

**SR 9 Widening: SR 522 to 212<sup>th</sup> Street Stage 2  
(MP0.0 to MP1.83) (Whistle Creek)  
Mitigation Site**

**USACE IP 200401089**

**Northwest Region**

**2010 MONITORING REPORT**

**Wetland Assessment and Monitoring Program**

*Issued March 2011*



Environmental Services Office

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# SR 9 Widening: SR 522 to 212<sup>th</sup> Street Stage 2 (MP 0.0 to MP1.83) (Whistle Creek) Mitigation Site

**USACE IP 200401089**

	General Site Information	
	<b>USACE IP Number</b>	200401089
	<b>Mitigation Location</b>	Near SR 9, off of Woodinville-Snohomish Road, Snohomish County
	<b>LLID Number</b>	1221420478028
	<b>Construction Date</b>	2005
	<b>Monitoring Period</b>	2007-2016
	<b>Year of Monitoring</b>	4 of 10
	<b>Type of Project Impact</b>	Buffer
	<b>Area of Project Impact</b>	3.28 acres
	<b>Type of Mitigation</b>	Buffer Enhancement
<b>Area of Mitigation</b>	3.3 acres	

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## Summary of Monitoring Results and Management Activities (2010)

Performance Standards	2010 Results <sup>1</sup>	Management Activities
Less than 15% cover by Snohomish County Noxious Weeds and specified invasive species in the forested wetland	Less than 1% cover	Manual weed control and herbicide application occurred in July, August, September, October of 2010.
Less than 15% cover by Snohomish County Noxious Weeds and specified invasive species in the upland buffer	2% cover	Manual weed control and herbicide application occurred in July, August, September, October of 2010.
Sixty percent cover by woody species in the forested wetland	95% cover (CI <sub>80%</sub> = 84-100%)	
Four native woody species will each have at least five percent cover in forested wetland	7 native woody species with more than 5% cover	
No more than 30 percent cover by red alder in the forested wetland	17% cover (CI <sub>80%</sub> = 9-26%)	
Sixty percent cover by woody species in upland buffer	85% cover (CI <sub>90%</sub> = 78-91%)	
Four native woody species will each have at least five percent cover in upland buffer	7 native woody species with more than 5% cover	

## Report Introduction

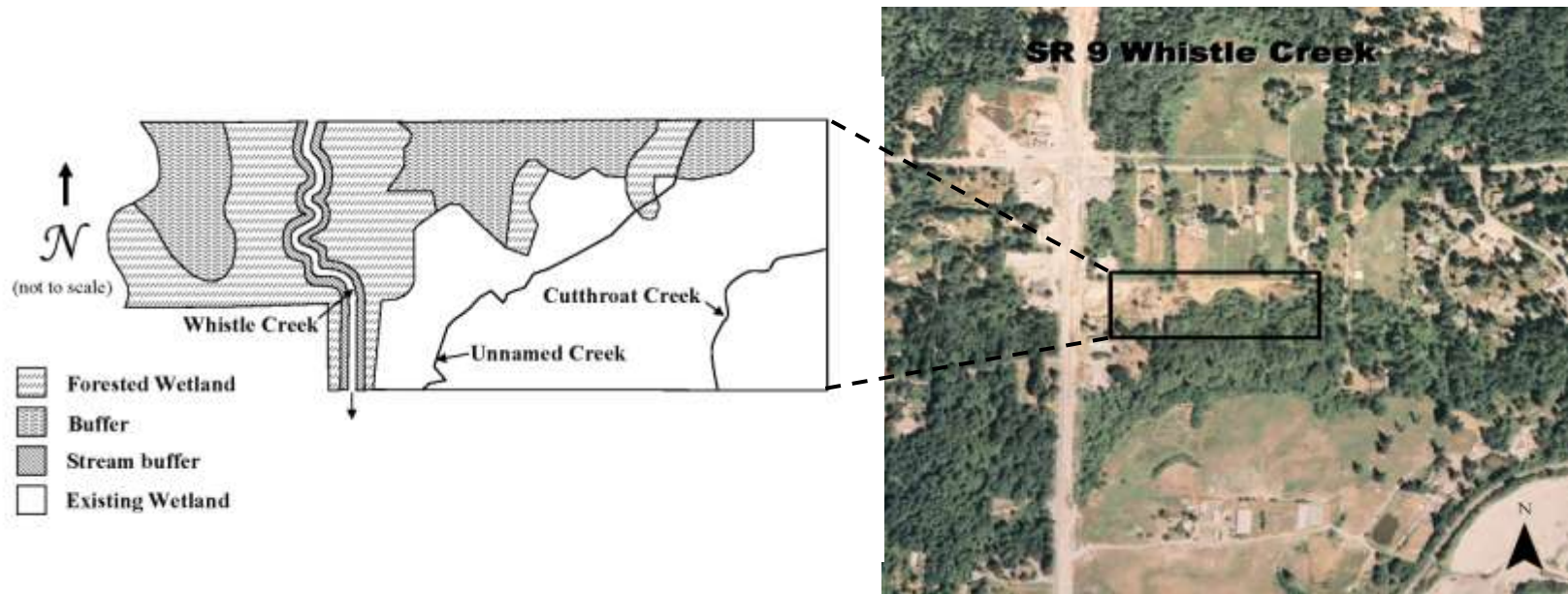
This report summarizes final-year (Year-10) monitoring activities at the State Route (SR) 9 Widening: SR 522 to 212<sup>th</sup> Street Stage 2 (MP0.0 to MP 1.83) (Whistle Creek) Mitigation Site. The site is in Year-4 of 10 in the monitoring schedule and would not normally be have a formal report required. This is the second year this site has met the final year performance standards. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site success. Monitoring activities included vegetation surveys and photo-documentation on August 9<sup>th</sup> and 10<sup>th</sup>.

