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**Rosewood Creek SEZ Restoration Project**

**Preliminary Design Memoranda**

**Prepared By**

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## INTRODUCTION

Rosewood Creek is a tributary of Third Creek and drains a 1.0 square mile basin within Incline Village and the northeast corner of the Lake Tahoe Basin. It is perhaps one of the most impacted watersheds in the Tahoe Basin. After over 120 years of watershed modifications resulting from clearcut timber harvesting and water diversions of the Comstock Era (1860s-1890s) and channelization and urbanization since the late 1950s, the watershed exhibits numerous erosional features and a high sediment load. Portions of Rosewood Creek are severely eroding gully channels. Many ephemeral tributaries are eroding road ditches. Several segments of the channel have been moved to accommodate roads, road crossings and other urban developments.

The Tahoe Regional Planning Agency (TRPA) and other agencies in the Lake Tahoe Basin have implemented programs to stabilize watersheds and streams with an aim toward reducing sediment and nutrient loads discharged into Lake Tahoe. Preliminary surveys of Rosewood Creek and its watershed reveal significant challenges for reducing sediment loads. Watershed stabilization measures may take years to implement and some conditions, especially the gully channel segment between Highway 28 and Northwood Blvd., are difficult to treat without significant disturbance to riparian vegetation and private lands. A treatment program for erosion control has yet to be defined and implementation appears to be at least several years away.

However, there is a significant opportunity to filter sediment loads along the original lower reaches of Rosewood Creek by restoring flood plain and wetland areas. There is significant evidence below Highway 28 that Rosewood Creek once flowed parallel to Third Creek and directly into Lake Tahoe about 4,000 feet below their present confluence. It was apparently shortened by approximately 3,000 feet during the Comstock logging era and moved to accommodate a sawmill. Current sediment loads in Rosewood Creek are flushed directly into Third Creek and then directly into Lake Tahoe.

This memorandum describes a preliminary conceptual plan to restore Rosewood Creek to its historic alignment. The conceptual plan would restore over 3,000 linear feet of the Stream Environment Zone (SEZ) and enhance wetland and flood plain areas in order to filter sediment prior to discharge into Lake Tahoe. The conceptual plan, described below, was developed over the past year by Watershed Restoration Associates as part of the Rosewood, Third and Incline Creeks SEZ Restoration Project administered by the Incline Village General Improvement District (IVGID) and TRPA. The purpose of this document is to describe the project in its conceptual form, provide a preliminary project cost estimate for the purpose of securing funding and initiate an agency planning process to complete construction plans and specifications and obtain permits.

This document is designed to provide a level of detail necessary to apply for project funding and to develop a preliminary cost estimate. The conceptual plan and cost estimate is preliminary and subject to change. It should not be represented as the final design of the project. No warranty is being expressed or implied that the project will cost more or less than the estimate contained herein nor that the project will, in its final form, be the conceptual plan described below. The conceptual plan is based upon conditions and

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information known to exist at the time this document was completed. Future conditions including but not limited to field conditions, subsurface conditions, archeological resources, toxic pollution, water rights, construction costs, conflicts with infrastructure, factors raised during environmental review or other factors that may be revealed in the future may affect the feasibility of implementing the project.

### **Project Site Description**

The project site is located between the Rosewood/Third Creek confluence west of Highway 28 and Lakeshore Boulevard (See Figure 1). The project area encompasses the corridor from the north bank of Third Creek to the valley edge formed by fill of the Incline Middle School, the valley hillside and the remote parking lot and access road. The gradient is generally steep above Incline Way (3-5 percent) and flatter near Lakeshore (less than 2 percent gradient in many areas). The terrain is dissected by multiple channels and by fill from roads and other developed areas. Vegetation cover is dominated by Ponderosa Pine forest with sparse scrub underbrush and isolated stands of individual willow and alder. The area near Lakeshore Boulevard has remnant wetlands now dominated by wild rose. Earthen fill of Incline Way, older roads and remnant Comstock-Era railroad grades are situated across and along the streams.

### **Proposed Channel Restoration Improvements**

#### *Channel Alignment*

The proposed channel alignment shown on Figure 1 follows the Natural Resources Conservation Service/IVGID 1997 Phase 1 project alignment and sediment retention basins to a point about 50 feet below the second sediment retention pond. At this point, the proposed alignment crosses an asphalt path and veers southward towards Incline Way, south of the third sediment retention pond of Phase 1. At Incline Way, the new channel alignment would cross under Incline Way through a new crossing and into a short section of new channel that would flow into the original Rosewood Creek channel. The original Rosewood Creek channel extends to the south edge of the IVGID overflow parking lot then to a remnant wetland basin bounded on its western side by road fill. A final channel segment would extend southward from the wetland basin to Third Creek where a new confluence would be constructed upstream of the present USGS stream gage on Third Creek.

