

**SR 900 78th Vicinity to Newport Way Widening
Lake Sammamish State Park (LSSP) Wetland Mitigation Site
and Tributary B Stream Mitigation Site
WIN #A90098V**

USACE IP NWS-2007-29-SOD

Northwest Region

2011 MONITORING REPORT

Wetlands Program

Issued March 2012



**Washington State
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Environmental Services Office

Author:

Sean Patrick

Editor:

Tony Bush

Contributors:

Teri Fisher

Diana Stone


For additional information about this report or the WSDOT Wetlands Program, please contact:

Tony Bush, Wetlands Program
WSDOT, Environmental Services Office
P. O. Box 47332, Olympia, WA 98504
Phone: 360-570-6640 E-mail: busht@wsdot.wa.gov

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SR 900 78th Vicinity to Newport Way Widening Lake Sammamish State Park (LSSP) Wetland Mitigation Site and Tributary B Stream Mitigation Site

USACE IP NWS-2007-29-SOD

	General Site Information		
	USACE IP Number	NWS-2007-29-SOD	
	Mitigation Location	Southwest of Issaquah Creek in Lake Sammamish State Park	
	LLID Number	LSSP Wetland Site: 1220619475588 Tributary B Stream Site: 1220625475351	
	Construction Date	2009–2010	
	Monitoring Period	2011–2020	
	Year of Monitoring	1 of 10	
	Type of Impact	Wetland	Buffer
	Area of Impact	0.75 acre	1.71 acres
	Type of Mitigation	Wetland Establishment	Wetland Enhancement
	Area of Mitigation	1.74 acres	0.11 acre
			2.81 acres

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Summary of Monitoring Results and Management Activities (2011)

Performance Standards	2011 Results	Management Activities
LSSP Wetland Mitigation Site		
Wetland hydrology will be present for at least 10% of the growing season	Present	
100 percent survival of planted woody species in the scrub-shrub planting areas	86% survival (all dead plantings have been replaced)	Additional planting is planned for fall 2012
No more than 30% cover by targeted invasive species in the wetland areas	1% cover	Weed control occurred April, July and November in 2011. Will continue regularly through 2012
100 percent survival of planted woody species in the buffer planting areas	86% survival (all dead plantings have been replaced)	Additional planting is planned for fall 2012
No more than 30% cover by targeted invasive species in the buffer areas	3% cover	Weed control occurred April, July and November in 2011. Will continue regularly through 2012
Tributary B Stream Mitigation Site		
100 percent survival of planted woody species in the riparian buffer planting areas	72% survival (all dead plantings have been replaced)	Additional planting is planned for fall 2012
No more than 30% cover by targeted invasive species in the riparian buffer areas	1% cover	Weed control occurred April, July and November in 2011. Will continue regularly through 2012

Report Introduction

This report summarizes first-year (Year-1) monitoring activities at the State Route (SR) 900 LSSP Wetland Mitigation Site and the SR 900 Tributary B Stream Mitigation Site. Included are a site description, the performance standards, an explanation of monitoring methods, and an evaluation of site development. Monitoring activities in 2011 included vegetation surveys and photo-documentation. A monitoring visit was conducted on September 15.

What is the Lake Sammamish State Park (LSSP) Wetland Mitigation Site?

This 4.08-acre mitigation site (Figure 1) is located in Lake Sammamish State Park in Issaquah, WA. It comprises 1.74 acres of wetland establishment, 0.11 acre of wetland enhancement, 1.98 acres of wetland buffer enhancement, and 0.25 acre of riparian buffer enhancement within existing state park property. This site was created to replace acreage and functions lost due to wetland and buffer impacts associated with the widening of SR 900. As a result of the widening project, 0.75 acre of wetland and 1.71 acre of wetland and stream buffer were permanently impacted. Wetland functions that will be mitigated for at this site include flood flow alteration, flood storage, aquatic invertebrate and amphibian habitat, general wildlife habitat, and sediment, nutrient, and toxicant removal.

