

**SR 202 Improvement Project:
SR 520 to Sahalee Way NE Wetland Mitigation Site #2
(Happy Valley)
USACE IP 200400024**

C7010, C7030, OL3498

Northwest Region

2010 MONITORING REPORT

Wetland Assessment and Monitoring Program

Issued March 2011



**Washington State
Department of Transportation**

Environmental Services Office

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SR 202 Improvement Project: SR 520 to Sahalee Way NE Wetland Mitigation Site #2 (Happy Valley)

USACE IP 200400024

	General Site Information			
	USACE IP Number	200400024		
	Mitigation Location	At the intersection of SR 202 and Sahalee Way, King County		
	LLID Number	1220631476556		
	Construction Date	2006-2007		
	Monitoring Period	2008-2017		
	Year of Monitoring	3 of 10		
	Type of Impact	Wetland		Buffer
	Area of Project Impact	Permanent	Indirect	Permanent
		1.47 acres	0.15 acre	4.0 acres
Type of Mitigation	Wetland Establishment	Wetland Enhancement	Buffer Enhancement	
Area of Mitigation¹	5.43 acres	1.72 acres	5.76 acres	

¹Additional wetland acreage provided by SR 202 Sahalee Way (Turple). See Appendix 2.

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Summary of Monitoring Results and Management Activities (2010)

Performance Standards	2010 Results ²	Management Activities
Wetland Hydrology	Not present in all intended areas	
The native woody species will maintain a density of four plants per 100 square feet in scrub-shrub and forested wetland communities and buffer communities	3.8 (CI _{80%} = 3.6-4.1 stems/100 ft ²)	Installed 350 plants in October 2010 in buffer, forested wetland, and scrub-shrub areas.
King County listed Class A weeds and reed canarygrass, non-native blackberries, Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community	8% cover across site (qualitative)	Manual weed control occurred in April, Aug., and Sept. 2010 and Jan. 2011. Herbicide was applied in April, June, and Sept. 2010.
Habitat structures as shown on the plans have been installed	Present	

Report Introduction

This report summarizes third-year (Year-3) monitoring activities at the State Route (SR) 202 Sahalee Way (Happy Valley) Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2010 included vegetation surveys, photo-documentation, and assessments of wetland hydrology. Hydrology visits took place on March 1st, 11th, and April 6th and vegetation surveys occurred on July 26th, 27th, and 28th.

² Estimated values are presented with their corresponding statistical confidence interval. For example, 3.8 (CI_{80%} = 3.6-4.1 stems/100 ft²) means we are 80% confident that the true density value is between 3.6 and 4.1 stems per 100 square feet. .

What is the SR 202 Sahalee Way (Happy Valley) Mitigation Site?

This 16.7 -acre property (Figure 1) contains a new wetland established (formerly called created) on the south side of SR 202, approximately 1.5 miles east of Lake Sammamish. This site was established to partially compensate for the loss of 1.5 acres of wetlands due to road improvements along SR 202. The rest of the mitigation for this project is taking place at SR 202 Sahalee Way NE Wetland Mitigation Site #1 (Turple). The mitigation at these sites is intended to provide the following functions: flood flow alteration, sediment removal, nutrient/toxicant removal, erosion control and shoreline stabilization, production/export of organic matter, general habitat suitability, habitat for aquatic invertebrates, habitat for amphibians, and general fish habitat.