#### *Proposed Channel Construction and Restoration*

The new channel would be constructed from the inlet of the Phase 1 channel to the point below Incline Way where it would empty into the original Rosewood Creek channel, and from the lower wetland basin to the new Third Creek confluence, possibly including segments of the original Rosewood Creek channel. The gradient in this upper reach is generally over 3 percent and would require grade control to maintain the channel profile. The concept plan proposes to create lower gradient reaches between the boulder and/or boulder-log weir grade control structures to create sets of complex pool, riffle and run morphology. Figures 2 and 3 show design drawings of the proposed channel. In the low gradient reaches between grade controls, the channel banks would be constructed with two

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encapsulated soil coir fabric lifts, and the channel bed would consist of gravel-cobble substrate and gravel riffles. The banks would be overexcavated with the excess substrate placed on the bed and the coir lifts constructed above. In general, the channel widths would be on the order of 10 feet and channel depths between three and six feet (maximum depths occur at the plunge pool below grade controls). The channel in this reach would be a Rosgen B-type. The encapsulated soil lifts would be seeded with native species. Willow brushing would be placed between the fabric lifts and the top of the upper soil lift would be filled with seeded soil and planted with transitional and upland species.

A new crossing under Incline Way would be required in order to construct a laterally stable channel and align the new channel with the original Rosewood Creek channel downstream. This may involve some issues with existing utilities and requires further investigation during the design process.

The original Rosewood Creek channel would be restored below Incline Way by removing fine sediments and accumulated duff with repeated controlled releases of flushing flows (controlled not to discharge sediment into Lake Tahoe) and spot stabilization work. The stabilization work would include removal or re-arrangement of obstructions, vegetation plantings, placement of substrate, placement of biotechnical bank protection structures and perhaps minor grading. A preliminary survey of the original channel found good gravel in many reaches of the channel bed underlying a layer of duff and fine sediments that have accumulated since Rosewood Creek was diverted. It is anticipated that the remedial work could be done by handcrews. However, it would be prudent to assume that some reaches may require more extensive treatment and re-construction using heavy equipment.

### *Construction Plan*

Construction of the project would occur over a three-year period. Year 1 would include installation of a headgate at the inlet of the project. The new channel would be constructed from this point to the inlet of the original Rosewood Creek channel below Incline Way and from the lower wetland basin to Third Creek. After Year 1, vegetation in the new channel would be allowed to grow for one season.

In the late summer/early fall of Year 2, controlled flows would be released from the headgate through the new channel into a sediment retention basin. This may be the lower wetland basin or another basin where materials could be mechanically removed and disposed of. It is anticipated that the flushing would reveal stability problems and/or obstructions where treatment would be required. It is anticipated that treatment may be done by handcrews, however, as mentioned above, use of heavy equipment and construction of new channel segments cannot be ruled out. Flushing would remove fines and duff from the channel bed and deposit them on flood plains in flatter reaches, or into sediment retention ponds. Repeated flushings would be carried out. When flow at the downstream end is sufficiently polished with an acceptably low turbidity, it could be released into Third Creek. Where problems are found, prescriptive treatments would be developed on a site-by-site basis and implemented. Prior to winter, the headgate would be closed.

In Year 3, larger flows would be released through the system during higher spring snowmelt in order to test channel stability and general hydraulic performance. Once again prescriptive solutions would be developed and implemented. In the fall of Year 3, the headgate would be removed and the segment of existing channel between the new channel inlet and the existing Third Creek confluence would be filled. Natural flows would be introduced to the restored channel and the project would be complete.

### *Preliminary Cost Estimate*

The preliminary cost estimate is presented in Table 1. The estimated cost for design, engineering and construction supervision is presented in Table 2.

The construction cost estimate was developed on a per linear foot basis using actual costs from similar completed SEZ projects in the Tahoe Basin including Angora Creek in the Lake Tahoe Golf Course, Griff Creek near Kings Beach and Lonely Gulch near Meeks Bay. The estimate conservatively assumes that a portion of the original Rosewood Creek channel will be fully re-constructed, which will not be known until the flushing stage occurs in Year 2.

