

**SR 520: West Lake Sammamish Parkway to SR 202
Widening (Bear Creek 3) Stream Buffer Mitigation Site
WIN: A52040A**

USACE IP NWS-2007-1926-SOD

Northwest Region

2015 MONITORING REPORT

Wetlands Program

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SR 520: West Lake Sammamish Parkway to SR 202 Widening (Bear Creek 3) Stream Buffer Mitigation Site

USACE IP NWS-2007-1926-SOD



General Site Information	
USACE IP Number	NWS-2007-1926-SOD
Mitigation Location	Redmond, WA at the north end of Lake Sammamish parallel to SR 520 between MP 11.40 and 12.83
LLID Number	1221093476692
Construction Date	2009-2010
Monitoring Period	2011-2015
Year of Monitoring	5 of 5
Type of Impact	Stream Buffer
Project Impact Area ^{1,2}	1.38 acres
Type of Mitigation	Stream Buffer Enhancement
Area of Mitigation ^{1,2}	3.90 acres

¹ Impact acreage was referenced from USACE individual permit NWS-2007-1926-SOD (USACE 2008). Mitigation acreage was referenced from the *Final Wetland Mitigation Report SR 520: West Lake Sammamish Parkway to SR 202 Widening (MP 11.40 to MP 12.83)* (WSDOT 2008).

² An additional 0.85 acre of wetland and 0.85 acre of buffer impacts for this project are being mitigated for with advance mitigation. The Happy Valley mitigation site will provide 1.74 acres of established wetland and 0.85 acre of enhanced buffer to compensate for these impacts.

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Summary of Monitoring Results and Management Activities (2015)

Performance Standards	2015 Results ³	Management Activities
Native woody species will achieve a minimum of 30% coverage in the riparian buffer planting area.	36% cover (CI _{80%} = 29-43%)	252 native trees and 1,001 native shrubs planted in December 2014
No more than 30% cover by non-native species as listed in the Table (see Appendix 3, Table 1) in the buffer areas.	1% cover	Bio, mechanical and chemical weed control occurred, targeting poison hemlock (<i>Conium maculatum</i>), blackberry (<i>Rubus species</i>), reed canarygrass (<i>Phalaris arundinacea</i>), tansy ragwort (<i>Jacobaea vulgaris</i>), Robert geranium (<i>Geranium robertianum</i>), thistle (<i>Cirsium species</i>) and vetch (<i>Vicia species</i>).
15% maximum cover across the entire mitigation site for blackberry (<i>Rubus laciniatus</i> and <i>Rubus armeniacus</i>).	<1% cover	
The presence of Japanese knotweed (<i>Reynoutria japonica</i> and related species) and purple loosestrife (<i>Lythrum salicaria</i>) will initiate eradication measures.	None observed	

Report Introduction

This report summarizes final-year (Year-5) monitoring activities at the State Route (SR) 520 Bear Creek 3 Stream Buffer Mitigation Site. 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 October 12 and 14, 2015.

³ Estimated values are presented with their corresponding statistical confidence interval. For example, 36% cover (CI_{80%} = 29-43) means we are 80% confident that the true cover value is between 29% and 43%.

What is the SR 520 Bear Creek 3 Stream Mitigation Site?

This 3.90-acre stream mitigation site (Figure 1) is an enhanced riparian buffer located north of SR 520, along the southern buffer area of Bear Creek and the right bank buffer of the Sammamish River. This stream buffer was enhanced to compensate for impacts to 1.38 acres of stream buffer due to the addition of traffic lanes on SR 520. This enhancement area is designed to protect stream functions, improve riparian and aquatic habitat and connectivity, as well as provide fish and wildlife habitat.