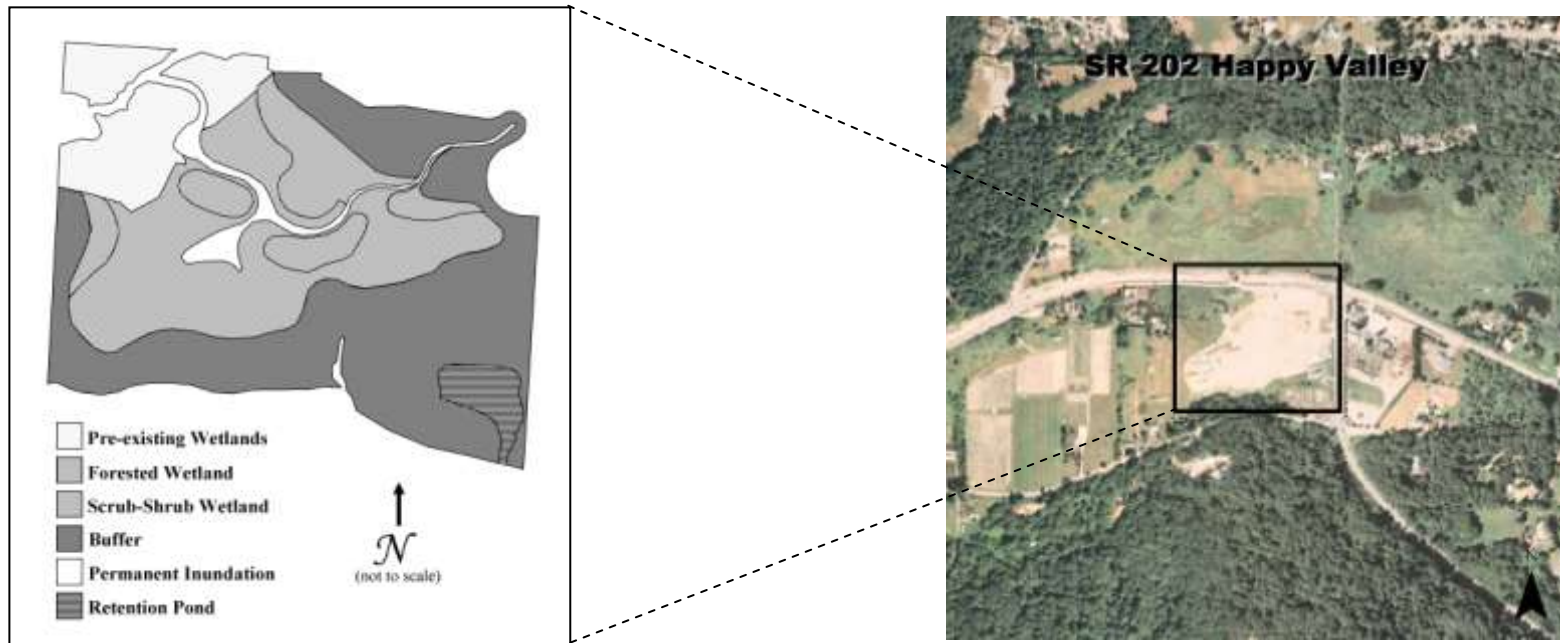


Figure 1 Site Sketch

The SR 202 Sahalee Way Happy Valley Mitigation Site consists of established forested and scrub-shrub wetlands surrounded by upland buffer on all sides but the northwest corner. Evans Creek runs through the northwest corner of the site and an unnamed tributary, designed to function as a backwater channel, runs through the center.

What are the performance standards for this site?

Performance Standard 1

The soils will be saturated to the surface, or standing water will be present in a monitoring well at 12 inches below the surface or less, for a consecutive number of days greater than or equal to 12.5% of the growing season. Wetland hydrology will be determined using indicators of wetland hydrology, as listed in the Washington State Wetlands Identification and Delineation Manual (Ecology publication #96-94).

Performance Standard 2

The native woody species will maintain a density of four plants per 100 square feet in scrub-shrub and forested wetland communities and buffer communities.

Performance Standard 3

King County listed Class A weeds and reed canarygrass, non-native blackberries (*Rubus* sp.), Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community. If coverage by native plant species falls below 80 percent of the success standard, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.

Performance Standard 4

Habitat structures as shown on the plans are in place.

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 3 shows the as-built planting plan (WSDOT 2009).

How were the performance standards evaluated?

To evaluate standards for vegetative cover, a 300-meter baseline was established through the center of the site (Figure 2). Twenty-five sampling transects were randomly placed perpendicular to the baseline. The unequal-area belt transect method was used to determine woody density across the site (Performance Standard 2). The cover of King County Class A weeds and invasive species was estimated qualitatively (Performance Standard 3).

WSDOT staff collected hydrology data using methods described in the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997) (Performance Standard 1). Thirteen permanent hydrology pit locations were established and recorded on a map (Appendix 2). During each monitoring visit, visual observations are made to determine the extent of inundation and surface saturation. Depth and location of standing water is recorded. At each pit location, in the absence of inundation or surface saturation, subsurface observations are made.

A count was conducted to determine the presence of habitat structures (Performance Standard 4).

For additional details on the methods view the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

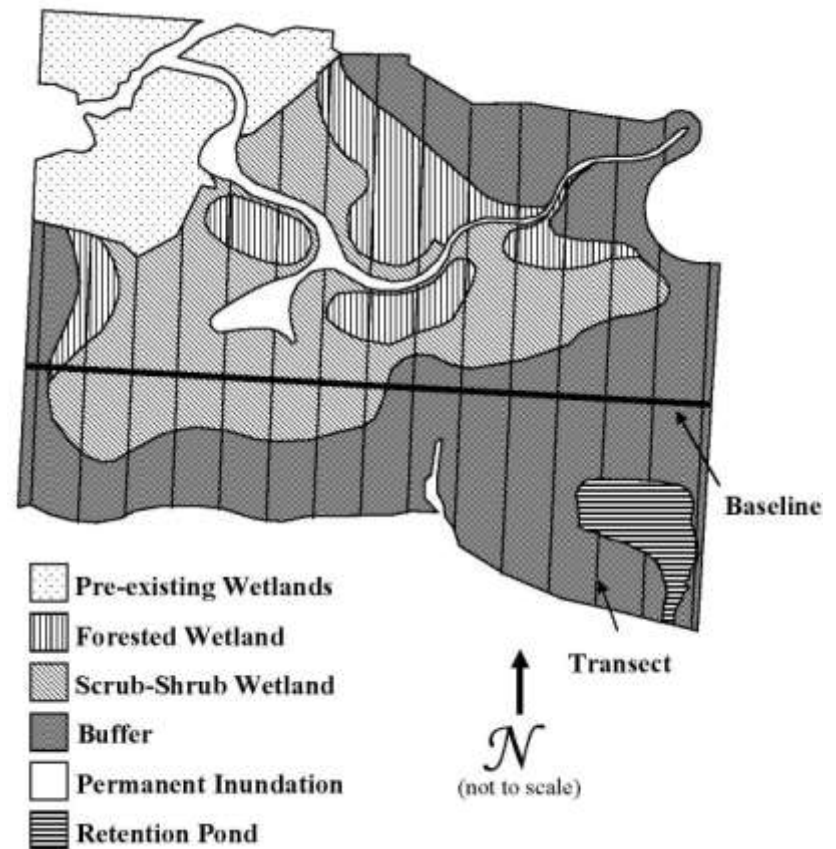


Figure 2 Site Sampling Design (2010)

How is the site developing?

