

## *Technical Memorandum*

Date: April 9, 2015                      Project Number: 1870.04

To: Wally Pereyra

From: Dan Turner, P.E. (R2), Glen Anderson, P.E. (R2)

Project: Zaccuse Creek Restoration

Subject: Initial Planning Study

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### **1. Introduction**

This Initial Planning Study in response to your email on December 5, 2014 and on-site meeting with Dan Turner on Tuesday December 16, 2014 and follow-up email/proposal sent on December 19, 2014. This Study provides guidance for doing work on the portion of Zaccuse Creek upstream of East Lake Sammamish Parkway on Dr. Pereyra's property. The Study includes recommendations for an approach to riparian rehabilitation and stream rehabilitation on Zaccuse Creek and includes a proposed scope of work, schedule and budget.

In 2012 R2 wrote a Technical Memorandum to Dr. Pereyra dated June 18, 2012 (R2 2012) providing design guidance for the culvert replacement projects being considered by the City of Sammamish and King County. Additional surveying has been done since then on the property for the purpose of mapping wetlands and to support a boundary line adjustment. R2 received the AutoCAD files from Steve Van Patten showing this new information.

### **2. Stream Rehabilitation Project Assessment**

Section 2 describes the current status of Zaccuse Creek including the status of the culvert replacement projects, the existing creek and riparian conditions, and recommends rehabilitation options and grant funding opportunities. The drawings referenced in the following section are included under Appendix A of this report.

#### ***2.1 Culvert Replacement Projects Status Report***

The R2 2012 report provided preliminary design guidance for the culvert replacement projects for Zaccuse Creek. There are three culverts in series just downstream of the Pereyra property. They are the East Lake Sammamish Parkway (Parkway) culvert, the East Lake Sammamish Trail (Trail) culvert, and the East Lake Sammamish Shore Lane (Lane) culvert. The Parkway and

Trail culverts were both determined to be barriers to fish passage. As part of the scope for this report, Hans Berge (King County), and Tawni Dalziel (City of Sammamish) were contacted by R2 to determine the state of planning and/or design for the Zaccuse Creek culvert replacement projects for the Parkway, Trail, and Lane culverts. In addition to the telephone calls, online research was done to find additional sources of information about the status of these culvert replacement projects. The status of the culvert replacement projects as we understand are summarized below.

- **Parkway Culvert.** The culvert replacement project is not currently in the budget for the City of Sammamish. The next budget cycle is for 2017-2018. Tawni Dalziel is aware of the project and will be attending the Kokanee Workgroup meeting(s).
- **Trail Culvert.** The East Lake Sammamish Trail is currently being upgraded in segments. The segment with Zaccuse Creek is Segment B (from SE 33rd St. to Inglewood Hill Road). Currently Segment B is “in planning” according to their website with construction slated to begin in the spring of 2016 and continue into 2017. Funding for this segment has been approved as part of the Open Space and Trails Levy (2008-2013) and the Parks, Trails, and Open Space Replacement Levy (2014-2019). No planning documents were available at this time. It is important that the members of the Kokanee Workgroup continue to keep this project high on the planning agenda for the trail in order to make sure the culvert is replaced with an appropriate culvert.
- **Lane culvert.** It is our understanding that the Lane culvert would be replaced at the same time as the Trail culvert replacement. Further research is needed to verify this information.

## 2.2 Site Visits

Three site visits were conducted as part of this planning study:

- Glen Anderson visited the site on 1/21/15 to do reconnaissance and observe the changes since his last visit in 2012, and to clear paths for the planned site visit on 1/28/15 with R2’s Riparian Ecologist (Kevin Fetherston, Ph.D.), and R2’s Stream Restoration Engineer/Geomorphologist (Paul DeVries P.E., Ph.D.) to assess the project.
- Glen Anderson and Kevin Fetherston visited the site on 1/28/15 with the goal of assessing the landscape and riparian ecology best approach to enhancing Zaccuse Creek.
- Glen Anderson and Paul DeVries visited the site on 2/4/15 to assess the channel modification/geomorphology best approach to the project.

## 2.3 Trip Reports

### 1/21/15 Trip Report

Since the last site visit in 2012, the creek has changed course in a couple of location and the head-cut has moved upstream 100 to 200 feet. The vegetation has died back for the winter and several trails had been cut for a wetlands survey so it was easier to move around on the property. This on-site trip verified that no work had been done on the channel or culverts since the last site visit in 2012.

### 1/28/15 Trip Report

Reach names used in this trip report are those identified in R2 2012 and shown on Drawing 1 (attached). The vegetation in Reach 3 is dominated by red alder trees and blackberries, and other low lying unidentified vines (See Drawing 2 and 3). At some locations the channel is choked by vegetation which results in sediment deposition and channel movement. Photos 1 and 2 show the dominant vegetation and Photo 2 shows an area where the channel is choked and significant deposition has occurred.



Photo 1. Looking downstream in Reach 3 towards the Parkway. Red alder, blackberry and other vine species dominate the vegetation in this reach.



Photo 2. Looking upstream in Reach 3 at an area where vegetation has choked the channel and caused significant sediment deposition.

Reach 4 vegetation is dominated by a salmonberry understory with red alder still the dominant tree, some cedar are also present in this reach (See Drawing 2 and 4). Photo 3 shows the straight gravel bed stream and a riparian with salmonberry, fern, blackberry and red alder visible.

In Reach 5 and 6 the vegetation transitions into a mature forest with cedar, cottonwood, vine maple, and fern dominant. Photo 4 shows Reach 6 (by the footbridge), which will be used as a reference reach to show the goal for riparian rehabilitation in Reaches 3 and 4 (See Drawing 2 and 5).





Photo 3. Looking upstream in Reach 4 with salmonberry, fern, red alder and some blackberry visible.



Photo 4. Looking upstream in Reach 6 at the footbridge. This area is used as a reference reach for vegetation rehabilitation goals in Reaches 3 and 4 downstream. Cedar, fern, salmonberry, and vine maple are dominant in this area.

2/4/15 - Trip Report (written from upstream to downstream direction):

*Reach 6*

Deep head-cutting looks to be a new process in this reach of Zaccuse Creek. The head-cutting is likely caused by changes in the capacity of the creek to move material, potentially caused by higher peak flows or increased channelization. Photos 5 and 6 show the current head-cut location and the channel scoured since 2012. Development in the upper basin may be the cause of these higher peak flows. The deposits in the floodplain (alluvial fan) indicate that previously the flow spread out and deposited material in reach 6, and that the creek was unable to carry the larger material any further. Inspection of the layers in the recent cut banks indicates only one or in some locations two visible lenses with gravel deposits separated by one to two feet of soil deposited between. We believe that for many years the creek channel had meandered on the alluvial fan, depositing gravel in the channel, and contributing to soil building in the area for long periods in between subsequent gravel deposition. Another indication that the creek bed has moved over the years in Reach 6 is shown on the older maps of the area, which still show Zaccuse Creek further to the north running along the base of the slope. We followed the route shown on the older maps in the field. There are signs that the creek once took the more northern course, but there is no indication that deep head-cutting had occurred in that channel. Based on our observations, it appears that this incision and head-cutting may be a new phenomenon at this location caused by recent changes to the creek.

