Appendix C – Iowa Hill Pumped-storage Development Visual Resources Technical Report Addendum No. 1

SACRAMENTO MUNICIPAL UTILITY DISTRICT
UPPER AMERICAN RIVER PROJECT
(FERC PROJECT NO. 2101)

IOWA HILL PUMPED-STORAGE DEVELOPMENT
VISUAL RESOURCES TECHNICAL REPORT
ADDENDUM NO. 1

Prepared by:

CH2M HILL, INC.
Sacramento, California

Prepared for:

Sacramento Municipal Utility District
Sacramento, California

January 2008

Version 0

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

This visual resource analysis report is an addendum to the January 2005 report titled, "Sacramento Municipal Utility District Upper American River Project (FERC No. 2101) Iowa Hill Pumped-storage Development Visual Resources Technical Report" prepared by Devine Tarbell & Associates, Inc. and Martha Goodavish Planning & Design. The 2005 report addressed the potential visual impacts of the Iowa Hill Pumped-Storage Development (the project) on the surrounding landscape.

The Iowa Hill Pumped-storage Development is a proposed new component of SMUD's Upper American River Project (UARP). The proposed development will be located in El Dorado County, near the community of Camino (Figure 1[1]). One of the primary issues associated with the Iowa Hill Development is the potential visual resource impacts of the project features. Although many of the project features will be underground or underwater, including the powerhouse and water conveyance system (penstock, intake/outlet structure), the upper reservoir, switchyard, tunnel portal leading to the powerhouse, and a 2.5-mile-long transmission line will be aboveground.

The 2005 Visual Resources Technical Report included photographic visual simulations from five residential viewpoints, focusing on the visibility of the project upper reservoir, switchyard, and transmission line. The five viewpoints, selected in consultation with federal resource agencies and the public, were considered to be representative of the views available from that area toward the project. The simulations depicted the project as it will appear one year and ten years after it is constructed from the five viewpoints.

In response to public concerns regarding the accuracy and comprehensiveness of the five visual photographic simulations in the 2005 Report and other issues, the Iowa Hill Joint Advisory Committee (IHJAC) was formed to advise the SMUD Board of Directors regarding potential measures to reduce impacts, including those associated with visual resources. The IHJAC is comprised of seven members, two each from El Dorado County and SMUD, and one from each of the following organizations: Apple Hill Growers' Association, Camino Action Committee, and the Iowa Hill Action Committee. The IHJAC, in turn, formed the Visual Resources Subcommittee to address the local citizens' concerns related to visual resources.

To address concerns regarding accuracy of the 2005 visual photographic simulations, SMUD contracted with Maraizon International (Maraizon) to develop an interactive three-dimensional (3-D) visual simulation of the project area plus the surrounding areas. This 3-D visual simulation is included on a DVD as Appendix A to this Report Addendum. Using the 3-D visual simulation, Maraizon prepared still-shot images from the same five viewpoints of the 2005 Report plus four additional residential viewpoints[2]. The purpose of Maraizon's

[1] All graphics are included at the end of this report.

[2] The additional four residential viewpoint simulations were generated on the basis of requests from the public during a December 12, 2007 IHJAC Visual Resources Subcommittee meeting.

work was threefold: 1) to provide a means of generating independent, third-party 3-D visual simulations of the project features from any property in the area using state-of-the-art simulation technology; 2) to aid SMUD in evaluating potential visual impacts in the project vicinity from the presence of the project using the simulation technology; and 3) to aid in comparing project visibility from the original five residential viewpoints as shown in the 2005 photographic simulations and the 3-D simuations.

The purpose of this Report Addendum is to: 1) provide an independent review of the 2005 photographic visual simulations; 2) provide an independent review of the 3-D visual simulations; 3) compare the two sets of simulations relative to the appearance and visibility of the project from the viewpoints; 4) provide an independent, third-party evaluation regarding whether the conclusions presented in the 2005 Report are still valid; and 5) provide additional conclusions regarding the project, if appropriate.

2.0 SUMMARY OF 2005 VISUAL RESOURCES TECHNICAL REPORT

The following sections provide a summary of the methodology and conclusions contained in the 2005 Visual Resources Technical Report.

The 2005 Report was prepared to address visual resource issues associated with the construction and operation of the proposed project. Visual resource issues identified included: 1) the visual effects of the project on sensitive viewing locations; 2) concerns of area residents about the visual effects of the project; 3) consistency of the project with Eldorado National Forest visual quality objectives; and 4) consistency of the project with the El Dorado County General Plan.

2.1 Methodology

The study area for the visual assessment of the project[3] was defined as a three-mile radius around the project features. The visual effects of the project were assessed in terms of the amount of visual contrast resulting from the project as compared to the existing condition without the project.

Potential viewpoints identified during a field reconnaissance performed in consultation with federal agencies were entered into a GIS-based three-dimensional model. Based on the information provided by the GIS-based model, as well as comments received during public meetings, model-generated photographic visual simulations of the project were prepared from three viewpoints and an analysis of the visual effects of the project was performed (for one year after construction and ten years after construction).

Public comments received during the visual resource assessment resulted in further field reconnaissance and two additional viewpoints being simulated. During the study and

[3] Project features included the upper reservoir, switchyard, 120-foot-high transmission line structures, and the tunnel portal.

assessment process, meetings were held with the Eldorado National Forest. The assessment included an evaluation to determine whether the project will be consistent with visual resource management direction of the Forest Service and El Dorado County.