This site is developing along a positive trajectory despite unanticipated changes in hydrology due to nearby beaver activity in Evans Creek. The planted vegetation in the wetland and buffer communities continues to mature and provide habitat for birds, small mammals and fish. Several deer were observed on site during vegetation monitoring.

Twenty avian species were observed utilizing the site in various ways. Three species including Red-tailed Hawk (*Buteo jamaicensis*), Great Blue Heron (*Ardea herodias*), and Osprey (*Pandion haliaetus*), were observed using the raptor perches. Several amphibian species were present on-site.

High emergent cover in the large inundated area likely provides nutrient/toxicant and sediment removal functions while the deciduous shrubs in this zone likely provide for the exportation of organic material. The high cover of willows along the stream banks, provide bank stabilization functions.

Results for Performance Standard 1
(Wetland Hydrology):

Wetland hydrology was not present in all intended areas during the March and April 2010 site visits. Although most intended wetland areas were inundated or saturated to the soil surface during the early part of the growing season (Photo 1), sampling locations in the highest portions of the forested wetlands did not consistently meet the hydrologic criteria. See Appendix 2 for hydrology data and sample pit locations.

Results for Performance Standard 2
(Native woody species will maintain a density of four plants per 100 square feet in scrub-shrub and forested wetland communities and buffer communities)

The density of native woody species across all planted zones is 3.8 (CI_{80%} = 3.6-4.1) plants per 100 square feet. This density value closely approaches the performance measure target. The areas of lowest density are in the portions of the scrub-shrub wetland that are inundated for long periods of time due to beaver activity in Evans Creek. Although woody cover is relatively low in some of these areas, native emergent species have volunteered and filled in the space between woody plants (Photo 2).



Photo 1
Inundation in the scrub-shrub wetland (March 2010)



Photo 2
Woody cover in wetland (July 2010)

Results for Performance Standard 3

(King County listed Class A weeds and reed canarygrass, non-native blackberries, Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community):

The cover of King County listed Class A weeds and the above listed species across the site is qualitatively estimated at eight percent. Cover in all individual plant communities is below the performance standard threshold. The vast majority of this cover is provided by reed canarygrass (*Phalaris arundinacea*) which is present in both wetland and upland planting areas. Other invasive species observed on site include Himalayan blackberry (*Rubus armeniacus*), Scotch broom (*Cytisus scoparius*), and bull thistle (*Cirsium vulgare*). These species were present primarily in upland areas. Weed control will continue in 2011.

Results for Performance Standard 4

(Habitat structures as shown on the plans are in place):

All habitat structures are in place as shown on the plans. The performance measure has been met.

What is planned for this site?

Replanting occurred throughout the site in October of 2010. Weed control will continue through the 2011 growing season. Additional replanting will occur as necessary to meet the performance standards.

In areas where the native grass mix seems to be out-competing the woody species, we cleared a 2-foot radius ring around woody plants and mulched the entire area with bark mulch to conserve soil moisture.

Appendix 1 – Goals and Performance Standards

The following excerpt is from the *SR 202 Improvement Project: SR 520 to Sahalee Way NE* (Entranco, Inc. 2005). This excerpt refers to two separate mitigation sites: Happy Valley (covered in this report) and Turple (not covered in this report). The performance criteria addressed this year are identified in **bold** font.

Regulatory Compliance

The proposed mitigation sites will be monitored for ten years to demonstrate the provision of intended functions. Goals describe the overall intent of mitigation efforts and objectives describe individual components of the mitigation sites in detail. Interim performance measures are used to guide management of the mitigation sites. Success standards are thresholds to be measured during the final year of the monitoring period that demonstrate each site has complied with regulatory requirements and is providing the intended functions. Contingency plans describe what actions can be taken to correct site deficiencies.

Goals

The goal of the proposed compensatory mitigation is to replace wetlands, acreage, and functions lost due to wetland impacts associated with the proposed project. The proposed mitigation intends to create riverine wetlands that contain forested and scrub-shrub wetland communities.

Functions and Values

The created and enhanced wetlands are anticipated to provide similar functions as those affected by the project. The functions provided by the mitigation wetlands are listed below and summarized in Table 9. The areas (in acreage) for the related functions are calculated from the Happy Valley Mitigation Plans (Appendix A) and the Turple Mitigation Plans (Appendix B) using the wetland Functions Characterization Tool for Linear Projects (WSDOT 2000). The habitat for aquatic invertebrates, amphibians, and fish are calculated based on the approximate area of the backwater channels at the respective sites. All other functions are calculated based on total enhanced and created wetland areas at the respective sites with the exception of the general habitat suitability function, which includes the enhanced buffers as well.

Table 9			
Wetland Functions and Values Provided by Mitigation Sites			
Function/Value	Happy Valley (Ac)	Turple (Ac)	Total Area (Ac)
Flood Flow Storage and Alteration	8.47	4.55	13.02
Sediment Removal	8.47	4.55	13.02
Nutrient/Toxicant Removal	8.47	4.55	13.02
Erosion Control & Shoreline Stabilization	8.47	4.55	13.02
Production & Export of Organic Matter	8.47	4.55	13.02
General Habitat Suitability	15.06	6.19	21.25
Habitat for Aquatic Invertebrates	0.75	0.45	1.20
Habitat for Amphibians	0.75	0.45	1.20
General Fish Habitat	0.57	0.45	1.02

Flood Flow Alteration

The mitigation sites are adjacent to existing roadways and are within the 100-year floodplain of Evans Creek. The on-site excavation required to comply with FEMA compensatory flood storage needs will provide greater flood storage than currently exists. Installing woody and herbaceous vegetation and incorporating organic soil amendments will reduce precipitation runoff over the current open pasture.