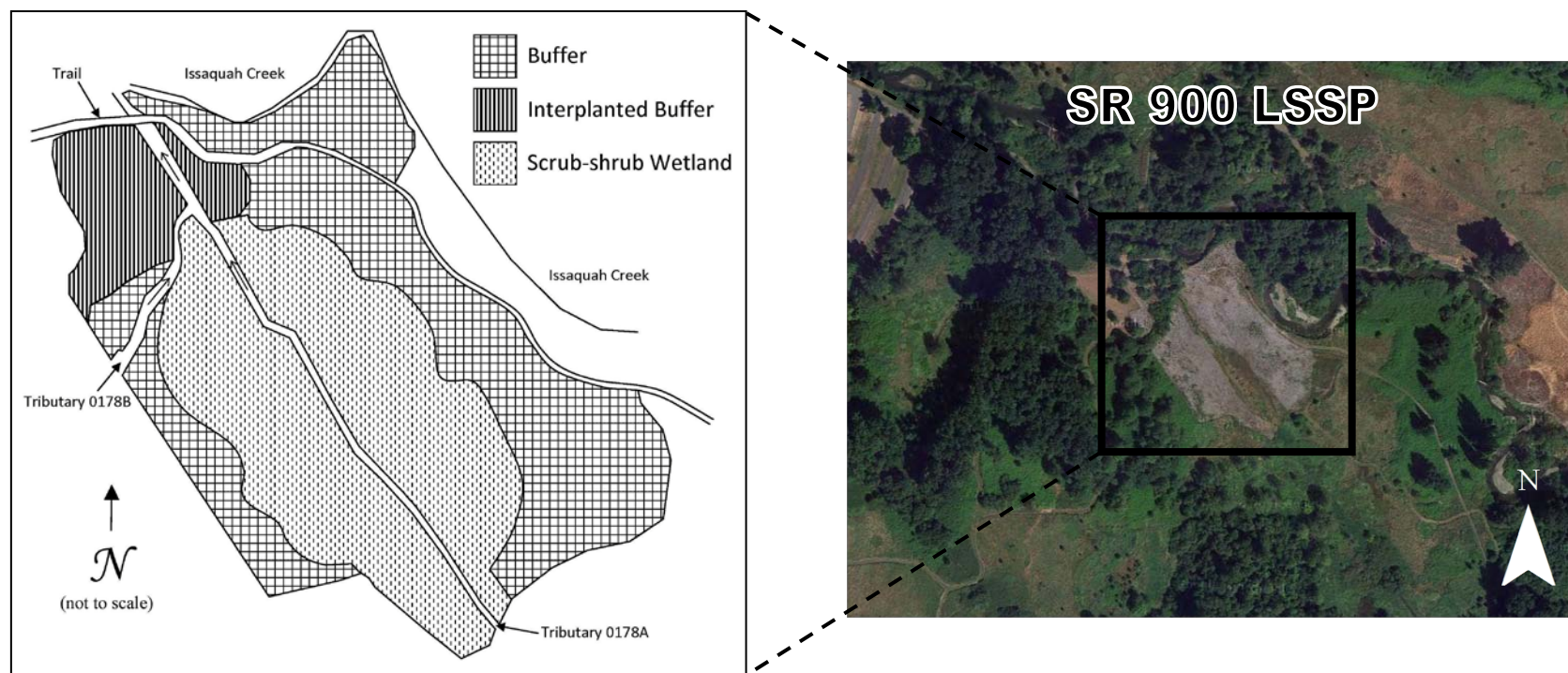


Figure 1 LSSP Site Sketch

The SR 900 LSSP Wetland Mitigation Site contains a scrub-shrub wetland along a tributary to Issaquah Creek within Lake Sammamish State Park. Appendix 1 includes site directions.

What is the Tributary B Stream Mitigation Site?

This 0.58-acre mitigation site (Figure 2) was created to mitigate for the combined 139 linear feet of perennial stream that was placed in a culvert as a result of the SR 900 widening project. Two hundred and thirty-three linear feet of Tributary B was enhanced in order to replace lost functions. The stream mitigation site will increase habitat for salmonids by providing high flow refuge. The riparian buffer plantings will contribute screening, shading, organic debris and large woody debris recruitment to the stream. The site will provide increased wildlife habitat by improving the quality of the riparian buffer, as well as increase the area and food resources available for aquatic invertebrates and amphibians, which in turn will lead to increased food resources for salmonids.

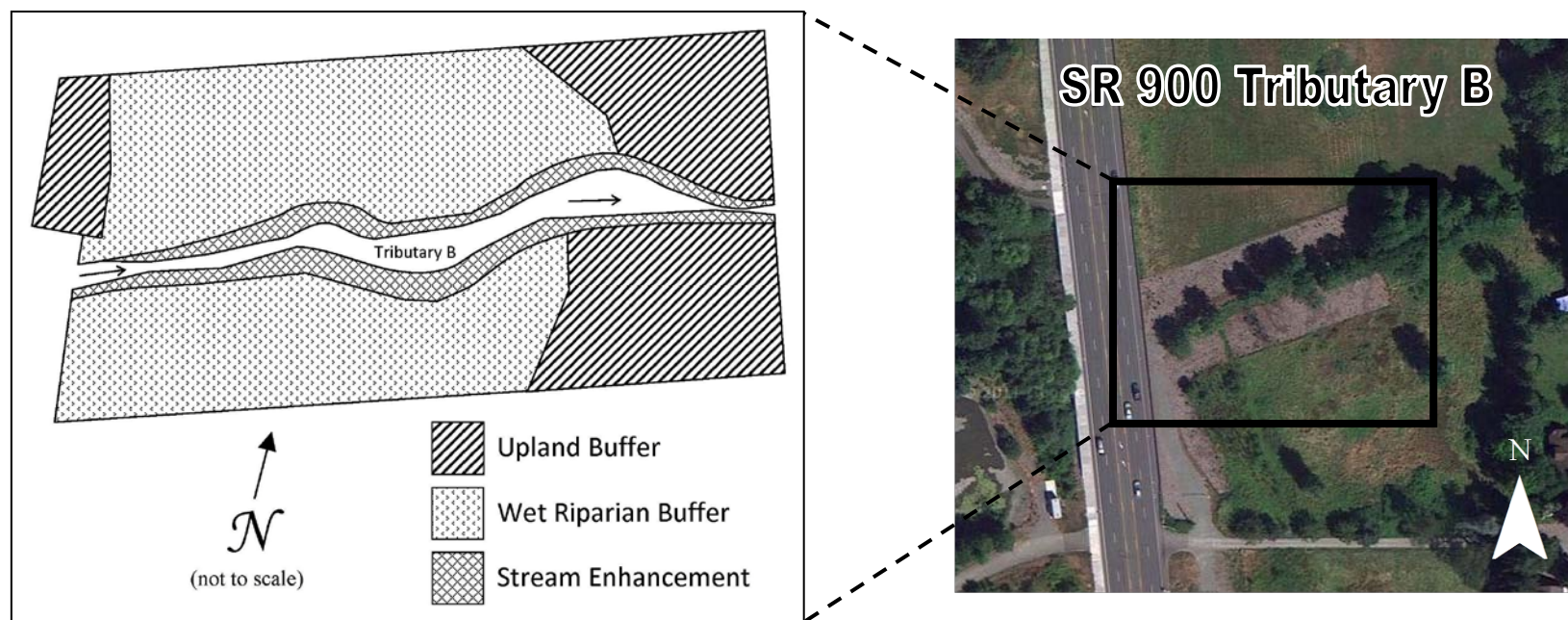


Figure 2 Tributary B Site Sketch

The SR 900 Tributary B Stream Mitigation Site consists of 233 linear feet of stream enhancement and 0.58 acre of riparian buffer enhancement along Tributary B as it emerges from the newly lengthened culvert under SR 900. Appendix 1 includes site directions.

What are the performance standards for these sites?

LSSP Wetland Mitigation Site

Performance Standard 1

The soils will be saturated to the surface, or standing water will be present at 12 inches below the surface or less, for a consecutive number of days greater than or equal to 10% of the growing season in years when rainfall meets or exceeds the 30-year average.

