

Aerial cover of *Phalaris arundinacea* (reed canarygrass) is 17% ( $CI_{80\%} = 12-22\%$ ). This estimate falls below the threshold set for the site. Estimates suggest a continued reduction in cover of *P. arundinacea* after a recovery plan was initiated in late 2005. With continued weed control, the limited cover of *P. arundinacea* will allow for establishment of planted woody species. *Rubus armeniacus* (Himalayan blackberry), and *Rubus laciniatus* (cutleaf blackberry) were observed in the wetland, and *Cytisus scoparius* (Scot's broom), and *Buddleja davidii* (orange eyed butterflybush) were observed adjacent to the site. Continued control of invasive species is recommended.

Results for Performance Standard 2

(At least 25% aerial cover of woody wetland species, involving at least three species):

Aerial cover of native woody species is 47% ( $CI_{80\%} = 36-58\%$ ). This estimate exceeds the threshold (Photo 1). Eight native woody species present on site are designated facultative or wetter (Appendix 3). Therefore, the second part of the performance standard has been achieved. Many *Spiraea douglasii* (hardhack) plants have colonized areas vacant of other native woody species.



**Photo 1**

**Woody cover in the scrub-shrub wetland (August 2007)**

# Appendix 1 – Performance Criteria

The performance standards used for this site are based on performance standards excerpted from the *SR 18: 180<sup>th</sup> Ave SE to Maple Valley, Washington (MP 12.57 to MP 16.55) Final Wetland Mitigation Plan* (Antieau and Krueger 2001), the *SR 18 180<sup>th</sup> Avenue to Maple Valley (Jenkins Creek) Mitigation Plan Addendum* (Brown 2002), and Permit Requirements from USACE Regulatory Branch Letter (2002, p.3) (Permit1999-4-00171). The criteria addressed this year are identified in **bold** font. Other tasks and standards will be addressed in the indicated monitoring year.

## Objective 1: Vegetation

### *Performance standards:*

**PS1.** All King County-listed Class A, B-designate, and County-selected priority noxious weed species will be controlled in the season they are first identified in the season they are first identified on the mitigation site. **Reed canarygrass (a King County Weed of Concern) is expected to be present during the life of this mitigation effort due to the abundant and adjacent source of propagules, as well as the presence of reed canarygrass on the mitigation site. The enhancement and restoration areas shall contain no more than 25% areal cover by reed canarygrass at any point during the lifetime of the monitoring period.**

*Performance Standards: Monitoring Year Five, Seven, and Ten*

**PS2.** Five years after planting, emergent wetland mitigation areas will be comprised of a planted and native naturally colonizing plant community with 75% or more areal cover involving at least three non-invasive herbaceous plant species adapted for life in saturated soil conditions (facultative-wet or wetter). **Forested wetland mitigation areas will be comprised of a planted and native naturally colonizing plant community with 25% or more areal cover involving at least three species of woody plant species adapted for life in saturated soil conditions (facultative or wetter).**

### ***Monitoring Schedule***

Once during the middle part of the growing season in Monitoring Years One, Two, Three,-Five, Seven, and Ten.

### ***Potential Contingency Actions***

1. If the site does not meet performance standards PS6 (vegetation not succeeding in directions that displace or weaken reed canarygrass), and PS7 and PS8 (Monitoring Year Five), resource agencies will be consulted for advice on further measures to remedy problems at the site. The monitoring schedule will be extended and such reasonable measures will be conducted as necessary to establish appropriate wetland vegetation. WSDOT will perform all reasonable measures considered necessary to establish and maintain a functioning wetlands/buffer system that meets the goals objectives of this monitoring plan.
2. The mitigation plan uses and promotes the growth of native vegetation. King County Class A, B-designate, and County-selected priority noxious weed species will be controlled in the season they are first identified on the site. -In the event that reed canarygrass in the enhancement and restoration areas exceeds 25% areal cover at any point during the monitoring period, a range of techniques will be employed to bring the area into compliance. These techniques include hand pulling and off-site disposal, hand-spraying or wiping with Rodeo, flaming, trampling (crushing), and/or mowing.

### **REPORTING**

Reports for the ten-year monitoring period (including a report for each of Monitoring Years One, Two, Three, Five, Seven, and Ten) will be issued to the Corps of Engineers Seattle District Regulatory Branch, Washington State Department of Ecology, King County Department and Environmental Services, and other appropriate resource agencies for review and comment. Successful mitigation will be measured by attainment of the performance standards described in this mitigation effort meets the stated performance standards earlier than anticipated.

### **OPERATION AND MAINTENANCE**

As described above, the goal of the proposed mitigation is to create a functional self-sustaining system that requires little or no maintenance. WSDOT will retain ownership of the site in perpetuity. Maintenance will be conducted on an as-needed basis by WSDOT personnel or designates and is anticipated to focus on maintaining access, repairing vandalism or fencing, correcting erosion or sedimentation problems, collecting trash, and managing King County Class A, B-designate, and County-selected priority noxious weed species.

