2 PROJECT ALTERNATIVES

This chapter describes a reasonable range of alternatives consistent with the requirements of the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and Tahoe Regional Planning Agency (TRPA) ordinances and procedures. The alternatives under detailed evaluation and consideration (with the exception of the No Project/No Action Alternative required by CEQA and NEPA) have each been formulated to accomplish most of the basic objectives of the project discussed in Chapter 1, Section 1.3.2, "Project Objectives," and to avoid or substantially lessen one or more of the potentially significant effects of other alternatives.

2.1 ALTERNATIVES DEFINITION PROCESS

2.1.1 CEQA, NEPA AND TRPA REQUIREMENTS

The definition of alternatives is based on a combination of requirements from CEQA, NEPA, and TRPA provisions. In accordance with Section 15126.6 of the State CEQA Guidelines, this environmental document includes an analysis of alternatives that could feasibly attain most of the basic project objectives, a review of a no-project alternative, an assessment of whether feasible off-site alternatives exist, and a discussion of on-site alternatives considered but determined to be infeasible. Section 15126.6 states that the alternatives analysis must:

- describe a range of reasonable alternatives for the project that could feasibly attain most of the basic objectives of the project but would substantially lessen or avoid any of the significant effects of the project;
- focus on alternatives capable of avoiding or substantially lessening any of the significant environmental impacts of the project, even if they may be more costly or could otherwise impede some of the project's objectives; and
- evaluate the comparative merits of the alternatives.

The focus and definition of alternatives evaluated in this draft EIR/EIS/EIS are governed by the "rule of reason," in accordance with Section 15126.6 of the State CEQA Guidelines. In other words, the range of alternatives presented in the draft EIR/EIS/EIS is limited to those that would permit a reasoned choice among those alternatives by State Parks, Reclamation, and TRPA decision-makers.

In addition to the guiding principles for selection of alternatives set forth above, the State CEQA Guidelines require that the environmental document evaluate a no-project alternative, identify alternatives that were initially considered, but then eliminated from detailed evaluation, and identify the "environmentally superior alternative." This draft EIR/EIS/EIS describes and evaluates a no-project alternative (Section 2.4) to provide the decision-makers and the public with an overview of what could reasonably be expected to occur if the proposed Upper Truckee River Restoration and Golf Course Reconfiguration Project were not approved and implemented. This chapter also describes various alternatives that were considered, but eliminated from detailed evaluation, because they are infeasible or do not meet most of the basic project objectives, or both (see Section 2.2.2, below).

State CEQA Guidelines Section 15126.6(f) provides that the analysis of alternatives should identify whether any of the potentially significant effects of the project would be avoided or substantially lessened by putting the project in another feasible location. Section 15126.6(f) also states that if the lead agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion. Among the factors that may be taken into account when addressing the feasibility of off-site alternatives are site suitability, economic viability, availability of infrastructure, plan and policy consistency, other regulatory limitations, and whether the project proponents can reasonably acquire, control, or otherwise have access to the alternative site. Accordingly, this

chapter provides a discussion of potential off-site alternatives and discussion of whether any of them is feasible (see Section 2.2.2, below).

According to the Council on Environmental Quality's (CEQ) NEPA regulations (40 Code of Federal Regulations [CFR] 1502.14), the alternatives section of the environmental document is required to rigorously explore and objectively evaluate all reasonable alternatives, including the no-action alternative. The discussion of alternatives must include information sufficient to define the environmental issues and provide a clear basis for choice among the alternatives for decision-makers and the public. For alternatives eliminated from detailed study, the document must include a brief discussion of the reasons for their elimination. NEPA requires comparable treatment of the alternatives, so that their comparative merits may be evaluated (40 CFR 1502.14[b]).

The NEPA regulations (40 CFR 15012.14) require that an environmental analysis include:

- an objective evaluation of reasonable alternatives;
- identification of the alternatives considered but eliminated from detailed study, along with a brief discussion of the reasons why these alternatives were eliminated;
- information that would allow reviewers to evaluate the comparative merits of the proposed action and alternatives;
- consideration of the no action alternative;
- identification of the agency's preferred alternative, if any; and
- identification of appropriate mitigation measures not already included in the proposed action or alternatives.

Unlike CEQA, which permits the evaluation of alternatives to occur in less detail than is provided for a proposed project, NEPA requires the analysis of alternatives to occur at a comparable level of detail. NEPA regulations (40 CFR 1502.14) require agencies to rigorously explore and objectively evaluate all reasonable alternatives and to devote substantial treatment to each alternative considered.

The TRPA Code of Ordinances Section 5.8 describes EIS requirements. It indicates the need to study, develop, and describe appropriate alternatives to address unresolved conflicts in uses of available resources. TRPA requires a comparable level of detail of analysis of alternatives, similar to NEPA.

This document provides comparable detail in the analysis of the alternatives in the manner directed by NEPA and TRPA, and more than the minimum necessary under CEQA. The full range of reasonable alternatives is presented for public review during circulation of the draft EIR/EIS/EIS. The selection of a preferred alternative would only occur after receipt of public comments on the draft EIR/EIS/EIS and preparation of responses to those comments. The alternatives described in this chapter include variations in both the golf course concept and in river restoration treatments to provide flexibility to State Parks, Reclamation, and TRPA in selecting the alternative that best meets the project objectives while taking into account the significant or potentially significant impacts upon the environment. The preferred alternative may be one of those presented or may be a modified combination of the golf course and river restoration features evaluated in this document.

2.2 ALTERNATIVES DEVELOPMENT

An array of alternatives to restore the natural geomorphic and ecological processes of this reach of the Upper Truckee River and to reduce this reach's contribution to the river's nutrient and suspended sediment discharge to Lake Tahoe have been considered by State Parks. An alternative screening process was undertaken for this project to help comply with CEQA, NEPA, and TRPA requirements. The process fulfills requirements for developing alternatives for analysis in this draft EIR/EIS/EIS.

The screening methodology used criteria developed from the project purpose and need and project goals and objectives, as described in Chapter 1, "Introduction and Purpose and Need" of this draft EIR/EIS/EIS. The primary purpose of the project is to restore natural geomorphic and ecological processes along this reach of river and to reduce the river's suspended sediment discharge to Lake Tahoe while still providing access to recreation opportunities in Washoe Meadows SP and Lake Valley SRA.

The alternatives development process was structured so that potential alternatives were systematically identified and then compared to these criteria to ascertain their ability to meet the project purpose and need and project objectives. Alternatives passing this screening review were carried forward into this draft EIR/EIS/EIS for detailed evaluation of potential environmental impacts. The alternatives carried forward are as follows:

- **Alternative 1 –** No Project/No Action: Existing River and 18-Hole Regulation Golf Course
- **Alternative 2 –** River Ecosystem Restoration with Reconfigured 18-Hole Regulation Golf Course
- **Alternative 3 –** River Ecosystem Restoration with Reduced-Play Golf Course
- **Alternative 4 –** River Stabilization with Existing 18-Hole Regulation Golf Course
- **Alternative 5 –** River Ecosystem Restoration with Decommissioned Golf Course

These alternatives were developed by the State Parks, Reclamation, the TRPA, and their team of technical consultants after review of scoping comments received on the NOP and NOI, as well as comments provided at public scoping meetings and a recreation planning workshop conducted for additional public input.

The descriptions below include information on the design concept and design elements, modifications to existing facilities and/or new facilities that would be required, the activities and equipment needed to construct each alternative, and likely operational scenarios.

2.2.1 CONSIDERATIONS IN DEFINITION OF THE STUDY AREA

The study area was initially defined utilizing the criteria listed in Chapter 1, "Introduction and Purpose and Need" combined with field surveys and evaluation of maps and records of known environmentally sensitive resources. This information was used to develop a map of resources, which, in turn, helped to identify areas of the existing golf course that could be considered for removal (Exhibit 2-1) and the areas that could be considered for relocation or reconfiguration.

Approximately 2 ¼ miles (12,000 linear feet) of the 20 mile Upper Truckee River main channel are within the study area. This reach of the river has been defined by river stations (RS) that extend from just upstream of U.S. 50, where it intersects with Sawmill Road and Elks Club Road (RS 00), to just downstream of Lake Baron at the southern end (RS 12000) (Chapter 1, Exhibit 1-2). To help organize information about existing conditions within the study area and expected future conditions under each alternative, three major river reaches and several subreaches within each reach were identified (Table 2-1). Major reaches are based on geologic history, valley topography, geomorphic features, sedimentary materials, and associated plant communities (SH+G 2004a, River Run 2006). Subreaches were identified to reflect some of the property ownership, land uses, and infrastructure locations that may be major factors to consider for project alternatives. (See Appendix B for additional information about conditions by subreach.)

Table 2-1
Upper Truckee River Reaches and Subreaches in the Study Area

Reach	Subreach	General Characteristics	Downstream River Station* (feet)	Upstream River Station* (feet)	Channel Length (feet)	Percent of Total Channel Length in Study Area
1	1A	Meadow	160	1,000	840	7.1
1	1B	Meadow	1,000	1,400	400	3.4
1	1C	Meadow	1,400	1,800	400	3.4
1	1D	Meadow	1,800	2,400	600	5.1
1	1E	Meadow	2,400	4,200	1,800	15.2
2	2	Transition	4,200	6,200	2,000	16.9
3	3A	Forest	6,200	7,500	1,300	11.0
3	3B	Forest	7,500	8,600	1,100	9.3
3	3C	Forest	8,600	9,000	400	3.4
3	3D	Forest	9,000	12,000	3,000	25.3
Total					11,840	100.0

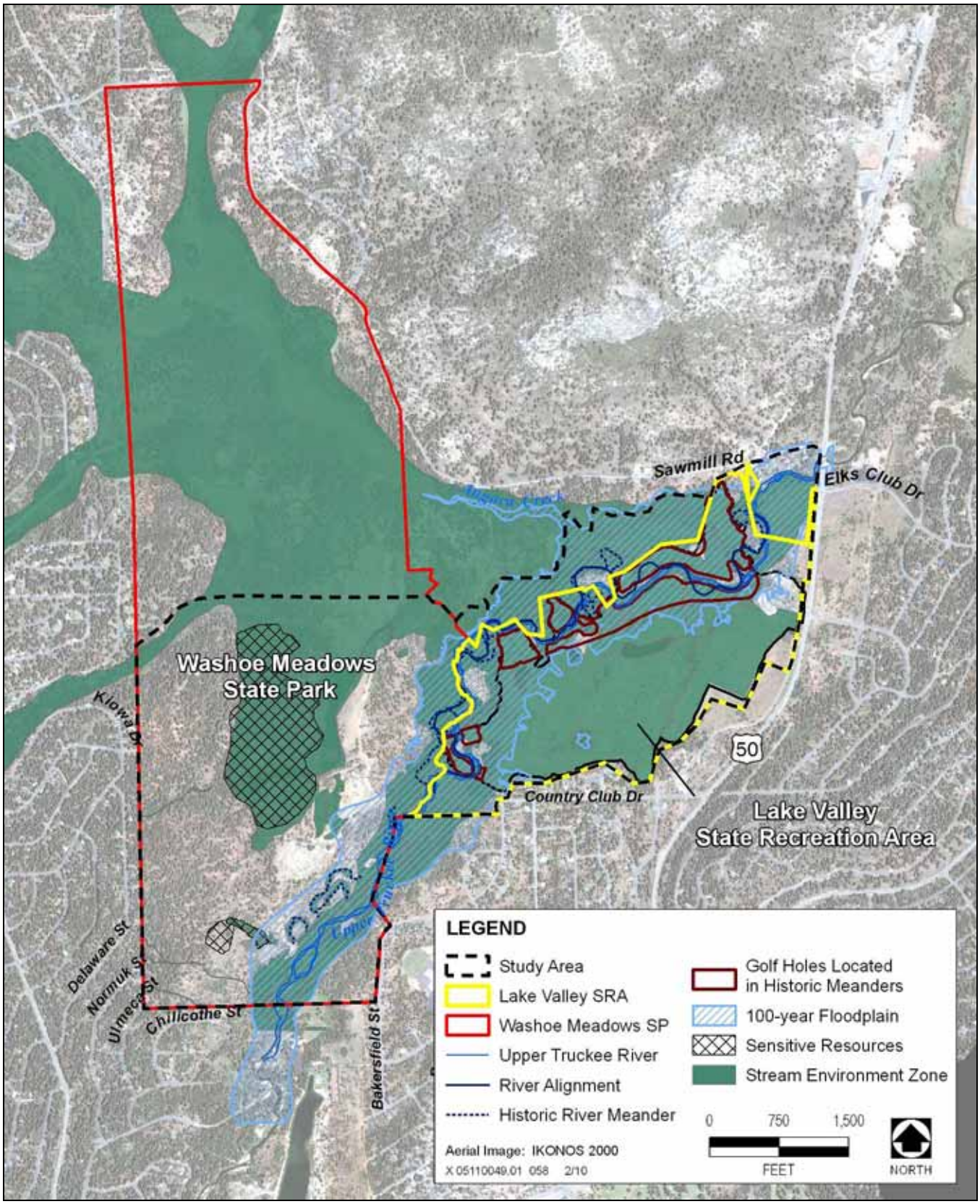
* River station is the distance (in feet) up river from a designated zero point downstream and east of the U.S. 50 bridge over the Upper Truckee River at Sawmill Road. River stations are those used in hydraulic models of the project area (SH+G 2004b, 2004c).

Source: Data prepared by EDAW, Inc. (now AECOM) and Valley & Mountain Consulting, 2008.

Many of the existing golf course holes are in both the active (i.e., 5-year) floodplain and the historic meander belt of the river. In addition, all of the holes are currently situated in sensitive areas designated as stream environment zone (SEZ). Proposed alternatives that include geomorphic restoration of the river would result in the river regaining important natural processes, such as occupying a wider meander belt, reconnecting with the adjacent floodplain, and overbanking into the active floodplain more frequently. Thus, one criterion for reconfiguring golf holes was minimizing golf course area within both the active floodplain and the SEZ to provide room for river restoration. Factors considered in selection of the study area include:

- Avoiding/minimizing disruption to sensitive resources (e.g., wildlife, vegetation, cultural)
- Reducing/minimizing golf course area within the SEZ
- Reducing/minimizing golf course area within the active floodplain
- Reducing/minimizing golf course area within the historic meander belt of the river
- Accommodating dispersed recreation (i.e., hiking, biking, cross-country skiing)
- Considering connectivity between golf holes
- Avoiding increase in golf turf area
- Maintaining acreage approximately equal to the existing acreage in Washoe Meadows SP and Lake Valley SRA.

The initial definition of alternatives was supplemented to consider options for the golf course recommended by the public during the public scoping process and early public recreation planning workshops. Two alternative considerations came out of this public input: evaluation of alternative locations for golf course development and addition of an action alternative that involves decommissioning the golf course and full restoration of Lake Valley SRA to riparian and meadow habitat.



Source: Data provided by State Parks in 2009

Study Area Resources Considered **Exhibit 2-1**

Finally, the alternatives considered for evaluation were screened against the following criteria:

- **Geomorphic criterion:** An alternative, either individually or in combination with features from other alternatives, improves or restores, to the extent feasible, natural geomorphic processes that sustain channel and floodplain morphology while avoiding any increase in flood hazard to private property.

- **Ecosystem criterion:** An alternative, either individually or in combination with features from other alternatives, improves or restores, to the extent feasible, ecosystem function in terms of ecological processes and aquatic and riparian habitat quality, including but not limited to reducing the SEZ area occupied by the golf course to improve the quality of SEZ, and to increase the extent of riparian and meadow habitat.

- **Water quality criterion:** An alternative, either individually or in combination with features from other alternatives, reduces erosion and improves water quality over the long term, including reducing the reach's contribution of suspended sediment and nutrient loading in the Upper Truckee River and Lake Tahoe.

- **Recreational criterion:** An alternative, either individually or in combination with features from other alternatives, maintains golf recreational opportunities and quality of play; provides opportunities for passive, dispersed, non-vehicular recreation (such as hiking, biking, and cross-country skiing), and avoids any increase in safety hazards to golfers and other recreation users.

- **Operational criterion:** An alternative, either individually or in combination with features from other alternatives, improves golf course layout, infrastructure, and management to reduce the environmental impact of the golf course on the river's floodplain, SEZ, water quality, and riparian habitat by integrating environmentally sensitive design concepts.

- **Engineering criterion:** An alternative, either individually or in combination with features from other alternatives, is feasible to design, permit, and construct.

- **State revenue criterion:** An alternative, either individually or in combination with features from other alternatives, is developed, constructed, and operated in a financially responsible and cost-effective manner and generates revenue at a level approximately similar to current levels.

2.2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED EVALUATION

State CEQA Guidelines Section 15126.6(c) provides the following guidance in selecting a range of reasonable alternatives for the project. The range of potential alternatives for the project shall include those that could feasibly accomplish most of the basic objectives of the project, and could avoid or substantially lessen one or more of the significant effects. The EIR/EIS/EIS should also identify any alternatives that were considered by the lead agency, but were rejected during the planning or scoping process and briefly explain the reasons underlying the lead agency's determination.

Alternatives for river treatment were considered during conceptual planning and preliminary assessment of the project prior to initiating the preparation of this draft EIR/EIS/EIS (SH+G 2004a; SH+G 2004b). Also, alternative locations for the golf course have been evaluated in response to public comments. In both cases, some of the considered alternatives were assessed and found to be infeasible in meeting most of the basic project objectives or in reducing a significant impact of the other alternatives. Therefore, they were eliminated from detailed evaluation.

RIVER ALTERNATIVES

As originally described in source documents (SH+G 2004a; SH+G 2004b), some of the river alternatives considered for restoration would extend further upstream and downstream than the alternatives under detailed

evaluation. As needed, the following descriptions have been adjusted from those reports to meet a consistent assumption that the treatment subreaches and maximum total length would be similar to those in the alternatives (subreaches 1C–3C; RS ~1400–8800) so that quantities are comparable.

The river alternatives described below were screened from further consideration and are somewhat, but not entirely, independent of the golf course alternatives that were considered and eliminated from detailed evaluation. The descriptions focus on each potential river corridor treatment and include a list of compatible/possible golf course treatments for each river alternative.

Inset Floodplain and Channel

The Inset Floodplain and Channel River Alternative was identified in the Upper Truckee River Upper Reach Environmental Assessment (SH+G 2004a) and was described in that report as Alternative 3.

This alternative was characterized as an active approach to improve floodplain processes in the study area. Ongoing, slow, passive recovery of the system has been forming a discontinuous, narrow, active floodplain along the incised channel and between the high-terrace banks through erosion. This alternative would accomplish the slow natural widening and inset floodplain formation process by excavating the terrace banks adjacent to the existing channel to the elevation of the lower modern floodplain. Removal and export of earth material would then construct a floodplain at a lower elevation and reduce shear stress and, thus, bank erosion. It would not increase channel length or elevate the channel to reactivate any of the surrounding terrace as active floodplain. It would involve removing a considerable volume of sediment from the terrace banks that is likely to erode into the river under the No Project/No Action condition.

The treatment would feature excavation of an inset floodplain along the existing river channel extending throughout the treatment area (RS 1400–8800). The inset floodplain would average a total width of 200 feet and have variations along either side of the channel to mimic natural variability and to protect key resources or infrastructure. The excavation depth typically would be 3–4 feet below the existing terrace surfaces to create a lowered floodplain surface with good connectivity to the existing river bed elevation. Although this alternative would not raise the water table, the inset floodplain area would have a shallow groundwater table. This would create an area of riparian vegetation and habitat, although not enough to meet the historic extent.

The existing streambed profile would not be modified and, because the inset floodplain treatment would not address the existing vertical instability, streambed grade controls (e.g., boulder steps) would be installed at the upstream and downstream ends and at regular intervals within the 7,400-foot-long treated segment. Each of these grade control features would require import of approximately 1,500 cubic yards of suitably sized boulders, cobble, and gravel. It would be feasible to use armored riffles for some of the intermediate grade controls, which would require cobble and gravel.

Excavation could occur in two phases to allow revegetation on the inset floodplain and provide some interim water quality protection. The second phase of excavation and reconfiguration would be along the existing active channel banks and would require isolation from active flows during construction. In addition, interim protection systems would be required until vegetation could stabilize the new lowered banks.

Approximately 200,000 cubic yards of soil would be excavated to construct the inset floodplain. It would be possible for a small amount (approximately 10,000 cubic yards) of this material to be reused as part of the project, depending on the golf course alternative selected; however, nearly all the excavated material would be hauled off-site. Assuming approximately 15–20 cubic yards per truckload, this would require approximately 10,000–13,000 truck trips. Soil would be disposed of at a permitted facility that would most likely be outside the Tahoe Basin.

The golf course footprint within the SEZ and floodplain would be reduced because the inset floodplain would create a wider riparian zone, and setback from the existing river would require relocation/modification of the golf course layout. The Inset Floodplain and Channel River Alternative would not be compatible with the existing 18-

hole regulation golf course. However, this alternative could be combined with four golf alternatives, and the overall golf course footprint size would vary based on the pairing:

- **Alternative I1** – Inset Floodplain with Reconfigured 18-Hole Regulation Golf Course
- **Alternative I2** – Inset Floodplain with Reduced Play Golf Course
- **Alternative I3** – Inset Floodplain with Decommissioned Golf Course
- **Alternative I4** – Inset Floodplain with Off-site Relocated Golf Course

If paired with the reduced play, decommissioned, or off-site relocated golf course, all existing Upper Truckee River bridges could be removed as part of this alternative.

If paired with the reconfigured 18-hole regulation golf course, this alternative would require moving four to six golf holes west of the river into the southern portion of Washoe Meadows SP. In this case, the existing river bridges would be removed and replaced with one longer bridge (possibly others), with the location dependent on final design, to provide access to the new holes west of the river.

If any of the existing river bridges were to be retained as part of the reconfigured golf course or as recreational trail features, the bridges could require new approaches (i.e., trestles across the inset floodplain) and/or modified footings/abutments. However, because the floodplain would be wider, longer bridges would be required, making continued use of any of the existing bridges infeasible without substantial modification.

This alternative was eliminated from more detailed evaluation in this draft EIR/EIS/EIS for the following reasons:

- The large volume of earthwork and off-haul of soil would be extremely costly and create substantial construction-period traffic and air pollution.

- The constructed inset active floodplain would remain confined between high-terrace banks and would contain more of the moderate flood flows (e.g., 5-year, 10-year) than under present conditions, so the existing high terrace would experience overbank flows only during extreme events (e.g., 50-year, 100-year), and the water table elevation would remain low. Although a narrow floodplain would be constructed, it would be much narrower than the pre-disturbance floodplain or area that could potentially be restored as floodplain under other approaches, and the area of increased riparian and wetland vegetation would be limited. This would not achieve project objectives for restoration of the river's natural geomorphic or ecosystem function.

- The channel planform would be only slightly modified since a more sinuous low flow channel would be created through excavation, and the high flow channel would remain straight. Extensive construction within and directly adjacent to the existing active channel would be complex and costly, and the effectiveness of temporary water quality protections would be uncertain. This approach has a high risk of sediment discharge and turbidity both during construction and in short-term stabilization of the bank because treatments would be adjacent to the active river.

Overall, this alternative would have limited ecosystem benefits, high cost, and short-term environmental risks. In addition, it would still require modifications to the golf course. Thus, this alternative was eliminated from detailed evaluation based on its inability to meet project goals and objectives.

High-Sinuosity Restored Channel

The High-Sinuosity Restored Channel River Alternative was identified in the Upper Truckee River Upper Reach Environmental Assessment (SH+G 2004a) and described in that report as Alternative 4.

The High-Sinuosity Restored Channel River Alternative would implement an active approach to restore and improve river channel and floodplain processes in the study area. This alternative would re-establish a channel alignment, profile, and size assumed to be the naturally functioning system before the Comstock Era and modern

human disturbance. This planform was designed by assuming all, or nearly all, the meander scars visible on the pre 1940 aerials were active prior to disturbance, yielding a highly sinuous tight radius of curvature pattern. The high-terrace surface would be reactivated as the active floodplain. It would increase channel length within the study area and elevate the channel bed. By raising the channel bed and lowering the bank heights, the sediment source on the terrace banks that would likely erode into the river under the No Project/No Action condition would be eliminated.

The active restoration would feature a combination of new channel construction and reconnection of remnant meanders throughout the treatment area (RS 1400–8800). The assumed historic alignment would greatly increase channel length and elevate the channel bed by approximately 3–4 feet through a combination of grade control features within the existing channel bed, reconnection of recently abandoned meanders, and construction of new channel sections and connections. The approach is largely form based, interpreting the remnant meander scars (via analysis of aerial photographs and LIDAR topographic data) as features of a single, highly sinuous predisturbance channel.

The excavation depth in areas of new channel would typically be approximately 3 feet below the existing terrace surfaces to create an appropriate channel depth with connectivity to the existing terrace as the restored floodplain. Implementing this alternative would involve fully constructing the envisioned final dimensions in the entire treated length and incorporating existing riparian vegetation wherever possible, particularly along remnant meanders.

The existing streambed profile would be specifically modified by the longer channel and higher bed elevation in the treatment section, which would have a geomorphically sized channel that would re-establish vertical stability. Streambed grade controls (e.g., boulder steps) would be required at transitions to untreated reaches upstream and downstream of the approximately 7,400-foot-long treated segment. Each of these grade control features would require import of approximately 1,500 cubic yards of suitably sized boulders, cobble, and gravel. Armored riffles and/or other cobble and gravel would be placed in the channel bed for stability and/or fish habitat, which would also require approximately 40,000 cubic yards of imported cobble and gravel.

Approximately 112,000 cubic yards of soil would be excavated to construct the new channel and reconnect/ modify abandoned meanders. An estimated 95,900 cubic yards of this material would be needed to backfill the existing channel sections not retained, and a small amount (approximately 10,000 cubic yards) might be reused as part of the project, depending on the golf course alternative selected. Approximately 6,100 cubic yards of excavated material would need to be off-hauled. Assuming approximately 15–20 cubic yards per truckload, it would require approximately 300–400 truck trips. The soil would be disposed of at a permitted facility that would most likely be outside the Tahoe Basin.

The smaller, higher, and longer channel throughout the treated reach would create a much broader active floodplain and riparian habitat area and would also increase the area of existing terrace surface inundated by intermediate and large floods. This would also result in reduced shear stress and erosive forces on the banks.

The golf course footprint within the SEZ and floodplain would be reduced under this alternative because the longer, more sinuous channel alignment would form a wider riparian zone and setback from the existing river that would require relocation/modification of the golf course layout. The overall golf course footprint would vary based on the alternative chosen.

The high-sinuosity restored channel river alternative would not be compatible with the existing 18-hole regulation golf course. However, this alternative could be combined with four golf alternatives:

- **Alternative S1** – Highly Sinuous Channel River Restoration with Reconfigured 18-Hole Regulation Golf Course
- **Alternative S2** – Highly Sinuous Channel River Restoration with Reduced Play Golf Course

- **Alternative S3** – Highly Sinuous Channel River and Meadow Ecosystem Restoration/Decommissioned Golf Course

- **Alternative S4** – Highly Sinuous Channel and Off-site Relocated Golf Course

If paired with the reduced play, decommissioned, or off-site relocated golf course, all existing Upper Truckee River bridges could be removed as part of this alternative. If paired with the reconfigured 18-hole regulation golf course, this alternative would require moving eight to ten golf holes west of the river into Washoe Meadows SP. In this case, the existing bridges could be removed and replaced with a single, longer bridge to provide access to the new holes west of the river.

If any of the existing bridges were retained as part of the reconfigured golf course or as recreational trail features, the bridges could require a modified location, new approaches, and/or modified footings/abutments.

This alternative was eliminated from more detailed evaluation in this draft EIR/EIS/EIS for the following reasons:

- The extensive construction of new channels and modification of remnant meanders would create a large area of temporary construction disturbance, increasing environmental impacts and potential short-term water quality risks.

- Although off-channel construction and revegetation could be phased for many of the individual channel segments, to foster short-term revegetation success, the numerous active channel crossings would require long-term stability, and there would be uncertainty about their performance during major floods.

- Numerous existing active channel crossings and active channel section modifications would require complex and costly in-channel construction, and the effectiveness of temporary water quality protections would be uncertain.

- The proposed highly sinuous alignment may not represent a single previously stable alignment, and the proposed length and sized channel may not be appropriate to remain stable under future flow and sediment conditions (even if it was a stable channel under Comstock Era conditions).

Overall this alternative would have similar benefit but higher risk than Alternatives 2, 3, and 5 being evaluated in this draft EIR/EIS/EIS and would still require major modification of the golf course. Thus, this alternative was eliminated from detailed evaluation.

Selective Bank Biotechnical and Stabilization

The Selective Bank Biotechnical and Stabilization River Alternative was identified in the Upper Truckee River Upper Reach Environmental Assessment (SH+G 2004a) and was described in that report as Alternative 5.

This approach would implement streambank stabilization emphasizing biotechnical measures to selected areas and would focus on measures that could be accomplished without extensive in-channel work or the need for extensive heavy equipment use. Some locations would require use of a rock armor (e.g., outer banks of meanders) and other bank stabilization treatments and/or variations, such as rock slope protection, brush boxes, and engineered log jams, depending on site conditions and the desired level of protection (e.g., existing biological resources or infrastructure).

This alternative involves applying an active approach to stabilizing selective sites along the Upper Truckee River banks in the study area, reducing sediment loads to downstream waters, and protecting adjacent riparian vegetation communities. It does not aim for system-wide stabilization or restoration of geomorphic function. The active restoration aspects of the project would not increase channel length or elevate the channel, nor would it reactivate any of the surrounding terrace as floodplain. Biotechnical river stabilization and revegetation would be

used to reduce active erosion and improve the riparian corridor quality. This approach involves selecting sites based on priority needs and does not involve comprehensively treating the entire area (RS 1400–8800). It would not stabilize the channel bed, so future channel incision and widening would be expected to continue.

The existing streambed profile would not be modified and, because the selective bank treatments would not address existing vertical instability, natural processes would likely continue to cause incision and increase channel capacity, therefore decreasing floodplain connectivity. Also, the channel could continue to adjust laterally, as local treatment of bank erosion could shift erosion to a nearby untreated bank.

Cut and fill would be used to create minor changes in bank heights and angles, and limited import or export would be required. Changes in bank heights, angles, and upper bank vegetation may indirectly improve local areas along the riparian corridor; however, hydrologic-related functions would not be improved due to limited connectivity.

Construction areas could require temporary isolation from the active channel. However, in-channel work would be limited because little buried streambed stabilization and/or rock toe-of-bank is assumed.

This river alternative does not propose changes to the golf course footprint, SEZ, and floodplain. The golf course area would not need to be reduced, because the existing channel alignment would be used, and no relocation/modification of the golf course layout would be required. However, the overall golf course footprint could vary based on pairing with possible golf alternatives.

The selective bank stabilization river alternative could be combined with any of the five golf alternatives:

- **Alternative B1** – Selective Bank Biotechnical and Stabilization with no change to existing 18-Hole Regulation Golf Course
- **Alternative B2** – Selective Bank Biotechnical and Stabilization with Reconfigured 18-Hole Regulation Golf Course
- **Alternative B3** – Selective Bank Biotechnical and Stabilization with Reduced Play Golf Course
- **Alternative B4** – Selective Bank Biotechnical and Stabilization with Decommissioned Golf Course
- **Alternative B5** – Selective Bank Biotechnical and Stabilization with Off-site Relocated Golf Course

This river alternative emphasizes protection of existing golf course infrastructure and does not require any changes to golf course layout. Therefore, it would not likely be cost effective to combine with a reconfigured, reduced-play, decommissioned, or relocated golf course.

This alternative was eliminated from more detailed evaluation in this draft EIR/EIS/EIS for the following reasons:

- This approach treats only selected banks and does not address profile instability; therefore, the treatments would be subject to undermining and failure. Over time, the channel would remain unstable, because of continued bed and bank erosion throughout the study area, which would not meet the project objective for reducing suspended sediment load in the river.
- Although the treatment would likely have short-term water quality benefit following completion of construction, long-term water quality improvements would be uncertain as a result of lingering channel instability, and/or repeat treatments/repairs or retrofits would be costly. Therefore, this approach would not likely meet water quality objectives and may be cost prohibitive over time.
- Only limited, localized benefit to the habitat and riparian corridor would be realized because connection with the floodplain and groundwater levels would not be restored, and there would be no significant increase in SEZ area.

Hole 6 - 7 Reach Focused Channel Stabilization

The Focused Channel Stabilization River Alternative was described in a draft design report (SH+G 2004c). This alternative would treat only a short reach of the river that is experiencing the worst erosion, namely the reach centered on golf course holes 6 and 7.

This alternative would involve applying active stabilization to a portion of the Upper Truckee River channel in the study area, reducing sediment loads to downstream waters, and protecting adjacent riparian vegetation communities. Active stabilization would not increase channel length or elevate the channel, but would apply a combination of floodplain excavation and engineered river channel and bank stabilization to reduce active erosion.

The active restoration would be focused on a 1,200-foot section of the river in Subreach 3B (RS 7500–8600) in the vicinity of golf course holes 6 and 7. This alternative would focus on addressing some of the most extensive historic, and continuing, streambank and streambed erosion within the study area. Undersized bridges have exacerbated local streambank erosion and bed scour, and constriction at the upper bridge has also acted as a back-watering grade control.

Several hydraulic modeling runs for preliminary development of this alternative (SH+G 2004c) explored different bridge widths and locations and iteratively developed a combination of treatments. The treatments would feature a combination of several measures:

- removal of the holes 6 and 7 bridges combined with construction of a single, longer full-span bridge located between the two existing bridge sites;
- excavation of an inset floodplain along the existing river channel to alleviate hydraulic constrictions and improve flow conveyance;
- installation of hard grade controls using boulders in the treated reach, including areas upstream of the present hole 6 bridge to provide streambed stability, prevent upstream migration of the headcut, and to help support water surface elevations in the immediate upstream reach; and
- installation of streambank stabilization treatment on the reconfigured terrace bank along the inset floodplain and along the new, lower active channel bank.

The inset floodplain would require approximately 5,500 cubic yards of excavation, which could be incorporated into the reconfigured golf course layout or hauled off-site. Substantial amounts of imported boulder, cobble, and gravel would be required for the short, treated section.

Under this river alternative, the golf course footprint within the SEZ and floodplain would be slightly reduced, because the inset floodplain would create a larger riparian zone and setback from the existing river, and would require relocation/modification of a small portion of the golf course near holes 6 and 7. The overall golf course footprint would vary based on pairing with possible golf alternatives.

The Focused Channel Stabilization River Alternative would generally be compatible with the existing 18-hole regulation golf course with only minor changes to holes adjacent to the river. This alternative could be combined with four golf alternatives:

- **Alternative F1** – Focused Stabilization with minor changes to Existing18-Hole Regulation Golf Course
- **Alternative F2** – Focused Stabilization with Reconfigured 18-Hole Regulation Golf Course
- **Alternative F3** – Focused Stabilization with Reduced Play Golf Course
- **Alternative F4** – Focused Stabilization with Decommissioned Golf Course
- **Alternative F5** – Focused Stabilization with Off-site Relocated Golf Course

The Focused Channel Stabilization River Alternative emphasizes protection of existing golf course infrastructure. The only required changes to golf course layout would be limited to the holes 6 and 7. Therefore, it would not likely be cost effective to combine with a reconfigured, reduced play, decommissioned, or off-site relocated golf course. However, if paired with the reduced play, decommissioned, or relocated golf course, all existing bridges could be removed.

- If paired with a reconfigured 18-hole regulation golf course, two options could occur with this alternative: Reconfigure the hole 6 and hole 7 layouts to accommodate the increased setback needed for the inset floodplain and a possible replacement bridge location.

- Move four or five golf holes west of the river into Washoe Meadows SP. In this case, the existing bridges could be removed and replaced with a single longer bridge (possibly more), depending on the final design, to provide access to the new holes west of the river.

If any of the existing bridges were to be retained as part of the reconfigured golf course or as recreational trail features, the bridges could require modified locations, new approaches, and/or modified footings/abutments.

This alternative was eliminated from more detailed evaluation in this draft EIR/EIS/EIS for the following reasons:

- The ecosystem benefits would be limited in scope and scale.

- There would be risk of incision to the upstream reach because the bridge has acted as a backwater grade control and, therefore, upstream migration of the headcut would be likely. Destabilization of the upstream reach would create environmental and water quality effects and be inconsistent with water quality objectives.

- The water quality improvements would be limited in scope and scale to the extent that they would not adequately meet project objectives.

- There would be residual channel instability and continued widening with erosion of high-terrace banks downstream of RS 7500, which would be inconsistent with water quality objectives of the project.

- The cost of restoration in relation to the length of river treatment would be high.

Because this alternative would have limited benefit, likely cause a headcut destabilizing the more functional reach upstream, leave the remaining channel at high risk, and be costly, it was eliminated from detailed evaluation.

Passive River Restoration

The concept of passive river restoration is generally described in the Upper Truckee River Restoration Project Riparian Ecosystem Restoration Feasibility Report (River Run 2006:35).

This alternative would apply a passive approach to ecosystem enhancement along the Upper Truckee River channel in the study area. The treatment would remove existing land and water uses that are incompatible with the geomorphic processes of natural river recovery from past and ongoing human disturbances without actively changing the channel or floodplain itself. Essentially all golf-related features would be removed from the floodplain allowing the river to adjust and form a new lower floodplain without impedance from infrastructure. The restoration would affect the river channel along the entire treatment reach (RS 1400–8800). The restoration would also involve modifying at least 50 percent of the existing golf course area, depending on the accompanying golf alternative. Implementing this alternative would encourage passive recovery of the system via natural erosion and depositional processes. Streambank failures, bank retreat, and channel widening, combined with point bar deposition in the inset channel, would create an inset active floodplain surface over time; however the surrounding terrace would not be reactivated as floodplain.

Key activities would include removal of all golf course bridges and all golf course fairways, tees, and facilities in areas that have been occupied by the river in the recent past. The golf course would be removed to approximately the limits of meander scars visible on historic photographs. All golf course infrastructure north of the river along Angora Creek in Reach 1 (holes 10, 11, and 12) would be removed. Golf course infrastructure nearest the river on the south side would be removed (i.e., all of holes 17 and 18 and portions of holes 13, 14, 15, and 16). Removal of golf course facilities further south and higher up on the unnamed creek alluvial fan would be optional, depending on the golf course alternative chosen.

Removing golf course infrastructure along the channel would allow for natural channel dynamics which would continue to erode the channel bed, widen the channel through bank erosion, and eventually result in net deposition and creation of a stabilized active floodplain inset in a broad incised area between high terrace banks.

Existing public utility infrastructure near the upstream and downstream ends of the treatment area would still require protection from stream dynamics, so it is likely that some form of channel bed and bank stabilization (i.e., boulder steps, rock toe bank protection) would be incorporated near RS 1400 and RS 8800.

The golf course footprint within the SEZ would be reduced, and the golf course area within the 50 to 100 year floodplain would be mostly eliminated under this alternative.

The Passive Restoration River Alternative would not be compatible with the existing 18-hole regulation golf course and would only be marginally compatible with a reconfigured golf course due to the need for a bridge. This alternative, however, could be combined with four golf alternatives:

- **Alternative P1** – Passive Restoration with Reconfigured 18 hole golf course
- **Alternative P2** – Passive Restoration with Reduced Play Golf Course
- **Alternative P3** – Passive Restoration with Decommissioned Golf Course
- **Alternative P4** – Passive Restoration with Off-site Relocated Golf Course

To allow natural channel adjustments, all existing bridges would be removed as part of this alternative. A reconfigured golf course would have holes on the west side of the river. This would require a bridge long enough to span the expected future floodplain width and, although infrastructure would be minimized, removal of all golf features from the river zone and floodplain would not be possible.

This alternative was eliminated from more detailed evaluation in this draft EIR/EIS/EIS for the following reasons:

- Water quality degradation would continue and ecosystem benefits would be long delayed until natural adjustments to prior channel instability could progress (likely for decades). These natural adjustments would involve large areas of erosion and sediment loads with associated impacts and would not be consistent with the water quality and ecosystem restoration objectives of the project.