The lack of evidence of head-cutting in the old channel supports the idea that this new head-cutting is brought on by recent changes in stream power. A King County 1994 channel survey reported some “sedimentation issues from channel incision in the middle reaches” of Zaccuse Creek. It is unclear if the report is referencing the location of the current incision, or if the “middle reaches” indicate something higher in the basin, above the 206th Ave NE culverts. However it does indicate that there were high sediment loads in the creek as far back as 1994. The material deposited in the fan, and visible in the recently exposed banks, indicates that there has been a source (or sources) of material upstream in the basin providing high sediment loads to Reach 6 for many years. Understanding the nature of the source of sediment is critical in understanding how the creek will respond to any future channel work done downstream.

We did not investigate upstream further than the 206th Ave NE culvert, but we recommend a reconnaissance survey up to the headwaters as part of any future design to identify and quantify all apparent sources of sediment to the creek. Based on the limited observations made during the site visit, it is our opinion that Zaccuse Creek may have an abundance of sediment sources.



These sources may include gravel from the existing incision head-cut, and from sources upstream in the basin. The stream restoration design will need to consider the high sediment load, and the potential for deposition in the lower reaches of the creek. In addition to the sediment source, a reconnaissance effort upstream to map habitat quality should also be completed to define the benefits that might be achieved from a fish passage project. Another issue is that the culvert under 206th Ave NE is at least a partial fish passage barrier to the upstream basin, which will potentially reduce the fish habitat benefit of providing passage upstream of the existing head-cut.



Photo 5. View of the current location of the head-cut at the base of a large cottonwood tree. The channel is supported by the cottonwood roots, temporarily retarding the rate of movement upstream. This location is at least 150 ft upstream of the head-cut (called Reach 5, or "waterfall" in R2 2012) location in 2012.



Photo 6. View looking upstream in Reach 6 at a channel roughly 4.5 ft deep by 4.5 ft wide which has formed since 2012. The head-cut location is approximately 50 ft upstream from this location.

#### *Reach 4*

This reach is mostly a transport reach with a gravel bottom, little channel diversity and relatively high velocities. Near the downstream end of Reach 4 deposition starts to become apparent, the stream banks are less defined and deposition on the adjacent floodplain is visible. At one location branches from a downed tree partially block the flow, resulting in a significant deposition of material (approximately one foot deep). This blockage and deposition has



happened since the field work for the R2 2012 study, indicating that high sediment loads have occurred in the interim.

### *Reach 3*

This reach shows signs of deposition over a large area upstream of the Parkway culvert. Recent sand and silt deposits with some small gravel are visible on the surface. Much of this deposited material would most likely be transported to Lake Sammamish if the Parkway and Trail culverts were not undersized. Assuming that the culverts are replaced, this reach's sediment transport connection with the lake would be increased. Typically a channel of this slope (2.5-3.5%) should support a gravel stream bed, rather than the sand and silt now present, meaning that much of the sand and silt and some gravel that is currently deposited upstream of the Parkway would be transported through Reach 3, and likely continue to the Lake.

## *2.4 Recommended Riparian and Stream Rehabilitation Overview*

### Riparian Rehabilitation

The eradication and replanting work should be able to proceed without a long permitting process if the work is done by hand. If machines are used for the eradication, then permits would be required similar to the permits for the channel realignment work. We recommend doing this work by hand to expedite the implementation. A small crew could use weed whackers fitted with blades to clear the area, followed by careful application of herbicide to the cut stalks. This would be repeated for 5 years to successfully eradicate the blackberries, and so the new riparian vegetation can get started without having to compete with the invasive species.

One other possibility for the eradication work is to use goats for the areas with blackberries, however goats do not root out the plants, so herbicide application, or rooting out by hand would still be necessary to control regrowth. As the plans are further developed, this idea will be given more consideration for part of the eradication work.

### Stream Rehabilitation Overview

As a result of the site visit and during the development of preliminary conceptual alternatives, we have prepared some thoughts on the design elements and approach. This could change significantly as the design process progresses, but we wanted to lay out the basic recommended approach at this point in time. The description below provides this information (described starting at the Parkway culvert in the upstream direction).

### *Reach 3*

In Reach 3 we recommend construction of a new channel connecting the downstream end of Reach 4 with the upstream end of the Parkway culvert. Drawing 6 shows a sketch of a proposed channel, including a six foot wide pilot channel, and a low floodplain with wood roughness elements. These wood structures would also function to slow channel velocity and to keep the channel from jumping into a new alignment. The roughness elements would act to slow down flow and allow deposition and sediment sorting to take place on the floodplain. Overflow notches to allow flood flows to spread out and deposit sediment during large floods could also be elements of the design. The details for these elements will require further hydrology, hydraulics, and sediment transport analysis to be conducted as part of any channel design which would be described in a design report.

### *Reach 4*

In Reach 4 we are proposing the addition of roughness elements to the creek for at least 400 ft of the channel, ending at the Pereyra property line. However, these roughness elements could be added in the channel up to the head-cut location if desired. The recommend roughness elements will slow the flow, encourage local deposition, and thereby increase channel diversity and Kokanee habitat. Roughness elements could be a combination of wood and/or large boulders. We also recommend blocking the ditch that acts as a distributary to the south (approximate station 7+90). This ditch is connected to the primary channel at high water and holds standing water most (or all of the year), and could strand fish.

### *Reach 5 and 6*

We are not recommending any channel work to be done in Reach 4 and 5 at this time. However, we have included descriptions for work that could be done in the future if desired. Reach 4 and 5 are located on property listed by the King County Assessor's Map (Tax ID # 2249850150) as owned by Jaye Siqueiros, Eden Glen Community Area.

The channel head-cut described in R2 2012 has been abandoned by the creek and the location has moved approximately 100-200 ft upstream in a new channel. There is currently a four to five foot vertical drop resulting in a total barrier to fish passage at the head-cut location. If fish passage is desired upstream of this location we would recommend temporary solutions until the channel stabilizes, and/or the city replaces the 206<sup>th</sup> Ave. culvert. Temporary solutions could range from hand carrying fish upstream of the head-cut to installing a temporary ladder such as a Denil or Steep pass during the spawning season. Any channel work done in this reach would presumably have the goals of stabilizing the creek to reduce further head-cutting upstream and to

provide fish passage above this location. The benefit of providing fish passage at the head-cut is limited by the existing culvert under 206th Ave NE, which is located approximately 300 ft upstream of the head-cut, and is likely a fish passage barrier at most flows. If the work is done to stabilize and provide passage at the head-cut location then it is our opinion that the culverts under 206th should also be replaced to allow passage above 206<sup>th</sup>.

If stabilization/fish passage work in this area is pursued, we would recommend installing grade control structures starting at approximately station 9+50, where the incision begins, and extending upstream approximately 250 ft at a six percent slope to the current head-cut location. Grade control steps would be six inches high and spaced approximately eight feet apart. The engineering for this feature would be relatively straight forward, but the permitting and construction could be much more costly.

### *2.5 Permitting*

The permits needed for the stream rehabilitation project would be similar to the permits that were required for the Ebright Creek culvert project. There should not be any permits required for the riparian rehabilitation work if this work is done without the use of earth-moving machines.