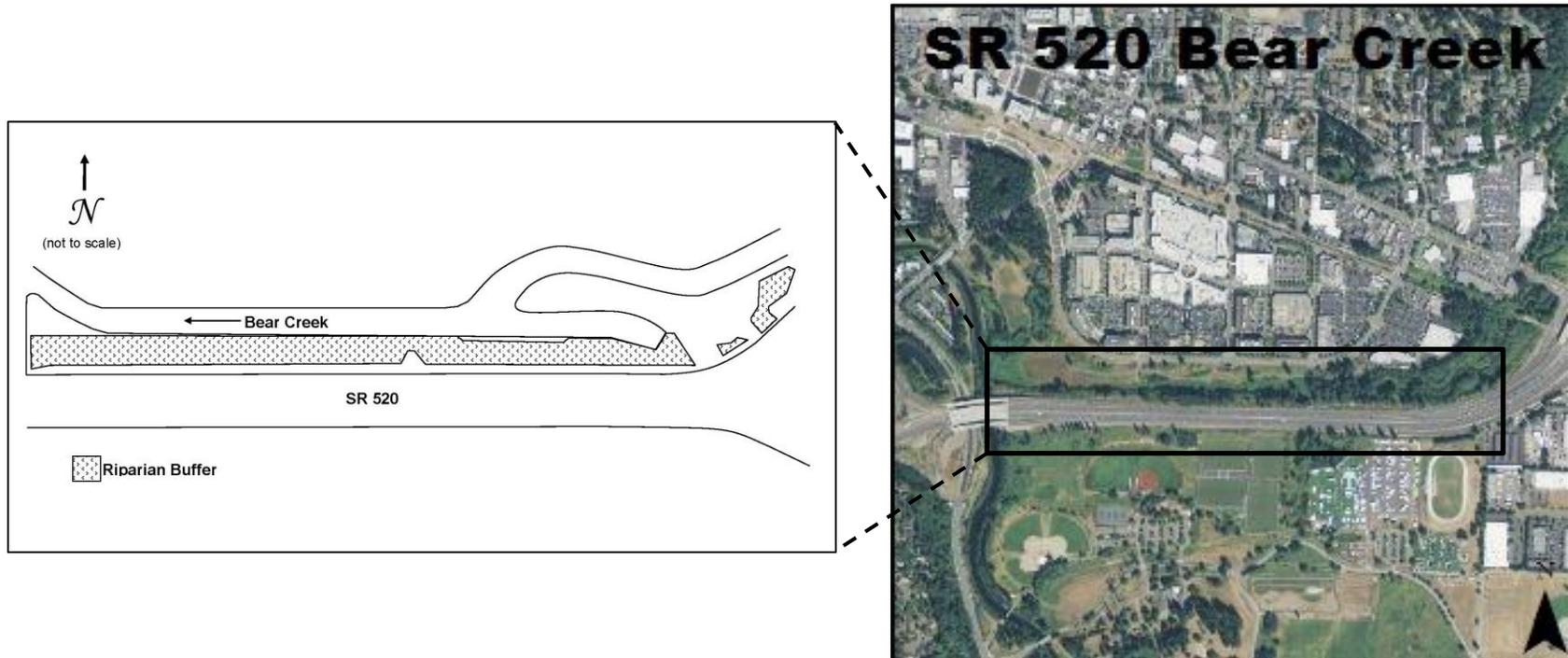


Figure 1 Site Sketch

This stream buffer enhancement consists of large areas of non-native invasive species removal and installation of native woody plants that will improve the vegetation community. Portions of the site vegetated with existing riparian vegetation have been preserved and under plantings installed to enhance the community. Appendix 2 includes site driving directions.

What are the performance standards for this site?

Year 5

Performance Standard 1

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.

Performance Standard 2

No more than 30 percent cover by non-native invasive species as listed in Table 14 (shown in this report in Appendix 3 as Table 1) in the buffer areas.

Performance Standard 3

Fifteen percent maximum cover across the entire mitigation site for blackberry (*Rubus laciniatus* and *Rubus armeniacus*).

Performance Standard 4

The presence of Japanese knotweed and purple loosestrife will initiate eradication measures.

Appendix 1 shows the planting plan (WSDOT 2008).

How were the performance standards evaluated?

The table below documents the sampling methodology utilized for all Performance Standard (PS) as required by the mitigation plan or permits. For additional details on the methods see the [WSDOT Wetland Mitigation Site Monitoring Methods Paper](#) (WSDOT 2008).