- Removal of golf course infrastructure, in particular the bridges, is not feasible without installation of substantial bed and bank stabilization to prevent immediate instability and water quality degradation, which would ultimately interfere with natural channel adjustments.

- Removal of rigid metal/wood and/or riprap material in existing bank stabilization structures would help to avoid their future entrainment in flood flows, but could result in immediate instability and water quality degradation.

- Ecosystem benefits are long delayed, but costs are incurred immediately for developing a reduced-play course or removing golf course infrastructure.

Under this alternative, channel and bank erosion would continue, the water table would not be raised, and instability would likely be exacerbated by removing bridges without grade control or profile manipulation. The

implications and costs of removing the golf course would still occur under this alternative. Because this project would have minimal near-term benefit and high erosion and risk potential, it was eliminated from detailed evaluation.

ALTERNATIVE LOCATIONS FOR THE GOLF COURSE

In determining whether alternative locations for the project need to be considered in an EIR, State CEQA Guidelines Section 15126.6(f)(2)(A) states that only locations that would feasibly avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR. In addition, Section 15126.6(f)(2)(B) of the State CEQA Guidelines provides that if the lead agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion and should include the reasons in the EIR. With respect to assessing the feasibility of alternatives, State CEQA Guidelines Section 15126.6(f)(1) provides that the following factors may be taken into account: site suitability, economic viability, availability of infrastructure, general plan consistency, other plan or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the project proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the project proponent).

Siting Criteria

Table 2-2 presents the siting criteria that were developed by State Parks, their consultants, concessionaire American Golf, and golf course designer John Harbottle to guide the evaluation of potential alternative site locations.

Method of Evaluation

A process of map review and agency consultation was conducted to identify potentially feasible alternative locations for the Lake Tahoe Golf Course. Agencies contacted during the consultation process included: TRPA, Reclamation, Conservancy, USFS, City of South Lake Tahoe, El Dorado County, and the Lahontan Regional Water Quality Control Board (RWQCB). TRPA, Reclamation, Conservancy, USFS, and the City of South Lake Tahoe responded regarding potential sites for consideration.

The search area for the potential golf course sites was the south shore of Lake Tahoe in California, including the City of South Lake Tahoe and surrounding areas within El Dorado County. Land in the State of Nevada was not included in the search because State Parks only has authority within the State of California.

All potential site locations identified through the map review and consultation process were evaluated to determine each site's ability to meet the project's purpose and need and the siting criteria described above. To qualify as a feasible alternative location for the golf course in the draft EIR/EIS/EIS, an alternative site must meet the project's purpose and need and most of its basic objectives, and be feasible in light of the siting criteria listed above. The results of the alternative site locations screening process for the project are described below.

Sunset Ranch

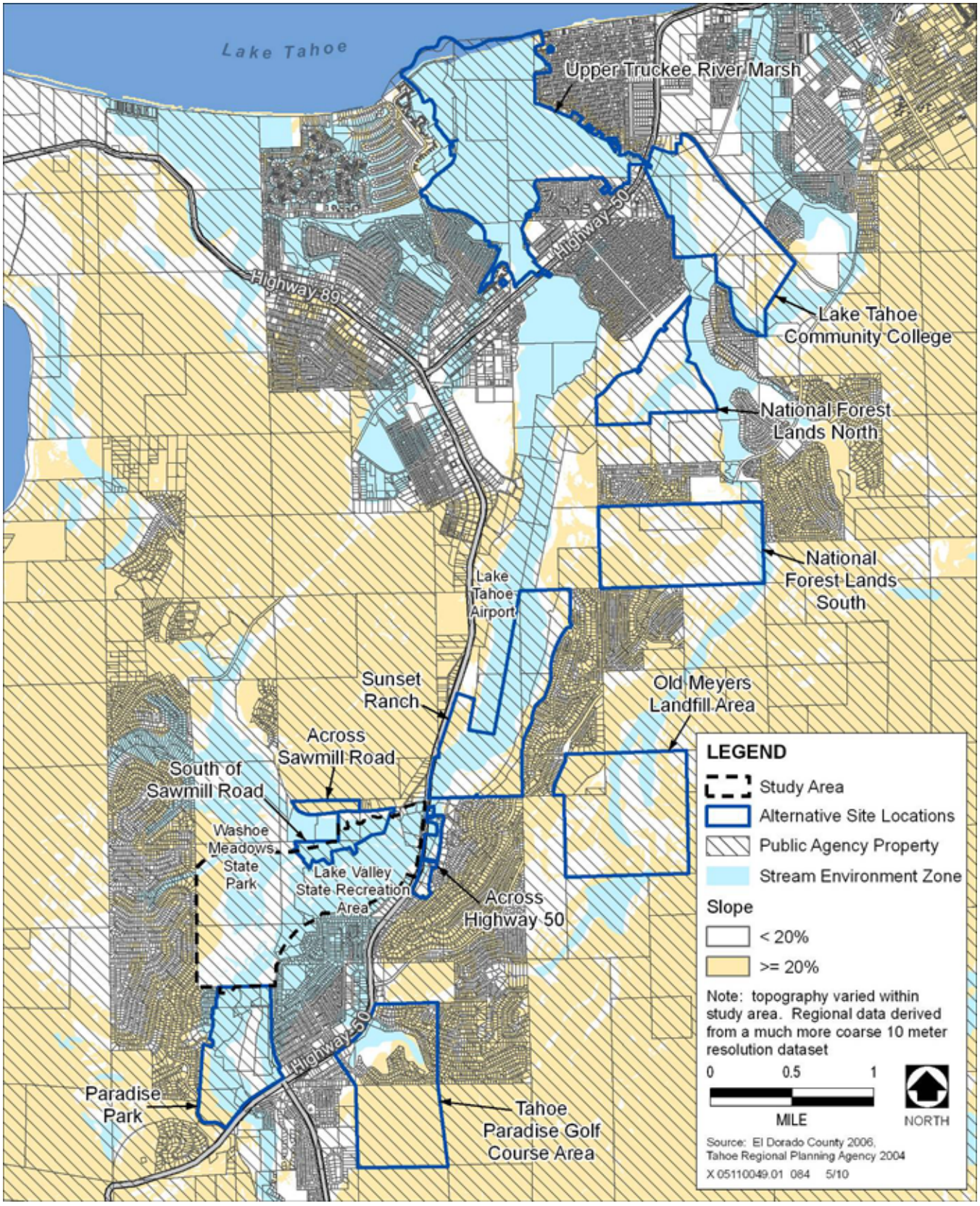
TRPA suggested consideration of the Sunset Ranch property. This site is located along the Upper Truckee River on the east side of U.S. 50 between the Elks Club Bridge and the Lake Tahoe Airport (Exhibit 2-2). The property is approximately 225 acres and was the former location of Sunset Stables. This site is under public ownership, with two-thirds of the land owned by the Conservancy and the remainder owned by the USFS. This site is largely vacant, with the exception of a well house and storage for revegetation materials (e.g., pine needles, wood chips) used by the Conservancy. The former stables and buildings have been removed. This site is accessible via U.S. 50 and is located in Plan Area Statement (PAS) 119 (Country Club Meadow). Allowable uses within this PAS include development and recreational facilities including golf courses. The Land Capability Classification for this site is primarily 1b, which is SEZ and only allows 1 percent base coverage. There are some small areas within this

site that have Land Capability Classifications 5 and 6, which allow 25 and 30 percent base coverage, respectively, and are considered higher capability lands. USFS and Conservancy plan to implement a SEZ and floodplain restoration on the Sunset Ranch portion of the Upper Truckee River watershed.

Table 2-2
Upper Truckee River Golf Course Reconfiguration Siting Criteria

Criterion	Description
Site size	The current golf course is approximately 130 acres and is located within a larger property owned by State Parks. Minimum usable course area should be 120 to 150 acres for 18 holes. According to American Society of Golf Course Architects, 150 acres is a more standard size. An entire property would not be usable, recognizing buffers and potential avoidance areas. For purposes of this analysis, a 150 to 200-acre site is the minimum size with a minimum useable area of 120 to 150 acres.
Contiguity and Shape	To allow for golf course use, property must be internally connected without discontinuous parcels. The property configuration must be shaped so that it is conducive to golf course design.
Public Ownership	As a public golf course, the property must be publicly owned, because market prices for land make purchase of private property infeasible for State Parks.
Use allowance	Applicable community plans, plan area statements, property acquisition purposes, or other use controls must permit a golf course as an allowable use or be amendable to do so.
Topography	Level, gently to moderately rolling, or gently sloped hillside areas are typically suitable for golf course construction. The goal is to minimize the need for grading and to allow the course to generally follow the terrain. Nearly level areas (up to 5% slopes) need to be present for greens. Also, side slopes on fairways need to be 5 to 6% or less. Slopes generally need to be 20% or less throughout the area used to develop the course, although small areas of steeper slope can be accommodated.
Land capability	Land must be high capability with an absence of SEZ or the ability to avoid all or most of the SEZ on the site.
Landslide/ rockslide areas	Areas prone to or with existing landslides or rockslides should be avoided.
Erodible soils and site drainage	Highly erodible soils should be avoided. Site topography and hydrologic characteristics must be conducive to proper erosion control and drainage.
Rock outcroppings	Natural rock outcroppings must be able to be avoided on the site, so large outcrop removal is not needed.
Cultural resources sites	Sensitive cultural resources sites should be absent or, if present, must be located so that buffers or protection measures are adequate to sufficiently protect the resource.
Sensitive species	Habitat important to listed threatened or endangered species must be avoided.
Threshold degradation	Locating a golf course on the alternative site would not lead to any degradation of conditions related to maintaining or achieving threshold carrying capacities.
Site access	Sites must abut at least one public roadway or highway that would not require extensive roadway construction and should minimize access through residential neighborhoods.
Electricity, water and sewer utilities	Utilities must be available to the site with reasonable construction of extensions.

Source: Data developed by EDAW, Inc. (now AECOM) 2008



Source: Data provided by State Parks 2010, El Dorado County 2006, and TRPA 2004

Alternative Site Locations **Exhibit 2-2**

Upper Truckee River Marsh

Although this site is publicly owned and would meet the size (i.e., larger than 150 acres) and site access criteria, the site is primarily SEZ. Therefore, this site would not meet the land capability criterion. In addition, portions of the site that are not within the SEZ have too much area with slopes greater than 20 percent. This site was also purchased with funds from Propositions 117 and 204 for the purpose of restoration. Therefore, development of a golf course on this site would not be consistent with the purpose for which the property was purchased. This site does not meet the siting criteria and, therefore, this site is not a feasible alternative location for the golf course and was eliminated from further evaluation.

Across U.S. 50

During public meetings for EIR/EIS/EIS scoping, consideration of the land across U.S. 50 from the Lake Tahoe Golf Course was requested as an option for golf course relocation. The land at this site is divided into 13 individual parcels located south of the Sunset Ranch site (Exhibit 2-2). The individual parcels are owned by multiple owners including the State of California, Conservancy, El Dorado County, and private landowners. The total size of these parcels is approximately 24.5 acres. This site is accessible via U.S. 50 and is located in PAS 119 (Country Club Meadow), which is described above for the Sunset Ranch site. The Land Capability Classification for all parcels that make up this site is 1b, which is SEZ and only allows 1 percent base coverage.

Although this site is near the existing Lake Tahoe Golf Course, it is too small to serve as an alternative location for the entire golf course. The site size could allow for relocating a portion of the golf course, if a means to cross U.S. 50 were feasible. This site is publicly accessible and would meet the site access criterion; however, for golfer safety and avoidance of traffic disruption, a grade-separated crossing would be necessary (overpass or underpass). In addition, some of the parcels within this site are privately owned, which would not meet the public ownership criterion. A majority of this site is also SEZ, which would not meet the land capability criterion. Because the site is primarily SEZ and has private parcels embedded within it, this site would not be a feasible alternative location for a portion of the golf course; therefore, this site was eliminated from further evaluation.

The Upper Truckee River Marsh site is located along the lowest reach of the Upper Truckee River, generally bounded by U.S. 50 and the Highland Woods neighborhood on the south, the Al Tahoe neighborhood on the east, and the Tahoe Islands/Sky Meadows and Tahoe Keys neighborhoods on the west (Exhibit 2-2). The site is approximately 592 acres and includes parcels owned by the Conservancy (which cover the majority of the area), other public agencies, and private landowners (on the south end of the area).

The Conservancy is planning for ecosystem restoration on a large portion of the site. Public access to the site is available via several roadways including Venice Drive East, Fifteenth Street, Rubicon Trail, Springwood Drive, and San Francisco Avenue. This site was considered because it is a large, accessible piece of public land in the South Lake Tahoe area. Existing uses on this site include undeveloped SEZ, a recreational area on the Cove East Beach portion of the site, and the Tahoe Keys Property Owners Association corporation yard. The Upper Truckee River Marsh site is within six different PASs: 099 (Al Tahoe), 100 (Truckee Marsh), 102 (Tahoe Keys), 103 (Sierra Tract Commercial), 104 (Highland Woods), and 111 (Tahoe Island). Most of the site is within PAS 100 and approximately 90 percent of the site is within one of PASs 100 or 102. PAS 100 does not allow development or any public service use. PAS 102 allows some development and recreational use. The remaining PASs (099, 103, 104, and 111) allow development and recreational use; however, these PASs make up only 10 percent of the site. Classification for this site is 1b, which is SEZ and only allows 1 percent coverage; however, there are some smaller areas classified as 4, 6, and 7. Land Capability Classification 4 allows 20 percent base coverage, and 6 and 7 allow 30 percent base coverage.

Although the majority of this site is publicly owned and would meet the size and site access criteria, the site is primarily SEZ and planned for restoration. Therefore, this site would not meet the land capability criterion. Golf courses are not an allowable use on this site; which would not meet the use allowance criterion. The Conservancy

is also in the planning stages for restoring ecological processes and functions on the majority of the site, including returning upland portions of the site to SEZ. Development of a golf course would not be consistent with the proposed restoration. With the substantial area of SEZ and the proposed site restoration, it would not be a feasible alternative location for the golf course. This site does not meet the siting criteria above; therefore, this site was eliminated from further evaluation.

Old Meyers Landfill Area

The Old Meyers Landfill Area site was considered because it is a large, accessible plot of public land in the South Lake Tahoe area. The site is located southeast of the Lake Tahoe Airport and east of Pioneer Trail (Exhibit 2-2). It is primarily owned by USFS with a small privately-owned parcel near the middle of the site. The entire site is approximately 367 acres, with 11 acres occupied by the waste disposal area. The landfill operated from about 1947 to 1971. The site stopped receiving waste in 1971, and in 1973 El Dorado County closed the landfill and covered the waste with a soil cap. USFS is managing remediation activities to clean up leachate contamination from this site (USFS 2007). The site is also being considered as a location for relocating the Tahoe Wildlife Care facility and constructing a wildlife park. Public access is provided to the site via Pioneer Trail to Garbage Dump Road, and the site is located in PAS 095 (Trout/Cold Creek), which allows for development and recreational uses. The primary Land Capability Classification of this site is 1c, which allows 1 percent base coverage. This site also has small areas classified as 1b and 6.

This site would meet the site access criterion; however, a portion of the site is a Comprehensive Environmental Response, Compensation and Liability Act site and, as such, is part of a strictly controlled Federal remediation planning and implementation process. The appropriate post remedial uses have not yet been determined, and it would likely be several years before a planned use of this portion of the site is determined (Harris, pers. comm., 2008). In addition, this site is not considered high capability land and, therefore, would not meet the land capability criterion. Much of this site also has slopes in excess of 20 percent, which would not meet the topography criterion. With its topographic constraints, and constrained clean-up process, the Old Meyers Landfill Area site would not be feasible as an alternative location for the golf course. This site does not meet the siting criteria above; therefore, this site was eliminated from further evaluation.

Across Sawmill Road

Comments received during public scoping meetings requested consideration of land immediately across Sawmill Road from the golf course. This site consists of two individual parcels bordered on the south and west by Sawmill Road (Exhibit 2-2). The larger parcel is approximately 19 acres and is owned by USFS. The smaller parcel is approximately 0.85-acre and is owned by the State of California. Both sites are currently undeveloped and are accessible via Sawmill Road. The site is located within PAS 118 (Twin Peaks), which allows for development and recreational use. The Land Capability Classification on this site is 6, which allows 30 percent base coverage. Land immediately north of this site is also owned by USFS and is classified as 1c.

This site is considered high capability land and would meet the site access criterion; however, it would not meet the size criterion because the parcels are much smaller than the 150-acre minimum required for relocating the golf course. Although this site and land to the north of this site are publicly owned, both sites consist of steep areas with slopes that exceed 20 percent. Therefore, does not have enough near level land to meet the topography criterion. The site's small size and steep slopes preclude use of it as a feasible alternative location for the golf course or a portion thereof; therefore, this site was eliminated from further evaluation.

South of Sawmill Road

The South of Sawmill Road site was considered because it is adjacent to the existing golf course and has site access. The site is located between Sawmill Road and hole 12 of the existing Lake Tahoe Golf Course (Exhibit 2-2). This site is owned by the Conservancy and USFS and is approximately 55 acres. State Parks restored 7,000 linear feet of Angora Creek channel and floodplain via two projects between 1998 and 2002. A length of 2,500

feet of the restored Angora Creek passes through this site. Restoration activities included reconstructing the channel, reoccupying remnant channels where appropriate, and moving the mouth closer to its original location to compensate for historic incision (SH&G 2004a:II-23). The site is accessible via Sawmill Road and is located in PAS 119 (Country Club Meadow). Allowable uses within this PAS include development and recreational facilities including golf courses. The Land Capability Classification for this site is 1b, which is SEZ and only allows 1 percent base coverage.

This site would meet site access criterion, and it is adjacent to the existing golf course which could allow for partial relocation of the golf course. In addition, the entire site has slopes below 20 percent. However, the entire site is SEZ and would not meet the land capability criterion. Use of the site for a golf course would also conflict with the previous Angora Creek restoration completed on this site. Because the site is entirely SEZ and was recently restored, it does not meet siting criteria. Therefore, this site was eliminated from further evaluation.

Lake Tahoe Community College

The Lake Tahoe Community College site was considered because it is a large, accessible area of public land in the South Lake Tahoe area. The Lake Tahoe Community College site is located northeast of the National Forest Lands North site and south of U.S. 50 (Exhibit 2-2). This site consists of 13 parcels totaling 303 acres. Parcels within the site are owned by the State of California, Lake Tahoe Community College, Lake Tahoe Unified School District, South Tahoe Public Utility District (STUPD), and the United States Postal Service. Public access is provided to this site via Al Tahoe Boulevard, and the site is located in PASs 098 (Bijou/Al Tahoe), 100 (Truckee Marsh), and 101 (Bijou Meadow). PAS 098 is covered by the Bijou/Al Tahoe Community Plan, which allows recreational uses. However, golf courses are only allowed within the District 4 – Town Center portion of the site, and a special use permit would be required. PAS 101 also allows for recreational uses including golf courses; however, PAS 100 does not allow development or any public service use. Much of the site is within Land Capability Classification 1b, which is SEZ; however, there are some areas classified as 4, 6, and 7. Land Capability Classification 4 allows 20 percent base coverage, and 6 and 7 allow 30 percent base coverage.

This site would meet the site access criterion, and some portions of the site are considered high capability lands with low slopes. However, a portion of the 303-acre site is already developed with the Lake Tahoe Community College or the South Lake Tahoe Public Utility District facilities. A majority of the undeveloped area within the site either has slopes greater than 20 percent, is SEZ, or is within PAS 100, which does not allow for development of any public service uses. Because these constraints are dispersed throughout the site, remaining areas within the site that could be suitable for development of a golf course would be well below the 150 acre size criterion. Because the developable area within the site would not meet the size criterion, this site does not meet the siting criteria and was eliminated from further evaluation.

National Forest Lands North

The area north of the Golden Bear Plan Area was suggested by the Conservancy for consideration. This site is located west of Pioneer Trail, east of the Upper Truckee River and Lake Tahoe Airport, and south of Golden Bear Trail (Exhibit 2-2). The site consists of two parcels totaling approximately 166 acres and is owned by USFS. Residential development is located to the north and south, and Trout Creek is located to the east. The nearest public access to this site is provided via Sierra Boulevard and Lodi Avenue to the north and Jacarillo Trail to the south. Sierra Boulevard dead ends into the current Caltrans snow storage area north of the site, and Lodi Avenue and Jacarillo Trail provide access through residential neighborhoods located to the north and south of the site. This site is located within PAS 095 (Trout/Cold Creek), which allows for development and recreational use. The Land Capability Classifications include 3 through 7, which allow between 5 and 30 percent coverage. Some portions of this site are classified as 1b, which is SEZ; however, these areas are primarily along the eastern edge of the site.

The site is publicly owned and would meet the size criterion. The majority of this site has slopes below 20 percent, which would meet the topography criterion. Although this site has public access, site access is only available through residential neighborhoods and/or the Caltrans storage area, which could cause traffic impacts to surrounding neighborhoods. Because this site was purchased under the Santini-Burton Act which does not include golf as an allowable use, it would not be suitable or feasible as an alternative location for the golf course. Therefore, this site was eliminated from further evaluation.

National Forest Lands South

The area south of the Golden Bear Plan Area was suggested for consideration by the City of South Lake Tahoe. This site is located west of Pioneer Trail, east of the Upper Truckee River and Lake Tahoe Airport, and south of Golden Bear Trail (Exhibit 2-2). This site consists of two parcels that total approximately 272 acres. The larger of the two parcels is owned by USFS, and the smaller parcel is owned by the Conservancy. Access to the site is provided via Pioneer Trail, and it is bordered on the north and south by residential development. This site is located within PAS 095 (Trout/Cold Creek), which allows for development and recreational use. The Land Capability Classifications on this site include 1b, 4, 5, and 6. The majority of the higher capability lands (i.e., 4, 5, and 6) are located near the middle of the site.

This site is publicly owned and would meet the size criterion. The site contains some SEZ, but is primarily higher capability lands, which would meet the land capability criterion. The site would meet the site access criterion; however, much of the site has slopes exceeding 20 percent, which would not meet the topography criterion. Because the site does not meet the topography criterion and was purchased under the Santini-Burton Act, which would not allow use of the site as a golf course, it would not be a suitable or feasible location for a golf course and was eliminated from further evaluation.

Paradise Park

Consideration of Paradise Park and surrounding properties was suggested by the Conservancy. Paradise Park is bordered on the north by Washoe Meadows SP and is owned by El Dorado County (Exhibit 2-2). Existing uses on this site include wedding facilities, fishing, swimming, camping, and a playground and picnic area. Surrounding parcels are owned by USFS and are primarily vacant. This site consists of 17 parcels totaling 197 acres, and access is provided to the site via Oaxco Street and Shawnee. The area is surrounded by residential development and is located within PAS 119 (Country Club Meadow). The Land Capability Classifications are primarily 1b, with some small areas of 3 and 5. Land Capability Classification 1b allows 1 percent base coverage, and allowable uses within this PAS include development, golf courses, and other recreational facilities.

This site is publicly owned and would meet the size criterion and site access criterion; however, access is provided through a residential neighborhood, which would result in additional impacts to the surrounding neighborhood. The site has extensive SEZ, which would not meet the land capability criterion, and a large portion of the site has slopes that exceed 20 percent, which would not meet the topography criterion. Because of the substantial amount of SEZ and steep slopes on this site, it would not be a feasible alternative location for the golf course. In addition, this site was purchased under the Santini-Burton Act which would not allow use of the site as a golf course. Therefore, this site was eliminated from further evaluation.

Tahoe Paradise Golf Course Area

Expansion of the Tahoe Paradise Golf Course Area site was considered, because it is a large area of land with uses compatible with use as a golf course. The site includes the existing Tahoe Paradise Golf Course and surrounding publicly-owned lands. The Tahoe Paradise Golf Course is privately owned, and surrounding lands are owned by USFS and the Conservancy. The site is approximately 332 acres, and Tahoe Paradise Golf Course is an 18-hole executive course located east of U.S. 50 and south of Pioneer Trail (Exhibit 2-2). The course is open to the public annually from May 1 through October 15 (Tahoe Paradise Golf Course 2009). This site is located in PAS 122 (Tahoe Paradise-Mandan), and adjacent lands are in PAS 121 (Freel Peak). Allowable uses in PAS 122

include residential and recreational uses including golf courses. Allowable uses on adjacent lands include recreational uses including hiking trails, undeveloped campgrounds, and snowmobile courses. Land Capability Classifications are primarily 1b, but also include 1a, 1c, 3, and 4, which allows between 1 and 20 percent coverage. The existing golf course area is primarily slopes below 20 percent; however, a majority of the adjacent lands have slopes that exceed 20 percent.

The site would meet the size criterion. In addition, it would meet the site access criterion because public access is provided via U.S. 50. Although a portion of the site is publicly-owned, the golf course portion of the site is privately owned and would not meet the public ownership criterion. More than half of this site has slopes that exceed 20 percent, and the existing course already utilizes nearly all the land with slopes under 20 percent. A regulation 18-hole course would require additional area that would not meet the topography criterion. This site contains some small areas of higher capability lands, but is primarily SEZ. This is a pre-existing use so the current level of SEZ development would be a "grandfathered" use, but generally this site would not meet the land capability criterion. Although the existing course in SEZ is a permissible use, the area available to expand to an 18-hole regulation course is not usable because lands are highly sloped or located in SEZ.

Because this site is primarily SEZ, has considerable area with slopes greater than 20 percent, and a portion is privately owned, it would not be a feasible alternative location for relocating the golf course. Therefore, this site was eliminated from further evaluation.

Feasibility of an Alternative Golf Course Location

The comprehensive evaluation of potentially feasible alternative locations for the golf course determined that no feasible alternative location is available. As a result and as directed by the State CEQA Guidelines, more detailed analysis of an alternative location is not presented in the draft EIR/EIS/EIS.

2.3 ALTERNATIVES EVALUATED FURTHER

Each alternative evaluated in this draft EIR/EIS/EIS is named for its treatment to restore the Upper Truckee River and its design approach regarding the public Lake Tahoe Golf Course in the Lake Valley SRA. These five alternatives were evaluated in detail:

- **Alternative 1** – No Project/No Action: Existing River and 18-Hole Regulation Golf Course
- **Alternative 2** – River Ecosystem Restoration with Reconfigured 18-Hole Regulation Golf Course
- **Alternative 3** – River Ecosystem Restoration with Reduced-Play Golf Course
- **Alternative 4** – River Stabilization with Existing 18-Hole Regulation Golf Course
- **Alternative 5** – River Ecosystem Restoration with Decommissioned Golf Course

The following sections describe project elements common to Alternatives 1 through 5 and project elements specific to each individual alternative. The exhibits prepared for each alternative show the location in the study area of the existing and proposed river, its restoration elements, and the golf course and proposed changes to the course, as well as boundaries, trails, cart paths, and buildings.

The following text, tables, and exhibits describe and illustrate the proposed features of those alternatives carried forward for detailed evaluation. These descriptions were developed through an iterative conceptual design process that built on assessment and preliminary design information in prior studies (SH+G 2004a, 2004b, 2004c; River Run 2006), along with continued design input from State Parks and technical consultants involved in the project (River Run, Haen Engineering, John Harbottle Design). The evaluation of potential impacts is based on conceptual designs for the river or the golf course; however, the final design may vary. This analysis is meant to convey the extent of potential impacts. Additional information comparing the existing and expected treatments and conditions under each alternative, listed by subreach, is provided in Appendix B, "Proposed River and Floodplain Treatments by Alternative". Descriptions of the conceptual designs for treatment activities and engineered features are included in Appendix C, "Conceptual Treatment Descriptions and Sketches" and

Appendix D, "Bridge Report," provides the preliminary design and implementation information for bridge replacement/removals.

2.3.1 RIVER RESTORATION TERMINOLOGY

Throughout the alternative descriptions we refer to particular proposed treatment types in specific river reaches, subreaches and long profile locations introduced in Table 2-1. Additional details regarding the existing conditions and proposed treatments within specific locations by Alternative are provided in Appendix B, "Proposed River and Floodplain Treatments by Alternative". Standardized conceptual descriptions and sketches of each treatment type, regardless of which alternative they are proposed for, are included in Appendix C, "Conceptual Treatment Descriptions and Sketches".

2.3.2 GOLF LAND MANAGEMENT TERMINOLOGY

This section describes categories of land management and terminology pertinent to golf used for all the alternative descriptions that follow.

REGULATION GOLF COURSE

An 18-hole regulation golf course has 18 holes and includes a variety of par 3, 4, and 5 holes. Par is indicative of the number of shots an expert player would take for a particular course, and a par of 3, 4, or 5 is assigned to each hole depending on length, difficulty, and other factors. Regulation golf courses usually are played to a length of between 6,000 and 7,200 yards for men and between 4,500 and 5,800 yards for women or other players requiring shorter distances. A hole consists of a tee complex, fairway and rough areas, and a green complex (described below). There are many courses with lengths above and below these yardages. Technological advances in golf equipment have affected the length of certain courses. Yardages in excess of 7,400 are often desirable for high-level amateur or professional competitions because of the distances in golf shots achieved by accomplished players. The term "championship golf course" is a generally accepted term for an 18-hole regulation course that contains par 3, 4, and 5 holes, is over 6,000 yards for men and par that is near 72, but can vary between 70 and 73.

GOLF COURSE FOOTPRINT

The golf course footprint includes areas managed for golf (both intensively managed and minimally managed) as well as adjacent or surrounding areas managed for natural resources (natural landscapes). Areas of a golf course are managed differently with varying intensities of treatment or disturbance. Definitions for the various management and vegetation treatments are discussed below.

INTENSIVELY MANAGED LANDSCAPE

Intensively managed landscapes are actively managed for golf purposes and values. These areas include infrastructure (e.g., buildings, bridges, cart paths, and parking lots) and intensively managed vegetation including highly manicured areas such as greens, tees, fairways, driving range, and the rough, (all generally referred to as turf) as well as areas of lawn. The fairways, tees and greens are the mostly intensely managed and highly manicured golf landscape comprised of non-native vegetation such as bluegrass and bentgrass. These areas are irrigated, fertilized, and mowed to a short length. The rough, driving range, and lawn areas are irrigated and mowed, although not mowed as closely as the other areas, and not fertilized regularly.

Greens

The green is the end point of a golf hole where the flagstick and cup are located. Greens vary widely in shape and size, however most are commonly oval or oblong in shape. Greens may be sited level with the fairway or be elevated above the fairway. They can be flat, sloped from one side to the other, or contoured all around their surface. Greens are intensively managed and highly manicured golf landscape with short, evenly mowed turf.

Tees

Tees, often referred to as the teeing area or tee-box, are the area where every hole starts; this is where a player's drive or tee shot is hit. There is usually more than one available box for a player to place his ball, each one a different distance from the hole. They are generally as level as feasible, and most are slightly raised from the surrounding fairway. The most common tee areas, in increasing order of length from the hole, are the ladies' tee, the men's tee, and the "pro" or championship tee. These areas are intensively managed as highly manicured with short even turf.

Fairways

Fairways are the irrigated and closely mown areas that usually run in between the tee box and the green of a golf hole. The turf of the fairway is generally cut short (3/8 of an inch to a half-inch) and even and is an advantageous area from which to hit the ball.

Rough

The rough is the area(s) outside of fairways that generally features higher, thicker grass. Rough is designed to be punitive to players who miss the fairways. It is generally non-native vegetation (turf), and can vary in height and thickness depending on its location on the course, and often is found around bunkers and greens and on fairways. The "first cut of rough" is a term applied to rough just off the fairway that is higher than the fairway but lower than the "second cut of rough," which is the denser vegetation and may include some trees and shrubs. Rough is regularly mowed and watered.

MINIMALLY MANAGED LANDSCAPE

Minimally managed areas are areas of native vegetation within the golf course that are generally not mowed, irrigated or fertilized regularly, however, they may currently receive some water over-spray due to layout of irrigation system. These areas include buffer areas around holes/fairways and connector areas between some of the isolated tees and greens. The vegetation height and structure is managed (trim, thin, etc.) to enhance course playability. (e.g., thinning some underbrush adjacent to the fairways to decrease the likelihood of lost golf balls or trimming trees that may affect golf play). For example, in areas between tees and fairways, vegetation may be native; however, tall stature shrubs or trees and areas adjacent to cart paths may be trimmed to maintain clear passage. The golf course ponds, runoff treatment areas, and flood control berms along the river fall into this category because they have native vegetation that is not irrigated, mowed or fertilized, but are managed for golf purposes. Ponds may be used for water storage and irrigation or for aesthetic purposes; where ponds are used for irrigation water levels may fluctuate.

NATURAL LANDSCAPE

Natural landscapes are areas contained within the golf footprint that are managed for natural resource values. These include areas of native vegetation that are not mowed, irrigated, or fertilized. They are managed to support native vegetation, and they function as natural habitat and are not used for golf play but are within the golf course footprint. These areas may be undisturbed or restored areas that are re-planted with native species and temporarily irrigated for establishment of those species. Natural landscape areas may contain cart paths or ponds not used for golf, and they may also be utilized for passive recreation such as walking trails.

BEST MANAGEMENT PRACTICES

Best management practices (BMPs) and techniques for golf courses include a range of proven techniques that employ water conservation, fertilizer and pesticide management techniques in concert with stormwater capture and treatment. The goals of the BMPs are to protect undisturbed areas, reduce the off-site transport of sediment, nutrients, and pesticides and to control the rate, method, and type of chemicals being applied.

TRPA considers golf courses, along with ski areas, high priority for retrofitting with BMPs because of their potential for significant water quality impacts from runoff. The states are encouraged to issue Waste Discharge Requirements (WDRs) or National Pollution Discharge Elimination System (NPDES) permits to those facilities. The bi-state policies of the 1981 Regional Plan incorporate BMP XII-C (TRPA, 1978, p. XII-3) as a guideline for golf courses. Slow release fertilizers which release nutrients due to bacterial action are preferred for use on golf courses. Application rates shall not exceed the rates stated in the BMP Handbook. [Note: Although the 1981 plan says that BMP XII-C includes "a prohibition of use of fertilizer of the fast release variety," (TRPA, 1981d, p. 96), it contains no such prohibition].

The State Water Resource Control Board (SWRCB) states that golf courses should have a control plan covering nutrient loads, nutrient pathways, and control strategies. Fertilizer use must be strictly limited in SEZs. The control strategies shall include (1) annual, monthly, and daily fertilizer limits, (2) controlled drainage, (3) maintenance of drainage systems, and (4) surface and groundwater monitoring. The policies limit fertilizer use at existing golf courses to the minimum necessary to maintain the facilities, and prohibit further encroachment of golf courses into SEZs and fertilizer use on new or expanded golf courses except where they are relocated away from SEZs (SWRCB, 1980, p.119).

Examples of BMPs include biological and cultural controls of pests, risk assessment based pesticide selection, correct application of pesticides, proper timing and placement of fertilizers, planting resistant crop varieties, use of soil testing and plant analysis, use of slow release fertilizer, good irrigation water management, use of stormwater ponds, sediment management, good subsurface drainage routing, regulated runoff impoundments, use of land absorption areas, and grassed waterways or outlets.

2.3.3 COMPARISON OF ALTERNATIVES

Table 2-3 presents a brief comparison of proposed modifications under each alternative.

Table 2-3
Upper Truckee River Restoration and Golf Course Relocation Alternatives Comparison Table

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
RIVER CHARACTERISTICS					
River treatment	None	Restore	Restore	Stabilize	Restore
Channel length total (feet)	11,840	13,430	13,430	11,840	13,430
Active (5yr) floodplain (acres)	36	77	77	36	77
Inset floodplain (acres)	0	1.7	1.7	0.4	1.7
Restored SEZ (acres)	0	37	43	0	123[2]
[1]Restored 100-year floodplain (acres)	0	39	46	0	56[2]
Restored floodplain/meadow (acres)	0	97	112	0	131.5[2]
Anchored High Gradient Riffle	NA	US and DS ends of project reach			
Boulder Steps	NA	1 (water intake)		13-15	0
Armored Riffles	NA	15-25	15-25	Optional	15-25
Reconnected Historic Meander	NA	2,490	2,490	0	2,490
Constructed New Channel	NA	1,700	1,700	0	1700
Modified Existing Channel	NA	5,000	5,000	NA	5,000
Backfilled Existing Channel	NA	2,600	2,600	0	2,600
Rock Armor Bank Protection	NA	200	200	7,500 (Outside Bends)	200

Table 2-3
Upper Truckee River Restoration and Golf Course Relocation Alternatives Comparison Table

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Biotechnical Bank Treatment	NA	2,400	2,400	7,400 (Inside bends)	2,400
GOLF CHARACTERISTICS					
Golf Course Type	18 hole Regulation	18 hole Regulation	9 hole Regulation or 18 hole Executive	18 hole Regulation	None
Golf Course footprint (acres)	133	156	86	133	2.5
Golf course within SEZ (acres)	123	96	80	123	0
Golf course within 100-year floodplain (acres)	56	40	10	56	0
Golf Course adjacent to the Upper Truckee River (linear feet)	6,382	850	0	6382	0
Intensively managed landscape (acres)	103	92	51	102	0
Minimally managed landscape (acres)	23	44	24	24	0
Naturalized landscape (acres)	7	20	11	7	0
Bridges over Upper Truckee River	5	1	0	4	0
Bridges over Angora Creek	4	0	0	4	0
Bridges over unnamed creek	4	4	4	4	0
Additional Restroom	No	Yes	No	Yes	No
Paving of unpaved parking area	No	Yes	No	Yes	No
EMPLOYMENT OPPORTUNITIES					
Total Number of Jobs	76	80	60 to 65	80	32
Change in Number of Jobs from Existing Conditions	0	+4	-11 to -16	+4	-44
OTHER RESTORATION					
Quarry Wetland Enhancement	No	Yes	No	No	No
RECREATION CHARACTERISTICS					
Upper Truckee Bridges Open to Public Access	No	One	NA[3]	No	NA[3]
Trail along east side of river with Sawmill Bike Trail connection	No	Yes	Yes	No	No
Trail to corner of Country Club Drive	No	Yes	Yes	No	No
Improve/reroute trails on west side of river	No	Yes	No	No	No
Add minor access enhancement at public right(s)-of-way into Washoe Meadows SP (small parking area)	No	Yes	Yes	Yes	Yes

[1] Represents restored floodplain that was formerly golf course. Increase in total floodplain area discussed in Chapter 3, Section 3.3. "Hydrology and Flooding."
[2] Acreage proposed for full restoration but future planning efforts may allow for other compatible land uses.
[3] All bridges removed
Source: Compiled by EDAW (now AECOM) and State Parks 2009

2.4 ALTERNATIVE 1: NO PROJECT/NO ACTION: EXISTING RIVER AND 18-HOLE REGULATION GOLF COURSE

2.4.1 PROJECT FEATURES

For the No Project/No Action Alternative, Alternative 1, the river restoration and changes to the golf course would not be implemented (Exhibit 2-3). This alternative represents a projection of reasonably foreseeable future conditions that could occur if no project actions were implemented. Reclamation considers several criteria for determining proposed future conditions resulting from the No Action Alternative. Only activities that are (1) authorized; (2) approved through completion of NEPA, CEQA, and the Endangered Species Act (ESA) compliance processes; (3) funded; and (4) permitted are included in the No Action Alternative.

Under Alternative 1, existing conditions in the study area would continue into the future. The reach of the Upper Truckee River within the study area would not be restored and would continue to erode and transport sediment to Lake Tahoe, with repairs to the river and golf course performed only on an emergency or as-needed basis. The 18-hole regulation golf course would remain as it currently exists, with an overall footprint of 133 acres, 56 acres in the 100-year floodplain, 123 acres in the SEZ, and 6,382 linear feet of golf course adjacent to the river. Five bridges across the Upper Truckee River and four across Angora Creek would remain. Use of the area occupied by the golf course, including cart paths and bridges, would continue without change. There would be no changes to recreational use (i.e., trails) in Washoe Meadows SP as a result of Alternative 1.