2.2 Study Conclusions

The proposed project will be generally consistent with the visual management direction of the Eldorado National Forest's Forest Plan and the El Dorado County General Plan. The evaluation of consistency with this visual management direction was based on the appearance of the Iowa Hill Development ten years after construction with both the mitigation measures that have been incorporated into the design of the project and additional mitigation measures identified in the study.

The upper reservoir will not be visible from any scenic vistas, major or scenic travel corridors, developed recreation facilities or tourism sites; however, it will be visible or partially visible from select residences along canyon edges of the South Fork American River and Iowa Canyon Creek (approximately one mile or more away). The Eldorado National Forest refers to these views as "community views" in which the upper reservoir will be seen primarily from private residential areas, and not public viewing locations.

Project development at the upper site appears to be consistent with the Forest Plan general direction for "moderate visual constraint," and the standard and guideline of "minimizing impacts on Forest resources…." With the mitigation measures already incorporated into the project and the implementation of additional measures, the upper reservoir berm will borrow textures and colors from the natural landscape, which will reduce the visual contrasts of the berm with the surrounding landscape. Although the form of the berm will be noticeable, the other features at the upper site, i.e., the switchyard, transmission line, and ventilation shaft portal entrance area and road will remain visually subordinate to the characteristic landscape.

The lower site is adjacent to Slab Creek Reservoir, which is part of the South Fork American River (SFAR) canyon, a highly valued scenic water feature within the Eldorado National Forest. The existing landscape includes flat-water, steep hills, a dam, an intake structure and an adit portal (to the Slab Creek – White Rock tunnel). Although the Slab Creek Reservoir area receives only limited dispersed recreational use, the reservoir and adjacent canyon walls are visually sensitive. Views of the lower site are confined primarily to the reservoir and surrounding canyon walls. Due mostly to steep topography, the lower site can only be seen from a few residences.

In general, the lower site will be consistent with the Forest Plan standard and guideline of "minimizing visual impacts" because several primary features of the project were designed to not be visible in this area. The powerhouse and water conveyance system (e.g., penstock and intake/discharge structure) will be underground or underwater, and the switchyard and transmission line towers were relocated to the upper site to reduce the area of disturbance in the SFAR canyon.

Thus, the only aboveground features at the lower site will be the powerhouse tunnel entrance portal and the minor widening of the existing 0.8-mile-long access road to it. The road widening will consist of a three-foot expansion with minor cut slopes that will be consistent with the "foreground retention" direction of the Forest Plan. Development of the powerhouse tunnel entrance portal will likely require cutting back the canyon slope to create a level area for the entrance portal, which will result in a cut slope of up to approximately 60 feet. A retaining wall below the portal entrance area and the exposed framing of the entrance portal itself will be built with concrete and colored a dark brown to blend with the surrounding landscape. This feature of the development will only be visually evident from a narrow area of the reservoir. It will not be visible over most of the reservoir area due to steep topography and the reservoir's narrow and serpentine shape. Nevertheless, this one feature of the lower site may conflict with the Forest Service foreground retention direction, and SMUD is committed to working with the Forest Service to ensure that final site design for the powerhouse tunnel entrance renders it consistent with this foreground retention direction.

The El Dorado County General Plan most directly addresses the County's visual and scenic quality objectives and policies within the Land Use Element. The Conservation and Open Space Element also contains reference to protection of aesthetic and scenic quality of the County.

Design of the project has incorporated several measures to minimize visual effects of the project, and other practicable measures could be implemented in the future. The project may be inconsistent with specific objectives of the El Dorado County General Plan; however, the approach of minimizing visual effects is consistent with the intention of the General Plan.

2.3 Methodology Used to Prepare the 3-D Visual Simulations

Maraizon developed an interactive 3-D visual simulation of the project area roughly covering the same three-mile-radius circle centered on the upper reservoir that was used in the 2005 GIS-based model. This 3-D visual simulation is included on a DVD as Appendix A to this Report Addendum. The interactive component was needed to allow public demonstrations of the simulation where, with the aid of a computer mouse, a user could navigate within the simulated landscape to view the project from any location and/or height above the ground. The Maraizon simulation contains assets such as project features, terrain, trees, and other 3-D assets of the landscape created with the 3-D authoring program Autodesk 3-D Studio Max R9 and Autodesk 3-D Studio Max 2008. All textures applied to the assets (tree textures, terrain, water, and sky) were edited, as necessary, using Adobe Photoshop.

Maraizon collected the following types of data from various sources: topographic maps, aerial photography, and satellite imagery of the area, survey data, photographs of the upper reservoir and lower portal tunnel facility sites, and photographs of similar existing facilities.

Project design drawings, terrain coordinates, a high-resolution aerial photograph, and survey data were used to simulate and position the proposed upper reservoir berm and switchyard

(shown in Figure 2 from 298 feet above ground) as well as 100-feet-high transmission line towers (shown in Figure 3 from 227 feet above ground). To accurately determine the sizes and dimensions of project facilities, SMUD provided detailed drawings of the proposed upper reservoir facilities (reservoir berm, transmission line towers, and switchyard) and a conceptual drawing of the lower portal at Slab Creek, which has not yet been designed in detail (Figure 4). Design drawings provided by SMUD were translated into a useable format, and then all of the data were combined to create the full simulation in a 3-D computer model.