### *2.6 Grant Opportunities:*

Further research of the WDFW – ALEA grant and other potential funding sources was completed at part of this study. The findings are summarized below. All of the grants we researched require the applicant to be a government, educational institution, a non-profit organization, or to provide significant volunteer hours. We reached out to Earth Corps as the most likely non-profit partner to lead the grant effort. Rob Anderson at Earth Corps suggested the following possible grant sources for Zaccuse Creek:

#### King Conservation District (KCD)

EarthCorps has had success with this program in the past and it seems like a good fit for this site. EarthCorps would collaborate or potentially even take the lead on writing a grant application. Grant applications are approved during regularly scheduled Board meetings between February and October. KCD supports projects that promote education and outreach, works with property owners



**National Fish and Wildlife Foundation (NFWF)**

EarthCorps has done other projects with NFWF funding, but we are not certain that this would be the most applicable program for Zaccuse Creek. This grant is only open to government, educational institution, a non-profit. Applications are accepted twice a year for matching funds.

**Aquatic Lands Enhancement Account (ALEA)**

ALEA is a volunteer cooperative grant program used to engage volunteers and benefit Washington's fish and wildlife resources. ALEA grants are in high demand and follow a competitive process to select recipients. Washington Department of Fish & Wildlife (WDFW) administers the grants. EarthCorps is willing to collaborate on this grant. The deadline for WDFW – ALEA grant is February 28th 2015 for the next biennium. This grant could be used for the landscape/riparian work.

The ALEA grant application would need to be submitted very quickly to be considered for the next round of grants. We did some additional research to verify that this project would be eligible for ALEA funds. Figure 2-1 shows a screenshot of the eligibility form from the ALEA website that indicates that this project is eligible given that we adhere to certain criteria.

[Home](#) » [Zaccuse](#) » Eligibility Questionnaire

### Eligibility Questionnaire

Thanks for your interest in applying for an ALEA grant. First, we need to ask you a few questions to determine if you are eligible to apply.

1. Will the project activities that you are requesting funds to support be occurring in Washington State?

Yes  
 No

2. Will you be utilizing any volunteers (unpaid persons) to conduct your project?

Yes  
 No

3. Are you representing a for-profit business or a state or federal agency?

Note: if you are representing a school, university or political subdivision of the state such as conservation district, select "no".

Yes  
 No

4. Is this project being done as required mitigation for impacts and damage to the environment caused by the applicant or any associates of the applicant?

Yes  
 No

5. Will your project benefit Washington's fish and wildlife resources and/or enhance the public's enjoyment or knowledge of those resources?

Yes  
 No

6. Does your project involve rearing and/or releasing any fish or wildlife species?

Yes  
 No

Excellent. Based on your responses it appears you are eligible to apply.

We welcome you to begin the application process.

Figure 2-1. ALEA Eligibility Questionnaire.

As shown in Figure 2-1 above, the Zaccuse project would be eligible to apply for a grant. It should be noted that volunteers are required for eligibility, so teaming with an organization that

can offer volunteers is essential to get the grant. Also, if we answered yes to question #6, “rearing and/or releasing fish,” then the project would need prior WDFW approval. So the project would be eligible, but we do are unsure of how it would score. Figure 2-2 shown below shows the scoring criteria for the ALEA grant program.

The project will need to score well on these criteria to be considered for ALEA funding. If an application is submitted special attention should be paid to highlighting how the project meets the objectives in items in #1-7 above.

<b>2015-2017 ALEA GRANT PROGRAM SCORING CRITERIA</b>		<b>POINTS</b>
<b>1</b>	<b>How consistent is the project with WDFW goals, objectives, actions or initiatives documented in a WDFW approved or supported management or recovery plan?</b>	<b>0-20</b>
<b>2</b>	<b>What level of public benefit would be realized from the project?</b>	<b>0-15</b>
<b>3</b>	<b>What level of focus does the project have on WDFW priority habitats or species?</b>	<b>0-5</b>
<b>4</b>	<b>Measurable objectives</b>	<b>0-10</b>
<b>5</b>	<b>How would you rate the project costs to benefits?</b>	<b>0-15</b>
<b>6</b>	<b>How would you rate the level of volunteer effort?</b>	<b>0-15</b>
<b>7</b>	<b>How qualified is the applicant to undertake this project?</b>	<b>0-10</b>
<b>Total</b>		<b>0-90</b>

Figure 2-2. ALEA Grant Program Scoring Criteria.

### 3. Stream Rehabilitation Design Scope of Work

The following is a description of the proposed design project scope by task and sub-task. The proposed schedule and budget are included after the scope text.

#### 3.1 Task 1 Site Riparian Rehabilitation

##### Task 1 Topographic Survey and Plant ID

A topographic survey with plant types identified is required to develop representative cross sections of the area to be rehabilitated. Depositional areas, channels, and rises will be identified by producing 1-foot contours in the 2-acre area identified as dominated by blackberries. In addition another 2-acre area, dominated by salmonberry, will be surveyed with sufficient coverage to produce 2-foot contours and identify vegetation.



### Task 1.1 Planting Plan

A planting plan will be developed for an area of roughly 4 acres. The plan will consist of 4 sheets described in Table 3-1 below.

Table 3-1. Planting Plan Proposed Drawing List.

<b>Sheet</b>	<b>Name</b>	<b>Description</b>
1	Plan View	Show areas of eradication and planting. Scale 1"=50' on 11x17 sheet
2	Sections	Show representative cross sections with existing and proposed plants
3	Details	Details of eradication and planting work to be done
4	Schedule	Schedule of plants and materials

Note: A 5-year maintenance plan would be required to allow the newly planted vegetation a chance to become established.

### Task 1.2 Grant Application(s)

Using the planting plan as a basis, R2 will prepare and submit grant applications. R2 believes that the plant rehabilitation portion of this project gives the best opportunity to obtain grant matching funds and have identified EarthCorps as the most likely entity to manage the grant and volunteers. Additional grant applications will be submitted for the stream rehabilitation portion of the project if grant funds are available.

### Task 1.3 Implementation

The implementation work will be done by others, however R2 will be available to answer any questions and inspect work on the implementation phase of the riparian rehabilitation work. The initial work will take place in the first year of the project with an additional 5 years of maintenance work. R2 will inspect the project on a yearly basis during the 5-year period after maintenance work has been done each season. We believe the initial eradication work could be started this year if we act quickly, and could possibly utilize EarthCorps for project implementation.

### *3.2 Task 2 Stream Restoration Design*

Task 2 describes the Stream Restoration Design phase of the project. The stream design is based on distinct reaches, that each requires different approaches to restoration work in the stream channel.

### Task 2.1 Topographic Survey

Additional topographic survey data will be collected as needed to define the stream channel and floodplain, and will extend to the edge of the property to identify any other low lying areas and abandoned channels. This information will be added to the information collected in Task 1.1 to create a topographic map with 2 ft contours over the entire area of interest.

### Task 2.2 Upper Basin Reconnaissance

This task will include gathering any background information available on the history of Zaccuse Creek and development in the basin. One engineer and one fisheries biologist from R2 will walk the upper basin of Zaccuse Creek and any significant tributaries as far as possible, documenting sources of sediment, stream width, substrate, and habitat quality. This information will be documented with photos and a brief trip report, and will be included in the design report in Task 2.8.

### Task 2.3 Hydrology and Hydraulics

R2 will obtain basin information including storm drainage and land use maps from the City of Sammamish. Where information is not available, R2 will estimate these values from aerial photography and field verification. R2 will use this information to estimate the flood flows for Zaccuse Creek. A HEC-RAS model of Zaccuse Creek will be built using the survey information from tasks 1.1 and 1.2, and flood flows will be routed through the model to estimate flow depths, velocities, and shear stresses to be used in Task 2.4 – Sediment transport. A brief memo will be provided summarizing this information which will be included in the design report.