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<sup>1</sup> Estimated values are presented with their corresponding statistical confidence interval. For example, 95% cover (CI<sub>80%</sub> = 84-100%) means we are 80% confident that the true aerial cover value is between 84% and 100%.

## What is the SR 9 Whistle Creek Mitigation Site?

This 3.3-acre mitigation site (Figure 1) located east of SR 9 includes wetland, stream, and buffer enhancement areas. For regulatory purposes, the enhancement of on-site wetland areas will mitigate for buffer impacts. The site was developed as one of three mitigation sites to compensate for unavoidable wetland, stream, and buffer impacts due to highway capacity and safety improvements along SR 9. Native plantings will enhance fish and wildlife habitat, provide food chain support, and increase water quality functions at the mitigation site.



**Figure 1 Site Sketch**

The SR 9 Whistle Creek Mitigation Site includes areas of enhanced forested wetland and upland buffer. Enhancements along Whistle Creek include riparian plantings, widening the channel and added meanders, gravel substrate, and large woody debris (LWD) to the creek.

## What are the performance standards for this site?

### Performance Standard 1

Snohomish County Noxious Weeds including reed canary grass, non-native blackberries, Scotch broom, Japanese knotweed, and purple loosestrife will not exceed 15 percent coverage in the forested wetland.

### Performance Standard 2

Snohomish County Noxious Weeds including reed canary grass, non-native blackberries, Scotch broom, Japanese knotweed, and purple loosestrife will not exceed 15 percent coverage in the upland buffer.

### Performance Standard 3

Sixty percent cover by woody species in the forested wetland.

### Performance Standard 4

Four native woody species will each have at least five percent cover in the forested wetland.

### Performance Standard 5

No more than 30 percent cover by red alder (*Alnus rubra*) in the forested wetland, excluding existing trees over twenty-five feet tall.

### Performance Standard 6

Sixty percent cover by woody species in the upland buffer.

### Performance Standard 7

Four native woody species will each have at least five percent cover in the upland buffer.

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 2 shows the planting plan (Hafs 2004).

## How were the performance standards evaluated?

The non-native invasive species cover in both zones was addressed qualitatively due the low amount present (Performance Standards 1, 2).