In addition, Maraizon staff visited the project area and vicinity in July 2007 to photograph the upper reservoir and switchyard sites, the lower tunnel portal area, the surrounding area, and views of the project facility sites from various locations.

Nine forested areas around the proposed reservoir berm footprint were surveyed by SMUD to determine the heights of existing trees in the area. After all the project facilities were placed in the model, Maraizon developed simulated trees and placed them around the berm in the model based on aerial photography and the data from the tree survey. The hilltop where the berm will be located was photographed at an oblique angle to obtain more detailed information regarding density and placement of trees near the reservoir berm. The oblique photos were subsequently compared to the aerial photos and tree survey data to fine-tune tree locations near the upper reservoir berm and switchyard site. To attain visual realism of the simulation components, Maraizon used textures created from photographs of real elements, such as species-specific trees and shrubs, then applied the textures to the model.

In cases where no photographic data were available to guide the simulation of textures and colors of the project facilities, such as the COR-TEN steel of the transmission line towers or the berm material, Maraizon created the textures from similar objects. Photographs provided by SMUD of other switchyards, dams, and the White Rock tunnel adit spoils pile were used to create textures and colors. Maraizon reviewed the photgraphs and painted the textures and colors into the program using Photoshop.

Photos provided to Maraizon to show the appearance of other project features (to aid in determining the correct colors and textures of project facilities) were taken in the fall. The sun's location in the sky changes from season to season, and therefore, changes how areas are shaded. At certain times of day and year, project features may appear more shaded, and at other times of day and year, they may appear less shaded.

The specifications of the PC computers used to develop the 3-D computer program are:

- Processor: Intel Core2 Quad 6600 – 2.4 GHz
- GPU (video card): Nvidia GeForce 8800GTS 640MB
- RAM (Memory): 4GB
- OS (Operating System): Windows Vista 64bit Business

The minimum system requirements to interactively run and display the simulation are:

- Processor: Intel or AMD 1.5GHz or Higher
- GPU (video card): NVidia Shader Model 3.0 (Series 6 and up) or Higher with at least 256MB of RAM
- RAM (Memory): 2GB
- OS (Operating System): Windows XP or Vista

2.4 Visual Simulations from Selected Viewpoints

It should be noted that the visual simulations presented in this report are not photographic visual simulations. Photographic visual simulations are developed by taking photos of a site from an observation point, then overlaying a model of the project onto the photo using computer software. These images from the 3-D simulation model are not the same as photo simulations because there is no photography involved. The 3-D simulated images reflect the appearance and visibility of project features from any location.

Whether it is a photographic visual simulation or a 3-D visual simulation that is prepared, it is worth noting that what is seen in the still image is not as wide a view as what the normal human eye actually sees. Although placement of the project into the landscape (i.e., its location) and its size and shape are accurate, what is shown in the 3-D visual simulations is approximately one-third of the landscape view the human eye would see when in the field. The cone of vision (i.e., the width of the view) of the 3-D visual simulations in this report is 60 degrees. In the photographic simulations, the cone of vision is narrower than 60 degrees. A human with normal eyesight actually has a cone of vision of greater than 180 degrees. Both the photographic visual simulations and the 3-D visual simulations show views that are substantially narrower than 180 degrees in the still images in this Report, and the view in all of the images is focused on proposed project features (whether it is the upper reservoir berm and associated facilities or lower tunnel portal area). As a result, the project's appearance in the landscape is overstated relative to what a person would actually see when standing at the viewpoint location.

2.5 2005 Photographic Visual Simulations

The 2005 Visual Resources Technical Report included photographic visual simulations of the project from five viewpoints. Those simulations have been reproduced and included in this analysis; all graphics are included at the end of this Report.

The viewpoint locations are shown on Figure 1, and are listed below:

- Viewpoint 1: Cableview Court (Figure 5A)
- Viewpoint 2: Log Cabin Lane (Figure 6A)
- Viewpoint 3: East Sky Ranch Lane (Figure 7A)
- Viewpoint 4: Slab Creek Court (Figure 8A)
- Viewpoint 5: West Sky Ranch Lane (Figure 9A)

Figures 5A through 9A each include three still photos, showing the view from the same location looking toward the upper reservoir berm. In the top photo, the existing condition view is shown (i.e., without project features). The middle photo depicts a view of the project one year after construction, and the bottom photo shows the same view ten years after construction. The photos show the view that will be seen by a person standing on the ground at each viewpoint location.

2.6 2008 3-D Visual Simulations

For this analysis, Maraizon prepared 3-D visual simulations from the same five viewpoints (Figures 5B through 9B) that were simulated in 2005, as well as four additional residential viewpoints (Figures 10 through 13) based on requests by the public that were made during the December 12, 2007 IHJAC Visual Resources Subcommittee meeting. Figure 1 shows the location of these viewpoints in relation to project facilities. The views shown in all of the 3-D visual simulations are from six feet aboveground to approximate the view a person would see when standing at that viewpoint. The 3-D visual simulations include a few differences from the 2005 photographic visual simulations:

- The 3-D visual simulations show the view toward the project immediately after it is constructed, rather than at one or ten years after construction is complete.
- The 3-D visual simulations show open views toward the project facilities. This was accomplished by simulating a circular area with a 600-foot-radius cleared of vegetation around each viewpoint. This feature of the 3-D simulation was implemented for two reasons: 1) existing tree placement at any viewpoint cannot be simulated accurately without current photographic documentation, which was infeasible to gather (thus the placement of no trees is more accurate than the placement of any trees); and 2) future tree clearing (if any) at any viewpoint is unknown. Clearing the foreground vegetation presents a worst-case simulation from that viewpoint, i.e., any trees that are situated at the residence may provide some screening of the view toward the upper reservoir site.
- The 3-D visual simulations include 100-feet-high transmission line structures, whereas the 2005 photographic visual simulations include 120-feet-high structures. SMUD's detailed design drawings show the height of the transmission line structures as 100 to 120 feet (see Exhibit F-165, License Application, July 2005). The 100-feet-high structures were included in the simulation as a refined mitigation measure to reduce the visibility of the transmission line.