Sediment Removal

The mitigation sites are adjacent to roadways that may provide a source of sediments. The entire mitigation area will be seeded with a grass mixture following grading operations. Forested and scrub-shrub vegetation will be installed in the first planting season following seeding to provide sediment removal. Current out-of-use livestock grazing pastures have limited this function on the property.

Nutrient/Toxicant Removal

The mitigation sites are adjacent to existing roadways that provide a source of toxicants. A site design that reduces and retains surface water flows, incorporates organic materials into the soil, and increases herbaceous and woody plant cover will provide nutrient/toxicant removal. Current out-of-use livestock grazing pastures have limited this function on the property.

Erosion Control and Shoreline Stabilization

The mitigation sites will be excavated to provide off-channel backwaters and an unnamed tributary to Evans Creek will be relocated on the Happy Valley site. These efforts will cause the wetland complex to experience high-flow velocities during storm events. The sites will be planted with a dense energy-absorbing cover of herbaceous and deciduous woody vegetation that can withstand and reduce these velocities to limit sedimentation downstream of the mitigation areas.

Production/Export of Organic Matter

The mitigation sites will be planted with a dense cover of herbaceous and deciduous woody vegetation that will provide a reliable source of decomposed and/or suspended organic material. The site will be excavated to allow backwaters to flow out with Evans Creek receding floodwaters.

General Habitat Suitability

The mitigation sites are comprised of three Cowardin classes, and will contain five wetland and three upland vegetative communities. These plant communities contain a variety of native species known to support a diversity of wildlife. The plant communities will be interspersed to increase edge habitat. The site will be graded to include areas of permanently open water (backwater channels) and seasonally saturated soils.

Habitat for Aquatic Invertebrates

The mitigation sites will provide complex habitat structure and an assortment of water regimes, which will include off-channel backwaters with permanent open water and intermittent flows from an unnamed tributary to Evans Creek. Also, the mitigation areas will contain several categories of woody debris (snags, stumps, and logs) and a number of plant strata associated with the three Cowardin classes occurring across the sites.

Habitat for Amphibians

The mitigation site will be excavated to provide off-channel backwaters to Evans Creek. Finish grade elevations have been set to achieve positive drainage. This will reduce the possibility of permanent standing water within the wetland complex and, therefore,

reduce the likelihood of bullfrog breeding. Also, downed logs and thin-stemmed vegetation in the backwater channels will enhance amphibian habitat.

General Fish Habitat

The mitigation sites will be excavated to provide off-channel backwaters to Evans Creek – a salmonid-bearing water. These backwaters will be permanently inundated relative to Evans Creek providing “wall-based channels” within the wetland complex that have egress channels for salmon refugia. These backwaters may support aquatic invertebrates and provide detrital matter from overhanging vegetation necessary for salmon rearing.

Objectives, Interim Performance Measures, and Success Standards

The following list describes the thresholds that will determine site success and guide management.

Objective 1 – Hydrology

The mitigation sites will provide ground or surface water inundation or saturation sufficient to support the wetland sites.

Interim Performance Measures

Years 1-10

- **The soils will be saturated to the surface, or standing water will be present in a monitoring well at 12 inches below the surface or less, for a consecutive number of days greater than or equal to 12.5% of the growing season. Wetland hydrology will be determined using indicators of wetland hydrology, as listed in the Washington State Wetlands Identification and Delineation Manual (Ecology publication #96-94).**

Year 5

- The wetland areas will be delineated using current methodology to assure that the mitigation sites contain 8.07 acres of new wetlands in total.

Success Standard

Year 10

- The wetland areas will be delineated using current methodology to assure that the mitigation sites contain 8.07 acres of new wetlands in total.

Objective 2 – Vegetation

The mitigation sites will include a total of 8.07 acres of new scrub-shrub and forested wetland vegetation, 2.52 acres of enhanced wetland vegetation, and 8.07 acres of enhanced upland buffer vegetation.

Interim Performance Measure

Year 1

- The vegetation will achieve 100 percent survival of planted woody species at the end of the first year plant establishment period. If all dead woody species plantings are replaced, the performance measure will be met.
- King County listed Class A weeds and reed canarygrass, non-native blackberries (*Rubus* sp.), Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community. If coverage by native plant species falls below 80 percent, 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 in scrub-shrub and forested wetland communities and buffer communities.**
- **King County listed Class A weeds and reed canarygrass, non-native blackberries (*Rubus* sp.), Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community. If coverage by native plant species falls below 80 percent of the success standard, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.**

Year 5

- Native facultative or wetter woody species will achieve 35 percent coverage in each scrub-shrub and forested wetland community. Native colonizing vegetation will be counted in this coverage calculation.
- Native upland buffer woody species will achieve 15 percent coverage in each upland buffer community. Native colonizing vegetation will be counted in this coverage calculation.
- King County listed Class A weeds and reed canarygrass, non-native blackberries (*Rubus* sp.), Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community. If coverage by native plant species falls below 80 percent of the success standard, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.
- Three native facultative or wetter vegetation species will achieve 5 percent or greater relative cover in the scrub-shrub wetland community.
- Three native facultative or wetter vegetation species will achieve 5 percent or greater relative cover in each forested wetland community.
- Relative cover of red alder and black cottonwood will be less than 30 percent for each species in the wetland creation and enhancement areas.
- Three native upland vegetation species will achieve 5 percent relative cover in each buffer community.