### Task 2.4 Sediment Transport

Using the information gathered in Tasks 2.1 through 2.3, R2 will estimate the current sediment transport potential of Zaccuse Creek, and for various channel design alternatives. This information will be used to design channel features, to arrive at the best design alternative from both a sediment transport perspective, and for Kokanee spawning habitat. The information will be summarized in the design report.

### Task 2.5 Stream Rehabilitation Design – 30%

The 30% design drawings will show the proposed channel re-alignment, extents of channel work, locations of structures to be used in the channel and floodplain, shape and slope of the channel, and typical cross sections. These drawings can be used to engage the stakeholders, and for soliciting comments that will be incorporated into the 60% design. Table 3-2 shows a drawing list and description of each drawing.

Table 3-2. Proposed 30% Drawing List.

Sheet	Name	Description
1	Cover Sheet and Drawing Index	Vicinity Map, Drawing Index, and General Notes will be included on this sheet.
2	Overall Site Plan	Shows an overall plan view of the project showing Zaccuse Creek from 206th St. to Lake Sammamish at scale 1"=100'
3	Channel Plan and Profile	Close-in plan view will show the proposed channel work area and corresponding elevation profile.
4	Sections and Details	Shows typical cross sections of the proposed channel and the channel structures.

#### **Task 2.6 Stream Rehabilitation Design – 60%**

The 60% design phase will incorporate the comments and design changes from the 30% design and include adequate detail in the design drawings for use in permit applications. At the 60% design phase, all project elements will be identified such that the design should not change substantially between the 60% and 90% design phases. A list of specification will be included with the 60% design submittal.

The 60% drawing list is shown in Table 3-3. These drawings will be used to submit permit applications. Stakeholders will have a chance to comment on these drawings for changes they would like to see for the 90% submittal.

#### **Task 2.7 Stream Restoration Design – 90%, 100%**

The 90% design will incorporate comments and design changes from the 60% design and will add detail to the design drawings for use in construction. At the 90% design the design is essentially complete for a final review. Minor edits are added from the 90% resulting in 100% the bid ready drawings. The drawing list will not change from the 60% drawing phase. Specifications will be included with the 100% design submittal. The drawings and descriptions are listed in Table 3-3 below.



Table 3-3. Proposed 60%-100% Drawing List.

Sheet	Name	Description
1	Cover Sheet and Drawing Index	Vicinity Map, Drawing Index, and General Notes included on this sheet.
2	Overall Site Plan	Overall plan view of the project showing Zaccuse Creek from 206 <sup>th</sup> St. to Lake Sammamish, scale 1"=100'
3	Channel Plan and Profile	Close-in plan view showing proposed channel work area with corresponding elevation profile.
4	Sections and Details 1	Sheet 1 of sections of the channel and structures with details of structure placement and construction.
5	Sections and Details 2	Sheet 2 of sections of the channel and structures with details of structure placement and construction.
6	Sections and Details 3	Sheet 3 of sections of the channel and structures with details of structure placement and construction.
7	Water Handling Plan	Plan of water diversion during construction
8	Temporary Erosion and Sediment Control (TESC)	Plan, details and notes of erosion control plan for construction.

### Task 2.8 Design Report

R2 believes it is critical that this project include a design report. Any change made in Zaccuse Creek on the Pereyra property will have some effect on the downstream reaches, including the culvert projects (Parkway, Trail, Lane, and the most downstream culvert). Task 2 information and design calculations will be compiled into brief memos, and incorporated to document the basis of design for this project. This information will be compiled together with additional information as needed, and the final design drawings to produce a comprehensive report. We expect this report to be no longer than 20 pages not including appendices and attachments.

### *3.3 Task 3 Permitting*

R2 would submit plans at the 30% design phase to all stakeholders at the Kokanee Work Group meeting to get comments for the 60% design development phase. This should allow R2 to incorporate any required changes by the 60% phase, which will be submitted with the permit applications, and avoid any surprises in the permit process.

### Task 3.1 SEPA

R2 will check with the City of Sammamish regarding the SEPA process. Similar to the Ebright Creek culvert job, the City of Sammamish will be the lead agency for SEPA and will make the determination if we need to go through the entire SEPA process, or if this project is exempt. If a SEPA checklist is required R2 will do this paperwork and submit to the city. This is required before the JARPA will be reviewed.

### Task 3.2 Write and Submit JARPA

R2 will take the lead on writing and submitting a full JARPA application and formatting the 60% design drawings to be submitted with the application. We will submit the permit via the WDFW APPS website to expedite the process. Copies of the JARPA will be also submitted to Department of Ecology, the Corps of Engineers, King County (if required) and the City of Sammamish to get all of the required permits.

### Task 3.3 City and County Permits (Clearing and Grading, Shorelines)

R2 will meet with the city for a permit requirements meeting prior to submitting any permits. R2 will format drawings at the 60% design phase to the City of Sammamish's requirements and submit a permit application package to the city. R2 will submit a shoreline exemption packet to King County to get an exemption from the shoreline permit based on it being a project designed to improve fish habitat. It would include written WDFW approval, HPA permit, and determination by the City of Sammamish that this project is consistent with the shoreline master program. If an exemption is not approved R2 will submit a shoreline development permit application. These permits typically take 120 days to process

### *3.4 Task 4 Construction Services*

Construction would be done by an independent contractor. R2 would provide construction services throughout the construction phase of the project.

### Task 4.1 Contractor Selection

R2 will assist in the selection of a qualified contractor to do the channel rehab work. This assistance will include sending out an RFP to contractors R2 has worked with on past projects, as well as other contractors with experience in similar projects. R2 will attend a site visit with the interested contractors. R2 will review the proposals and will provide recommendations to Dr. Pereyra regarding the proposals.

#### Task 4.2 Submittal Review and RFI Responses

R2 will review submittals and respond to RFIs from the contractor. At a minimum we would expect the submittals to include Water Handling, Construction Schedule, TESC, and materials specification for the in channel and floodplain structures. In addition we have made allowances for 10 RFIs.

#### Task 4.3 On-Site Inspection

R2 will make on-site inspections at critical junctures in the project. The project site is close to the R2 offices, which will make frequent inspections possible. We have assumed 10 on-site visits during construction taking approximately 2 hours each.

### **4. Schedule**

A proposed schedule showing the tasks to complete the project as well as work by others is presented in Figure 4-1 shown on the following page. This schedule assumes notice to proceed (NTP) on the Riparian Rehabilitation work by February 16th. This is due to the ALEA grant deadline of February 28th. If it is decided to wait for the next biennium to apply for grant funding then the schedule can be relaxed. The schedule shows six to seven months between the 30% and 60% to allow time for implementation of the Planting Plan and Stakeholder review of the 30% design. The 60% duration is shown for the entire year 2016 to allow for coordination with the estimated concurrent design effort by King County and the City of Sammamish on the culverts. We have also allowed a 1-year duration for the 90-100 percent design as well in an effort to time final design and construction with the downstream culvert projects.