Under this alternative, no boundary changes for Lake Valley SRA and Washoe Meadows SP would occur. No amendment to the text of the Lake Valley SRA General Plan would be needed, because the approach to management of the river would continue similar to current conditions (i.e., repairs to existing bank stabilization, infrastructure, and additional spot stabilization in response to erosion, damage, or failures). This does not preclude future general plan preparation for Washoe Meadows SP, but planning is not required at this time, because no permanent development is anticipated under this alternative.

RIVER AND FLOODPLAIN

Approach

Under Alternative 1, direct steps would not be taken to re-establish and improve floodplain processes or modify the degraded existing channel throughout the study area (RS 160 to 12000). The existing river and golf course would remain in place. This alternative would allow, but not encourage, passive recovery of the system via natural processes only where golf course infrastructure is not adjacent to the river. Streambank failures, bank retreat, and channel widening, along with point bar deposition in the inset channel, would enlarge small active floodplain patches over time; however, the surrounding terrace would not be reactivated as floodplain. In those river reaches where the golf course exists, the river would not be allowed to adjust or function naturally.

Repairs to existing bank stabilization, infrastructure, and additional spot stabilization would occur in response to erosion, damage, or failure, as it does today.

Within the study area the river has a channel length of 11,840 linear feet. The active (5-year) floodplain is currently 36 acres and 6,382 linear feet of the river is adjacent to golf course.

Design Features

Under Alternative 1, no engineering features or restoration would be implemented in the study area. The channel and riparian corridor of the Upper Truckee River, the unnamed creek and Angora Creek flowing through the golf course would remain similar to present conditions, and all golf cart bridges would remain in place.

A summary of the expected geomorphic features, processes, and functions in the study area under Alternative 1 are provided below.

Upper Truckee River

Alignment

Under Alternative 1, the Upper Truckee River channel, SEZ, and floodplain would generally remain in its present configuration. However, the exact location of the river channel would be modified by natural stream processes over time in areas where golf course infrastructure would not be affected. Changes to the river could occur gradually, as unprotected cut banks erode and point bars grow, lengthening the low-flow channel or rapidly during large flood events, such as if the channel erodes entrances to former meanders or forms new channels in low or weak areas of the terrace/floodplain. Adjustments would not be allowed, however where the river is near or adjacent to the golf course spot stabilization and repairs of banks would occur as needed (as under current management conditions).

Profile

Implementing Alternative 1 would not directly modify the streambed elevation of the Upper Truckee River (Exhibit 2-4), which has been actively eroding (down-cutting). A distinct change in slope occurs near RS 4000, approximately midway through the study area. This localized change is a result of natural changes in the overall valley configuration through geologic history and geomorphic processes that would likely continue to affect the rates of erosion and sediment transport in the future.

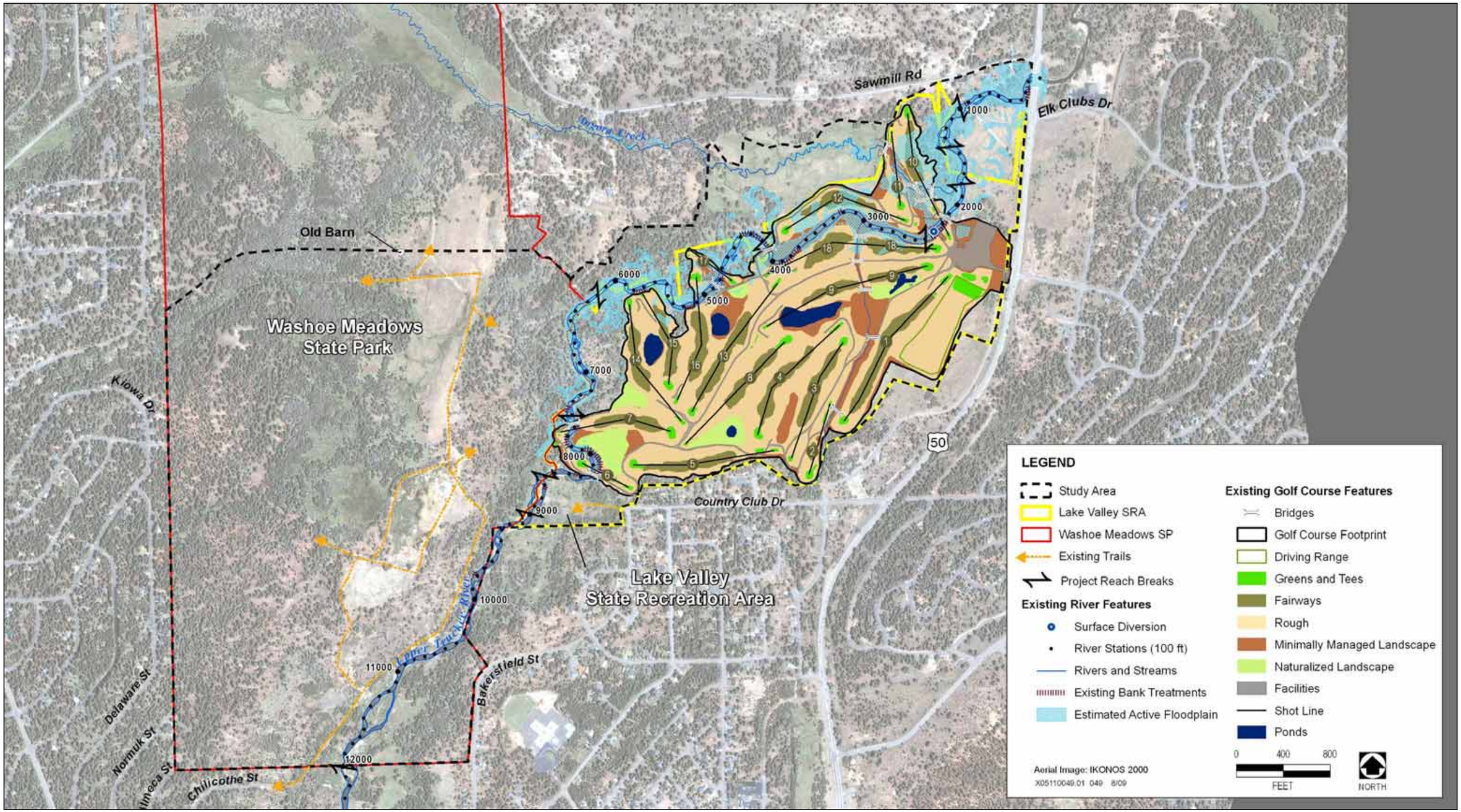
Under Alternative 1, the river's long profile would be modified by natural stream processes over time. Because the river is currently not in a state of equilibrium the river's natural profile changes would initially include streambed erosion (degradation that lowers the bed) in areas that do not have protective geologic or engineered streambed stabilization materials or hydraulic conditions that reduce bed velocities and shear stress. The only location that currently has a protected streambed is the surface water diversion at RS 2300.

Results of hydraulic modeling (SH+G 2004c:9) indicate that some of the existing bridges constrict flows during large events. These undersized bridges, especially the hole 6 bridge, create a local backwater effect, reducing velocities, shear stress, and streambed erosion on the upstream side of the constriction. This has a local protective effect helping to prevent upstream migration of a headcut (knickpoint) and ensuing incision. The downstream bridge over U.S. 50 creates a similar effect.

Swanson Hydrology + Geomorphology (March 2004: IV-1) estimated that active headcuts in the streambed would continue moving upstream in the study area for several decades. Under existing conditions, key knickpoints (distinct eroded low spots in the streambed profile) are in the vicinity of RS 1900, RS 4000–4300, RS 7600-8100, and RS 10,100 (Exhibit 2-4). Repeated stream survey data collected for the reach indicate that the recent channel response includes local incision, along with channel widening (River Run 2006:36). Similarly, river dynamic modeling by Simon et al. (2003:5-65) predicts local incision and channel widening in the near future, followed by local long-term aggradation (over the 50-year simulation period). The streambed lowering would occur in areas lacking resistant substrate (natural or engineered) relative to bank strength. It would likely continue until the flattened profile gradient and increased streambank erosion and channel widening decreases forces on the streambed and/or enough sediment is supplied to allow net deposition.

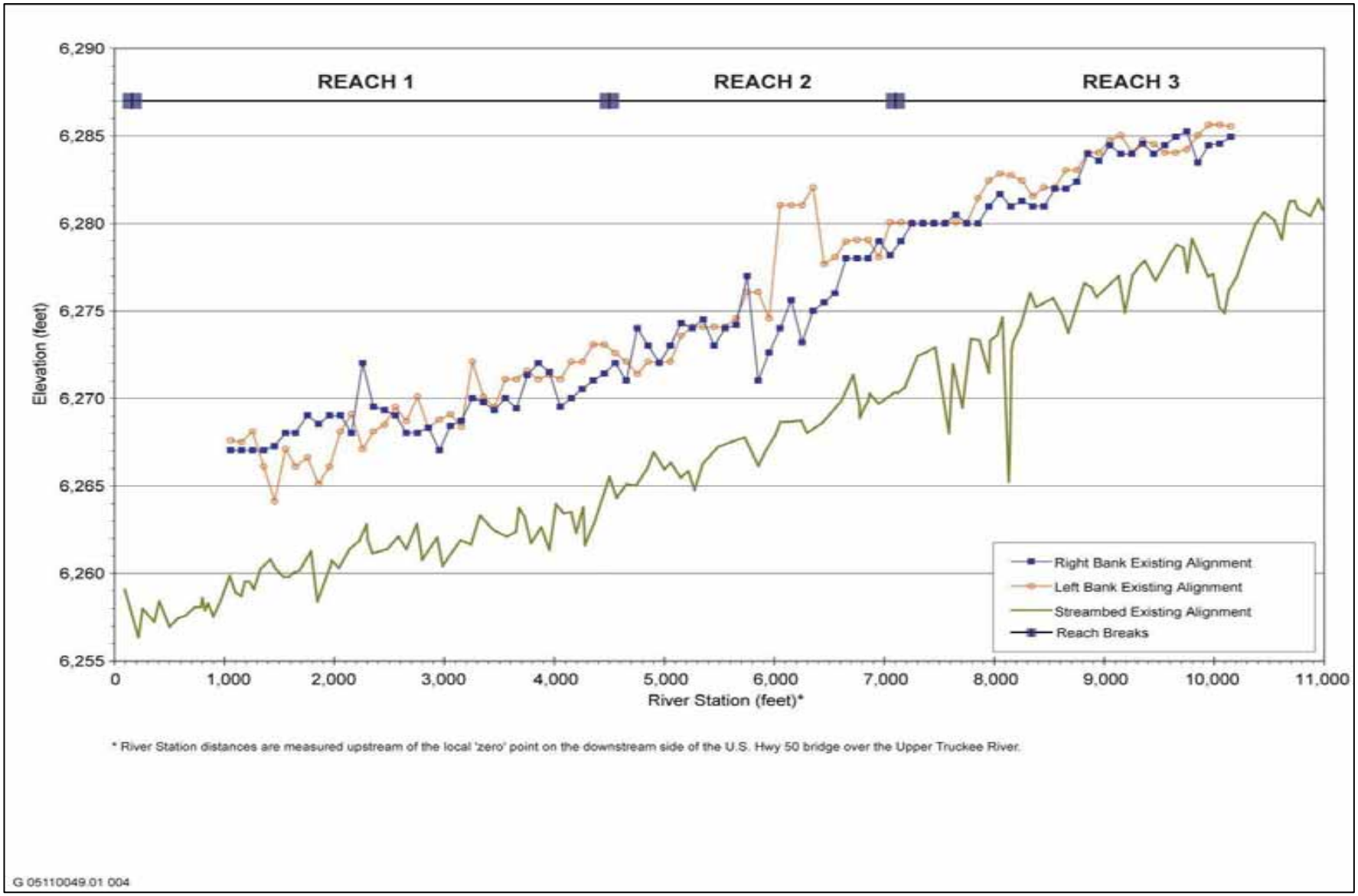
Banks

Under Alternative 1, existing streambank protection features would not be modified. However, repairs to streambanks and/or streambank treatments would continue on an as-needed basis. Spot treatments and repairs would occur primarily in response to major flood events and would be limited to locations with vulnerable public or golf infrastructure, or private property. Any future bank treatments under Alternative 1 would be likely be similar in scale and scope to those implemented historically and summarized below.



Source: Data Provided by State Parks in 2009, data adapted by AECOM in 2009

Alternative 1: No Project/No Action: Existing River and 18-Hole Regulation Golf Course **Exhibit 2-3**



Source: Valley Mountain Consulting 2009

Existing Upper Truckee River Profiles for Alternative 1 **Exhibit 2-4**

American Golf Corporation (American Golf), State Parks, and earlier landowners/leaseholders installed various bank protection structures to control site-specific streambank erosion problems (SH+G 2004c:11-21). A 2008 field inventory by State Parks indicates the presence of 1,900 feet of existing bank protection features, which represents 15.8 percent of the channel length and 8.9 percent of the total bank length. Nearly 70 percent of existing bank treatments (1,294 feet) are full bank riprap placed in 1970, most of which are now partially failing. Approximately 10 percent of existing bank treatments (196 feet) is toe-of-bank root wad treatments installed in the early 1990s. More than half of them are still intact, although erosion on banks just downstream of the bank protection structures has been exacerbated. A 285-foot-long brush box treatment installed in 2005 (between holes 6 and 7) to extend a treatment initially installed in the mid-1990s is also intact. The other mid-1990s treatments, composed of smooth logs, were used at two sites and have partially failed in both locations. The only bank stabilization treatment that has included bed stabilization is located in the vicinity of the surface diversion at approximately RS 2300, which has remained stable. In the remainder of the channel bank, treatments have been implemented without accompanying grade control of the streambed. Streambed incision in the reach has reduced the effectiveness of existing bank stabilization treatments.

Streambanks in the study area would be expected to continue to erode as part of natural channel widening in the incised channel system, and existing bank treatments would continue to fail. Over time, if not impeded by golf course bridges and infrastructure and bank treatments, the channel would likely erode sufficiently to form a new inset floodplain at a lower elevation. Lower, partially vegetated banks along the geomorphically active channel would form within an overall enlarged inset channel within the terrace surface, and the banks of the terrace would continue to have high-flow velocities and depths, with potential to erode during large flood events.

Channel Dimension/Capacity

Under Alternative 1, channel dimension (width, depth, cross section area) would not be altered, and its capacity to convey flow would not be directly modified. However, the natural river processes of bed and bank erosion, channel widening, and eventual aggradation would change the channel size over time as the channel attempts to naturally equilibrate, if not impeded by infrastructure and bank treatments. Channel capacity would be expected to generally increase in the future, until aggradation occurs and sediment deposits are stabilized by vegetation. This process would likely require decades. The enlarged channel would remain inset within the high terrace, and its capacity to convey large flood flows would likely increase somewhat.

Upper Truckee Bridges

Under Alternative 1, existing golf course bridges would be replaced or relocated if they were damaged or failed. The bridges are significant local controls on channel dynamics. Most of them restrict high flows, so it is possible that any of the bridges could experience local erosion, undermining abutments, or other damage in the future. The worst conveyance problems are at the upper two bridges (the 45-foot-wide hole 6 bridge at RS 8200 and the 75-foot-wide hole 7 bridge at RS 7575). These two bridges are located in areas that are predicted by channel evolution models to experience channel widening. In the future, this would result in worsening erosion problems requiring repeated spot treatment or repair (River Run 2006). Any failure or replacement of the bridges would incorporate grade control structures.

Unnamed Creek

Under Alternative 1, the unnamed creek that flows northward through the golf course between holes 1 and 3 and enters the Upper Truckee River at RS 3000 would not be modified. The creek was previously straightened and has limited function. If future bed erosion occurs at the confluence of the Upper Truckee River and the unnamed creek, the lower reach of the unnamed creek could experience erosion of its bed and banks if a headcut were to propagate upstream. All four existing cart path bridges would remain.

Angora Creek

Under Alternative 1, Angora Creek, which is located north and west of the Upper Truckee River between holes 10 and 11 and enters the river at RS 1800, would not be directly modified. The lower 0.75 mile of Angora Creek was restored through the meadow upstream of the golf course in 1997. Because the Upper Truckee River was incised near the historic confluence, the restored Angora Creek needed to be longer to drop down to that elevation. The restoration incorporated a portion of an abandoned historic Upper Truckee River meander as part of the restored Angora Creek channel. All four existing pedestrian/cart path bridges would remain.

Active Floodplain and River Overbanking

Under Alternative 1, the floodplain along the Upper Truckee River and the unnamed creek would continue to have limited degraded function. The area and frequency of floodplain inundation along the Upper Truckee River would continue to be limited by high streambanks, and the potential for fine sediment deposition on a floodplain would not be enhanced nor would the water table be raised. As channel incision, widening, and aggradation naturally proceed over the decades, a small increase in active floodplain area would be expected, unless restricted by golf infrastructure and bank stabilization. However, the enlarged channel and active floodplain would still be inset between high terrace banks subject to high flow stress and erosion.

EXISTING 18-HOLE REGULATION GOLF COURSE

Lake Tahoe Golf Course was constructed from 1958 through 1961 prior to ownership by State Parks. It is a daily fee public course offering 18-hole regulation length, par 71 course with a total walking distance of 6,741 yards with facilities used to host tournaments, weddings and banquets. Under Alternative 1, the Lake Tahoe Golf Course would continue to operate as it does currently and would remain in its current location. It would continue to be managed under a concessionaire agreement with a private golf company. Since 1989, the golf course has been operated by American Golf under the concessionaire contract.

The golf course has an overall footprint of 133 acres. The golf course would remain in its current configuration with 6,382 linear feet of golf course adjacent to the Upper Truckee River, 56 acres of it in the 100-year floodplain and 123 acres in the SEZ. Under current the TRPA regulations development within a SEZ is limited to 1 percent of the SEZ area of a parcel, however, the use associated with the golf course within the SEZ is “grand-fathered” because it was built prior to the formation of TRPA, therefore 123 acres would remain within SEZ.

Golf Course Design Concept

Under Alternative 1, the golf course design would remain as it is; no golf course holes or bridges would be improved, removed, or relocated, and existing conditions on the project site would be projected into the future through normal business operations.

Layout and Routing

The current Lake Tahoe Golf Course is an 18-hole regulation length, par 71 course with a total walking distance of 6,741 yards designed to host championship play. The current course has three sets of tees at 6,741; 6,327; and 5,703 yards. The course rating and slope for the three tees are, respectively, 70.8/126, 68.9/120, and 66.7/109. The Lake Tahoe Golf Course footprint is considered relatively compact in its current layout, using less acreage than an average 18-hole regulation golf course. However, in its current configuration and design, a large percentage of the golf course acreage is mowed and landscaped with non-native species, and this would not change.

Land Management

The footprint of the golf course includes areas managed for golf as well as adjacent or surrounding areas managed for natural resources. Under Alternative 1, the No Project/No Action Alternative, the existing golf course

footprint is considered relatively compact, with a high percentage of the course mowed and landscaped (intensively managed). The total golf course footprint is 133 acres, with 103 acres of intensively managed landscape (96 acres of turf and lawn and 7 acres of facilities), 23 acres of minimally managed landscape, and 7 acres of natural landscape. These areas are described in Section 2.3.2.

Lawn mowing typically occurs from early morning until mid to late afternoon, and occasionally into the evening. Drainage is poor and ponding commonly occurs at holes 1, 3, 5, 8, 9, 10, 11, and 13. Much of the golf course drains toward the river with little or no buffer. There are multiple small swales which are vegetated with turf that locally pond water or drain toward river. Under Alternative 1, the ponds would continue to be used to detain storm water, store water for irrigation, and enhance golf play and natural landscape features. The pond at hole 9 is occasionally stocked with trout.

The existing irrigation system is outdated and insufficient to address issues related to the climate, trees, sun, and shade. The irrigation system and irrigation practices in place at Lake Tahoe Golf Course would not change, and spot repairs and occasional upgrades would be continued. Over the past 10–12 years, the irrigation system for the greens at holes 1 through 9 have all been repaired or replaced at various times. An improved system would allow for more efficient use of irrigation water (Russell D. Mitchell Associates 2008).

Until recently there were no groundwater wells associated with golf course irrigation, and all irrigation water was pumped directly from the Upper Truckee River (near hole 11) and stored in the pond at hole 9. Irrigation occurs between the hours of 6:00 p.m. to as late as 10:00 a.m. depending on water needs. Actual quantity of water pumped for irrigation purposes from the Upper Truckee River has not been officially recorded. American Golf recently upgraded the system and installed a groundwater well and new pumphouse near the pond at hole 9, which would continue to be used for storing irrigation water. The new pump has a maximum pumping volume of 1,700 gpm. The river intake would now be used only as a back-up in the case of well malfunction or the need for additional water supply.

Fertilizer use at the Lake Tahoe Golf Course typically occurs twice per year in May and November. Most fertilizers used are slow release but some are not. Use of slow release fertilizer minimizes the amounts of fertilizer free in the soil solution which could be leached Fertilizers used on-site that are not considered slow release are applied either as spoon fed on greens only (on approximately 2 acres) or are applied in a manner that approximates a slow release feeding in that they are applied in such small quantities (per acre) that they do not overwhelm the soil's ability to hold and then release to the plant. No nitrates are applied, nitrates are negatively charged, as is the soil, have no holding ability in the soil therefore whatever the plant doesn't uptake or attach to its roots would be lost to the groundwater below. Fertilizer use is focused on fairways, tees, and greens, and not within the rough areas. Buffer zones are located along fairways adjacent to creeks and ponds. Herbicides are used only in spot treatments and pesticide use is also very minimal.

Efforts by TRPA and the Lahontan RWQCB to reduce the concentration of phosphorus (P) applied to turf and manicured lawns produced strict requirements for fertilizer management at golf courses and recreational facilities in the last 10–15 years (SH&G 2004a:III-13). Existing golf course operations are conducted under an updated waste discharge permit and associated monitoring and reporting program from Lahontan RWQCB (Lahontan RWQCB 2000a, 2000b). For the purposes of Board Order No. 6-00-48, State Parks (as landowner) and American Golf (as lease holder) are considered as "the discharger," and the golf course and its routine operation and maintenance are referred to as "the facility." Before the 2000 update, the facility operated under Board Order No. 6-89-9, which was adopted on January 12, 1989. The waste discharge requirements for the facility include compliance with discharge limitations and receiving water limitations consistent with the Basin Plan. In compliance with the updated permit, the golf course prepared a maintenance plan that included a "chemical plan, an irrigation plan, an agronomic plan, an erosion control plan, and reporting requirements" (Lake Tahoe Golf Course and Restaurant 2000). Potential discharge of pollutants from the facility consists of nutrients from fertilizers and toxic compounds from the use of pesticides, suspended sediment, construction waste materials, and

small amounts of oil and grease contained in stormwater runoff from impervious surfaces, diesel fuel, and gasoline fuel from the two aboveground fuel tanks and the former underground tanks (Lahontan RWQCB 2000a).

The monitoring and reporting program that began under the original (1989) permit established two surface-water monitoring and three monitoring wells (Lahontan RWQCB 2000a:1). Monitoring site SW-I is along the unnamed creek at the upstream (south) boundary of the golf course, and SW-II is the downstream monitoring location. Monitoring results show little or no increase in constituents monitored in surface waters (nitrate plus nitrite, dissolved ammonia, orthophosphorus, turbidity, oil and grease, pesticides, and fungicides). Groundwater monitoring site GW-2 is located in a monitoring well at the upstream end of the study area, GW-3 is near the midpoint of the study area, and GW-1 is at the downstream end of the study area. A residential area adjacent to GW-2 provides a relatively high concentration of background nutrients to the upgradient monitoring well. The upgradient well (GW-2) and the downgradient well (GW-1) seemed hydrologically connected in that the downgradient well tracks slugs of nitrate (NO_3) and orthophosphate (OP), with a characteristic time lag of several months (indicating a relatively rapid rate of groundwater movement). Golf course fertilizer management practices seemed to be relatively well reflected by nutrient concentrations in GW-3.

BMPs associated with the facilities are discussed below in Clubhouse, Maintenance, and Parking Facilities section.

Bridges

Bridges would not be removed, replaced, or modified under Alternative 1, except in the case of damage or failure. They would remain closed to non-golf use because of safety hazards of non-golf users crossing golf facilities and related liability concerns. Active enforcement would continue to discourage non-golfers from using the bridges.

Clubhouse, Maintenance, and Parking Facilities

The 7,000 square foot clubhouse was built under American Golf's lease in 1991, replacing a previous smaller facility, and remodeled in 2002. Power carts and golf clubs are available for rent and a driving range and practice putting/chipping greens are used for warm-up and instruction. The 2,000 square foot maintenance yard structure was built at this same time. Prior to the new maintenance building being built, an underground storage tank (later removed) was in the location of the existing building. The yard currently has two above ground tanks for diesel and gasoline. Golf carts and other maintenance vehicles are stored and maintained in this area. Wash water discharges into a biomass/oil & grease water separator where wash water is treated with microbes then ultimately discharged to the sewer.

There are 115 parking spaces in the paved parking lot. BMPs in the parking lot include channel drains and an oil and grease separator located near the stormwater pond, adjacent to the maintenance yard. Parking lot water discharges to a stormwater treatment pond prior to entering the river. Grassy, unpaved areas on both sides of the golf course entrance are used for additional parking, regularly throughout the summer.

Golf Course Operations

The Lake Tahoe Golf Course would continue to operate from approximately April 15 to November 1 from dawn until dusk, as weather allows. Golf Course staff needs are a total of 76 employees.

Lake Tahoe Golf Course hosts a variety of golf tournaments and outings each year. Approximately 16 percent of golf rounds played at the golf course are tournament rounds that may include large parties for corporate outings, traveling golfing clubs, civic associations, government agencies, bachelor parties, reunions, and memorial events (HEC 2008 [Appendix E]). There is no anticipated change in tournament play frequency or fees under this alternative, except those that may arise in the normal course of business in accordance with the golf course's business plan.

Throughout the year, Lake Tahoe Golf Course hosts a variety of functions unrelated to golf, such as weddings and banquets. There are approximately 35 such events per year, and approximately 15 of these events occur during winter (HEC 2008 [Appendix E]). Under Alternative 1, the clubhouse would remain as it is today. No improvements or alterations are anticipated, and the current level/frequency, type, and fee structure(s) associated with use of the clubhouse would remain the same or be altered only through the normal course of business.

Permitted uses at Lake Valley SRA allow the property to be used for winter recreational activities from November through March. Since 2000, the driving range has been used as a snowmobile track; snowmobiles are rented for use on a groomed track on the driving range. Snowmobile traffic is not allowed anywhere else on the property, except by golf course staff members for patrol purposes. The snowmobile operation is sublet to an outside vendor. These activities are expected to continue unchanged under this alternative.

Lake Tahoe Golf Course is a member of the Audubon Cooperative Sanctuary Program for Golf Courses (ACSP) and is a certified cooperative sanctuary under ACSP. Since its inception in 1992, the ACSP has been assisting golf courses in their efforts to blend environmentally responsible maintenance practices into day-to-day golf course operations. The ACSP is an award-winning education and certification program that helps golf courses protect our environment and preserve the heritage of the game of golf. By helping people enhance valuable natural areas and wildlife habitats that golf courses provide, improve efficiency, and minimize potentially harmful impacts of golf operations, the ACSP serves as a vital resource for golf courses (ACSP 2006).

TRAILS

The network of existing roads and trails shown on Exhibit 2-3 would remain in their current locations and, presumably, would continue to be used for the purposes for which they are used today. All trails that exist on the western side of the river are casual or volunteer trails. No trails within the study area are officially established, American Disability Act (ADA) compliant or designated trails; instead, they have been formed over time by users. The golf bridges would remain closed to non-golf public use due to safety hazards and liability concerns with continued, active enforcement to discourage non-golfers from using the bridges. Public snowmobile use would also continue to be prohibited outside of the track on the driving range. The gravel road on the west side of the river is used by the STPUD as a required maintenance road for its subsurface sewer line in that area. No new public trails would be constructed on the east side of the river and no tie-in would be made with the Sawmill Trail under this alternative.

2.4.2 GENERAL PLAN AMENDMENT

Alternative 1 does not involve altering the existing boundaries in the Lake Valley SRA or in the Washoe Meadows SP. Although the general plan calls for river restoration and Alternative 1 would not implement this provision, it does not preclude consideration of restoration in future. An amendment to the General Plan text would not be required for this alternative, because existing river management approaches and land uses, including golf use would not change.

The property that includes both Washoe Meadows SP and Lake Valley SRA was acquired through a General Plan litigation settlement in 1984. Because the golf course was an existing use and resources on the property varied, the property was divided into two park units to reflect the varied uses, resources, and consequent management differences. The Lake Valley SRA boundary was drawn to encompass the existing golf course and allow for its continued operation. The remainder of the property was designated as Washoe Meadows SP. According to Public Resources Code Section 5019.53, units classified as state parks “consist of relatively spacious areas of outstanding scenic or natural character, oftentimes also containing significant historical, archaeological, ecological, geological, or other similar values. The purpose of state parks shall be to preserve outstanding natural, scenic, and cultural values, indigenous aquatic and terrestrial fauna and flora, and the most significant examples of ecological regions of California.” In accordance with Public Resources Code Section 5019.56, state recreation areas “consist of areas selected, developed, and operated to provide outdoor recreational opportunities.” SRA’s

are “selected and developed to provide multiple recreational opportunities to meet other than purely local needs. The areas shall be selected for their having terrain capable of withstanding extensive human impact…”

There is an existing general plan prepared for Lake Valley SRA (State Parks 1988). The purpose of the Lake Valley SRA is “to make available to the people for their enjoyment and inspiration the 18-hole golf course and the scenic Upper Truckee River and its environs.” The statement of purpose indicates that “objectives of providing optimum recreational opportunities and maintaining the highest standards of environmental protection” shall be balanced. In so doing, a program of management in the unit that shall perpetuate the unit’s declared values, providing for golfing along with other compatible summer and winter recreation opportunities while restoring the natural character and ecological values of the Upper Truckee River, protecting its water quality, and protecting and interpreting significant natural, cultural, and scientific values shall be defined and balanced (State Parks 1988). Although Alternative 1 would not implement the vision of the General Plan to restore the river, it would continue the existing management approach of protecting water quality, natural resources, and cultural resources to the extent feasible with repairs to existing bank stabilization, infrastructure, and additional spot stabilization in response to erosion, damage, or failures. Amendment of a general plan is not required for this situation, as described in Public Resources Code Section 5002.2(c).

Washoe Meadows SP does not have a general plan, but the purpose statement says that the purpose of Washoe Meadows SP is to preserve and protect a wet meadow area associated with the Angora Creek and the Upper Truckee River at the southwestern side of the Lake Tahoe Basin. The unit contains 14 Native American occupancy sites and remnants of a historic dairy and is contiguous to other public lands important for their open space values and recreational uses. Consistent with the purpose of the unit, State Parks will preserve, protect, restore, interpret, and manage the unit’s natural, cultural, and aesthetic resources, features, and values, making them available to the public for their educational, inspirational, and recreational benefits (General Plan Policy Committee, October 2000). A general plan does not need to be prepared for a state park unit until substantial facility development that makes a permanent commitment of resources is anticipated, in accordance with Public Resources Code Section 5002.2(c). Recognizing that Alternative 1 continues the current management practices of Washoe Meadows SP, a general plan is not needed to implement this alternative. This does not preclude future general plan preparation for Washoe Meadows SP, as appropriate, if there is an anticipated change in land use or substantial, permanent development is some day desired.

2.5 ALTERNATIVE 2: RIVER ECOSYSTEM RESTORATION WITH RECONFIGURED 18-HOLE REGULATION GOLF COURSE

2.5.1 PROJECT FEATURES

Alternative 2 involves river ecosystem restoration with a reconfigured 18-hole regulation golf course. The current 11,840 foot long reach of the Upper Truckee River would be restored to 13,430 feet with additional floodplain area. Several golf course holes would be relocated to an area on the west side of the river that contains less sensitive land that is further from the river. This would also reduce the amount of SEZ occupied by the golf course (Exhibit 2-5). All five existing bridges would be removed from the Upper Truckee and one new, longer bridge would be constructed. Four bridges would also be removed from Angora Creek. New trails would be constructed on both sides of the river.

The boundaries between Washoe Meadows SP and Lake Valley SRA would be modified so the SRA would encompass the reconfigured golf course and the restored river would generally become part of Washoe Meadows SP. The text and maps of the Lake Valley SRA General Plan would be amended to reflect management of the reconfigured golf course.

RIVER AND FLOODPLAIN

Approach

Under Alternative 2, land uses associated with the golf course would be removed from areas adjacent to the Upper Truckee River, which have been occupied by the river in the "recent" past to make room for a more meandering channel and more floodplain area. A portion of the golf course would be relocated primarily to less sensitive higher capability lands, more distant from the river. The Upper Truckee River and adjoining riparian vegetation communities would be restored. Treatments are also proposed along the lower portion of Angora Creek and the unnamed creek to reconfigure the confluence with the Upper Truckee River.

The restoration approach is designed to reverse the negative trends caused by past channelization, existing infrastructure, and associated land uses. The restoration aspects of this alternative would increase channel length and elevate the channel bed through a combination of grade control features in the existing channel bed, reconnection of historically cut-off or abandoned meanders, and construction of new channel sections. This approach uses elements of both form-based and process-based design (River Run 2006:2). Meanders that were cut-off in the 1940s and 1950s, many of which are still visible on the terrace, would be reincorporated as active channel, and approximately one-half of the existing channels would be retained. The overall approach would decrease erosive force, increase floodplain inundation and duration, thereby both reducing sediment supply and providing more opportunity for fine sediment deposition. It would also actively restore riparian habitat adjacent to the river.

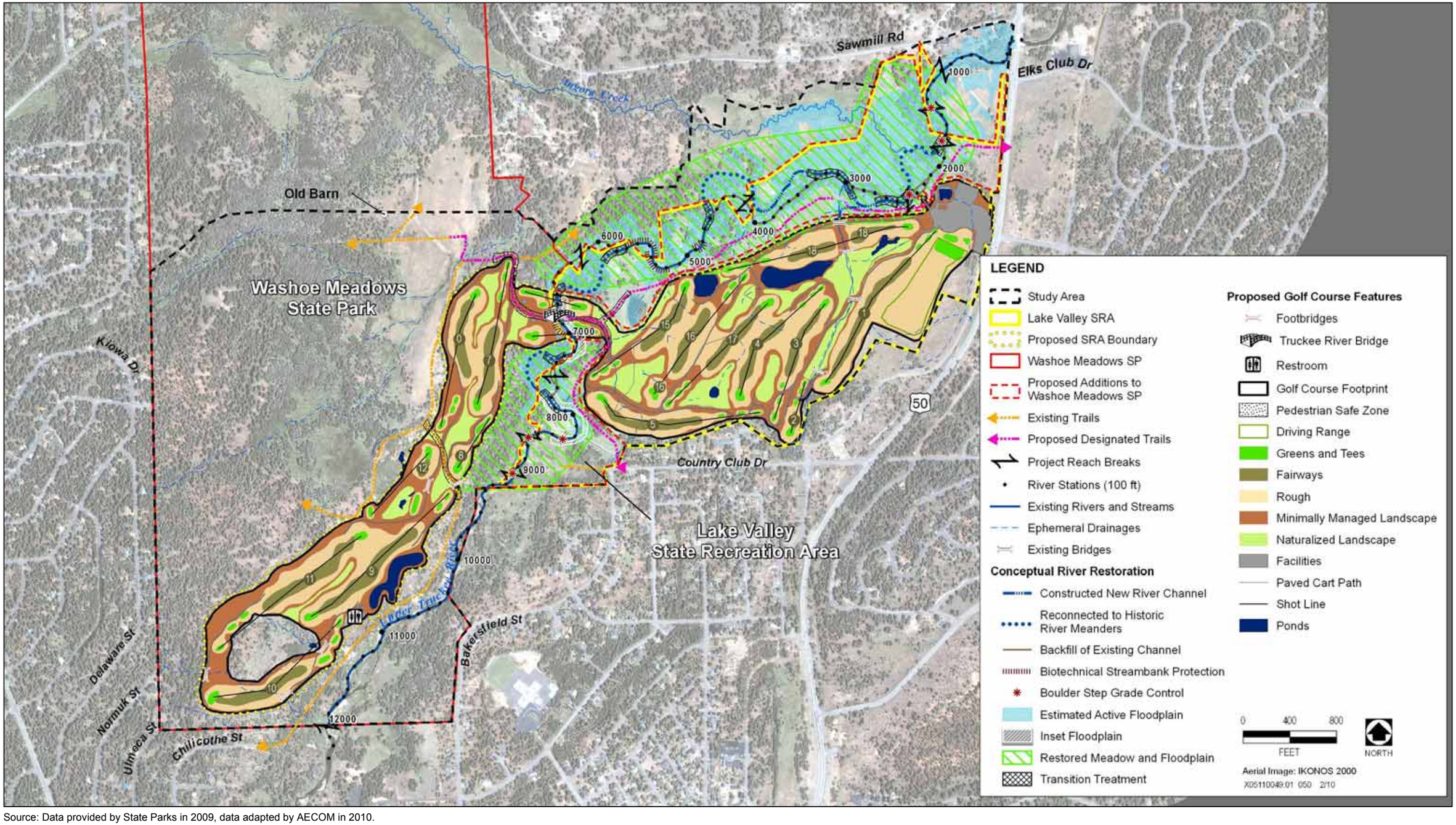
The river would have an increased channel length to 13,430 linear feet with an active floodplain of 77 acres, including the constructed inset floodplain of 1.7 acres. Approximately 97 acres of floodplain and meadow would be restored, 39 acres within the 100-year floodplain, and 37 acres in SEZ. Most of the golf course would no longer be adjacent to the river, except 850 linear feet in the vicinity of the proposed replacement bridge. The channel bed would be elevated approximately 2 feet on average throughout the project reach.

This design does not rely on or advocate full construction of the envisioned final dimension of the channel form. Rather, it removes infrastructure that prohibits natural processes and provides basic form and grade. Therefore, it anticipates that natural geomorphic processes, such as deposition and active movement of gravel bars, recruitment of woody debris, substrate sorting, and vegetation establishment would modify the constructed bed and bank features over time to establish a site-specific final channel form.

Design Features

Under Alternative 2, the new channel would incorporate sections of the existing channel, reactivate historic meanders, and construct new sections of channel. This combination would give the desired sinuosity and slope. Approximately 4,240 feet of the existing channel would be used without modification, 5,000 feet of the existing channel would be modified (as described below), 2,490 feet of historic channel remnants would be reconnected, and 1,700 feet of new channel would be constructed. The numeric estimates of length, area, and volume in this section are based on conceptual design and would be modified during final design. Conceptual treatment descriptions and typical sketches are presented in Appendix C.

The reactivated/reconnected historic meanders would generally utilize the existing outside bank with mature vegetation. The bed, inside bank, and transitions would need to be modified. Constructed streambed stabilization features, including grade control via anchored high gradient riffles at the upstream and downstream treatment extents, a boulder step grade control at the irrigation water intake, and 15–25 armored riffles at crossovers (i.e., between meanders) and channel segment transitions, would be installed. Approximately 2,600 feet of existing channel would be backfilled or partially backfilled to restore about 4.5 acres of floodplain. Inset floodplain areas would be excavated along approximately 1,300 feet of channel. Additional local cut and fill would be used at various locations to adjust channel dimensions, channel bed elevation, and streambank heights and angles.



Source: Data provided by State Parks in 2009, data adapted by AECOM in 2010.