Year 7

- Native facultative or wetter woody species will achieve 50 percent relative cover in each scrub-shrub and forested wetland community. Native colonizing vegetation will be counted in this coverage calculation.
- Native upland buffer woody species will achieve 3 percent coverage in each upland buffer community. Native colonizing vegetation will be counted in this coverage calculation.
- King County listed Class A weeds and reed canarygrass, non-native blackberries (*Rubus* sp.), Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community. If coverage by native plant species falls below 80 percent of the success standard, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.
- Three native facultative or wetter vegetation species will achieve 6 percent or greater relative cover in the scrub-shrub wetland community.

- Three native facultative or wetter vegetation species will achieve 6 percent or greater relative cover in each forested wetland community.
- Relative cover of red alder and black cottonwood will be less than 30 percent for each species in the wetland creation and enhancement areas.
- Three native upland vegetation species will achieve 6 percent relative cover in each buffer community.

Success Standards

Year 10

- Native facultative or wetter woody species will achieve 75 percent coverage in each scrub-shrub and forested wetland community. Native colonizing vegetation will be counted in this coverage calculation.
- Native upland buffer woody species will achieve 50 percent coverage in each upland buffer community. Native colonizing vegetation will be counted in this coverage calculation.
- King County listed Class A weeds and reed canarygrass, non-native blackberries (*Rubus* sp.), Scot's broom, Japanese knotweed, and purple loosestrife will not exceed 20 percent coverage in each forested, scrub-shrub, and emergent wetland and upland buffer community. If coverage by native plant species falls below 80 percent of the success standard, then contingency actions shall be implemented and the invasive species list shall be evaluated to determine if additional invasive species should be controlled.
- Three native facultative or wetter vegetation species will achieve 8 percent relative cover in the scrub-shrub wetland community.
- Three native facultative or wetter vegetation species will achieve 8 percent relative cover in each forested wetland community.
- Relative cover of red alder and black cottonwood will be less than 30 percent for each species in the wetland creation and enhancement areas.
- Three native upland vegetation species will achieve 8 percent relative cover in each buffer community.

Objective 3 – Wildlife

Wildlife cover and forage availability for birds and mammals should increase substantially. The addition of 6 floodplain log jams, 12 tree overhangs with branched crowns, 11 snags, 8 brush piles, 10 habitat logs with rootwads, and 5 rock piles increase habitat diversity and structural complexity in newly vegetated areas. Overall, creating emergent, scrub-shrub, and forested wetland communities and enhancing upland buffer areas should provide feeding, breeding, and nesting habitat for passerines, raptors, waterfowl, shorebirds, small and large mammals, salamanders, frogs, toads, snakes, and turtles.

Interim Performance Measure

Year 1

- Habitat structures as shown on the plans have been installed.

Year 3

- **Habitat structures as shown on the plans are in place.**
- **Vegetation standards in Objective 2 apply.**

Year 7

- Vegetation standards in Objective 2 apply.

Success Standards

Year 10

- Vegetation standards in Objective 2 apply.

Appendix 2 – Data Tables

Table 1 – Proposed Wetland Mitigation Areas for SR 202 Improvement Project: SR 520 to Sahalee Way NE

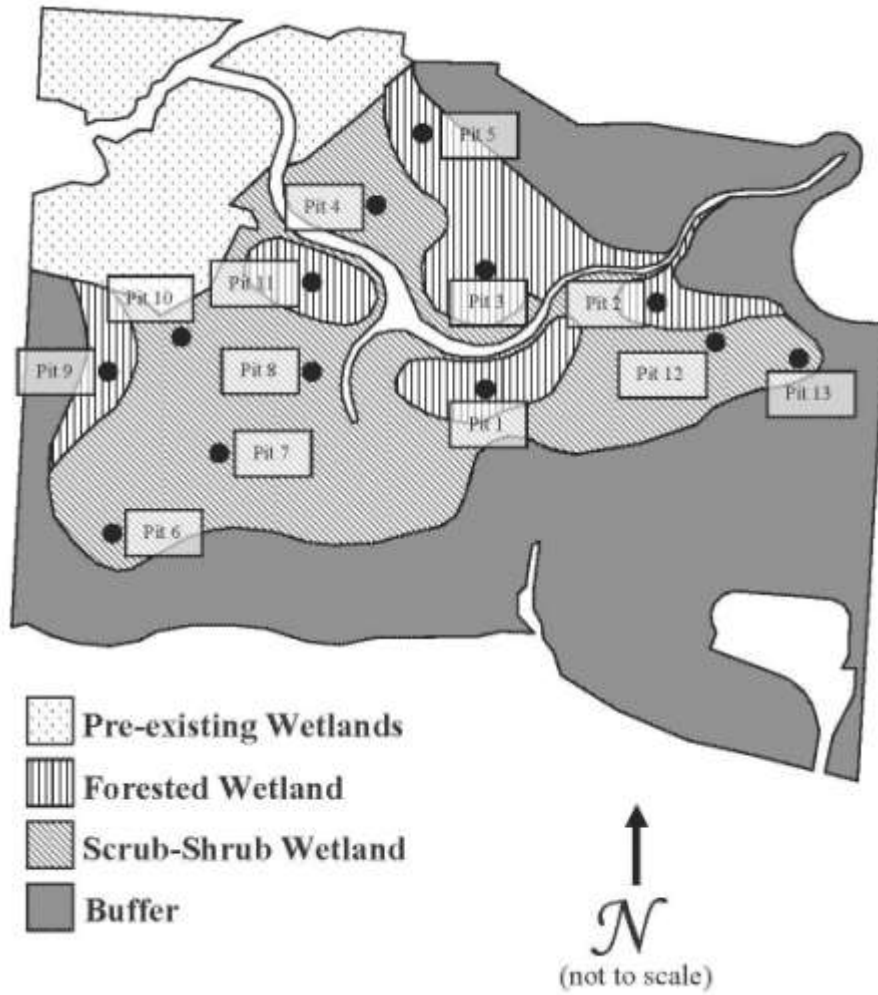
Site	Mitigation Type	Area (acres)
Happy Valley	Established wetland	5.43
	Enhanced buffer	5.76
	Enhanced wetland	1.72
Turple	Established wetland	2.64
	Enhanced buffer	2.31
	Enhanced wetland	0.80