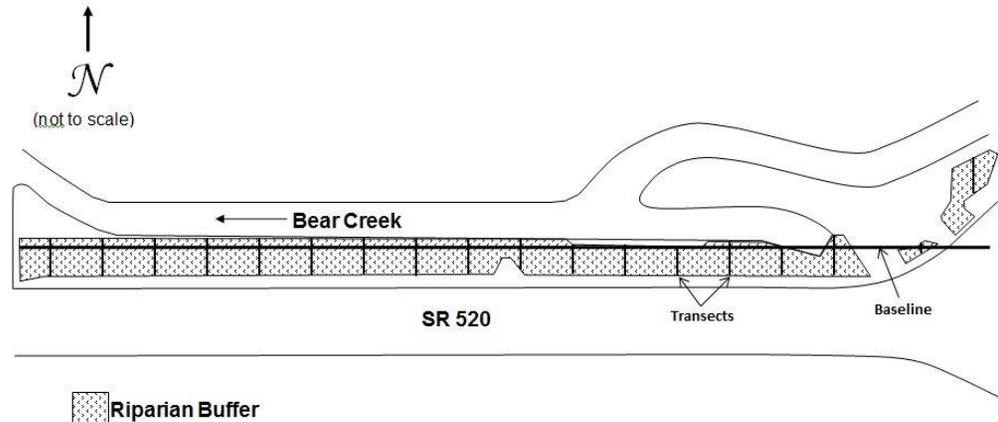


Figure 2 Site Sampling Design (2015)

Placement of Baseline: A baseline was established parallel to SR 520 (Figure 2).
Length: 986m
Transects: 26

	PS 1	PS 2	PS 3	PS 4
Attribute	Cover	Cover	Cover	Presence/Absence
Target pop.	Native Woody	Invasive species	Blackberry	Japanese knotweed and purple loosestrife
Zone	Riparian Buffer	Buffer	Entire Site	Entire Site
Sample method	Line-intercept	Qualitative	Qualitative	Qualitative
SU length	5m	NA	NA	NA
SU width	NA	NA	NA	NA
Points per SU	NA	NA	NA	NA
Total # of SU	26	NA	NA	NA

Is this site a success?

This site has successfully developed a diverse and robust native woody plant community with low cover of invasive species, and is meeting all final performance standards. If pre-existing woody vegetation were included in the cover estimate, it would be much higher (~75 percent). In 2014, construction for the creek re-alignment affected a small section of the riparian buffer. Cover of newly planted woody species in the affected areas affected is qualitatively estimated at 15 percent; these plants appear healthy.

A red-tailed hawk, great blue heron, black-capped chickadees, and rabbits were observed at the time of monitoring. This site is providing an effective buffer between Bear Creek and SR 520.

Results for Performance Standard 1

(30% cover native woody species in the riparian buffer planting area):

Cover of native woody species in the riparian buffer is estimated at 36% (CI_{80%}= 29-43%). This value exceeds the performance standard target. Dominant species include Nootka rose (*Rosa nutkana*), snowberry (*Symphoricarpos albus*), Hooker's willow (*Salix hookeriana*), and cluster rose (*Rosa pisocarpa*). (Photo 1)

Cover of newly planted woody species in areas affected by the creek re-alignment is qualitatively estimated at 15 percent. (Photo 2)

Results for Performance Standard 2

(Less than 30% cover by non-native invasive species as listed in Table 14 (see Appendix 3, Table 1) in the buffer):

Cover of non-native species is qualitatively estimated at one percent for species listed in Table 14 (Appendix 3, Table 1) and two percent overall. This value is below the performance standard threshold. Species from Table 14 that were observed include Himalayan blackberry (*Rubus armeniacus*), English holly (*Ilex aquifolium*), reed canarygrass (*Phalaris arundinacea*), cutleaf blackberry (*Rubus laciniatus*), and Robert geranium. Other species observed include poison hemlock, tansy ragwort, field bindweed (*Convolvulus arvensis*), climbing nightshade (*Solanum dulcamara*), English ivy (*Hedera helix*), and bull thistle (*Cirsium vulgare*).



Photo 1
Woody cover in the riparian buffer (October 2015)



Photo 2
Woody cover in newly planted area (October 2015)

Results for Performance Standard 3

(Less than 15% cover across the entire mitigation site for blackberry):

Cover of blackberries across the entire site is qualitatively estimated at less than one percent. This value is below the performance standard threshold.