Performance Standard 2

The vegetation will achieve 100 percent survival of planted woody species at the end of the of the first year plant establishment period within the scrub-shrub planting areas. If all dead woody plantings are replaced, the performance measure will be met.

Performance Standard 3

No more than thirty percent cover by non-native invasive species as listed in **Table 10** in the wetland areas except:

- 15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).
- The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.

Performance Standard 4

The vegetation will achieve 100 percent survival of planted woody species at the end of the of the first year plant establishment period within the wetland buffer and riparian buffer planting areas. If all dead woody plantings are replaced, the performance measure will be met.

Performance Standard 5

No more than thirty percent cover by non-native invasive species as listed in **Table 10** in the buffer areas except:

- 15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).
- The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.

Tributary B Stream Mitigation Site

Performance Standard 6

The planted woody species will achieve 100 percent survival at the end of the of the first year plant establishment period in the riparian buffer planting areas. If all dead woody plantings are replaced, the performance measure will be met.

Performance Standard 7

No more than thirty percent cover by non-native invasive species as listed in **Table 10** in the riparian buffer areas except:

- 15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).
- The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.

Table 10. Non-native invasive species.

Scientific Name	Common Name
<i>Buddleia alternifolia</i>	fountain butterfly bush
<i>Cytisus scoparius</i>	Scot's broom
<i>Geranium robertianum</i>	herb Robert
<i>Ilex aquifolium</i>	English holly
<i>Iris pseudacorus</i>	yellow flag iris
<i>Lythrum salicaria</i>	purple loosestrife
<i>Polygonum cuspidatum</i> (and related species and hybrids)	Japanese knotweed
<i>Prunus laurocerasus</i>	English laurel
<i>Rubus laciniatus</i>	evergreen blackberry
<i>Rubus armeniacus</i> (discolor)	Himalaya or Armenian blackberry

Appendix 1 provides the complete text of the performance standards for this project, and Appendix 3 shows the planting plans (WSDOT 2008 and 2010).

How were the performance standards evaluated?

WSDOT staff collected hydrology data using methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), *the Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (Version 2.0) (USACE 2010) (Performance Standard 1).

To evaluate performance standards for survival of woody species (Performance Standards 2, 4, and 6) plant mortality counts, conducted by WSDOT region staff in conjunction with contractors, were compared to as-built planting numbers.

Because these first-year sites were sheet-mulched and invasive species cover was low, visual estimates were used to address invasive species cover standards (Performance Standards 3, 5, and 7).

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

How is the LSSP Wetland Mitigation Site developing?

This site is beginning to develop well, with high survival of planted woody species and limited cover of invasive species. Wetland hydrology appears to be present from the limited data available so far. As long as the invasive species are kept under control this site should continue on a positive trajectory and develop well over the coming years.

How is the Tributary B Stream Mitigation Site developing?

The woody plantings on this site had relatively high survival and appear to be doing well. The cover of invasive species over most of the site is low. However, the majority of the creek channel has filled in with watercress (*Nasturtium officinale*), potentially threatening the effectiveness of the intended functional improvements to fish habitat (Photo 1). It is possible that, once the woody plantings fill in and shade the creek, the watercress will be shaded out enough so that it does not cover the creek channel and is less detrimental to fish habitat functions.



Photo 1
Watercress in Tributary B (September 2011)

Results for the LSSP Wetland Mitigation Site

Results for Performance Standard 1

(Wetland hydrology will be present for at least 10% of the growing season):

Readings from three piezometers installed in the wetland establishment area (Appendix 2, Table 1) indicate that wetland hydrology is present. Ten percent of the growing season is equal to about four weeks. Two of the three piezometers on this site had consecutive readings at or above twelve inches below the soil surface for a time span of greater than four weeks. The third piezometer, in a time span of 11 weeks, had six readings at or above twelve inches below the soil surface and two readings just below twelve inches (1.10 feet). The 2011 water-year exceeded the thirty-year average rainfall, making it a qualifying year for this standard to apply (Appendix 2, Table 2).

Results for Performance Standard 2

(100 percent survival in the scrub-shrub planting areas):

Survival of woody plantings in the scrub-shrub wetland (Photo 2) was 86 percent. All dead plantings have been replaced, fulfilling the requirements of this performance standard.



Photo 2
Woody plantings in the scrub-shrub wetland
(September 2011)

Results for Performance Standard 3

(No more than 30% cover by targeted invasive species in the wetland areas):

The cover of the targeted invasive species within the wetland is estimated at one percent. Of the targeted species, butterfly bush (*Buddleja sp.*), reed canarygrass (*Phalaris arundinacea*), and Himalayan blackberry (*Rubus armeniacus*) were observed in the wetland. Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) were not observed on site during monitoring activities. In 2011, weed control was performed in April, July and November. Additional regular weed control events are planned for 2012.



Photo 3
Woody plantings in the buffer (September 2011)

Results for Performance Standard 4

(100 percent survival in the buffer planting areas):

Survival of woody plantings in the buffer (Photo 3) was 86 percent. All dead plantings have been replaced, fulfilling the requirements of this performance standard.

Results for Performance Standard 5

(No more than 30% cover by targeted invasive species in the buffer areas):

The cover of the targeted invasive species within the buffer is estimated at three percent. Of the targeted species, butterfly bush, reed canarygrass, Himalayan blackberry, and cutleaf blackberry (*Rubus laciniatus*) were observed in the buffer. Blackberries in the interplanted buffer and along Tributary 0178b comprise the majority of the invasive species cover on this site. Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) were not observed on site during monitoring activities. In 2011, weed control was performed in April, July and November. Additional regular weed control events are planned for 2012.

Results for the Tributary B Stream Mitigation Site

Results for Performance Standard 6

(100 percent survival in the riparian buffer planting areas):

Survival of woody plantings in the riparian buffer (Photo 4) was 72 percent. All dead plantings have been replaced, fulfilling the requirements of this performance standard.

Results for Performance Standard 7

(No more than 30% cover by targeted invasive species in the riparian buffer areas):

The cover of the targeted invasive species within the riparian buffer is estimated at one percent. Of the targeted species, butterfly bush, reed canarygrass, Himalayan blackberry, and cutleaf blackberry were observed in the riparian buffer. Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) were not observed on site during monitoring activities. In 2011, weed control was performed in April, July and November. Additional regular weed control events are planned for 2012.



