3.0 ALTERNATIVES CONSIDERED

As summarized in section 1.2 Project Background, the Project was originally conceived as two separate projects. As a result, two sets of alternatives were developed and evaluated independent from each other. The two sets of alternatives have since been merged together into the Project. NEPA requires that an environmental assessment include a brief discussion of alternatives. Therefore, pursuant to the NEPA regulations, the alternatives are presented here.

The alternatives were evaluated by the County and a Technical Advisory Committee (TAC) that was established to provide input from permitting and responsible public agencies. The TAC included staff from the following entities:

- County of Placer
- Tahoe Regional Planning Authority (TRPA)
- Lahontan Regional Water Quality Control Board (LRWQCB)
- U.S. Forest Service (USFS)
- U.S. Bureau of Reclamation (Reclamation)
- California Department of Transportation (Caltrans)
- North Tahoe Public Utility District (NTPUD)
- California Tahoe Conservancy (CTC)

The TAC was convened for numerous meetings throughout the development of the Project to review and comment on the goals, needs, objectives, and implementation actions for the Project. This review process informed the development of alternatives. Ultimately, the TAC's consideration of the alternatives resulted in the development of the Project as a synthesis of the most appropriate elements of the alternatives. Minutes for all TAC meetings are on file at Placer County and TRPA offices.

3.1 Watershed Improvement Alternatives

Previous watershed improvement (WIP) work included an existing condition assessment (MACTEC 2003b) that identified and evaluated sites for potential water quality improvements and proposed 14 water quality concept alternatives. The Technical Advisory Committee (TAC) selected four of the 14 concept alternatives in December 2002 for further consideration. Placer County subsequently prepared a *Hydrologic Conditions Report* (Placer County 2006b) that summarized and enhanced the four alternatives, provided details and modifications, and consolidated appropriate elements from two of the alternatives into one hybrid alternative, resulting in three alternatives. The three alternatives were further developed and described in the *Review Alternatives Memorandum* (Placer County 2006d), and evaluated in the *Evaluating Alternatives Technical Memorandum* (Placer County 2006e).

Each of the WIP alternatives were thoroughly evaluated by the TAC to determine their effectiveness in achieving the Project objectives and to identify any constraints posed by the alternatives. The evaluation primarily focused on the water quality improvement potential, capital costs, and construction issues (including traffic disruption) for implementation of each alternative. Consideration was also given to permitting requirements and public and funding support for each alternative. In addition, the advantages and constraints related to operation and maintenance of the alternatives and the expected land acquisition requirements were assessed.

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3.1.1 Summary of the WIP Alternatives

The WIP alternatives consisted of three different approaches based on land area. These three approaches for addressing urban runoff and water quality became the basis of the more fully developed alternatives summarized below. The alternatives were described in detail and evaluated in a memorandum prepared by Placer County and reviewed by the TAC in the *Evaluating Alternatives Technical Memorandum* (Placer County 2006e), incorporated herein by reference. Please refer to that document for more detailed information, including maps. All potential environmental effects of each alternative were assessed for each issue area evaluated in Section 4.0. The results of the assessment are presented in the following sections.

WIP Alternative A: Localized Approach

Alternative A was a localized approach to runoff treatment. The localized approach would collect and treat urban runoff from areas smaller than the sub-watersheds (shown in Figure 3); these areas would each be approximately the size of a street block. Alternative A would primarily use settling basins and sediment traps to treat runoff. The approach of this alternative was to reduce the runoff volume and peak flow at State Route 28 by storing runoff at numerous locations throughout the watershed, and promoting infiltration through a series of vegetated swales, infiltration galleries, and detention basins.

Alternative A would not present any substantial construction issues. No large features (e.g. large detention basins) were proposed. Construction activities would primarily involve conventional excavation techniques and would result in short-term air emissions from equipment and construction noise. These activities would include some grading and exposure of soil to erosion during the construction period. Alternative A would result in traffic disruptions during the construction period. The disruptions would be expected to last only one season. Traffic disruptions would be minimal and limited in extent due to the small isolated construction areas.

Alternative A would not require any new equipment purchases because this alternative would expand only on the size and number of existing facilities. Maintenance activities and costs would result from a need to clean the additional sediment traps/drop inlets and settling basins, as well as maintain any roadside ditches, storm drain pipes or curb-and-gutters. The Coon Street SEZ would require regular maintenance to avoid erosion or debris jams.

Alternative A would require the purchase of six private parcels, including a parcel owned by AT&T Corporation. About 100 feet of isolated easements for roadside channels, culvert inlet and outlets, and basins would also be necessary.