## Permit Requirements

**From USACE Regulatory Branch Letter (2002, p.2) (Individual Permit 1999-4-00171)**

Because this project involves a permit deviation, you must submit annual wetland mitigation monitoring reports for the original and addendum mitigation plan to our office in a separate report than all other Washington State Department of Transportation (WSDOT) wetland mitigation annual monitoring reports. **The monitoring reports you submit for this project must also describe the replanting success of the restoration of wetland KA.**

**From Ecology Water Quality and Certification Permit 1999-4-00171**

**Each year's monitoring report shall include photographic documentation of the project taken from permanent reference points (Appendix 5).**

**Driving Directions:** Wetland KA is located on the south side of SR 18, adjacent to the eastbound lanes, on the east side of the Jenkins Creek bridge at approximately MP 11.9. From I-5, continue east on SR 18 past SR 516 in Covington. Once past SR 516, continue east under the 180<sup>th</sup> Avenue SE overpass; the first Jenkins Creek Bridge is approximately 800 feet east of this overpass. Pull off on the shoulder just east of the bridge; at the end of the guardrail on the Exit ramp for 256th St.

# Appendix 2 - Methods

To assess vegetation standards, a 125-meter baseline was established parallel to the sound wall. Twenty-five temporary sampling transects were placed perpendicular to the baseline using a systematic random sampling method (Figure 2). The line intercept method was used to estimate aerial cover of woody species (Performance Standard 2). Thirty-one 3-meter line-segment sample units were randomly positioned along the sampling transects. To estimate *Phalaris arundinacea* (reed canarygrass) cover, 31 randomly positioned 3-meter point-line sample units (20 points each) were placed along the sampling transects (Performance Standard 1). Photographs were taken to evaluate tree and shrub growth.

Sample size analysis confirmed sufficient sampling had been completed based on site sampling objectives and the desired level of statistical confidence. The sample size equation shown here (below) was used to perform the analysis on data collected. In this equation, the precision level equals half the maximum acceptable confidence interval width multiplied by the sample mean.

$$n = \frac{(z)^2 (s)^2}{(B)^2}$$

- n* = unadjusted sample size
- z* = standard normal deviate
- s* = sample standard deviation
- B* = precision level

For additional details on the methods, see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2007).