Table 2 - Hydrology Observations (2010)

Date	Surface Observations	Subsurface Observations	
3/1/2010	Hydrology not observed in all intended areas. The SW area of the site is wetter than intended. The NE side of the backwater in the PSS/PFO is dry. No water was observed and some of the FACW vegetation is struggling.	Pit 1	None. Shovel refusal at 15"
		Pit 2	None. Shovel refusal at 13"
		Pit 3	None. Shovel refusal at 12"
		Pit 4	None
		Pit 5	Not located or needed
		Pit 6	Standing water at 12" and saturation at 7" after 26 minutes
		Pit 7	Standing water at 5"
		Pit 8	Inundated to 2.5"
		Pit 9	None
		Pit 10	Standing water at 12" and saturation at 7" after 20 minutes
		Pit 11	Standing water at 10" and saturation at 4"
		Pit 12	saturated to the surface
		Pit 13	saturated to the surface
3/11/2010	The PFO areas are the only areas where hydrology is not present.	Pit 1	Standing water at 14"
		Pit 2	Standing water at 9"
		Pit 3	Standing water at 15.5" after 30 min
		Pit 4	None
		Pit 5	N/A
		Pit 6	Standing water at 12" and saturation at 8" after 18 min
		Pit 7	Standing water at 8.5"
		Pit 8	Inundated to 5"
		Pit 9	Standing water at 15" and saturation at 10"
		Pit 10	Saturated to the surface
		Pit 11	Standing water at 11"
		Pit 12	Saturated to the surface
		Pit 13	Saturated to the surface

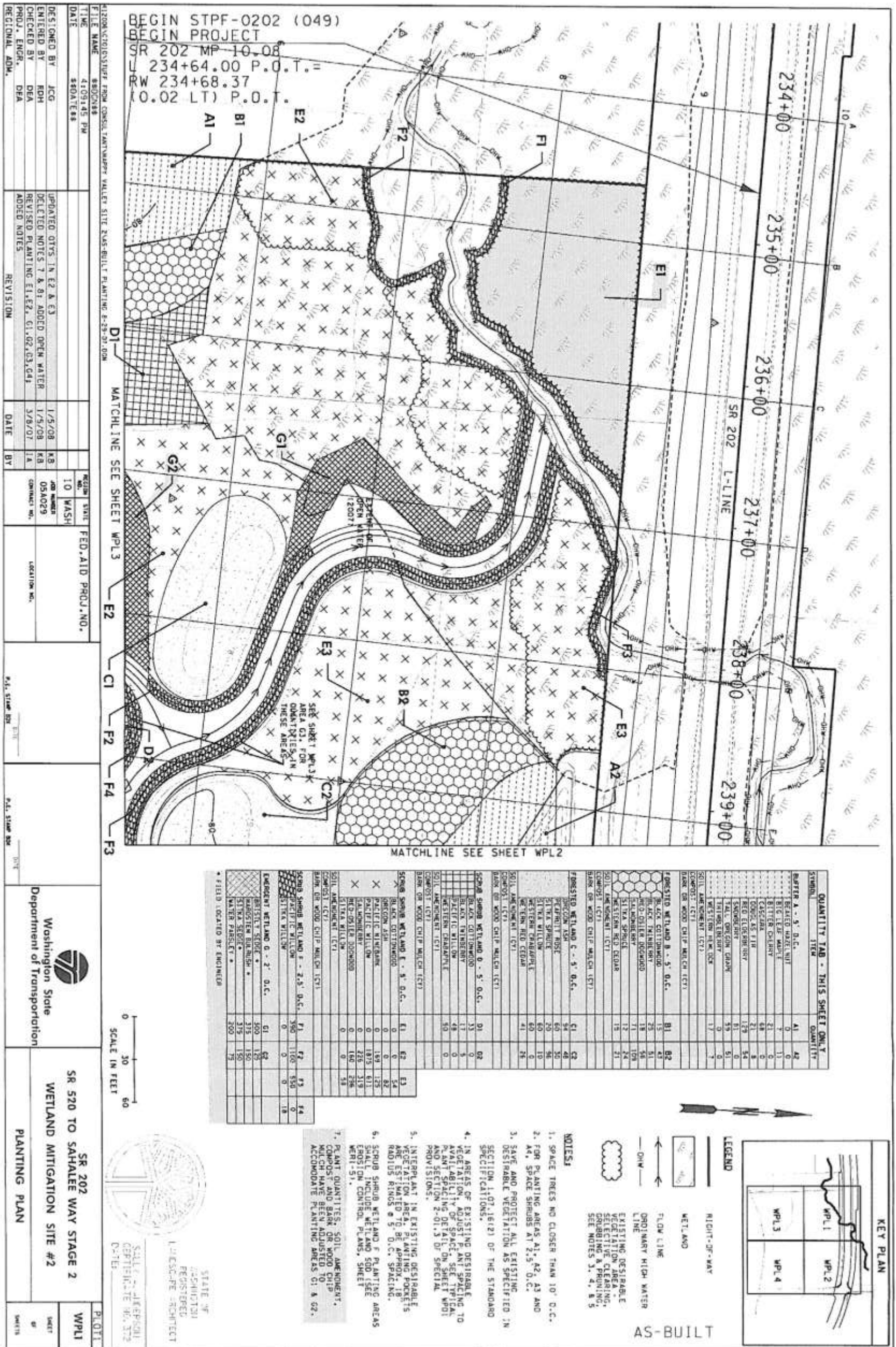
Date	Surface Observations	Subsurface Observations	
4/6/2010	Hydrology is present in most of the intended areas. The two small FO that are at a slightly higher elevation are the only areas that lacked indicators. These are the same areas that were excluded from this year's delineation.	Pit 1	none
		Pit 2	Standing water at 9"
		Pit 3	none
		Pit 4	Standing water at 12"
		Pit 5	N/A
		Pit 6	Standing water at 7"
		Pit 7	standing water at 6"
		Pit 8	inundated to 7"
		Pit 9	standing water at 18"
		Pit 10	standing water at 11"
		Pit 11	standing water at 9"
		Pit 12	Saturated to the surface
		Pit 13	inundated to 1"