WIP Alternative B: Basin-wide Approach

Like Alternative A, Alternative B would use settling basins and sediment traps to slow and treat runoff, but Alternative B would collect runoff from each sub-watershed, directing the runoff to large treatment facilities located closer to the Commercial Core. In addition, selected areas would have storm drain pipes, curb-and-gutter, and infiltration areas to slow, treat, and redirect runoff and reduce pollutant loads to the lake. Forest and upgradient surface runoff would be redirected and treated in traditional sediment basins, then discharged directly to the lake, bypassing the Commercial Core. This approach would collect more runoff than Alternative A along the lower half of the Project area, reducing the volume of runoff and peak flow at State Route 28.

Excavations of roadside ditches would be required under this alternative, unlike Alternative A, and a pipeline to redirect forest runoff would also be needed.

Under Alternative B, construction would interfere with existing utilities and the need to cross the highway at several locations. Construction activities would also result in short-term air emissions, construction noise, and exposure of soils to erosion during construction. Known hazardous

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materials sites (related to fuel storage leaks and reported spills) could impact the feasibility and costs of construction of proposed basins. Additionally, construction in these areas could result in exposure of workers and the environment to hazardous materials. Impacts to biological resources could include disturbance of spotted owl or northern goshawk nesting in the vicinity of the Project, disturbance of Tahoe yellow cress in the area of outfalls to the Lake, and increase in the potential for invasive weeds. Alternative B would require construction activities along several streets and rerouting of traffic through residential areas would be necessary. These impacts would be similar to those described for the Project in Section 3.0 of this environmental document. Construction could last three to four (3-4) construction seasons.

Alternative B would not require any new equipment purchases as this alternative would expand only on the size and number of existing facilities. Maintenance activities and costs would be higher compared to Alternative A due to the increased number and size of the facilities proposed. As with Alternative A, the Coon Street SEZ would require regular maintenance. Occasional maintenance on the forest runoff pipe and curb-and-gutter locations would also be required with this alternative.

Alternative B would require the same six parcels as Alternative A. Additionally, 200 feet of roadside easements would be required.

Alternative B would offer the best fine sediment reduction of the three alternatives.

WIP Alternative C: Regional Approach

Alternative C would utilize a regional approach, and would be the most comprehensive at collecting and treating runoff. Runoff from the entire Project boundary (except Griff Creek) would be directed to several treatment facilities located south of the Commercial Core. Collected water would first be treated by sediment traps, then conveyed to settling basins, then to sand filters, followed by media filters before discharging to the lake. Each of the treatment features would slow runoff, and in the case of sediment traps and settling basins, promote infiltration.

Alternative C would have extensive curb-and-gutter and physical water treatment facilities. With this alternative, all sub-basin runoff would be directed to treatment facilities before discharging to the lake; however, due to the limited flow capacity of sand filters, during large storm events not all runoff would be treated and some overflow would be discharged to the lake without treatment.

Construction of Alternative C would interfere with existing utilities and the need to cross the highway at several locations. Construction of larger filtration units to treat the runoff would require relatively deep excavations. Under Alternative C, construction would take place over three to four construction seasons. Extensive road disruptions would occur due to placement of curb-and-gutter and storm drains.

Alternative C would have the highest number of sediment traps/drop inlets and settling basins within the Project area that would require regular maintenance and cleaning. The new curb-and-gutter throughout the Project area would also need to be maintained in addition to the Coon Street SEZ. The media filters would need to be cleaned and maintained (or replaced), and the water used to clean the filters would need to be disposed.

The environmental impacts related to implementation for Alternative C would be similar to those described for the Project in Section 4.0 of this document. These impacts would include short-term construction noise, temporary air emissions, potential disruption of spotted owl and northern goshawk nesting, exposure of soil to erosion (and related water quality degradation), failure of unstable soils/sediments, exposure of workers and the environment to hazardous materials, and temporary disruption of traffic.

Alternative C would require the least amount of land to be purchased, as no parcels would be required with this alternative. Alternative C would require the purchase of 1,000 feet of easements in

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the Project area to install curb-and-gutter. There would also be a possibility of unknown property concerns when installing storm drains and curb-and-gutter.

Summary of WIP Alternatives Evaluation

The final rankings determined by the TAC evaluation of WIP alternatives indicated that Alternative A and B were similar under several of the evaluation criteria such as Operations and Maintenance and Land Acquisition. The evaluation indicated that the most significant differences were related to water quality benefits. The unit cost per water quality benefit also showed that while Alternative B was more expensive than Alternative A, the benefits for improvement in water quality were greater. The largest limitation to water quality improvement with Alternative C was that the filtration systems were limited by flow capacity.