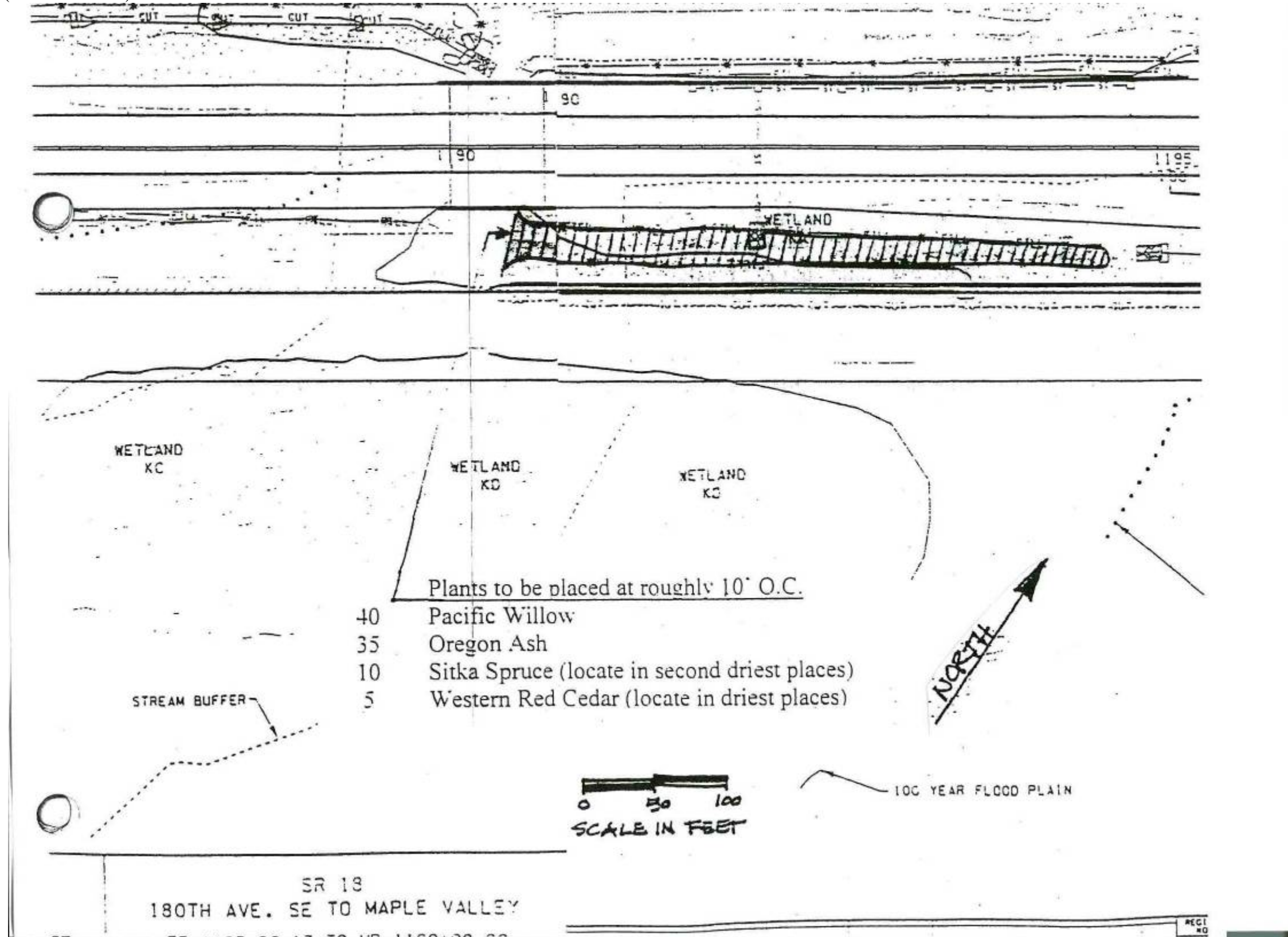
## Appendix 3 – Data Tables

Table. Native Woody Species Wetland KA Site (2007)

<b>Scientific Name</b>	<b>Common Name</b>	<b>Wetland Indicator Status</b>
<i>Spiraea douglasii</i>	hardhack	FACW
<i>Salix sitchensis</i>	Sitka willow	FACW
<i>Cornus sericea</i>	redosier dogwood	FACW
<i>Fraxinus latifolia</i>	Oregon ash	FACW
<i>Salix lucida</i>	Pacific willow	FACW
<i>Picea sitchensis</i>	Sitka spruce	FAC
<i>Thuja plicata</i>	western red cedar	FAC
<i>Populus balsamifera</i>	black cottonwood	FAC

# Appendix 4 – Planting Plan

(Cleveland 2003)



# Appendix 5 – Photo Points

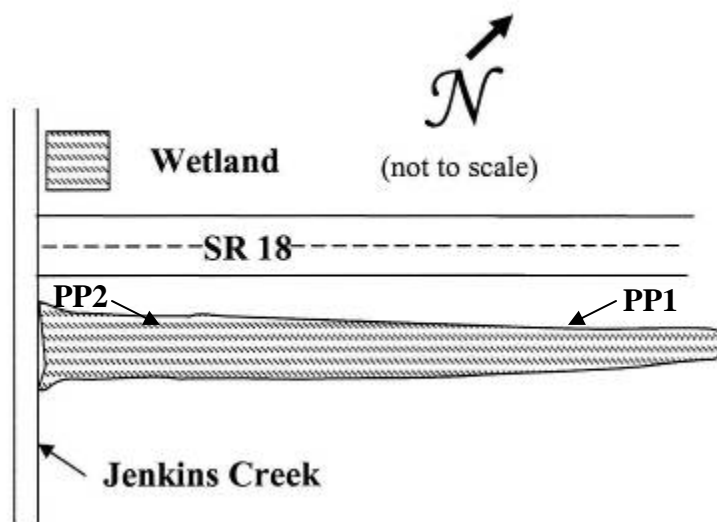
The photographs below were taken from permanent photo-points on August 16, 2007 and document current site development.



**Photo Point 1 (PP1)**



**Photo Point 2 (PP2)**



## Literature Cited

1. Antieau, C. J. and Krueger, P. W. 2001. Final Wetland Mitigation Plan SR 18: Ave SE to Maple Valley, Washington (MP 12.57 to MP 16.55). Washington State Department of Transportation, Northwest Region, Seattle, WA.
2. Brown, B. 2002. SR 18: 180th Ave SE to Maple Valley, Washington, Updated Wetland Mitigation Plan Addendum. Washington State Department of Transportation, Northwest Region, Seattle, WA.
3. Cleveland, C. 2003. SR 18 – 180<sup>th</sup> to Maple Valley Wetland KA Background and Directions (including map). Letter to Jodie Beall dated 24 April 2003.
4. Ecology. See Washington State Department of Ecology
5. United States Army Corps of Engineers. September 6, 2002. Regulatory Branch Letter (Permit Number 1999-4-00171).
6. Washington State Department of Ecology (Ecology). 1997. Washington State Wetlands Identification and Delineation Manual. Publication No. 96-94, Olympia, WA.
7. Washington State Department of Transportation (WSDOT) WSDOT Wetland Mitigation Site Monitoring Methods (30 November 2007). <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>