

Appendix A CEQA Checklist

Appendix A

Project Impacts CEQA Checklist for Alternative 2

The CEQA checklist was used to identify potential project impacts based on the criteria identified in section 4 for Alternative 2. The following pages include the completed CEQA Environmental Checklist Form with information to support each answer to the checklist questions. CEQA requires a brief explanation of all answers except for those answered as “No Impact”. CEQA also requires information sources supporting a “No Impact” answer. Information sources are included for each “No Impact” answer as well as brief explanations of all other answers. The subheadings for each resource area specify the section within the joint NEPA/CEQA/TRPA document where these issues are addressed.

Environmental Checklist

1.	Project title: Upper Truckee River Restoration Project, Middle Reaches 3 and 4.		
2.	Lead agency name and address: <i>City of South Lake Tahoe</i> <i>1052 Tata Lane, South Lake Tahoe, CA 96150</i>		
3.	Contact person and phone number: <i>Jennifer Quickel, Assistant Engineer (530) 542-6036</i>		
4.	Project location: <i>South Lake Tahoe, California</i>		
5.	Project sponsor's name and address: <i>City of South Lake Tahoe</i> <i>1052 Tata Lane, South Lake Tahoe, CA 96150</i>		
6.	General plan designation: <i>PAS 095 Trout/Cold Creek PAS 100 Truckee Marsh and PAS 116 Airport</i>	7.	Zoning: <i>Same as #6.</i>
8.	Description of project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.) <i>See Section 3 Project Description in the Upper Truckee River Restoration Project, Middle Reaches 3 and 4, Joint Environmental Document – Alternative 2 – New Channel East of the Airport (Recommended Alternative).</i>		
9.	Surrounding land uses and setting: Briefly describe the project's surroundings: <i>Privately-owned undeveloped land, vacant State of California land, vacant USFS land and Lake Tahoe Airport. See Section 4.13 Land Use in the Upper Truckee River Restoration Project, Middle Reaches 3 and 4, Joint Environmental Document.</i>		
10.	Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.) <i>US Army Corps of Engineers, Bureau of Reclamation, Tahoe Resource Conservation District, Tahoe Regional Planning Agency, California Tahoe Conservancy, California Department of Fish and Game, City of South Lake Tahoe, and California Regional Water Quality Control Board – Lahontan and South Tahoe Public Utility District.</i>		

Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

	Aesthetics		Agriculture Resources		Air Quality
	Biological Resources		Cultural Resources		Geology /Soils
	Hazards & Hazardous Materials		Hydrology / Water Quality		Land Use / Planning
	Mineral Resources		Noise		Population / Housing
	Public Services		Recreation		Transportation/Traffic
	Utilities / Service Systems		Mandatory Findings of Significance		

Determination (To be completed by the Lead Agency)

On the basis of this initial evaluation:

	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.
Signature _____	Date _____

Evaluation of Environmental Impacts

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).
2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).
5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). In this case, a brief discussion should identify the following:
 - a. Earlier Analysis Used. Identify and state where they are available for review.
 - b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.
 - c. Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.
6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.
9. The explanation of each issue should identify:
 - a. the significance criteria or threshold, if any, used to evaluate each question; and
 - b. the mitigation measure identified, if any, to reduce the impact to less than significance

Issues

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?			X	
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				X
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				X

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X	
d) Expose sensitive receptors to substantial pollutant concentrations?				X
e) Create objectionable odors affecting a substantial number of people?				X
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?			X	
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?			X	

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?				X
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X
d) Disturb any human remains, including those interred outside of formal cemeteries?			X	

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
VII. HAZARDS AND HAZARDOUS MATERIALS B -- Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			X	
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X
VIII. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?			X	

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			X	
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			X	
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X	
f) Otherwise substantially degrade water quality?			X	
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
j) Inundation by seiche, tsunami, or mudflow?				X
IX. LAND USE AND PLANNING -- Would the project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X
X. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X
XI. NOISE B -- Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				X
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			X	
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?			X	
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X
XII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				X
Fire protection?				X

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
Police protection?				X
Schools?				X
Parks?				X
Other public facilities?				X
XIV. RECREATION				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?			X	
XV. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			X	
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?			X	
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?				X

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
f) Result in inadequate parking capacity?				X
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X
XVI. UTILITIES AND SERVICE SYSTEMS B -- Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project=s projected demand in addition to the provider=s existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project=s solid waste disposal needs?				X
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X

	<i>Potentially Significant Impact</i>	<i>Less Than Significant with Mitigation Incorporation</i>	<i>Less Than Significant Impact</i>	<i>No Impact</i>
XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			X	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?				X

CEQA Checklist Analysis

All of the CEQA checklist questions were answered as “Less Than Significant Impact” or “No Impact”.

I. Aesthetics – Section 4.2

Would the project:

- a. Have a substantial adverse effect on a scenic vista?

No Impact. The project would improve the scenic quality to the area. No scenic vistas will be impacted. The project area is located along the Upper Truckee River Corridor adjacent to the Lake Tahoe Airport and Mosher grazing property. It is surrounded by the Mosher grazing property and public land owned by the US Forest Service, California Tahoe Conservancy and the City of South Lake Tahoe. The public land areas provide a buffer between the river and neighboring subdivisions. The project area will be visible from the Airport property, Barton Tract subdivision and the recreation trail traveling along the eastern side of the Upper Truckee River. There may be some short-term impacts during construction with the presence of construction equipment and grading activities.

- b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. Project is not proposed within a state scenic highway according to the project area map.

- c. Substantially degrade the existing visual character or quality of the site and its surroundings?

Less Than Significant Impact. The project will improve the scenic quality of the site because restoration and revegetation is a major part of the project. However, there will be short-term impacts during construction. Since these impacts are temporary they are considered to be less than significant.

- d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

No Impact. The project does not include any new sources of light or glare in the project description or on the project plans.

II. Agriculture Resources – Section 4.3

Would the project:

- a. Convert prime farmland, unique farmland, or farmland of statewide importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

No Impact. No disturbance is proposed on any agricultural resources.

- b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?

No Impact. The project would not result in a conversion of any existing agricultural land to a non-agricultural use.

- c. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

No Impact. Proposed restoration activities will not affect adjacent grazing land.

III. Air Quality – Section 4.4

Would the project:

- a. Conflict with or obstruct implementation of the applicable air quality plan?

No Impact. The project would not result in the construction or operation of any new stationary sources of emissions, and would not result in increased regional growth. Therefore, this project would not conflict with or obstruct the implementation of an applicable air quality plan.

- b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

Less Than Significant. The CSLT has determined that air quality impacts are less-than-significant based on the guidance provided by the El Dorado County APCD in its Guide to Air Quality Assessment: Determining Significance of Air Quality Impacts Under the California Environmental Quality Act (Guide) (February 2002). Construction controls as mitigation measures will be included in the project plans and specifications to eliminate the potential of violating any air quality standard or contribute substantially to an existing or projected air quality violation. These controls are discussed in Section 4.4 Air Quality.

- c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under the applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

Less Than Significant. Construction controls to be included in the project plans and specifications as mitigation measures would reduce construction emissions to less-than-significant levels avoiding contributing to a cumulatively considerable net increase of any criteria pollutant. These controls are discussed in Section 4.4 Air Quality.

- d. Expose sensitive receptors to substantial pollutant concentrations?

No Impact. There are no sensitive receptors adjacent to or within the project area.

- e. Create objectionable odors affecting a substantial number people?

No Impact. This project is a habitat and stream restoration project and would not create stationary or long-term sources of odor such as at wastewater treatment plants. Any odors attributed to construction emissions would be short-term and rapidly dissipated by air movements.

IV. Biological Resources – Sections 4.5, 4.6, 4.7 and 4.8

Would the project:

- a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less Than Significant. Several special status wildlife species (Federal, State or TRPA) could occur in the project area for foraging or breeding. These include the following:

- *Bald eagle – USFWS de-listed, TRPA Species of Special Interest*
- *California spotted owl – USFS LTBMU Sensitive Species, TRPA Species of Special Interest*
- *Northern goshawk – USFS LTBMU Sensitive Species, TRPA Species of Special Interest*
- *Great grey owl – USFS LTBMU Sensitive Species*
- *Willow flycatcher – USFS LTBMU Sensitive Species, California State-listed Endangered*
- *Mallard/Waterfowl – USFS LTBMU Management Indicator Species, TRPA Species of Special Interest*
- *Mule deer – USFS LTBMU Management Indicator Species, TRPA Species of Special Interest*
- *Sierra Nevada Red Fox – USFS LTBMU Sensitive Species*
- *American marten – USFS LTBMU Sensitive Species*
- *Great basin rams-horn snail – USFS LTBMU Sensitive Species*

Of the species listed above only the Northern goshawk, Willow flycatcher and Mallard/Waterfowl have been observed within the project area. The Northern goshawk is

considered to be a Sensitive Species for the USFS- LTBMU. The USFS surveyed for the Northern goshawk in 2004. A nesting site is located approximately 800 feet northwest of the north end of the SLT Airport runway. The project would cause disturbance within a .5 mile threshold radius defined by TRPA from the nest. The nest has not been active since 1989. No goshawks have been detected within the project area during 2004 surveys. A Limited Operating Period (LOP) between February 15 through September 15 may apply if goshawks are detected during future surveys. Protocol level surveys will be required prior to project construction.

The Willow fly catcher is considered to be a Sensitive Species for the USFS-LTBMU and a California State-listed Endangered Species. The project would disturb Willow Fly Catcher habitat along the river corridor. Prior to project implementation, protocol-level surveys for willow flycatchers will be required to be conducted in suitable riparian/meadow habitat within 300 feet of a proposed project activity. If willow flycatchers are detected, a LOP between June 1 and August 31 will be imposed. The location of the LOP will be determined by the consulting wildlife biologist based on site conditions and the type of project activity. If no surveys are conducted, an LOP will automatically be implemented in suitable habitat within 300 feet of any project activities. Protocol level surveys require 2 visits. One must be conducted between June 15-25, while the second can be conducted between June 1-14 or between June 26-July 15. If snow is gone and spring conditions prevail, the first survey can be conducted the first week of June and the second can be completed the week of June 15. Overall, the project is expected to increase channel length by 14 percent which would be a benefit to Willow flycatcher habitat once the project is completed.

Construction would occur in Mallard/Waterfowl habitat in the project area. However, the project is for the purpose of habitat restoration and will result in improved habitat conditions once the project is completed.

Construction impacts could occur to existing migratory bird nests within the project area during tree removal. A tree nest survey will be conducted prior to tree removal for any trees proposed to be removed between April 1 and August 15. If trees with nests are identified during this survey they will be marked and a buffer area developed. These trees will not be removed until the nests are gone or after August 15.

Short term impacts to riparian vegetation and aquatic habitat could occur during construction. This project proposes an improvement to the riparian habitat through revegetation with native species throughout. Removal of fill material between the Airport and the river channel combined with revegetation efforts will expand riparian and meadow habitat as well as wetland area. Aquatic habitat disturbances would occur during construction, however, mitigation measures have been identified to bring impacts to a less than significant level. Mitigation measures for construction disturbances to aquatic habitat, wildlife resources, vegetation and wetlands are identified in Sections 4.5, 4.6, 4.7 and 4.8 respectively. Overall, the project proposes an improvement to aquatic, wildlife and vegetation habitat and wetlands.

- b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

Less Than Significant. See answer a above..

- c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less Than Significant. Wetlands would be impacted during construction, however, the wetland areas will be expanded as part of the project and existing wetlands will be improved and/or restored.

- d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant. The project area contains mapped summer range for the Carson deer herd. No mapped migration routes or critical winter, fawning, or summer range habitat for the Carson Deer Herd occurs in or near the project area. No mule deer or their sign were observed in or near the project.

Fisheries would be disturbed during construction of the project. A Fish and Game permit and US Fish and Wildlife permit will be required prior to construction. Control measures shall be implemented to bring impacts to less than significant levels. Ultimately, the project proposes to improve fish habitat and fish passage. This will be a net environmental benefit for fish and aquatic habitat.

- e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impact. The project is for the purpose of stream and habitat restoration. The proposed project will remove approximately 463 trees over 6" dbh throughout the project. Tree removal is allowed according to TRPA regulations when there is no other alternative for the proposed project. TRPA Governing Board approval is required for removal of over 100 trees 14" dbh or greater prior to project construction. Approximately 192 trees 14 inches dbh or over will be removed as part of the project. Substantial revegetation and restoration is proposed within the SEZ areas and along the existing eroding bank areas. The project will not conflict with any local policies or ordinances protecting biological resources including the TRPA tree removal policy. The project is consistent with the TRPA Environmental Improvement Program and other federal, state and local policies and ordinances which establish goals for restoration and other natural resources throughout the Tahoe Basin.

- f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. The project is for the sole purpose of stream and habitat restoration and is in conformance with all applicable Conservation Plans.

V. Cultural Resources – Section 4.9

Would the project:

- a. Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?

Less Than Significant. None of the historic resources found within the proposed area of disturbance are considered to be significant according to the Upper Truckee River Middle Reach Preliminary Restoration Alternative South Lake Tahoe, El Dorado County, California/Report of Historical Significance of Cultural Resources by Judith Marvin and Linda Thorpe of Foothill Resources, October 2007. This report is included in Appendix G of the Upper Truckee River Restoration Project, Middle Reaches 3 and 4 Joint Environmental Document.

The project cultural resources mitigation measure states:

“In the event of fortuitous discoveries of buried or concealed heritage resources, ground disturbance activities should cease in the area of the find and the project sponsor should consult a qualified archaeologist for recommended procedures. If human remains are inadvertently discovered, California law requires that work must stop immediately and the county coroner must be notified. If the remains are Native American, AB 297 makes it mandatory that the coroner notifies the members of the Washoe Tribe to insure that proper treatment is given to the burial site.”

- b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

Less Than Significant. None of the archaeological resources found within the proposed area of disturbance are considered to be significant according to the Upper Truckee River Middle Reach Preliminary Restoration Alternative South Lake Tahoe, El Dorado County, California/Report of Historical Significance of Cultural Resources by Judith Marvin and Linda Thorpe of Foothill Resources, October 2007. This report is included in Appendix G of the Upper Truckee River Restoration Project, Middle Reaches 3 and 4 Joint Environmental Document.

The project cultural resources mitigation measure states:

"In the event of fortuitous discoveries of buried or concealed heritage resources, ground disturbance activities should cease in the area of the find and the project sponsor should consult a qualified archaeologist for recommended procedures. If human remains are inadvertently discovered, California law requires that work must stop immediately and the county coroner must be notified. If the remains are Native American, AB 297 makes it mandatory that the coroner notifies the members of the Washoe Tribe to insure that proper treatment is given to the burial site."

- c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less Than Significant. No paleontological resources have been identified within the project area.

The project cultural resources mitigation measure states:

"In the event of fortuitous discoveries of buried or concealed heritage resources, ground disturbance activities should cease in the area of the find and the project sponsor should consult a qualified archaeologist for recommended procedures. If human remains are inadvertently discovered, California law requires that work must stop immediately and the county coroner must be notified. If the remains are Native American, AB 297 makes it mandatory that the coroner notifies the members of the Washoe Tribe to insure that proper treatment is given to the burial site."

- d. Disturb any human remains, including those interred outside of formal cemeteries?

Less Than Significant. The project cultural resources mitigation measure states:

"In the event of fortuitous discoveries of buried or concealed heritage resources, ground disturbance activities should cease in the area of the find and the project sponsor should consult a qualified archaeologist for recommended procedures. If human remains are inadvertently discovered, California law requires that work must stop immediately and the county coroner must be notified. If the remains are Native American, AB 297 makes it mandatory that the coroner notifies the members of the Washoe Tribe to insure that proper treatment is given to the burial site."

VI. Geology And Soils - Section 4.10

Would the project:

- a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

- i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

No Impact. The project is a stream and habitat restoration project and will not be developing housing or any other structures where people will gather.

- ii) Strong seismic ground shaking?

No Impact. The project does not propose any construction activity that would qualify as strong seismic ground shaking. The project is a stream and habitat restoration project and will not be developing housing or any other structures where people will gather.

- iii) Seismic-related ground failure, including liquefaction?

No Impact. The project does not propose any construction activity that will result in seismic-related ground failure or liquefaction. The project is a stream and habitat restoration project and will not be developing housing or any other structures where people will gather.

- iv) Landslides?

No Impact. Due to the topography of the project area and the surrounding area, no danger from landslides exists.

- b. Result in substantial soil erosion or the loss of topsoil?

Less Than Significant. The project is a stream and habitat restoration project and will not be developing housing or any other structures where people will gather. Erosion control and stabilization measures will be constructed as part of the project and mitigation measures are identified in Section 4.10.

- c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant. According to the results of CDM's geotechnical study and potholing investigations the site appears to be suitable for proposed restoration activities. Stabilization measures are identified within the project description in Section 3 and mitigation measures are identified in Section 4.10.

- d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

No Impact. According to the results of CDM's geotechnical study the site appears to be suitable for proposed restoration activities.

- e. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

No Impact. The project does not propose the construction of any septic tanks or waste water disposal systems. Sewer transport facilities are located in the project area and will not be disturbed. Construction controls include avoidance and stabilization measures.

VII. Hazards And Hazardous Materials – Section 4.11

Would the project:

- a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

No Impact. The project does not propose the transport, use or disposal of hazardous materials.

- b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

No Impact. The project design does not involve the use of any hazardous materials. One LUST site exists at the Lake Tahoe Airport, however, it is not in the project area, nor near enough to conflict with construction activities.

- c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

No Impact. The project does not propose the transport, use or disposal of hazardous materials and is not located within on-quarter mile of an existing or proposed school.

- d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

No Impact. One LUST site exists at the Lake Tahoe Airport, however, it is not in the project area, nor near enough to conflict with construction activities.

- e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

Less Than Significant. Airport take off and landing procedures would be altered during construction of the project in Year 1 or Year 2 as a result of the proposed Airport Runway Reconstruction project scheduled for the summer of 2008 or 2009. During the Runway Reconstruction project the runway will be closed and aircraft will land on the taxiway.

Airport personnel equipped with aviation radios will be controlling aircraft and vehicle movements during construction hours.

Construction of the project within close proximity to an Airport and within Airport property could have potentially significant public safety and hazard impacts. Mitigation measures are listed in Section 4.11.6 that would reduce potential significant impacts to less than significant during construction. Normal operations at the Airport would already be altered during Year 1 or Year 2 of construction. Years 1 and 3 would experience the majority of travel through Runway Safety Zones. Therefore, Alternative 2 would pose a less than significant impact to public safety and hazards/risk of upset within the project area and surrounding the project area.

A Preliminary Wildlife Hazard Assessment has been conducted for the project area to determine if restoration activities could result in attracting more wildlife that could result in hazards to air traffic. The Preliminary Wildlife Hazard Assessment determined that the project, once constructed, would not result in an increase to the potential of wildlife strikes. This report is included in the Administrative Record for the project at the City of South Lake Tahoe.

- f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. No private airstrip is located near the project area.

- g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

No Impact. The project is to provide water quality improvements to the area. Emergency vehicles will be given access if required through the project area.

- h. Expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are intermixed with wild lands?

No Impact. The project is located in a non urban area, however urban area is located adjacent to the undeveloped land. All construction equipment will be required to include spark arresters to avoid ignition of wild land fires. The project area is located in wet meadow areas where the potential for wildfires is low.

VIII. Hydrology And Water Quality - Section 4.12

Would the project:

- a. Violate any water quality standards or waste discharge requirements?

Less Than Significant. The project is for the purpose of restoration in the area and is being designed to meet water quality standards and waste discharge requirements. BMPs and mitigation measures identified in Section 3 Project Description and Section 4.12 Hydrology and Water Quality will bring potential significant impacts to a less than significant level. Bank stabilization measures included in the project description will ultimately improve conditions within the project area and may help to reduce the occurrence of water quality standards violations in the future.

- b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

No Impact. The project is for the purpose of stream and habitat restoration and will raise the groundwater table in the project area. The project is not expected to deplete groundwater supplies or affect the volume of groundwater available in the project area.