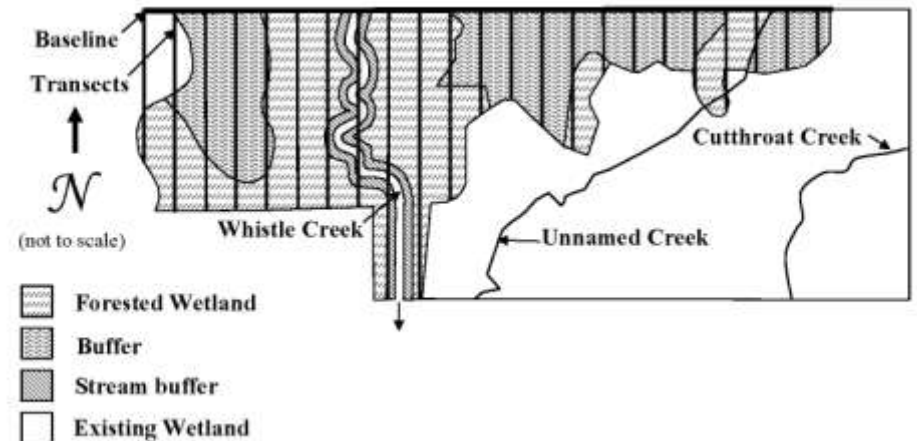
To assess vegetation standards, a 296-meter baseline was established on the northern border of the site. Fifteen temporary sampling transects were placed perpendicular to the baseline using a restricted random sampling method (Figure 2). Aerial cover of woody species in the forested wetland and the upland buffer (Performance Standards 3, 4, 5, 6, 7) were assessed using the line intercept method. Seven 15-meter line-segment sample units were randomly positioned along the sampling transects in the forested wetland and thirteen 15-meter line segment sampling units in the upland buffer.

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 (Performance Standards 3, 5, and 6). In this equation, the precision level ( $B$ ) 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 2008).



**Figure 2 Site Sampling Design (2010)**

## Is this site a success?

The Whistle Creek Mitigation site is currently in Year-4 of 10 in the monitoring schedule and has developed dense and diverse upland buffer and forested wetland communities that are functioning as a buffer to the streams on site. Year-10 performance standards have been evaluated and exceeded for two years in a row.

The high level of woody cover and the multiple strata present in the forested wetland indicate the following functions are present on site: stream shading, wildlife habitat, future source of large woody debris (LWD), transfer of nutrients, and water quality improvement. Species that provide wildlife food sources, such as roses (*Rosa* spp), thimbleberry (*Rubus parviflorus*), red elderberry (*Sambucus racemosa*), and salmonberry (*Rubus spectabilis*) are thriving. The conifers planted in the upland buffer intended to provide a future source of LWD are present and thriving as well.

Many species of birds have been observed onsite including sapsuckers feeding on willow spp. Small mammals such as rabbits and moles were also observed.

Results for Performance Standards 1 and 2

(Less than 15% cover by non-native invasive species in the forested wetland and the upland buffer):

Cover of non-native invasive species in the forested wetland is qualitatively estimated at less than one percent. Cover of these species is qualitatively estimated at two percent in the upland buffer. Species observed include thistles (*Cirsium* spp.), Himalayan blackberry (*Rubus armeniacus*), and reed canarygrass (*Phalaris arundinacea*). Most of these species were observed along the borders of the site (Photo 1).

Results for Performance Standard 3

(60% cover by woody species in the forested wetland):

Cover of native woody species in the forested wetland is 95% cover (CI<sub>80%</sub> = 84-100%) (Photo 2). The dominant species observed include willows (*Salix* spp.), black cottonwood (*Populus balsamifera* ssp. *Trichocarpa*), salmonberry (*Rubus spectabilis*), and redosier dogwood (*Cornus sericea*). The woody species in this zone range in height from 2.5 to 7.5 meters.

Results for Performance Standard 4

(Four native woody species will each have at least 5% cover in the forested wetland):

Cover of four native woody species in the wetland include willows (*Salix* spp.) at 17 percent, black cottonwood (*Populus balsamifera* ssp. *Trichocarpa*) at 13 percent, salmonberry (*Rubus spectabilis*) at 12 percent, and redosier dogwood (*Cornus sericea*) at nine percent cover.