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Evaluation Criteria	Weighting Value	WIP Alternative A	WIP Alternative B	WIP Alternative C
Water Quality	40%	1	3	2
Capital Cost	20%	3	2	1
Feasibility	10%	3.5	3.0	2.7
Operations and Maintenance	20%	4	4	3
Land Acquisition	10%	3	3	5
Final Rank		2.45	3.0	2.37

Table 4. Summary of Watershed Improvement Alternative Rankings

The recommended WIP alternative was Alternative B, the basin wide approach, with some additional media filters which were proposed in Alternative C. A combination of Alternative B and Alternative C would provide the best opportunity for water quality improvement; Alternative B would reduce fine sediment loads, and the addition of media filters at the bottom of the watershed would further reduce fine sediment loads to the lake.

The alternatives analysis resulted in a rigorous development of a feasible and effective approach to water quality improvement specific to the Kings Beach area. The alternatives analysis presented in the preceding paragraphs define the Project as the recommended alternative for water quality improvements within the Project area.

3.2 Griff Creek SEZ Restoration Alternatives

The primary conclusion of the SEZ Existing Conditions and Alternatives Report (Placer County 2006a) was that the greatest opportunity to improve pollutant filtering and to stabilize channel morphology in the Griff Creek SEZ was prevention of further channel degradation and improved floodplain connection. While urban development has eliminated many historic floodplain areas, several existing undeveloped floodplain parcels still exist in Kings Beach. Some of these parcels still function as active floodplains, while many others are now not functional as floodplain areas (i.e., abandoned).

As mentioned in the Project Description, twenty priority areas were identified in which water quality, geomorphic channel stability, floodplain connectivity, riparian habitats, and fish passage could be improved by addressing an existing problem or taking advantage of an enhancement opportunity (see Table 3). These priority areas are referred to as Enhancement Sites, and are shown in Figure 7. Each Enhancement Site would have up to three restoration alternatives that could be implemented.

The Enhancement Site alternatives offered different approaches that varied in complexity from constructing in-channel grade control and bank stabilization structures, to replacing pipe culverts with bottomless arch culverts or bridges, and enhancing floodplain connectivity by excavating new floodplains. When possible, publicly owned parcels (e.g., CTC, Placer County) were incorporated

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into the alternatives. At some locations, however, drainage easements or purchases of private property would be required to implement an alternative.

3.2.1 Summary of the Griff Creek SEZ Restoration Alternatives

The three restoration alternatives could be applied to the 20 Griff Creek Enhancement Sites in a myriad of ways. This analysis evaluates the specific potential environmental effects, and detailed descriptions of the Griff Creek SEZ restoration alternatives, including concept drawings, are available in the SEZ Improvement Plan (Placer County 2006c), incorporated herein by reference.

Griff Creek SEZ Restoration (Griff) Alternative 1

Alternative 1 proposed installation of in-channel structures (check dams, rock weirs, and large woody debris) to reduce erosion and promote overbanking. Alternative 1 would require the least amount of excavation and very little road undercrossing work, and therefore would result in the least amount of traffic disruption. Alternative 1 would require purchase of some easements to gain access to private property. Alternative 1 provides the least amount of environmental benefits compared to Alternatives 2 and 3.

Griff Creek SEZ Restoration (Griff) Alternative 2

Alternative 2 proposed in-channel structures as well as a moderate amount of excavation adjacent to the existing channel to create inset flood plains and new channels. Alternative 2 proposed a moderate amount of road undercrossing work, which would result in moderate traffic disruption. Alternative 2 would also require an extensive number of easements or other agreements to enable work to proceed. Alternative 2 would provide more environmental benefits compared to Alternative 1, but not as much as Alternative 3.

Griff Creek SEZ Restoration (Griff) Alternative 3

Alternative 3 proposed considerably more flood plain excavation and road undercrossing work than Alternatives 1 and 2, therefore causing the greatest amount of traffic disruption as well as potential short-term impacts to existing natural resources. Alternative 3 would require easements and outright purchase of property to enable work to proceed. Alternative 3 would provide the greatest environmental benefits, compared to Alternatives 1 and 2.

Summary of Griff Creek SEZ Restoration Alternatives Evaluation

Each alternative developed for improvements to Griff Creek was determined to be feasible. All of the alternatives were evaluated by the TAC to create the most appropriate final improvement plan. Determination of which alternatives would be recommended was an iterative process that required balancing the need to achieve as much improvement in water quality and ecological value as possible while considering the practicality of implementing a measure due to constraints such as cost, construction, and access onto private property. Furthermore, the need to select alternatives that would be compatible with selected alternatives up and downstream of a given enhancement site was also factored into the evaluation.

Following evaluation, Griff Alternative 2 was recommended for sites 1-7, 9, 14, and 16; Griff Alternative 3 was recommended for sites 8, 10 and 13; and Griff Alternative 1 was recommended for sites 11-12, 15, and 17-19. At Site 20, the TAC recommended "No Action."

After the recommendations were made, funding constraints caused the restoration design to be scaled back. The design was revised accordingly, and the revised recommended restoration actions are now integrated into the Project. Please refer to Table 3 for the final recommended Griff Creek SEZ restoration actions.

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