- c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Less Than Significant. The project would alter the existing drainage pattern, however this would be a benefit. The project is to restore this portion of the Upper Truckee River to a more natural channel and increase the floodplain to promote increased overbanking frequency and sediment deposition. A new channel would be constructed which would alter the existing drainage pattern. However, this approach is consistent with current Tahoe Basin restoration management approaches. The goal of the project is to restore plant and wildlife habitat by increasing floodplain area which could result in an overall improvement to the water quality of Lake Tahoe by reducing sediment load reaching the lake. It is anticipated that this action will improve the riparian habitat and ultimately improve water quality. Permanent bank and soil stabilization measures and temporary BMPs will be implemented during construction to help to reduce erosion or siltation on- or off-site.

- d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

Less Than Significant. The project is a stream and habitat restoration project and will be designed to not increase the rate or amount of surface runoff, thus, not increasing flooding potential off-site. Some flooding may occur in newly created wetland and meadow area along the river corridors, however, this will be for the purpose of restoring habitat and will be beneficial to the environment, not posing a threat to any urban area. Entrix has modeled future flooding conditions and no increase in flooding is expected to result. See response to question c above.

- e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Less Than Significant. The project includes construction of a new channel in a portion of the UTR. This would require filling of the existing channel in this area once the new channel is ready to be brought online. Natural materials such as logs, boulders, rocks and gravel are proposed to be placed within portions of the existing river channel to provide bank stabilization and habitat improvements for river restoration efforts. However, these measures would be implemented to restore the river and surrounding meadow area.

During construction, the potential for a discharge to surface waters could increase. Temporary BMPs would be implemented during construction to bring potential impacts to water quality to a less than significant level. These BMPs are described in Section 3 Project Description and Section 4.12 of the Upper Truckee River Restoration Project, Middle Reaches 3 and 4 Joint Environmental Document.

- f. Otherwise substantially degrade water quality?

Less Than Significant. See responses to questions VIII.a through VIII.e above.

- g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

No Impact. The project does not propose any new housing.

- h. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

No Impact. The project is located within the 100-year floodplain of the Upper Truckee River. The project proposes some habitat structures using natural materials such as boulders and logs. These structures may redirect flows into a more natural looking channel for the purpose of stream and habitat restoration. Flows will not be impeded and redirected flows will improve the natural function of the stream and riparian areas.

- i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

No Impact. The project will not increase flooding potential on or off the site.

- j. Inundation by seiche, tsunami, or mudflow?

No Impact. The project does not propose any new development or modifications that could be affected by a seiche, tsunami or mudflow.

IX. Land Use And Planning – Section 4.13

Would the project:

- a. Physically divide an established community?

No Impact. The project does not propose any improvements that could physically divide the community.

- b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

No Impact. The project is consistent with applicable land use plans, policies and regulations. The project will not conflict with habitat conservation plans. The project will restore habitat within the project area. No impacts to land use are foreseen.

- c. Conflict with any applicable habitat conservation plan or natural community conservation plan?

No Impact. The project area is located within a habitat conservation zone. The project is for the purpose of stream and habitat restoration; therefore, it is consistent with the conservation plan for the area.

X. Mineral Resources

Would the project:

- a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impact. No mineral resources are located in the project area.

- b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

No Impact. The project does not propose the use of an important mineral resource. No mineral recovery site is located in the project area.

XI. Noise – Section 4.14

Would the project result in:

- a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

No Impact. Construction noise is exempt from noise limitation regulations according to the TRPA Code of Ordinances. Maximum construction noise levels would comply with El Dorado County noise standards.

- b. Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?

Less Than Significant. Temporary ground borne vibrations or ground borne noise levels may be higher than normal during construction. However, they are not proposed to be excessive beyond normal construction activity. Construction controls are proposed and discussed within the Section 4.14, Noise.

- c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

No Impact. Any increase to ambient noise levels will be temporary during construction. Construction controls are proposed and discussed within the Section 4.14, Noise.

- d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Less Than Significant. Ambient noise levels will be increased during construction. Construction controls are included in Section 4.14, Noise for the project associated with the operation of equipment. All construction equipment shall be equipped with mufflers or equivalent noise-attenuating devices.

- e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Less Than Significant. The project will not result in excessive noise beyond that required for construction.

- f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The project is not within the vicinity of a private airstrip. It is located next to a public airport.

XII. Population And Housing

Would the project:

- a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

No Impact. The project is a stream and habitat restoration project and has no effect on population growth.

- b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. The project is a stream and habitat restoration project and will have no effect on housing.

- c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. The project is a stream and habitat restoration project and will have no effect on housing.

XIII. Public Services

- a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

Fire protection?

No Impact. The project is a stream and habitat restoration project and will not increase demand for fire protection services.

Police protection?

No Impact. The project is stream and habitat restoration project and will not increase demand for police protection services.

Schools?

No Impact. The project is a stream and habitat restoration project and will not increase demand for new schools.

Parks?

No Impact. The project is a habitat and stream restoration project and will not increase demand for new parks.

Other public facilities?

No Impact. The project is a stream and habitat restoration project and will not increase demand for other public facilities.

XIV. Recreation – Section 4.15

- a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impact. The project is a stream and habitat restoration project and will not increase the use of any recreational facilities in the area.

- b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Less Than Significant. Several existing trails along the Airport Reach would be fenced off during construction. These trails are on Airport property and are not open to the public. Because members of the public often use the trails on the Airport property, signs would be posted to warn them of the construction activities and restricted areas. All trail-related impacts would occur on private or restricted property and therefore there would be no impact to public recreation.

Boating on the river through the project area would be restricted periodically during times of low flow when in-channel work is being performed in Years 1, 2 and 3. This is unlikely to affect recreation as boaters are generally not interested in using the river during times of low flow. Signs would be posted upstream at the Elks Club where boaters access the river stating that construction work is being implemented along the river and list restricted time periods. Other areas upstream and downstream of the proposed project site would still be open for boating. The river would be restored at the close of construction and water-related recreation would be allowed to resume. Overall, the project would have a less-than-significant impact to recreation.

XV. Transportation/Traffic – Section 4.16

Would the project:

- a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

Less Than Significant. The project will require the temporary transport of material to and from the site during construction and daily vehicle worker traffic to and from the site. The analysis included in Section 4.16 of the Upper Truckee River Restoration Project, Middle Reaches 3 and 4 Joint Environmental Document determines that the project would have no adverse impacts to automobile traffic and circulation. There could be short term impacts during construction, however, the impacts are not considered to be significant according to applicable traffic standards.

- b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

Less Than Significant. On all roads within the study area, the temporary addition of up to 60 vehicle trips per day would not cause the volume to capacity ratio to exceed 1.0 and therefore not cause a decrease to the LOS. Although the project volume to capacity ratio along Highway 50 would approach 1.0, the existing volume to capacity ratio is already approaching 1.0, and the 0.002 temporary increase to the ratio would not be significant.

- c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Less Than Significant. During construction, heavy equipment would enter the site through the airfield, and this could potentially conflict with air traffic. The transport of equipment would be limited to the beginning and end of the indicated construction periods, with some additional trips when necessary. During the first or second year of construction, the Airport runway project would simultaneously be under construction requiring specific air traffic planning and a reduction in air traffic. This would reduce some of the potential conflict with air traffic operations. In years when the Airport runway project is not under construction, mitigation measures discussed in Section 4.16 of the Upper Truckee River Restoration Project, Middle Reaches 3 and 4 Joint Environmental Document would be required to avoid conflicts and safety hazards associated with the transport of equipment on the airfield.

- d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

No Impact. The project is for the purpose of stream and habitat restoration. No design features will conflict with automobile traffic.

- e. Result in inadequate emergency access?

No Impact. Emergency access will not change as a result of this project.

- f. Result in inadequate parking capacity?

No Impact. The project description includes adequate parking for daily construction workers. No other demand for parking would be created as a result of the project.

- g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

No Impact. The project is a stream and habitat restoration project and will not conflict with any adopted policies, plans, or programs supporting alternative transportation.

XVI. Utilities And Service Systems – Section 4.17

Would the project:

- a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

No Impact. The project will not be discharging any water to the sewer system.

- b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

No Impact. The project is stream and habitat restoration project and does not increase demand for wastewater treatment.

- c. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Less Than Significant. The project description includes the construction of temporary stormwater drainage facilities to be used during construction. The project also proposes the alteration of an existing river channel for the benefit of riparian habitat and other environmental resources. Temporary BMPs will be implemented during construction to bring impacts to water quality to a less than significant level. These measures are described in the Upper Truckee River Restoration Project, Middle Reaches 3 and 4 Joint Environmental Document in Sections 3 Project Description and Section 4.12 Hydrology and Water Quality.

- d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

No Impact. The project is a stream and habitat restoration project and will require the use of water for irrigation during plant establishment. This water will come from either the Upper Truckee River, groundwater or the public water system. Entitlements will be pursued if required.

- e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the projects projected demand in addition to the providers existing commitments?

No Impact. The project will not require a will serve determination from the wastewater treatment provider.

- f. Be served by a landfill with sufficient permitted capacity to accommodate the projects solid waste disposal needs?

No Impact. Solid waste is required to be hauled to a City approved dump site.

- g. Comply with federal, state, and local statutes and regulations related to solid waste?

No Impact. The proposed project would comply with all federal, state, and local statutes and regulations related to solid waste. Fill removed from the site will be disposed of at an approved location on the Airport property.

XVII. Mandatory Findings Of Significance

- a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

Less Than Significant. The project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory. The project will improve fish, wildlife and plant habitat. With mitigation measures imposed during construction the project will not impact cultural resources beyond less than significant levels.

Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past

projects, the effects of other current projects, and the effects of probable future projects)?

Less Than Significant. Other projects planned along the Upper Truckee River and within the Sierra Tract Erosion Control Project area would likely be under construction at some point during the 3-year construction period for the Airport Reach project. Water Quality impacts from construction and during the seasoning period for new channel alignments along the river could occur during a major storm event. BMPs would be implemented along all of the projects along the Upper Truckee River Middle Reach. This would help to reduce impacts to a less than significant level. BMPs proposed for use on the Airport Reach project include those listed in the Upper Truckee River Restoration Project, Middle Reaches 3 and 4 Joint Environmental Document Sections 3 Project Description and 4.12.7 Hydrology and Water Quality. Many of the other Upper Truckee River Restoration projects have not chosen a recommended alternative so BMPs have not been identified. It is likely that most of the projects would implement BMPs similar to those listed in the Joint Environmental Document. A significant amount of coordination between the projects would take place since many of the projects share funding agencies, lead agencies, property ownership and design teams.

- c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

Less Than Significant. The only potential impact to human beings would be a possible wildlife air strike. A Preliminary Wildlife Hazard Assessment has been conducted for the project area to determine if restoration activities could result in attracting more wildlife that could result in hazards to air traffic. The Preliminary Wildlife Hazard Assessment determined that the project, once constructed, would not result in an increase to the potential of wildlife strikes. This report is included in the Administrative Record for the project at the City of South Lake Tahoe.

Appendix B

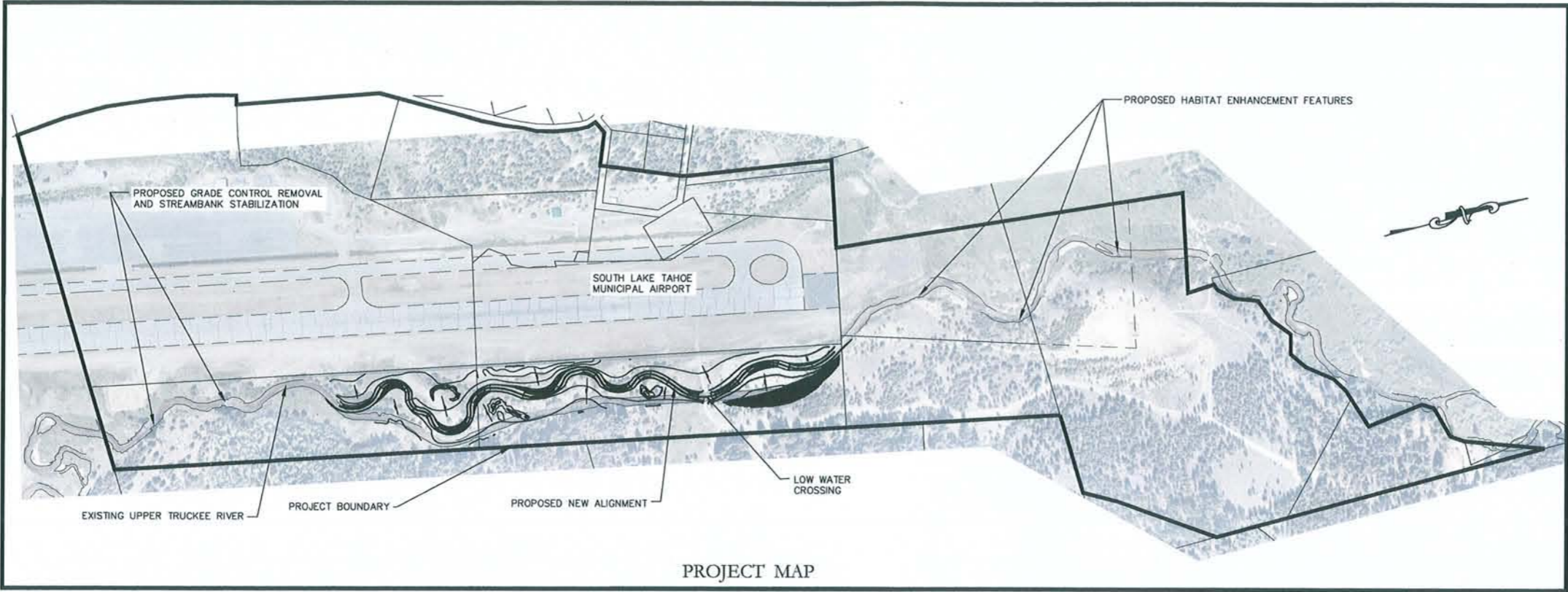
75 Percent Project Plans

PWC# 2003-04
September 2007
BID #

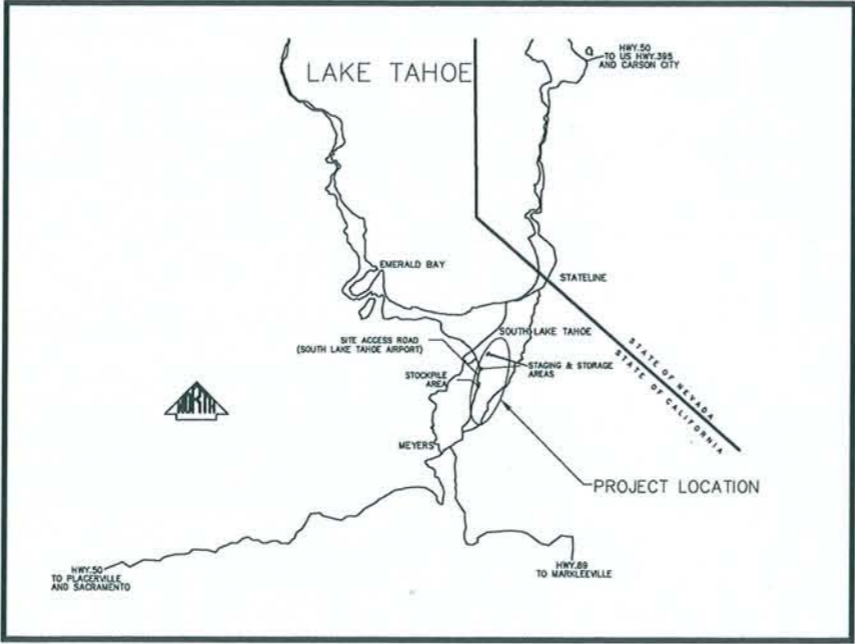
CITY OF SOUTH LAKE TAHOE
CALIFORNIA



UPPER TRUCKEE RIVER MIDDLE REACH
RESTORATION PROJECT - REACHES 3 & 4



PROJECT MAP
SCALE = 1:200



VICINITY MAP
N.T.S.

NOTES:

CONTRACTOR'S LICENSE CLASSIFICATIONS: IN ACCORDANCE WITH THE PROVISIONS OF CALIFORNIA PUBLIC CONTRACT CODE 3300, THE OWNER HAS DETERMINED THAT THE CONTRACTOR SHALL POSSESS A VALID CLASS LICENSE OF A C-8, C12, C21, & C-27 AT THE TIME BIDS ARE RECEIVED

CONSTRUCTION SHALL CONFORM TO THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, DATED 2006, THE STANDARD PLANS, DATED 2006, THE SPECIAL PROVISIONS AND THESE PLANS

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

SHEET INDEX:	
TITLE	SHEET NO.
TITLE SHEET	I
NOTES	II
INDEX	III
CONSTRUCTION PHASING YEAR I	C1
CONSTRUCTION PHASING YEAR II	C2
CONSTRUCTION PHASING YEAR III	C3
PLAN SHEET	P1
PLAN & PROFILE SHEET (STA 1+00 TO 13+00)	P2
PLAN & PROFILE SHEET (STA 13+00 TO 25+00)	P3
PLAN & PROFILE SHEET (25+00 TO 36+19.46)	P4
PLAN SHEET	P5
PLAN SHEET (UPSTREAM TIE-IN)	P6
PLAN SHEET (LOW WATER CROSSING)	P7
PLAN SHEET (DOWNSTREAM TIE-IN)	P8
STAGING AND STOCKPILE AREAS	P9
STOCKPILE SECTIONS	P10
EROSION CONTROL PLAN	P11
REVEGETATION PLAN	R1
DETAILS	D1
DETAILS	D2
DETAILS	D3
DETAILS	D4
DETAILS	D5

NO.