Photo 4
Woody plantings in the riparian buffer
(September 2011)

What is planned for these sites?

Ongoing weed control is planned for 2012.

Replanting of some areas at Tributary B and the wetland site will be done in the fall of 2012. Areas targeted are areas that had higher than expected mortality during the second year.

Additionally, Tributary 0178A, on the wetland site, is being monitored for erosion; photos below. A head-cut formed in 2009 and is continuing to migrate upstream. Erosion control measures that have been taken to slow the upstream migration include the placement of biodegradable fabric and planting of live willow stakes.



Photo 5 – February 2010



Photo 6 – April 2011

The location of the scour hole shown in April 2011 (Photo 6) is near the top of the February 2010 photo (Photo 5). At this point no further activities are planned for this site but the stream will continue to be evaluated throughout the year.

Appendix 1 – Goals and Performance Standards

The following excerpt is from the *SR 900: 78th Vicinity to Newport Way Widening (MP 20.09 to MP 21.08) Final Wetland and Stream Mitigation Report* (WSDOT 2008). The performance criteria addressed this year are identified in **bold** font.

REGULATORY COMPLIANCE FOR THE WETLAND MITIGATION SITE

The proposed wetland mitigation site 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 and success standards describe specific on-site characteristics that indicate a function is being provided. 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.

Goal

The goal of the proposed compensatory wetland mitigation site in LSSP is to replace acreage and functions lost due to the wetland and buffer impacts associated with the proposed widening project. The mitigation at LSSP is addressed in this section, and has separate requirements from the Tributary B stream mitigation site (see Regulatory Compliance for the Stream Mitigation Site).

Functions and Values

The site will be graded to allow flows from Tributary 0178a to enter the mitigation site. This excavation will allow flood flows to disperse across a wider area which will increase flood flow alteration and flood storage functions. The channel side slopes and wetland creation area will be planted with water-tolerant shrub vegetation. The scrub-shrub vegetation will slow channel flows and facilitate sediment, nutrient, and toxicant removal functions. Shrub vegetation will also stabilize the channel banks and provide a source of leaf litter that will contribute to the organic matter supply. The created wetland area adjacent to the stream will provide habitat for aquatic invertebrates and amphibians. The site will contain a high diversity of plant species and will provide general habitat suitability for a variety of wildlife species. Finally, interpretative signage may be installed at the perimeter of the mitigation site and along the informal pedestrian trail providing educational value (this is still being negotiated with the Park).

Objectives, Interim Performance Measures, and Success Standards

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

Objective 1 – Hydrology

The LSSP wetland mitigation site will possess ground and/or surface water inundation or saturation sufficient to support the wetland site.

Performance Measures

Years 1-9

- **The soils will be saturated to the surface, or standing water will be present at 12 inches below the surface or less, for a consecutive number of days greater than or equal to 10% of the growing season in years when rainfall meets or exceeds the 30-year average.**

Year 5

- The wetland areas will be delineated using current methods. The mitigation site will contain 1.74 acres of created wetland and 0.11 acre of enhanced wetland for a total wetland area of 1.85 acres.

Success Standards

Year 10

- The wetland area at LSSP will be delineated using current methods. The mitigation site will contain 1.74 acres of created wetland and 0.11 acre of enhanced wetland for a total wetland area of 1.85 acres.

Objective 2 – Wetland Vegetation

The LSSP wetland mitigation site will include a scrub-shrub wetland community.

Performance Measures

Year 1

- **The vegetation will achieve 100 percent survival of planted woody species at the end of the of the first year plant establishment period within the scrub-shrub planting areas. If all dead woody plantings are replaced, the performance measure will be met.**

Year 3

- The native woody species will maintain a minimum average density of four plants per 100 square feet within the scrub-shrub planting areas. Native colonizing vegetation will be included in this coverage calculation.

Year 5

- Native facultative or wetter woody species will achieve a minimum of 35 percent coverage within the scrub-shrub planting areas. Native colonizing vegetation will be included in these coverage calculations.

Year 7

- Native facultative or wetter woody species will achieve a minimum of 50 percent coverage within the scrub-shrub planting areas. Native colonizing vegetation will be included in these coverage calculations.

Years 1-9

- **No more than thirty percent cover by non-native invasive species as listed in Table 10 in the wetland areas except:**
 - **15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).**
 - **The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.**

Success Standards

Year 10

- The mitigation site will include approximately 1.85 acres of scrub-shrub wetlands.
- Native facultative or wetter woody species will achieve a minimum of 70 percent coverage within the scrub-shrub planting areas. Native colonizing vegetation will be included in these coverage calculations.
- No more than thirty percent cover by non-native invasive species as listed in **Table 10** in the wetland areas except:
 - 15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).
 - The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.

Objective 3 – Buffer Vegetation

The LSSP mitigation site will include approximately 1.98 acres of enhanced wetland buffer vegetation and 0.25 acre of enhanced riparian buffer vegetation, totally 2.23 acres of enhanced buffer.

Performance Measures

Year 1

- **The vegetation will achieve 100 percent survival of planted woody species at the end of the of the first year plant establishment period within the wetland buffer and riparian buffer planting areas. If all dead woody plantings are replaced, the performance measure will be met.**

Year 3

- The native woody species will maintain a minimum average density of four plants per 100 square feet in the wetland buffer and riparian buffer planting areas.

Year 5

- Native woody species will achieve a minimum of 30 percent coverage in the wetland buffer and riparian buffer planting areas. Native colonizing vegetation will be included in this coverage calculation.

Year 7

- Native woody species will achieve a minimum of 40 percent coverage in the wetland buffer and riparian buffer planting areas. Native colonizing vegetation will be included in this coverage calculation.

Years 1-9

- **No more than thirty percent cover by non-native invasive species as listed in Table 10 in the buffer areas except:**
 - **15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).**
 - **The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.**

Success Standards

Year 10

- Native woody species will achieve a minimum of 50 percent coverage in the wetland buffer and riparian buffer planting areas. Native colonizing vegetation will be included in this coverage calculation.
- No more than thirty percent cover by non-native invasive species as listed in **Table 10** in the buffer areas except:

- 15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).
- The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.