Hydrology Pit Locations



Appendix 3 – As built Planting Plan

(WSDOT 2009)



412005NCT020102SRIFR.FM CONSON UNIVERSITY VALLEY SITE TRANSFER PLANTING 8-29-01.DGN

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 DATE: 8/8/08

DESIGNED BY: JCG
 ENTERED BY: RDH
 CHECKED BY: DEA
 PROJ. ENGR. DEB
 REGIONAL ADM.

UPDATED DTYS IN A61 DELETED NOTE 7
 REVISION: 1/5/08
 DATE: 1/5/08
 BY: KB

WASH STATE: FED-AID PROJ. NO.
 I.D. WASH: 05A029
 CONTRACT NO.:
 LOCATION NO.:

P.L. Stamp Box

Washington State
 Department of Transportation

SR 202 TO SAHALEE WAY STAGE 2
 WETLAND MITIGATION SITE #2
 PLANTING PLAN

PILOT 4
 SHEET 4
 SHEETS



QUANTITY TAB - THIS SHEET ONLY

SYMBOL	ITEM	QUANTITY
BUFFER A - 5' O.C.	SALEAD HAZELHUT	46
	SIG. LEAF MAPLE	183
	BITTER CHERRY	187
	PASCALIA	190
	DOGWOOD	191
	RED EUCALYPTUS	249
	SNOWBERRY	187
	PALE GREEN GRASS	353
	TRIFOLIUM	187
	WESTERN HEMLOCK	210
	WESTERN RED CEDAR	6
	SOIL AMENDMENT (CY)	6
	COMPOST (CY)	6
	RAIL OR WOOD CHIP MULCH (CY)	6
	TONS STEER WETLAND C - 5' O.C.	67
	SECTION 179	76
	SECTION 180	0
	SECTION 181	0
	SECTION 182	0
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	SECTION 275	0
	SECTION 276	0
	SECTION 277	0
	SECTION 278	0
	SECTION 279	0
	SECTION 280	0
	SECTION 281	0
	SECTION 282	0
	SECTION 283	0
	SECTION 284	0
	SECTION 285	0
	SECTION 286	0
	SECTION 287	0
	SECTION 288	0
	SECTION 289	0
	SECTION 290	0
	SECTION 291	0
	SECTION 292	0
	SECTION 293	0
	SECTION 294	0
	SECTION 295	0
	SECTION 296	0
	SECTION 297	0
	SECTION 298	0
	SECTION 299	0
	SECTION 300	0

EMERGENT WETLAND 5' - 2' O.C.

SYMBOL	ITEM	QUANTITY
	BRISTLE WOOD	79
	HARDY BULBUSH	97
	SITKA WILLOW	28
	WATER PARSLEY	28
	FOR QUANTITIES, SEE SHEET WPL3	

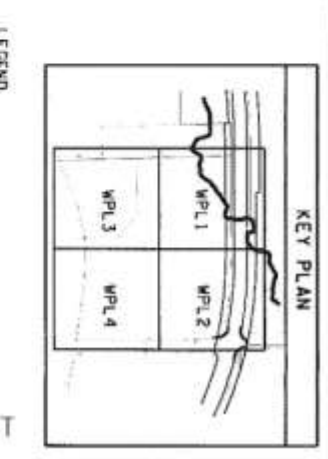
SCOUR SHRUB WETLAND 5' - 5' O.C.