REVISIONS

DATE

APPROVED

CITY OF SOUTH LAKE TAHOE
DEPARTMENT OF PUBLIC WORKS
10521 TWIN LANE
SOUTH LAKE TAHOE, CA 96150
STAN B. HILL - CITY ENGINEERING MANAGER
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SEAL

UPPER TRUCKEE RIVER MIDDLE REACHES
RESTORATION PROJECT REACHES 3 & 4
TITLE SHEET
SOUTH LAKE TAHOE, CA

DESIGNED/DRAWN
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DATE
10/03/07

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JOB NO.
3114201

FIGURE NO.
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ENTRIX
ENVIRONMENTAL CONSULTANTS

GENERAL NOTES

1. ALL IMPROVEMENTS SHALL BE ACCOMPLISHED UNDER THE APPROVAL, INSPECTION, AND TO THE SATISFACTION OF THE CITY OF SOUTH LAKE TAHOE (CSLT) IMPROVEMENT CONSTRUCTION SHALL COMPLY WITH THESE PLANS AND THE JULY 2006 CALTRANS STANDARD PLANS FOR CONSTRUCTION OF LOCAL STREETS AND ROADS, UNLESS NOTED OTHERWISE. ALL REFERENCES TO THE "STANDARD SPECIFICATIONS" SHALL MEAN THE STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION (CALTRANS) STANDARD SPECIFICATIONS FOR CONSTRUCTION OF LOCAL STREETS AND ROADS, JULY 2006, INCLUDING THE AMENDMENTS TO THE JULY 2006 STANDARD SPECIFICATIONS, UPDATED JUNE 19, 2006. CONSTRUCTION NOT SPECIFIED ON THESE PLANS OR IN SPECIFIC EL DORADO COUNTY (COUNTY) ORDINANCES SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS. THE CONTRACTOR IS OBLIGATED TO BE FAMILIAR WITH APPLICABLE SECTIONS OF THE STANDARD SPECIFICATIONS NOT DISCUSSED IN THE GENERAL NOTES. THE CONTRACT SPECIAL PROVISIONS SHALL SUPERSEDE THOSE OF THE STANDARD SPECIFICATIONS WHERE DISCREPANCIES OCCUR.
2. CONSTRUCTION HOURS SHALL BE WEEKDAYS BETWEEN 8:00 A.M. AND 6:30 P.M. UNLESS PRIOR APPROVAL IS RECEIVED FROM THE CSLT.
3. THE LOCATIONS AND EXTENT OF EXISTING UNDERGROUND UTILITIES IN THE WORK AREA AS SHOWN ARE APPROXIMATE AND ARE NOT NECESSARILY COMPLETE. A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE EXISTING UTILITIES BASED UPON AVAILABLE RECORDS. THE CONTRACTOR SHALL DETERMINE THE TYPE, LOCATION, SIZE, AND/OR DEPTH OF THE EXISTING UTILITIES WITHIN THE WORK AREA BEFORE COMMENCING WORK. THE CONTRACTOR OR ANY SUBCONTRACTOR FOR THIS CONTRACT SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT AT (800) 642-2444 AT LEAST 48 HOURS PRIOR TO ANY CONSTRUCTION. SEE SPECIAL PROVISIONS FOR CONTRACTOR NOTIFICATION REQUIREMENTS. THE CONTRACTOR SHALL ASSUME COMPLETE RESPONSIBILITY FOR DAMAGED UTILITIES.
4. UNLESS NOTED OTHERWISE ON THE PLANS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING SURVEY MONUMENTS AND OTHER SURVEY MARKERS DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL PROVIDE, PLACE, AND MAINTAIN ALL LIGHTS, SIGNS, BARRICADES, FLAG PERSONS, PILOT CAR, OR OTHER DEVICES NECESSARY TO CONTROL TRAFFIC THROUGH THE CONSTRUCTION AREA AND FOR PUBLIC SAFETY IN ACCORDANCE WITH THESE PLANS, THE STANDARD SPECIFICATIONS, FEDERAL HIGHWAY ADMINISTRATION (FHWA) MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) 2003 EDITION AND MUTCD 2003 CALIFORNIA SUPPLEMENT.
6. THE CONTRACTOR AGREES TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY, AND FURTHER AGREES THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS IN ACCORDANCE WITH THE PROVISIONS OUTLINED BY THE PROJECT CONTRACT AND STANDARD SPECIFICATIONS.
7. THERE SHALL BE NO GRADING OR LAND DISTURBANCE PERFORMED WITH RESPECT TO THE PROJECT BETWEEN OCTOBER 15 AND MAY 1 UNLESS PROPER APPROVALS ARE OBTAINED FROM THE TAHOE REGIONAL PLANNING AGENCY (TRPA), AS PROVIDED IN THE LIMITED EXEMPTION DESCRIBED IN SUBSECTION 4.2.A. OF THE TRPA CODE OF ORDINANCES. APPROVALS FOR GRADING BETWEEN OCTOBER 15 AND MAY 1 MUST ALSO BE OBTAINED FROM THE REGIONAL WATER QUALITY CONTROL BOARD, LAHONTAN. IF REQUIRED, THE COUNTY SHALL OBTAIN THESE APPROVALS.
8. THE CONTRACTOR SHALL MAINTAIN A SET OF PLANS ON THE JOB SHOWING "AS-CONSTRUCTED" CHANGES MADE TO DATE. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL SUPPLY TO THE COUNTY A SET OF PLANS, MARKED UP TO THE SATISFACTION OF THE COUNTY, REFLECTING THE AS-CONSTRUCTED MODIFICATIONS.
9. ALL CONTROL STATIONING AND DATA DIMENSIONING ARE REFERENCED TO THE CENTERLINE OF THE FACILITY SHOWN UNLESS OTHERWISE NOTED.
10. AT NO TIME SHALL THE CONTRACTOR UNDERTAKE TO CLOSE OFF ANY EXISTING UTILITY LINES OR OPEN VALVES OR TAKE ANY OTHER ACTION WHICH WOULD AFFECT THE OPERATION OF EXISTING WATER OR SEWER SYSTEMS WITHOUT PRIOR APPROVAL FROM THE SOUTH TAHOE PUBLIC UTILITY DISTRICT (STPUD). APPROVAL SHALL BE REQUESTED AT LEAST 48 HOURS IN ADVANCE OF THE TIME THAT THE INTERRUPTION OF THE EXISTING SYSTEM IS REQUIRED. ANY INTERRUPTION OF SERVICE TO ACTIVE WATER OR SEWER SERVICES, INCLUDING FIRE HYDRANTS, WHETHER INTENTIONAL OR NOT, MUST BE KEPT TO A MINIMUM TIME PERIOD. IF SERVICE TO BUILDINGS IS TO BE OFF FOR MORE THAN FOUR HOURS, THE CONTRACTOR MUST ADVISE STPUD.
11. THE CONTRACTOR SHALL BE REQUIRED TO PERFORM PREVENTIVE DUST CONTROL MEASURES TO ENSURE THAT DUST RESULTING FROM THE CONTRACTOR'S PERFORMANCE OF THE WORK IS CONTROLLED IN CONFORMANCE WITH SECTION 5-1.17 OF THE SPECIAL PROVISIONS, THE PROVISIONS OF SECTION 7, "LEGAL RELATIONS AND RESPONSIBILITY," AND SECTION 10 "DUST CONTROL" OF THE STANDARD SPECIFICATIONS, COUNTY, AND LOCAL ORDINANCES. SEE SPECIAL PROVISIONS REGARDING SWEEPING, DUST CONTROL AND TRACKING REQUIREMENTS.
12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING ALL TEMPORARY EROSION CONTROL MEASURES. THE EROSION CONTROL MEASURES SHALL BE IN ACCORDANCE WITH THE TRPA "HANDBOOK OF BEST MANAGEMENT PRACTICES" AND THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP). THE DOT SHALL CONTACT TRPA PRIOR TO THE COMMENCEMENT OF WORK FOR A PRE-GRADING INSPECTION OF THE INSTALLED TEMPORARY EROSION CONTROL FACILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE AND PERFORMANCE OF THE TEMPORARY EROSION CONTROL MEASURES THROUGHOUT THE DURATION OF THE PROJECT. SEE SPECIAL PROVISIONS REGARDING TEMPORARY EROSION CONTROL FACILITY REMOVAL.
13. CONSTRUCTION LIMITS SHOWN ON THE PLANS DELINEATE BOUNDARIES FOR THE CONTRACTOR'S OPERATIONS OUTSIDE THE COUNTY STREET RIGHT-OF-WAY. CONSTRUCTION LIMIT FENCING SHALL BE ERECTED ALONG THESE BOUNDARIES PRIOR TO COMMENCEMENT OF CONSTRUCTION. WITHIN THE CONSTRUCTION LIMITS, EXISTING VEGETATION SHALL BE PROTECTED TO THE EXTENT FEASIBLE. ALL EXISTING TREES SHALL BE PROTECTED UNLESS SHOWN ON THE PLANS TO BE REMOVED. SEE SPECIAL PROVISIONS REGARDING PAYMENT FOR TREE REMOVAL.
14. ALL REVEGETATION SHOWN ON THE PLANS IS TO BE COMPLETED BY OTHERS, UNLESS NOTED OTHERWISE.
15. THE CONTRACTOR SHALL USE ONLY DESIGNATED SPECIFIC SITES FOR STORAGE OF EQUIPMENT AND MATERIALS AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SECURITY OF ALL EQUIPMENT AND MATERIALS.

16. IT IS THE RESPONSIBILITY OF THE CONTRACTOR AND HIS SUBCONTRACTOR(S) TO EXAMINE THE PROJECT SITE PRIOR TO THE OPENING OF BID PROPOSALS. THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED, SUCH AS THE NATURE AND LOCATION OF THE WORK AND THE GENERAL AND LOCAL CONDITIONS, PARTICULARLY THOSE AFFECTING THE AVAILABILITY OF TRANSPORTATION, THE DISPOSAL, HANDLING, AND STORAGE OF MATERIALS, AVAILABILITY OF LABOR, WATER, ELECTRICITY, ROADS, THE UNCERTAINTIES OF WEATHER, THE CONDITIONS OF THE GROUND, SURFACE AND SUBSURFACE MATERIALS, THE EQUIPMENT AND FACILITIES NEEDED PRIMARILY FOR AND DURING THE PERFORMANCE OF THE WORK, AND THE COSTS THEREOF. ANY FAILURE BY THE CONTRACTOR AND SUBCONTRACTOR(S) TO ACQUAINT HIMSELF WITH ALL THE AVAILABLE INFORMATION WILL NOT RELIEVE HIM FROM RESPONSIBILITY FOR PROPERLY ESTIMATING THE DIFFICULTY AND COST OF SUCCESSFULLY PERFORMING THE WORK.

3. ELEVATIONS SHOWN ON THE PLANS FOR PIPE INVERTS, TOPS OF BANKS, THALWEGS, GRADE CONTROLS, ETC., ARE BASED UPON THE TOPOGRAPHIC INFORMATION SHOWN ON THE PLANS. THE CONTRACTOR SHALL VERIFY ALL NECESSARY SURFACE ELEVATIONS IN THE FIELD AND NOTIFY THE CSLT OF ANY DISCREPANCIES, WHICH MIGHT AFFECT PROPER OPERATION OF THE NEW FACILITIES BEFORE BREAKING GROUND AND PRIOR TO FACILITY INSTALLATION. THE CSLT SHALL BE CONTACTED IN THE EVENT ELEVATIONS ARE INCORRECT SO THAT THE PROPER ADJUSTMENTS CAN BE MADE PRIOR TO THE INSTALLATION OF THE FACILITIES, AS SET FORTH IN THE SPECIAL PROVISIONS.
18. THE CONTRACTOR SHALL OBTAIN AT HIS OWN EXPENSE ALL PERMITS, LICENSES, INSURANCE POLICIES, ETC., NOT ALREADY OBTAINED BY DGS, AS MAY BE NECESSARY TO COMPLY WITH STATE AND LOCAL LAWS ASSOCIATED WITH THE PERFORMANCE OF THE WORK. SEE SPECIAL PROVISIONS.
19. THE CONTRACTOR IS RESPONSIBLE TO REVIEW THE CONTRACT DOCUMENTS FOR ALL SUBMITTALS REQUIRED FOR CSLT REVIEW AND ACCEPTANCE.
20. THE CSLT WILL FURNISH THE CONSTRUCTION STAKING TO THE CONTRACTOR AS SET FORTH IN THE SPECIAL PROVISIONS.
21. THE CONSULTANT TEAM AND OVERSEEING ENGINEER RESPONSIBLE FOR PREPARATION OF THESE PLANS AND SPECIFICATIONS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE CONSULTANT TEAM AND OVERSEEING ENGINEER RESPONSIBLE FOR PREPARATION OF THESE PLANS.
22. NO TREES OR WETLAND VEGETATION SHALL BE REMOVED UNLESS THEY ARE SHOWN AND NOTED TO BE REMOVED ON THE PLANS, OR AS DIRECTLY SPECIFIED ON-SITE BY THE PROJECT MANAGEMENT STAFF. ALL TREES CONFLICTING WITH GRADING SHALL BE TRIMMED. NO GRADING SHALL TAKE PLACE WITHIN THE DRIP LINE OF TREES NOT TO BE REMOVED UNLESS OTHERWISE APPROVED.
23. IF, DURING CONSTRUCTION, ARCHAEOLOGICAL REMAINS ARE ENCOUNTERED, CONSTRUCTION IN THE VICINITY SHALL BE HALTED, AND THE STATE OFFICE OF HISTORIC PRESERVATION AND A QUALIFIED ARCHEOLOGIST SHALL BE NOTIFIED IMMEDIATELY.
24. PERMIT CONDITIONS MAY CONTAIN SPECIFIC REQUIREMENTS FOR THE CONTROL OF OFF-SITE TURBIDITY FROM PROJECT OPERATIONS. TURBIDITY WILL BE MONITORED ON A FREQUENT BASIS BY THE PROJECT MANAGEMENT AND INSPECTION STAFF ON-SITE. TURBIDITY AMOUNTS IN EXCESS OF THE PERMITTED AMOUNT AND/OR DURATIONS WILL CAUSE WORK TO BE STOPPED UNTIL IMPROVED PRACTICES ARE IN EFFECT AND THE PROBLEMS CONTROLLED. THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR ANY PROJECT DELAYS THAT OCCUR BY NATURE OF THIS FAILURE TO ADEQUATELY CONTAIN SEDIMENT ON-SITE.

ABBREVIATIONS

A	ASPEN	FL	FLOWLINE
ABAND	ABANDONED	FS	FINISH SURFACE
AC	ASPHALT CONCRETE	G	GAS
APN	ASSESSOR'S PARCEL NUMBER	IE	INVERT ELEVATION
BLVD	BOULEVARD	INST	INSTALL
CA	CALIFORNIA	LF	LINEAR FEET
CALC'S	CALCULATIONS	LT	LEFT
CF	CUBIC FEET OR CURB FACE	LT BLVD	LAKE TAHOE BLVD
CIR	CIRCLE	MISC	MISCELLANEOUS
C	CENTERLINE	N	NORTH
CLF	CONSTRUCTION LIMIT FENCE	NNTS	NOT TO SCALE
CLR	CLEAR	OH	OVERHEAD
CO	COUNTY	P	PINE
CONC	CONCRETE	PL	PROPERTY LINE
CONST	CONSTRUCT	PP	POWER/UTILITY POLE
CMP	CORRUGATED METAL PIPE	PROP	PROPOSED
CSLT	CITY OF SOUTH LAKE TAHOE	PUE	PUBLIC UTILITY EASEMENT
CT	CALTRANS OR COURT	RD	ROAD
CTC	CALIFORNIA TAHOE CONSERVANCY	REF	REFERENCE
CY	CUBIC YARD	ROW	RIGHT-OF-WAY
DET	DETAIL	RSP	ROCK SLOPE PROTECTION
DI	DRAINAGE INLET	RT	RIGHT
DIA OR Ø	DIAMETER	S	SOUTH OR SANITARY SEWER
DISS	DISSIPATOR	SD	STORM DRAIN
DRIVE	DRIVE	SDMH	STORM DRAIN MANHOLE
D/W	DRIVEWAY	SF	SQUARE FEET
E	EAST	SHT	SHEET
EA	EACH	SS	SANITARY SEWER
EG	EXISTING GRADE	ST	SEDIMENT TRAP OR STREET
ELEV	ELEVATION	STA	STATION
ELEC	ELECTRIC	STPUD	SOUTH TAHOE PUBLIC UTILITY DISTRICT
EP	EDGE OF PAVEMENT	TRPA	TAHOE REGIONAL PLANNING AGENCY
EX	EXISTING	TYP	TYPICAL
F	FIR	USFS	UNITED STATES FOREST SERVICE
FES	FLARED END SECTION	W	WEST OR WATER
FF	FILTER FENCE	WFB	WATER FILLED BERM
FG	FINISHED GRADE	W/	WITH
FH	FIRE HYDRANT	W/O	WITHOUT

UTILITIES

CABLE TELEVISION	CHARTER COMMUNICATIONS, (775) 588-1077
NATURAL GAS	SOUTHWEST GAS, (530) 543-3225
ELECTRIC	SIERRA PACIFIC POWER COMPANY, (530) 541-2040
SEWER & WATER	SOUTH TAHOE PUD, (530) 544-6474
TELEPHONE	SBC, (916) 453-7316
STORM DRAIN	EL DORADO COUNTY DOT, (530) 573-3180

LEGEND

*NOTE: LEGEND PROVIDED ON SHEET SUPERCEDES THIS LEGEND

EXISTING		PROPOSED	
	MAJOR CONTOUR		MAJOR CONTOUR
	MINOR CONTOUR		MINOR CONTOUR
	WATERS EDGE		NEW CHANNEL ALIGNMENT
	PROPERTY LINE		GRADING DAYLIGHT LINE
	FENCELINE		ENGINEERED PROTECTION
	FOOT TRAIL		ENGINEERED PROTECTION LAUNCHABLE STONE
	PROJECT BOUNDARY		HABITAT ENHANCEMENT FEATURE
	SEWER EXPORT LINE		DETAIL REF NUMBER SHEET NUMBER
	SEWER GRAVITY LINE		
	CONCRETE		
	CONTROL POINT		

HORIZONTAL AND VERTICAL CONTROL/PROJECTION

VERTICAL CONTROL IS NGVD 29; HORIZONTAL CONTROL IS CALIFORNIA STATE PLANE, ZONE 2, NAD 83 (FEET):

UPPER TRUCKEE RIVER MIDDLE REAHCES
RESORTATION PROJECT REACHES 3 & 4
NOTES SHEET
SOUTH LAKE TAHOE, CA

CITY OF SOUTH LAKE TAHOE
DEPARTMENT OF PUBLIC WORKS
1052 TATA LANE
SOUTH LAKE TAHOE, CA 96150
STAN B. HILL - CITY ENGINEERING MANAGER
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SEAL

DESIGNED/DRAWN
MR/CK

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DATE
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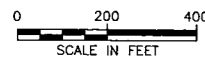
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JOB NO.
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FIGURE NO.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

$$ii$$



CITY OF SOUTH LAKE TAHOE
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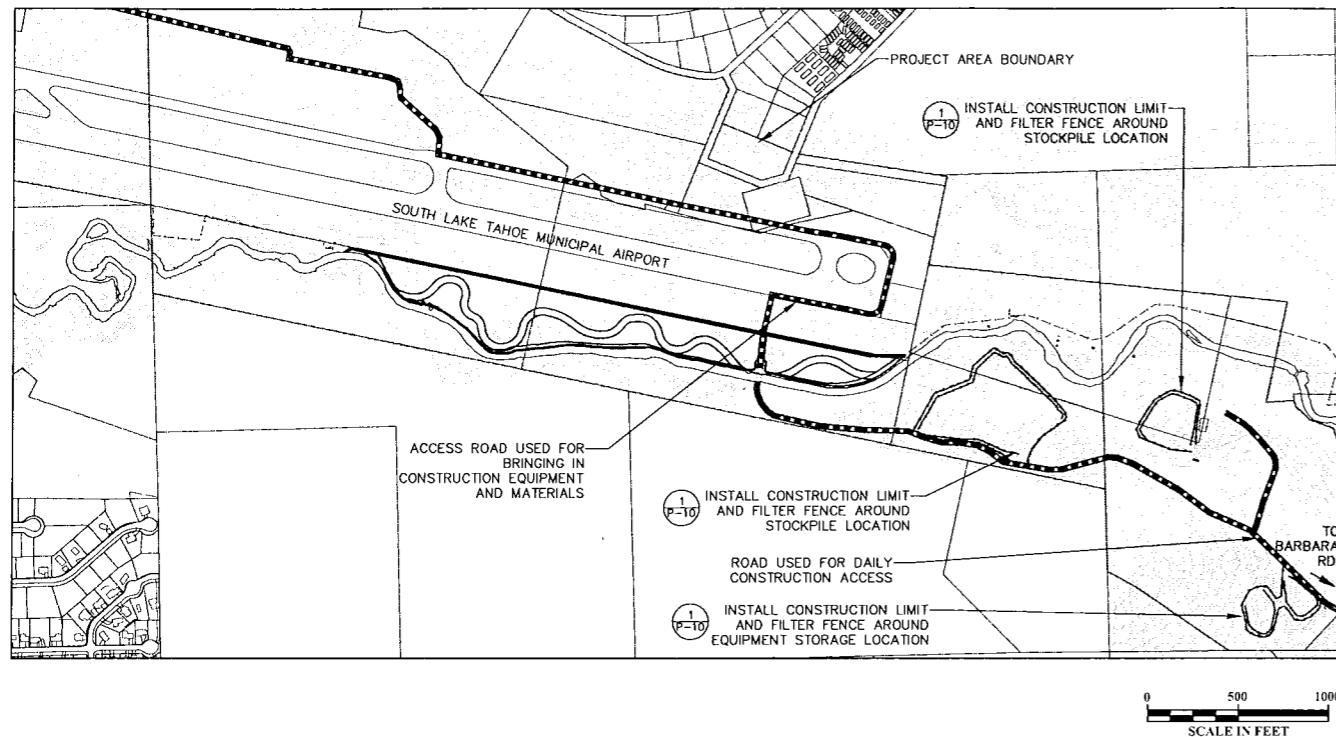
UPPER TRUCKEE RIVER MIDDLE REACHES
RESORTATION PROJECT REACHES 3 & 4
INDEX SHEET
SOUTH LAKE TAHOE, CA

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DATE 10/03/07
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JOB NO. 3114101
FIGURE NO.