Results for Performance Standard 4

(Presence of Japanese knotweed and purple loosestrife will initiate eradication measures):

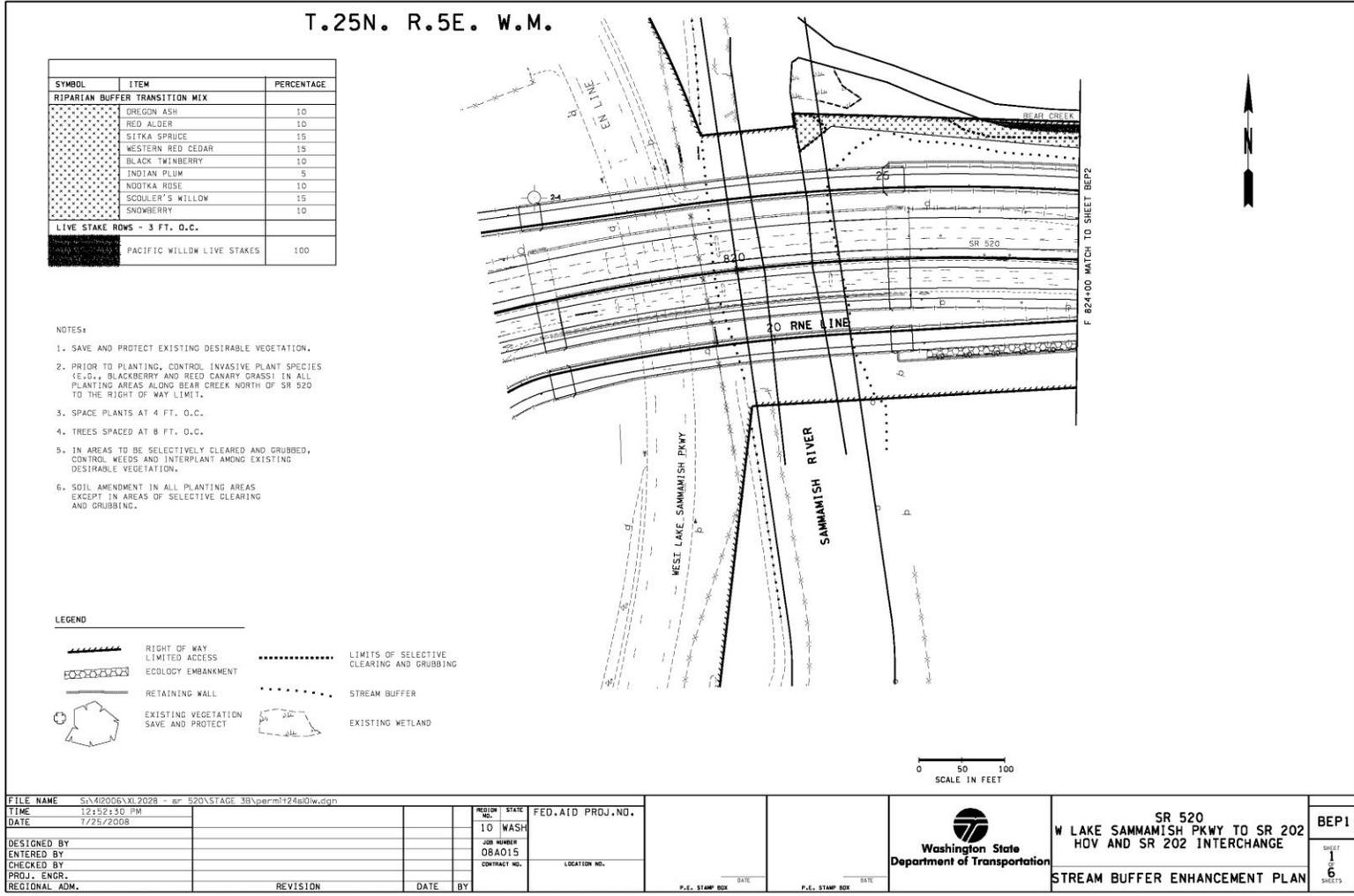
No Japanese knotweed or purple loosestrife was observed at the time of monitoring.

What is planned for this site?

The intent is to have the site closed-out in the near future.