Alternative 2: River Ecosystem Restoration with Reconfigured 18-Hole Regulation Golf Course **Exhibit 2-5**

Where existing channel is to be incorporated into the new channel, approximately 2,700 feet of new streambank stabilization materials would be installed. Bank stabilization would be mostly biotechnical, emphasizing use of live vegetative materials on banks with reduced heights and angles. However, some areas would also require rock armor streambank protection and/or engineered large woody debris features depending on the amount of stabilization needed (e.g., near sewer lines). It may be necessary to relocate some sewer line sections. Most of the 1,750 feet of existing bank protection would be removed, and the materials would be evaluated for re-use.

Reconfiguration of the golf course out of much of the floodplain and recent meander belt would allow for ecosystem restoration of the Upper Truckee River. Removal of golf course adjacent to the river would allow for restoration of the entire floodplain and meadow north of the river (along Angora Creek), and a large area of the floodplain southeast of the river. All four pedestrian/golf cart bridges would be removed from Angora Creek.

All five golf course bridges over the Upper Truckee River would be removed, and one longer bridge would be installed. This would allow more natural channel dynamics through most of the study reach and minimize risks to infrastructure while providing access to newly developed more ecologically designed golf features west of the river. The storm drainage pond between the existing holes 14 & 15 would be converted to wetland, the channel and riparian corridor of the unnamed creek would be enhanced, and the four golf cart bridges would remain, and the confluence of Angora Creek would also be reconfigured (as discussed below).

A summary of the expected geomorphic features, processes, and functions of the study area under Alternative 2 are provided below.

Upper Truckee River

Alignment

The approximate pre-1940 Upper Truckee River alignment serves as the basis for the proposed location of the restored channel (River Run 2006). The 1940 historic aerial photos show several meanders that were cut-off around that time, reducing sinuosity and increasing slope. The meanders were likely physically cut-off by human manipulation to decrease flooding and improve grazing, although some may have been naturally abandoned.

The proposed alignment would increase sinuosity, reduce slope, and increase floodplain area. It is based on a conceptual design that may be modified during final design, but generally it would be composed of a combination of existing (unmodified) channel, modified existing channel, reconnected historic channel (abandoned meanders), and new constructed channel sections (Appendix B, “Proposed River and Floodplain Treatments by Alternative”). Some portions of the existing channel proposed to remain as active channel would not be modified for the project. The proposed Alternative 2 channel length would be 13,430 feet, which would be 1,590 feet longer than the existing 11,840 feet of channel, an increase of 13.4 percent, and the channel would be reconnected to the historic floodplain.

Abandoned meanders proposed for reconnection still have a visible channel shape in both cross section and planform, although some deposition of sediment and encroachment by vegetation has occurred since remnants were part of the active channel. Existing mature riparian vegetation would be incorporated as an immediately well-vegetated outside bank, while other areas of vegetation could be salvaged and used for transplanting. The meander dimensions and elevations would be graded where needed and disturbed areas treated with transplants or other biotechnical techniques. In the lower half of the meadow reach most of the meanders visible in the 1940 aerial photograph were subsequently filled as part of the original golf course construction (River Run 2006). There are no abandoned meanders with remnant topography or vegetation suitable for reconnection as part of an active river channel in that area, therefore, two new channel sections would be created. Mature vegetative materials salvaged from the other historic meanders would be used in construction of these meanders. The final channel alignment for the restored segment would be updated during detailed design based on hydraulic analyses or other design factors (e.g., aquatic habitat, infrastructure locations). Where a reactivated meander or new channel reach may encroach near the existing sewer line, protective features would be installed to avoid damage to the line (i.e., alignment adjustment, sheet pile or other physical protection, or relocation of a section of the sewer line away from the restored river meander). The new alignment would increase channel length in all the

treated subreaches from 10 to 60 percent. The percent increase in overall channel length for the study area is approximately 13 percent allowing the profile grade transition to be distributed over a longer reach, resulting in a lower gradient.

Profile

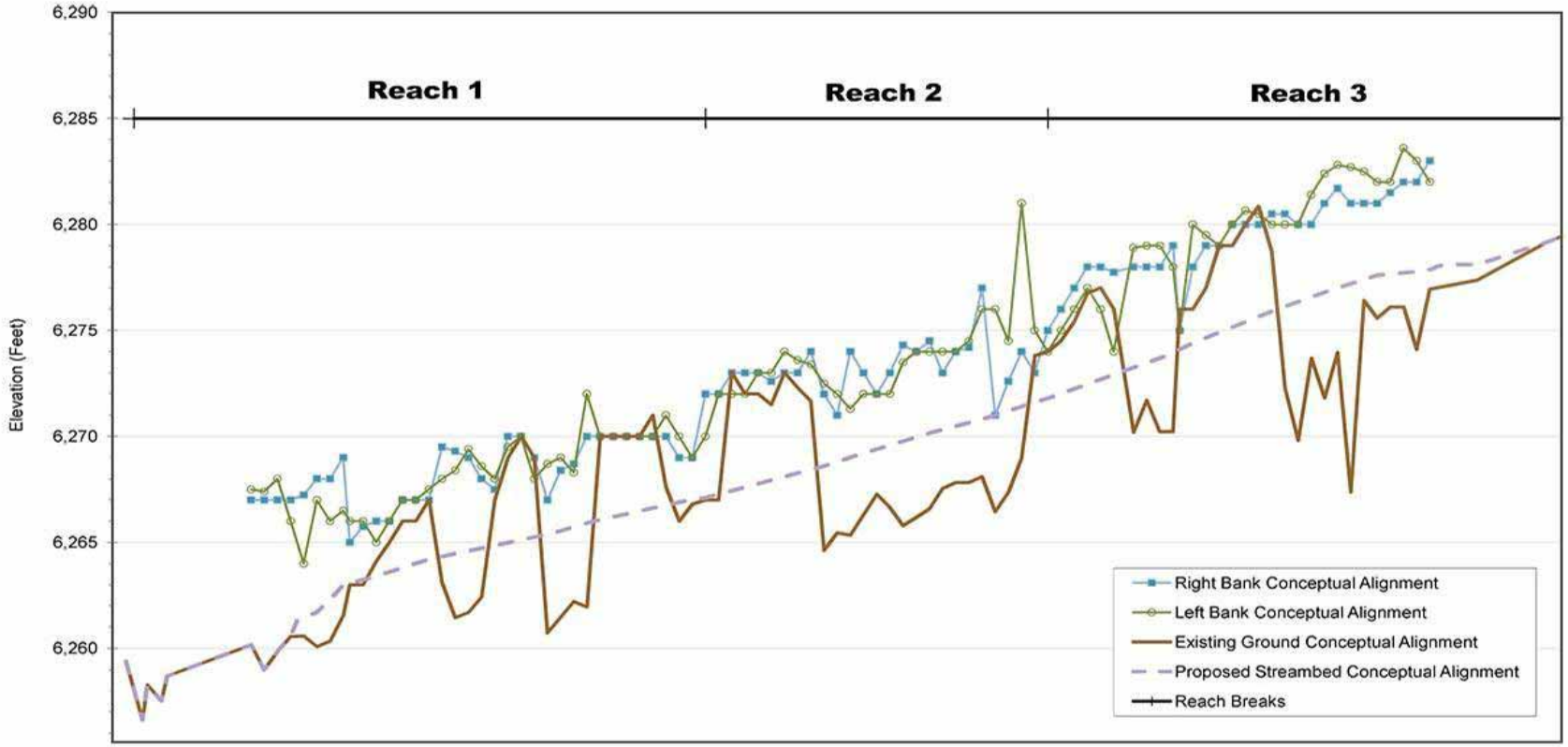
The channel bed and resulting long profile would be directly modified to raise the channel bed and indirectly encourage future sediment storage and aggradation. Measures used for these modifications would include reoccupying abandoned meanders present on the existing terrace surface as well as constructing new channel sections with higher bed elevations, resulting in longer length and decreased slope. Measures within the existing channel would include installing raised grade boulder steps and armored riffles. Proposed locations of the boulder step and armored riffle bed stabilization structures (Exhibit 2-5) have been selected to achieve reachwide stability and minimize erosion, channel avulsion, and damage to infrastructure (exact locations may be modified in final design). The boulder steps would require about 6,200 cubic yards of mixed rock (boulder through gravel), and the armored riffles would require about 16,500 cubic yards of cobble and gravel. In addition, clean gravel and cobble could be added to various sites along the channel (quantity not estimated at this time).

Channel lengthening alone would reduce the overall average bed slope for the entire project reach (RS 160 to RS 12000) from 0.22 percent to 0.19 percent. The desired profiles would create a smoother slope transition between the upstream and downstream reaches and create a riverbed closer to the surrounding terrace surface (River Run 2006). The conceptual proposed channel bed profile (Exhibit 2-6) was derived by connecting proposed bed elevations at the upstream and downstream ends of the treated reaches along the length of the new alignment and adjusting for the existing higher slopes in forested and transition reaches (River Run 2006). Resulting bed slopes in the treated subreaches would range from 0.14 percent to 0.19 percent.

As previously described, varied forms of grade control would be used: anchored high gradient riffles (boulder and cobble) at the upstream and downstream ends of the treated reaches, a boulder step (boulder and cobble at the water intake), and armored riffles (cobble and gravel), requiring different materials and construction techniques. (See Appendix C, “Conceptual Treatment Descriptions and Sketches” for additional description of treatment types.)

Anchored high gradient riffles would be at the upstream and downstream extents of the project and would be reach scale (300-400 feet) features with a combination of about three boulder steps and integrated cobble riffles. The reach-long treatments would use a boulder-cobble mix to form an undulating surface that would be installed in the existing river channel near the downstream and upstream ends of the restored channel. They would both raise and stabilize the streambed, acting as hard grade control structures, composed of boulders and cobble sized material and installed to remain immobile even during large flood flows (e.g., greater than 100-year peak flow) (River Run 2006). The current boulder step grade control at the irrigation water intake would be modified and raised slightly. To ensure vertical and lateral stability, grade controls would have buried (keyed) boulders below approximately the 100-year scour depth and would include wings for flanking protection at the upstream and mid points, extending approximately one-quarter the channel width into the floodplain at each bank. This indicates that about 6,200 cubic yards of material would likely be required for the boulder steps.

Armored riffles would act as hydraulic controls to establish and maintain bed elevation and slope and would be distributed throughout the restored channel reach. Spacing between riffles would be approximately every five to seven bank full channel widths, as documented for functional alluvial channels (Knighton 1998 cited in River Run 2006). These features would be located at crossovers between meander bends, including at the transitions into meanders to be added (upstream and downstream ends of connections to historic or constructed meanders) as well as in crossovers of retained channel. This would provide continuity in the longitudinal profile. The armored riffles would be soft grade control structures made of cobble-sized material designed to remain immobile up to moderate flood flows (e.g., 10 to 20 year peak flow) (River Run 2006). Buried coarse substrate (e.g., cobble) may also be extended at least one-fourth the channel width or to the edge of the active floodplain (5-year) in a trench at the upstream end of the riffles. While the surface materials of these riffles would be expected to be mobile during moderate flood flows, the elevation of the features would be expected to remain consistent over time.



Source: Valley Mountain Consulting 2009

Proposed Upper Truckee River Profiles for Alternatives 2, 3, and 5 **Exhibit 2-6**

In areas where restored channel width is proposed to be approximately 70 feet, the distance between armored riffles would be about 350–500 feet (River Run 2006). The conceptual length and spacing indicate that riffles would compose approximately one-third (2,478 feet) of the total restored channel length. The concept is to use the armored riffles to absorb the full proposed bed elevation change within the restored segment (approximately 11.0 feet vertical change over 7,435 feet planform), with resulting riffle slopes of about 0.15 percent. For the conceptual design, riffles are assumed to average 60 feet wide and 2 to 3 feet thick (greater in the existing channel areas, less within reconnected or constructed sections) with additional extension of gravel for approximately 30 feet on to the floodplain. Approximately 16,500 cubic yards of cobble would be imported for constructing the riffles.

Banks

Alternative 2 involves modifying and protecting streambanks of the proposed channel using a mixture of bank treatments designed and implemented in conjunction with the overall channel treatments to modify existing channel sections, reconnnect historic channel sections, and/or construct new channel sections. The bank treatment areas were selected to achieve reachwide stability and minimize erosion, channel avulsion, and other damage to infrastructure while generally allowing for natural channel processes.

Biotechnical bank treatments would be installed on a total of approximately 2,700 feet of existing banks along the 9,240 feet of existing channel that would be retained as active channel. Proposed bank treatments would be focused on vulnerable locations, as well as in the upstream and downstream sections adjoining untreated river reaches. The primary type of bank treatment along the entire 1,700 feet of proposed constructed channel sections would be transplanting salvaged materials combined with other biotechnical techniques. The treatment examples include transplanted sod and shrubs, stacked native sod to stabilize outside bends and native sod blankets in straighter portions, and woody debris brush boxes. Sod and shrub materials could be obtained from within the footprint of the new channels, salvaged from the bottom of reconnected meanders or from adjacent meadows with native vegetation. These treatments allow for more natural channel migration and processes over time than hard grade control features.

Where abandoned meanders are to be reconnected, final alignment decisions would prioritize locations where robust, existing woody vegetation along remnant channel banks could be incorporated into proposed bank positions. Throughout the approximately 2,490 feet of reconnected meanders, vegetation in the bottom of the channel would be removed and salvaged for revegetation opportunities elsewhere in the study area. However, existing vegetation on streambanks would be preserved to the maximum extent possible to provide immediate stability and habitat. Generally, the area of vegetation protection would be about half of the total bank length. The proposed constructed channel sections are in areas where vegetation has historically been modified for golf course management, and there are limited opportunities to incorporate existing woody vegetation into the bank treatments, so these sections would utilize salvaged material and other biotechnical techniques.

Transition among existing, reconnected, or constructed channel segments that would be part of the proposed active channel would generally be at riffle crossovers. These areas would include treatments combining both streambed and streambank measures that would be installed to provide stability and to smooth the hydraulic connection between segment types. Streambed treatment measures would likely be armored riffles in the existing channel, and are discussed in the profile section. Streambank treatments at the junction of the existing channel to be abandoned and plugged would have compacted soil and either mature vegetation transplants or biotechnical measures such as stacked sod. Hydraulic analysis during final design may result in treatments at the transitions that include other combinations, such as the use of rock armor, buried sheet piling, living woody vegetation, and large woody debris structures. Meanders that approach within approximately 15 feet of the sewer line would require additional treatment such as rock armoring or sheetpile.

Riprap, root wads, and/or metal or concrete materials present in the existing bank treatments would be evaluated on a site-by-site basis during the engineering design phase. Most existing bank treatments located in proposed active channel areas would be removed, although some biotechnical treatments could be retained or repaired as

needed to stabilize banks. Where levees in the existing channel are to be removed, recontouring to floodplain elevation would accompany other bank treatments. Materials removed would be salvaged for re-use, disposed, or buried. Existing bank treatments located in channel areas to be backfilled may be removed or buried, as appropriate.

In some areas, particularly in the forested reach, woody debris is relatively common in the channel, and woody debris supply can be expected to remain relatively high (River Run 2006). Woody debris jams could be constructed in this reach to help promote streambank stability and improve instream habitat complexity. Small jams configured as flow deflectors along channel margins would likely be most effective. These jams would be carefully configured to avoid increasing overall streambank erosion or affecting the function of other planned bed and bank treatments.

In addition to specific bank treatments described above, in all near-bank areas that would have construction disturbance, protection of the present bank vegetation would be emphasized. The most limited number of channel access points would be used to avoid bank vegetation, trees would be shielded, and shrubs could be pruned while protecting soil and root structures if avoidance is not possible. In areas where existing streambank vegetation must be removed, the project would salvage, store, and reuse plant materials.

Channel Dimension/Capacity

Under Alternative 2, the channel dimension (width, depth, cross-section area) would be altered, and the channel's capacity to convey flow would be modified in the new constructed sections (reconnected meander sections). In the existing channel sections that would remain part of the active channel, dimensions and capacity would be modified by a combination of implemented direct and expected future indirect changes.

Mussetter Engineering (2000) recommended 600 cubic feet per second (cfs) for bankfull discharge downstream of the study area, based on the 2-year recurrence peak flow. (River Run [2006: 47] concluded this would probably be adjusted to approximately 550 cfs in the project reach, upstream of Angora Creek and other inflows). ENTRIX estimated the 1.5 year flow to be 450 cfs for the Sunset Reach immediately downstream (ENTRIX 2003). Swanson Hydrology + Geomorphology (2004a: III-7) suggested a bankfull discharge within the study area of about 350 cfs, based on field identification of indicators such as vegetation lines and mid-channel and point bar surface heights. River Run (2006:48) emphasized the importance of rain-on-snow events in shaping channel geomorphology and cites field observations during runoff events that support a design flow of 450–550 cfs. Based on these estimates, the proposed channel capacity of constructed portions of the restored channel is estimated at 500 to 550 cfs (River Run 2006:48).

For conceptual design, field measurements of water stage and channel dimension under known flows at State Parks' stream gage sites (RS 10600 to 1700) were used to develop typical dimensions for a 550-cfs capacity channel (River Run 2006:48). At a 550-cfs discharge, this cross section has a top width of about 70 to 75 feet, a bottom width of about 40 to 50 feet, and an average depth of about 3 to 3.5 feet. These dimensions provide the conceptual design of the proposed channel geometry at armored riffles or other constructed areas, allowing for variability while keeping continuity. Final channel dimensions for the project would be developed through the design phase, using an iterative approach that incorporates further analysis of channel geometry in functional areas (analog forms), sediment transport data and hydraulic analyses, along with consideration of other factors.

The proposed 1,700 feet of new constructed sections would be excavated into the existing terrace and floodplain ground surface, with additional grading to adjust for consistent and appropriate bank heights and angles (e.g., outer banks versus point bars) for the stacked sod and/or other revegetation treatments. In all cases, the upper 1 foot of material would generally include salvaged soil, gravel, and vegetation to be reused on bank treatments (described above).

The proposed 2,490 feet of reconnected meanders would require various degrees of excavation and reshaping to meet design elevations and dimensions. Over the decades since they were active channel sections, the abandoned

meanders have experienced sediment deposition and vegetation encroachment. Excavation and shaping of the channel bottom and modifications to streambank heights and angles (at least on the inside of bends), would be required as part of the reconnection. The proposed 5,000 feet of modified existing channel would include areas with hard and soft grade control structures and areas of bank treatments (described above). To the degree feasible, bed and bank treatments within the existing channel would be designed to reduce channel width and depth, but at a minimum, treatments would prevent channel enlargement. In locations with armored riffles, the final grade would be between 2 and 4 feet higher (positive grade) than the existing channel bed and final bank treatments would include additional roughness and resistance to help narrow the channel. The restoration concept relies on natural geomorphic processes (e.g., sediment deposition and bar formation, vegetation colonization, woody debris recruitment) in the existing channel to adjust the channel shape and size between treatment areas.

The design assumption is that natural processes of erosion and deposition would establish appropriate channel dimensions over time in areas where the stream is not fully reconstructed (River Run 2006). While general channel dimensions would be established at armored riffles, in the newly constructed channel and in the reconnected meanders, the intervening reaches would adjust over time in response to local sediment supply, transport, deposition, and erosion. The water surface elevation and channel capacity would be controlled by the profile elevation and cross section of the next downstream riffle crest.

Upper Truckee Bridges

Under Alternative 2, all five existing golf course bridges would be removed. Removal of existing bridges would include local excavation at the footings to cut existing steel piles 1-2 feet below finish grade. A one-half-inch steel plate would be welded to the newly cut end before reburial. The quantity of material removed would be minimal, and all steel products would be recyclable. Bridges with concrete footings would require jack hammering of the concrete to 1-2 feet below finish grade. Exposed reinforcing steel would be cut flush with the concrete surface. Approximately 3 cubic yards of concrete debris would be generated at each footing removal. Existing rock riprap associated with the bridges would also be removed; this material would be salvaged and reused or buried in reaches to be abandoned and filled. The bridge removal sites would be evaluated to determine what degree or type of bed and bank stabilization and revegetation is required. In some bridge removal locations, the site would become part of the inset floodplain, backfilled channel, or other restored surfaces and would be treated as such. In reaches of the existing channel to be incorporated into the final alignment, bed grade elevation would be controlled by restored profile but bank treatments may be needed.

A new bridge would be installed over the Upper Truckee River to accommodate two-way golf cart traffic, service vehicles, and pedestrian access to trails, with a proposed location between RS 6600 and RS 6900. The new bridge would span the channel and active floodplain without piers in the channel bed, total span length would be between 135 and 200 feet to provide flood flow passage. To provide enough room for two-way cart traffic and pedestrian use, either a single 15 to 20-foot-wide deck or two side-by-side 10-foot-wide decks would be installed. The total vertical clearance to the bottom of the bridge would be designed to pass the 100 year flow, approximately 10 feet above the streambed, which would be about 5 feet above the typical water surface (2-year flow). In the vicinity of the new bridge, an inset floodplain would be excavated into the high streambanks to improve flood flow conveyance and allow for a functional active floodplain area along the main channel. The inset floodplain would be approximately 900 feet long (300 to 500 feet upstream and downstream of the proposed bridge), and about 50 to 70 feet wide (20 to 50 feet in from the channel bank). The depth of excavation into the existing high terrace along the streambanks would range from 4 feet to 8 feet, with a resulting active floodplain surface of about 2 to 3.5 feet above the streambed. Bridge abutments would be along the back edge of the active floodplain, with pilings driven to refusal (below the 100-year flood scour depth). Conveyance of the 100-year flood would be uninhibited.

The newly constructed bridge would resemble the existing prefabricated steel golf course cart bridges. Decking and railing materials would be similar to existing golf course bridges at holes 6 and 7. Bridge guardrails would conform to the existing course bridge guardrail configuration, and guardrail height would vary with clear span

from 3 to 6 feet. An irrigation pipe would be attached to the underside of the bridge deck with pipe clamps. Waterlines would be protected by a steel sleeve one pipe size larger than the irrigation pipe. The pipe would convey water from the well and storage ponds east of the river to the proposed golf course areas west of the river.

Unnamed Creek

The unnamed creek that flows northward through the golf course between existing holes 1 and 3 and enters the Upper Truckee River at RS 3000 was previously straightened and channelized into a ditch. Under Alternative 2, this creek would be enhanced. The four cart path bridges would not be removed, but the northernmost bridge would be designated for trail use outside the golf course footprint.

Along the unnamed creek, the setback from golf course landscaping turf would be slightly widened to increase the naturalized landscape. Within this zone, turf would be removed (where needed), and native vegetation would be planted to improve stormwater treatment and increase habitat. As feasible, the low-flow channel of the creek would be modified to add more channel length and increase potential for small active floodplain areas in the buffer zone. The lower reach of the creek, which is currently piped, would be day-lighted and restored.

Under Alternative 2, the mouth of the unnamed creek would be moved, raised and its orientation adjusted relative to the restored Upper Truckee River alignment. Approximately 300 feet of the unnamed creek would likely need to be replaced with a newly constructed channel to the east that curves to meet the new Upper Truckee River position about 275 feet further downstream than at present. Approximately 2 to 3 cobble- boulder step grade control features and biotechnical bank stabilization treatments would be installed along the approximately 225 feet of new, reoriented channel. The reoriented creek mouth would reduce erosive forces on the banks of the Upper Truckee River.

Angora Creek

The lower ¾ mile of Angora Creek was restored in 1997 (as described in Alternative 1). The restoration incorporated a portion of an abandoned historic Upper Truckee River meander as part of the restored Angora Creek channel. Under Alternative 2, the bed of the Upper Truckee River would be raised and historic meander previously occupied by Angora Creek would be reconnected to the restored Upper Truckee River. The mouth of Angora Creek would be relocated approximately 200 feet upstream of the current confluence to the point where the creek currently enters the historic meander. The lower 200 feet of Angora Creek would be restored to an off-channel oxbow feature and four pedestrian and cart path bridges would be removed.

Active Floodplain and River Overbanking

Under Alternative 2, the active floodplain would be enlarged providing increased connectivity and frequency of river overbanking through channel restoration. The floodplain along the Upper Truckee River and the unnamed creek would have improved function, including allowing floodwater to slow down and sediments to settle out, thus improving water quality. The frequency of floodplain inundation along the Upper Truckee River would be increased by reducing confinement from the existing high streambanks and enlarged channel capacity, particularly downstream of RS 7300. The increased bank length and frequency of overbank flows, along with direct floodplain topography modification (e.g., inset floodplain excavation and retired/restored golf course areas), and increased elevation of channel bed, would combine to increase the active floodplain (5 year) area from 36 acres under the existing condition to 77 acres under Alternative 2, and 92 acres within 100-year floodplain would be restored.

The conceptual design generally targets restoring connectivity and increasing the length and area of active floodplain adjacent to an appropriately sized channel that would overflow its banks at least once every 1.5–2.5 years while still providing flood protection to adjacent private properties. However, the design is not rigidly applying the same channel capacity and bank heights throughout the study area. Because the project spans reaches that would have different natural floodplain relationships the design concept allows for variability in channel

capacity and bank height (River Run 2006). The stream was likely naturally incised within outwash deposits near the upstream end of the project reaches and had a limited active floodplain in that reach. However, it naturally transitioned downstream to the valley flat meadow reach with a broad active floodplain. Because of the complexity of existing topography, the conceptual design focuses primarily on restoring channel length and profile characteristics rather than on ensuring channel dimensions match the design (bankfull) discharge throughout.

Because the channel bed profile would be raised with continuity of grade between the upstream and downstream grade controls, the streambank height would be decreased and floodplain connectivity and overbanking frequency would be increased throughout. The 4,190 feet of newly constructed and reconnected historic meanders, as well as, some sections of the 5,000 feet of modified existing channel would have a raised bed elevation (at installed grade controls). The 4,240 feet of unmodified existing channel upstream and downstream of the proposed river treatments would still be inset between high terrace banks and would have limited overbanking under frequent, small magnitude events (e.g. 2 year to 5 year peak flows).

Inset Floodplains

The active floodplain would be enlarged by directly excavating a total of about 1.7 acres of inset floodplain from the existing terrace banks. Proposed locations for the inset floodplains are sites near the upstream end of the project reach where the channel is incised in glacial outwash and would normally be more confined than meadow reaches or sites with severe hydraulic confinement, and limited opportunity to substantially raise bed elevation. Floodplain excavation would reduce active channel bank height; provide additional conveyance capacity for large flood flows between the high-terrace banks; and directly remove sediment sources in an area of highly unstable, steep banks. The conceptual design assumes that approximately 2 feet of excavation would occur throughout the proposed inset floodplain areas (River Run 2006). The design width and configuration of the excavated floodplain could be modified based on a number of criteria: extent of severe bank erosion, hydraulic characteristics of the final channel and bridge design, protection of existing vegetation, or other factors.

Backfilled Channels

The approximately 2,600 feet of the existing channel to be abandoned would be converted into about 4.5 acres of functional floodplain by complete or partial backfilling. Backfilling would create sediment and soil depths and properties suitable for conveying and storing groundwater and soil moisture that supports native vegetation that grows well in wet areas. Partial backfilling would mimic oxbows and abandoned meanders such as those that currently exist in the study area.

The backfilled channel sections would be stabilized at the upstream and downstream ends with compacted soil plugs revegetated with stacked sod or salvaged vegetation. Plugs would be at least 40–50 feet long, extending across the entire blocked channel width to tie in with a finished ground surface that is equal to or slightly higher (up to +1.0 foot) than the existing adjacent surfaces (River Run 2006). Vinyl sheet piling would be installed across the former channel within the downstream plug and the upstream plug may contain a rock core to protect against erosive forces. The plugs at the upstream ends of backfilled channel sections must be designed to force all flows up to the design flow (550 cfs) into the proposed new or reconnected meander. However, a portion of flood flows greater than the design bankfull flow could be allowed into the backfill channels, promoting floodplain function and diversity of natural abandoned meanders. The designated streamflow at which overflow into the backfill channels might occur would be selected during final design, based on hydraulic analysis, desired active channel flows and water elevations, and other factors related to floodplain flow paths and residence time.

The amount of fill placed in the backfilled channel sections would depend on many factors. All of the plugs (approximately 20 plugs totaling about 1,000 feet of length) and other areas vulnerable to erosion would be completely filled to ensure stability of the proposed channel margins. Most other areas would be filled to within 1–3 feet of the surrounding ground surface (approximately 55-75 percent fill). Some areas may not be backfilled

as deeply, to allow for additional surface water features and habitat values on the floodplain. The final area and configuration of shallow (partial) backfill would minimize stagnant water suitable for mosquito breeding and maximize groundwater and soil water continuity across the floodplain. Numerous oxbows and abandoned meanders currently exist, and these features would mimic the existing habitat. As much as possible material generated on-site through other construction elements would be used for backfill. However, specified materials would likely need to be imported.

Restored Floodplains

Relocating some golf course holes farther from the river would increase the buffer between the golf course and the river, and allow restoration of floodplain topography, soils, vegetation, and function. The area selected for removal and relocation of holes was guided by analysis of meander scars on aerial photos, and in the conceptual design, holes were generally relocated outside the historic meander belt. A total of approximately 97 acres of floodplain/meadow would be restored, including removal of golf course from 39 acres within the 100-year floodplain. All existing golf course infrastructure north of the river along Angora Creek in Reach 1 (holes 10, 11, and 12) would be removed, and south of the river, all of holes 17 and 18 and portions of holes 6, 7, 14, 15, and 16 would be removed.

The revegetation treatment of the floodplain would vary depending on the amount of disturbance required to remove golf features, the proximity to the STUPD sewer line, and the species of vegetation present, leading to a range of treatment options that could be applied. In order of decreasing intensity these include:

- removal of fill, grading, soil rebuilding, and revegetation;
- removal of shallow fill and expose buried native rhizomes or revegetation;
- deep-ripping, amendment, and revegetation;
- seeding and irrigation; and
- turf abandonment.

Where ground elevation is raised during construction of the existing golf course (e.g., greens, tee boxes, spoils, and levees), the historic topography would be restored by removing nonnative turf and fill material and/or local grading. The final elevation would match the native pre-disturbance grade. Minimum required cover for existing sewers would be maintained. In other areas where the naturally diverse and complex topography was smoothed for golf course landscaping, grading would be used to recreate topographic variability similar to natural floodplains. Topsoil would be salvaged and replaced at the restored elevation. Revegetation would use native seed or plants appropriate to the site, would consist of seeding and plug plantings or application of pre-grown sod mats and would generally be followed by application of mulch (loose or hydraulically applied), or coconut fiber fabric to provide initial erosion protection. At suitable locations, willow plantings (cuttings, stubs, or entire rooted clumps) would be clustered to reestablish willow-meadow complexes. Where willows are desired but preexisting relict turf is present, measures would be applied to create a competitive advantage for willow over the meadow vegetation in which they would be planted.

In areas with only shallow fill that may have buried natural soil and native meadow rhizomes, the turf and fill would be removed, and the surface evaluated to see whether rhizomes are viable or if native sod or seeding is required. If needed, the disturbed surface would be seeded with additional desirable species (e.g., *Deschampsia cespitosa*) and mulched or covered with fabric.

In areas where the golf course topography is generally appropriate for the restored floodplain but there is no evidence of native species competing with the turf, and/or the soil conditions are not conducive to the desired vegetation type, soils would be deep-ripped and amended if needed. Prepared soil areas would be seeded, and/or planted with plugs of desired species, and mulched or covered with fabric.

Seeding over existing golf course turf may be used in locations where the existing vegetation is desired for erosion protection and/or the soil profile would not require modification to support the desired future vegetation.

This would be used in areas that show some minor interspersed native species competing with the turf and/or would have a higher soil moisture after restoration such that golf turf species would be out-competed with time.

Turf abandonment treatments may be used in locations where existing vegetation has native wet meadow graminoids or other desired vegetation community, present and vigorous. Native species such as *Carex nebrascensis* grow up through the turf and readily out-compete grass turf and reestablish wet or mesic meadow habitat with the restored hydrology. During the transition period before native species dominate, existing turf would provide erosion protection.

Areas anticipated to support mesic meadow and dry meadow could be treated with ripping and planting in bands oriented along topographic contours, alternating with parallel bands of seeding and mulching with the abandonment treatment (combination of the above two treatments).

Existing golf turf would be tilled and incorporated into subsurface fill or removed and salvaged for other use and/or disposed off-site, and any undesired layers of sand or soil would be scraped and disposed of off-site or re-utilized as fill.

These floodplain treatments could be applied to the entire floodplain in one season or could be applied in strips perpendicular to the river over a 2- to 4-year period so that all of the vegetation would not be disturbed simultaneously. The untreated strips would be replaced with native vegetation once the treated strips have good vegetation establishment.

Other Restoration Efforts

Other improvements proposed under Alternative 2 include the area where the eastern lobe of the old quarry pit cut into the hillside intercepting subsurface water which drains to the base of the slope and forms a small, wetland on the disturbed topography of the old quarry floor. The drainage would be reconfigured to a more naturalized channel, and a wetland pond covering about 0.5 acres would be constructed where drainage from the cutslope of the eastern quarry ponds on the disturbed topography to form a more natural habitat. This wetland pond would be outside of but adjacent to the golf course footprint. Drainage out of the pond would cross the golf course, requiring a small cart path bridge.

A seasonal drainage in the southwest area of the footprint was previously diverted into a ditch that has since headcut and gullied. That gully would be re-contoured and the stream channel rebuilt into a natural configuration. Where this drainage crosses the golf course a cart path bridge would be required.

18-Hole Regulation Golf Course Reconfiguration

The conceptual 18-hole regulation golf course design for Alternative 2 reconfigures Lake Tahoe Golf Course by relocating seven entire and two partial golf course holes to the western side of the Upper Truckee River and upgrading drainage for retained areas of the course. Those existing holes identified for relocation are within the historic meander belt of the Upper Truckee River. They would generally be relocated onto higher capability lands farther from the river to minimize use of SEZ lands, avoid sensitive biological and cultural resources known to exist in Washoe Meadows SP, and maintain a buffer from the river and adjacent residential areas (Exhibit 2-5). Where golf course holes would be removed from the river corridor, the riparian/floodplain areas would be restored (as described above).

The reconfigured golf course would have an overall footprint of 156 acres, 64 acres of which would be native vegetation (minimally managed and naturalized landscape), and 92 acres of intensively managed (nonnative) vegetation. The area of golf course in SEZ would be reduced to 96 acres, 40 acres of which would be in the 100-year floodplain. All five existing golf course bridges over the Upper Truckee River would be removed, and one new bridge would be constructed, 850 linear feet of golf course would be adjacent to the river at the replacement bridge.

Golf Course Design Concept

The reconfigured course is proposed to be environmentally sensitive and sustainable design. The golf course would be sensitively placed within the landscape by using a suitable design approach for the setting with the intent of minimizing land disturbance. The conceptual design minimizes potential golf course impacts on the natural ecosystem while maintaining a high quality golf experience. It also provides an opportunity to create interpretive signs throughout the course, calling out environmental enhancements that would result from the project, as well as various habitats, plant, and animal communities located in the study area. The combination of providing a high quality recreational opportunity, maintaining open space, and preserving visual and functional quality of the landscape are a few of the key design goals. While tree removal would be substantial under this alternative the layout was designed to minimize this effect by placement in relatively open and previously disturbed areas that would have the least impact on the ecosystem. The design would incorporate measures to continue Audubon Sanctuary certification through the Audubon Cooperative Sanctuary Program for Golf Courses with ecologically sound land management and the conservation of natural resources.

The reconfigured golf course design concept is intended to make the best use of the site, provide recreation values, and maintain a proper relationship to the environment and adjacent land uses. Golf infrastructure and holes would generally avoid the most sensitive areas adjacent to the river. This would allow the river room to function more naturally and a continuous riparian habitat corridor. In consideration of areas within which the reconfigured golf course could be located included major factors, such as:

- Minimize connectivity of golf course and river
- Minimize or avoid sensitive archaeological sites and sensitive ecological habitat
- Maximize golf use of higher capability lands and minimize use of SEZ lands
- Decrease area of golf course within floodplain and adjacent to the river.

A links touch-and-target style golf course is proposed under Alternative 2, where wider turf areas would be placed only in main landing zones so that turf is narrower near tees. All turf areas (intensively managed) would be buffered using native grasses (minimally managed). The existing golf holes would be modified to match this style. Golf course holes remaining on the east side of the river would be reconfigured and upgraded to improve drainage, turf quality, irrigation efficiency, water collection system and to incorporate current BMP technology. As part of this reconfiguration, the unnamed creek crossing the center of the golf course and discharging into the Upper Truckee River also would undergo modification (e.g., added setbacks and buffer areas between turf areas and the creek, and native vegetation treatments in those buffer areas). All areas where existing golf facilities are removed within the current golf course footprint and are no longer used as part of the new course would be restored to a native landscape and removed from the Lake Valley SRA. These areas would receive minimal grading to restore natural topography and drainage. They would then be planted with native vegetation and managed only for natural values as part of Washoe Meadows SP.

Course Layout and Routing

The conceptual routing and layout of the reconfigured golf holes is based on the proposed use for the golf course and existing characteristics of the study area (as discussed earlier in this chapter and presented in Exhibit 2-1). The exact configuration of the golf course would likely be modified during final design; however size and layout considerations would remain the same. Topography and natural features would be incorporated into the routing to create a natural character unique to the site and integrated into the natural setting. Routing of this conceptual design takes into consideration environmentally sensitive areas, drainage patterns, climatic conditions and other factors that would affect playability, construction, and maintenance of the golf course.

The current Lake Tahoe Golf Course is an 18-hole regulation length, par 71 course with a total walking distance of 6,741 yards. The current course has three sets of tees at 6,742; 6,327; and 5,702 yards. The course rating and slope for the three tees are, respectively, 70.8/126, 68.9/120, and 66.7/109.

The conceptual design for the reconfigured course maintains its status as an 18-hole regulation course designed to be able to host championship play, with approximately the same slope, rating, length, par, and variety of holes as currently exist. In addition to the natural features of a site, the golf course layout incorporates design features, such as teeing areas, greens complexes, sand and grass bunkers, and water features to define the strategy of each hole and produce the desired visual quality, keeping in mind circulation, speed-of-play, and safety. For areas that lack character or topography, these features would be used in conjunction with golf course routing to create playability, surface drainage, and aesthetics.

The reconfigured golf course would incorporate and improve sections of the existing golf course that are distant from the river, construct two new holes that cross the river, seven new holes on the west side of the river, removing golf course from most areas adjacent to the river. All existing cart paths that are not within the footprint of the reconfigured golf course would be removed, and the area would be restored to native topography and vegetation. The asphalt would be disposed of off-site, and the area would be tilled, seeded with native seed, and mulched. New cart paths would be constructed within the reconfigured golf course footprint to serve the new holes. Asphalt cart paths would be approximately 8 to 9 feet wide in areas of one-way traffic, and 12 feet wide in areas of two-way traffic. Exhibit 2-5 shows the new path layout. A section of the new cart path route would also serve as a walking trail on the west side of the river to provide non-golf recreation access across the course and to the new bridge, and connecting to newly constructed trails that tie into the bike path on the east side of the river.

The portion of the course on the west side of the river would be designed so maintained turf areas are surrounded by native vegetation. The intent is to create a course that blends well with existing terrain and natural vegetation. This concept creates more target-style golf, where wider turf areas would be placed only in main landing zones (fairways through greens), so manicured vegetation is narrow near the tees and minimized overall, resulting in tee areas being more like islands in the native landscape. In some cases cart paths would cross through portions of natural landscape between holes. Fairway and rough areas would be minimized to accommodate play with little disturbance of existing natural landscape. A 1.6 acre pond is proposed for irrigation and stormwater treatment in the area of a former oxbow on the terrace. A new 650 square foot restroom facility would be constructed near the new hole 9 on the west side of the river. A connection to the existing power and sewer lines located at Chilicothe Street would be installed. Access to the restroom would be via the cart path described above.

Grading would be minimized using the natural contour to the extent possible. Modifications to the natural contour would only be made where necessary to create playable slopes for golf, positive drainage, and to properly elevate greens and tees. Grading of landforms west of the river would require an estimated 210,000 cubic yards, including topsoil salvage. All material would be used on site. An estimate of approximately 4,800 yards of sand and gravel would be required for tee, green, and bunker construction on the west side of the river, as well as the 32 acres of new sod.