Task	Activity	2015												2016	2017	2018	2019	2020
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec					
-	Notice to Proceed (Feb 16th)		◊															
1	Site Riparian Rehabilitation																	
	1.1 - Topographic Survey and Plant ID		■															
	1.2 - Develop Planting Plan		■															
	1.3 - Grant Application (ALEA - Feb 28th)		◊															
	1.4 - Implementation (Initial and 5-yr Maintenance)			Initial Eradication Effort							Initial Planting Effort			Maintenance for 5 years minimum				
2	Stream Rehabilitation Design																	
	2.1 - Topographic Survey				■													
	2.2 - Upper Basin Reconnaissance				■													
	2.3 - Hydrology and Hydraulics Analysis					■												
	2.4 - Sediment Transport Analysis						■											
	2.5 - 30% Design							30% Design										
	2.6 - 60% Design													60%				
	2.7 - 90%, 100% Design														90-100%			
	2.8 - Design Report																	
3	Permitting																	
	3.1 - SEPA																	
	3.2 - Write and Submit JARPA																	
	3.3 - Write and Submit City and County Permits																	
4	Construction Services																	
	4.1 - Contractor Selection																	
	4.2 - Submittal Review and RFI Responses																	
	4.3 - On-Site Inspection																	
N/A	Work by Others																	
	- Trail Culvert and Lane Culvert (King Co.)			Planning										Design	Const.			
	- Parkway Culvert (City of Sammamish)													Planning	Design	Const.		
	- Channel Construction on Peryera Property															Const.		

Figure 4-1. Proposed Project Schedule.

## 5. Budget

The following Figure 5-1 shows our proposed budget for design services detailed by task and subtask, however we plan on managing the project to the total cost.

Tasks	Total Cost	Labor Cost	Labor Hours	Direct Expenses	Year of Work (1)
<b>1 Site Riparian Rehabilitation</b>	<b>\$14,852.85</b>	<b>\$14,436.00</b>	<b>116</b>	<b>\$416.85</b>	
1.1 Topographic Survey and Plant ID	\$7,654.85	\$7,340.00	68	\$314.85	2015
1.2 Planting Plan	\$3,366.00	\$3,264.00	24	\$102.00	2015
1.3 Grant Applications	\$2,464.00	\$2,464.00	16	\$0.00	2015
1.4 Implementation (R2 cost only)	\$1,368.00	\$1,368.00	8	\$0.00	2015
<b>2 Stream Rehabilitation Design</b>	<b>\$53,461.71</b>	<b>\$53,304.28</b>	<b>390</b>	<b>\$157.43</b>	
2.1 Topographic Survey	\$3,173.43	\$3,016.00	24	\$157.43	2015
2.2 Upper Basin Reconnaissance	\$1,628.00	\$1,628.00	10	\$0.00	2015
2.3 Hydrology and Hydraulics Analysis	\$4,264.00	\$4,264.00	38	\$0.00	2015
2.4 Sediment Transport Analysis	\$4,488.00	\$4,488.00	36	\$0.00	2015
2.5 30% Design	\$8,703.00	\$8,703.00	65	\$0.00	2015
2.6 60% Design	\$14,492.40	\$14,492.40	105	\$0.00	2016
2.7 90%, 100% Design	\$8,858.30	\$8,858.30	62	\$0.00	2017
2.8 Design Report	\$7,854.58	\$7,854.58	50	\$0.00	2017
<b>3 Permitting</b>	<b>\$24,198.64</b>	<b>\$24,198.64</b>	<b>162</b>	<b>\$0.00</b>	
3.1 SEPA Checklist	\$6,913.59	\$6,913.59	45	\$0.00	2017
3.2 Write and Submit JARPA	\$10,140.00	\$10,140.00	69	\$0.00	2017
3.3 City and County Permits	\$7,145.05	\$7,145.05	48	\$0.00	2017
<b>4 Construction Services</b>	<b>\$28,324.08</b>	<b>\$28,324.08</b>	<b>168</b>	<b>\$0.00</b>	
4.1 Contractor Selection	\$4,065.26	\$4,065.26	24	\$0.00	2018
4.2 Submittal Review and RFI Responses	\$16,357.77	\$16,357.77	100	\$0.00	2018
4.3 On-Site Inspection	\$7,901.04	\$7,901.04	44	\$0.00	2018
<b>Project Totals</b>					
Units			836		
Dollars	\$120,837.27	\$120,263.00		\$574.28	
<b>Total Not-to-Exceed Amount</b>	<b>\$121,000</b>				

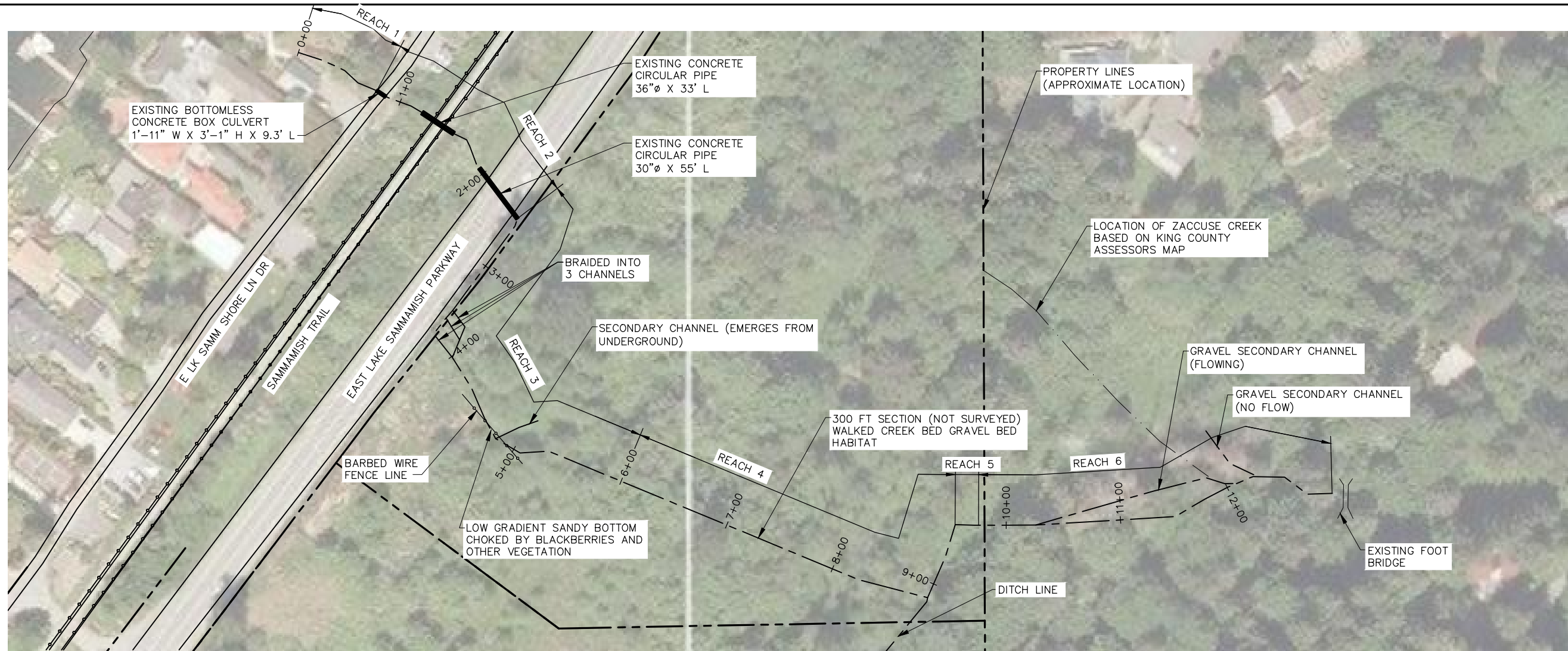
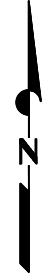
(1) Estimate includes an annual rate increase of 4% effective every January 1st.