Appendix 1 – Planting Plan

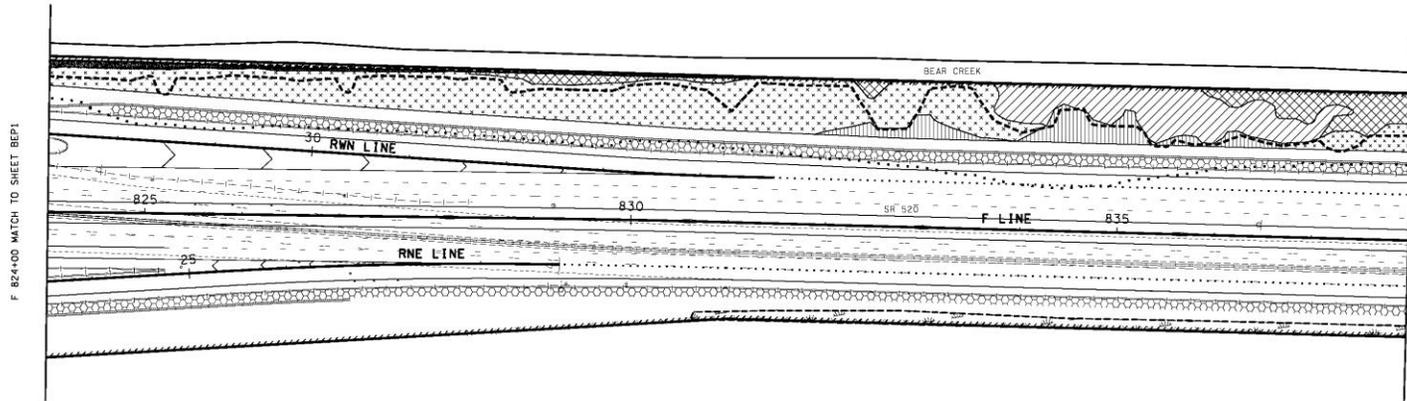
(from WSDOT 2008)



T.25N. R.5E. W.M.

LEGEND

	RIGHT OF WAY LIMITED ACCESS		LIMITS OF SELECTIVE CLEARING AND GRUBBING
	ECOLOGY EMBANKMENT		STREAM BUFFER
	RETAINING WALL		EXISTING WETLAND
	EXISTING VEGETATION SAVE AND PROTECT		



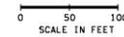
NOTES:

1. SAVE AND PROTECT EXISTING DESIRABLE VEGETATION.
2. PRIOR TO PLANTING, CONTROL INVASIVE PLANT SPECIES (E.G., BLACKBERRY AND REED CANARY GRASS) IN ALL PLANTING AREAS ALONG BEAR CREEK NORTH OF SR 520 TO THE RIGHT OF WAY LIMIT.
3. SPACE PLANTS AT 4 FT. O.C.
4. TREES SPACED AT 8 FT. O.C.
5. IN AREAS TO BE SELECTIVELY CLEARED AND GRUBBED, CONTROL WEEDS AND INTERPLANT AMONG EXISTING DESIRABLE VEGETATION.
6. SOIL AMENDMENT IN ALL PLANTING AREAS EXCEPT IN AREAS OF SELECTIVE CLEARING AND GRUBBING.

PLANTING AREAS		
SYMBOL	ITEM	PERCENTAGE
RIPARIAN BUFFER TRANSITION MIX		
	OREGON ASH	10
	RED ALDER	10
	SITKA SPRUCE	15
	WESTERN RED CEDAR	15
	BLACK TWINBERRY	10
	INDIAN PLUM	5
	NOTKA ROSE	10
	SCOLLER'S WILLOW	15
	SNOWBERRY	10
LIVE STAKE ROWS - 3 FT. O.C.		
	PACIFIC WILLOW LIVE STAKES	100

PLANTING AREAS		
SYMBOL	ITEM	PERCENTAGE
RIPARIAN BUFFER WET MIX		
	OREGON ASH	10
	PACIFIC WILLOW	10
	RED ALDER	10
	SITKA SPRUCE	20
	PACIFIC NINEBARK	10
	RED-OSTER DOGWOOD	15
	SALMONBERRY	10
	SITKA WILLOW	15
EVERGREEN UNDERPLANTING MIX		
	SITKA SPRUCE	50
	WESTERN RED CEDAR	50

PLANTING AREAS		
SYMBOL	ITEM	PERCENTAGE
RIPARIAN BUFFER UPLAND MIX		
	BITTER CHERRY	10
	DOUGLAS FIR	15
	RED ALDER	15
	WESTERN RED CEDAR	10
	BALDHIP ROSE	5
	BEAKED HAZELNUT	10
	RED ELDERBERRY	10
	SNOWBERRY	10
	VINE MAPLE	15



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CHECKED BY	
PROJ. ENGR.	
REGIONAL ADM.	