The design for the two holes to cross the river is necessitated to reduce long green-to-tee distances and to keep play moving at an acceptable pace. The existing layout is easy to walk and the proposed course should also remain as easy to walk as possible. The two new par 3 holes across the river would be “target holes” to minimize the golf landscape footprint redesigned to lead up to and away from the river crossing holes minimizes impacts on the stream zone. The par 3 holes would require about two acres of turf and would be graded so drainage is toward the surrounding buffer zone and would not return flow directly to river. These par 3 holes would have minimal rough and create an island of turf in the native landscape. The turf area for these holes would be sufficiently wide to contain the majority of golf shots. The perimeter of the turf area for the two new holes playing across the river would be marked as environmentally sensitive areas. This marking would dictate that players not enter the area adjacent to the turf at any time, not even to search for lost balls, thus reducing any impact players may have on the river ecosystem. Only maintenance staff would enter sensitive areas (upon occasion) to retrieve balls. The river holes would also enhance the quality of the playing experience and create an opportunity to bring focus to the interpretation for the river restoration.

Existing golf course holes would be modified to tie in with the proposed new holes and river restoration project. The proposed design would modernize the portion of the existing golf course to be incorporated to reduce environmental impacts, and natural areas between holes would be expanded. In the proposed design, nine holes near the river would be removed. Four existing holes would have minor routing adjustments to tie in with the new holes west of the river and reduce excessively long green to tee walks. Five other existing holes and the practice areas would be improved to reflect the character and quality of the new holes. This work would include local grading, new irrigation, drainage cart path improvements, and replacement of bunker sand. Tees and portions of fairways that need to be re-configured would be re-sodded, and existing bunkers would be rebuilt as well as spot treatment in problem areas. Areas out of play between holes that currently have managed vegetation would be restored to natural native vegetation. Approximately 100,000 cubic yards of grading would be required with materials balanced on site. About 7,200 cubic yards of sand and gravel would be imported for construction of tees, greens, and bunkers.

Land Management

The footprint of the golf course includes areas managed for golf as well as adjacent or surrounding areas managed for natural resources. In the reconfigured 18-hole golf course conceptual design, the total golf course footprint is increased from 133 to 156 acres; however, it includes more areas managed for natural resource values (natural landscape) as well as increasing less intensively managed (golf landscapes) than the previous footprint. The amount of intensively managed area decreases from 103 acres to 92 acres, the amount of minimally managed acreage is 44 acres and areas managed as natural landscape increase to 20 acres in Alternative 2 from 7 acres under existing conditions (Alternative 1). However coverage adjacent to the river will decrease. Detailed coverage discussions are presented in Section 3.6, “Earth Resources”.

Intensively managed areas would be constructed or modified to develop new out of play areas of natural landscape, composed of native vegetation (scrub and grasses) that surround tees and greens. All improved turf areas would either be grassed with sod or seeded. In the case of sod, where existing turf occurs it would be pulverized and incorporated into the seedbed. Greens would be bentgrass, and fairways, tees, and roughs would be bluegrass. A fescue blend would border all turf areas to act as a buffer (minimally managed area) between the highly maintained turf areas and the natural landscape. Alternatively only the tees, greens, and rerouted areas would be re-grassed. Under the reconfigured 18-hole regulation golf course conceptual design, riparian habitat would be further enhanced by planting native species between and around holes.

Currently, the golf course drains toward the river with little or no buffer. The proposed drainage concept would regrade areas of the golf course and remove golf landscape adjacent to the river. Additionally, existing erosion hazard sites affecting infrastructure would be reduced by bridge removal, as well as by restoration of a more functional river. Drainage would be designed to collect runoff on the course and run it through natural biofilter vegetation buffers to ensure it does not run directly into the river or the unnamed creek. Also, source reduction practices are in place within the management zones around ponds, thus fertilizer and pesticide use is limited near water bodies.

Under Alternative 2, the surface water diversion from the Upper Truckee River would remain a component of the irrigation water supply system. However, use of this diversion would be limited to period when the exiting well cannot produce a sufficient water supply. The diversion infrastructure would be protected with a boulder step grade control structure as part of the river restoration design.

Implementation of improved water conservation strategies would be integral to this alternative. The irrigation and drainage system in the vicinity of the existing holes would be replaced with new, more efficient computerized technology controlling the rate, amount, and timing of irrigation water application in order to minimize soil erosion, runoff, and fertilizer and pesticide movement. The irrigation system would be designed to have an average application rate below the infiltration capacity of the soil so that no surface ponding would occur and maximum efficiency of water use would occur without excess deep percolation. All irrigation would be based on

a water balance method which takes into account plant water use as monitored by environmental conditions, soil drainage, and natural rainfall.

Existing irrigation heads are 360-degree spray with 90-degree spray and do not allow for targeting application. These would be removed. Irrigation piping and wire would be left in the ground, and a new piping and control system would be installed. Approximately 11,000 feet of new irrigation pipe would be placed at a depth of about 30 inches, and approximately 45,000 feet of new irrigation pipe would be placed at a depth of about 18 inches. The new irrigation heads would allow for directional control and closer spacing to better target irrigation application and water conservation. The well and pond at the existing hole 9 would continue to be used for irrigation purposes and be evaluated for additional water supply. The stormwater pond west of the existing hole 15 would be regraded and restored as oxbow/wetland floodplain habitat as described in the river and floodplain section above. This feature would be adjacent to but outside the golf course footprint.

The new irrigation system proposed on the west side of the river would include a1.6 acre, 5-foot deep stormwater and water supply pond adjacent to the proposed hole 9 and approximately 11,000 feet of new irrigation pipe would be placed at a depth of approximately 30 inches, and approximately 45,000 feet of new irrigation pipe would be placed at a depth of approximately 18 inches. Construction of the new pond would be in a high terrace older oxbow. If this option is not feasible because power could not be brought in, then the pond between current holes 13 and 16 would be enlarged for water supply to this area. A pipe attached to the new bridge with a maximum 10 inch diameter would connect to the irrigation system on the east side of the river. A small wetland/pond feature is also proposed within the former quarry as described in the river and floodplain section above. Because this modification is to enhance a disturbed wetland to improve habitat and not for golf purposes, this feature would be adjacent to but outside of the golf course footprint.

Lawn mowing would continue to occur typically from early morning until mid to late afternoon, and occasionally into the evening. Fertilizer and pesticide use would continue to occur twice per year in May and November and if requested by overseeing agencies (Lahontan RWQCB, TRPA or El Dorado County), an updated chemical, irrigation, agronomic, and erosion control plan, with reporting requirements would be prepared. However, it is expected that application protocols and monitoring and reporting requirements would continue as is occurring today.

BMPs associated with the facilities are discussed below in Clubhouse, Maintenance, and Parking Facilities section.

Bridges

The five golf course bridges that cross the Upper Truckee River would be removed and replaced with a single bridge crossing that spans the floodplain. The proposed bridge would be much longer (approximately 150 to 200 feet) than the existing undersized bridges with approximately 150 linear feet of launchable riprap and 700 feet biotechnical bank treatments, reducing impacts to river erosion and stability. All native areas adjacent to turf would be protected from disturbance and left as thick riparian vegetation signed to prevent entry.

Currently all golf course bridges are closed to non-golf public use due to the safety hazard of non-golfers crossing golf play areas. The new bridge would be designed to accommodate two-way traffic, and dispersed recreation access would be planned to allow safe access from localized neighborhoods to the river and meadow trails. The trails and golf holes would be designed so that there would be buffer areas between golf play and the path. Pedestrian paths could pass relatively closely behind a tee, but would have a greater buffer distance behind a hole.

The four pedestrian/cart path bridges across Angora Creek would be removed and the four cart path bridges across the unnamed creek would remain, but the northernmost would be outside the golf course footprint and used as part of the new recreation path. (The Sawmill Bike Path bridge outside of the study area, next to U. S. 50 would also remain providing auxiliary access across the river.)

Other improvements proposed under Alternative 2 include construction of golf cart bridges over four small sub-watershed drainages. These include the drainage from the wetland area formed by seepage from the eastern quarry cutslope, two small (5 foot wide) ephemeral drainages in the southwest part of the proposed golf course area west of the river, and a seasonal drainage in the northern part of the proposed golf course area. An old ditch that diverts the southwesternmost drainage would be removed and that drainage would be restored. Overall, approximately five new crossings of existing surface water drainages or wetlands with short bridges or boardwalks would be required. They would be approximately 10 to 15 feet long and 8 feet wide.

Bridge particulars are discussed in further detail in the River and Floodplain section above.

Clubhouse, Maintenance, and Parking Facilities

Under Alternative 2, no changes to the clubhouse or maintenance facilities are proposed. There are currently 115 parking spaces in the paved parking lot at the Lake Tahoe Golf Course. Grassy areas on both sides of the golf course entrance are used for additional parking, and under Alternative 2, the northern half of the unpaved parking area would be paved to create an additional 89 parking spaces. Lighting associated with the parking would be designed to match existing lighting, which meets TRPA criteria, and use would continue to be for special events at the clubhouse (i.e., banquets). Additional BMPs including an additional oil separator and slotted channel drains would be incorporated into the existing management system to reduce impacts on water quality.

Operations and Maintenance

The Lake Tahoe Golf Course would continue to operate from approximately April 15 to November 1 (as weather allows) from dawn until dusk. Golf Course staff needs would increase by four people to a total of 80 employees due to increased maintenance needs. It would continue to host a variety of golf tournaments and outings each year. There is no anticipated change in tournament play frequency or fees under this alternative, except those that may arise in the normal course of business in accordance with the golf course's business plan. Permitted winter recreational snowmobile activities would continue to occur from November through March on the driving range, and not be allowed anywhere else on the property, except by golf course or State Parks staff members for patrol purposes. The snowmobile operation would continue to be provided by an outside vendor. Lake Tahoe Golf Course would request a review and continuation of its ACSP certification.

Normal maintenance or future improvements to golf course infrastructure would be implemented by State Parks (the lease holder) or its contracted concessionaire/representative(s). A reduction in infrastructure maintenance is expected under this alternative due to removal of undersized bridges and river restoration efforts.

TRAILS

Currently all the trails that exist on the west side of the river are casual or volunteer trails. No trails are officially established or designated trails; instead, they have been formed over time through adoption of old roads or routine use, and presumably, trails outside the golf course footprint would continue to be used for the purposes for which they are used today.

Under Alternative 2, a new designated ADA compliant trail system would be constructed to tie the informal dispersed recreation trails on the west side of the river across the new bridge and into new trails on the east side of the river. The recreation trail would share the new bridge with the golf cart path and would then diverge into separate paths on both sides of the river. There would be two new recreation trails on the east side of the river connecting to the bridge. One would go to the south and tie into the corner of Country Club Drive, while the other would go along the south side of the river to the east and tie into the new Sawmill Bike Path along U.S. 50 near the golf course clubhouse. That trail would cross the unnamed creek on an existing golf course bridge that would no longer be in the reconfigured golf course footprint. This trail would also require sections of boardwalk and causeway through the restored floodplain. A new trail would also be constructed around the north end of the western section of the golf course that would allow access across the new bridge. The recreation trail would share

the cart path in the central area of the western holes where a gap in the golf course would provide a corridor for other recreation users to pass through to the river and tie into the gravel road which parallels the river. This gravel road is currently, and would continue to be, used by the STUPD as a required maintenance road for its subsurface sewer line in that area. This proposed trail configuration would enable public access and use into and within the area (Exhibit 2-5). Interpretive signage would be added in appropriate locations along the new trail system to identify sensitive habitats and restoration improvements.

Trails outside the study area are not addressed in this document.

INTERIM MANAGEMENT PLAN

To manage Washoe Meadows SP in a manner consistent with its purpose and to address existing resources, public access, and use issues of this unit, State Parks would prepare and implement an Interim Management Plan. The plan would address resources protection and management, public access, and trails management to protect the quality of important natural and cultural resources and enhance access to the park unit by the public. Natural and cultural resources and trails management would involve normal maintenance and resources protection measures with the performance criterion of meeting the unit's purpose statement regarding resources. Public access provisions would enhance accessibility for the broader public by the addition of trail improvements, signage. one or more, small parking areas on State Parks land within Washoe Meadows SP (e.g., for 2 or 3 cars). The candidate locations would be where public rights-of-way abut State Parks land. Such public access point(s) would supplement public access to Washoe Meadows SP provided by the proposed bridge across the river near hole 6. No other development within Washoe Meadows SP would be included because majority of remaining park area is within sensitive low capability land.

2.5.2 GENERAL PLAN AMENDMENT

Alternative 2 would involve revising the park unit boundaries, essentially "trading" land between Washoe Meadows SP and Lake Valley SRA, and realigning the boundaries between the two park units. The boundaries of Lake Valley SRA would be adjusted to encompass the reconfigured golf course and to generally place the restored riparian areas along the river in Washoe Meadows SP. Currently the northeastern two-thirds of the river in the study area is bounded by golf facilities and is within the Lake Valley SRA, while the southwestern one-third is within Washoe Meadows SP. The revised park unit boundaries, shown in Exhibit 2-5, would remove nearly all the river zone from the Lake Valley SRA and put it within Washoe Meadows SP. The only section of river remaining in the Lake Valley SRA would be in the vicinity of the new bridge crossing. The area north of the river near Angora Creek would also be changed from Lake Valley SRA to Washoe Meadows SP. The area to which the reconfigured golf holes would be relocated on the west side of the river is generally less sensitive land and would become part of the Lake Valley SRA.

Revising the park unit boundaries would involve amendment of the Lake Valley SRA General Plan, including appropriate text changes, such as revised management policies for the Lake Valley SRA. The General Plan amendment would modify, where necessary, the application of Lake Valley SRA river protection goals and policies to the reconfigured golf course.

The General Plan amendment would apply to Lake Valley SRA and its new boundaries, but would not include plan elements for Washoe Meadows SP. Because no development was anticipated for Washoe Meadows SP, State Parks has not prepared a general plan for this unit. As part of its normal administrative responsibilities (separate from this project), State Parks would prepare interim management guidelines for Washoe Meadows SP, with the revised boundaries, which would provide additional guidance for protection of resources and management of permissible uses for that unit. The infrastructure in Washoe Meadows SP would be limited to existing informal trails; a potential, temporary small parking area (four spaces or fewer); interpretive signage; and service vehicle access. The existing sewer line easement would also remain.

Potential environmental effects associated with the proposed boundary change and the Lake Valley SRA General Plan amendment are evaluated in Chapter 3, "Affected Environment and Environmental Consequences." After a preferred alternative is identified, the details of the map and text amendments to the General Plan will be prepared to reflect the changes. The proposed amendment will then be submitted with the completed EIR/EIS/EIS to the State Parks and Recreation Commission for consideration of approval at the conclusion of the environmental review process.

2.5.3 PROJECT CONSTRUCTION

This section summarizes construction activities and the estimated construction schedule for Alternative 2 and provides an overview of how construction would be coordinated with golf course play. Under Alternative 2, the following planned construction activities would be conducted: changes to the existing golf course areas, construction of new golf course areas, removal of unnecessary infrastructure, removal of bridges and installation of a replacement bridge, construction and modifications to the river channel and floodplain surfaces, and construction of the restroom and parking facilities. The overall construction period would include phases that allow for vegetation reestablishment success and pre-wetting of new and reconnected channel sections before their connection to the active river flows (see Table 2-4).

Several overarching construction management measures would be implemented to ensure minimal environmental impacts during project construction. These measures include, but are not limited to, the following: 1) construction limit fencing would be erected and maintained to ensure construction activities occur within delineated construction boundaries. 2) Preventive dust control measures would be implemented to reduce air quality effects. 3) No trees or wetland vegetation would be removed unless they are shown and identified for removal on the approved final plans or as specified on-site by the project engineer with appropriate agency agreement.

In addition to the general measures above, specific measures, such as those that follow, would be taken to protect water quality:

- All imported gravel, cobble, or boulders used in construction would be washed before installation.
- Clean gravel would be placed along the channel bottom on riffles in the reconnected, sections of existing, and constructed channel sections.
- A combination of native sod blanket, willow transplants or wattles, woody debris, strips of remaining golf course sod, or mulch or erosion control fabrics over seeds would be used on excavated inset floodplain surfaces.
- Before the active river is allowed to flow through areas of new and reconnected meanders, these channel sections would be primed by pre-wetting and introducing controlled flows that would remain isolated from the active channel (protected by berms, water-filled dams, or similar measures) and then having any turbid water pumped out onto settling basins or sprayed onto the revegetated floodplain without return flow to the channel.

All construction phase BMPs, mitigation measures, and the final conditions of all permits, approvals, and easements would be identified in the project plans and specifications for the contractor or fulfilled by State Parks. While exact erosion control measures (BMPs) are not specified at this time it is expected that general construction BMPs would include construction fencing, silt fences, weed-free hay bales, temporary settling basins, vegetation protection, hydroseeding, and strawmulch. Trees removed from proposed golf area would be used as part of the river restoration activities, as mulch material for revegetation work, or hauled off-site. Dewatering and diversion discussions are presented in more detail below and would be further defined in the project plans and specifications.

Construction activities that must access the existing streambed or streambanks would require temporary dewatering of surface water in the river channel, and where subsurface access is needed, temporary dewatering/pumping of groundwater that seeps into the work area may also be required. Construction activities would be limited to the summer and early fall seasons, which would reduce the likely amount of water present. However, seasonal streamflows vary from year to year and it is possible that thunderstorms can produce brief peak flows that must also be accommodated. The final construction schedule of in-channel work would use an approach that minimizes risk of high peak flows during temporary dewatering. A variety of specific techniques and equipment may be employed to provide dry work areas and to isolate the disturbed areas for protection of water quality within the adjoining water bodies. The final dewatering/BMP plans for the project would indicate the scheduling approach, specific diversion/bypass/dewatering methods and equipment, defined work areas, the types and locations of temporary BMPs, along with water quality performance standards. A general approach to dewatering for the conceptual level design is described below, although the details would be further developed along with other elements of final design prior to implementation.

Dewatering of small, discrete work areas (i.e., bridge pier footings or an individual boulder step) may be accomplished by isolation measures that bypass surface low flow around the area (e.g. temporary sheet piles, water-filled berms or similar methods), accompanied by sump pump dewatering of the interior work area to remove seepage. Water quality of the bypass flows would not be affected by the work area disturbance, but the pumped seepage water would be pre-treated by routing through a filtration or settling system prior to release back to the downstream surface water.

Dewatering of reach scale work areas (i.e., a series of boulder steps, armored riffles, streambank treatments) may be accomplished by a couple of different approaches, depending on whether and to what extent construction activities need to access the streambanks and streambed.

One approach would be constructing a temporary diversion structure (e.g., small dams comprised of gravel bags/plastic sheeting, sheet piles, and/or water-filled berms) upstream of the work reach that divert the surface low flow into a gravity-fed or pump-fed pipe or hose around the entire work reach to a temporary release location downstream that is provided with temporary protection against erosive releases from the pipe/hose. It is likely that sump pump dewatering of specific reaches being worked may be required to either remove seepage during active work and/or to control turbidity during re-wetting. Water quality of the bypass flows would not be affected by the work area disturbance, but the pumped water would be pre-treated by routing through a filtration or settling system prior to release back to the downstream surface water. This approach would be most suited to reaches that require extensive streambed access during construction.

Another approach would also construct a temporary diversion structure upstream of the work reach and have an erosion-protected release structure downstream of the work reach. However, it would be designed to route all surface low flows within the work reach to one side of the channel at a time around a mid-channel barrier (e.g., sheet pile and/or water-filled berm). This approach might be well-suited to reaches that require extensive streambank treatment, but only need streambed treatment at the upstream and downstream ends of the work reach.

The installation of the new replacement bridge during Year 1 (construction schedule described below) Diversion and by-passing of the streamflow around replacement bridge piers and the interior of isolated work areas would be anticipated.

The Year 2 pre-wetting of reconnected historic meanders, constructed new river channel and irrigation of associated re-vegetation may require partial diversion and/or pumping of streamflow, but no in-channel work is planned that would require full diversion/by-passing of streamflow.

Several activities in Year 3 would require temporary dewatering of the entire streamflow around sites or reaches. Installation of streambed and streambank treatments in all reaches of the existing channel that would be modified for reuse as part of the proposed alignment, including the transition treatment areas between the existing channel

and reconnected historic meanders and constructed new river channel sections, would require temporary dewatering for streambed and streambank treatments. The removal of existing bridges in areas of active streamflow would also require dewatering at the site(s) of the footings and abutments. It is expected that cost savings would be realized and water quality protection would be simplified if all in-channel work (from bridge demolition through streambank re-vegetation) was conducted concurrently within each designated work reach, and that work reaches would be implemented sequentially along the river (either upstream to downstream or downstream to upstream). Therefore, it is expected that most dewatering would likely occur at the reach scale, using diversion structures and piped bypass to permit installation of the streambed treatments (e.g., anchored high gradient riffles at the upstream and downstream limits of the project, armored riffles, boulder steps) and that work reaches would likely be defined between major streambed treatments or transition treatments.

CONSTRUCTION SCHEDULE

Alternative 2 construction would be phased over the 3- to 4-year period between May 1 and October 15 (possibly November 1 if weather allows and extension granted) of each year, beginning in 2012. However, construction would not occur on Sundays and may not occur on other designated weekends and holidays. Construction hours would be 7:00 a.m. to 7:00 p.m., with hauling restricted to 8:00 a.m. to 6:30 p.m. On occasion, there may be a need for longer work hours to address specific constructability issues that cannot otherwise be accomplished. Such work schedule exceptions would be coordinated with the TRPA and El Dorado County, as well as local residents and emergency service providers.

Alternative 2 construction would commence as soon as possible after completion of construction plans and specifications, project approval, acquisition of permits, securing of funding, and all preconstruction monitoring. Construction activities would be continuous for the multi-year period, with winter closedowns, except for BMP maintenance and monitoring. Conceptual construction phasing, equipment, and workers are presented in Table 2-4. However, final phasing approach may be modified to accommodate needs of State Park, their concessionaire, or the contractor as needed. If possible Year 1 would focus on construction of the new golf course holes on the western side of the river, the new bridge installation, and off-channel work (historic meander modifications and new channel construction). Golf play would be limited to a 9-hole course on the east side of the river to allow for construction access adjacent to the river. It is anticipated that in Year 2, most off-channel river restoration work would be completed and vegetation would be allowed to properly establish during this year. In Year 2, golf play could be located on the western 9 holes constructed in Year 1 if vegetation is properly established or the golf course may need to be completely shut down in Year 2. Year 2 would include reconfiguring the existing golf course and upgrading irrigation for play in Year 3. Year 3 would include removal of old bridges, in-channel work, and connection of historic meanders and new channel sections, if vegetation is established. Pre-wetting of the channels would occur prior to connection with the existing channel sections. The new configuration of the 18-hole regulation golf course would be open to play in Year 3, with possible minor short term modifications to allow for construction access to the river.

Table 2-4
Alternative 2 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Year 1 – Off Channel Work, New Bridge, and Construction of Back 9 (West Side) Golf Course - 9 Hole Course Open		
Mobilization for off-channel work and west side new golf course; Construction of access routes and storage areas; equipment refueling areas, and construction equipment wash area; install temporary BMPs, tree removal and vegetation salvage.	May 15–30	2 equipment transport trucks (1 week), 2 dump trucks, 2 dozers (approx Cat D6), 2 excavators (approx Cat 330), 2 loaders; 2 water trucks, forklift, 1 one ton pickup truck, 3 chain saws, 1 tub grinder, 1 feller buncher, 1 skidder, 1 log loader, 2 logging trucks workers: 12

Table 2-4
Alternative 2 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Construct west side (back 9) golf course including irrigation, drainage, cart paths, sod or seed, restroom, utility connection, sewerline protection, pond, and permanent BMPs. Enhance wetland at the former quarry pit and install 5 foot bridges over ephemeral drainages. Install new bridge over Upper Truckee River.	June 1–September 30	2 excavators (approx. 325 and 330), 2 ten or twenty yard dump trucks , 2 dozers, 2 graders, 2 water trucks, 1one ton pickup truck, 1 scraper, road grader, roller, backhoe, l (approx Cat 420E), 2 loaders, 1 forklift (approx Cat TL642), 1 tractor w/box blade & drag mat, 2 trenchers, 2 cranes (2 weeks), 1 pile driver (2 weeks) workers: 20
Off-channel work- modify historic meanders and construct new channels including vegetation and bank treatments of those sections. Leave small plugs of existing soil and vegetation where future connection is to be made.	June 1–September 30	2 excavators (325 and 330), 2 ten or twenty yard dump trucks, 1dozer, 2 loaders, 1 water truck, 1 back hoe, 1 one ton pickup truck workers: 12
Install temporary irrigation and winterization measures. Demobilization – removal of equipment from the 100-year floodplain.	October 1–15	1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader, 1 water truck, 1 one ton pickup truck, 1 dump truck, 1 tub grinder, 1 hydroseeder, 1 strawmulcher, 2 transport trucks (1 week) Workers: 12
Year 2 – Off-Channel Monitoring and Construction of Front 9 (East Side) Golf Course. Entire Golf Course Possibly Closed		
Mobilization for modification of eastside golf course. Install temporary BMPs and additional vegetation salvage.	May 15–30	2 equipment transport trucks (1 week), 1 dump truck, 1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader, 1 water truck, 1 forklift, 1 one ton pickup truck, 3 chain saws, 1 tub grinder workers: 12
Off-channel vegetation maintenance and monitoring. Pre-wet the new (and still isolated) channel segments, using partial diversion of the Upper Truckee River. This step would not disturb the existing channel.	May 15–October 15	2 truck or trailer mounted water pumps, 2 water trucks, 1 one ton pickup truck workers: 6
Upgrade existing east side golf course and re move section of golf course in floodplain, including removal of existing cart paths, pulverizing or removal of sod, tilling in existing sand. Then localized grading to improve drainage and raise tees, installation of new irrigation, cart paths, sod or seed, and permanent BMPs.	June 1–September 30	2 excavators (325 or 330), 2 ten or twenty yard dump trucks, 2 dozers, 2 loaders, 1 water truck, 1 back hoe, 1 grader, 1 tractor w/box blade & drag mat, 1 trencher, 2 one ton pick-up truck, 1 forklift, 1 roller workers: 24
Install temporary irrigation and winterization measures. Demobilization – removal of equipment from the 100-year floodplain.	October 1–15	1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader, 1 water truck, 1 one ton pickup truck, 1 tub grinder, 1 hydroseeder, strawmulcher, and 2 equipment transport trucks (1 week) workers: 10
Year 3 – In-Channel Work, Removal of Existing Bridges, and Connection of Off-Channel Sections Reconfigured 18-Hole Golf Course Possibly Open		
Mobilization for in- channel construction activities. BMP and any additional access.	May 15–30	2 equipment transport trucks (1 week), 1 dump truck, 1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loaders, 1 water truck, 1 forklift, 1 one ton pickup truck, 1 chain saws, 1 tub grinder workers: 10

Table 2-4
Alternative 2 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Off-channel vegetation maintenance and monitoring. Pre-wet new (and still isolated) channel segments, using partial diversion of the Upper Truckee River. Use this water to flush constructed segments and pump and spray turbid water onto floodplain to infiltrate and water vegetation treatments. This step would not disturb the existing channel.	May 1–October 15	2 truck or trailer mounted water pumps, 1 water truck, 1 one ton pickup truck workers: 4
Install biotechnical/bank stabilization treatments, woody debris, segment transitions, and armored riffles or gravel in existing channel sections. Reconnect off-channel sections. Excavate and vegetate the inset floodplain. Unnamed creek enhancement and construction of new alignment of the mouth of the unnamed creek with bed-elevation adjustment. Reconfigure lower reach of Angora Creek to adjust for the new confluence with the proposed river channel and its finished bed elevation. Remove existing five bridges on the Upper Truckee River and four bridges across Angora Creek. Floodplain modifications including remove levees and restore floodplain outside of proposed golf course layout. Modify former stormwater pond to create wetland/oxbow feature. Transport material from stockpile storage (and/or import as needed) and backfill to desired level the abandoned sections of the existing channel, including placement/construction of subsoil and addition of soil treatments as needed for groundwater and soil moisture benefits. Apply seed or vegetation transplants and mulch.	June 1–September 30	2 excavators (325 or 330), 3 tenor twenty yard dump trucks, 2 dozers, 2 loaders, 1 water truck, 2 one ton pickup trucks, 1 backhoe, 1 crane (1 month) 1 roller, 2 truck mounted pumps, hydroseeder (1 month) workers:16
Construct the modified recreation access trail west of the river to tie into the bridge and construct new trail to tie into Country Club Drive corner. Construct the recreation access trail and boardwalk east of the river to tie into the bridge and bike path. Pave parking lot and install permanent BMPs.	September 1–30	1 loader, 1 excavator, 2 dump trucks , 1 water truck, 1 one ton pickup truck, small roller & backhoe, paving equipment (asphalt paver, roller, asphalt truck and screed) (1month) workers: 10
Install temporary irrigation and winterization measures Remove the temporary disturbances of all access points and staging and storage areas, which includes revegetation activities where needed. Formally demobilize from the site.	October 1–15	1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader; 1 water truck, 1 one ton pickup truck, 1 tub grinder, 1 hydroseeder, 1 strawmulcher, 1 ten or twenty yard dump truck, 2 equipment transport trucks (1 week) workers: 12
Year 4 – Items Not Completed In Previous Year		
Construction activities would only occur in Year 4 if the condition of revegetation in new channel segments, reconnected meanders, and restored floodplain was not adequate to allow for completion in Year 3. If channel segments were not able to be reconnected in Year 3, those elements would be delayed until Year 4. Year 4 activities would commence with mobilization activities and would include the same tasks as listed under Year 3.		
Note: Final phasing approach may be modified to accommodate needs of State Park, their concessionaire, or the contractor as needed.		

Proposed construction activities scheduled for each year are summarized below. Access locations, proposed haul routes, and potential storage/staging areas are shown in Exhibit 2-7.

Preliminary Quantities

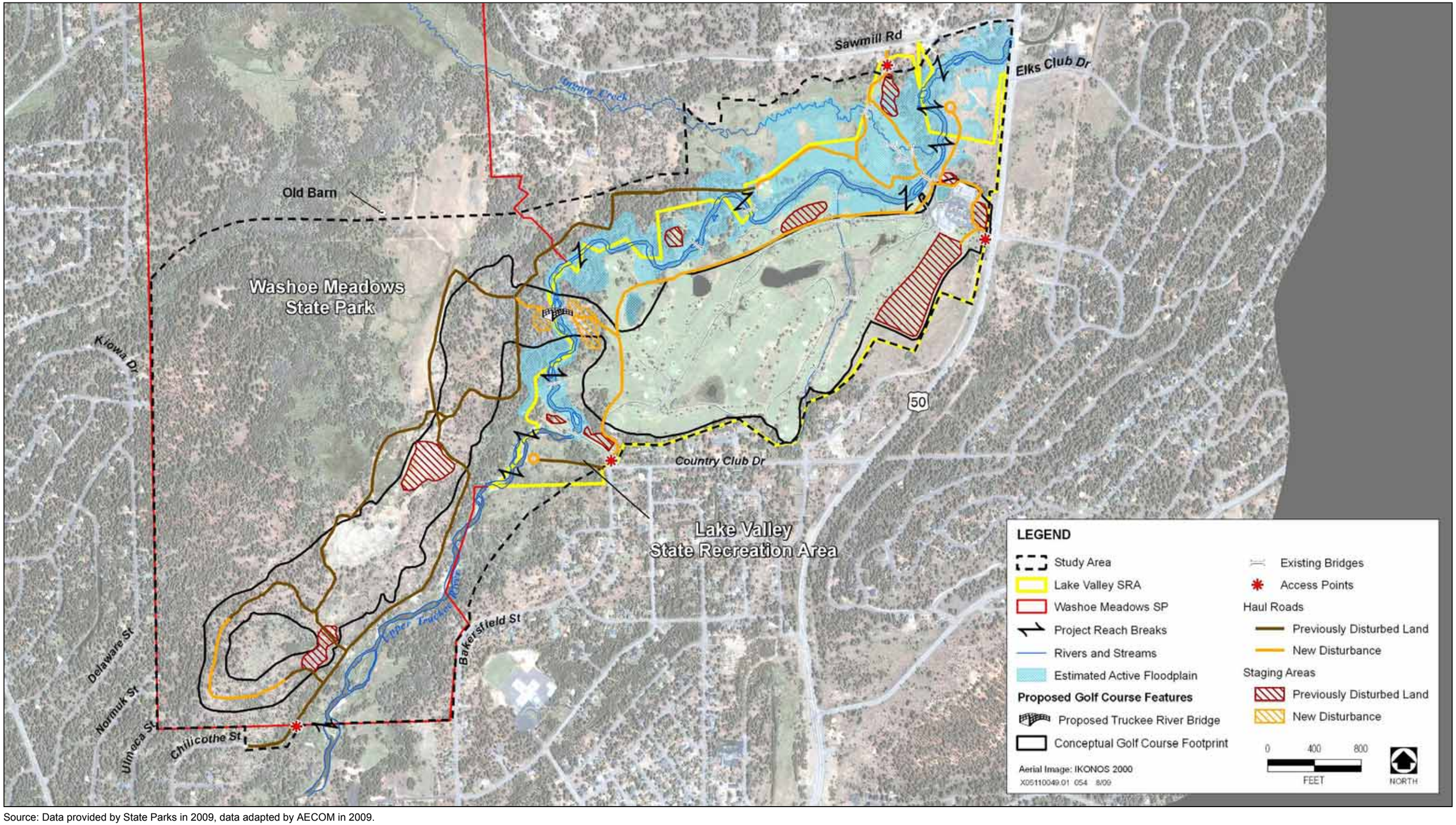
Preliminary quantities of material to be excavated and the cut-and-fill balance for Alternative 2 are summarized in Table 2-5. Estimated quantities related to the river restoration are based on the existing and proposed channel dimensions and lengths. At this conceptual stage of design, no adjustments have been made for density or composition of existing materials or compaction requirements of backfill areas. The 18-hole reconfigured golf course design contemplates a minimalist approach to the grading scheme for construction. Only the necessary amount of cut and fill to ensure playability would be undertaken during golf course renovation and reconstruction, and it is expected that all cut and fill would be balanced on-site.

Table 2-5
Preliminary Quantities (Cubic Yards) for Alternative 2

Treatment Area/Activity	Approximate Cut Volume	Approximate Fill Requirement
New constructed channel	11,000	0
Reconnected historic meanders	8,300	0
Modified existing channel	0	1,000
Boulder steps	4,700	6,200
Armored riffles	8,300	16,500
Other channel bed features	0	
Existing bank treatments	1,400	
Proposed bank treatments	2,400	2,400
Inset floodplains	10,800	0
Backfilled channels (assume partial to complete)	0	43,000–58,000
Floodplain fill removal	500	0
Modified unnamed creek	160	90
USGA-approved sand and base	0	7,200
Asphalt	130	180
Baserock	300	430
Sod	7,400	11,200-22,600
Concrete	16	16
Trails	0	9,400
Bridges	5 bridges	1 bridge
Total	**62,790**	**92,000-112,700**

Calculations are estimates based on conceptual design and would be modified, as appropriate, during final design.
Source: Data prepared by EDAW (now AECOM) and Valley & Mountain Consulting, 2008.

Several particular river treatments (e.g., boulder steps, armored riffles, rock armored bank, and portions of channel gravel treatments) require specific weight and sized material. For the purposes of traffic evaluations, these materials are not assumed to be available in the on-site excavated materials, but would be brought in from off-site sources. It is possible that some reusable materials would be salvaged on-site, reducing the eventual need for imported material. The USGA-approved sand, and road base or asphalt for new golf cart paths must meet specifications and would be imported. Conversely, existing bank treatments, bridge footings/abutments, and some of the golf course hardscape and sod to be removed may require off-site disposal. Five bridges would be hauled off on five separate flat bed trucks and four bridges would be reused over ephemeral drainages on the west side of the river.



Source: Data provided by State Parks in 2009, data adapted by AECOM in 2009.

Access, Staging, and Storage for Alternative 2 **Exhibit 2-7**

Access, Staging, and Storage

Proposed access points, temporary routes, and staging and storage areas for Alternative 2 are illustrated in Exhibit 2-7.

All restoration and golf course reconfiguration construction activities on the southeast side of the river would be accessed through the existing golf course. Street access points could include the golf course entrance off U.S. 50 and the entry off Country Club Drive. Restoration areas north of the river in the downstream half of the study area would be accessed through the existing golf course. Street access points could include the golf course entrance off U.S. 50 or a temporary access off Sawmill Road across public property. Restoration activities in the upstream half of the river and golf course construction on the west side of the river would be accessed through either the Sawmill Road entrance near hole 10, sewer maintenance easements, existing trails in Washoe Meadows SP, and/or the new bridge. Street access to the study area would be provided via Chilcothe Street, Country Club Drive, and the Sawmill Road entrance near hole 10.

Most of the construction area would be accessed through sites already disturbed by golf course grading, sewer line maintenance routes, or other existing trails, cart paths, and roads. Specialized road construction techniques to protect meadows would not generally be required because of the existing infrastructure in place. However, where access roads must cross soft or wet areas or native meadow vegetation, stabilization to protect soils and vegetation and prevent water quality impacts would be required. Where access roads must cross golf course landscaping or infrastructure that would remain in use following project implementation, measures to protect soils, vegetation, and infrastructure would be required.

Temporary access roads would likely be constructed of gravel with road base laid over a temporary fabric barrier. Following construction, roads would be removed and the area restored to preconstruction conditions. Areas would be revegetated or stabilized where needed after use of the roads was completed. Compaction under access roads may occur; therefore, restoration of their footprint areas may require ripping and active revegetation.

Any partial street closures and traffic control would be coordinated with the California Department of Transportation (Caltrans) and El Dorado County Public Works Department, as appropriate. Local residents would be informed of potential traffic controls, closures, or detours at least 48 hours in advance. Adequate emergency access would be provided at all times, and local emergency service providers would be notified of any potential road closures or detours at least 48 hours in advance. Signage on the Sawmill Road Bike Path would be required near the construction entrances on Sawmill Road and north of the golf course entry on U.S. 50.

Construction staging sites would be established in the study area, on previously disturbed land and/or high capability land, and would be secured to prevent unauthorized access. Temporary erosion control fencing and (if needed) an approved refueling station would be incorporated into staging areas where appropriate.

Soil would be removed from abandoned meanders, areas of newly constructed channels, reconfigured golf course topography, excavated floodplains, and/or other miscellaneous areas. This material would be stockpiled for placement in the backfilled existing channel. Material would be stockpiled in one of the locations designated in Exhibit 2-7 for up to three years while soil stabilizes and vegetation along the proposed channel becomes established. At project completion, the stockpile area would be used to backfill sections of the existing channel to be abandoned or contoured to the natural topography of the surrounding area (or integrated into the new golf course landscaping) and revegetated.

Vegetation would also be removed from excavated new channels, reconnected historic meanders, modified existing channel bed and banks, areas of the existing golf course to be reconfigured or retired, areas of the new golf course, and other miscellaneous locations. Plant materials could range widely and would include willows and native sod desired for reuse in the restored areas. Salvageable plant material would be stockpiled until areas are prepared for replanting. Vegetation stockpiling locations would likely be near the river channel, in historic meanders, or in golf course ponds. A temporary plant propagation area where plants would be grown from salvaged materials and/or seed for use on the project may also be designated. Because both native and nonnative

materials may be reused in the reconfigured and new golf course areas, no excess plant materials would be expected under Alternative 2.

Bridge Installation

Bridge materials would be staged on the east bank near the installation site, and a smaller staging area on the west bank; both areas would become part of the golf course fairway. Transport of bridge sections from an unloading zone near Country Club Drive to construction staging areas for the bridge would be provided by 40-foot flatbed trailers on a temporary construction road or existing dirt roads. Brushing and grading of a 16-foot road section may be necessary in some locations to allow access. Detours on Country Club Drive would be required to allow a 20-ton tracked crane to stack bridge sections in the staging area.