(2) Reimbursable expenses include a 10% fee.

Figure 5-1. Proposed Project Budget.

# **Attachment A**

## **Drawings**

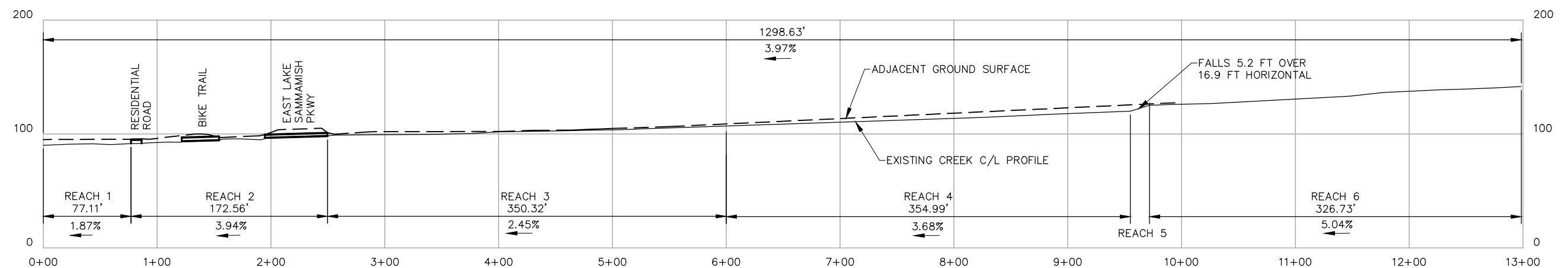


NOTES:

1. SURVEY APRIL 13TH, 2012. ZACCUSE CREEK FLOW = 1.0 CFS. HORIZONTAL LOCATION BASED ON BEST FIT TO AERIAL PHOTO. VERTICAL DATUM BASED ON SETUP #1 ON SAMMAMISH TRAIL ARBITRARILY SET TO 100.0'.

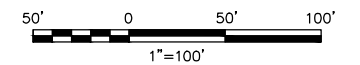
**SITE PLAN**

SCALE: 1" = 100'



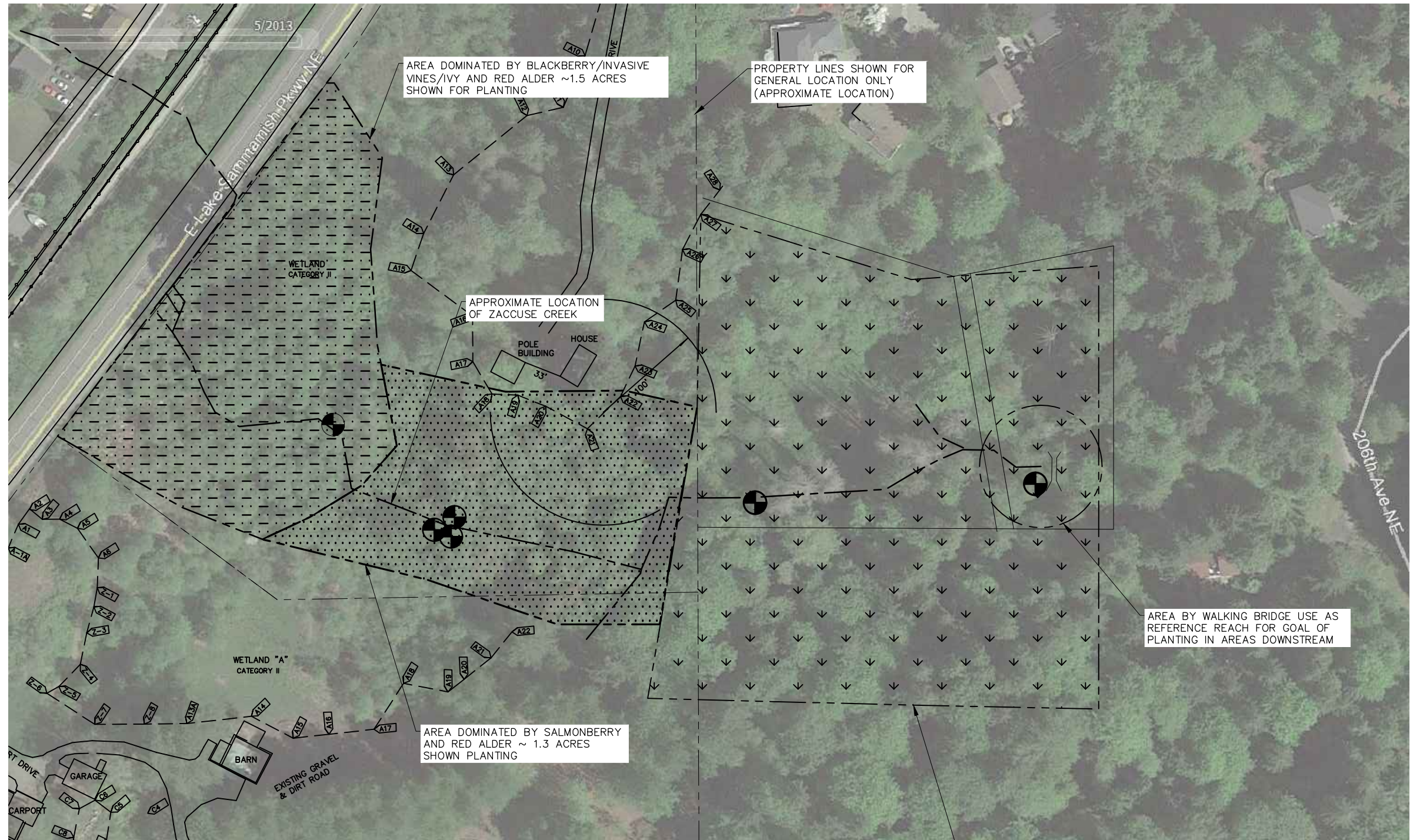
**EXISTING CHANNEL PROFILE**

SCALE: 1" = 100'




<p>Resource Consultants, Inc. REDMOND, WA.</p>	<p>PEREYRA ZACCUSE CREEK</p>
	<p>DRAWING 1 EXISTING PLAN AND PROFILE</p>





SITE PLAN



 <p>Resource Consultants, Inc. REDMOND, WA.</p>	<p>PEREYRA ZACCUSE CREEK</p>
	<p>DRAWING 2 – PLAN VIEW EXISTING DOMINANT PLANT TYPES</p>