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STATE	WASH
JOB NUMBER	O8A015
CONTRACT NO.	

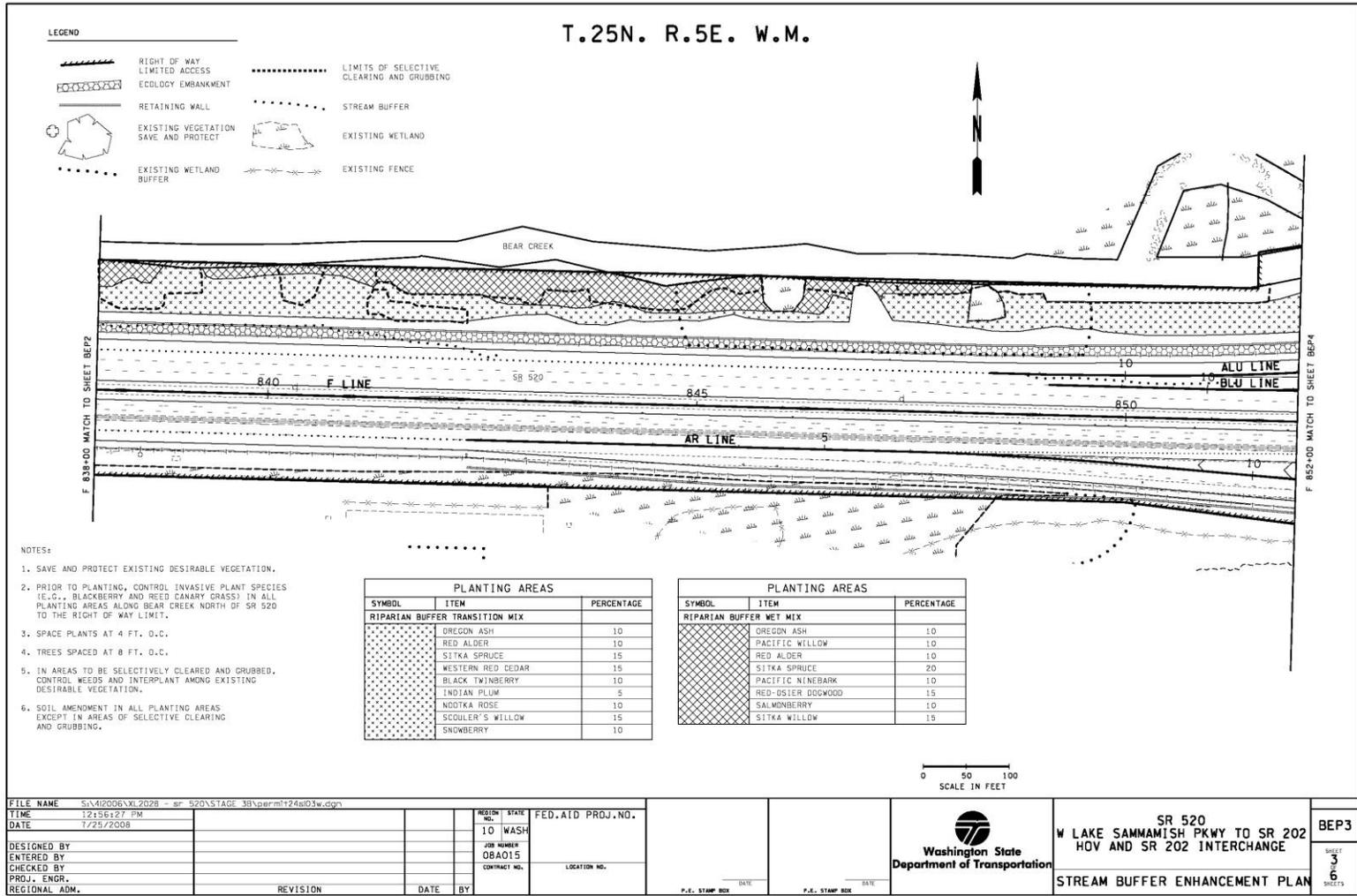
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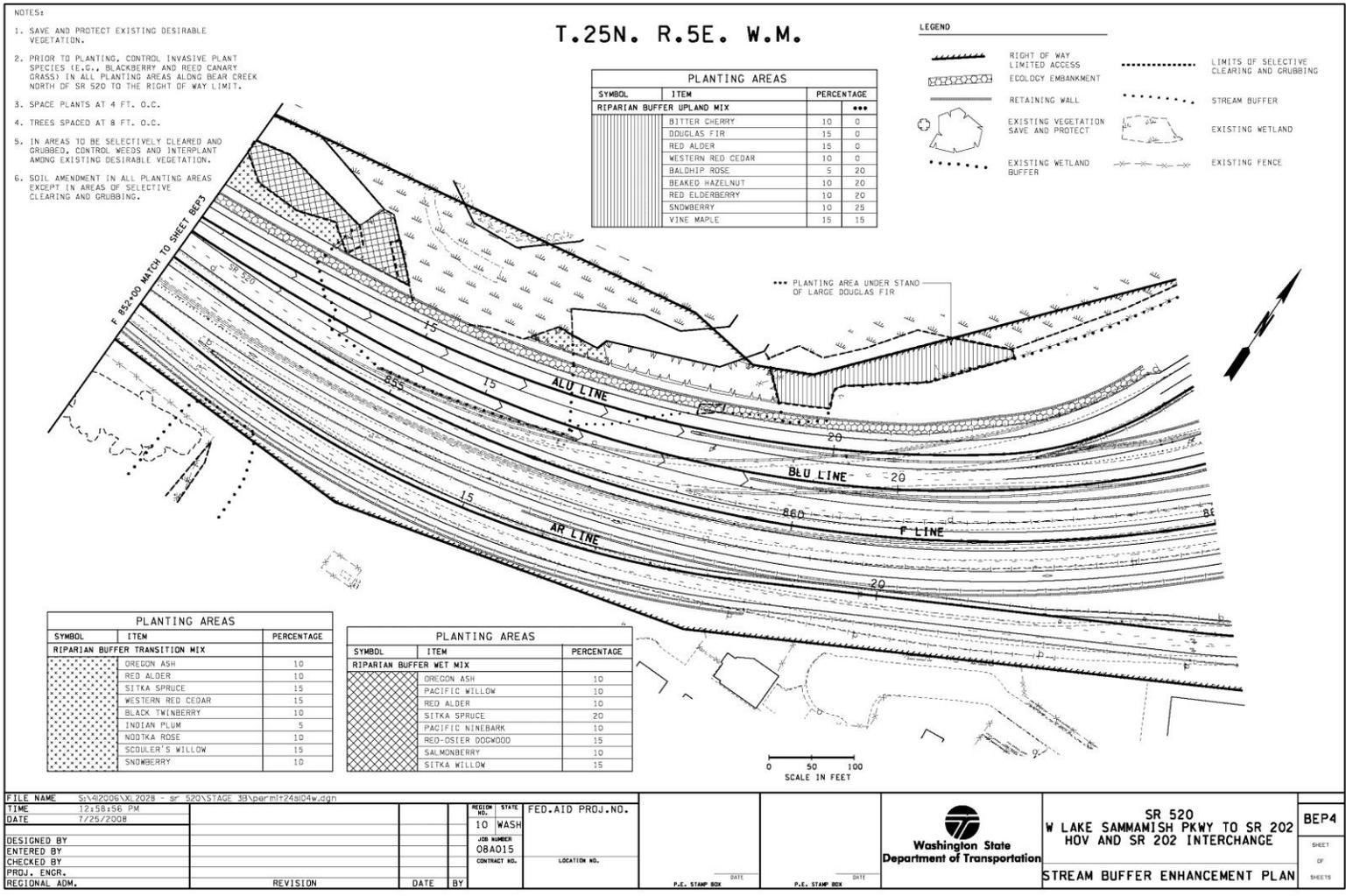
DATE	
P.E. STAMP BOX	



SR 520
W LAKE SAMMAMISH PKWY TO SR 202
HOV AND SR 202 INTERCHANGE
STREAM BUFFER ENHANCEMENT PLAN

BEP2
SHEET
2
6
SHEETS





Appendix 2 – Photo Points

The photographs below were taken from permanent photo-points on October 14, 2015 and document current site development.