**Photo 1 Border of the site where weed control occurred (August 2010)**



**Photo 2 Woody cover in the forested wetland (August 2010)**

Results for Performance Standard 5

(No more than 30% cover of red alder in the forested wetland):

The relative cover of red alder (*Alnus rubra*) in the forested wetland is 17% (CI<sub>80%</sub> = 9-26%). The alder in the wetland are not inhibiting the diversity of woody species present.

Results for Performance Standard 6

(60% cover by woody species in the upland buffer):

The cover of woody species in the upland buffer is 85% (CI<sub>90%</sub> = 78-91%). The dominant species in this zone include thimbleberry (*Rubus parviflorus*), red alder (*Alnus rubra*), snowberry (*Symphoricarpos albus*), roses (*Rosa* spp), and Douglas-fir (*Pseudotsuga menziesii*). Species range in height from approximately one to four meters tall (Photo 3).

Results for Performance Standard 7

(Four native woody species will each have at least 5% cover in the upland buffer):

The species in this zone with at least five percent cover include thimbleberry (*Rubus parviflorus*) at 25 percent, red alder (*Alnus rubra*) at 23 percent, snowberry (*Symphoricarpos albus*) at 12 percent, roses (*Rosa* spp) at eight percent, and Douglas-fir (*Pseudotsuga menziesii*) at five percent cover (Photo 4). All species observed display vigorous growth.



**Photo 3 Woody cover in the upland buffer (August 2010)**



**Photo 4 Diversity of species on the wetland/buffer edge (August 2010)**

**What is planned for this site?**

Ongoing weed control is planned through the 2011 growing season. If the site still is achieving final standards in Year-5 (third year in a row), early closeout will be pursued.

# Appendix 1 – Goals and Performance Standards

The following excerpt is from the *SR 9 Widening: SR 522 to 212<sup>th</sup> Street Stage 2 (MP 0.0 to MP 1.83) Conceptual Wetland and Stream Mitigation Report* (WSDOT, 2005). The performance criteria addressed this year are identified in **bold** font.

## GOALS AND OBJECTIVES

### Objective 1: Establish forested wetland

A forested wetland will function as a buffer to the stream and adjacent wetlands. The forested wetland should develop a native forest plant community with a diverse number of native plant species and few non-native species.

### Performance Measures

Year 1, 3, 5 and 7

Snohomish County Noxious Weeds including reed canary grass, non-native blackberries, Scotch broom, Japanese knotweed, and purple loosestrife will not exceed 15 percent coverage. If coverage by native plant species falls below the cover standard noted in the performance measure for this objective, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.

Year 3

The native woody species will maintain a density of four plants per 100 square feet.

Year 5 and 7

Thirty-five (year 5) and fifty (year 7) percent cover by woody species.

Four native woody species will each have at least five percent cover.

No more than 30 percent cover by red alder (*Alnus rubra*), excluding existing trees over twenty-five feet tall.

## Success Standards

### Year 1

100% survival of planted wooded species at the end of the first year plant establishment period. If all dead woody species plantings are replaced, the success standards will be met.

### Year 10

**Snohomish County Noxious Weeds including reed canary grass, non-native blackberries, Scotch broom, Japanese knotweed, and purple loosestrife will not exceed 15 percent coverage. If coverage by native plant species falls below the cover standard noted in the performance measure for this objective, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.**

**Sixty percent cover by woody species.**

**Four native woody species will each have at least five percent cover.**

**No more than 30 percent cover by red alder (*Alnus rubra*), excluding existing trees over twenty-five feet tall.**

## Objective 2: Establish forested upland buffer

Forested buffer areas should develop a native forest plant community with a diverse number of native plant species and few non-native species. WSDOT will monitor and evaluate each area (forested wetland and upland buffer) separately.