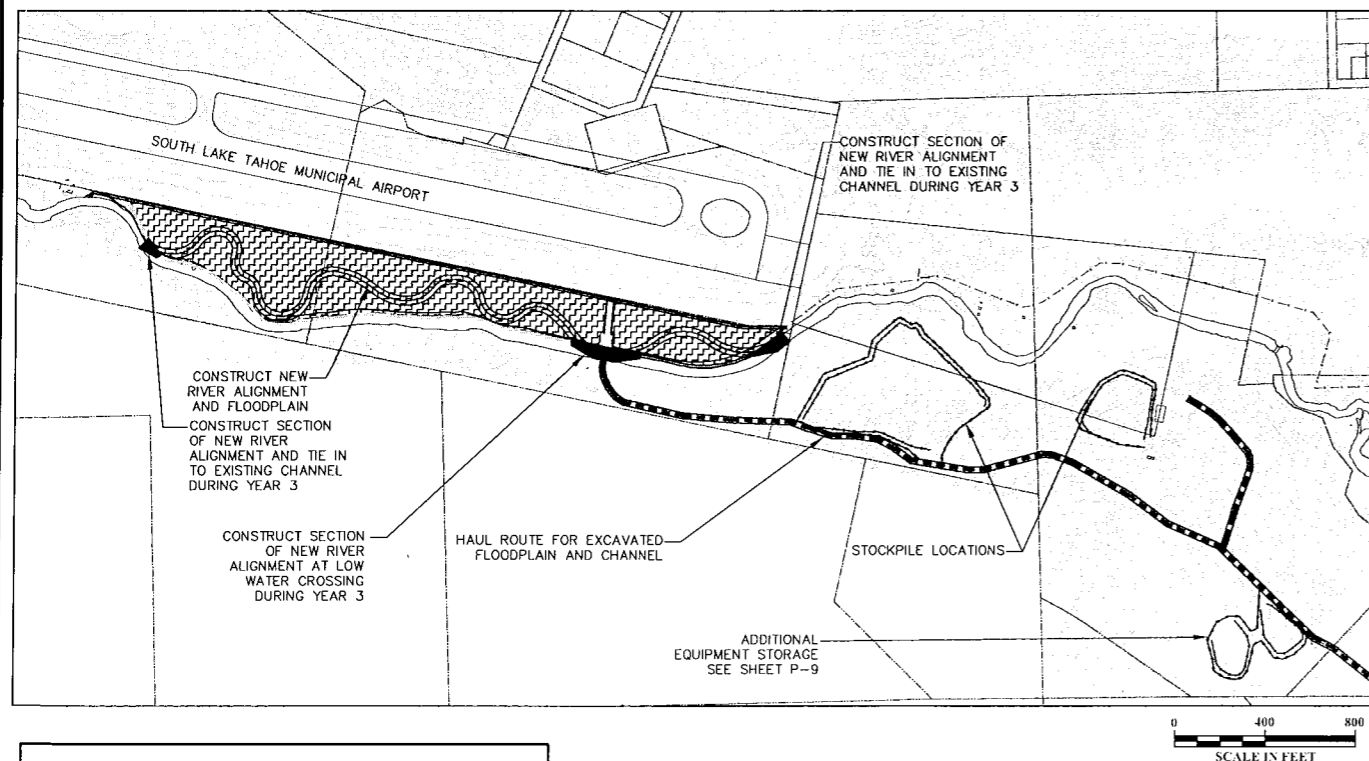
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ENTRIX
ENVIRONMENTAL CONSULTANTS

MOBILIZATION, INCLUDING HAUL ROAD CONSTRUCTION, SIGNAGE PLACEMENT, AND CONSTRUCTION LIMIT AND TREE PROTECTION FENCING WILL COMMENCE. ALL MOBILIZATION AND DELIVERIES WILL BE COORDINATED WITH AIRPORT STAFF 24 HOURS PRIOR TO ARRIVAL.

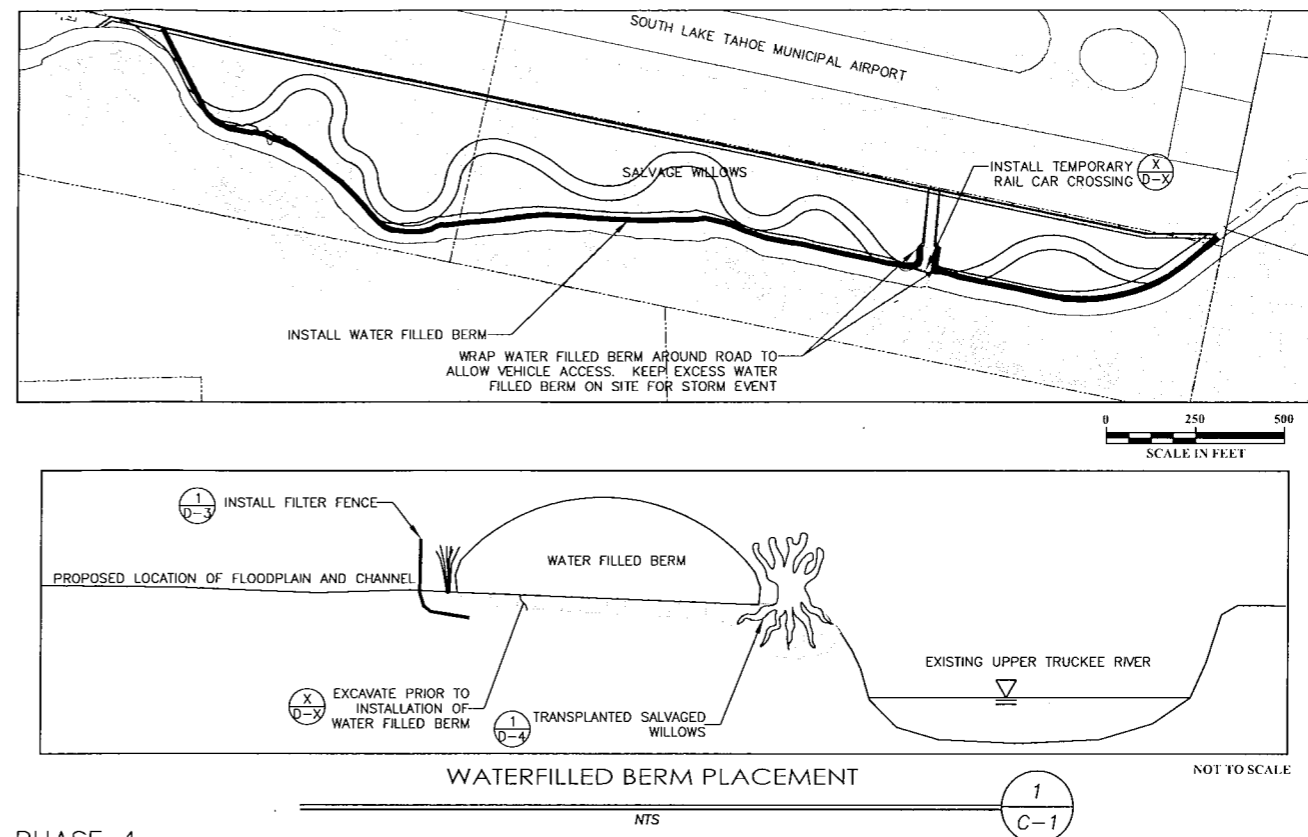


1. AFTER THE BERM IS IN PLACE THE CONTRACTOR WILL BEGIN CONSTRUCTION OF THE NEW RIVER ALIGNMENT, EXCEPT IN THOSE AREAS SHOWN BELOW. WHEN CONSTRUCTION OF THE NEW RIVER ALIGNMENT IS COMPLETED ALL DISTURBED AREAS WILL BE REVEGETATED.
2. EXCAVATED MATERIAL FROM THE NEW RIVER ALIGNMENT WILL BE HAULED TO THE STOCKPILE LOCATION NORTH OF THE EXCAVATION AREA. THE PROJECT IS EXPECTED TO BE BALANCED WITH CUT AND FILL. ANY EXCESS CAN REMAIN AT THE STOCKPILE LOCATION WITH NATURAL GRADING AND REVEGETATION.

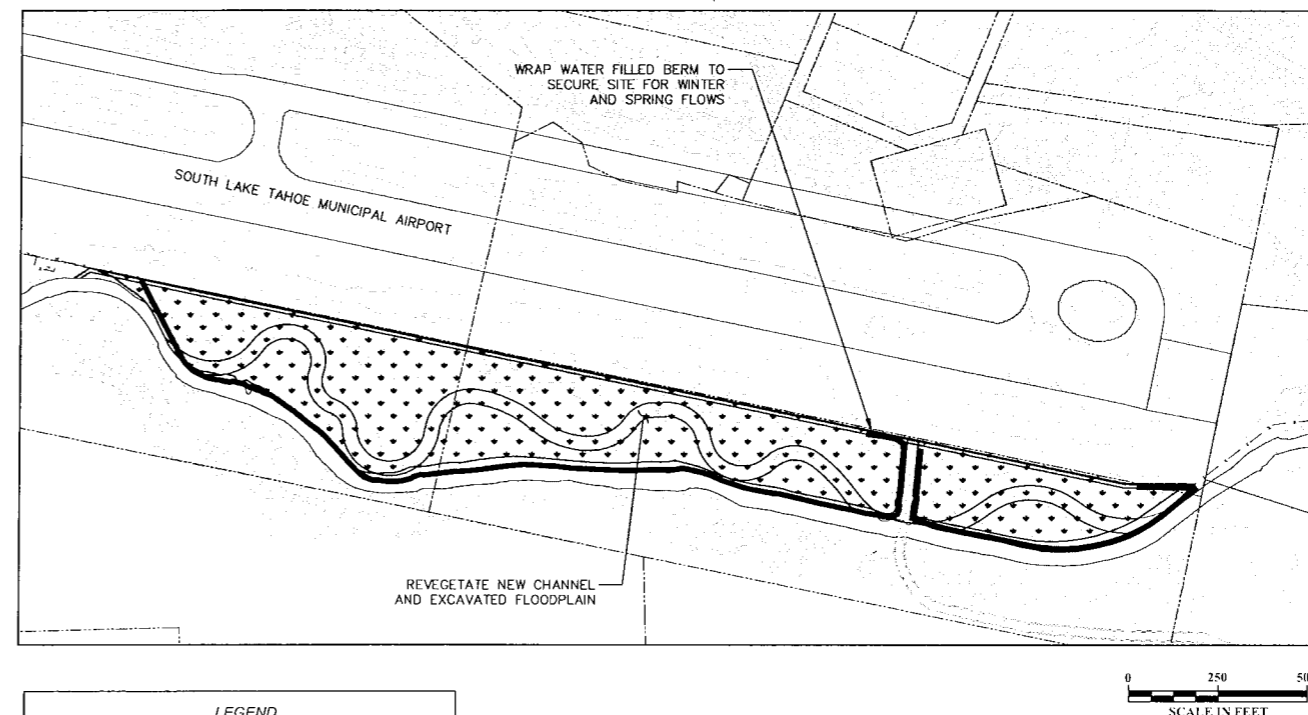


PRELIMINARY PLANS
NOT FOR CONSTRUCTION



CLEARING AND GRUBBING OF LARGE ROCKS, TREES, AND BRUSH WILL BE COMPLETED ALONG THE WEST SIDE OF THE EXISTING UPPER TRUCKEE RIVER AT A WIDTH OF APPROXIMATELY 20' TO ALLOW FOR THE WATER FILLED BERM EXCAVATION, WILLOW TRANSPLANTING, AND SILT FENCE PROTECTION. THE WATER FILLED BERM IS EXPECTED TO BE APPROXIMATELY 6'X16' AND RUN THE LENGTH OF THE UPPER TRUCKEE RIVER THROUGH THE PROJECT AREA. THIS WILL ISOLATE THE NEWLY CREATED FLOODPLAIN FROM THE RIVER.




REVEGETATION WILL CONSIST OF SCARIFYING THE GROUND, APPLYING AND INCORPORATING SOIL INOCULANTS AND AMENDMENTS, APPLICATION OF SEED MIX, AND APPLICATION OF HYDROSTRAW. ONSITE SOD AND NATIVE WILLOWS WILL BE SALVAGED WHERE AVAILABLE AND STORED ONSITE FOR LATER USE.



LEGEND

PROJECT BOUNDARY	— x —	EXISTING FENCE
PARCEL BOUNDARY	—————	NEW ALIGNMENT
EXCAVATION		REVEGETATION
EARTHEN FILL		ROCK PROTECTION

[illegible]

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SEAL

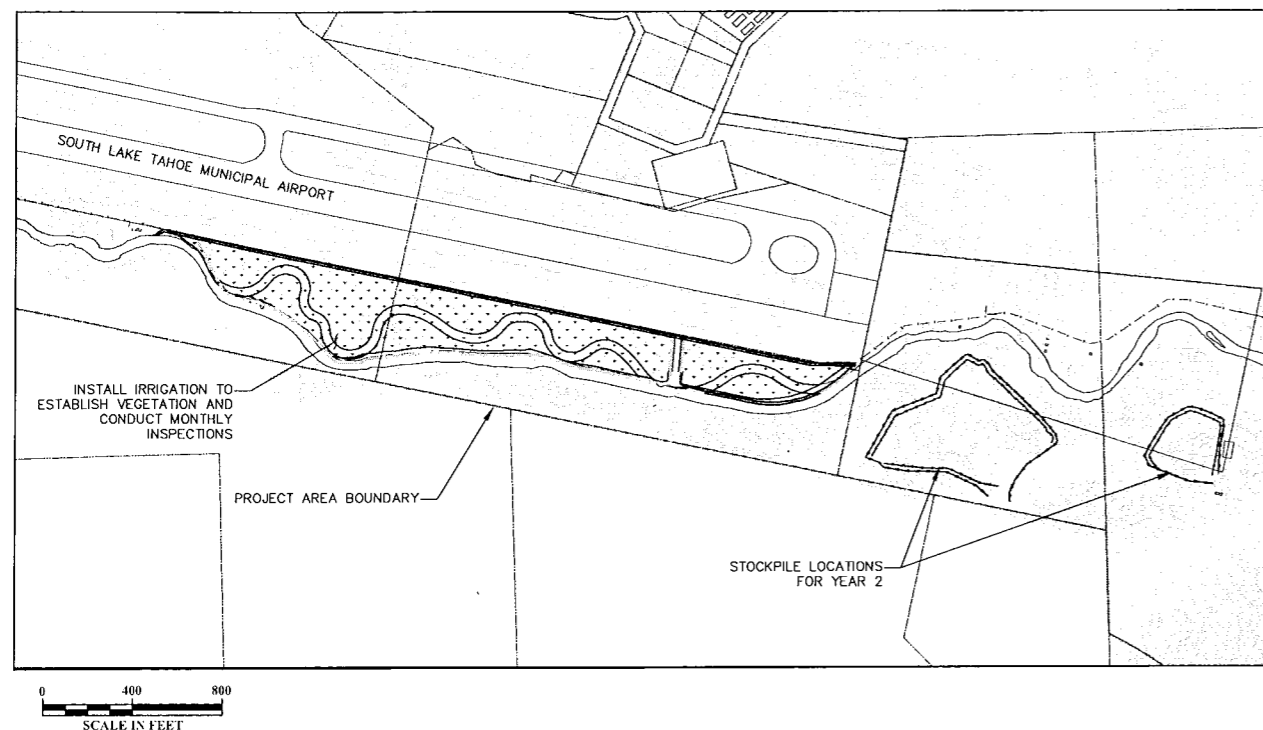
UPPER TRUCKEE RIVER MIDDLE REACHES
RESTORATION PROJECT REACHES 3 & 4
CONSTRUCTION PHASING
YEAR 1
SOUTH LAKE TAHOE, CA

DESIGNED/DRAWN MC
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DATE 10/3/07
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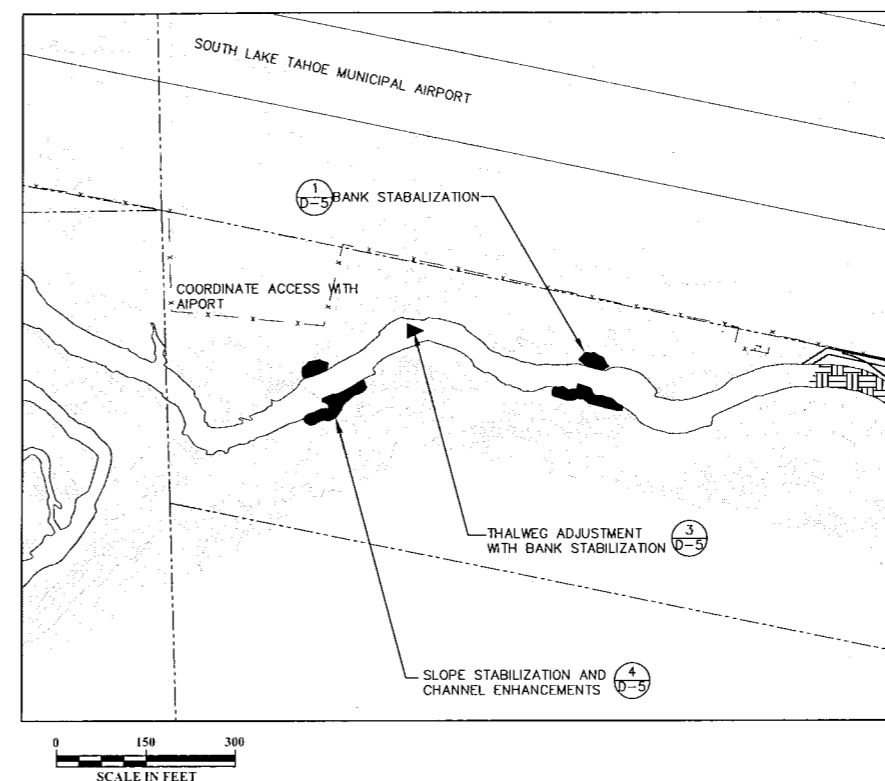
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ENTRIX
ENVIRONMENTAL CONSULTANTS

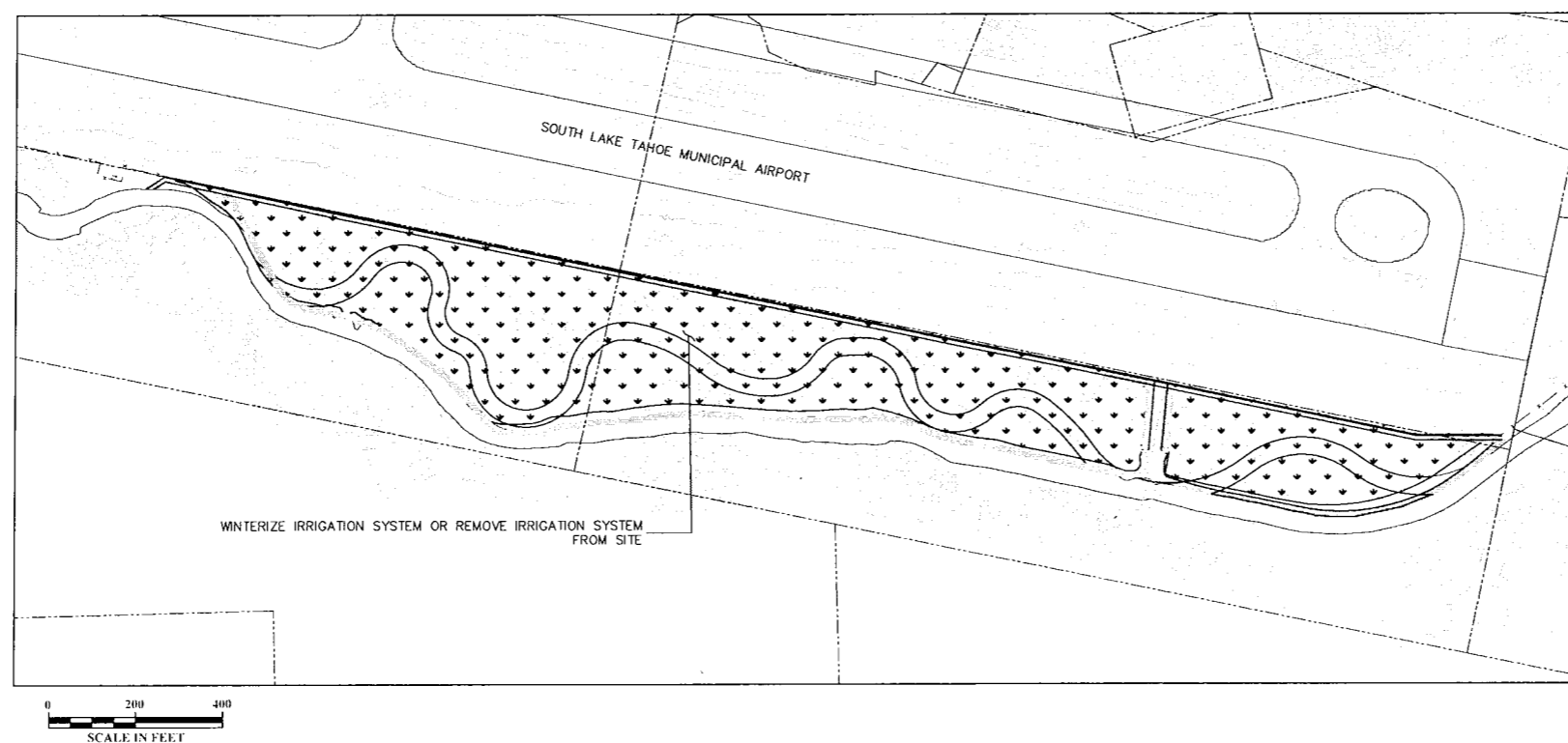
THE ENTIRE YEAR OF 2009 WILL BE DEDICATED TO ESTABLISHING VEGETATION AND SEASONING THE NEW RIVER ALIGNMENT AND FLOOD PLAIN. AS EARLY AS POSSIBLE IRRIGATION LINES WILL BE PLACED AND A REVEGETATION INSPECTION WILL BE COMPLETED TO EVALUATE PERCENTAGE OF COVERAGE AND GROWTH. REVEGETATION AND BEST MANAGEMENT PRACTICES INSPECTIONS WILL BE COMPLETED ON A MONTHLY BASIS.