SYMBOL	ITEM	QUANTITY
	BLACK COTTONWOOD	7
	AMERICAN ASH	17
	PACIFIC SIBIRIAN	114
	RED-LEAFED DOGWOOD	160
	SALBURN	90
	SALBURN	40
	SITKA WILLOW	46
	FOR QUANTITIES, SEE SHEET WPL3	

SCOUR SHRUB WETLAND F PLANTING AREAS CONTROL PLANS, SHEET WPL-511

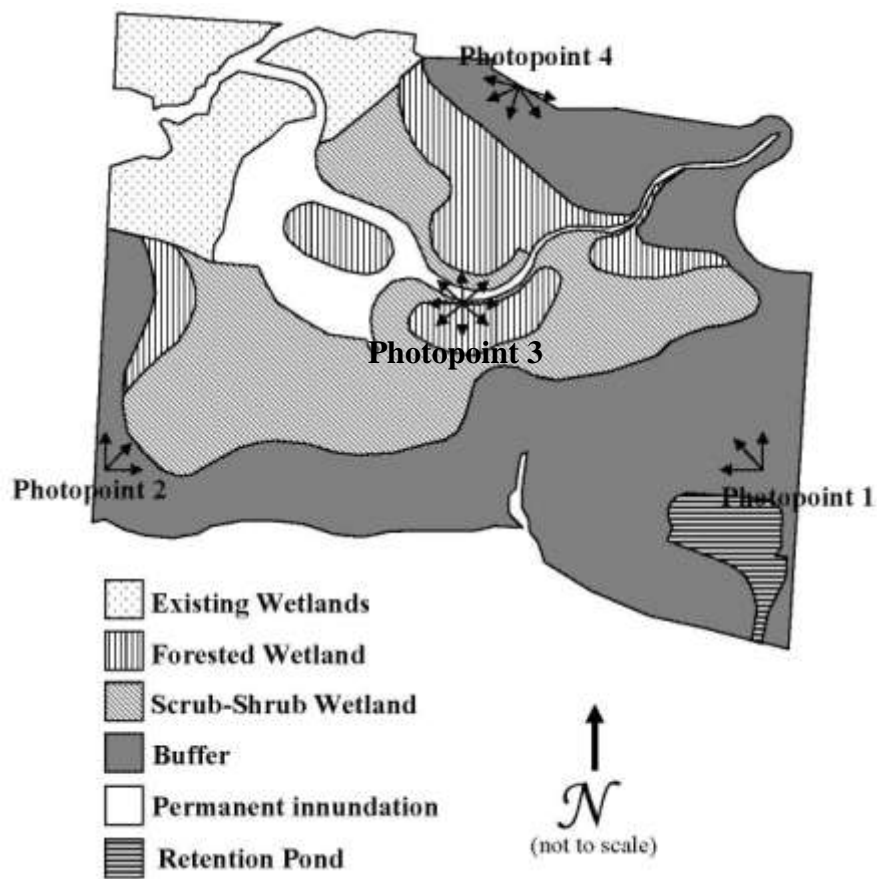
NOTES:

1. SPACE TREES NO CLOSER THAN 10' O.C.
2. FOR PLANTING AREAS A1, A2, A3 AND A4, SPACE SHRUBS AT 2.5' O.C.
3. SAVE AND PROTECT ALL EXISTING DESIRABLE VEGETATION AS SPECIFIED IN SECTION 1.07.16(2) OF THE STANDARD SPECIFICATIONS.
4. IN AREAS OF EXISTING DESIRABLE VEGETATION, ADJUST PLANT SPACING TO MAINTAIN PLANT SPACING OF ALL ON SHEET WPL1 AND SECTION 2-01.3 OF SPECIAL PROVISIONS.
5. INTERPLANT IN EXISTING DESIRABLE VEGETATION AREAS. PLANTING POCKETS ARE ESTIMATED TO BE APPROX. 18" RADIUS RINGS @ 5' O.C. SPACING.
6. SCOUR SHRUB WETLAND F PLANTING AREAS CONTROL PLANS, SHEET WPL-511.



AS-BUILT

Photo Point Locations



Appendix 4 – Photo Points

The photographs below were taken from permanent photo-points on July 28th, 2010 and document current site development.



Photo Point 1a



Photo Point 1b



Photo Point 1c



Photo Point 2a



Photo Point 2b



Photo Point 2c



Photo Point 3a



Photo Point 3b



Photo Point 3c



Photo Point 3d



Photo Point 3e



Photo Point 3f



Photo Point 3g



Photo Point 4a



Photo Point 4b



Photo Point 4c



Photo Point 4d



Photo Point 4e

Literature Cited

1. Entranco, Inc. 2005. Final Wetland and Stream Mitigation Plan SR 202 Improvement Project: SR 520 to Sahalee Way NE. Prepared for Washington State Department of Transportation, Northwest Region, Seattle, WA.
2. United States Army Corps of Engineers. 2004. Department of the Army Permit Number 200400024.
3. Washington State Department of Transportation (WSDOT). 2009. SR 202 SR 520 to Sahalee Way Stage 2 Wetland Mitigation Site #2 As-built Planting Plan. WSDOT Northwest Region, Seattle, WA.
4. 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>