## Performance Measures

### Year 1, 3, 5 and 7

Snohomish County Noxious Weeds including reed canary grass, non-native blackberries, Scotch broom, Japanese knotweed, and purple loosestrife will not exceed 15 percent coverage. If coverage by native plant species falls below the cover standard noted in the performance measure for this objective, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.

Year 3

The native woody species will maintain a density of four plants per 100 square feet.

Year 5 and 7

Thirty-five (year 5) and fifty (year 7) percent cover by woody species

Four native woody species will each have at least five percent cover.

## **Success Standards**

Year 1

100% survival of planted wooded species at the end of the first year plant establishment period. If all dead woody species plantings are replaced, the success standards will be met.

**Year 10**

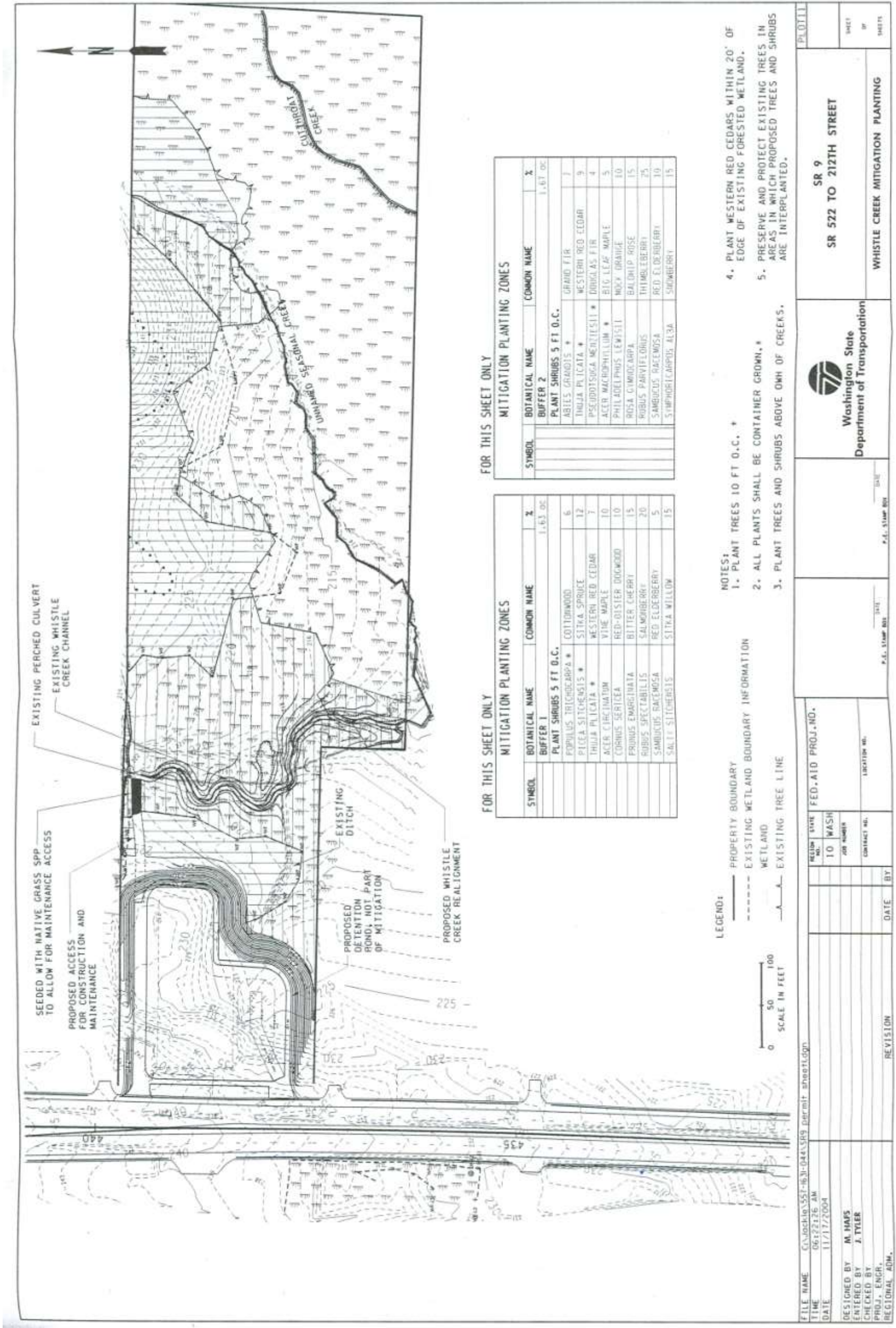
**Snohomish County Noxious Weeds including reed canary grass, non-native blackberries, Scotch broom, Japanese knotweed, and purple loosestrife will not exceed 15 percent coverage. If coverage by native plant species falls below the cover standard noted in the performance measure for this objective, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.**