Table 10. Non-native invasive species.

Scientific Name	Common Name
<i>Buddleia alternifolia</i>	fountain butterfly bush
<i>Cytisus scoparius</i>	Scot's broom
<i>Geranium robertianum</i>	herb Robert
<i>Ilex aquifolium</i>	English holly
<i>Iris pseudacorus</i>	yellow flag iris
<i>Lythrum salicaria</i>	purple loosestrife
<i>Polygonum cuspidatum</i> (and related species and hybrids)	Japanese knotweed
<i>Prunus laurocerasus</i>	English laurel
<i>Rubus laciniatus</i>	evergreen blackberry
<i>Rubus armeniacus</i> (discolor)	Himalaya or Armenian blackberry

REGULATORY COMPLIANCE FOR THE STREAM MITIGATION SITE

The proposed stream mitigation site will be monitored for five years to demonstrate the provision of intended functions.

Goal

The goal of the stream mitigation site is to enhance 233 linear feet of a fish bearing stream in order to replace functions lost due to stream impacts associated with culvert widening and replacement in the proposed widening project. The mitigation also consists of a total of 0.58 acre of riparian buffer enhancement, which will occur on each side of the stream.

Functions and Values

The mitigation at Tributary B will include excavating three areas in the stream channel to serve as fish refuge during high flows, installing six pieces of LWD in these areas, removing invasive species from the riparian buffer, and planting a 50-foot wide stream buffer with native emergent, shrub, and tree species.

The stream mitigation site will increase habitat for salmonids by providing high flow refuge. Invasive species will be removed and a greater diversity of native trees, shrubs, and emergents will be planted. As the riparian buffer matures, it will increasingly contribute screening, shading, organic debris and large woody debris recruitment to the stream. The site will provide increased wildlife habitat by improving the quality of the riparian buffer, as well as increase the area and food resources available for aquatic invertebrates and amphibians, which in turn will lead to increased food resources for salmonids.

When compared to the streams and stream buffers that were impacted by the widening project, the Tributary B mitigation site should have a net increase in stream functions. The impact areas immediately adjacent to the roadway are often composed of fewer trees and a greater number of invasive species than areas more distant to the road. Additionally, the streams themselves near road crossings are usually in a degraded condition because of the improperly sized or degrading culverts. The stream mitigation area will provide better habitat value as it is not adjacent to the roadway. The stream mitigation on Tributary B, along with the removal of the two fish passage barriers on Clay Pit Creek and West Fork Tibbetts Creek, and the stream enhancement on Tributary 0178a at the LSSP mitigation site will substantially improve the riparian areas in the SR 900 project corridor upon completion of this project.

Objective 1 – Buffer Vegetation

The stream mitigation site at Tributary B will include a total of 0.58 acre of enhanced riparian vegetation.

Performance Measures

Year 1

- **The planted woody species will achieve 100 percent survival at the end of the of the first year plant establishment period in the riparian buffer planting areas. If all dead woody plantings are replaced, the performance measure will be met.**

Year 3

- The native woody species will maintain a minimum average density of four plants per 100 square feet in the riparian buffer planting areas.

Years 1-4

- **No more than thirty percent cover by non-native invasive species as listed in Table 10 in the riparian buffer areas except:**
 - **15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).**

- **The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.**

Success Standards

Year 5

- Native woody species will achieve a minimum of 30 percent coverage in the riparian buffer planting area. Native colonizing vegetation will be included in this coverage calculation.
- No more than thirty percent cover by non-native invasive species as listed in **Table 10** in the buffer areas except:
 - 15% maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *R. armeniacus*).
 - The presence of Japanese knotweed (*Polygonum cuspidatum* and related species) and purple loosestrife (*Lythrum salicaria*) will initiate eradication measures.

Driving Directions:

From I-90 east, take exit 15 for WA-900 W/17th Ave NW. Turn left onto WA-900 E/17th Ave NW. After approximately 0.3 mile, turn left onto NW Sammamish Road. After approximately 0.4 mile, turn right into Lake Sammamish State Park. Drive straight to the end of the last parking lot. The trail to the wetland mitigation site starts at the northeast corner of the last parking lot. To get to the stream mitigation site, go back to WA-900/17th Ave NW and head south for approximately one mile. Turn left on SE 75th Street, then immediately take another left into the mitigation site.

Appendix 2 – Hydrology Data

Table 1. Piezometer Readings
(readings at or above 12” below the soil surface are indicated in bold font)

Date	Water Level (in feet from the soil surface)		
	Piezometer A1	Piezometer A2	Piezometer A3
1/11/2011	-0.60	-0.60	-0.80
2/10/2011	-0.95	-0.40	-1.10
3/1/2011	-0.30	-0.20	-0.65
3/7/2011	-0.35	-0.35	-0.15
3/14/2011	0.00	-0.10	-0.10
3/21/2011	-1.20	-0.50	-1.10
3/28/2011	-0.30	-0.10	-0.30
4/4/2011	0.00	-0.10	-0.20
4/11/2011	-1.10	-0.50	-1.10
4/18/2011	-1.00	-0.40	-1.05
4/25/2011	-1.85	-0.80	-1.30
5/3/2011	-1.30	-0.45	-1.00
5/9/2011	-0.80	-0.40	-0.75
5/16/2011	-0.20	-0.30	-0.20
5/23/2011	-1.10	-0.50	-0.75
5/31/2011	-2.00	-1.00	-1.30
6/6/2011	-2.20	-1.40	-1.40
6/13/2011	-2.55	-1.70	-1.80
6/20/2011	-2.70	-1.50	-1.80
6/27/2011	-2.30	-1.10	-1.35
7/5/2011	-2.90	-2.10	-2.25
7/11/2011	-3.00	-2.30	-2.55
7/18/2011	-3.10	-2.30	-2.70
7/25/2011	-3.30	-2.50	-3.00