A list of the 3-D visual simulations follows:

- Figure 5B: Viewpoint 1 – Cableview Court
- Figure 6B: Viewpoint 2 – Log Cabin Lane
- Figure 7B: Viewpoint 3 – East Sky Ranch Lane
- Figure 8B: Viewpoint 4 – Slab Creek Court
- Figure 9B: Viewpoint 5 – West Sky Ranch Lane
- Figure 10: Viewpoint 6 – Apple Vista Lane

- Figure 11: Viewpoint 7 – Apple Tree Lane
- Figure 12: Viewpoint 8 – Waxwing Lane
- Figure 13: Viewpoint 9 – Heron Lane

2.7 Comparison of the Photographic Simulations with the 3-D Simulations

A review of the photographic visual simulations and the 3-D visual simulations has been performed. In addition, a comparison of the visibility of the project in the two sets of simulations has been completed (Table 1).

Table 1	**Comparison of Project Visibility in the Photographic Visual Simulations and 3-D Visual Simulations**		
Location	**Photographic Simulation**	**3-D Simulation**	**Comparison**
Viewpoint 1 Distance to Upper Reservoir is 1.0 mile (middleground view)	The middle photo simulation shows the upper reservoir berm above the ridgeline and tops of the transmission line structures nearest to the reservoir. The switchyard equipment is not discernable. It adds a form to the top of the ridgeline, and is a dominant feature. There is a change in color and texture at the ridgeline. The bottom photo (ten years after the project is constructed), the upper reservoir berm is less prominent due to vegetation growth near it. The color of the berm has changed.	The 3-D simulation shows the top of the upper reservoir berm at the ridgeline. The ridgeline has been changed from an uneven texture to a straight horizontal line. The berm is barely visible; it does not dominate the view. The tops of the transmission line structures nearest to the reservoir are not discernible.	The upper reservoir berm is above the ridgeline and is a dominant feature in the photographic simulation. Its visibility in the 3-D simulation is limited due to the top being at the ridgeline and the tint of the berm blending with the surrounding environment. It is a subordinate feature in this simulation. Its mass is smaller than that shown in the photographic simulation.
Viewpoint 2 Distance to Upper Reservoir is 0.8 mile (middleground view)	The middle photo simulation shows the upper reservoir berm, partially screened by a tree that is at the viewpoint location. The berm's form is noticeable, but does not dominate the view. A change to the ridgeline is not visible. A change in color and texture to the area through the tree is visible. The switchyard and transmission line structures are not visible. The bottom photo (ten years after the project is constructed), the upper reservoir berm is barely visible through the tree.	The 3-D simulation shows the top of the upper reservoir berm slightly below the ridgeline. The ridgeline has been changed from an uneven texture to a straight horizontal line. The berm is visible and noticeable, but does not dominate the view. The switchyard equipment and transmission line structures are not discernible.	The upper reservoir berm appears to be slightly below the ridgeline and not a dominant feature in the photographic simulation. The upper reservoir berm appears to be slightly below the ridgeline in the 3-D simulation. Its visibility is similar to that shown in the photographic simulation. Its mass is comparable to that shown in the photographic simulation.
Viewpoint 3 Distance to Upper Reservoir is 1.1 mile (middleground view)	The middle photo simulation is visible because it changes the ridgeline from an uneven texture to a smooth surface. It adds a form that does not dominate the view. The color and texture blends with the surrounding environment. The switchyard equipment and transmission line structures are not discernible. The bottom photo (ten years after the project is constructed), the upper reservoir berm is barely visible due to the vegetation growth near it.	The 3-D simulation shows the top of the upper reservoir berm at the ridgeline. The ridgeline has been changed from an uneven texture to a straight horizontal line. The berm is visible and noticeable, but does not dominate the view. The switchyard and transmission line structures are not discernible.	The upper reservoir berm appears to be slightly below the ridgeline and is not a dominant feature in the photographic simulation. The upper reservoir berm appears to be at the ridgeline in the 3-D simulation. It is more noticeable than the photographic simulation depicts, but does not dominate the view. Its mass is comparable to that shown in the photographic simulation.