CONSTRUCTION WORK WILL COMMENCE OUTSIDE THE NEW CHANNEL ALIGNMENT AREA. THE UPSTREAM STRUCTURE, DAM AND WING WALL WILL BE REMOVED. CHANNEL AND SLOPE STABILIZING ITEMS WILL BE CONSTRUCTED OUTSIDE THE REALIGNMENT AREA.



AT THE END OF THE CONSTRUCTION SEASON THE IRRIGATION SYSTEM WILL BE WINTERIZED AND/OR REMOVED FROM THE SITE.



LEGEND

	PROJECT BOUNDARY		EXISTING FENCE
	PARCEL BOUNDARY		NEW ALIGNMENT
	EXCAVATION		REVEGETATION
	EARTHEN FILL		ROCK PROTECTION



PRELIMINARY PLANS
NOT FOR CONSTRUCTION

UPPER TRUCKEE RIVER MIDDLE REACHES
RESTORATION PROJECT REACHES 3 & 4
CONSTRUCTION PHASING
YEAR 2
SOUTH LAKE TAHOE, CA

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FIGURE NO.

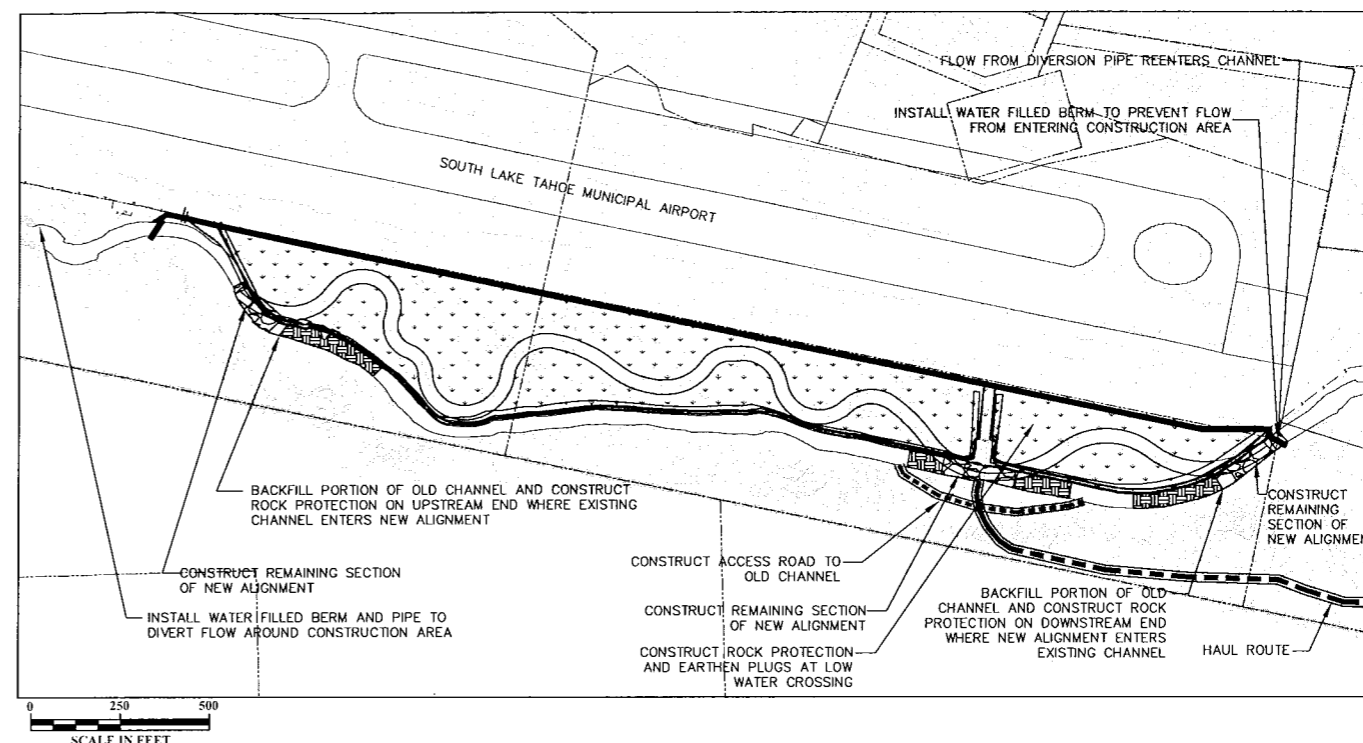
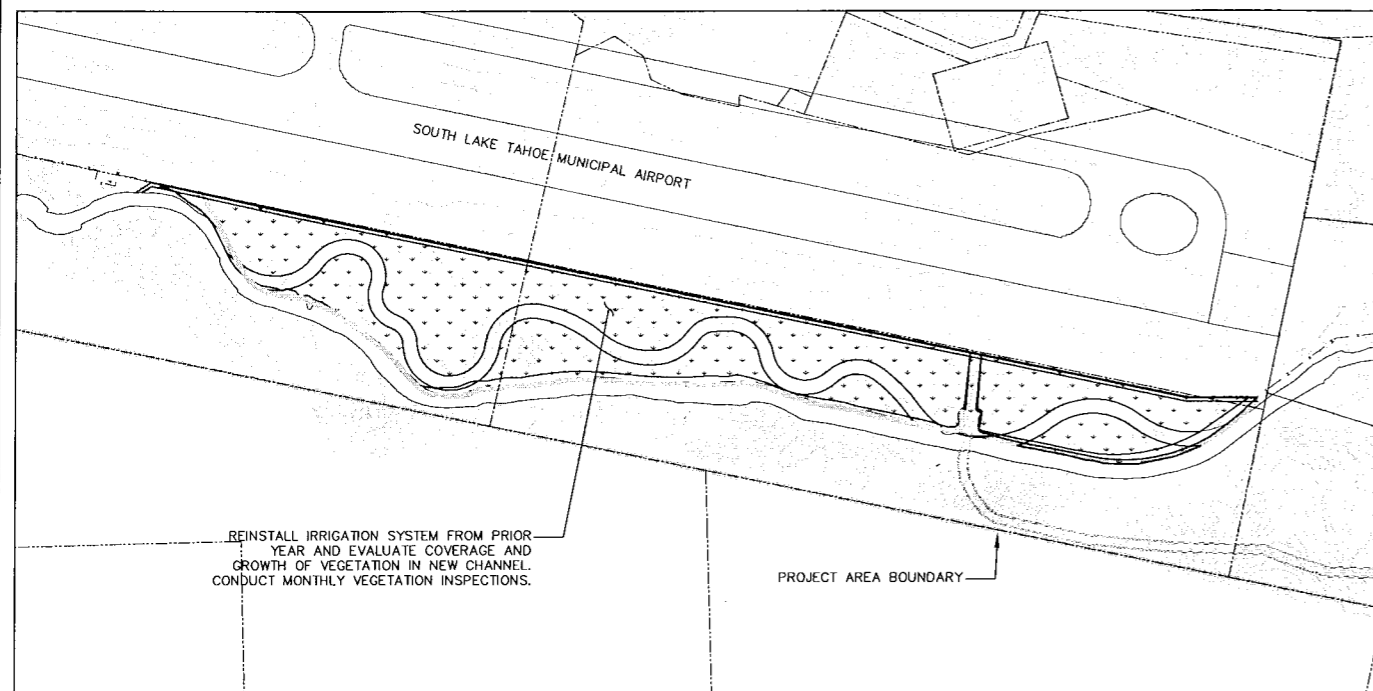
C-2

ENTRIX
ENVIRONMENTAL CONSULTANTS

PHASE 2

1. THIS CONSTRUCTION SEASON IS FOCUSED ON PUTTING THE RIVER IN THE NEW ALIGNMENT. AS EARLY AS POSSIBLE IRRIGATION LINES WILL BE PLACED AND A REVEGETATION INSPECTION WILL BE COMPLETED TO EVALUATE PERCENTAGE OF COVERAGE AND GROWTH. REVEGETATION INSPECTIONS WILL BE COMPLETED ON A MONTHLY BASIS.

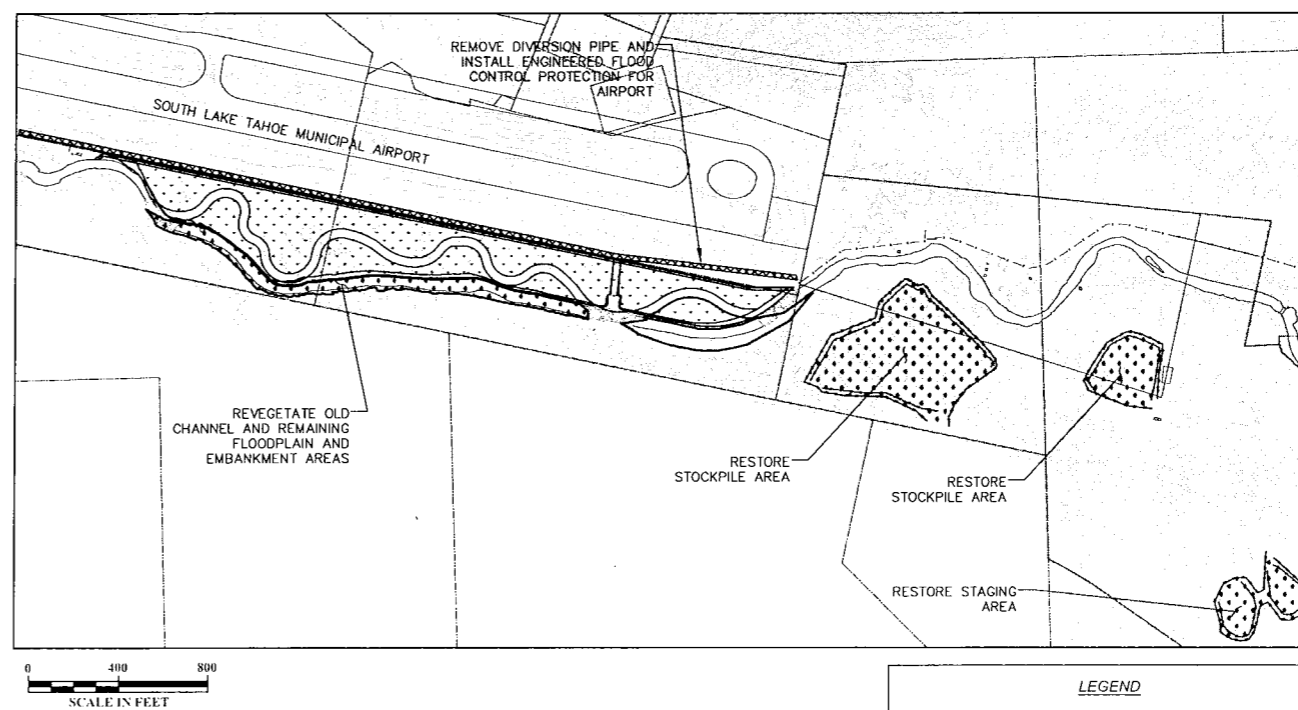
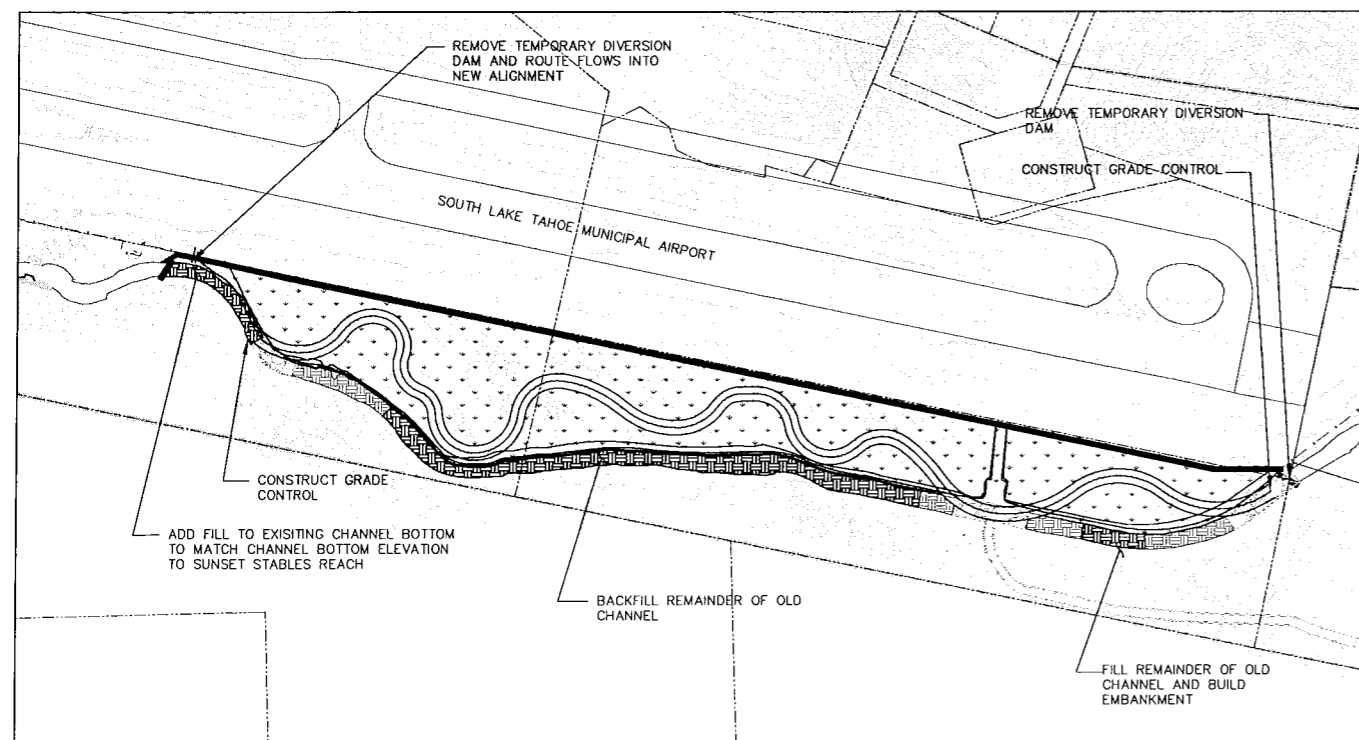
1. LATER IN THE CONSTRUCTION SEASON WHEN FLOWS RECEDE, TWO WATER FILLED BERMS WILL BE INSTALLED TO DIVERT THE EXISTING CHANNEL ONE UPSTREAM OF THE BEGINNING OF THE NEW ALIGNMENT AND ONE DOWNSTREAM FROM THE END OF THE NEW ALIGNMENT. PIPES WILL BE INSTALLED AT THE UPSTREAM WATER FILLED BERM TO DIVERT TO FLOW THROUGH THE PROJECT AREA ALONG THE EASTERN BOUNDARY OF THE AIRPORT.
2. THE LOCATIONS WHERE THE NEW ALIGNMENT AND THE EXISTING ALIGNMENT CONVERGE WILL BE GRADED AND ARMORED WITH A COMBINATION OF ROCK AND LARGE WOOD ELEMENTS. WILLOW STAKES WILL BE INCORPORATED INTO THESE ENGINEERED AREAS. PROPAGATED SOD WILL BE PLACED AS NEEDED ON TOP OF THE ARMORED PROTECTION.



PHASE 4

1. THE REMAINDER OF THE OLD CHANNEL WILL BE BACKFILLED AN EMBANKMENT WILL BE CONSTRUCTED DOWNSTREAM OF THE LOW WATER CROSSING.
2. UPSTREAM OF THE NEW ALIGNMENT, THE EXISTING CHANNEL BOTTOM WILL BE FILLED TO MATCH THE GRADE OF THE SUNSET STABLES REACH OF THE UPPER TRUCKEE RIVER AND THE NEW ALIGNMENT. GRADE CONTROL WILL BE CONSTRUCTED AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE NEW ALIGNMENT.
3. THE TEMPORARY DAM USED TO DIVERT THE FLOW INTO THE PIPE WILL BE REMOVED DURING A LOW FLOW PERIOD AND FLOWS WILL THEN BE REDIRECTED INTO THE NEW ALIGNMENT.

1. THE BACKFILLED PORTION OF THE OLD CHANNEL WILL BE REVEGETATED.
2. THE PIPING USED TO RE-ROUTE WATER WILL BE REMOVED AND THE PIPE TRENCH WILL BE BACKFILLED WITH BOULDERS AND COVERED WITH SOIL TO PROVIDE ADDED FLOOD PROTECTION TO THE AIRPORT.
3. AT THE END OF THE CONSTRUCTION SEASON THE IRRIGATION SYSTEM WILL BE REMOVED FROM THE SITE.



PRELIMINARY PLANS
NOT FOR CONSTRUCTION

[illegible]

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UPPER TRUCKEE RIVER MIDDLE REACHES
RESTORATION PROJECT REACHES 3 & 4
CONSTRUCTION PHASING
YEAR 3
SOUTH LAKE TAHOE, CA

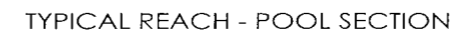
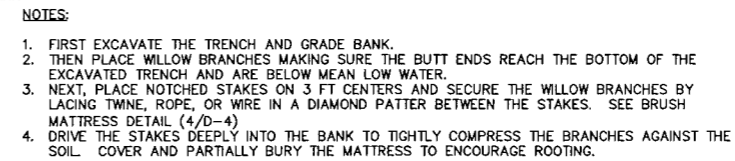
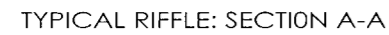
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AS SHOWN

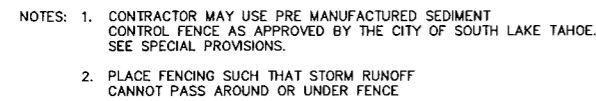
JOB NO.
3114101

FIGURE NO.