A pile driver would need to access both sides of the river at 40- by 50-foot construction staging areas. Lengths of 10-inch steel piles would be hammered to a depth of up to 25 feet. Pile clusters would be spaced at approximately 5 feet, 3 piles for 10-foot widths and 5 piles for 20-foot widths. Bridge deck supports would be 1-inch-thick steel plates welded to the top of the pile clusters. After the pile foundation is completed, 20-ton cranes would be stationed on both sides of the river to set and connect bridge sections. Bridge installation should be completed within one week.

Four or five existing bridges removed from the existing golf course would be re-used on west side of river over ephemeral drainages.

Restroom and Parking Area Construction

A new 650-square foot restroom facility would be constructed near the new hole 9 on the west side of the river to accommodate both men's and women's restrooms. A connection to the existing power and sewer lines located at Chilicothe Street would be installed.

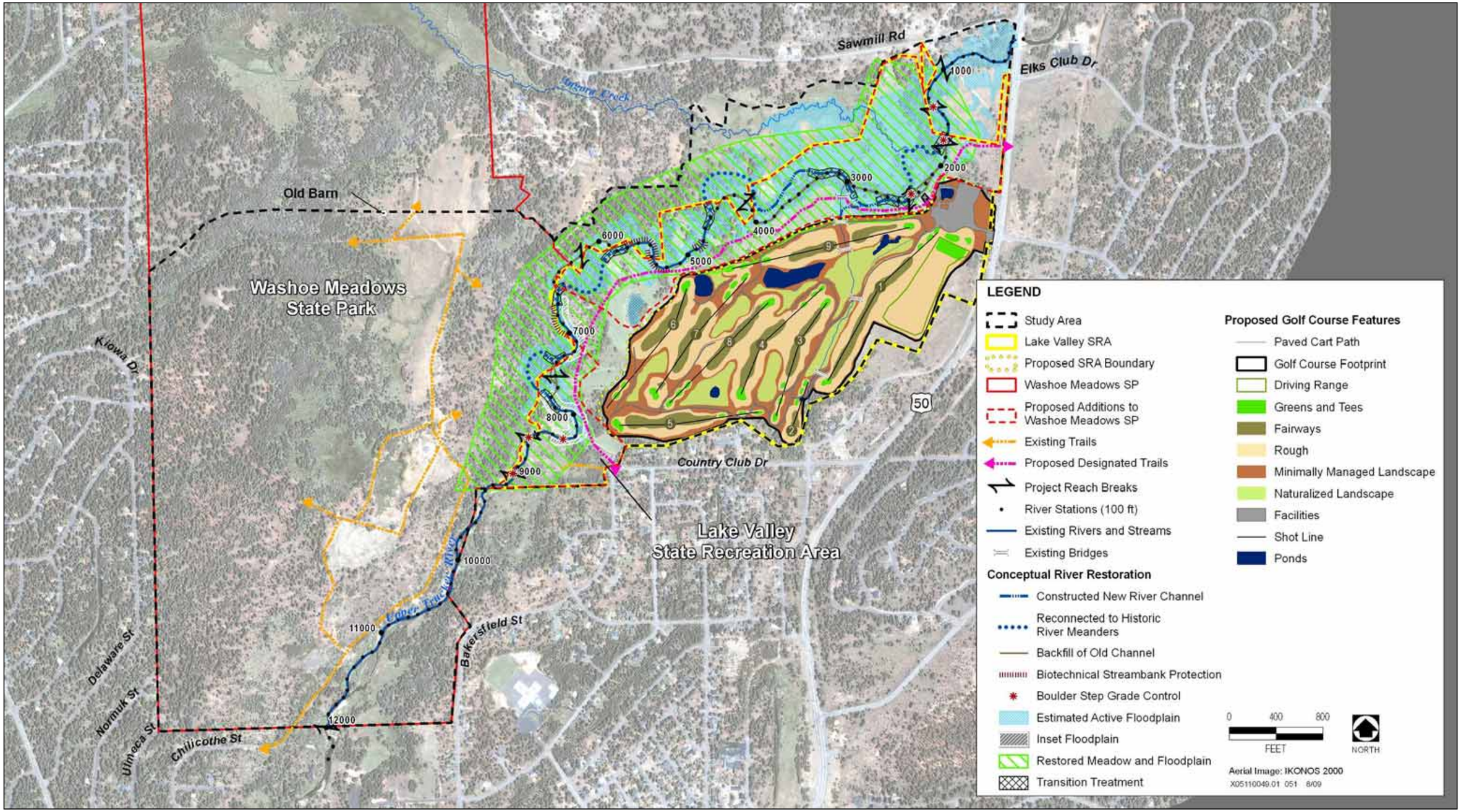
The unpaved parking area to the north of the golf course entrance would be paved to create an additional 89 parking spaces. Additional BMPs including a separate oil separator and slotted channel drains would be incorporated to existing management system.

2.6 ALTERNATIVE 3: RIVER ECOSYSTEM RESTORATION WITH REDUCED-PLAY GOLF COURSE

2.6.1 PROJECT FEATURES

Alternative 3 would involve restoring the Upper Truckee River ecosystem and providing a reduced-play golf course. A 13,430-foot reach of the Upper Truckee River and adjoining floodplain would be restored. The golf area would be reduced in size to remove golf course from as much of the historic meander belt and floodplain as possible without moving golf outside of the existing footprint. A reduced-play golf course, such as an 18-hole executive or 9-hole regulation course, would be constructed on the southeast side of the river, with a buffer along the river. All bridges would be removed from the Upper Truckee River and four bridges would be removed from Angora Creek. A new trail would be constructed on the southeast side of the river. No construction would occur on the west side of the river in Washoe Meadows SP under Alternative 3 except river restoration within areas of the historic meander belt (Exhibit 2-8). Note that the map shows the layout for a 9-hole regulation course, but the footprint of an executive course would be similar.

A boundary adjustment to Lake Valley SRA and Washoe Meadows SP would occur to decrease the size of the SRA to fit the reduce-play golf course. Washoe Meadows SP would be expanded to include the restored riparian corridor of the Upper Truckee River. Amendment of the text of the Lake Valley SRA General Plan would be needed for the development of a reduced-play golf course (rather than the current 18-hole regulation course noted in the document).



Source: Data provided by State Parks in 2009, data adapted by AECOM in 2009.

Alternative 3: River Ecosystem Restoration with Reduced-Play Golf Course

Exhibit 2-8

RIVER AND FLOODPLAIN

Approach

Under Alternative 3 land uses associated with the golf course would be removed from most areas adjacent to the Upper Truckee River channel to restore and reconnect the active floodplain and improve riparian vegetation communities within the project reach. Treatments are also proposed along the lower portion of Angora Creek and the unnamed creek. Restoration activities proposed under Alternative 3 would increase channel length to 13,430 linear feet and no golf course would be adjacent to the river. The channel bed would be elevated by adding a combination of grade control features within the existing channel bed, reconnecting recently abandoned meanders, and constructing new channel sections. This approach uses elements of both form-based and process-based design (River Run 2006). Abandoned meanders that were active in the 1940s and 1950s and are still visible on the terrace surface would be reincorporated as active channel sections, and about half the existing channel would also be retained as active channel. This would decrease erosive force, increase floodplain inundation and duration, thereby reducing sediment supply and providing more opportunity for fine sediment deposition. It would also actively restore riparian habitat adjacent to the river.

The design does not rely on or advocate full construction of the envisioned final dimension of the channel form. Rather, it removes infrastructure that impedes natural processes and provides basic form and grade. Thus, the conceptual design anticipates that natural geomorphic processes, such as the deposition and active movement of gravel bars, recruitment of woody debris, substrate sorting, and vegetation establishment, would modify the constructed bed and bank features over time to establish a site-specific final channel form.

Design Features

Treatment for the Upper Truckee River in Alternative 3 is the same as the river treatment in Alternative 2 except that Alternative 3 does not include any bridges over the river. Alternatives 2 and 3 treat the lower portion of Angora Creek, the mouth of the unnamed creek, and restoration of adjoining floodplain and meadow similarly.

Under Alternative 3, the new channel would incorporate sections of the existing channel, reactivate historic meanders that were cut off, and construct new sections of channel. The reactivated/reconnected historic meanders would generally utilize the existing outside bank with mature vegetation, but the bed, inside bank, and transitions would generally be modified. Alternative 3 would use approximately 4,240 feet of existing river channel (without modification) for the proposed channel and would modify 5,000 feet of the existing channel, reconnect 2,490 feet of historic channel remnants, and construct 1,700 feet of new channel (Exhibit 2-8). Constructed streambed stabilization features would be the same as in Alternative 2, including anchored high gradient riffle grade control transitions at the upstream and downstream treatment extents, a boulder step grade control at the irrigation water intake, and 15–25 armored riffles at crossovers and channel segment transitions. Numeric estimates of length, area, and volume are based on conceptual design and would be modified during final design.

The 2,600 feet of existing channel to be abandoned would be partially backfilled to restore floodplain. Approximately 1.7 acres of inset floodplain would be excavated along about 1,300 feet of channel. Additional local cut and fill would be used to adjust channel dimensions, channel bed elevation, and streambank heights and angles at various sites.

In that section of the existing channel to be incorporated into the new channel, approximately 2,700 feet of new streambank stabilization techniques would be installed. Bank stabilization would be primarily biotechnical, emphasizing the use of live vegetative materials on banks with reduced heights and angles. However, some areas would also require rock armor streambank protection and/or engineered large woody debris features. Existing streambank protection features would be evaluated for removal or repair and incorporation.

The existing 18-hole regulation golf course would be reconfigured and reduced in size to remove it from much of the meander historic belt and allow ecosystem restoration of the Upper Truckee River, all of the floodplain north

of the river (along Angora Creek), and a large area of the 100-year floodplain southeast of the river. All infrastructure and improvements would be removed from those portions of the floodplain and meadow that would no longer be part of the golf course. The approximately 112-acre retired golf course area would be restored as floodplain and meadow including the 0.75-acre storm drainage pond by existing holes 14 and 15, which would be reconfigured and revegetated as part of floodplain restoration or oxbow features.

The channel and riparian corridor of the unnamed creek would be enhanced, and the four golf cart bridges would remain. In addition, the confluence of Angora Creek would be reconfigured and four pedestrian/cart path bridges would be removed. The diversion infrastructure in the Upper Truckee would remain a component of the golf course's irrigation system and be protected with a boulder step grade-control structure.

A summary of the expected geomorphic features, processes, and functions in the study area under this alternative is provided below. Additional details are presented under Alternative 2 above.

Upper Truckee River

Alignment

The proposed river alignment under Alternative 3 would be the same as that for Alternative 2.

Profile

Proposed streambed treatments and profile conditions under Alternative 3 would be the same as those for Alternative 2.

Banks

Proposed bank treatments under Alternative 3 would be the same as those for Alternative 2.

Channel Dimension/Capacity

The design channel dimension and capacity would be the same as in Alternative 2.

Upper Truckee Bridges

All five existing golf course bridges crossing the Upper Truckee River would be removed under Alternative 3. The approach to the bridge removal is the same as under Alternative 2. However, no replacement bridges would be installed because the golf course would remain east of the river only.

Unnamed Creek

Enhancements to the unnamed creek and reconfiguration of the creek mouth would be the same as under Alternative 2. All four cart path bridges would remain, however, the northern most bridge that is outside of the golf course footprint would be designated for trail use.

Angora Creek

Treatments to Angora Creek would be the same as under Alternative 2. The mouth would be moved, four pedestrian/cart path bridges would be removed, and the lower 200 feet of Angora Creek would be restored to an off-channel oxbow feature.

Active Floodplain and Overbanking

Under Alternative 3, the active floodplain would be enlarged as well as having increased connectivity and frequency of river overbanking through channel restoration. Areas proposed under Alternative 3 to have increased overbanking, enlargement of the active floodplain by excavating the inset floodplain, and the backfilled channel treatments would all be the same as under Alternative 2.

Under Alternative 3, relocating and removing some of the golf course holes would increase the floodplain area and buffer between the golf course and the river. About 112 acres of floodplain would be restored. All golf course infrastructure north of the river along Angora Creek in Reach 1 (holes 10, 11, and 12) would be removed to restore approximately 76 acres of floodplain meadow. Golf course infrastructure nearest the river on the south side would be removed (i.e., all of holes 17 and 18 and portions of holes 13, 14, 15, and 16) to restore approximately 36 acres of floodplain meadow.

The topography, fill removal, soil amendment, planting strategies, species mixes, and plant materials for restored floodplains under Alternative 3 would be analogous to those under Alternative 2.

REDUCED-PLAY GOLF COURSE

Alternative 3 would provide a reduced golf course area on the east side of the Upper Truckee River, with all golf course infrastructure set back from the river and floodplain allowing a buffer zone along the river. The area where golf play is allowed to remain was determined by analysis of aerial photos to avoid "recent" (approximately past 80 years) meander belt extent. All golf course bridges would be eliminated on the Upper Truckee River, resulting in removal of all river crossings between the U.S. 50 bridge in Meyers and the U.S. 50 crossing near the highway's intersection with Sawmill Road. The four pedestrian/cart path bridges across Angora Creek would also be removed. The golf course would be reconfigured to a nine-hole regulation course or an 18-hole executive course.

Alternative 3 (Exhibit 2-8) would be similar to Alternative 2 on the east side of the river. However, no new restroom, paving, bridge crossing near the existing hole 6 bridge, or new holes for playing across the river are proposed and it would not alter the area west of the river. Under Alternative 3 the floodplain near the bridge proposed in Alternative 2 could be more fully restored than under Alternative 2, given that the new bridge would not be constructed and golf activities would be set back from this area.

The reduced Lake Tahoe Golf Course would be limited to areas east of the river and would have a smaller footprint than the existing course, decreasing disturbance within SEZ and floodplain. The golf course would have an overall footprint of 86 acres. The golf area in SEZ would be reduced to 80 acres, of which, 10 acres are within the 100-year floodplain. The golf course would be reconfigured to allow ecosystem restoration of the Upper Truckee River; golf features would be removed from the entire floodplain north of river (along Angora Creek), and a large portion of the floodplain southeast of the river, and no golf would be adjacent to the river.

Golf Course Design Concept

Under Alternative 3, the reconfigured golf course (9-hole or 18-hole executive) would incorporate and improve sections of the existing golf course into a reduced-play golf course and remove golf course from areas adjacent to the river. This combination would reduce impacts of the golf course on the river and sensitive resources, and it would reduce golf play to a limited area that could accommodate either a regulation 9-hole or 18-hole executive golf course.

Golf infrastructure and holes would generally be removed from the most sensitive areas adjacent to the river, reconfiguring a smaller course in less sensitive areas farther from the river. This would allow the river room to function more naturally and a continuous riparian habitat corridor. In consideration of areas within which the reconfigured reduced-play golf course could remain included major factors, such as:

- Minimize connectivity of golf course and river
- Minimize or avoid sensitive archaeological sites and sensitive ecological habitat
- Maximize golf use of higher capability lands and minimize use of SEZ lands
- Decrease area of golf course within floodplain and adjacent to the river

The proposed Alternative 3 course, whether a nine-hole regulation course or an 18-hole executive course, would be situated on the east side of the Upper Truckee River farther from the river. A portion of the existing golf course would be reconfigured to the new layout and holes would be upgraded to improve surface drainage design, irrigation, and to incorporate current BMP technology. Because the golf course would have a limited/reduced footprint only minor modifications to the unnamed creek crossing in the center of the golf course and discharging into the Upper Truckee River would occur (e.g., added setbacks and buffer areas between turf areas and the creek, and native vegetation treatments in those buffer areas). Tree removal related to Alternative 3 implementation would be minimal and located in areas where crew need to gain access to the river and off-channel work areas.

Alternative 3 would include the same eco-friendly characteristics, as they relate to design and construction, as described for Alternative 2. The intent is to create a course that blends well with the existing terrain, increase areas of natural vegetation. All turf areas would be buffered from the native landscape with natural grassland such as described in the minimally managed areas. The layout, irrigation, drainage systems, and fertilizer management for the reduced-play golf course would be upgraded, as described below.

Layout and Routing

The conceptual routing and layout of the reduced golf holes is based on the existing characteristics of the current golf course. The exact configuration of the golf course would likely be modified during final design; however, size and layout considerations would remain the same. The reduced golf course would incorporate and improve sections of the existing golf course, removing golf course from most areas adjacent to the river. All existing cart paths that are not within the footprint of the reconfigured golf course would be removed and disposed of off-site, and the area would be restored to native topography and vegetation. Other cart path sections would become part of the golf course footprint and some new cart path coverage would be added to serve the modified holes. Cart paths would be approximately 8 to 9 feet wide in areas of one-way traffic, and 12 feet wide in areas of two-way traffic and paved.

The area of the golf course that is reconfigured would also be modernized to reduce environmental effects, and natural areas between holes would be expanded to the extent possible within the limited area available. Nine holes near the river would be removed, and the area would be restored to meadow and floodplain. Four existing holes would receive minor routing adjustments to move the course away from the river and to reduce long green to tee walks. Five other existing holes and the practice area would be improved. Grading would be minimized. Modifications to the existing contour would only be made where necessary to create playable slopes for golf, positive drainage, and to properly elevate greens and tees. This work would include grading, new irrigation, drainage, cart path modifications, bunker sand and grassing. Approximately 80,000 cubic yards of grading would be required with materials balanced on-site. About 6,600 cubic yards of sand and gravel would be imported for construction of tees, greens, and bunkers, as well as up to the 52 acres of new sod (depending on whether just tee and greens or also fairways are re-sodded).

Tees and greens would be re-sodded or seeded, existing bunkers would be rebuilt with new sand and drainage installed. Fairways would either be re-sodded, seeded, or would have spot treatment in problem areas. Areas out of play between holes that currently have managed vegetation would be restored to natural vegetation. The natural landscape areas would be composed of native vegetation. Existing turf would be pulverized, and incorporated into the soil prior to planting or hauled off-site for disposal. Natural landscape areas that are disturbed during construction, and turf areas converted to natural landscape would be seeded with native vegetation. Areas where golf facilities are removed would be restored as described in previous sections.

If the existing golf course were reconfigured to a regulation length nine-hole course, the reconfigured course would follow the same criteria (par 3, 4, and 5 holes, 200 to 500 yards) as the existing 18-hole golf course. The layout of tees, fairways, and greens would be similar to holes in an 18-hole regulation course, but with only nine holes, the smaller course could fit on the southeast side of the river and be situated outside the river meander belt. The length and rating would be roughly half that of the 18-hole executive course, and total yardage would be about 3,600 yards. The course would no longer have holes that cross the river, so scenic appeal and challenge would be reduced.

An executive course consists of 18 shorter playing holes that may range in par from 100 to 350 yards, par 3 and 4. If the existing golf course were reconfigured to an 18-hole executive course, total yardage would be about 3,500 yards. Executive golf courses usually consist of par 3 and par 4 holes only. Because of their shorter lengths, these layouts require less land, usually 50–100 acres. Courses with only par 3 holes have the shortest layouts and sometimes require as little as 30–40 acres if the length of the holes has been kept to a minimum. Executive and nine-hole courses do not host tournaments or championship play. They generally attract more novice players as opposed to players who golf more frequently.

Land Management

The footprint of the golf course includes areas managed for golf as well as adjacent or surrounding areas managed for natural resources. The reduced Lake Tahoe Golf Course would be limited to areas east of the river and would have a smaller footprint than the existing course, decreasing disturbance within SEZ and floodplain. The golf course would have an overall footprint of 86 acres, 80 acres are in the SEZ and 10 acres within the 100-year floodplain. Fifty-one acres would be intensively managed, 24 acres would be minimally managed, and 11 acres would be managed as naturalized landscape.

Turf limits would be revised to accommodate the new design and to develop new natural landscape areas. Turf areas would be re-grassed, reseeded, or have spot treatments. Greens would be bentgrass, and fairways, tees, and roughs would be bluegrass. Approximately 52 acres of turf would be sodded or seeded. A fescue blend would border all turf areas to act as a buffer (minimally managed area) between the highly maintained turf areas and the natural landscape. Alternatively, only the tees, greens, and rerouted areas would be re-grassed, resulting in approximately 10 acres of new sod. Natural landscape areas disturbed during construction and turf areas converted to natural landscape would be seeded with native vegetation. The channel and riparian corridor of the unnamed creek would be enhanced by creating a wider buffer between the turf and the creek, and the four golf cart bridges over it would remain.

The irrigation and drainage treatment for Alternative 3 would be upgraded as described in Alternative 2. The difference between the alternatives is that treatments would be applied only to the east side of the river, where the reduced-play golf course would be situated. No irrigation and drainage treatments related to golf would exist on the west side of the river. As a result, this alternative would utilize less water than Alternatives 1 and 2. Additionally, infrastructure would be reduced by eliminating need for a bridge over the river.

The irrigation system in the vicinity of the existing holes would be replaced with new, more efficient computerized technology able to distribute water with greater control. Existing irrigation heads would be removed. Irrigation piping and wire would be left in the ground, and a new piping and control system would be installed. Approximately 11,000 feet of new irrigation pipe would be placed at a depth of about 30 inches, and approximately 45,000 feet of new irrigation pipe would be placed at a depth of about 18 inches. The pond at the existing hole 9 would continue to be used for irrigation purposes. The stormwater ponds between the current holes 13 and 16 and north of the current hole 5 would remain as is today. The stormwater pond west of the existing hole 15 would be regraded and restored as oxbow/wetland floodplain habitat as described in the river and floodplain section above, this feature would be adjacent to but outside of the golf course foot print. Because the golf course would remain only east of the river and within a reduced area, no new well, water storage or drainage ponds would be constructed.

Under Alternative 3 the surface water diversion from the Upper Truckee River would remain a component of the irrigation water supply system. However, use of this diversion would be limited to periods when there is a problem with the existing well. The diversion infrastructure would be protected with a boulder step grade control structure as part of the river restoration design.

Lawn mowing would continue to occur typically from early morning until mid to late afternoon, and occasionally into the evening. Fertilizer and pesticide use would continue to occur twice per year in May and November; however, quantity would decrease due to less turf area. If necessary, an updated chemical, irrigation, agronomic, and erosion control plan, with reporting requirements would be prepared. However, it is expected that application protocols and monitoring and reporting requirements would continue as is occurring today.

BMPs associated with the facilities would not change and are discussed in Alternative 1, Clubhouse, Maintenance, and Parking Facilities section.

Bridges

Under Alternative 3 there would be no bridges across the Upper Truckee River within the study area. (The Sawmill Bike Path bridge outside of the study area, next to U. S. 50, would remain providing trail access across the river.) Bridges across the unnamed creek would remain with the northernmost being converted to recreation use, while the four pedestrian/cart path bridges across Angora Creek would be removed.

Clubhouse, Maintenance, and Parking Facilities

Under Alternative 3, no changes to the clubhouse, parking, or maintenance facilities are proposed.

Operations and Maintenance

The Lake Tahoe Golf Course would continue to operate from approximately April 15 to November 1 from dawn until dusk. Golf course staff needs would decrease by 11 to 16 employees (current need is 76). Tournament play would no longer occur. Permitted winter recreational snowmobile activities would continue to occur from November through March on the driving range and not be allowed anywhere else on the property, except by golf course and State Parks staff members for patrol purposes. The snowmobile operation would continue to be provided by an outside vendor. Lake Tahoe Golf Course would request a review and continuation of its ACSP certification.

Alternative 3 would involve decreasing the area covered by golf course and provide a setback from the river. Therefore, normal operations and maintenance of the golf course in the river zone would be reduced under this alternative. New drainage and irrigation systems would decrease the need for on-going maintenance needs. Additionally, existing erosion hazard sites affecting infrastructure would be reduced by bridge removal, as well as by restoration of a more functional river. Normal maintenance or future improvements to golf course infrastructure would be implemented by State Parks (the lease holder) or its contracted concessionaire/representative(s).

TRAILS

Under Alternative 3, a pedestrian path would be established along the northern edge of the proposed reduced-play golf course. This new designated ADA compliant trail would run from U.S. 50, just north of the main entrance to the Lake Tahoe Golf Course along the river, to Country Club Drive, with a tie in to the Sawmill Bike Path. Interpretive signs would be added in appropriate locations along the new trail system to inform the public of sensitive habitats and restoration efforts.

No trail work would be done on the west side of the river as part of this alternative.

INTERIM MANAGEMENT PLAN

To manage Washoe Meadows SP in a manner consistent with its purpose and to address existing resources, public access, and use issues of this unit, State Parks would prepare and implement an Interim Management Plan. The plan would address resources protection and management, public access, and trails management to protect the quality of important natural and cultural resources and enhance access to the park unit by the public. Natural and cultural resources and trails management would involve normal maintenance and resources protection measures with the performance criterion of meeting the unit's purpose statement regarding resources. Public access provisions would enhance accessibility for the broader public by the addition of trail improvements, signage. one or more, small parking areas on State Parks land within Washoe Meadows SP (e.g., for 2 or 3 cars). The candidate locations would be where public rights-of-way abut State Parks land. The access points would supplement public access to Washoe Meadows SP and help users who relied (illegally) on gaining access across the golf course bridges that would be removed under this alternative.

State Parks retains the opportunity to embark on a separate, future planning process to consider substantial permanent public access and recreation facilities and additional resources management practices.

2.6.2 GENERAL PLAN AMENDMENT

Alternative 3 would reduce the size of the golf course footprint and increase the area of restored riparian area; therefore, changes in the boundaries between Washoe Meadows SP and Lake Valley SRA would be necessary to adjust the SRA boundary to fit the smaller golf course. In keeping with the respective purposes of Washoe Meadows SP and Lake Valley SRA, the boundary of Washoe Meadows SP would be adjusted (in this case, expanded) to encompass all of the restored river and riparian corridor (see Exhibit 2-8).

The current Lake Valley SRA General Plan calls for an 18-hole regulation golf course. The text of the General Plan would need to be amended to allow for development and management of the reduced-play golf course.

2.6.3 PROJECT CONSTRUCTION

This section summarizes construction activities and construction schedule for Alternative 3 and provides an overview of how construction would be coordinated with golf course play.

Under Alternative 3, the following planned construction activities would be conducted: proposed changes to the existing golf course, removal of unnecessary infrastructure, removal of bridges, and construction and modifications to the river channel and floodplain surfaces. The overall construction period would include phases that allow for vegetation reestablishment success and pre-wetting of new and reconnected channel sections before their reconnection to the active river flows. Construction management approach would be the same as under Alternative 2, including application of BMPs, dewatering, diversion, and pre-wetting activities.

All construction phase BMPs, mitigation measures, and the final conditions of all permits, approvals, and easements would be identified in the project plans and specifications for the contractor or fulfilled by State Parks. While exact erosion control measures (BMPs) are uncertain at this time BMPs may include construction fencing, silt fences, hay bales, and temporary dams (i.e. sand bags, water filled berm, or sheet pile) to isolate ephemeral drainages and bridge footing work areas from the river. Pumps would be used to remove ponded groundwater in local excavation sites. Water could be sent to sprinkler systems in upland areas or into existing or proposed ponds depending on volumes. Trees removed from access points and off-channel work would be used in restoration activities, as mulch material for revegetation work, or hauled off-site.

CONSTRUCTION SCHEDULE

Alternative 3 construction would be phased over the 3- to 4-year period between May 1 and October 15 (possibly November 1 if weather allows and extension granted) of each year, beginning in 2012. However, construction

would not occur on Sundays and may not occur on other designated weekends and holidays. Construction hours would be 7:00 a.m. to 7:00 p.m., with hauling restricted to 8:00 a.m. to 6:30 p.m. On occasion, there may be a need for longer work hours to address specific constructability issues that cannot otherwise be accomplished. Such work schedule exceptions would be coordinated with the TRPA and El Dorado County, as well as local residents and emergency service providers.

Alternative 3 construction would commence as soon as possible after completion of construction plans and specifications, project approval, acquisition of permits, securing of funding, and all preconstruction monitoring. Construction activities would be continuous for the multi-year period, with winter closedowns, except for BMP maintenance and monitoring. Construction phasing, duration, equipment, and workers are presented in Table 2-6. Year 1 would focus on off channel work (historic meander modifications and new channel construction). Golf play would be limited to a 9-hole course on the east side of the river to allow for construction access adjacent to the river. It is anticipated that in Year 2, most off-channel river restoration work would be completed and vegetation would be allowed to properly establish during this year. In Year 2 golf play would be completely shut down for modification of the existing course. Year 3 would include removal of the bridges, in-channel work, and connection of historic meanders and new channel sections. Dewatering and diversion approach under Alternative 3 would be the same as Years 2 and 3 of Alternative 2. However, no dewatering would be required in Year 1. Pre-wetting of the channels would occur prior to connection with the existing channel sections.

The Alternative 3 construction activities and schedule for each year are summarized below. Access locations, proposed haul routes, and potential storage/staging areas are shown in Exhibit 2-9.

Preliminary Quantities

Preliminary quantities of material to be excavated and the cut-and-fill balance for Alternative 3 are summarized in Table 2-7. Estimated quantities related to the river restoration use the existing and proposed channel dimensions and lengths as the basis for assumed volumes. At this conceptual stage of design, no adjustments have been made for the density or composition of existing materials or for compaction requirements of backfill areas. Abandoned channels to be backfilled would likely be partially filled to mimic oxbows and provide off channel habitat. However, quantities are estimated for both partial and total fill of these areas. The quantities related to river restoration would be similar to those under Alternative 2. Estimated quantities related to the reconfigured golf course areas. Generally cut and fill for the reconfigured golf area would be balanced on site with an estimated 800 cubic yards of sand and gravel imported. Approximately 40 acres of sod would also be imported.

Several particular treatments (e.g., boulder steps, armored riffles, rock armor and portions of channel gravel treatments) would require materials of specific weights and sized material. For the purpose of traffic evaluations, these materials are not assumed to be available in the on-site excavated materials, but would be assumed to be brought in from off-site sources. It is possible that some reusable materials would be salvaged on site, reducing the eventual need for imported material. Existing sod, bank treatments, the bridge footings/abutments, and some of the golf course hardscape to be removed may require off-site disposal. Nine bridges would be hauled off-site on separate flat bed trucks.

Access, Staging, and Storage

Proposed access points, temporary routes, staging areas for Alternative 3 are illustrated in Exhibit 2-9.

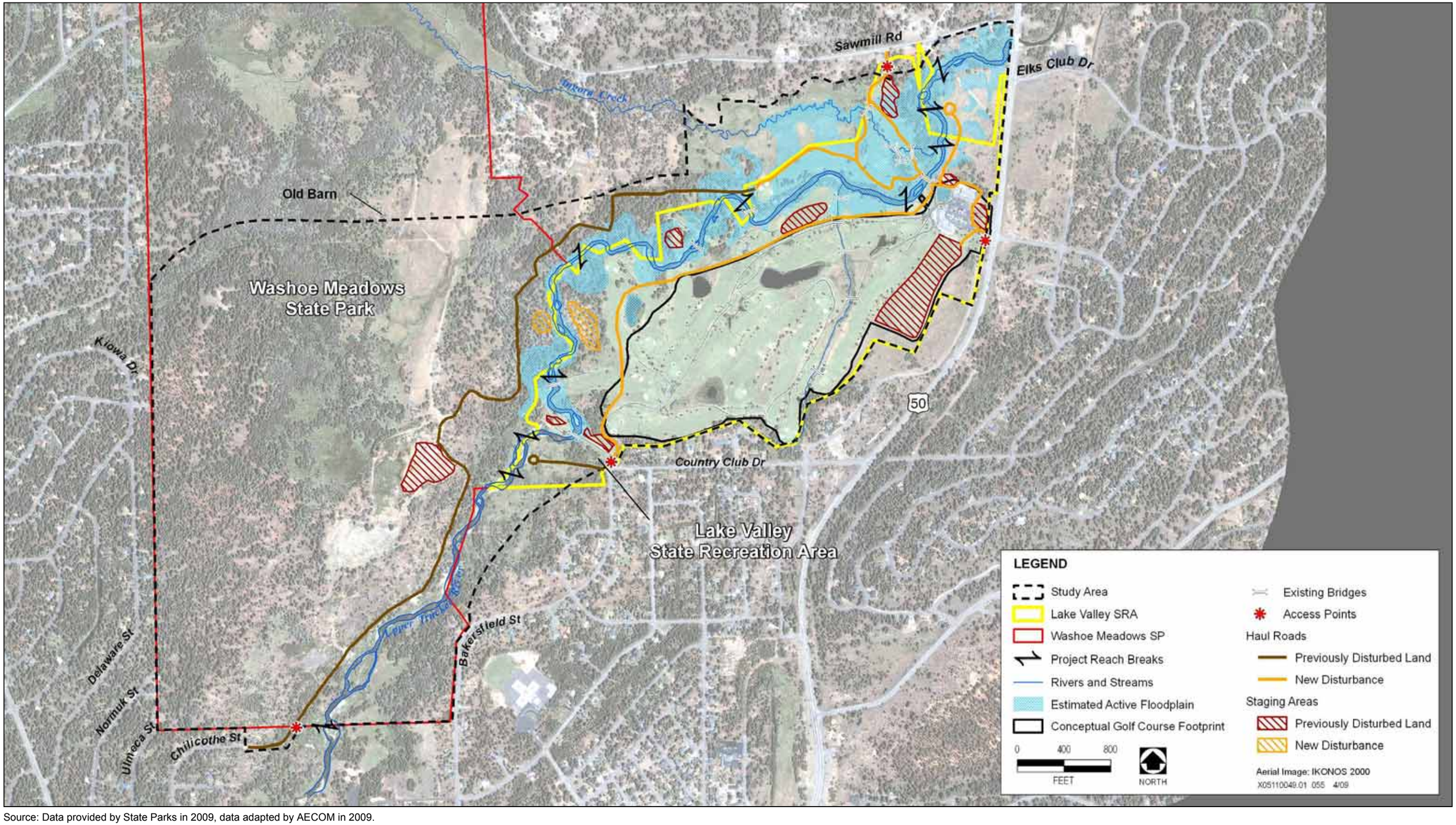
All construction activities for the river ecosystem restoration and golf course reconfiguration would be accessed through the existing golf course. Street access points could include the existing golf course entrance off U.S. 50, the existing entry off Country Club Drive, and the gravel access road off Sawmill Road near hole 10 and Chilicothe Street. Access facilities, notifications, and procedures would be the same as in Alternative 2. Staging areas for Alternative 3 would be similar to Alternative 2, but would not include those for new bridge or in the far southwest.

Table 2-6
Alternative 3 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Year 1 – Off channel work – 9-hole course open		
Mobilization for off-channel work, construction of access routes and storage areas, equipment refueling areas, and construction equipment wash area, install temporary BMPs, tree removal and vegetation salvage.	May 15–30	2 equipment transport trucks (1 week), 2 dump trucks, 2 dozers (approx Cat D6), 2 excavators (approx Cat 330), 2 loaders, 2 water trucks, 1 forklift, 1 one ton pickup truck, 3 chain saws, and 1 tub grinder, 1 skidder, 1 log loader, 1 log truck workers: 12
Off-channel work- modify historic meanders and construct new channels including vegetation and bank treatments of those sections. Leave small plugs of existing soil and vegetation where future connection is to be made.	June 1–September 30	2 excavators (325 or 330), 2 ten or twenty yard dump trucks, 1 dozer, 2 loaders, 1 water truck, 1 backhoe, 1 one ton pickup truck workers:12
Install temporary irrigation and winterization measures. Demobilization – removal of equipment from the 100-year floodplain.	October 1–15	1 dozer (approx Cat D6), 1 excavator, 1 ten or twenty yard dump truck (approx Cat 330), 1 loader; 1 water truck, 1 one ton pickup truck, 1 tub grinder, 1 hydroseeder, 1 strawmulcher, and, 2 equipment transport trucks (1 week) workers: 12
Year 2 – Off-channel monitoring and construction of reduced golf course- golf course closed		
Mobilization for modification of existing golf course. Install and repair BMPs and additional vegetation salvage.	May 15–30	2 equipment transport trucks (1 week), 1 dump truck, 1 dozer (approx Cat D6), 2 excavators (approx Cat 330), 1 loader, 1 water truck, 1 forklift, 1 one ton pickup truck, 3 chain saws, 1 tub grinder workers: 12
Off-channel vegetation maintenance and monitoring. Pre-wet the new (and still isolated) channel segments, using partial diversion of the Upper Truckee River. This step would not disturb the existing channel.	May 15–October 15	2 truck or trailer mounted water pumps, 2 water trucks, 1 one ton pickup truck workers: 4
Modify existing golf course including removal of existing cart paths and holes adjacent to the river, pulverizing or removal of sod, and tilling existing sand. Then regrade for new layout and drainage improvements and installation of new irrigation, cart paths, sod or seed, and permanent BMPs.	June 1–September 30	2 excavators (325 or 330), 2 ten or twenty yard dump trucks, 2 dozers, 2 loaders, 2 water trucks, 1 back hoe, 1 grader, 1 tractor w/box blade & drag mat, 1 trencher, 1 small roller, 1 one ton pickup truck, paving equipment (asphalt paver, roller, asphalt truck and screed) (2 weeks) workers: 24
Install temporary irrigation and winterization measures. Demobilization – removal of equipment from the 100-year floodplain.	October 1–15	1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader, 1 water truck, 2 one ton pickup truck, 1 forklift, 1 roller, 1 tub grinder, 1 hydroseeder and 1 strawmulcher, 2 equipment transport trucks (1 week) workers: 10

Table 2-6
Alternative 3 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Year 3 – In-Channel Work, Removal of Existing Bridges, and Connection of Off-Channel Sections Reconfigured-Reduced Play Golf Course Open		
Mobilization for in- channel construction activities. BMP and additional access.	May 15–30	2 equipment transport trucks (1 week), 1 dump trucks, 1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader, 1 water truck, 1 forklift, 1 one ton pickup truck, 3 chain saws, 1 tub grinder workers: 10
Off-channel vegetation maintenance and monitoring. Pre-wet new (and still isolated) channel segments, using partial diversion of the Upper Truckee River to flush constructed segments and pump and spray turbid water onto floodplain to infiltrate and to water vegetation treatments. This step would not disturb the existing channel.	May 15–October 15	2 truck or trailer mounted water pumps, 1 one ton pickup truck workers: 4
Install biotechnical/bank stabilization treatments, woody debris, segment transitions, and armored riffles and gravel in existing channel sections. Reconnect off-channel sections. Excavate and vegetate the inset floodplain. Unnamed creek enhancement and construction of new alignment of the mouth. Reconfigure lower reach of Angora Creek to adjust for the new confluence with the river channel. Remove existing five bridges on the Upper Truckee River and four bridges across Angora Creek. Floodplain modifications including remove levees and restore floodplain outside of proposed golf course layout. Modify former stormwater pond to create wetland/oxbow feature. Transport material from stockpile storage (and/or import as needed) and backfill to desired level the abandoned sections of the existing channel, including placement/construction of subsoil and addition of soil treatments as needed for groundwater and soil moisture benefits. Apply seed or vegetation transplants and mulch.	June 1–September 30	2 excavators (325 or 330), 3 ten or twenty yard dump trucks, 2 dozers, 2 loaders, 2 water trucks, 2 one ton pickup trucks, 1 backhoe, 1 roller, hydroseeder (1 month) and strawmulcher (1 month), crane (1 month) workers: 16
Construct the recreation access trail and boardwalk east of the river to tie into the bridge and bike path, and construct new trail to tie into Country Club Drive corner.	September	1 loader, 1 excavator, 2 ten or twenty yard dump trucks, 1 water truck, 1 one ton pickup truck , 1 small roller, and 1 backhoe workers: 8
Install temporary irrigation and winterization measures. Remove the temporary disturbances of all access points and staging and storage areas, which includes revegetation activities where needed. Formally demobilize from the site.	October 1–15	1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader, 1 water truck, 1 one ton pickup truck, 1 tub grinder, hydroseeder and strawmulcher, 1 ten or twenty yard dump truck, 2 equipment transportation trucks (1 week) workers: 12
Year 4 – Items not completed in previous year		
Construction activities would only occur in Year 4 if the condition of revegetation in new channel segments, reconnected meanders, and restored floodplain was not adequate to allow for completion in Year 3. If channel segments were not able to be reconnected in Year 3, those elements would be delayed until Year 4. Year 4 activities would commence with mobilization activities and would include the same tasks as listed under Year 3.		
Note: Final phasing approach may be modified to accommodate needs of State Park, their concessionaire, or the contractor as needed.		