**Sixty percent cover by woody species**

**Four native woody species will each have at least five percent cover.**

# Appendix 2 – Planting Plan

(Hafs 2004)



FOR THIS SHEET ONLY

**MITIGATION PLANTING ZONES**

SYMBOL	BOTANICAL NAME	COMMON NAME	%
	BUFFER 1		1.63 DC
	PLANT SHRUBS 5 FT O.C.		
	POPULUS TRICHOCARPA *	COTTONWOOD	6
	PICEA SITCHENSIS *	SITKA SPRUCE	12
	THUJA PLICATA *	WESTERN RED CEDAR	7
	ACER CIRCINATUM	VINE MAPLE	10
	CORNUS SERICEA	RED-OSIER DOGWOOD	10
	PRUNUS EMARGINATA	BITTER CHERRY	15
	RUBUS SPECTABILIS	SALMONBERRY	20
	SAMBUCUS RACEMOSA	RED ELDERBERRY	5
	SALIX SITCHENSIS	SITKA WILLOW	15

FOR THIS SHEET ONLY

**MITIGATION PLANTING ZONES**

SYMBOL	BOTANICAL NAME	COMMON NAME	%
	BUFFER 2		1.67 DC
	PLANT SHRUBS 5 FT O.C.		
	ABIES GRANDIS *	GRAND FIR	7
	THUJA PLICATA *	WESTERN RED CEDAR	9
	PSEUDOTSUGA MERTENSII *	DRUGLAS FIR	4
	ACER MACROPHYLLUM *	BIG LEAF MAPLE	5
	PHILADELPHUS LEWISII	HOCKY ORANGE	10
	ROSA GYMNOCARPA	BALDWIN ROSE	15
	RUBUS PARVIFLORUS	THIMBLEBERRY	25
	SAMBUCUS RACEMOSA	RED ELDERBERRY	10
	SYMPHORICARPOS ALBA	SHOWEBERRY	15

LEGEND:

- PROPERTY BOUNDARY
- - - - - EXISTING WETLAND BOUNDARY INFORMATION
- WETLAND
- A — EXISTING TREE LINE

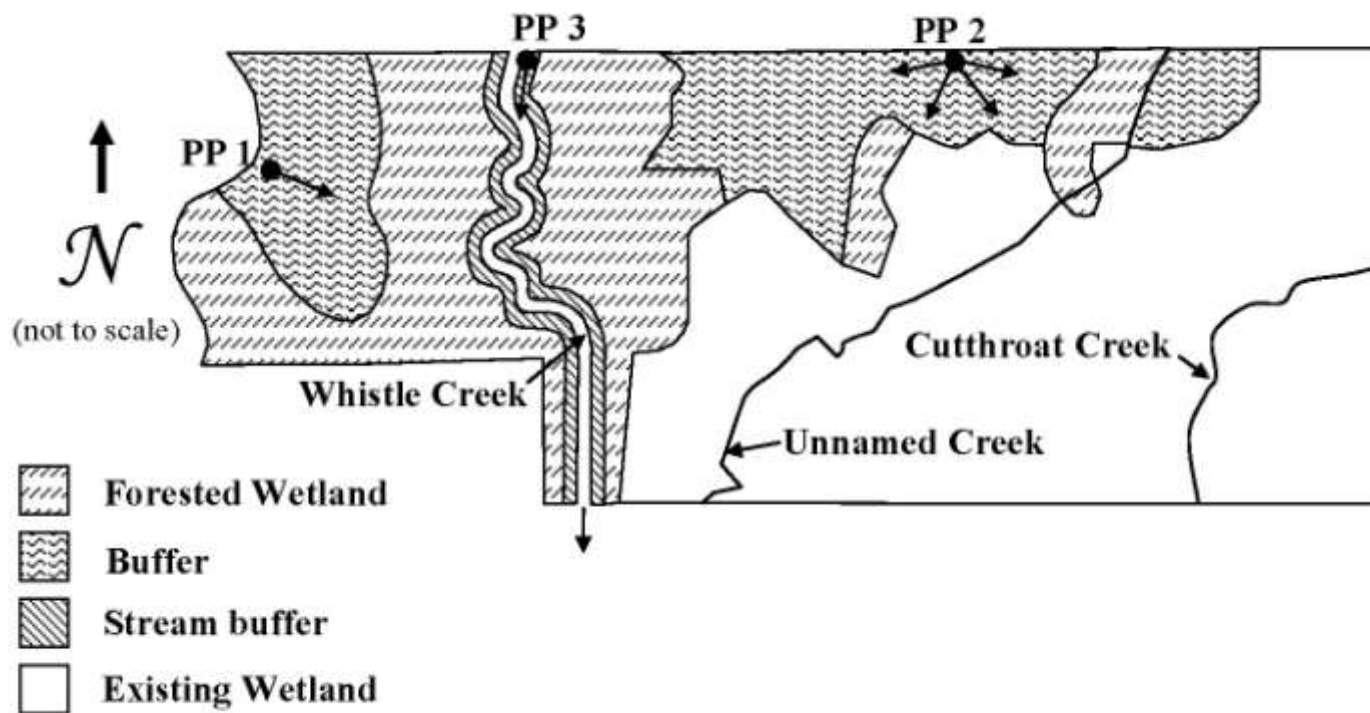
NOTES:

1. PLANT TREES 10 FT O.C. \*
2. ALL PLANTS SHALL BE CONTAINER GROWN. \*
3. PLANT TREES AND SHRUBS ABOVE OWH OF CREEKS.
4. PLANT WESTERN RED CEDARS WITHIN 20' OF EDGE OF EXISTING FORESTED WETLAND.
5. PRESERVE AND PROTECT EXISTING TREES IN AREAS IN WHICH PROPOSED TREES AND SHRUBS ARE INTERPLANTED.

FILE NAME: C:\jockiq\557-hg-044\569 permit sheet1.dgn TIME: 06:22:26 AM DATE: 11/17/2004	REGION: STATE TO WASH JOB NUMBER CONTRACT NO. LOCATION NO.	FEDERAL PROJ. NO. REVISION DATE BY	 <b>Washington State</b> Department of Transportation	SR 9 SR 522 TO 212TH STREET WHISTLE CREEK MITIGATION PLANTING	SHEET OF SHEETS
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# Appendix 3 – Photo Points

## Photo Point Map



The photographs below were taken from permanent photo-points on August 10, 2010 and document current site development.



**Photo Point 1**



**Photo Point 2a**



**Photo Point 2b**



**Photo Point 2c**

DRAFT



**Photo Point 2d**



**Photo Point 3**

## Literature Cited

1. Ecology. See Washington State Department of Ecology.
2. United States Army Corps of Engineers. 2004. Department of the Army IP Number 200401089.
3. Washington State Department of Ecology (Ecology). 1997. Washington State Wetlands Identification and Delineation Manual. Publication No.96-94, Olympia, WA.
4. Washington State Department of Transportation (WSDOT), Northwest Region Environmental Services. 2005. SR 9 Widening: SR 522 to 212<sup>th</sup> Street Stage 2 (MP 0.0 to MP 1.83) Final Conceptual Mitigation and Stream Report. Washington State Department of Transportation, Northwest Region, Seattle, WA.
5. Washington State Department of Transportation (WSDOT) WSDOT Wetland Mitigation Site Monitoring Methods (12 June 2008). <http://www.wsdot.wa.gov/NR/rdonlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>