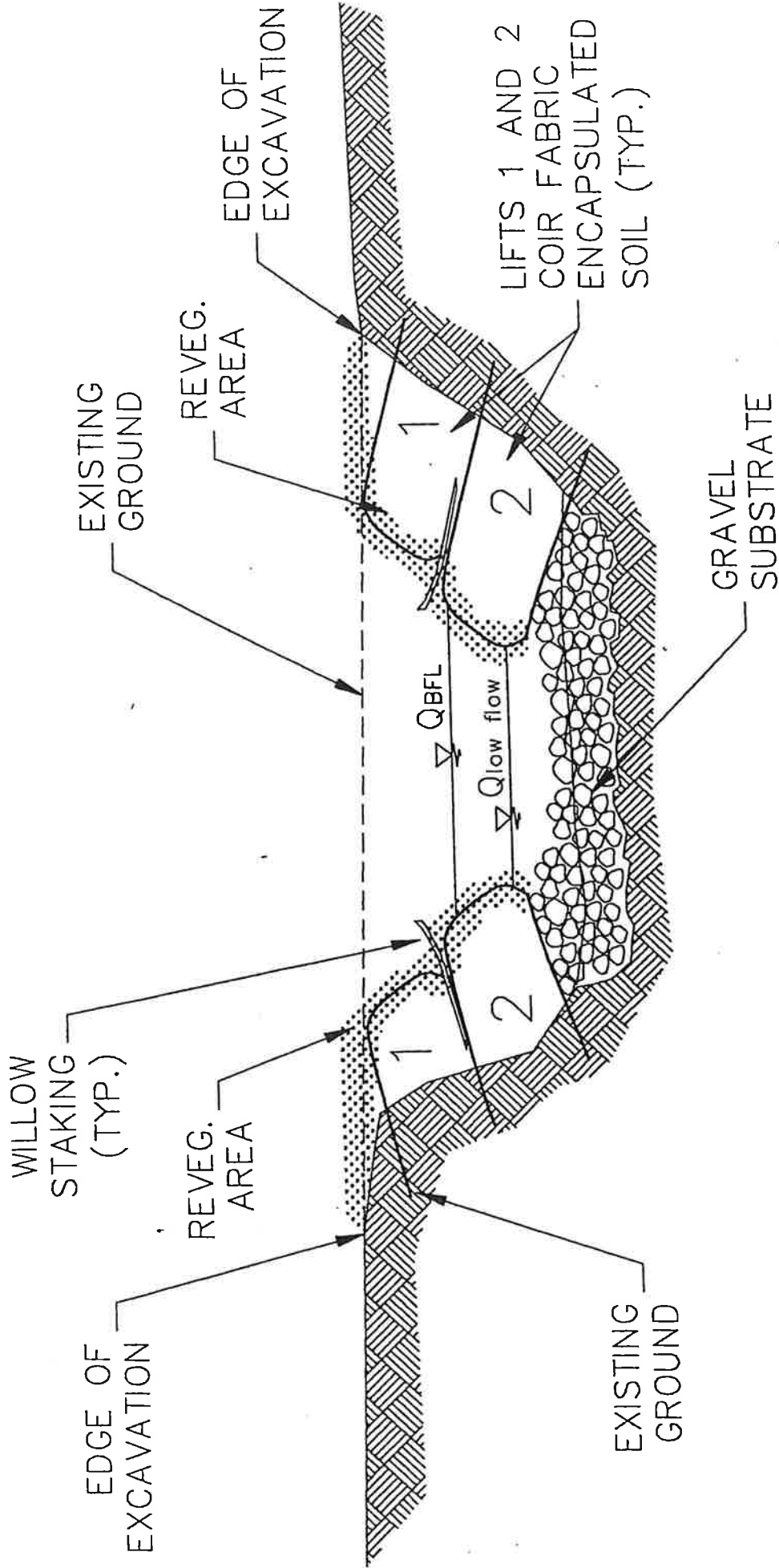
The design and construction supervision cost estimate is drawn from similar project experience.

### *Expected Project Benefits*

It is anticipated that the Rosewood Creek Restoration Project will have the following benefits:

- Expansion of functional SEZ by 3,000 linear feet.
- Reduction in sediment loads discharged into Third Creek and Lake Tahoe by polishing and filtration in wetlands. This could be a major benefit during the unknown interim period before watershed stability projects are implemented. Also, the wetlands could reduce sediment delivery to Lake Tahoe during the stabilization period of watershed stabilization projects.
- A safe temporary diversion channel to dewater Third Creek for channel stabilization and pocket flood plain creation.