Source: Data provided by State Parks in 2009, data adapted by AECOM in 2009.

Access, Staging, and Storage for Alternative 3 **Exhibit 2-9**

Table 2-7 Preliminary Quantities (Cubic Yards) for Alternative 3		
Treatment Area/Activity	Approximate Cut Volume	Approximate Fill Requirement
Newly constructed channel	11,000	0
Reconnected historic meanders	8,300	0
Modified existing channel	0	1,000
Boulder steps	4,700	6,200
Armored riffles	8,200	16,500
Other channel bed features	0	0
Existing bank treatments	1,400	0
Proposed bank treatments	2,400	2,400
Inset floodplains	10,800	0
Backfilled channels (assume partial to complete)	0	43,300 to 58,000
Floodplain fill removal	500	0
Modified unnamed creek	160	90
USGA-approved sand and base	0	800
Asphalt	120	30
Baserock	280	70
Concrete	16	0
Sod	7,000	4,000
Trails	0	17,800
Bridges	9 bridges	0 bridges
Total*	61,860	95,190 to 109,890
Calculations are estimates based on conceptual design and would be modified, as appropriate, during final design. Source: Data prepared by EDAW, Inc. (now AECOM) and Valley & Mountain Consulting, 2008.		

2.7 ALTERNATIVE 4: RIVER STABILIZATION WITH EXISTING 18-HOLE REGULATION GOLF COURSE

2.7.1 PROJECT FEATURES

Alternative 4 would use a combination of hard and soft stabilization to keep the river in its present configuration and includes only minor changes to the existing golf course. It would involve the systematic and extensive installation of bank protection and grade controls (boulder steps) within the present river alignment and at the existing elevations. While the streambed and streambank protections would be relatively rigid, biotechnical treatments with native riparian vegetation would be incorporated to the maximum extent possible while still ensuring stabilization of the river to minimize erosion. Use of biotechnical treatments would restore some habitat value to the riparian corridor, but would not improve the floodplain nor restore natural processes to the river. Because the river would be stabilized in place, the existing 18-hole regulation golf course would remain largely unchanged with an overall footprint of 133 acres, 56 acres in the 100-year floodplain, 123 acres in the SEZ, and 6,382 linear feet of golf course adjacent to the river (Exhibit 2-10). The existing stream channel longitudinal profile and plan form would remain unchanged under Alternative 4. Bank treatment and grade control areas were

selected to achieve localized stability and minimize damage from erosion and sudden changes in channel position. Three of the existing bridges would remain in place while the two upstream bridges would be replaced by one longer bridge. No changes to recreational trails would be implemented.

Because the basic footprint of the golf course would not change, there would be no need to modify the current boundaries between Lake Valley SRA and Washoe Meadows SP.

While it is recognized that some habitat value would be restored and bank erosion reduced through the river stabilization, this approach does not constitute restoration of the natural configuration of the river, as called for in the existing General Plan). Consequently, a General Plan text amendment would be required to allow for development of the river stabilization approach.

RIVER AND FLOODPLAIN

Approach

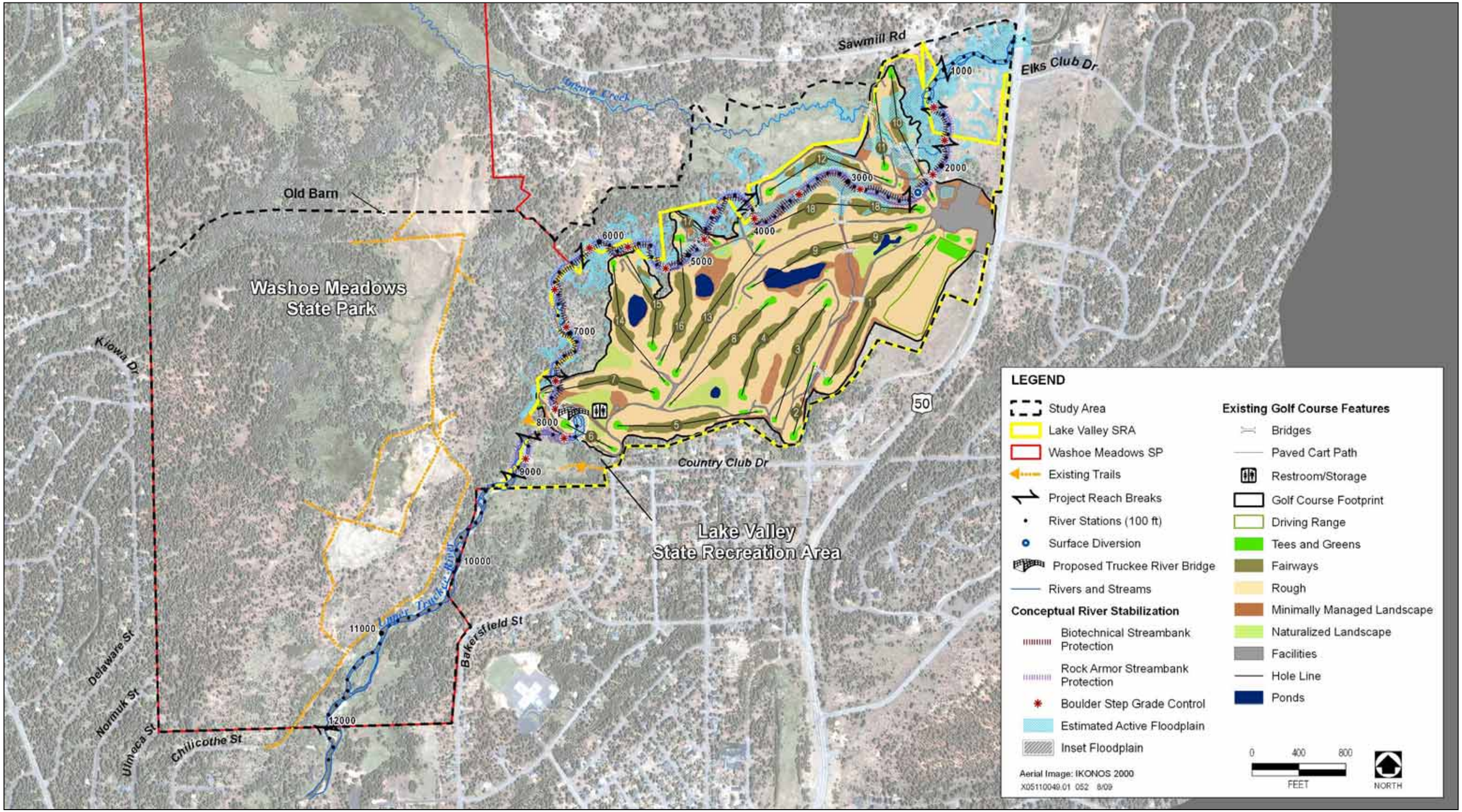
The Alternative 4 approach would stabilize the Upper Truckee River channel and golf infrastructure in its present configuration to reduce sediment loads to downstream waters, and protect adjacent riparian vegetation communities and golf course infrastructure. The restoration approach would not increase channel length or elevate the channel; rather, it would involve a systematic and comprehensive application of river stabilization measures to reduce active erosion. Treatments and activities would be conducted along the river between RS 13+00 and RS 89+00, along the unnamed creek, and in limited portions of the existing golf course (Exhibit 2-10).

Because the golf course would remain north and east of the river, historic meanders would not be incorporated, and new channel sections would not be developed. No golf course infrastructure would be removed or relocated out of the floodplain, and the existing setbacks from the river would not be modified. There would be no increase in floodplain area or riparian or wetland habitat. Minor changes in bank heights, angles, and upper bank vegetation may indirectly improve the riparian corridor; however, the hydrologically related functions of the floodplain would not be improved, and natural geomorphic channel adjustment would be prevented. No changes would be made to the area west of the Upper Truckee River in Washoe Meadows SP.

Design Features

The Alternative 4 design features river stabilization measures to protect the streambed and streambanks from erosion, keeping the river in its present location and elevation, and preventing natural or accelerated channel migration. Approximately 4,440 feet of the existing channel would not be modified and about 7,400 feet of the channel would be modified (Exhibit 2-10). Conceptual treatment descriptions and typical sketches are presented in Appendix C.

Streambank stabilization features would include both “hard” and “soft” engineering techniques, and essentially all banks would be treated in the area (approximately RS 1400 and approximately RS 8800) because stabilization must be system-wide to work. Treatments would include a combination of biotechnical measures in areas with less erosive stress (e.g., inside bends), and structures that incorporate rock armor streambank protection wherever bank migration would be expected to occur (e.g., outer banks of meanders). Other bank stabilization treatments and/or variations, such as rock slope protection, rock groins, brush boxes, and engineered log jams, may be used in certain locations, depending on site conditions and desired level of protection (e.g., existing biological resources or infrastructure). Approximately 18 boulder steps would provide streambed stabilization at infrastructure crossings, as well as throughout treated reaches, to prevent further incision and destabilization of proposed bank treatments. Anchored high gradient riffles would be used at upstream and downstream extent of treatment reach.



Source: Data provided by State Parks in 2009, data adapted by AECOM in 2010.

Alternative 4: River Stabilization/Existing 18-Hole Regulation Golf Course **Exhibit 2-10**

Existing bank stabilization treatments (riprap, root wads, etc.) would be evaluated on a site-by-site basis during the engineering design phase, however most of these treatments have already partially failed. Of the approximately 1,750 feet of existing stabilization, about 80 percent would be removed, materials salvaged, and replaced. Approximately 15,100 feet of new streambank stabilization would be installed.

About 0.4 acre of inset floodplain area would be excavated along approximately 500 feet of channel that has experienced extensive hydraulic confinement by the golf course bridges (along both banks in the area of the proposed replacement bridge, between RS 7700 and RS 8300). The channel in this reach is also undersized due to natural cutoff of an overflow channel. Local cut and fill would be used to adjust channel dimensions, channel bed elevation, and streambank heights and angles at various sites. Minor enhancements would occur on the channel and riparian corridor of the unnamed creek; however, none of the four golf cart bridges over the creek would be removed.

A summary of expected geomorphic features, processes, and functions in the study area under this alternative is provided below.

Upper Truckee River

Alignment

Under Alternative 4 the Upper Truckee River channel would remain in its present alignment and the proposed engineered features would restrict channel migration and adjustment (Exhibit 2-10). Only limited river alignment changes would be expected from natural processes due to the extensive stabilization treatments. Engineered features would be designed to limit the potential for former meanders to be reoccupied or for new channels to be created on the terrace/floodplain during large floods; however, the possibility of rapid changes and structural failures during large events would remain.

Profile

Alternative 4 would not change the current elevation of the channel bed or reconnect the river to the main floodplain. However, implementing Alternative 4 would directly modify the future streambed elevation of the Upper Truckee River through prevention of continued bed erosion and upstream knickpoint migration. Protective engineered streambed stabilization would be installed at approximately 18 sites, limiting the potential for future erosion. Grade control sites have been selected to achieve reachwide stability and minimize erosion, channel avulsion, or damage to infrastructure. The only location that presently has a protected streambed is the golf course surface water diversion at RS 2300.

Constructed streambed stabilization features, including approximately 18 boulder steps, would be installed. Boulder steps would provide stabilization at infrastructure crossings, as well as throughout treated reaches, to prevent further bed incision and destabilization of proposed bank treatments. The boulder step grade controls would have wings that extend into the floodplain to prevent end-run and tied into bank stabilization treatment.

Grade control boulder steps and anchored high gradient riffles would require between 24,000 and 33,800 cubic yards of mixed rock (boulder through gravel, depending on the necessary total width (range is assumed to be 90-120 feet, but wings at upstream end would extend further). Armored riffles, consisting of cobble and gravel could be placed in the existing channel between boulder steps.

Banks

Alternative 4 would modify and protect existing streambanks by installing bank stabilization treatments between RS 13+00 and RS 89+00 (Exhibit 2-10). Approximately 7,500 feet of rock-toe bank treatments and 7,400 feet of biotechnical bank treatments would be installed, treating about 63.8 percent of the total channel length within the study area. Bank treatment areas were selected to achieve reachwide stability and minimize erosion, channel

avulsion, and damage to infrastructure. Comprehensive treatment would be required for this approach because the channel remains in an incised, straighter configuration, and erosive stresses would remain high. Treatment types alternate along each side of the channel, with rock-toe treatments generally on outer cut banks and biotechnical types on the inside of bends or lower bank height sections.

The extensive bank treatments under Alternative 4 would be designed and implemented in conjunction with streambed grade control features. The combined design would reduce the likelihood of undermining or end-run failures that have occurred with spot bank treatments implemented historically. However, failures could occur and repairs could be needed in response to major flood events. If needed, repairs would be limited to locations with vulnerable public infrastructure, natural resources, or private property, unless failure threatens stability of the reach.

Existing bank treatments would be evaluated on a site-by-site basis during the engineering design phase and may be removed, retained, or repaired as needed to stabilize banks. Because many of the existing treatments are failing, it is anticipated that most would be removed, materials salvaged for re-use or disposed of, and treatments replaced.

In some areas, particularly in the forested reach, woody debris is relatively common in the channel, and woody debris supply can be expected to remain relatively high (River Run 2006). Woody debris jams could be constructed in this reach to help promote streambank stability, with the added benefit of improving instream habitat complexity. Small jams configured as flow deflectors along channel margins would likely be most effective. These jams would be carefully configured to avoid increasing overall streambank erosion or affecting the function of other planned bed and bank treatments. It is envisioned in the conceptual design that as much as 2,000 linear feet of this type treatment could be used. In some reaches, boulder deflector groins may also be used to deflect flows away from banks or infrastructure.

In addition to the specific bank treatments described above, all treatments in near-bank areas would emphasize protection of existing vegetation. As few channel access points as possible would be used to avoid bank vegetation, trees would be shielded, and shrubs could be pruned while protecting soil and root structures if avoidance is not possible. In areas where existing streambank vegetation must be removed, plant materials would be salvaged, stored, and reused within the study area.

Channel Dimension/Capacity

Under Alternative 4, neither the channel dimension (width, depth, cross-section area) nor the channel's capacity to convey flow would be substantially altered from present conditions. Implementing Alternative 4 would stabilize the river in its present alignment and profile position, resisting anticipated future river processes of bed and bank erosion, channel widening, and eventual aggradation. Therefore, the existing channel size would not be expected to change in the future. The channel would remain inset within the high terrace, and its capacity to convey large flood flows would remain similar to present conditions. The channel capacity near holes 6 and 7 would be slightly increased by widening the channel to an average of approximately 75 to 85 feet. Elsewhere channel capacity would be slightly reduced, as installation of bank protection could be used to slightly reduce width (generally 2 to 4 feet).

Upper Truckee Bridges

Under Alternative 4, the three downstream golf course bridges would not be replaced or relocated, except in the case of damage or failure. The golf course bridges are significant local controls on channel dynamics; they restrict high flows so any of the bridges could experience local erosion, undermining of abutments, or other damage in the future.

Under Alternative 4, the two golf course bridges at holes 6 and 7 would be removed and replaced with one longer span bridge, eliminating substantial hydraulic constrictions and local erosion sources. Bridge removal procedures

would be similar to those described for Alternative 2. The new bridge would be installed over the Upper Truckee River between RS 7800 and RS 8100 to accommodate two-way golf cart traffic, and service vehicles. The proposed replacement bridge would span the entire channel and widened active floodplain without piers in the channel bed. Total span length would be between 100 and 140 feet. Total vertical clearance to the bottom of the bridge would be 10 feet above the streambed, which would be about 5 feet above the typical water surface (2-year flow). In the vicinity of the bridge, the channel would be slightly widened, and an inset floodplain would be excavated into the high streambanks to improve flood flow conveyance and allow for an inset active floodplain area along the main channel. The inset floodplain would be approximately 500 feet long (350 feet upstream and 150 feet downstream of the bridge), and between 85 and 110 feet wide (allowing for bridge abutments on both ends). The depth of excavation into the existing high terrace along the streambanks would range from 4 to 7 feet, with a resulting active floodplain surface about 2 to 4 feet above the streambed. Bridge abutments would be along the back edge of the active floodplain, with pilings driven to refusal (below the 100-year flood scour depth).

The appearance of the new bridge would resemble that of the existing prefabricated steel golf course pedestrian bridges. Decking and railing materials would be identical to those used for existing golf course bridges at holes 6 and 7. Bridge guardrails would conform to the existing course bridge guardrail configuration. Guardrail height would vary with clear span between 3 and 6 feet.

Unnamed Creek

Under Alternative 4, the unnamed creek that flows northward through the golf course between holes 1 and 3 and enters the Upper Truckee River at RS 3000 would have minor enhancements. The setback from the golf course landscaping turf would be locally increased. Within this enlarged naturalized buffer zone, turf would be removed (where needed), and native vegetation would be planted. No cart path bridges would be removed. The mouth of the unnamed creek would be not be modified under Alternative 4.

Angora Creek

No changes to Angora Creek would occur under Alternative 4. No pedestrian/cart path bridges would be removed.

Active Floodplain and Overbanking

Under Alternative 4, the active floodplain would not be directly modified except for a 500-foot section of inset floodplain excavation in the vicinity of the replacement bridge between holes 6 and 7. The inset floodplain would create about 0.4 acres of active floodplain. The remaining floodplain along the Upper Truckee River and the unnamed creek would continue to have degraded function. The area and frequency of floodplain inundation along the Upper Truckee River would continue to be limited by high streambanks. Because channel incision, widening, and aggradation would be prevented by stabilization, no increase in active floodplain would be expected from natural channel processes. The channel would still be inset between high terrace banks, and the frequency of floodplain inundation and overbanking would not be expected to increase.

18-HOLE REGULATION GOLF COURSE

Under Alternative 4, the current 18-hole regulation golf course would remain primarily in its existing configuration and location, with minor modifications to holes 6 and 7 to account for the removal and replacement of two golf course bridges. One new bridge would be installed over the Upper Truckee River to accommodate two-way golf cart traffic. Minor modifications to the cart path would occur. The proposed replacement bridge would span the entire channel and active floodplain without piers in the channel bed. The bridges across Angora Creek and the unnamed creek would remain and the channel of the unnamed creek would not be modified, however, a minor buffer zone and riparian corridor would be added. A new restroom facility would be constructed adjacent to hole 5. The structure would accommodate both men's and women's restrooms and would be

approximately 650 square feet and connect to the existing power and sewer lines at Country Club Drive. The unpaved parking area to the north of the golf course entrance would be paved.

The golf course would remain on both sides of the river and would continue operating in its 133-acre footprint. There would be no reduction of golf course within the 123 acre SEZ and 56 acre of the golf course would remain within the 100-year floodplain. Approximately 7,200 linear feet of golf course would be adjacent to the river.

Golf Course Design Concept

The current Lake Tahoe Golf Course is an 18-hole regulation length, par 71 course with a total walking distance of 6,741 yards. An 18-hole regulation golf course includes 18 holes and a variety of par 3, 4, and 5 holes. Under Alternative 4, the Lake Tahoe Golf Course would continue to operate as it currently does and would be managed by a concessionaire agreement with a private company.

Course Layout and Routing

Only minor layout and routing modifications associated with the bridge replacement at holes 6 and 7 would be completed under Alternative 4. All other holes would remain in their current configuration, as discussed in Alternative 1. A restroom would be installed near the existing hole 5. The structure would be approximately 650 square feet and accommodate both men's and women's facilities. A connection to the existing power and sewer lines at Country Club Drive would be installed.

Land Management

Landscape management would continue in a manner similar to today (as under Alternative 1). The footprint would remain at 133 acres, including 96 acres of turf or lawn, 8 acres of facilities (hard coverage), 22 acres of minimally managed areas, and 7 acres of natural landscape.

Turf areas that are intensely managed include highly manicured areas such as greens, tees, fairways, driving range, and the rough. The turf is comprised of non-native vegetation such as bluegrass and bentgrass and is irrigated, fertilized, and mowed to a short length. The rough is treated similarly, although it is not fertilized or mowed as closely as the other areas. The connecting or buffer areas are also part of the golf landscape; however, they are less intensively or minimally managed. These less intensively managed areas include buffer areas around holes, runoff treatment areas, areas of travel between holes, flood control berms along the river, and ponds used for water storage and irrigation. Natural landscapes within the golf footprint are minimal under Alternative 4; however, minor improvements would be made adjacent to the unnamed creek.

Currently, the golf course drains toward the river with little or no buffer. Drainage would continue as it exists today with minor improvements near hole 6 and 7 and the unnamed creek, where a narrow vegetation buffer would be added, but the downstream piped section would not be day-lighted or restored. Ponding would continue to occur at holes 1, 3, 5, 8, 9, 10, 11, and 13.

Under Alternative 4, the surface water diversion from the Upper Truckee River would remain a component of the irrigation water supply system. However, use of this diversion would be limited to periods when the existing well cannot produce a sufficient water supply. The diversion infrastructure would continue to be protected with a boulder step grade control structure as part of the river restoration design.

The irrigation system and irrigation practices in place at Lake Tahoe Golf Course would not change, and spot repairs would continue with occasional upgrades or replacements as needed. The pump station would continue to be used. All ponds would continue to be used to detain storm water, store water for irrigation, and enhance golf play and natural landscape features. Fertilizer and pesticide use would continue to occur twice per year in May and November. Protocols would continue to follow the existing chemical, irrigation, agronomic, and erosion control plan, and reporting requirements.

BMPs associated with the facilities would not change and are discussed in Alternative 1, Clubhouse, Maintenance, and Parking Facilities section.

Bridges

Under Alternative 4, the three downstream golf course bridges would not be replaced or relocated, except in the case of damage or failure. The golf course bridges are significant local controls on channel dynamics; they restrict high flows so any of the bridges could experience local erosion, undermining of abutments, or other damage in the future. The two golf course bridges at holes 6 and 7 would be removed and replaced, eliminating substantial hydraulic constrictions and local erosion sources. Bridge removal procedures are described above in the River and Floodplain section of this alternative and in more detail under Alternative 2. A new bridge would be installed over the Upper Truckee River between RS 7800 and RS 8100 to accommodate two-way golf cart traffic and service vehicles. The proposed replacement bridge would span the entire channel and widened active floodplain without piers in the channel bed. The four pedestrian/cart path bridges across Angora Creek and the four cart path bridges across the unnamed creek would remain. The golf bridges would remain closed to non-golf public use due to safety hazard of non-golfers crossing golf-play areas.

Clubhouse, Maintenance, and Parking Facilities

Under Alternative 4, no changes to the clubhouse or maintenance facilities are proposed. There are currently 115 parking spaces in the paved parking lot at the Lake Tahoe Golf Course. Grassy areas on both sides of the golf course entrance are used for additional parking, and under Alternative 4, the area to the north of the golf course entrance would be paved to create an additional 89 parking spaces. Lighting associated with the parking area would be designed to match existing lighting. Additional BMPs including a separate oil separator and slotted channel drains would be incorporated to existing management system.

Operations and Maintenance

The Lake Tahoe Golf Course would continue to operate from approximately April 15 to November 1 from dawn until dusk. Golf Course staff needs would continue to be 76 employees. Lawn mowing would continue to occur typically from early morning until mid to late afternoon, and occasionally into the evening. It would continue to host a variety of golf tournaments and outings each year. There is no anticipated change in tournament play frequency or fees under this alternative, except those that may arise in the normal course of business in accordance with the golf course's business plan.

Permitted winter recreational snowmobile activities would continue to occur on the driving range from November through March and not be allowed anywhere else on the property, except by golf course or State Parks staff members for patrol purposes. The snowmobile operation would continue to be provided by an outside vendor. Lake Tahoe Golf Course would request a review and continuation of its ACSP certification.

Normal maintenance or future improvements to golf course infrastructure would be implemented by State Parks (the landowner) or its contracted concessionaire/representative(s).

TRAILS

The network of existing roads and trails would remain in their current locations and, presumably, would continue to be used for the purposes for which they are used today. All trails that exist on the west side of the river are casual or volunteer trails. No trails are officially established or designated trails; instead, they have been formed over time through routine use or adoption of previous roads. The gravel road on the west side of the river is used by the STPUD as a required maintenance road for its subsurface sewer line in that area. No new public trails would be constructed on the east side of the river, and no tie-in would be made with the Sawmill Bike Path. The golf course bridges would remain closed to non-golfing public use.

INTERIM MANAGEMENT PLAN

To manage Washoe Meadows SP in a manner consistent with its purpose and to address existing resources, public access, and use issues of this unit, State Parks would prepare and implement an Interim Management Plan. The plan would address resources protection and management, public access, and trails management to protect the quality of important natural and cultural resources and enhance access to the park unit by the public. Natural and cultural resources and trails management would involve normal maintenance and resources protection measures with the performance criterion of meeting the unit's purpose statement regarding resources. Public access provisions would enhance accessibility for the broader public by the addition of trail improvements, signage. one or more, small parking areas on State Parks land within Washoe Meadows SP (e.g., for 2 or 3 cars). The candidate locations would be where public rights-of-way abut State Parks land. The access points would supplement public access to Washoe Meadows SP and help users who may continue to rely (illegally) on gaining access across the golf course bridges retained under this alternative.

State Parks retains the opportunity to embark on a separate, future planning process to consider substantial permanent public access and recreation facilities and additional resources management practices.

2.7.2 GENERAL PLAN AMENDMENT

Alternative 4 would not involve changing the configuration of the existing golf course nor modify its footprint; therefore, no changes in the boundaries between Washoe Meadows SP and Lake Valley SRA would be necessary.

The existing Lake Valley SRA General Plan statement of purpose calls for "restoring the natural character and ecological values" of the Upper Truckee River. The General Plan's resource policy states that a river management plan shall be implemented that restores a "more natural channel configuration" and "riparian habitat", among other things, and that gives foremost consideration to minimizing "hard engineering." The approach in Alternative 4 with the river largely stabilized in place would be different than the directives of the General Plan for restoring a more natural channel. The use of biotechnical stabilization techniques would improve some riparian habitat values, but they do not minimize hard engineering nor constitute restoration of a natural channel, as contemplated in the General Plan. As a result, the text of the General Plan would need to be revised under this alternative.

2.7.3 PROJECT CONSTRUCTION

This section summarizes construction activities and approximate construction schedule for Alternative 4 and provides an overview of how construction would be coordinated with golf course play.

Under Alternative 4, the following planned construction activities would be conducted: proposed changes to the existing golf course, removal of unnecessary infrastructure, removal of bridges, and construction and modifications to the river channel and floodplain surfaces. Construction management approach would be the same as under Alternative 2, including application of BMPs, dewatering, diversion, and pre-wetting activities. The installation of the new replacement bridge and removal of existing bridges at holes 6 and 7 during Year 1 would require temporary dewatering of partial or the entire streamflow at the site(s) of the footings and abutments or piers. Installation of streambed and streambank treatments in all reaches of the existing channel during Year 1 and potentially during Year 2 would require temporary dewatering.

It is expected that cost savings would be realized and water quality protection would be simplified if all in-channel work (from bridge demolition through streambank re-vegetation) was conducted concurrently within each designated work reach, and that work reaches would be implemented sequentially along the river (probably from upstream to downstream so that the replacement bridge near the upstream end would occur in Year 1). The approach to dewatering in each work reach might vary by anticipated treatment, reach length, and flow conditions. The reaches that are proposed to have an anchored high gradient riffle (at the upstream and

downstream ends of the entire project reach) or to have boulder steps, armored riffles, or inset floodplains (by the replacement bridge) would likely be dewatered using diversion structures and piped bypass of the entire streamflow. Reaches that are proposed to have extensive streambank treatment between widely spaced boulder steps might be dewatered using diversion structures and a center barrier to bypass flow alternatively along either the left or right bank within each work reach (with work reaches defined as extending from one boulder step to another).

All construction phase BMPs, mitigation measures, and the final conditions of all permits, approvals, and easements would be identified in the project plans and specifications for the contractor or fulfilled by State Parks. While exact erosion control measures (BMPs) are uncertain at this time BMPs may include construction fencing, silt fences, hay bales, and temporary dams (i.e. sand bags, water filled berm, or sheet pile) to isolate ephemeral drainages and bridge footing work areas from the river. Pumps would be used to remove ponded groundwater in local excavation sites. Water could be sent to sprinkler systems in designated areas or into existing or proposed ponds depending on volumes. Trees removed from access points and off-channel work would be used in restoration activities, as mulch material for revegetation work, or hauled off-site.

CONSTRUCTION SCHEDULE

Alternative 4 construction would be phased over the 2- to 3-year period between May 1 and October 15 (possibly November 1 if weather allows and extension granted) of each year, beginning in 2012. However, construction would not occur on summer Sundays and may not occur on other designated weekends and holidays. Construction hours would be 7:00 a.m. to 7:00 p.m., with hauling restricted to 8:00 a.m. to 6:30 p.m. On occasion, there may be a need for longer work hours to address specific constructability issues that cannot otherwise be accomplished. Such work schedule exceptions would be coordinated with the TRPA and El Dorado County, as well as local residents and emergency service providers.

Alternative 4 construction would commence as soon as possible after completion of construction plans and specifications, project approval, acquisition of permits, securing of funding, and all preconstruction monitoring. Construction activities would be continuous for the multi-year period, with winter closedowns, except for BMP maintenance and monitoring. Construction phasing, duration, equipment, and workers are presented in Table 2-8. Because most of the work is within the existing channel, construction phasing would be the same for both years working from upstream to downstream or downstream to upstream. Project related activities would involve primarily in-channel work with minor floodplain work and restroom installation. It is possible that the golf course would need to be completely shut down for 1 year for construction access. However, attempts would be made to keep 9-holes open during the 2- to 3-year construction period.

Table 2-8
Alternative 4 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Year 1 – In channel work –Possible shutdown of golf course		
Mobilization for in-channel work; Construction of access routes and storage areas; equipment refueling areas, and construction equipment wash area; install temporary BMPs, tree removal and vegetation salvage.	May 15–30	2 equipment transport trucks(1 week), 2 dump trucks, 2 dozers (approx Cat D6), 2 excavators (approx Cat 330), 2 loaders, 2 water trucks, 1 forklift, 1 one ton pickup truck, 3 chain saws, 1 tub grinder, 1 skidder, 1 log loader, 1 log truck workers: 12

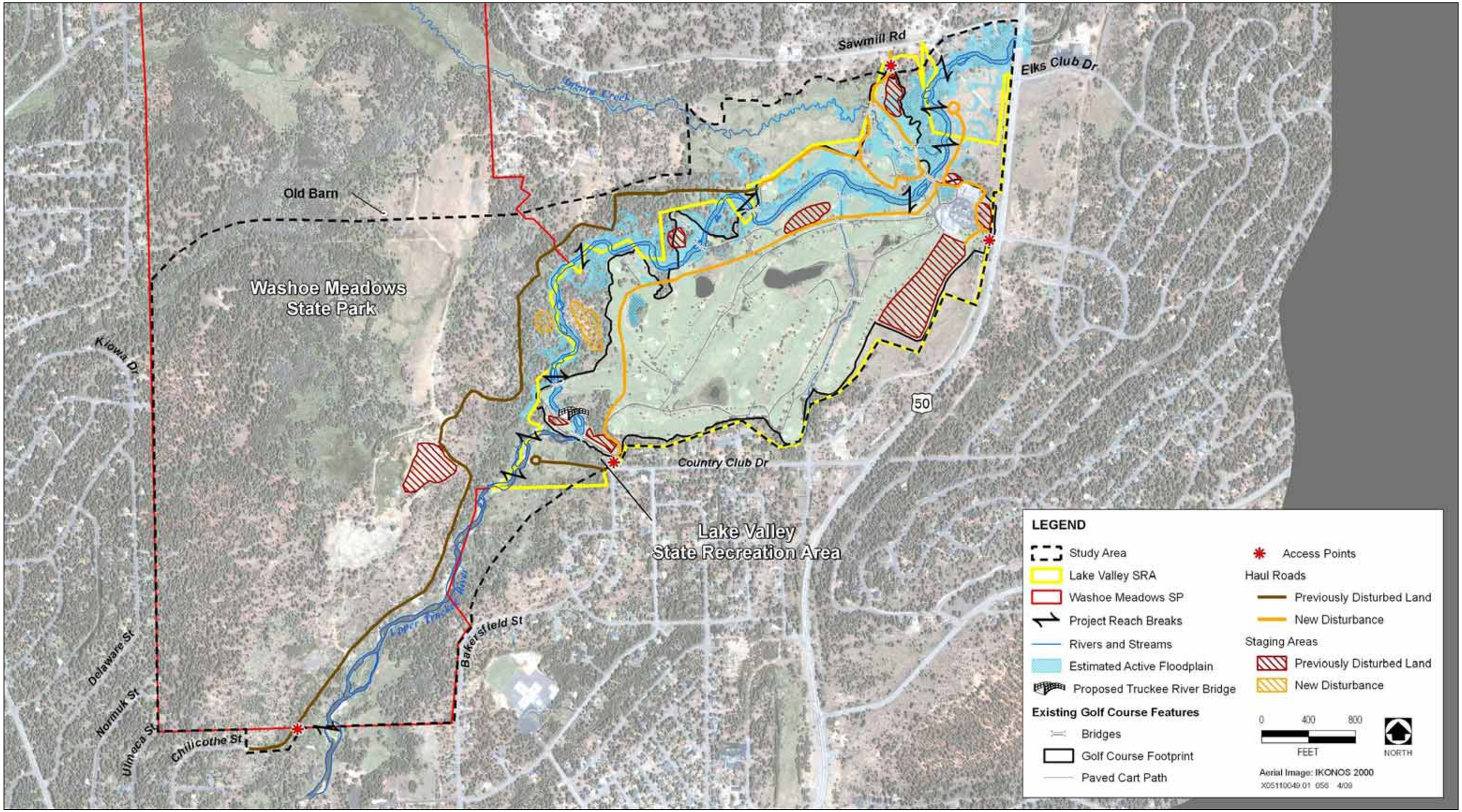
Table 2-8
Alternative 4 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Vegetation maintenance and monitoring. Install rock and biotechnical/bank stabilization treatments, and boulder grade controls in existing channel (phase1 1). Remove bridges at holes 6 & 7 and install new bridge and re-configure approach to cart paths. Excavate and vegetate the inset floodplain near holes 6 and 7. Install restroom near hole 5 and pave parking area and cart path near hole 6 and 7.	June 1– October 15	2 truck or trailer mounted water pumps, 4 ten or twenty yard dump trucks, 2 dozers (approx Cat D6), 3 excavators (approx Cat 330), 2 loaders, 3 water trucks, 1 forklift, 1 roller, 1 backhoe, 2 one ton pickup trucks, ,3 chain saws, 1 tub grinder, 2 cranes and 1 pile driver, (1 month), 1 hydroseeder (1 month) and strawmulcher (1 month) , paving equipment (asphalt paver, roller, asphalt truck and screed) (1 month) workers: 30
Install temporary irrigation and winterization measures Demobilization – removal of equipment from the 100-year floodplain.	October 1–15	1 loader, 1 excavator, 1 ten or twenty yard dump truck, 1 dozer, 1 water truck, 1 one ton pickup truck, 1 tub grinder, 1 hydroseeder and strawmulcher, 2 equipment transportation trucks (1 week) workers: 12
Year 2 – In channel work – 9-hole course open		
Mobilization for continuation of in-channel work and modifications near hole 6 and 7. Additional BMPs and access. Vegetation maintenance and monitoring. Install remainder of rock and biotechnical/bank stabilization treatments, and boulder grade controls in existing channel. Unnamed creek revegetation, and other areas of drainage and irrigation improvement.	May 15– October 15	2 truck or trailer mounted pump, 3 dump trucks, 2 dozers (approx Cat D6), 2 excavators (approx Cat 330), 2 loaders, 3 water trucks,1 forklift, 1 roller, 1 backhoe, 2 one ton pickup trucks, 3 chain saws, 1 tub grinder, 1 trencher,1 crane (1 month), 1 hydroseeder (1 month) and strawmulcher (1 month) workers: 24
Install winterization measures. Remove the temporary disturbances of all access points and staging and storage areas, which includes revegetation activities where needed. Formally demobilize from the site.	October 1–15	1 loader, 1 excavator, 1 ten or 20 yard dump truck, 1 tub grinder, 1 hydroseeder and strawmulcher, 1 dozer, 1 one ton pickup truck, 1 water truck, 2 equipment transport trucks (1 week) workers: 12
Year 3 – Items not completed in previous year		
Construction activities would only occur in Year 3 if the in-channel and bridge removal/replacement work was not completed in Year 1 or if condition of revegetation was not adequate to allow for completion in Year 2. Year 3 activities would commence with mobilization activities and would include the same tasks as listed under Year 2.		
Note: Final phasing approach may be modified to accommodate needs of State Park, their concessionaire, or the contractor as needed.		

Access locations, proposed haul routes, and potential storage/staging areas are shown in Exhibit 2-11.

PRELIMINARY QUANTITIES

Preliminary quantities of material to be excavated and the cut-and-fill balance for Alternative 4 are summarized in Table 2-9. Estimated quantities related to river modifications are based on existing channel dimensions and lengths. At this conceptual stage of design, no adjustments have been made for density or composition of existing materials or compaction requirements of backfill areas.



Source: Data provided by State Parks in 2009, data adapted by AECOM in 2009.

Access, Staging and Storage for Alternative 4

Exhibit 2-11

Several of the particular treatments (e.g., boulder steps, rock armor, and rock-toe bank stabilization) require specific weight and sized material. For the purpose of traffic evaluations, these materials are not assumed to be available in the on-site excavated materials with the exception of 50 percent of bank treatment materials. Therefore, most materials should be assumed to be brought in from off-site sources, although it is possible that some reusable materials would be salvaged on-site. Existing sod, bank treatments and bridge footings/abutments may require off-site disposal. Two bridges would be hauled off-site on separate flat bed trucks.

Table 2-9
Preliminary Quantities (Cubic Yards) for Alternative 4

Treatment Area/Activity	Approximate Cut Volume	Approximate Fill Requirement
New constructed channel	0	0
Reconnected historic meanders	0	0
Modified existing channel	0	0
Boulder steps (1.5 to 2X proposed channel width)	12,000	24,000–33,800
**Armored riffles	0	4,800
Other channel bed features	0	0
Existing bank treatments	1,400	0
*Proposed bank treatments	13,400	44,700
Inset floodplains	5,600	0
Backfilled channels (assume partial to complete)	0	0
Floodplain fill removal	0	0
Modified unnamed creek	30	30
USGA-approved sand and base	0	0
Asphalt	4	7
Base Rock	8	17
Concrete	0	0
Sod	0	0
Trails	30	15
`	2 bridges	1 bridge
Total	32,442	68,754–78,554

*Assumes that approximately 50% of fill material could come from cut volume
**Armored riffles as a component of anchored high gradient riffles.
Calculations are estimates based on conceptual design and would be modified, as appropriate, during final design.
Source: Data prepared by EDAW, Inc. (now AECOM) and Valley & Mountain Consulting 2008.

ACCESS, STAGING, AND STORAGE

The proposed access points, temporary routes, and staging and storage areas for Alternative 4 are illustrated in Exhibit 2-11. All restoration construction activities would be accessed through the existing golf course. Street access points could include the golf course entrance off U.S. 50, the existing entry off Country Club Drive, and the existing gravel access roads off Chilicothe and Sawmill Road behind hole 10.