Table 1	**Comparison of Project Visibility in the Photographic Visual Simulations and 3-D Visual Simulations**		
Location	**Photographic Simulation**	**3-D Simulation**	**Comparison**
Viewpoint 4 Distance to Upper Reservoir is 0.8 mile (middleground view)	The middle photo simulation shows the upper reservoir berm's form as a dominant feature and the tops of the transmission line structures nearest to the reservoir are evident. It has changed the height, texture, and color of the ridgeline. The bottom photo (ten years after the project is constructed), the upper reservoir berm remains a dominant feature. Minimal vegetation growth around the berm is evident, and the color of the berm has changed.	The 3-D simulation shows the top of the upper reservoir berm at the ridgeline. The ridgeline has been changed from an uneven texture to a straight horizontal line. The berm is visible, similar to Viewpoint 2, and is more noticeable than in Viewpoint 3, but does not dominate the view. The switchyard equipment and the transmission line structures are not discernible.	The upper reservoir berm appears to be slightly above the ridgeline; it is a dominant feature in the photographic simulation. The upper reservoir berm appears to be at the ridgeline in the 3-D simulation. It appears less noticeable than the photographic simulation depicts. It does not dominate the view. Its mass is smaller than that shown in the photographic simulation.
Viewpoint 5 Distance to Upper Reservoir is 1.2 mile (middleground view)	The middle photo simulation shows the upper reservoir berm, partially screened by a tree that is at the viewpoint location. It adds a form to the ridgeline. A change in color and texture along the ridgeline will result. The berm is visible and noticeable, but not a dominant feature in the photo. The switchyard and transmission line structures are not visible. The bottom photo (ten years after the project is constructed), the upper reservoir berm remains noticeable; the only visible change is the color of the berm. Vegetation appears to have grown, but does not screen the berm.	The 3-D simulation shows the top of the upper reservoir berm at the ridgeline. The ridgeline has been changed from an uneven texture to a straight horizontal line. The berm is visible and noticeable similar to that shown in Viewpoint 3, but it does not dominate the view. The switchyard equipment and the transmission line towers are not discernible.	The upper reservoir berm appears to be above the ridgeline in the photographic simulation. It is visible and noticeable, but does not dominate the view. The upper reservoir berm appears to be at the ridgeline in the 3-D simulation. It does not dominate the view. Its mass is comparable to that shown in the photographic simulation.

2.8 Project Visibility in the 3-D Visual Simulations from the Additional Four Viewpoints

In addition to the five 3-D visual simulations that were developed for the same locations as the 2005 photographic simulations, Maraizon simulated views from four other residential viewpoints.

- Figure10 (Viewpoint 6): View of the upper reservoir berm from this location is minimal. In this view, it is seen in the center of the still image as a faint light gray behind the trees that are atop the ridgeline. The casual viewer will not notice the berm in the image. It is likely the viewer who is reviewing the still image, intent on finding the berm, will only find it in the image by knowing: 1) it is in the center of the image; 2) it is light gray; and 3) it is along the ridgeline. Even so, there is no clear indication that the feature shown in the image is the upper reservoir. The upper reservoir berm is a subordinate feature in this view.
- Figure 11 (Viewpoint 7): View of the upper reservoir berm from this location is obscured by topography and vegetation. No view of the berm is visible.
- Figure 12 (Viewpoint 8): View of the upper reservoir berm from this location is obscured by topography and vegetation. No view of the berm is visible.
- Figure 13 (Viewpoint 9): View of the upper reservoir berm from this location is obscured by topography and vegetation. No view of the berm is visible.

3.0 CONCLUSIONS

Provided below are conclusions based on a review of the 2005 Visual Resources Technical Report conclusions, the photographic visual simulations, and the 3-D visual simulations.

- The Iowa Hill Development upper reservoir berm will not be visible from any scenic vistas, scenic travel corridors, or developed recreation facilities or tourism sites. It will, however, be visible or partially visible from certain residences located to the northwest, west, and southwest - located between 0.8 and 1.2 miles away (i.e., middleground views).

- The Eldorado National Forest Visual Quality Objective (VQO)[4] for the upper reservoir site is Partial Retention. Partial Retention provides that forest management activities may be noticeable but must blend well with the natural appearance of the landscape. The 3-D simulations demonstrate that the upper reservoir berm, switchyard, and transmission line will comply with the VQO of Partial Retention.

[4] Visual quality management or scenery management on U. S. Forest System lands is described in terms of Visual Quality Objectives (VQOs). VQOs refer to the acceptable alteration of a landscape in five levels (presented in order from most stringent to least stringent requirements): Preservation, Retention, Partial Retention, Modification, and Maximum Modification.

- The Eldorado National Forest VQO for the tunnel portal and road leading to the portal (both adjacent to Slab Creek Reservoir) is Retention. Retention provides that forest management activities may be discernible but not clearly visible to the average viewer; disturbances must appear to be from natural causes. Many of the primary features of the project at the lower site were designed to be underground or underwater to eliminate visual impacts. Although the tunnel portal entrance may conflict with the Retention VQO, as shown in Figure 4, two facts must be considered. First, major facilities already exist within proximitiy of the tunnel portal: Slab Creek Dam, intake structure, and boat launch ramp. Second, the tunnel portal has limited visibility in the sourrounding area: 1) it is only visible from within Slab Creek Reservoir when the viewer is directly in front of and facing the portal; and 2) it is not visible from the opposite bank because the steep terrain precludes access except possibly at a few residences located on the canyon rim. This potential conflict will be discussed with the Eldorado National Forest in an attempt to reach agreement regarding whether the tunnel portal is inconsistent, and if so, the appropriate mitigation for this apparent inconsistency with the Forest VQO.

- The approach of minimizing visual effects, as reflected in the current project design, is consistent with the intention of the El Dorado County General Plan.

- When comparing the 3-D visual simulations to the photographic visual simulations, the 3-D visual simulations show some differences in appearance of the upper reservoir berm, switchyard, and transmission line structures from Viewpoints 1 through 5. Differences include mass, visibility, height relative to the ridgeline, and tint of the berm. The 3-D visual simulations reflect a refinement in mitigation measures, such as maintaining as much vegetation as possible around the berm and lowering the transmission line towers from 120 to 100 feet. The 3-D visual simulations also include textures and colors from existing project facilities, resulting in more accuracy in appearance.