ROSEWOOD CREEK  
 PROPOSED NEW CHANNEL CONSTRUCTION  
 TYPICAL CROSS SECTION



NOT TO SCALE

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FIGURE 2: ROSEWOOD CREEK  
 CONCEPTUAL DESIGN PLANS

Date: 12-8-99  
 Scale: NTS  
 Project: 98-131

**Table 1**

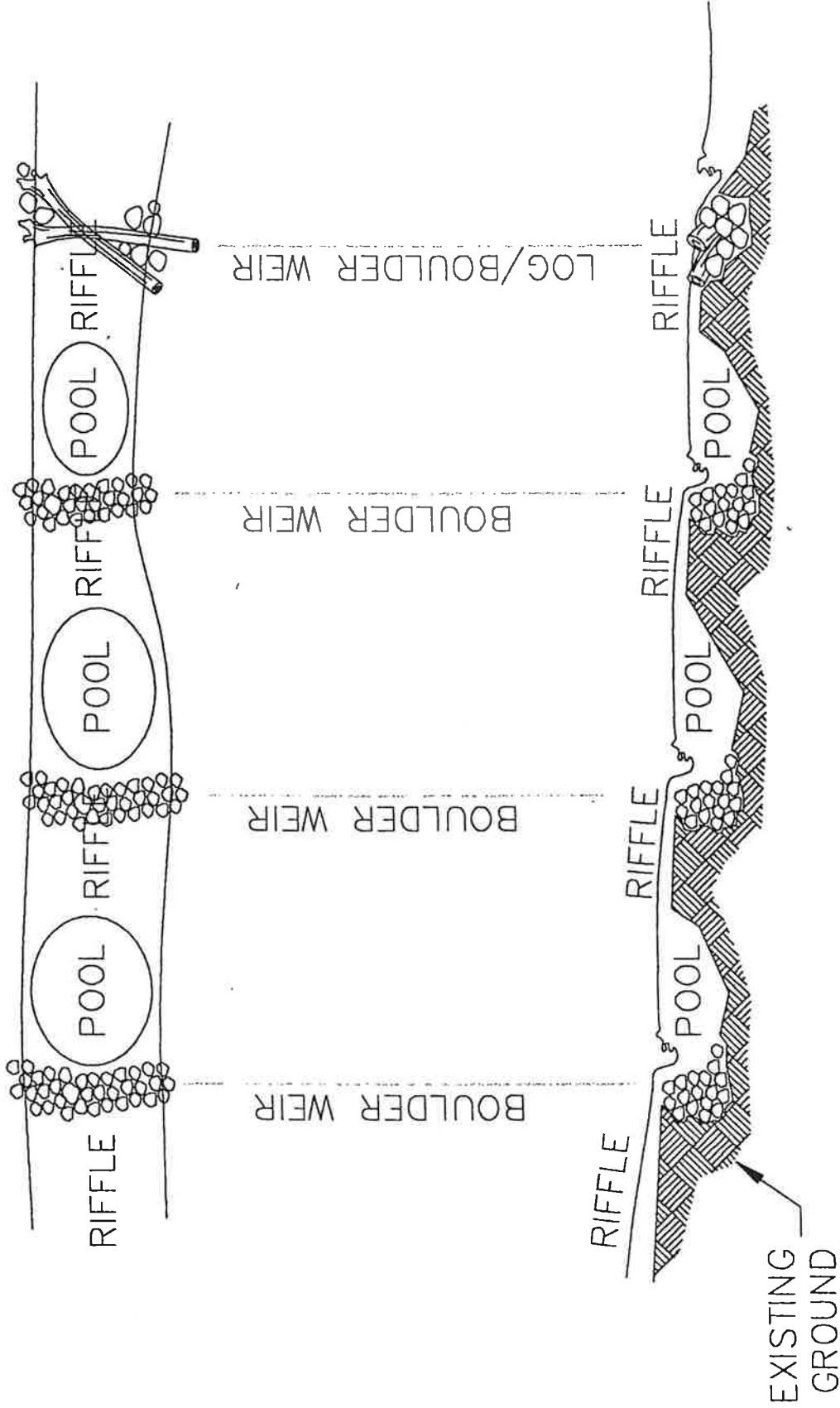
<b>ROSEWOOD CREEK RESTORATION PROJECT PRELIMINARY COST ESTIMATE (see footnote) (Assuming Coir Fabric Banks on new channel)</b>	
<b>COST ITEM</b>	<b>ESTIMATED COST</b>
channel & wetland construction & revegetation 2,215 feet new channel @ \$250/LF flush/remediate 785 LF	\$553,750
	\$60,000
Incline Way Crossing	\$25,000
head gate	\$10,000
total costs	\$648,750
construction contingency (15%)	\$97,313
<b>Total Construction Costs</b>	<b>\$746,063</b>
design, planning and permit fees	\$236,870
<b>Total project costs</b>	<b>\$982,933</b>

**Footnote: This cost estimate is presented as a preliminary estimate of costs and is subject to change**





PLAN VIEW



PROFILE VIEW

NOT TO SCALE

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FIGURE 3: ROSEWOOD CREEK  
 CONCEPTUAL DESIGN PLANS

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