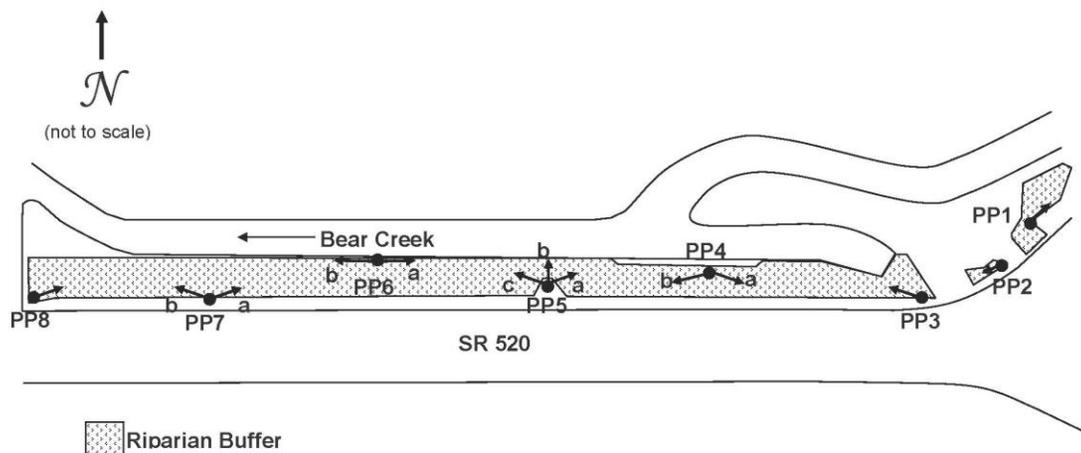


Photo Point 1



Photo Point 2



Photo Point 3



Photo Point 4a



Photo Point 4b



Photo Point 5a



Photo Point 5b



Photo Point 5c



Photo Point 6a



Photo Point 6b



Photo Point 7a



Photo Point 7b



Photo Point 8

Driving Directions:

From I-5 take Exit 154 to I-405 North toward Renton. Take Exit 14 to merge onto SR 520 East toward Redmond. Take the Redmond Way Exit. Turn left onto Redmond Way and go under the freeway. Turn left onto the ramp to get back onto SR 520. Instead of getting back on SR 520, there is a gravel pull-off from the ramp. Park there and walk down the riparian buffer.

Appendix 3 – Data Table

Table 1. 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>Phalaris arundinacea</i>	reed canarygrass
<i>Polygonum cuspidatum (and related species and hybrids)</i>	Japanese knotweed
<i>Prunus laurocerasus</i>	English laurel
<i>Rubus laciniatus</i>	evergreen blackberry
<i>Rubus armeniacus (discolor)</i>	Himalayan or Armenian blackberry

Literature Cited

1. [USACE] US Army Corps of Engineers. 2008. Department of the Army Individual Permit Number NWS-2007-1926-SOD.
2. [WSDOT] Washington State Department of Transportation. 2008. Final Wetland Mitigation Report SR 520: West Lake Sammamish Parkway to SR 202 Widening (MP 11.40 to MP 12.83). Redmond (WA): Washington State Department of Transportation, Northwest Region.
3. [WSDOT] Washington State Department of Transportation. 2008. SR 520 W Lake Sammamish Pkwy to SR 202 HOV and SR 202 Interchange Stream Buffer Enhancement Plans. Sheets BEP1 to BEP4.
4. [WSDOT] Washington State Department of Transportation. 2008. WSDOT Wetland Mitigation Site Monitoring Methods. <http://www.wsdot.wa.gov/NR/ronlyres/C211AB59-D5A2-4AA2-8A76-3D9A77E01203/0/MethodsWhitePaper052004.pdf>