- In all of the 3-D visual simulations where the upper reservoir berm, switchyard, and transmission line structures are visible, they comprise only a small portion of the image. They will comprise an even smaller portion of the landscape when viewed in the field due to the differences in the cones of vision (i.e., view angles) between humans (180 degrees) and the simulated images (60 degrees). Thus, project facilities such as the berm, switchyard, and transmission line will not dominate the landscape in such a way as to attract the viewer's gaze to the facility.

- The 3-D visual simulations demonstrate that the project will not dominate views from any of the viewpoint locations (i.e., residences).

- The 3-D visual simulations demonstrate that the upper reservoir berm will not rise above the background or surrounding ridge.

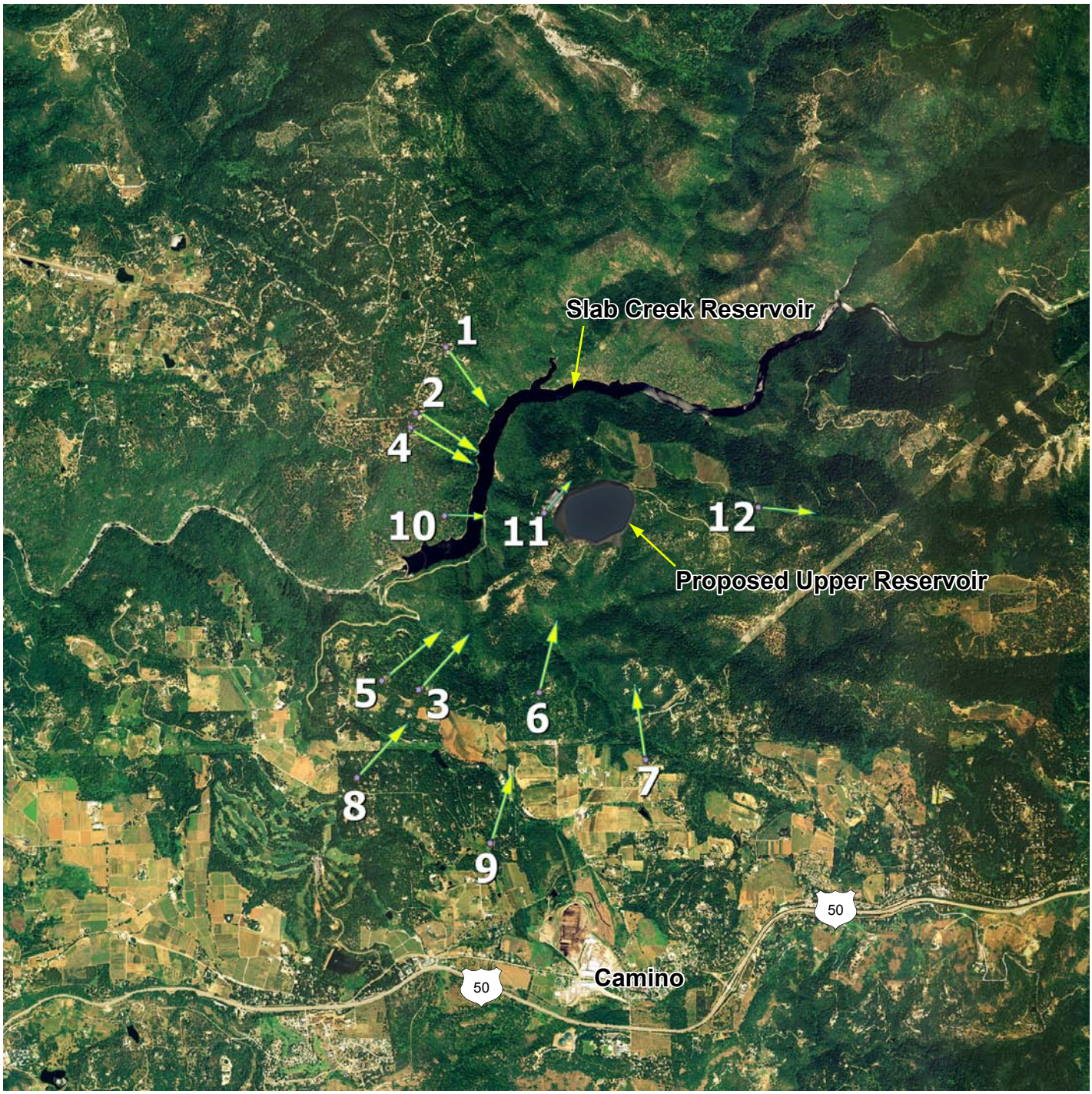
- The 3-D visual simulations demonstrate that the switchyard and transmission line will not be easily discernible from any of the viewpoint locations.

- The 3-D visual simulations do not include vegetation in the foreground of the viewer. Vegetation may currently exist at the viewpoint locations that may partially or completely screen views of the project from those locations, thus affecting the visibility of the project. In addition, current and future vegetation management by private property owners may affect the project's visibility over the life of the project.

4.0 REFERENCES

Devine Tarbell & Associates, Inc. and Martha Goodavish Planning & Design. 2005. Sacramento Municipal Utility District Upper American River Project (FERC NO. 2101). Iowa Hill Pumped Storage Development. Visual Resources Technical Report. January.
Maraizon International. 2008. 3-D Visual simulations and simulation methodology. January.