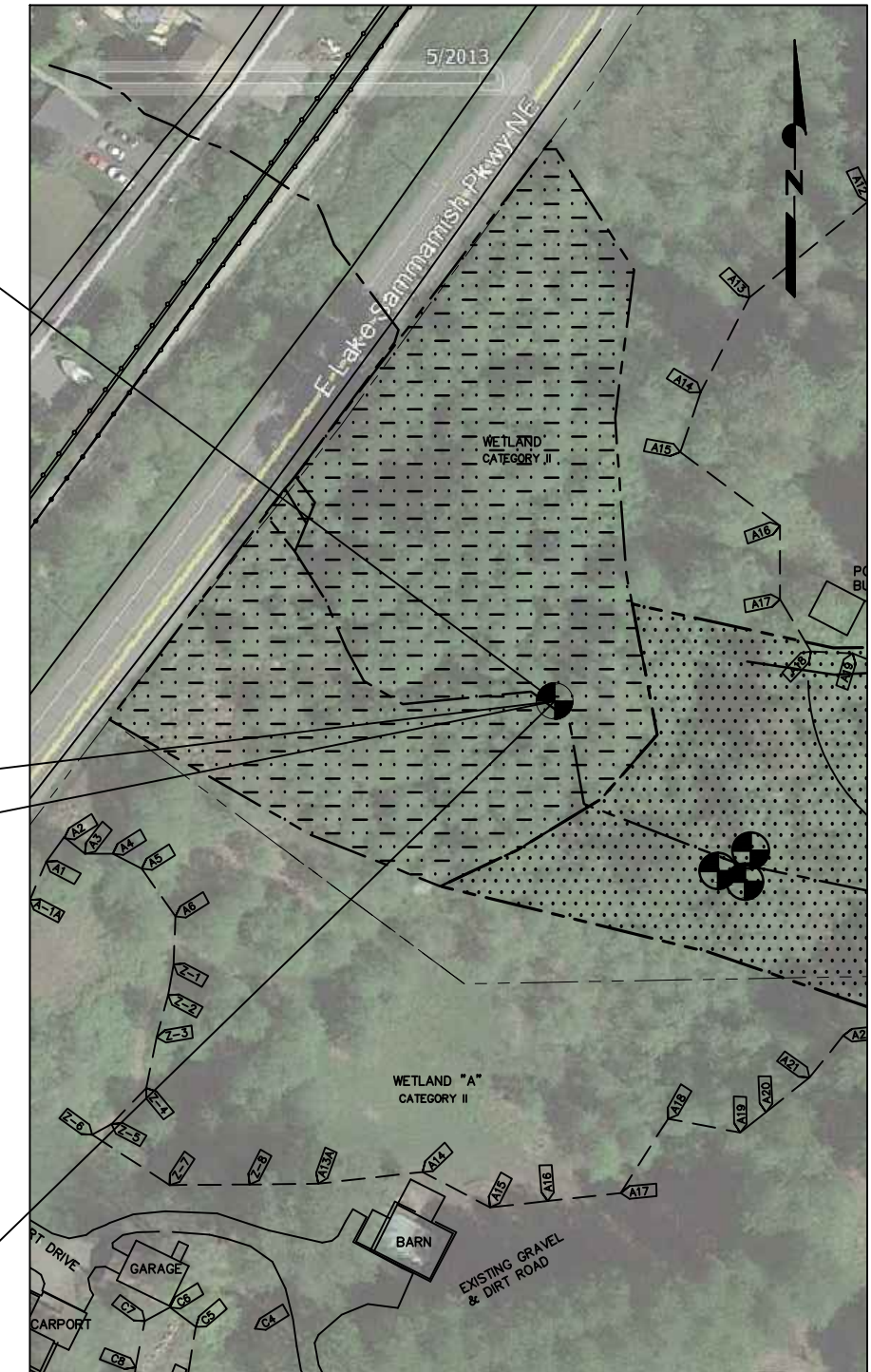




LOOKING DOWNSTREAM IN BLACKBERRY AND RED ALDER DOMINATED AREA



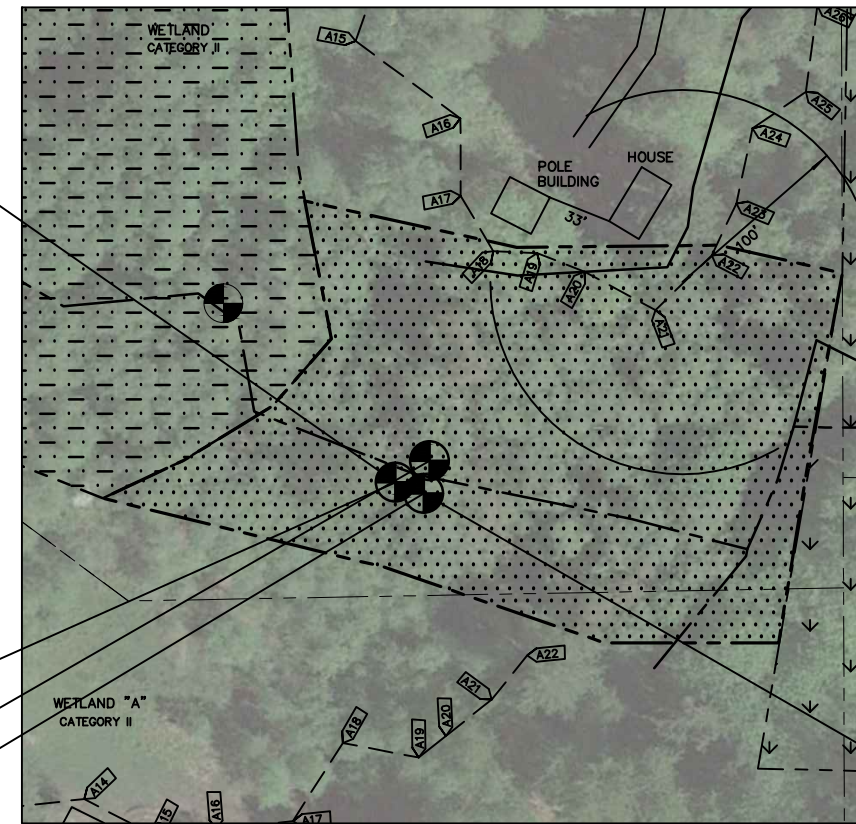
LOOKING UPSTREAM IN BLACKBERRY AND RED ALDER DOMINATED AREA







LOOKING DOWNSTREAM IN SALMONBERRY DOMINATED AREA LOOKING AT 1' HIGH DAM CAUSED BY WOOD, HOLDING BACK STREAM GRAVEL

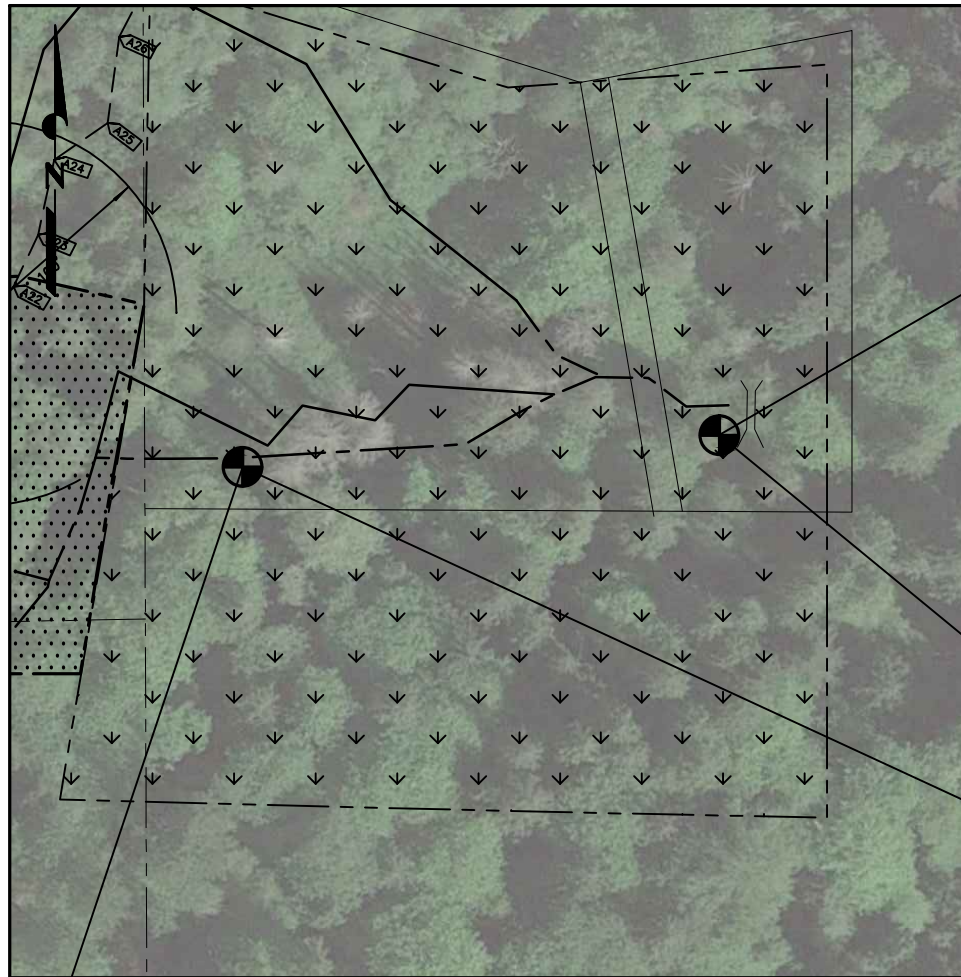


LOOKING ACROSS CHANNEL IN SALMONBERRY DOMINATED AREA AT TREES COVERED IN IVY



LOOKING UPSTREAM IN SALMONBERRY DOMINATED AREA