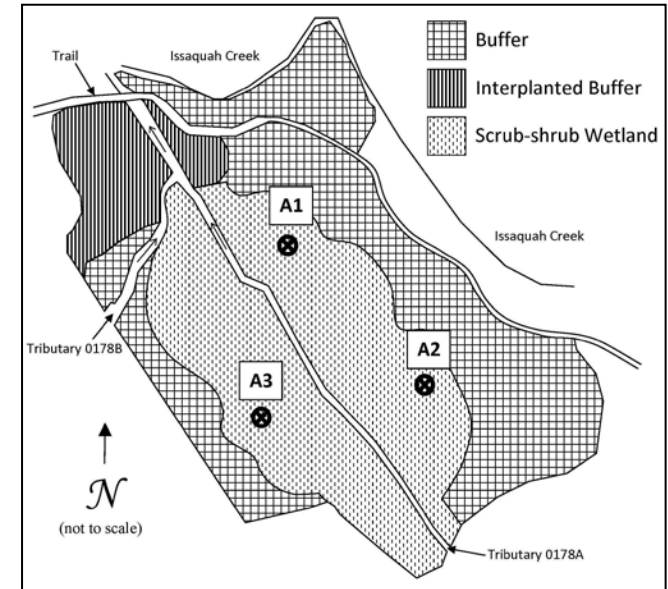


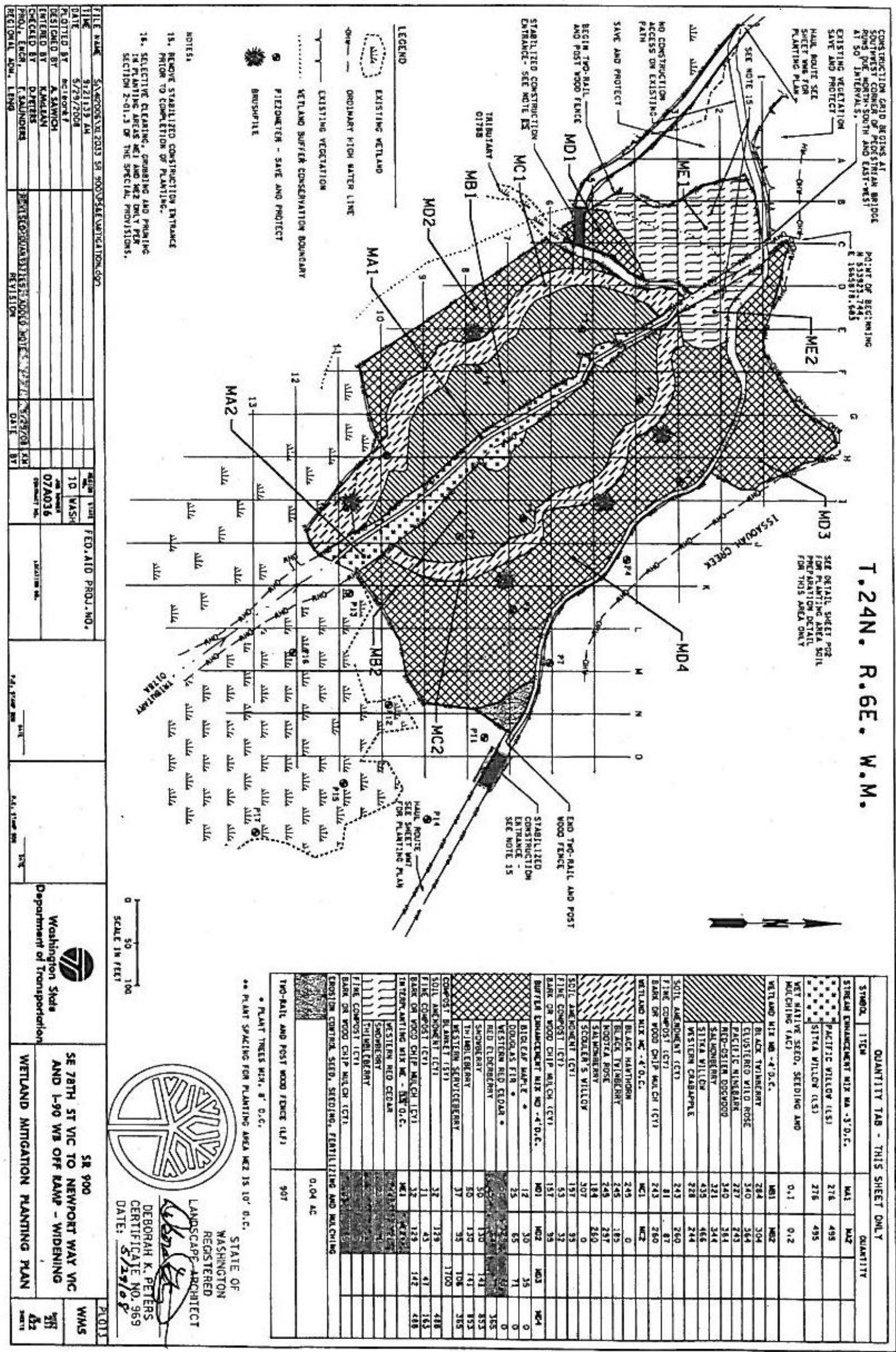
Figure 3 Piezometer Locations

Table 2. 2011 Water Year Precipitation (NOAA 2011 and NRCS 2011)