Appendix A – Figures



Map showing the locations of viewpoints for the visual simulations.

Legend:

5 - Viewpoint Locations

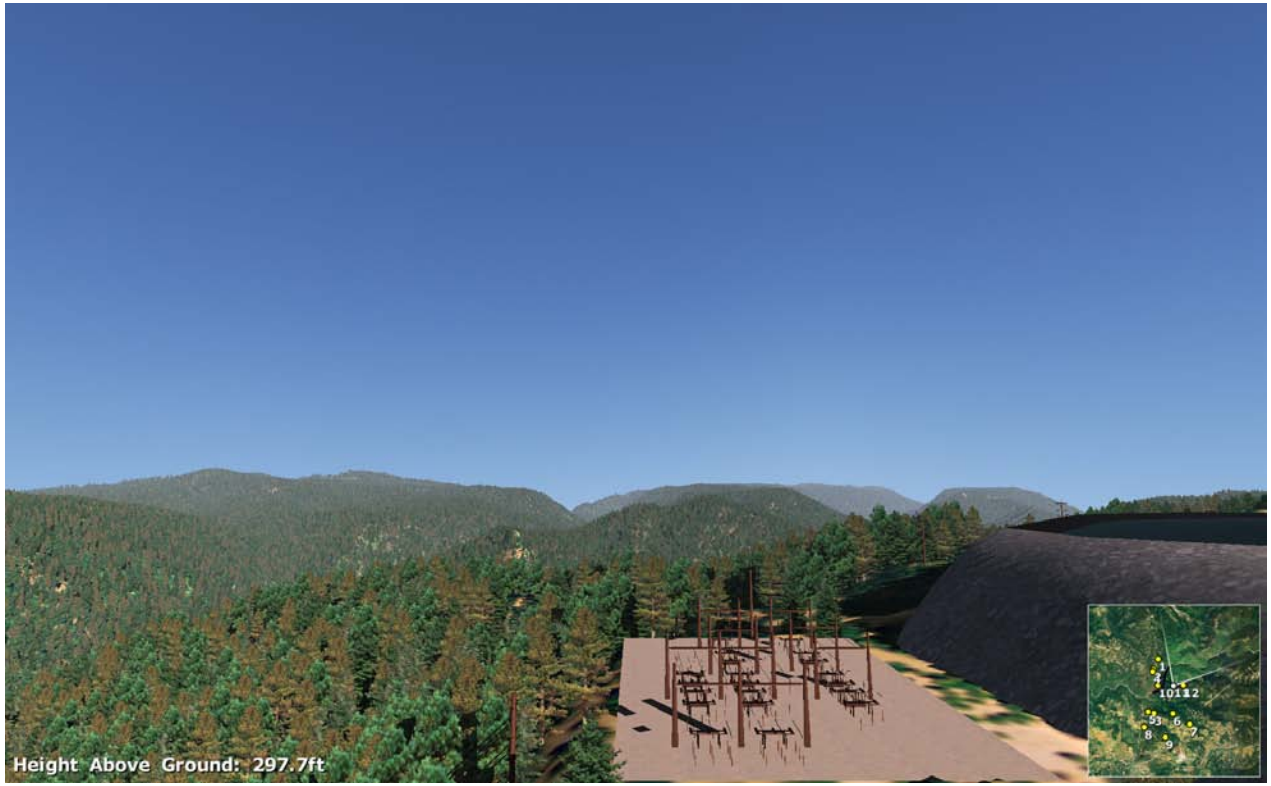
NORTH

0 4260

APPROXIMATE SCALE IN FEET

FIGURE 1
Locations of Viewpoints for Visual Simulations
Upper American River Project