9

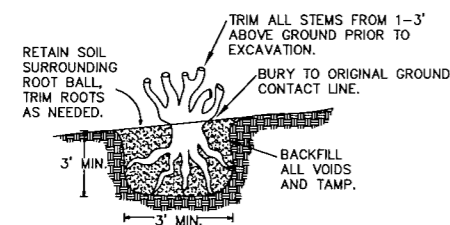
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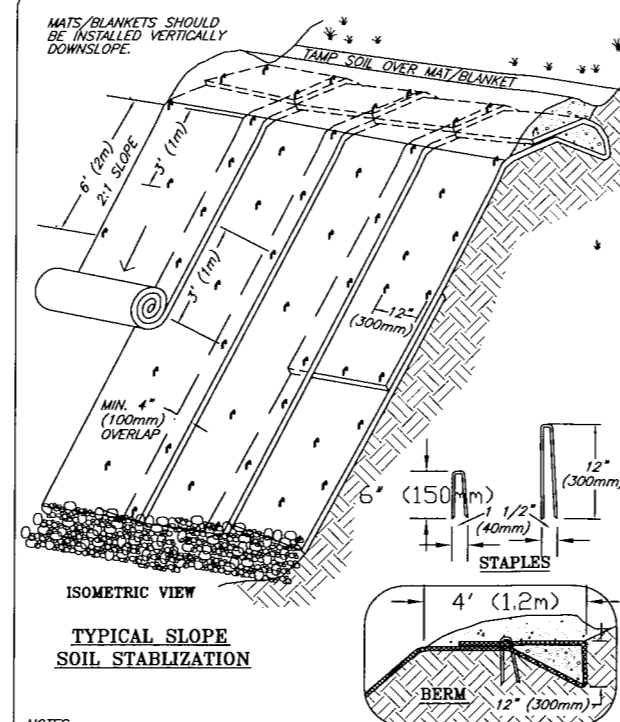
1
D-3


$$\frac{5}{D-3}$$



RELOCATE WILLOW

NTS

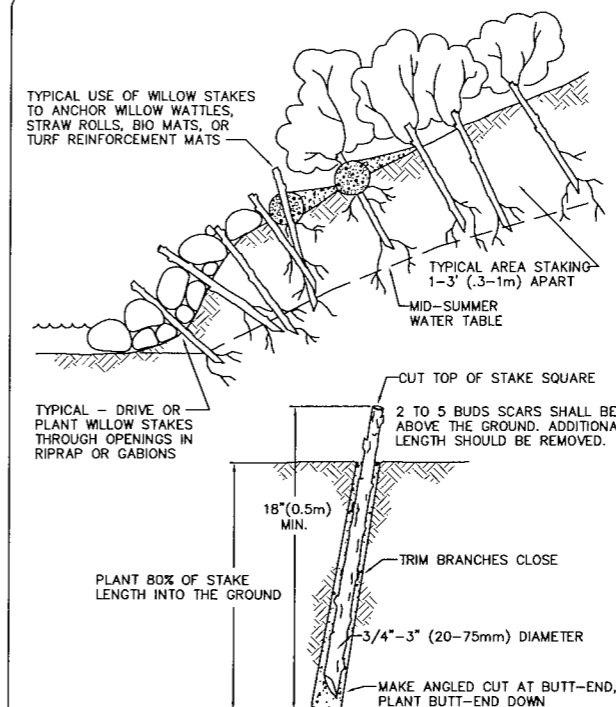
$$\frac{1}{D-4}$$


NOTES:

1. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS AND GRASS. MATS/BLANKETS SHALL HAVE GOOD SOIL CONTACT.
2. APPLY PERMANENT SEEDING BEFORE PLACING BLANKETS.
3. LAY BLANKETS LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH THE SOIL. DO NOT STRETCH.

NOT TO SCALE

EROSION BLANKETS &
TURF REINFORCEMENT MATS
SLOPE INSTALLATION

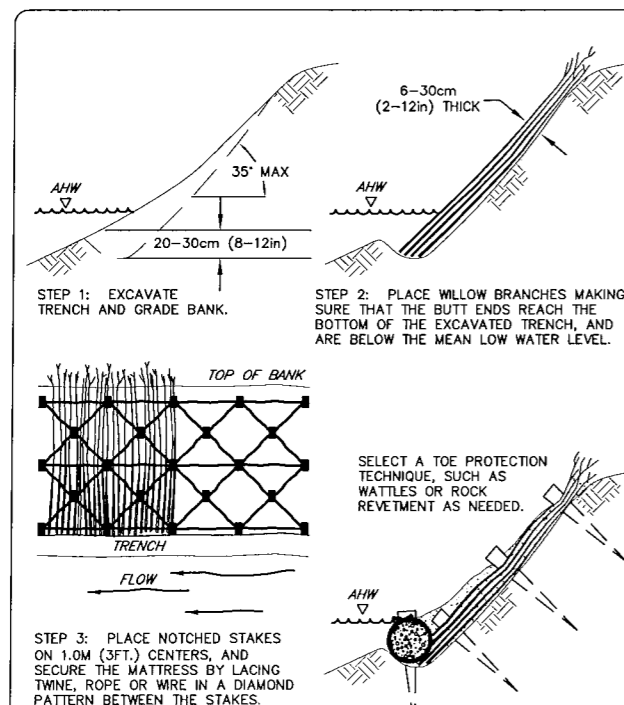
$$\frac{2}{D-4}$$


NOTES

1. HARVEST AND PLANT STAKES DURING THE DORMANT SEASON.
2. USE HEALTHY, STRAIGHT AND LIVE WOOD AT LEAST 1 YEAR OLD.
3. MAKE CLEAN CUTS AND DO NOT DAMAGE STAKES OR SPLIT ENDS DURING INSTALLATION, USE A PILOT BAR IN FIRM SOILS.
4. SOAK CUTTINGS FOR 24 HOURS (MIN.) PRIOR TO INSTALLATION.
5. TAMP THE SOIL AROUND THE STAKE.

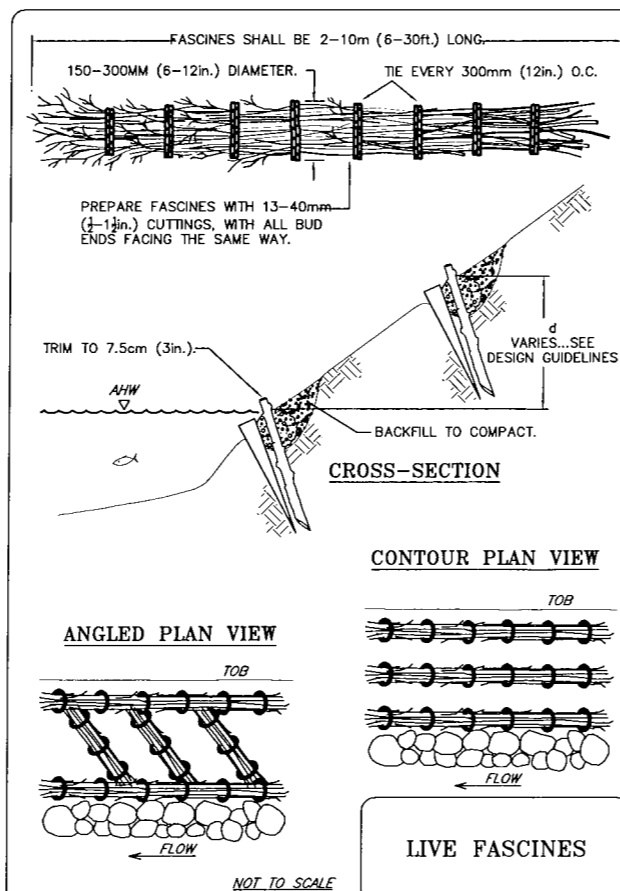
NOT TO SCALE

LIVE STAKING

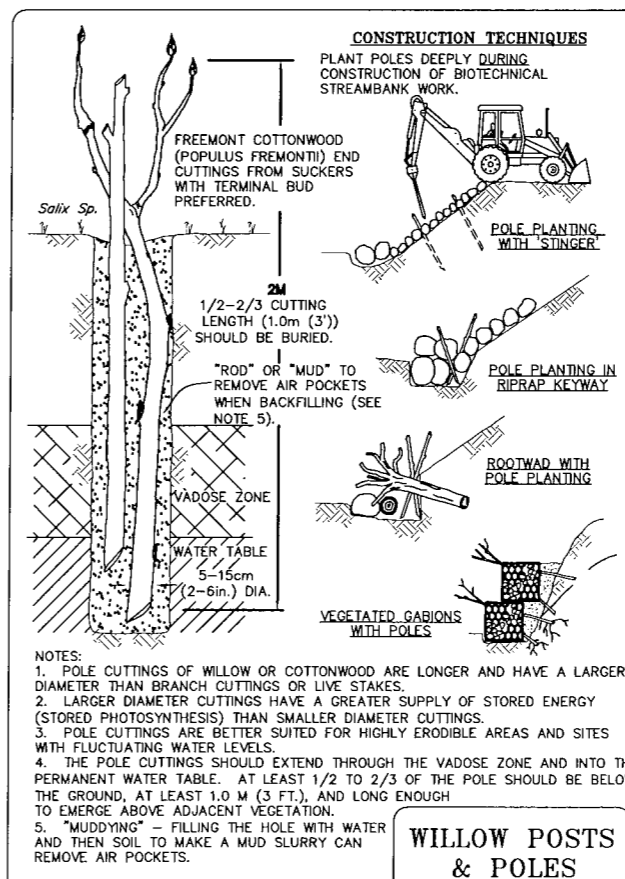
$$\frac{3}{D-4}$$


BRUSH MATTRESS

$$\frac{4}{D-4}$$

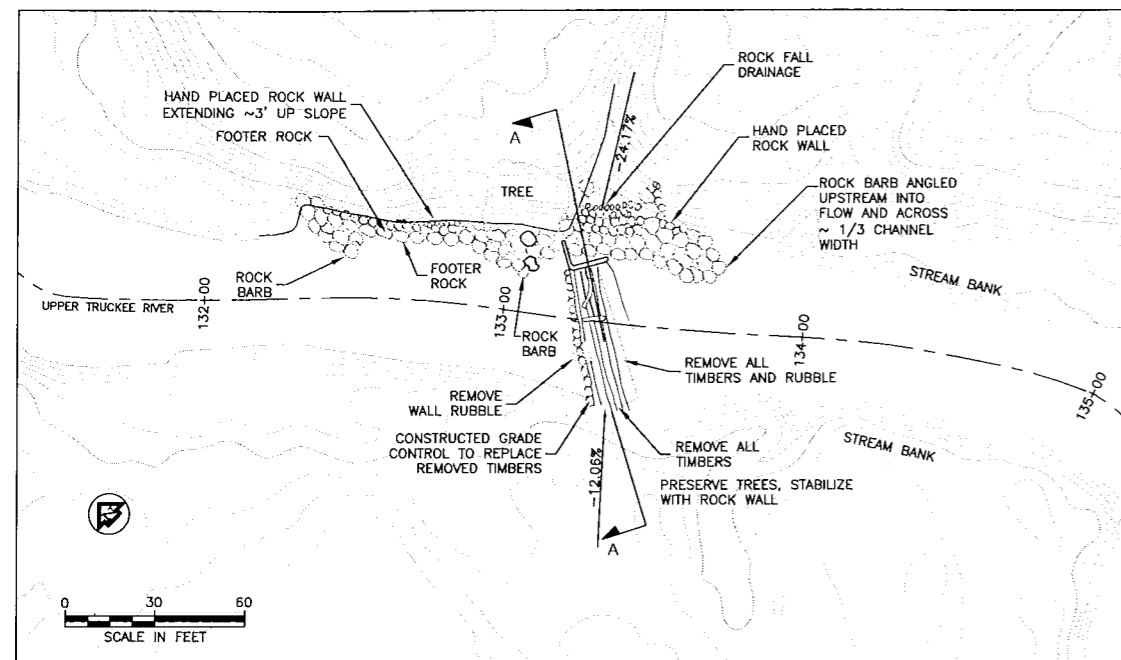


LIVE FASCINES

$$\frac{5}{D-4}$$


WILLOW POSTS
& POLES

6
D-4

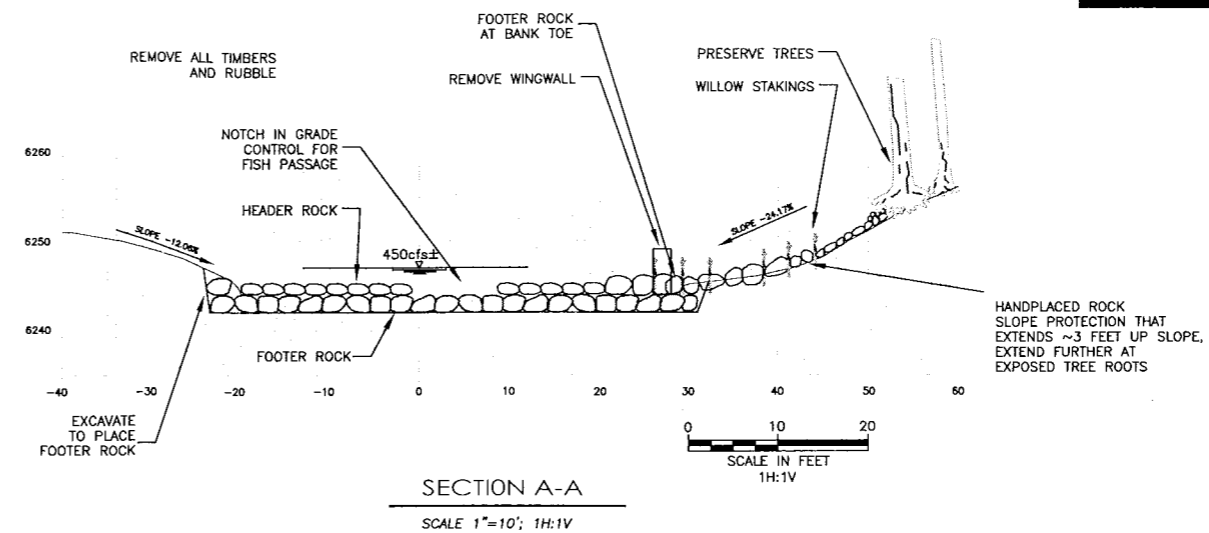


PLAN VIEW

SCALE 1"=30'

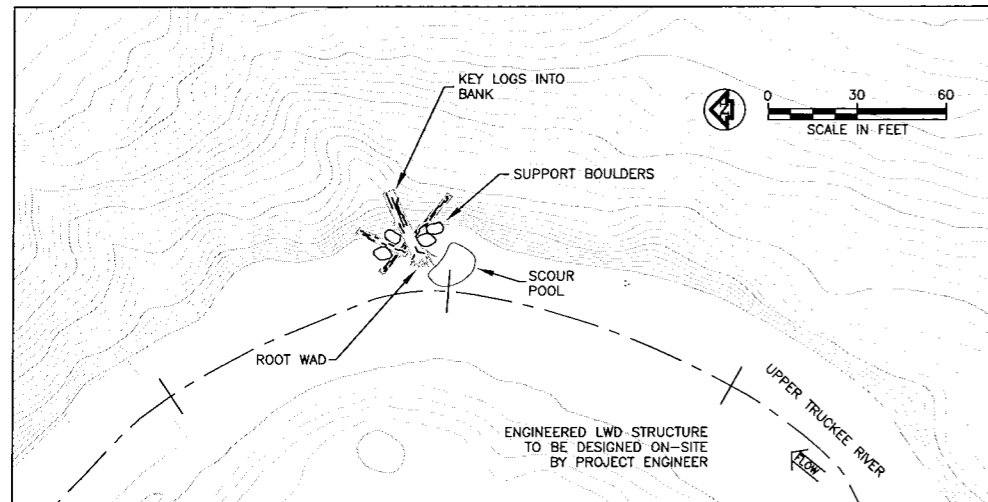
PRESERVE TREES, STABILIZE WITH ROCK WALL

SCALE AS SHOWN



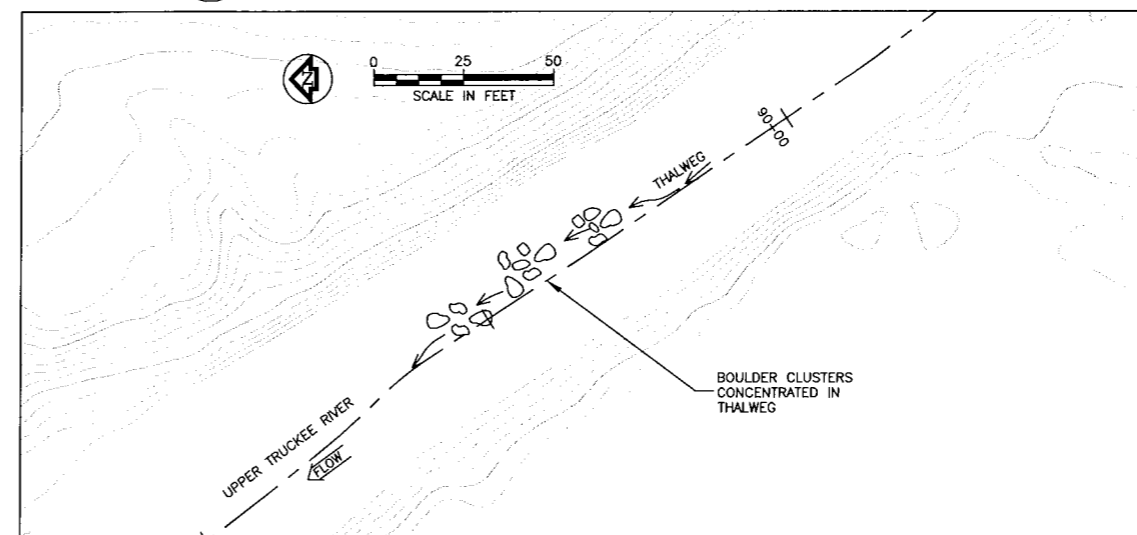
SECTION A-A

SCALE 1"=10'; 1H:1V



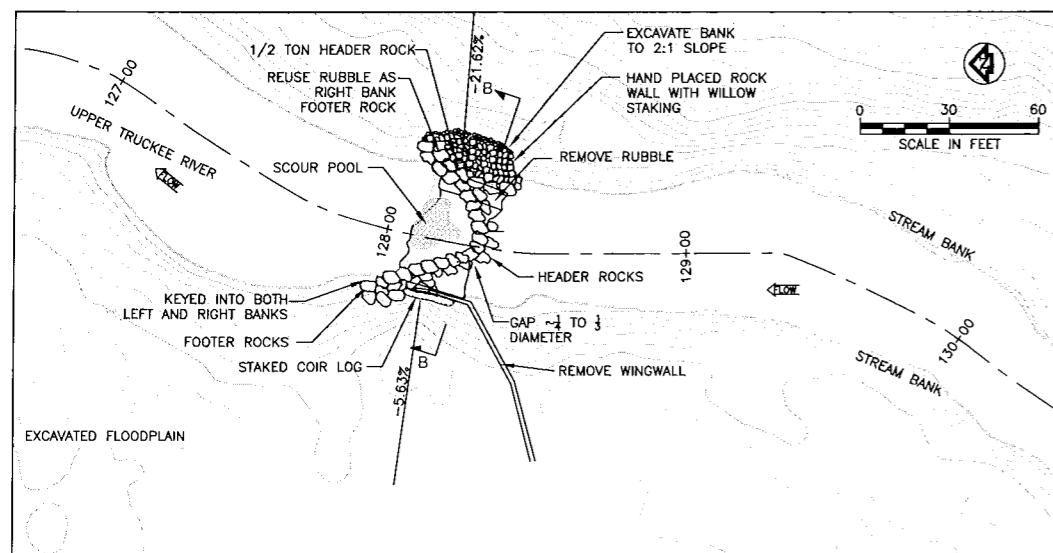
ROOT WAD HABITAT ENHANCEMENT (TYP)

SCALE 1"=30'



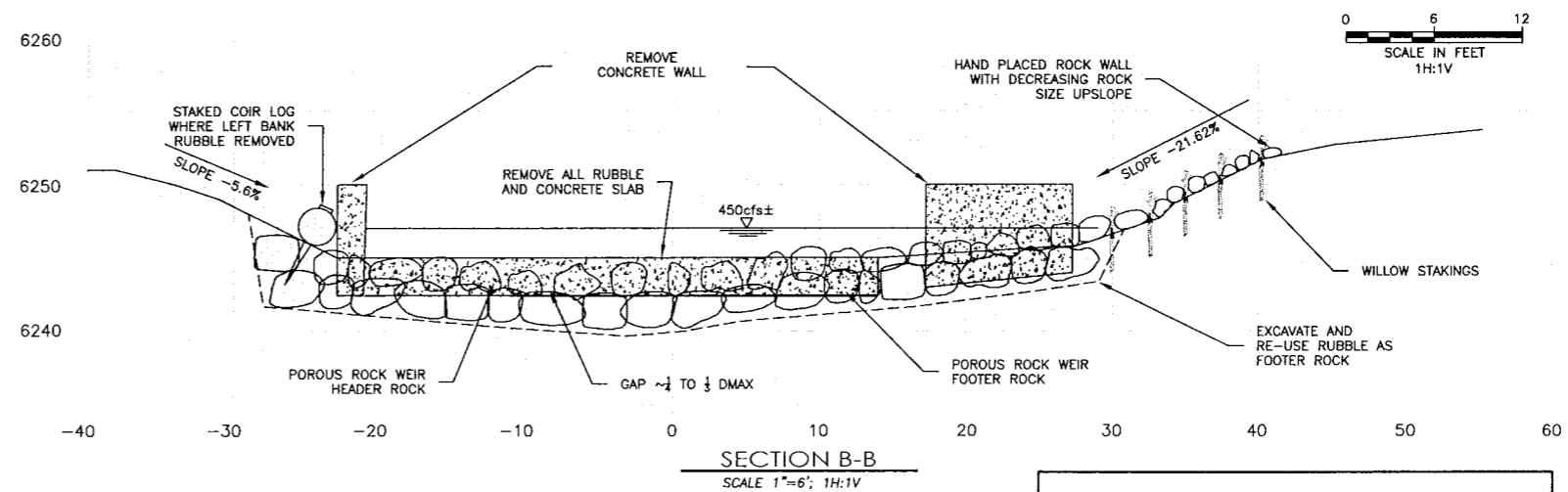
THALWAG ADJUSTMENT WITH BANK STABILIZATION (TYP)