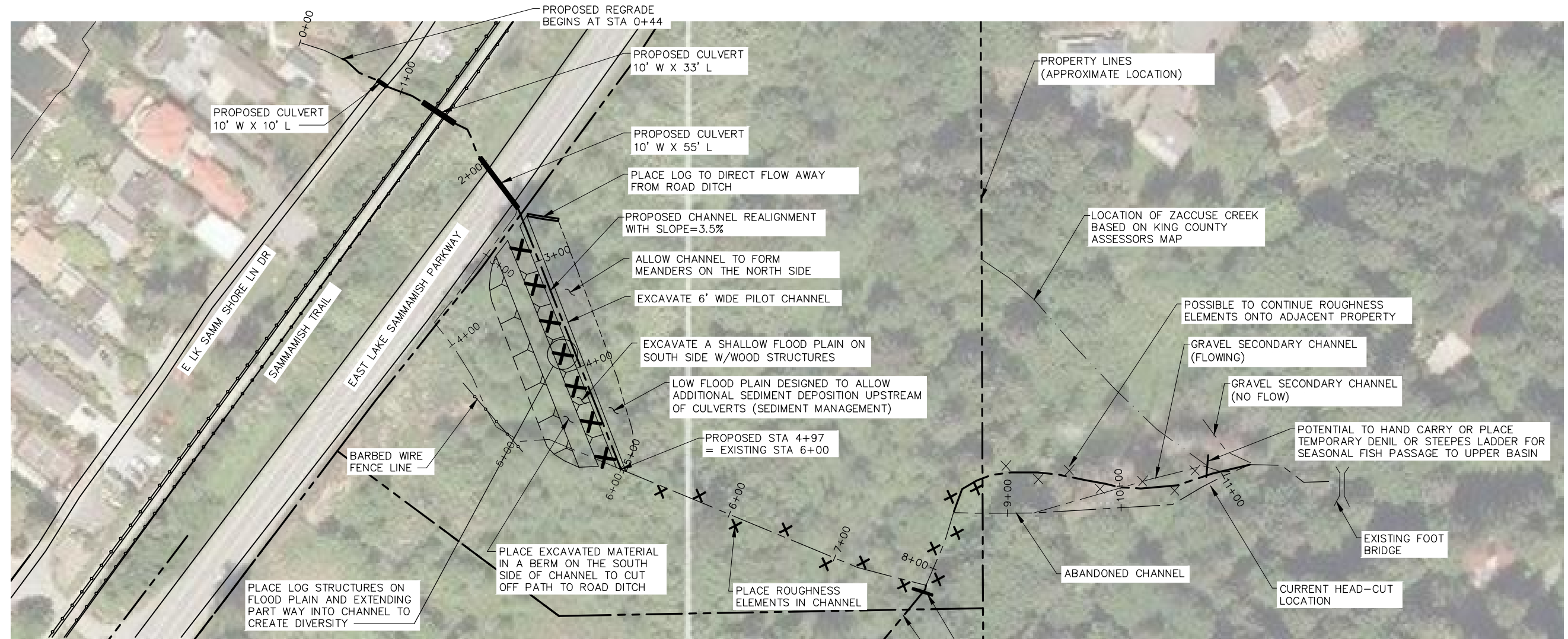


LOOKING UPSTREAM IN REFERENCE REACH BY WALKING BRIDGE – FOREST DOMINATED BY CEDAR, FERN, VINE MAPLE ETC.

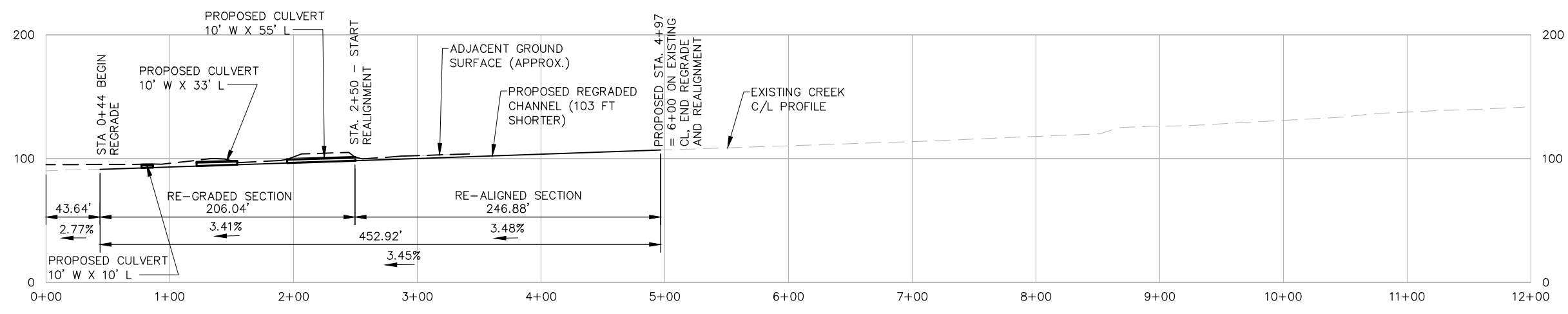


LOOKING UPSTREAM AT MATURE FOREST AREA WITH RECENTLY CUT INCISED CHANNEL IN THE FOREGROUND

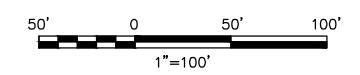





**SITE PLAN**  
SCALE: 1" = 100'



**PROPOSED CHANNEL PROFILE**  
SCALE: 1" = 100'



 <p>Resource Consultants, Inc. REDMOND, WA.</p>	<p>PEREYRA ZACCUSE CREEK</p>
	<p>DRAWING 6 PROPOSED PLAN AND PROFILE</p>