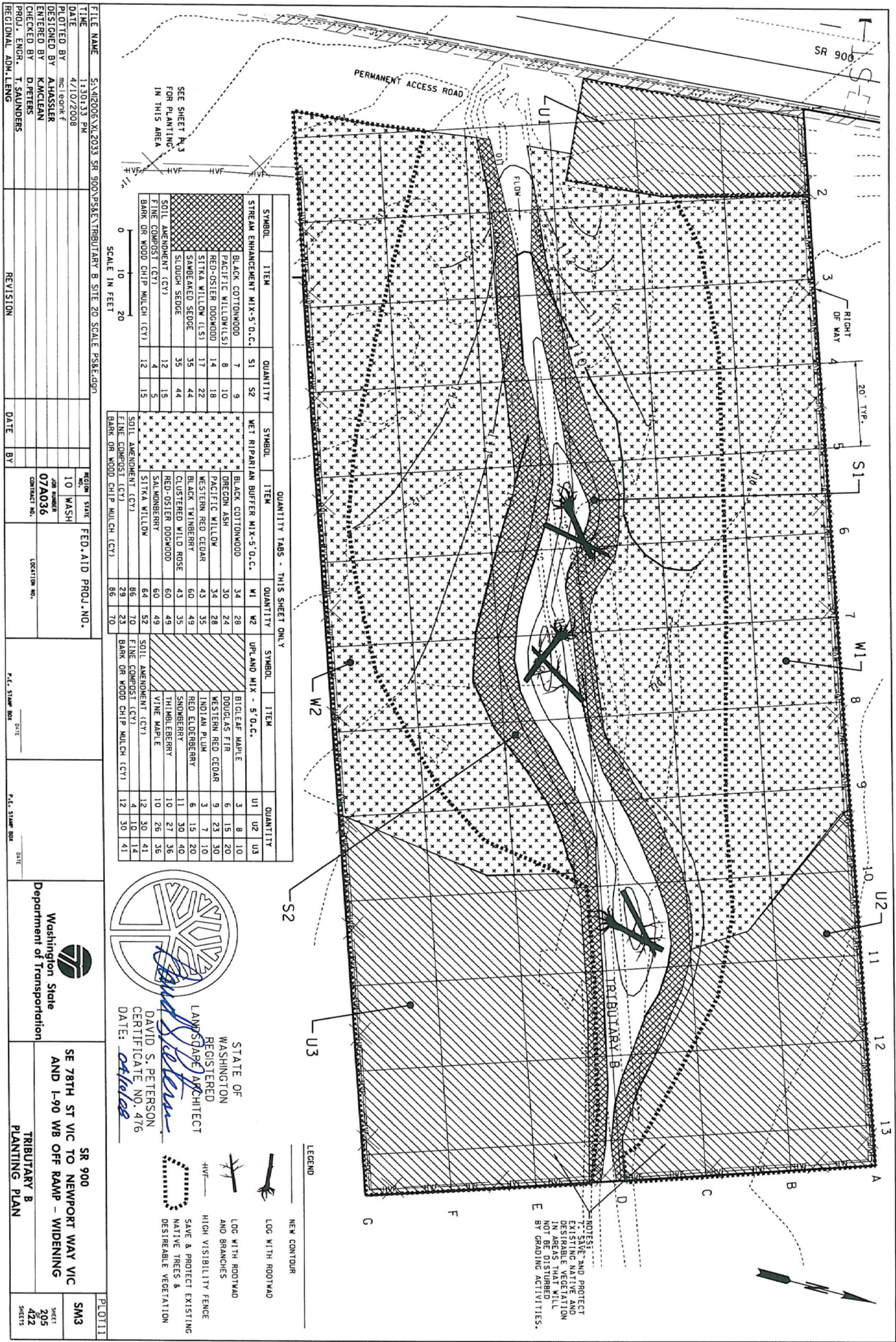
Weather Station : SEATTLE TCOMA WSCMO AP, WA7473												
2011 water year = October 1, 2010 – September 30, 2011												
Precipitation (inches)												
Year										Oct	Nov	Dec
2010										5.24	5.05	8.69
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep			
2011	4.99	3.05	6.29	4.47	3.2	1.42	0.7	0.13	1.29			
Thirty-year average (1971-2000):					37.07							
Thirty percent will have less than:					33.52							
Thirty percent will have more than:					40.09							
2011 water year total:					44.52							
Conclusion: The 2011 water year was wetter than normal												

Appendix 3 – As-built Planting Plans

LSSP Wetland Mitigation Site As-built
(WSDOT 2010)



Tributary B Stream Mitigation Site Planting Plan
(WSDOT 2008)



Appendix 4 – Photo Points

LSSP Wetland Mitigation Site

The photographs below were taken from permanent photo-points on September 15th, 2011 and document current site development.