SCALE 1"=25'



PLAN VIEW

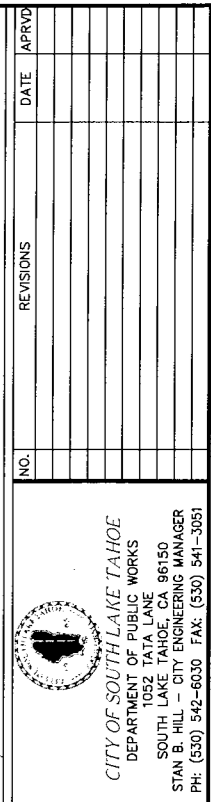
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SECTION B-

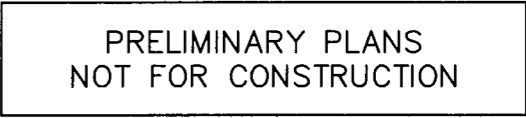
SCALE 1"=6'; 1H:1V

















PRELIMINARY PLANS
NOT FOR CONSTRUCTION

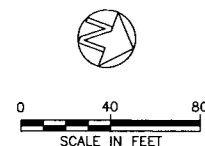


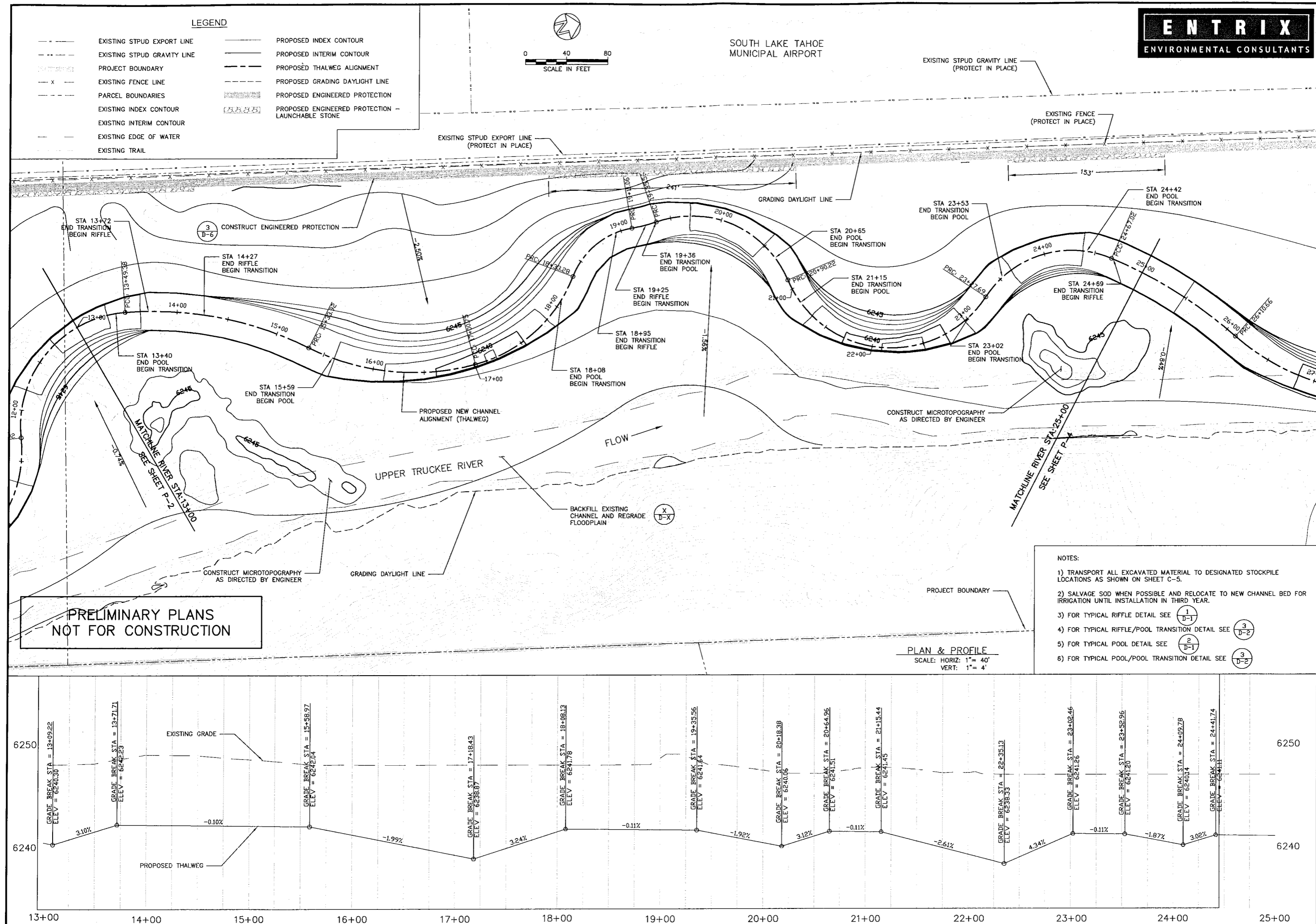
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SCALE
1"=40'
JOB NO.
3114101
FIGURE NO.
<i>P-1</i>




	EXISTING STPUD EXPORT LINE		PROPOSED INDEX CONTOUR
	EXISTING STPUD GRAVITY LINE		PROPOSED INTERIM CONTOUR
	PROJECT BOUNDARY		PROPOSED THALWEG ALIGNMENT
	EXISTING FENCE LINE		PROPOSED GRADING DAYLIGHT LINE
	PARCEL BOUNDARIES		PROPOSED ENGINEERED PROTECTION
	EXISTING INDEX CONTOUR		PROPOSED ENGINEERED PROTECTION - LAUNCHABLE STONE
	EXISTING INTERIM CONTOUR		PROPOSED CLEAN BED FILL
	EXISTING EDGE OF WATER		
	EXISTING TRAIL		





ENTRIX
ENVIRONMENTAL CONSULTANTS

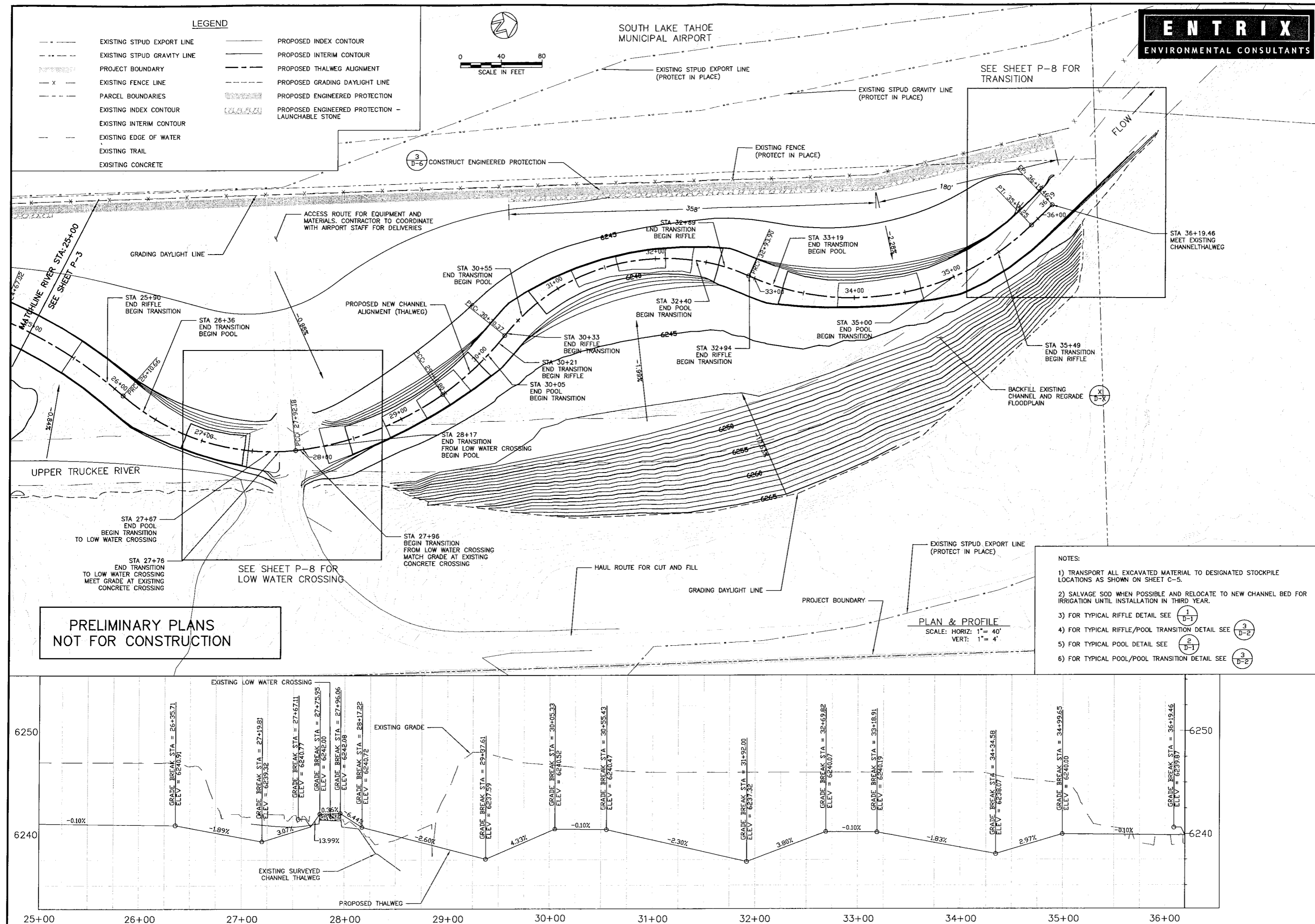
UPPER TRUCKEE RIVER MIDDLE REACHES RESORTATION PROJECT REACHES 3 & 4 PLAN VIEW STATIONS 13+00 TO 25+00 SOUTH LAKE TAHOE, CA		SEAL	 <p> CITY OF SOUTH LAKE TAHOE DEPARTMENT OF PUBLIC WORKS 1032 TATA LANE SOUTH LAKE TAHOE, CA 96150 STAN B. HILL - CITY ENGINEERING MANAGER PH: (530) 542-6030 FAX: (530) 541-3031 </p>	NO. REVISIONS DATE APPROVED
DESIGNED/DRAWN BB/CK				
CHECKED CM				
DATE 10/03/07				
SCALE AS SHOWN				
JOB NO. 31114101				
FIGURE NO. <div style="font-size: 2em; font-weight: bold; text-align: center;">P-3</div>				

UPPER TRUCKEE RIVER MIDDLE REACHES
RESORTATION PROJECT REACHES 3 & 4
PLAN VIEW

STATIONS 13+00 TO 25+00
SOUTH LAKE TAHOE, CA

DESIGNED/DRAWN BB/CK
CHECKED CM
DATE 10/03/07
SCALE AS SHOWN
JOB NO. 31114101
FIGURE NO.

P-3



ENTRIX
ENVIRONMENTAL CONSULTANTS

[illegible]

CITY OF SOUTHLAKE TAHOE
 DEPARTMENT OF PUBLIC WORKS
 1052 TATA LANE
 SOUTH LAKE TAHOE, CA 96150
 TITAN B. HILL - CITY ENGINEERING MANAGER
 PH (530) 542-6030 FAX (530) 541-3051

SEAL

UPPER TRUCKEE RIVER MIDDLE REACHES
RESTORATION PROJECT REACHES 3 & 4
PLAN VIEW
STATIONS 25+00 TO 36+19.46
SOUTH LAKE TAHOE, CA

DESIGNED/DRAWN

CHECKED

DATE

SCALE

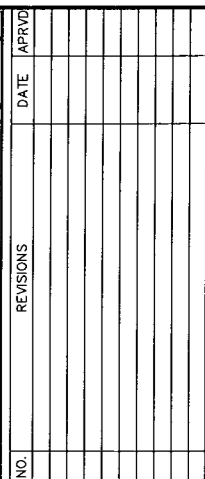
AS SHOWN
JOB NO.

31114101

SIGNS UP

FIGURE NO.

P-4

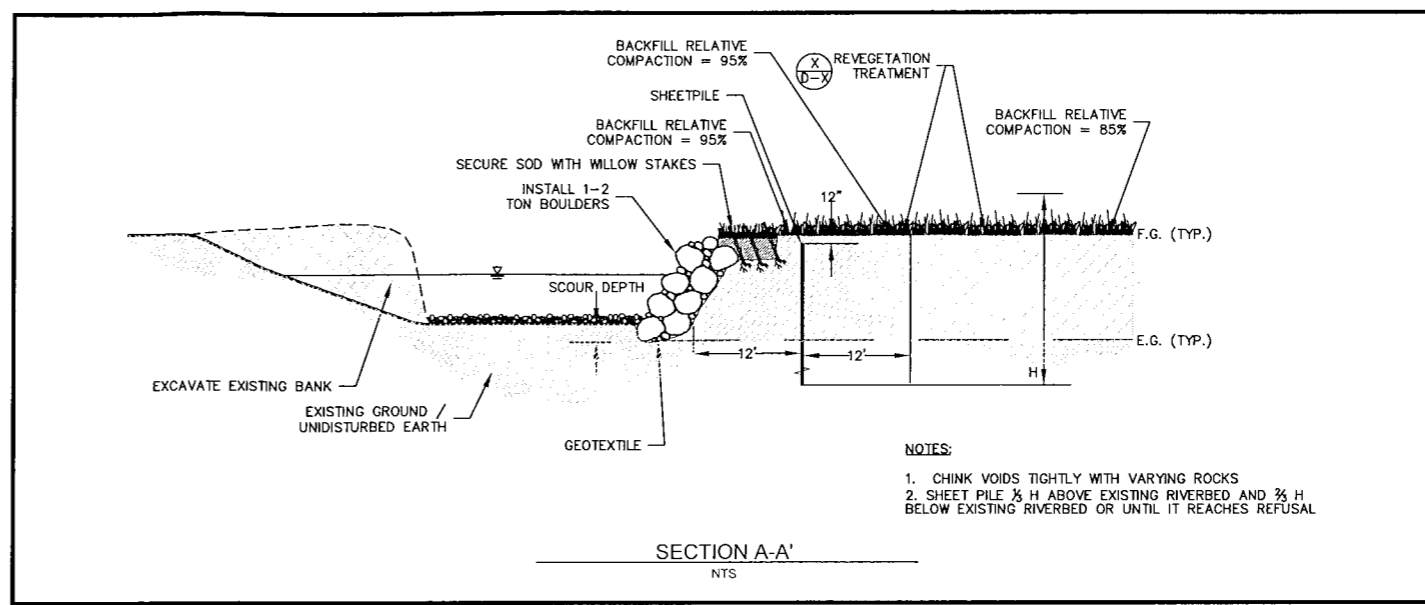
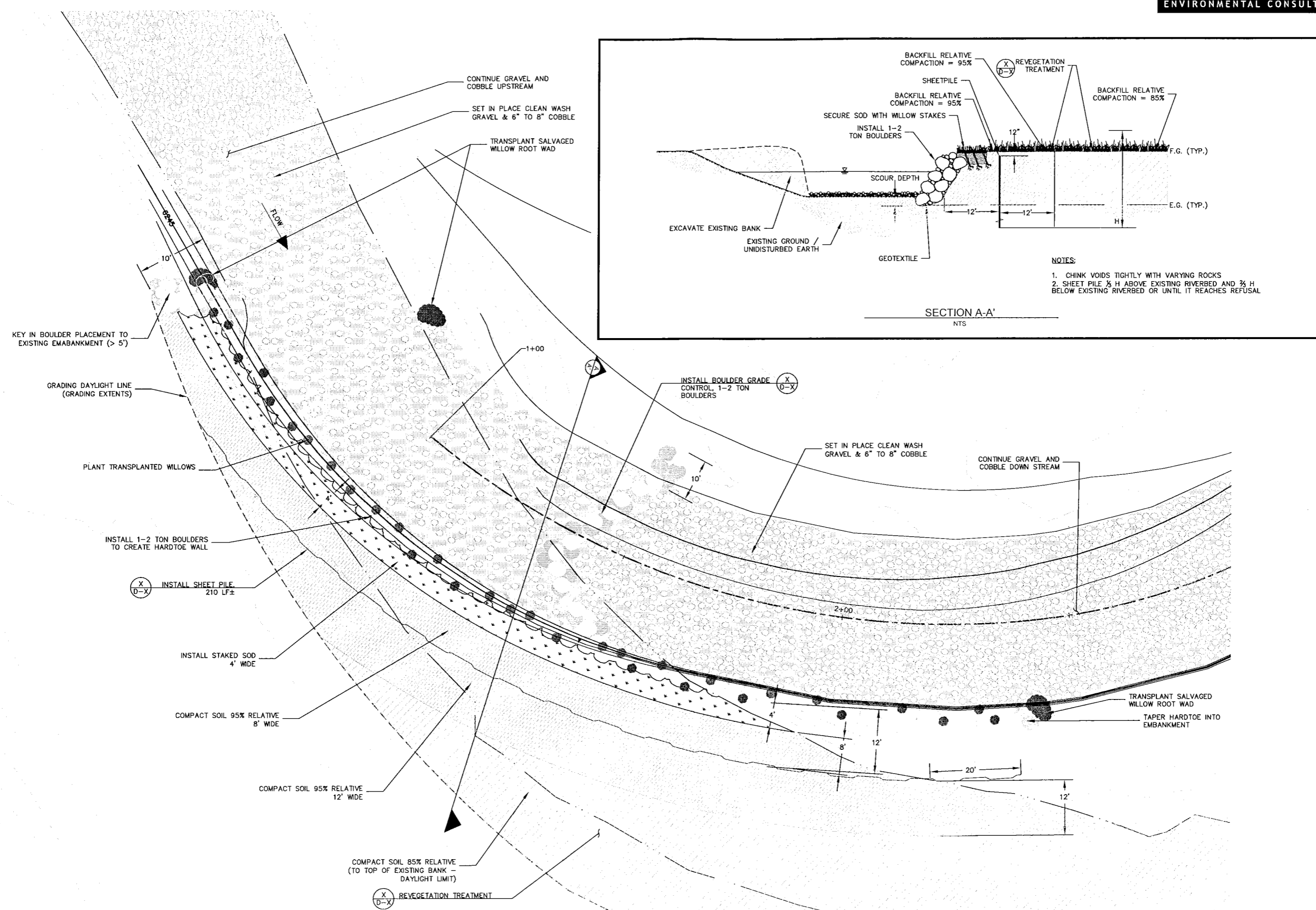


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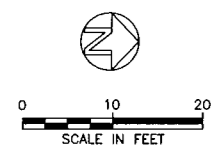
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CHECKED CM
DATE 10/03/07
SCALE 1"=40'
JOB NO. 3114101
FIGURE NO.