Most of the construction area can be accessed through sites already disturbed by golf course grading, sewer line maintenance routes, or other existing trails and roads rather than across undisturbed meadows. Specialized road construction techniques to protect meadows would not generally be required. However, where access roads must cross soft or wet areas or native meadow vegetation, stabilization to protect soils and vegetation and prevent water quality impacts would be required. Where access roads must cross golf course landscaping or infrastructure that would remain in use following project implementation, measures to protect soils, vegetation, and infrastructure would be required. Access would remain in place for all phases of construction. Temporary access roads would likely be constructed of gravel and road base over a temporary fabric barrier and temporary BMPs would be installed. Following construction, roads would be removed and the area restored to preconstruction condition. Compaction under access roads may occur; therefore, restoration of footprint areas may require ripping and active revegetation. Removal of vegetation along several banks would be required for access and treatment of riverbanks. Vegetation would be salvaged and reused on-site.

Any partial street closures and traffic control would be coordinated with Caltrans and El Dorado County Public Works Department, as appropriate. Local residents would be informed of potential traffic controls, closures, or detours at least 48 hours in advance. Adequate emergency access would be provided at all times, and local emergency service providers would be notified of any potential road closures or detours at least 48 hours in advance. Signage would be required on the Sawmill Road Bike Path near the construction entrances on Sawmill Road and north of the golf course entrance on U.S. 50.

Construction staging sites would be established in the study area, on previously disturbed land and/or high-capability land, and would be secured to prevent unauthorized access. Temporary erosion control fencing and (if needed) an approved refueling station would be incorporated into each staging area where appropriate. Soil would be removed from the excavated inset floodplain, and/or other miscellaneous areas as needed. Soil stockpile locations would be away from the active stream channel. Bed and bank materials would be stockpiled for up to 1 year. The stockpile areas would be contoured to the natural topography of the surrounding area or integrated into the golf course landscaping and revegetated.

Vegetation would also be removed from modified existing banks and other miscellaneous locations in the study area. Plant materials could range widely and would include willows and native sod desired for reuse in the restored areas, along with landscaping materials. The salvageable plant material would be stockpiled until areas for replanting were prepared. Vegetation stockpiling locations would likely be near the river channel. A temporary plant propagation area may also be designated where plants would be grown from salvaged materials and/or seed for use on the project. If excess non-native plant materials are generated, they may be hauled off-site for use at an appropriate site or disposal at a permitted location.

Bridge Installation

Access to the bridge installation site would be from both sides of the Upper Truckee River. Bridge materials would be staged on the bank near the site in an area near existing hole 6. Transport of bridge sections from an unloading zone near Country Club Drive to the construction staging area would be provided by 40-foot flatbed trailers on a temporary construction road or existing dirt roads. Detours on Country Club Drive would be required to allow a 20-ton tracked crane to stack bridge sections in the staging area.

A pile driver would require access to both sides of the river at 40- by 50-foot construction staging areas. Lengths of 10-inch steel piles would be hammered to a depth of up to 25 feet. Pile clusters would be spaced at 5 feet, three piles for 10-foot widths and five piles for 20-foot widths. The bridge deck supports would be 1-inch-thick steel plate welded to the top of the pile clusters. After the pile foundation is complete, 20-ton cranes would be stationed on both sides of the river to set and connect bridge sections. Bridge installation should be completed within 1 week.

Golf cart paths for holes 6 and 7 would be re-aligned to access the new bridge.

Restroom and Parking Lot Construction

A new 650-square foot restroom facility would be constructed near the existing hole 5 to accommodate both men's and women's restrooms. A connection to the existing power and sewer lines located at Country Club Drive would be installed.

The grassy area north of the golf course entrance would be paved to create an additional 89 parking spaces. Additional BMPs including a separate oil separator and slotted channel drains would be incorporated to existing management system.

2.8 ALTERNATIVE 5: RIVER ECOSYSTEM RESTORATION/ DECOMMISSIONED GOLF COURSE

2.8.1 PROJECT FEATURES

Alternative 5 proposes decommissioning and removing the 18-hole regulation golf course to restore the golf course footprint to meadow and riparian habitat. For this alternative the river would be restored in a similar manner to Alternatives 2 and 3. A 13,430-foot reach of the Upper Truckee River and adjoining floodplain would be restored. All five Upper Truckee bridges and four Angora Creek bridges would be removed. Golf holes would be removed from sensitive lands adjacent to the river and the area further away from the river and the golf course landscaped area would be restored as native meadow and riparian habitat. The clubhouse facility, parking area, and maintenance yard would remain with the clubhouse available for public use.

While removal of the golf course and restoration of it to meadow and riparian habitat would not fulfill the purpose for Lake Valley SRA, it could be implemented under the existing general plan, because permanent facilities would not be developed. State Parks could initiate a future planning effort for Lake Valley SRA or the entirety of the areas of Washoe Meadows SP and Lake Valley SRA for possible future classification, naming, outdoor recreation uses, and long-term resource management. This would be a separate planning process from the current project. If changes to the permanent recreational uses and facilities at Lake Valley SRA were considered in a later planning effort, the General Plan would be amended at that time to reflect the changes.

State Parks would have the opportunity to embark on a new planning effort for the entire area at any time in the future when it wishes to consider development of permanent facilities. This could include planning for the two units together or separately. It could include reclassification of land and the consideration of a variety of outdoor recreation and resources management actions (e.g., day use, picnicking, multi-use trail development, overnight tent and RV camping, group camping, cabins, etc.).

State Parks may choose to temporarily maintain a 9-hole golf course in use during river restoration, but prior to decommissioning and restoration in the remainder of the golf course area. The temporary golf use could continue while State Parks evaluates whether to initiate planning for future changes in classification, name, use, and resources management. Because the reduced-play golf course use would be temporary, it could be carried out under the existing General Plan. If a reduced-play course remains temporarily, it would be physically configured similar to Alternative 3.

RIVER AND FLOODPLAIN

Approach

Under Alternative 5, land uses associated with the golf course would be removed from areas adjacent to the Upper Truckee River channel and adjoining riparian vegetation communities would be restored. Treatments are also proposed along the lower portion of Angora Creek and the mouth of the unnamed creek as well as meadow area

more distant from the river. The restoration approach is the same as under Alternatives 2 and 3, however, this alternative would not include a golf course as part of the proposed project.

The river would have an increased channel length of 13,430 linear feet with an active floodplain of 77 acres and inset floodplain of 1.7 acres. Up to 56 acres of the 100-year floodplain would be restored and up to 133 acres of floodplain and meadow would also be restored. The channel bed would be elevated approximately 2 feet on average.

Upper Truckee River restoration under Alternative 5 would decrease erosive forces and increase floodplain inundation and duration by increasing the channel length and elevating the channel bed through adding a combination of grade-control features, reconnecting abandoned meanders that were formerly active in the 1940s and 1950s, and constructing several sections of new channel. This approach uses elements of both form-based and process-based design (River Run 2006). The conceptual design does not rely on or advocate full construction of the final dimensions or conditions; rather, it anticipates that natural geomorphic processes, such as the deposition and active movement of gravel bars, the recruitment of woody debris, substrate sorting, and vegetation establishment would modify the constructed features over time. The ultimate configuration of the channel would be established by these natural geomorphic processes.

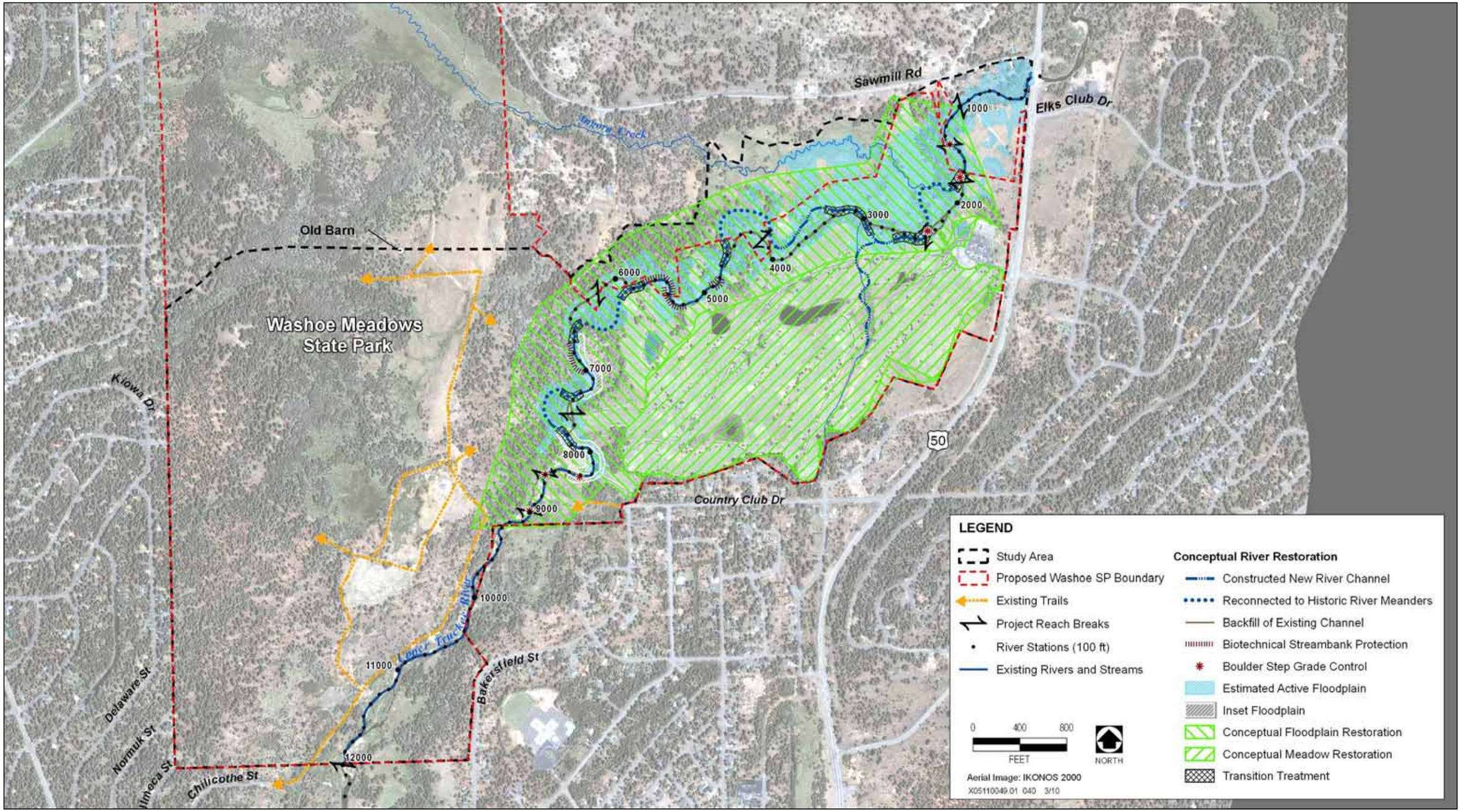
Design Features

The treatment for the Upper Truckee River in Alternative 5 is the same as the treatments in Alternatives 2 and 3. Some differences exist among these three alternatives, primarily in that Alternatives 3 and 5 would not include any bridges over the river and Alternative 5 would include additional SEZ and meadow restoration beyond that proposed in Alternatives 2 and 3. Alternatives 2, 3, and 5 all treat the mouth of the unnamed creek and remove the four pedestrian/cart path bridges on Angora Creek.

Under Alternative 5, the reach of river to be restored would incorporate sections of the existing channel, re-activate historic meanders, and construct new sections of channel, giving the desired sinuosity and slope. Alternative 5 would include approximately 4,240 feet of the existing river channel that would not be modified, approximately 5,000 feet of the existing channel would be modified, approximately 2,490 feet of historic channel remnants would be reconnected, and construction of approximately 1,700 feet of new channel would occur (Exhibit 2-12). The numeric estimates of length, area, and volume in this section are based on conceptual design and would be modified during final design. Conceptual treatment descriptions and typical sketches are presented in Appendix C.

Constructed streambed stabilization features would be the same as in Alternative 2, including anchored high gradient riffles at the upstream and downstream treatment extents and 15–25 armored riffles at crossovers and channel segment transitions, however no water intake would be needed and therefore the grade control structure at this location would be eliminated. Approximately 2,700 feet of new streambank stabilization measures would be installed. The bank stabilization would be primarily biotechnical, emphasizing the use of live vegetative materials on banks with reduced heights and angles. However, some areas would also require rock armor streambank protection and/or engineered large woody debris features. The re-activated/reconnected historic meanders would generally utilize existing mature vegetation along outside banks; however, the bed, inside banks, and transitions would generally need to be modified. Existing streambank protection features would be evaluated for removal or repair and incorporation.

The 2,600 feet of existing channel to be abandoned would be backfilled to create about 4.5 acres of floodplain. About 1.7 acres of inset floodplain would be excavated along 1,300 feet of channel, including along the right bank between RS 6600 and RS 7300 and along both banks between RS 7700 and RS 8300 where hydraulic flows have been substantially confined by the golf course bridges. The removal of the five golf course bridges over the Upper Truckee River would allow more natural channel dynamics throughout the entire project reach a summary of the expected geomorphic features, processes, and functions in the study area under this alternative is provided below.



Source: Data provided by State Parks in 2009, data adapted by AECOM in 2010

Alternative 5: River Ecosystem Restoration/Decommissioned Golf Course

Exhibit 2-12

Upper Truckee River

Alignment

The proposed river alignment under Alternative 5 would be the same as that for Alternatives 2 and 3.

Profile

The proposed streambed treatments and profile conditions under Alternative 5 would be the same as those for Alternatives 2 and 3, except that the water intake and boulder step at RS 2300 would not be needed.

Banks and Channel Capacity

The proposed bank treatments under Alternative 5 would be the same as those for Alternatives 2 and 3. The design channel dimension and capacity would be the same in Alternative 5 as in Alternatives 2 and 3, with the same excavation and grading requirements.

Upper Truckee Bridges

All five existing golf course bridges crossing the Upper Truckee River in the study area would be removed under Alternative 5. Existing bridges would be removed in a similar manner as under Alternatives 2 and 3. No replacement bridges would be installed as part of this alternative.

Unnamed Creek

The unnamed creek that flows northward through the golf course between existing holes 1 and 3, entering the Upper Truckee River at RS 3000, would be enhanced under Alternative 5, and all four of the cart path bridges would be removed at the time when the golf course is completely decommissioned. The creek channel would be recontoured as needed at former bridge/culvert crossings, and the low-flow channel would be modified to add channel length and increase the active floodplain area along the entire length. The downstream reach in culverts would be day-lighted and restored. Within this zone, a native vegetation riparian corridor would be restored along the creek. Because the golf course would be removed, the corridor of this creek would be widened and minor sinuosity would be added to the planform.

The mouth of the unnamed creek would be modified under Alternative 5, similar to Alternatives 2 and 3, to adjust its orientation relative to the restored Upper Truckee River alignment and to meet the raised streambed elevation of the restored river.

Angora Creek

The lower ¾ mile of Angora Creek was restored in 1997, as described in Alternative 1. Under Alternative 5, Angora Creek would be modified as described in Alternative 2 and 3, raising the bed, reconnecting the historic meander to the Upper Truckee River, and moving the mouth of Angora Creek approximately 200 feet upstream of the current. The lower 200 feet of Angora Creek would be restored to an off-channel oxbow feature and the four pedestrian/cart path bridges removed.

Active Floodplain and Overbanking

Under Alternative 5, the active floodplain would be enlarged providing increased connectivity and frequency of river overbanking through channel restoration. The floodplain along the Upper Truckee River and the unnamed creek would have improved function, including allowing floodwater to slow down and sediments to settle out, thus maintaining water quality. The frequency of floodplain inundation along the Upper Truckee River would be less limited by high streambanks and enlarged channel capacity, particularly downstream of RS 7300. The

increased bank length and frequency of overbank flows, along with direct floodplain topography modification (e.g., inset floodplain excavation and retired golf course areas), and increased elevation of channel bed, would combine to increase the active floodplain (5 year) area from 36 acres under the existing condition to 77 acres under Alternative 5, similar to Alternatives 2 and 3.

The conceptual design generally targets enhancing the length and area of active floodplain adjacent to an appropriately sized channel that would overflow its banks at least once every 1.5–2.5 years while still providing flood protection to adjacent private properties. However, the design is not rigidly applying the same channel capacity and bank heights throughout the study area. Because the project spans reaches that would have different natural floodplain relationships, the concept allows for variability in channel capacity and bank height (River Run 2006). The channel bed profile would be raised, streambank heights decreased, and channel capacity reduced along the 4,190 feet of newly constructed and reconnected meanders; therefore, overbanking frequency would be greatly improved in these sections. In addition, some sections of the 5,000 feet of modified existing channel would have a raised bed elevation (at installed riffles and grade controls) and would be expected to experience net sediment deposition over time between the riffles that would indirectly increase the bed elevation and the overbanking frequency in these sections. The 4,240 feet of unmodified existing channel would be back-watered by the raised streambed in adjacent sections, causing these sections also to have better floodplain connectivity.

The topography, fill removal, soil amendment, planting strategies, species mixes, and plant materials for restored floodplains under Alternative 5 would be similar to those under Alternatives 2 and 3. However, the meadow area restored would be greater. Most of these additional areas are more distant from the stream would generally be restored as mesic or dry meadow as it would not support wet meadow because of the lower groundwater table.

DECOMMISSIONED 18-HOLE REGULATION GOLF COURSE

Under Alternative 5, the existing golf course would be decommissioned and restored as native meadow and riparian habitat. The entire golf course would be removed and meadow and riparian habitat reestablished. Areas adjacent to the Upper Truckee River, within the active floodplain that are disturbed by golf course infrastructure would be restored to riparian habitat, under the same approach as Alternatives 2 and 3. Tees, greens, fairways, and cart paths would be removed from all areas. Irrigation pipes would be abandoned in place unless exposed during restoration activities. Golf course landscape areas not adjacent to the river could be restored to mesic, to dry meadow, or would be tilled and seeded with low cost native seeds to allow soils to amend in preparation of additional treatment in a few seasons, if future land use planning efforts call for other uses compatible with the meadow habitat restoration approach. The channel and riparian corridor of the unnamed creek would be enhanced, and the four golf cart bridges would be removed. The clubhouse facility, parking area, and maintenance yard would remain.

State Parks may initiate a planning effort, separate from and following decommissioning of the 18-hole golf course, to determine appropriate uses for the state property including both Lake Valley SRA and Washoe Meadows SP. If economically feasible, a temporary 9-hole golf course may remain in place while State Parks evaluates alternative uses of this area. However, the five Upper Truckee and four Angora Creek bridges would all be removed.

Landscape Management

Golf landscape would no longer be adjacent to the river, where the floodplain would be restored. Within the golf course footprint irrigation, fertilizer, and pesticide use would cease and the area would be seeded with native grasses and scrub. The landscape management approach would be evaluated under the future planning process. Irrigation would be abandoned in place, drainage would be slightly modified, primarily in areas adjacent to the river, and the pond west of the existing hole 15 would be partially filled to mimic an oxbow or off-channel feature as part of floodplain restoration efforts. Other ponds and the well at pond 9 would be evaluated during future

planning efforts. The diversion infrastructure would be removed. The stormwater treatment pond adjacent to the maintenance yard would continue to be used as is today.

BMPs associated with the facilities would not change and are discussed in Alternative 1, Clubhouse, Maintenance, and Parking Facilities section.

Bridges

Under Alternative 5 there would be no bridges across the Upper Truckee River or Angora Creek; all bridges would be removed. The cart path bridges along the unnamed creek would be removed with golf course decommissioning. (The Sawmill Bike Path bridge outside of the study area, next to U. S. 50, would remain providing trail access across the river.)

Clubhouse, Maintenance, and Parking Facilities

No changes are proposed to the clubhouse, parking area, or maintenance yard under this alternative. These structures would be evaluated through a separate planning process based on comments from this draft EIR/EIS/EIS, compatible State Park uses and a potential future planning efforts. State Parks would continue to maintain the facilities but no concessionaires would open or manage them until future uses were determined.

Operations and Maintenance

State Parks would no longer lease the property to a concessionaire. Lake Tahoe Golf Course would be removed and therefore would no longer host golf tournaments and outings, and the 76 golf course employees would no longer be needed. Fertilizer, herbicide, and pesticide use would no longer be needed. Snowmobile activities would be evaluated during the future planning efforts. Lake Tahoe Golf Course would not continue its ACSP certification. Normal maintenance or future improvements to infrastructure would be implemented by State Parks (the lease holder) or its contracted representative(s).

Potential Temporary 9-hole Golf Course

If a temporary 9-hole course were retained, it would be similar to the conceptual 9-hole course under Alternative 3. The layout of tees, fairways, and greens would be similar in length to holes in an 18-hole regulation course, but with only nine holes, the smaller course could fit on the southeast side of the river and be situated outside the river meander belt (same layout as Alternative 3). All holes, cart paths, and bridges adjacent to the Upper Truckee River would be removed and only nine holes would remain. No holes would exist on the floodplain adjacent to Angora Creek. Turf would not be modified because it would be a temporary course. The temporary 9-hole course footprint would be 86 acres. During this period, fertilizer use would continue to occur twice per year in May and November; however, quantities would decrease, due to a smaller course. Pesticide and herbicides would continue to be used on a limited basis. Protocols would continue to follow the existing chemical, irrigation, agronomic, and erosion control plan, and reporting requirements. No additional BMPs would be added beyond the current stormwater pond and drainage areas.

If a temporary 9-hole course remained, it would continue to operate from approximately April 15 to November 1 from dawn until dusk. Golf Course staff needs would decrease by 11 to 16 people from the current 76 employees. It would no longer host golf tournaments and outings each year. However, events would still occur at the clubhouse. Snowmobiling activities would be limited to recreational use within the driving range area from November through March, and patrol purposes by golf course and State Parks staff members. The snowmobile operation would continue to be provided by an outside vendor. Lake Tahoe Golf Course would not continue its ACSP certification. Normal maintenance or future improvements to golf course infrastructure would be implemented by State Parks (the lease holder) or its contracted concessionaire/representative(s).

Considering the opportunity to temporarily operate the reduced-size, nine-hole golf course, the restored condition of the SRA under Alternative 5 could consist of either a minimum area within the active river corridor (outside of the reduce golf course area) or a maximum area comprising the full restoration of the existing golf facilities and the active river corridor together. In either case, the clubhouse and maintenance buildings would be retained for public use (clubhouse) and unit maintenance (maintenance facilities).

TRAILS

The network of existing roads and trails on the west side of the river would remain in their current locations and would, presumably, continue to be used for informal recreation as they are currently used. Trails that exist on the west side of the river are either on roads used for other purposes (e.g., STPUD sewer line access) or are casual or volunteer trails. No trails are officially established or designated. No new public trails would be constructed on the east side of the river as part of Alternative 5.

INTERIM MANAGEMENT PLAN

No Interim Management Plan would be prepared under Alternative 5. State Parks would retain the opportunity to embark on a separate, future planning process to consider substantial permanent public access and recreation facilities and additional resources management practices on one or both of Washoe Meadows SP or the area of the former SRA, as explained below.

2.8.2 GENERAL PLAN AMENDMENT

Alternative 5 would eliminate golf recreation on Lake Valley SRA, which is a primary purpose for the SRA. The golf course removal and restoration of the SRA to riparian and meadow habitat can be implemented without a general plan amendment, however, because it would not involve the development of new permanent facilities. In light of the decommissioning and removal of golf course facilities, the primary purpose of the SRA would be eliminated. Consequently, State Parks would revoke the existing Lake Valley SRA General Plan and reclassify the former SRA to become part of a single unit with Washoe Meadows SP. All land of the former SRA would be classified as state park. Maintaining the unit in perpetuity as an ecosystem restoration area with no public access or outdoor recreation use would not be feasible, recognizing the unmet demand for outdoor recreation in the state and the mission of State Parks. In time, some form of planning for and implementation of public access and/or outdoor recreation facilities would need to occur in keeping with the mission of State Parks.

If State Parks pursued development of significant permanent facilities in the future, a new general plan would need to be prepared that could include consideration of final unit classification, unit name, recreation uses, and resources management at the park, consistent with the Public Resources Code. State Parks has the opportunity to embark on a separate planning effort for the entirety of the area of Washoe Meadows SP and Lake Valley SRA at any time in the future when it wishes to consider development of permanent facilities. Such a planning effort could involve combining the units or continuing the existence of two units. This would be a separate action from the current project.

The future planning effort could include consideration of a variety of outdoor recreation and resources management actions, consistent with a state park classification (e.g., day use, picnicking, multi-use trail development, overnight tent and RV camping, group camping, cabins, or other outdoor recreation concessions). Similarly, permanent outdoor recreation uses and facilities in Washoe Meadows SP could be considered, if a later general plan was prepared for that unit as part of a future planning effort.

If temporary retention of a 9-hole golf course occurred prior to decommissioning and restoration of the meadow while State Parks restores the river and floodplain and/or considers future classification, unit names, recreation uses, and resource management, the Lake Valley SRA and Washoe Meadows SP boundaries and General Plan would remain unchanged until a decision was made about the future disposition of the park units. The Public

Resources Code does not require amendment of the General Plan to accommodate a non-permanent use, so the temporary use of Lake Valley SRA for a 9-hole golf course could occur under the existing General Plan.

2.8.3 PROJECT CONSTRUCTION

This section summarizes construction activities and construction schedule for Alternative 5 and provides an overview of how construction would be coordinated with golf course play.

Under Alternative 5, the following planned construction activities would be conducted: proposed changes to the existing golf course, removal of unnecessary infrastructure, removal of bridges, and construction and modifications to the river channel and floodplain surfaces. The overall construction period would include phases that allow for vegetation reestablishment success and pre-wetting of new and reconnected channel sections before their reconnection to the active river flows. Trees removed from access points and off-channel work would be used in restoration activities, as mulch material for revegetation work, or hauled off-site. Dewatering and diversion requirements under Alternative 5 would be the same as Years 2 and 3 of Alternative 2. No dewatering would be required in Year 1. All construction phase BMPs, mitigation measures, and the final conditions of all permits, approvals, and easements would be identified in the project plans and specifications for the contractor or fulfilled by State Parks.

CONSTRUCTION SCHEDULE

Alternative 5 construction would be phased over the 3- to 4-year period between May 1 and October 15 (possibly November 1 if weather allows and extension granted) of each year, beginning in 2012. However, construction would not occur on Sundays and may not occur on other designated weekends and holidays. Construction hours would be 7:00 a.m. to 7:00 p.m., with hauling restricted to 8:00 a.m. to 6:30 p.m. On occasion, there may be a need for longer work hours to address specific constructability issues that cannot otherwise be accomplished. Such work schedule exceptions would be coordinated with the TRPA and El Dorado County, as well as local residents and emergency service providers.

Alternative 5 construction would commence as soon as possible after completion of construction plans and specifications, project approval, acquisition of permits, and all preconstruction monitoring. Construction activities would be continuous for the multi-year period, with winter closedowns, except for BMP maintenance and monitoring. Construction phasing, duration, equipment, and workers are presented in Table 2-10. Year 1 would focus on off-channel work (historic meander modifications and new channel construction). If a temporary 9-hole course is to remain, golf play would be limited to the east side of the river to allow for construction access adjacent to the river during all years of construction or would be removed in the first year of construction. It is anticipated that in Year 2, most off-channel river restoration work would be completed and vegetation would be allowed to properly establish during this year. No additional construction activities would occur in Year 2. Year 3 would include removal of the bridges, in-channel work, and connection of historic meanders and new channel sections. Pre-wetting of the channels would occur prior to connection with the existing channel sections.

Table 2-10
Alternative 5 Construction Phasing, Equipment, and Workers

Activity	Duration	Equipment and Workers
Year 1 – Off Channel Work		
Mobilization for off-channel work; Construction of access routes and storage areas; equipment refueling areas, and construction equipment wash area; install temporary BMPs, tree removal and vegetation salvage.	May 15–30	2 equipment transport trucks (1 week), 2 ten or 20 yard dump trucks, 2 dozers (approx Cat D6), 2 excavators (approx Cat 330), 2 loaders, 2 water trucks, 1 forklift, 1 one ton pickup truck, 3 chain saws, 1 tub grinder, 1 skidder, 1 log loader, 1 log truck. workers: 12
Off-channel work- modify historic meanders and construct new channels including vegetation and bank treatments of those sections. Leave small plugs of existing soil and vegetation where future connection is to be made.	June 1–September 30	2 excavators (325 or 330), 2 tenor twenty yard dump trucks, 1 dozer, 2 loaders, 1 water truck, 1 backhoe, 1 one ton pickup truck workers:12
Install temporary irrigation and winterization measures. Demobilization – removal of equipment from the 100-year floodplain	October 1–15	1 dozer, 1 water truck, 1 loader, 1 excavator, 1 ten or twenty yard dump truck, 1 one ton pickup truck, 1 tub grinder, hydroseeder and strawmulcher, 2 equipment transport trucks (1 week) workers: 12
Year 2 – Off-Channel Monitoring		
Mobilization, additional access roads, and BMP installation and repairs	May 15–30	1 equipment transport truck, 1 excavator, 1 one ton pickup truck workers: 6
Off-channel vegetation maintenance and monitoring. Pre-wet the new (and still isolated) channel segments, using partial diversion of the Upper Truckee River. This step would not disturb the existing channel.	June 1–October 30	2 truck or trailer mounted water pumps, 2 water trucks, 1 one ton pickup truck, workers: 4
Golf course removal efforts would include removal of tees, greens, fairways, other non-native vegetation, bridges, and cart paths in all areas. Irrigation pipes would be abandoned in place unless exposed during restoration activities. Golf course landscape areas not adjacent to the river would be tilled and seeded with low cost native seeds to allow soils to amend.	June 1–September 30	2 excavators (325 and 330), 3 ten or twenty yard dump trucks, 2dozers, 2 loaders, 1 water truck, 1one ton pickup truck, 1 grader, 1 backhoe, 1 roller, 1 forklift, 1 hydroseeder and 1 strawmulcher workers: 16
Install temporary irrigation and winterization measures. Demobilization – removal of equipment from the 100-year floodplain.	October 1–15	1 dozer (approx Cat D6),1 excavator (approx Cat 330), 1 ten or twenty yard dump truck, 1 loader, 1 water truck, 1 one ton pickup truck, 1 tub grinder, 1 hydroseeder, 1 strawmulcher, and 2 equipment transportation trucks workers: 12
Year 3 – In-Channel Work, Removal of Existing Bridges, and Connection of Off-Channel Sections That Connecting and Re-Watering of Restored Channel Would Only Occur if Sufficient Re-Vegetation. Otherwise Delay Additional Year as Needed		
Mobilization for in- channel construction activities. Additional access roads and BMP installation and repairs.	May 1–15	2 equipment transport trucks (1 week), 1 ten or twenty yard dump truck, 1 dozer (approx Cat D6), 1 excavator (approx Cat 330), 1 loader, 1 water truck, 1 forklift, 1 one ton pickup truck, 3 chain saws, 1 tub grinder workers: 10

Table 2-10 Alternative 5 Construction Phasing, Equipment, and Workers		
Activity	Duration	Equipment and Workers
Off-channel vegetation maintenance and monitoring Pre-wet new (and still isolated) channel segments, using partial diversion of the Upper Truckee River. Use this water to flush constructed segments and pump and spray turbid water onto floodplain to infiltrate and water vegetation treatments. This step would not disturb the existing channel.	May 1–October 15	2 truck or trailer mounted water pumps, 2 water trucks, 1 one ton pickup truck workers: 4
Install biotechnical/bank stabilization treatments, woody debris and segment and armored riffles or gravel in existing channel sections. Reconnect off-channel sections. Excavate and vegetate the inset floodplain. Unnamed creek enhancement and construction of new alignment of the mouth of the unnamed creek with bed-elevation adjustment. Reconfigure lower reach of Angora Creek to adjust for the new confluence with the proposed river channel and its finished bed elevation. Remove existing five bridges on the Upper Truckee River, bridges and culverts on unnamed creek, and four bridges across Angora Creek. Floodplain modifications including remove levees and restore floodplain outside temporary (if applicable) golf course layout. Modify former stormwater pond to create wetland/oxbow feature. Transport material from stockpile storage (and/or import as needed) and backfill to desired level the abandoned sections of the existing channel, including placement/construction of subsoil and addition of soil treatments as needed for groundwater and soil moisture benefits. Apply seed or vegetation transplants and mulch.	June 1–September 30	2 excavators (325 or 330), 3ten or twenty yard dump trucks, 2 dozers, 2 loaders, 1 water truck , 2 pickup trucks, 1 backhoe, 2 cranes,(1month) 1 roller, 1 hydromulcher and 1 straw mulcher (2 month) workers: 16
Install temporary irrigation and winterization measures Remove the temporary disturbances of all access points and staging and storage areas, which includes revegetation activities where needed. Formally demobilize from the site.	October 1–15	1 dozer (approx Cat D6),1 excavator (approx Cat 330), 1 ten or twenty yard dump truck, 1 loader, 1 water truck, 1 one ton pickup truck, 1 tub grinder, 1 hydroseeder, 1 strawmulcher, and 2 equipment transportation trucks workers: 12
Year 4 – Items Not Completed In Previous Year		
Construction activities would only occur in Year 4 if the condition of revegetation in new channel segments, reconnected meanders, and restored floodplain was not adequate to allow for completion in Year 3. If channel segments were not able to be reconnected in Year 3, those elements would be delayed until Year 4. Year 4 activities would commence with mobilization activities and would include the same tasks as listed under Year 3.		
Note: Final phasing approach may be modified to accommodate needs of State Park, their concessionaire, or the contractor as needed.		

PRELIMINARY QUANTITIES

Preliminary quantities of material to be excavated and the cut-and-fill balance for Alternative 5 are summarized in Table 2-11. Estimated quantities related to the river restoration use the existing and proposed channel dimensions and lengths as the basis for assumed volumes. At this conceptual stage of design, no adjustments have been made for the density or composition of existing materials or for compaction requirements of backfill areas.

Several particular river treatments (e.g., boulder steps, armored riffles, rock armored bank and portions of channel gravel treatments) require specific weight and sized material. For the purposes of traffic evaluations, these materials are not assumed to be available in the on-site excavated materials, but would be brought in from off-site

sources. It is possible that some reusable materials would be salvaged on-site, reducing the eventual need for imported material. Existing bank treatments, bridge footings/abutments, and some of the golf course hardscape and sod to be removed may require off-site disposal. Fourteen bridges would be hauled off-site on separate flat bed trucks.

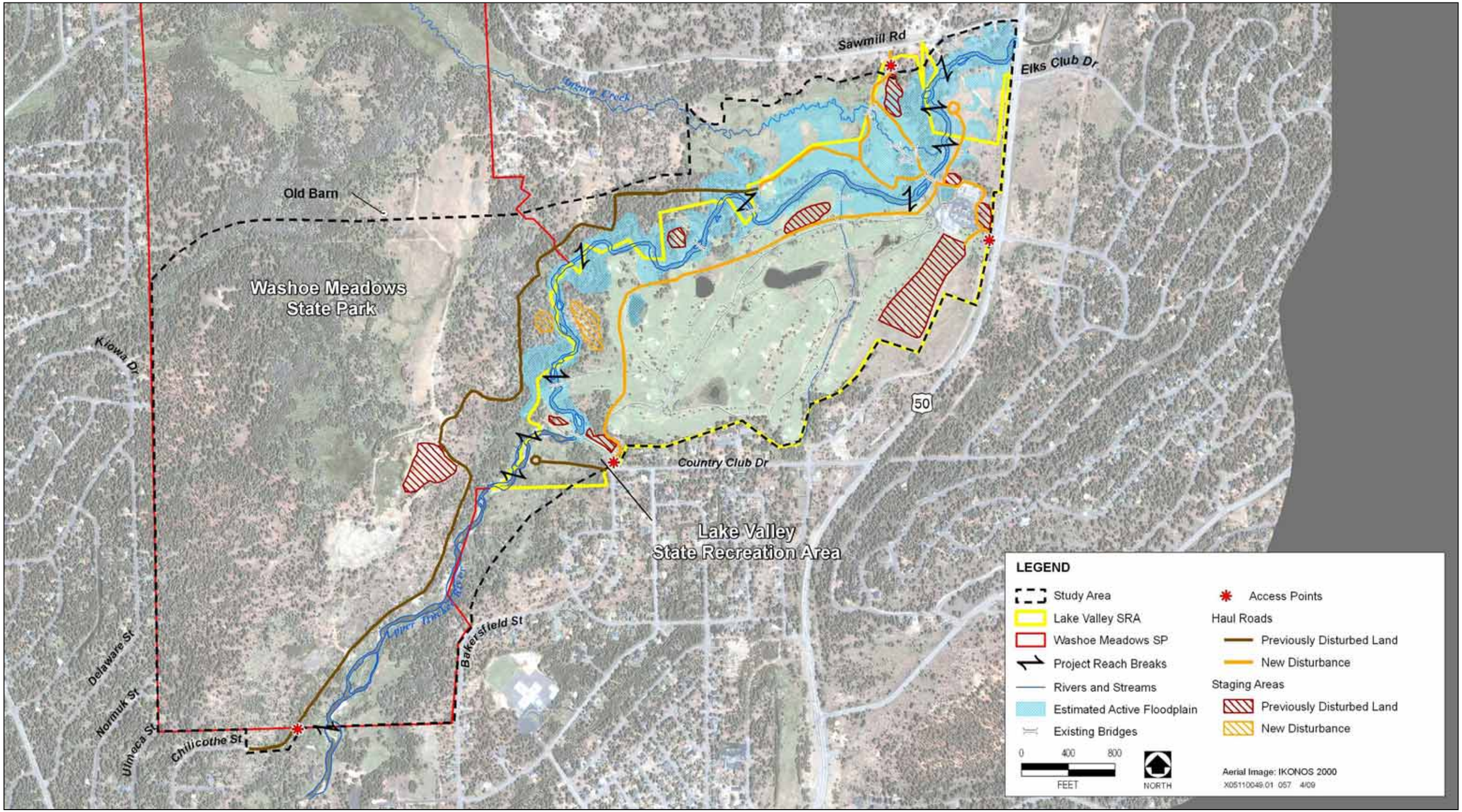
Table 2-11
Preliminary Quantities (Cubic Yards) for Alternative 5

Treatment Area/Activity	Approximate Cut Volume	Approximate Fill Requirement
Newly constructed channel	11,000	0
Reconnected historic meanders	8,300	0
Modified existing channel	0	1,000
Boulder steps	4,700	6,200
Armored riffles	8,300	16,500
Other channel bed features	0	0
Existing bank treatments	1,400	0
Proposed bank treatments	2,400	2,400
Inset floodplains	10,800	0
Backfilled channels (assume partial to complete)	0	43,300 to 58,000
Floodplain fill removal	1,000	0
Modified unnamed creek	160	90
USGA-approved sand and base	0	0
Asphalt	900	0
Base Rock	2,100	0
Concrete	24	0
Sod	15,250	0
Trails	0	0
Bridges	14 bridges	0 bridges
Total	**81,560**	**69,490 to 84,190**

Calculations are estimates based on conceptual design and would be modified, as appropriate, during final design.
Source: Data prepared by EDAW, Inc. (now AECOM) and Valley & Mountain Consulting, 2008.

ACCESS, STAGING, AND STORAGE

The proposed access points, temporary routes, staging, and storage areas for Alternative 5 are illustrated in Exhibit 2-13. All construction activities for the river ecosystem restoration and the removal of golf course infrastructure would be accessed through the existing golf course. Street access points could include the existing golf course entrance off U.S. 50, the existing entrance off Country Club Drive, and the gravel access roads off Sawmill Road and Chilicothe Street. The access facilities, notifications, and procedures would be the same as in Alternative 2. Construction staging areas would be established in the study area on previously disturbed land and/or high-capability land, and would be secured to prevent unauthorized access. Temporary erosion control fencing and (if needed) an approved refueling station would be incorporated into each staging area where appropriate.



Source: Data Provided by State Parks in 2009, data adapted by AECOM in 2009

Access, Staging, and Storage for Alternative 5

Exhibit 2-13