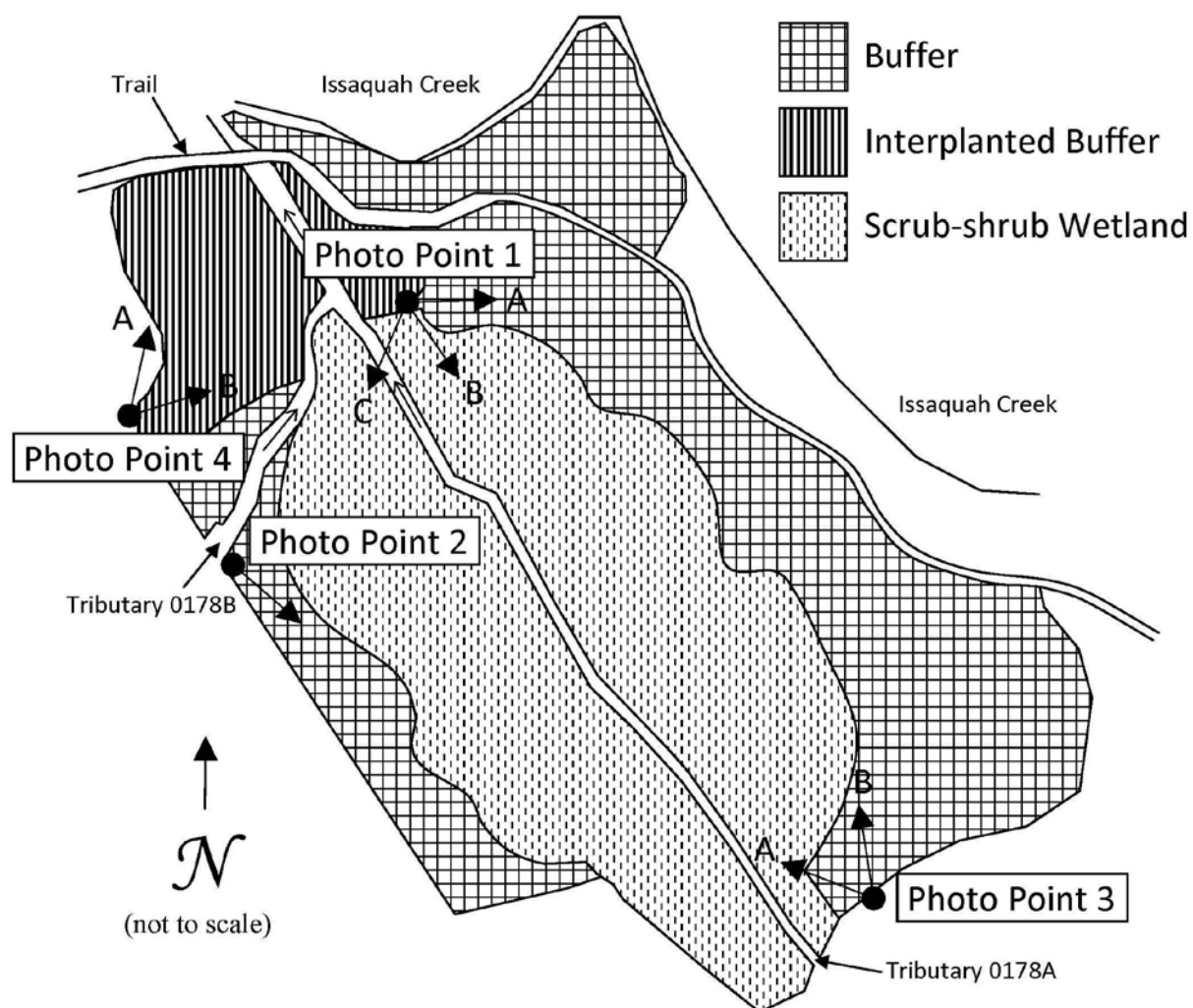




Photo Point 1a



Photo Point 1b



Photo Point 1c



Photo Point 2



Photo Point 3a



Photo Point 3b



Photo Point 4a



Photo Point 4b

Tributary B Stream Mitigation Site

The photographs below were taken from permanent photo-points on July 7th, 2011 and document current site development.

Photo Point 5

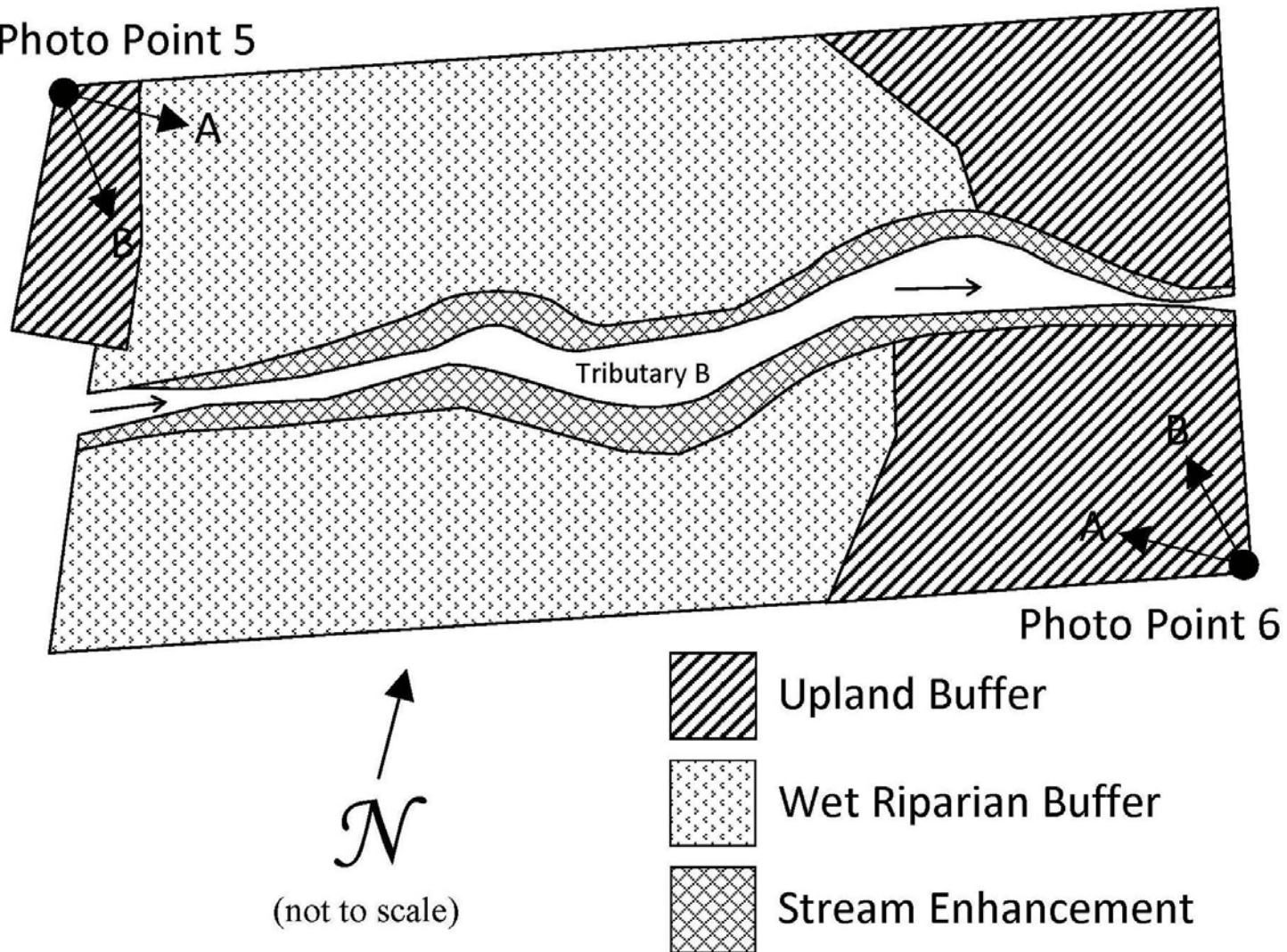




Photo Point 5a



Photo Point 5b



Photo Point 6a



Photo Point 6b

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