MATCHLINE RIVER
STA: 90+56.72
NEW ALIGNMENT
STA: 36+00
SEE SHEET P-4

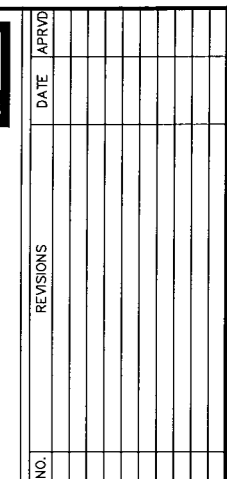
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NO.	REVISIONS
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<p>UPPER TRUCKEE RIVER MIDDLE REACHES RESORTATION PROJECT REACHES 3 & 4 TIE IN UPSTREAM LOCATION SOUTH LAKE TAHOE, CA</p>	
DESIGNED/DRAWN	CM/CD
CHECKED	MR
DATE	10/03/07
SCALE	1"=10'
JOB NO.	XXXXXXXXXXXX
FIGURE NO.	P-6




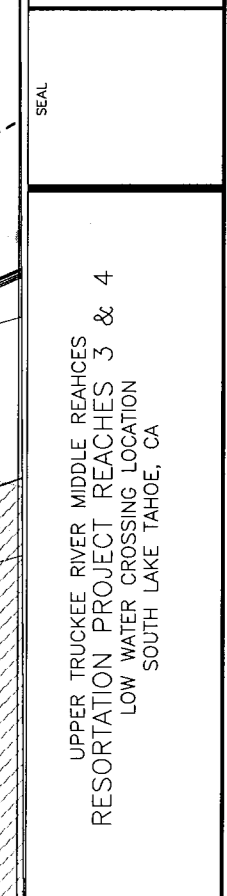
PRELIMINARY PLANS
NOT FOR CONSTRUCTION



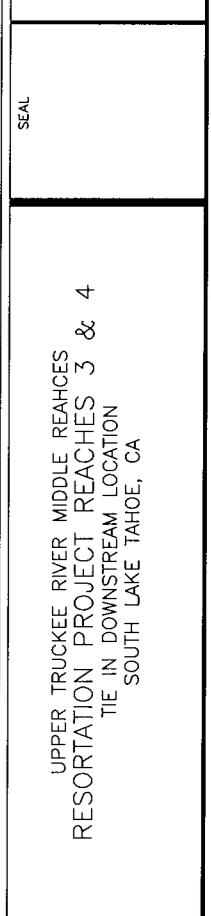
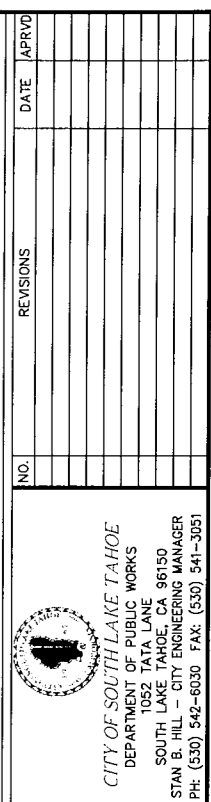
ENTRIX
ENVIRONMENTAL CONSULTANTS




 **CITY OF SOUTH LAKE TAHOE**
DEPARTMENT OF PUBLIC WORKS
1052 TATA LANE
SOUTH LAKE TAHOE, CA 96150
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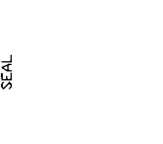
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3114101	
FIGURE NO.	



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DATE
10/03/07
SCALE
1"=10'
JOB NO.
XXXXXXXXXXXXXX
FIGURE NO.
<i>P-8</i>

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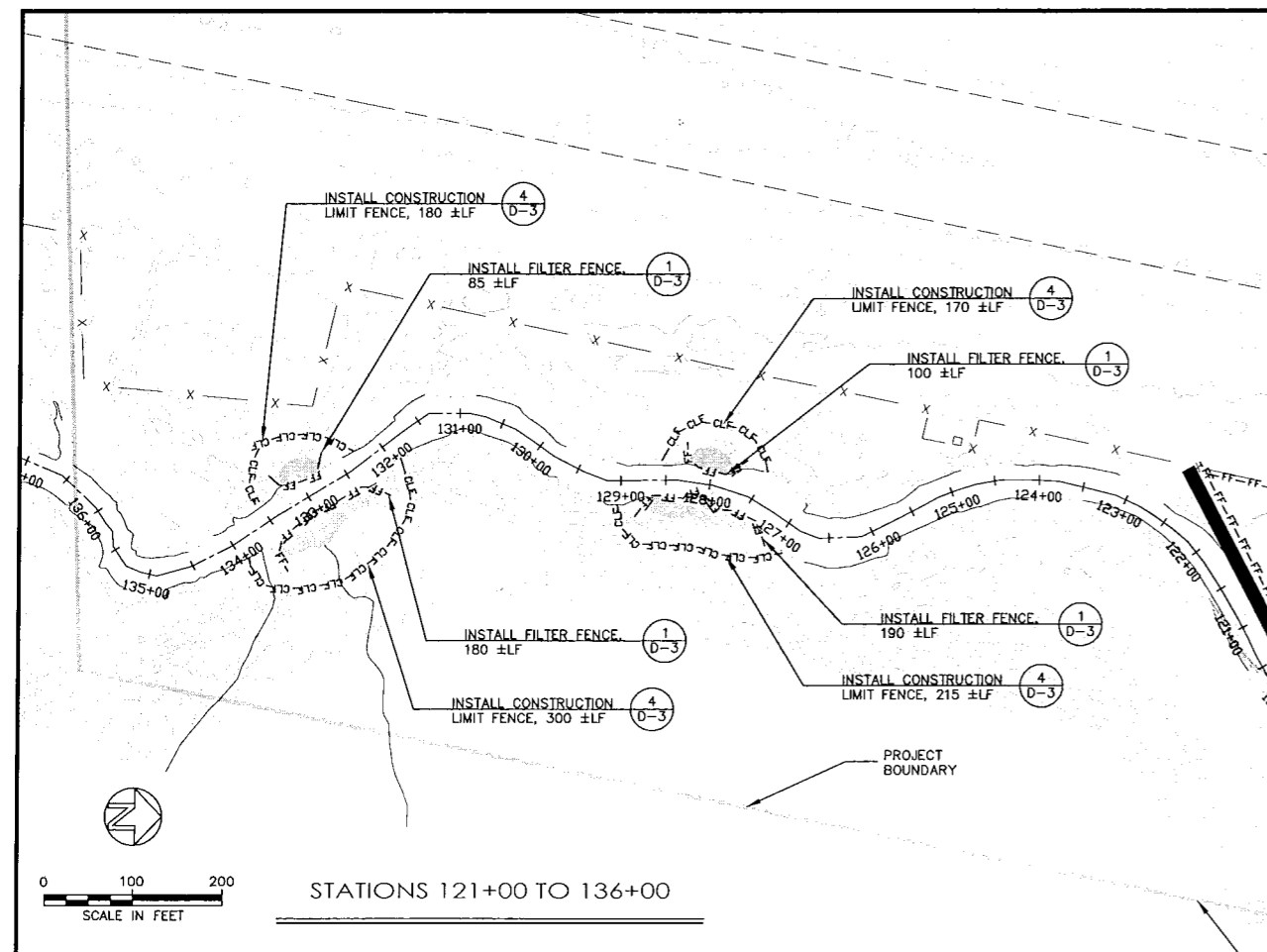
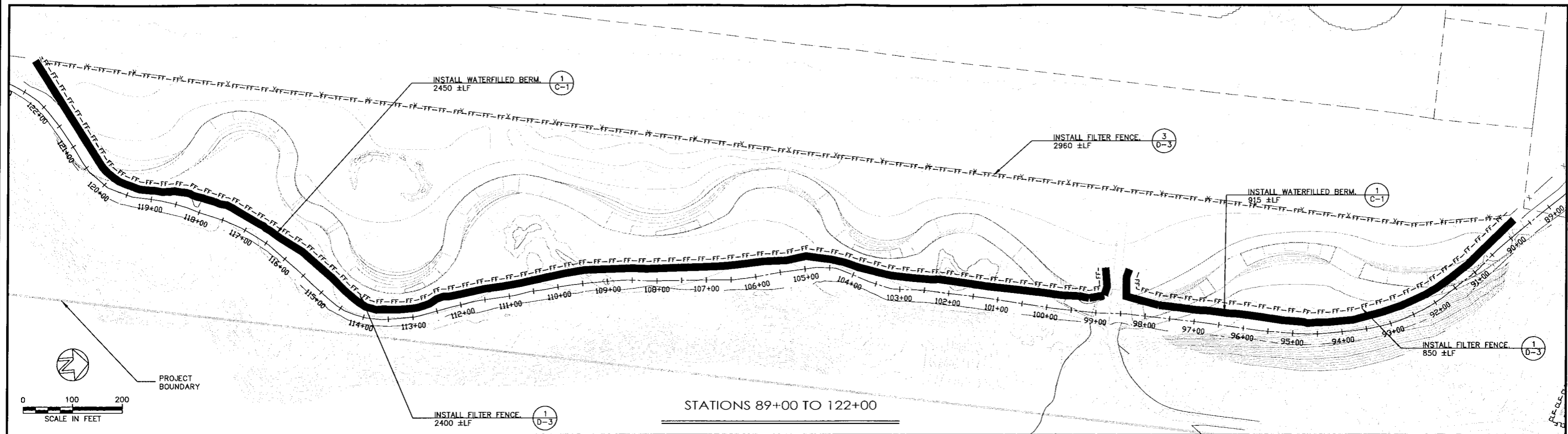
CITY OF SOUTH LAKE TAHOE
DEPARTMENT OF PUBLIC WORKS
1052 TATA LANE
SOUTH LAKE TAHOE, CA 96150
CHRISTIAN B. HILL - CITY ENGINEERING MANAGER
PH (530) 542-6030 FAX (530) 541-3051



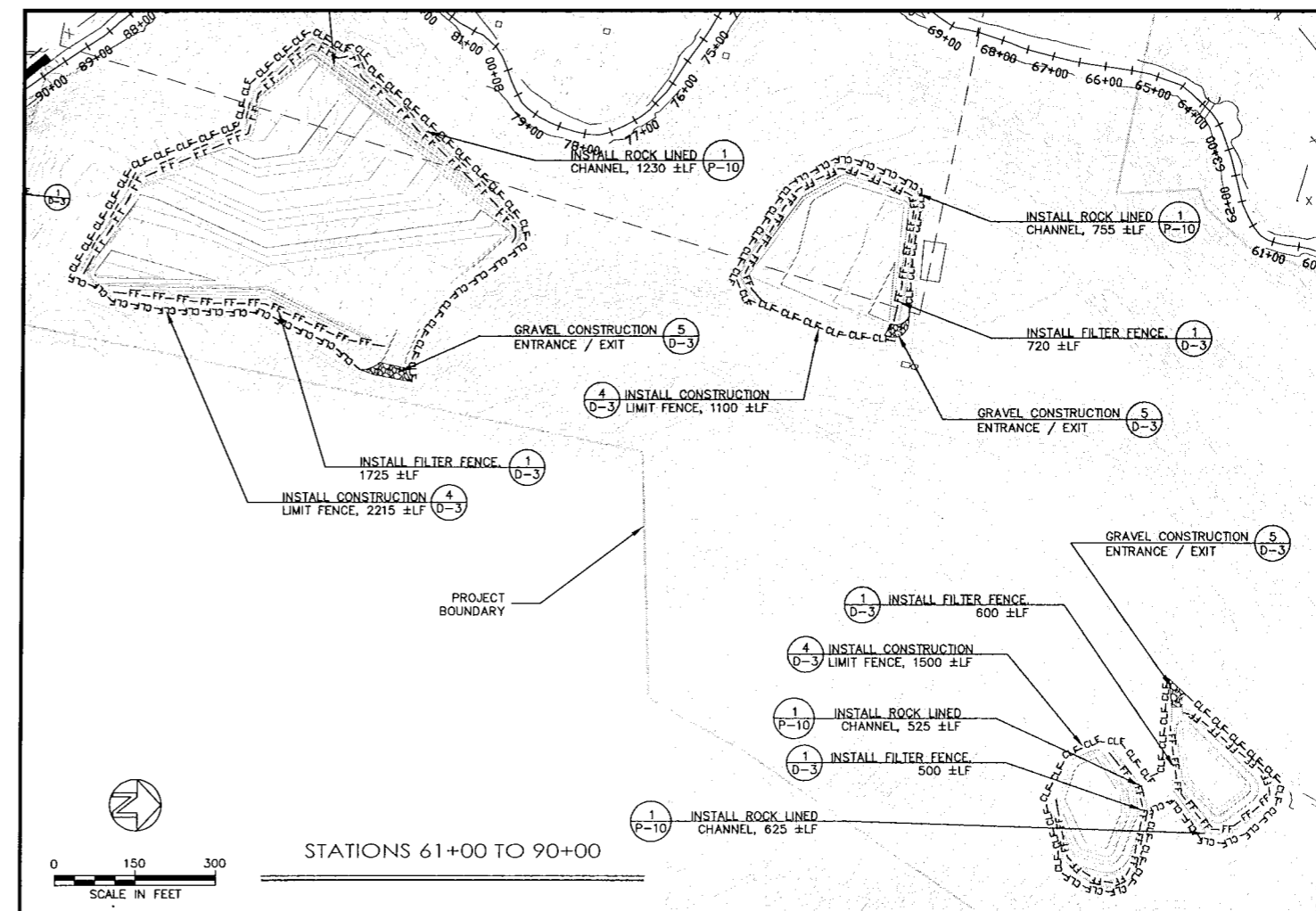
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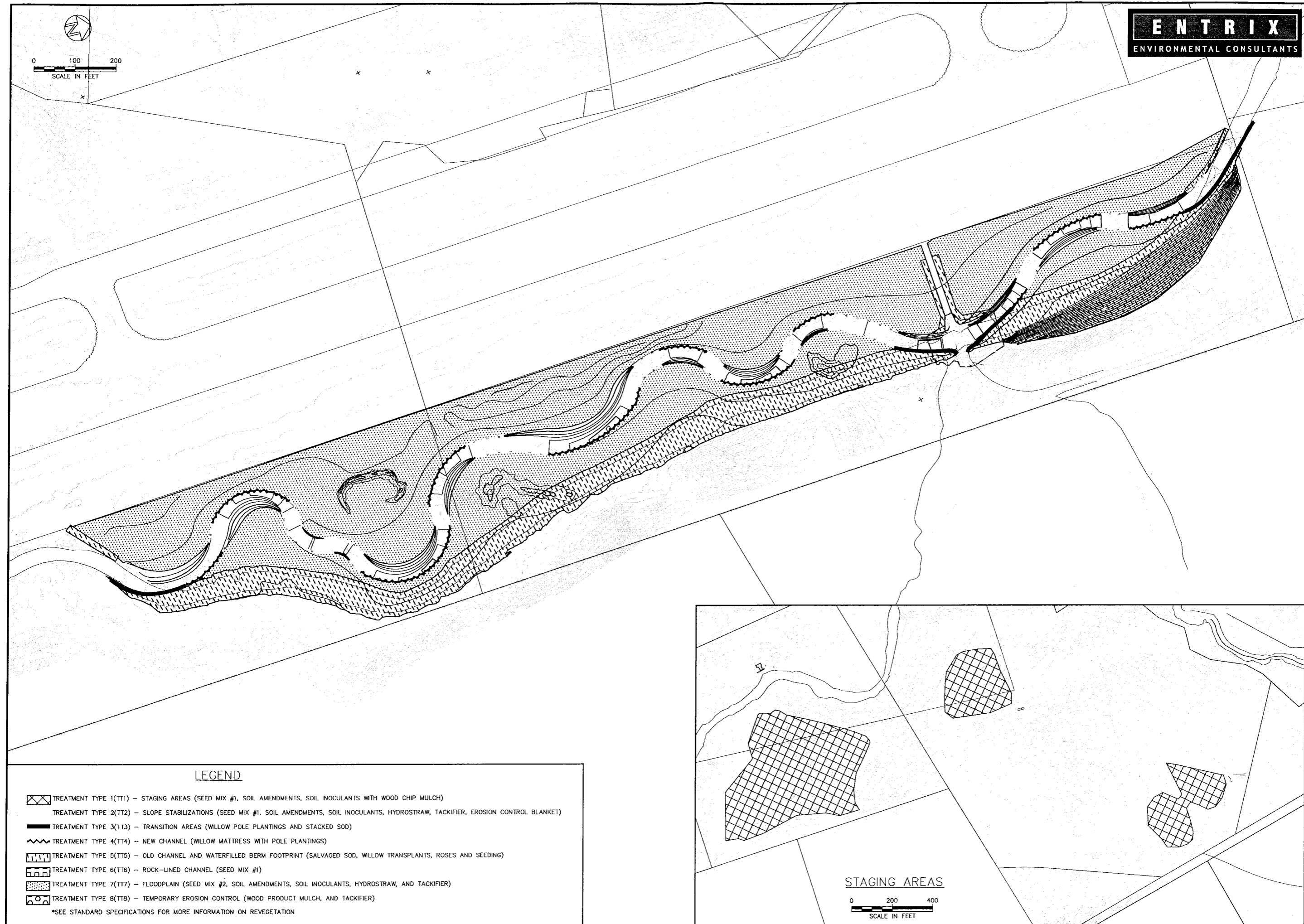
UPPER TRUCKEE RIVER MIDDLE REACHES
RESORTATION PROJECT REACHES 3 & 4
STORAGE AND STAGING GRADING PLAN
SOUTH LAKE TAHOE, CA

DESIGNED BY/ DRAWN CD
CHECKED CM
DATE 10/03/07
SCALE 1"=100'
JOB NO. 3114101
FIGURE NO. <i>P-9</i>



PRELIMINARY PLANS
NOT FOR CONSTRUCTION





Appendix C

Glossary

Appendix C

Glossary of Terms

Aggradation - continual sediment deposition in the channel over a relatively long time period (i.e. years) that can result in an increased number and/or volume of in-channel bars, and possibly overall raising of the bed elevation.

Alluvial deposits - sediment that was deposited by UT River water.

Channelization - widening, deepening and/or straightening of natural streams. Channelization often includes periodic dredging, riparian vegetation removal, and bank protection. Waterways are often channelized to make room for development, prevent meandering, and provide flood protection.

Channel capacity - measured at a cross-section refers to how much flow the channel can convey at the point where the water surface elevation is equal to the top of bank elevation of the lowest bank. Once the river's flow exceeds the channel capacity, incipient flooding (overtopping of the banks) begins.

Colluvial deposits - sediment that originates from hillslope erosion.

Competence - The competence of a river is the maximum particle size that it is able to transport.

D₅₀ - median grain diameter (in mm) in which 50 percent of the sampled particles are finer. Similarly, the **D₁₆** (a measure of fine material) is the grain size in which 16 percent are finer, **D₈₄** (a measure of coarse material) the size at which 84 percent are finer, etc.

Degradation - continual sediment erosion in the channel over a relatively long time period (i.e. years) that can result in a decrease in the number and/or volume of in-channel bars, and possibly overall lowering of the bed elevation.

Dynamic channel stability - state in which a set of self-regulating or cyclic mechanisms creates adjustments in stream processes over time without net aggradation or degradation of the channel bed. A channel in dynamic equilibrium is able to adjust to changes in independent variables, namely sediment load and discharge, while maintaining stability of form and process (Leopold and Others 1964). A channel in dynamic equilibrium may still undergo episodes of scour, fill, and lateral migration. However, these episodes are short-term variations over geologic time scales.

Flow conveyance capacity - see channel capacity.

Headcutting - upstream propagation and lowering of the bed elevation through degradation. Headcuts often form in response to channel incision can travel upstream until an equilibrium bed slope is attained.

Incision - erosive downcutting/degradation of the channel that over time lowers the bed elevation with respect to the top of the bank elevation. In the UT River in CSLT study area, the top of the bank elevation is the meadow surface, which because of incision, has been transformed from a floodplain to a terrace. The most common factors leading to channel incision are direct human manipulation of the channel (e.g. straightening, confining), decrease in sediment supply, and increased peak flows.

Lacustrine deposits - sediment that was lake deposited in the past when Lake Tahoe had a higher elevation that extended into the CSLT study area.

Lateral confinement - streams that are not free to meander back and forth in a sinuous pattern. Streams can have a naturally straight planform and be naturally laterally confined because of the presence of erosion resistant material (e.g. bedrock, glacial lag deposits). In the case of the lower UT River, lateral confinement is mostly due to channelization and incision.

Over-widening - occurs when high rates of bank erosion increase channel width to a point where channel width is out of equilibrium with the prevailing flow regime and sediment loads carried by the UT River. Over-widening increases channel capacity and sediment erosion, and negatively impacts aquatic ecosystems by decreasing flow depths.

Planform - the river's pattern/alignment as viewed from above.

Sinuosity - the ratio of channel length to downvalley length, and is a measure of meandering, or the degree to which a channel deviates from a straight planform. A perfectly straight channel has the lowest sinuosity with a value of 1.0. Higher sinuosities indicate a greater degree of channel meandering. Typically, low sinuosity channels are considered to have values less than 1.2, moderately sinuous channels range from 1.2-1.5, and highly sinuous channels have sinuosities greater than 1.5.