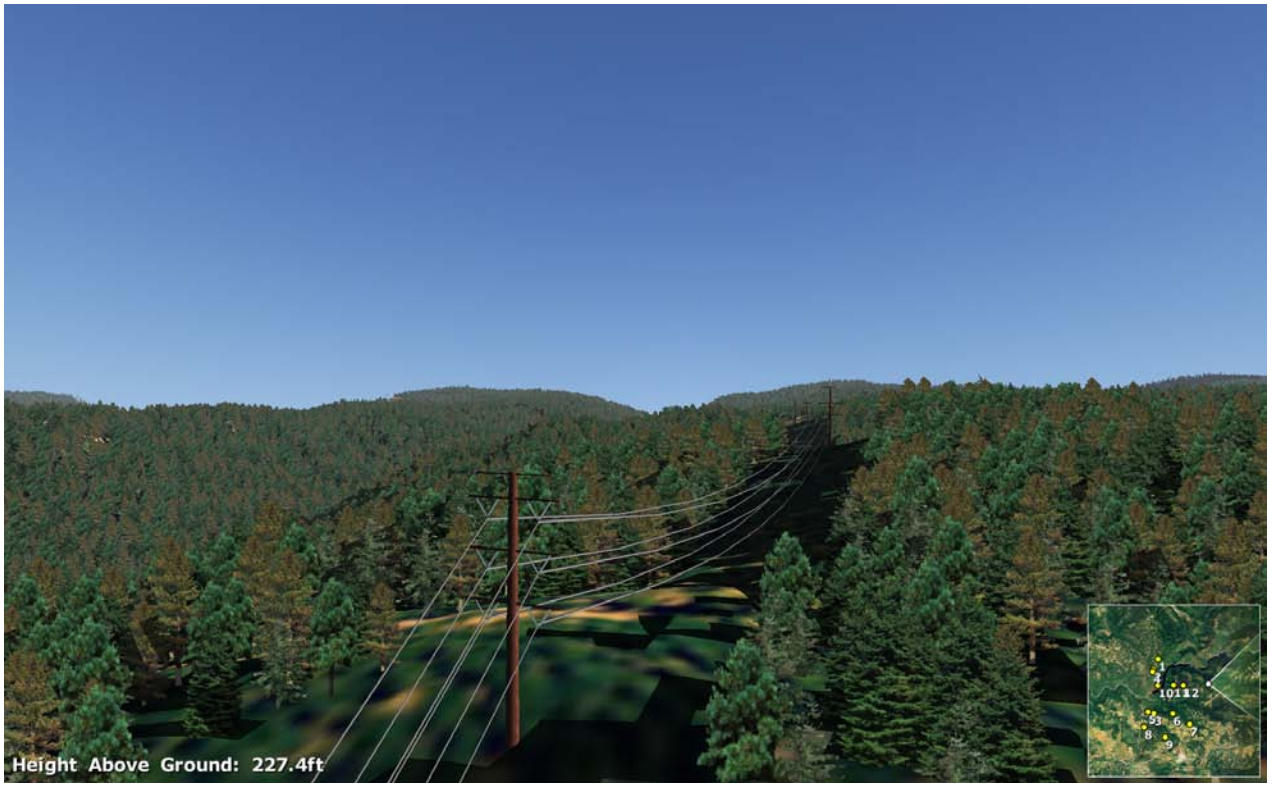
Source: Maraizon International, 2008.



Viewpoint 11 looking northeast along the west side of the proposed Upper Reservoir from approximately 298 feet above the ground.

FIGURE 2
Viewpoint 11 - Proposed Switchyard and Upper Reservoir Berm
Upper American River Project

Source: Maraizon International, 2008.

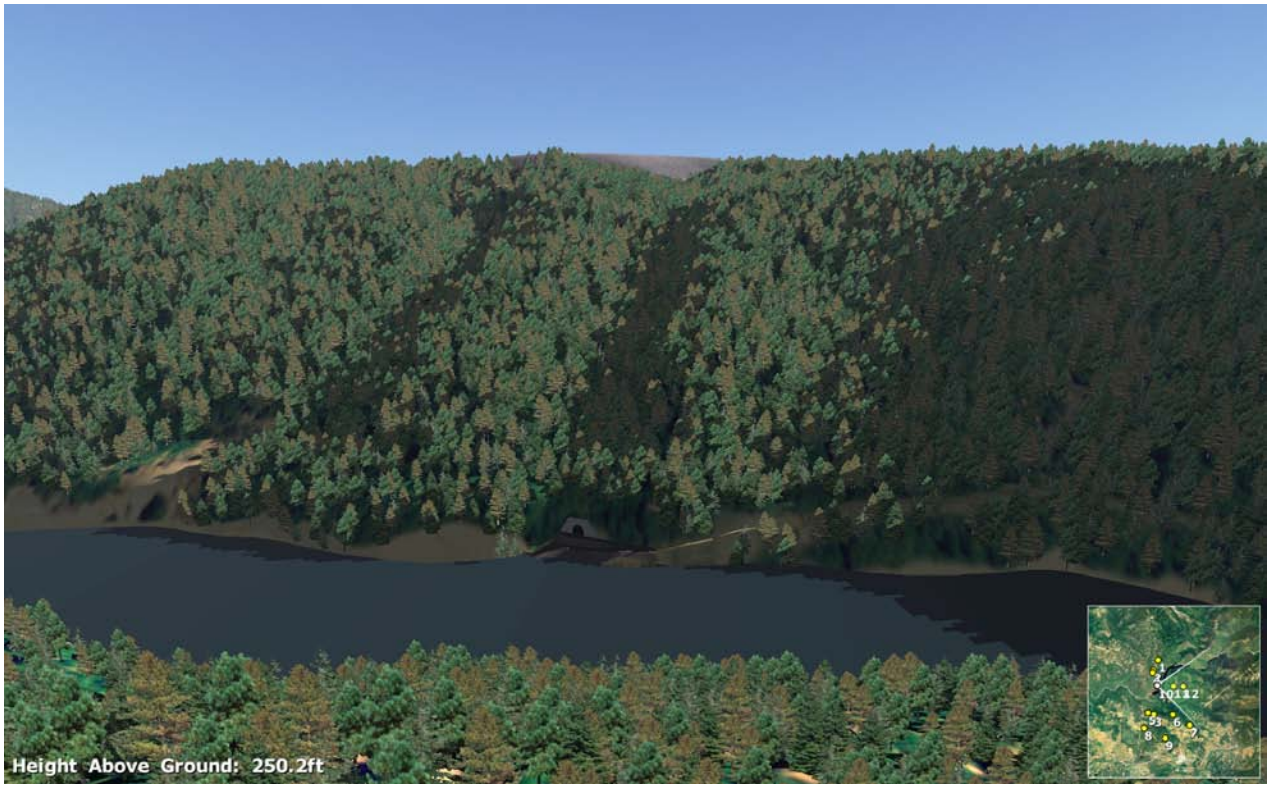


Viewpoint 12 looking east along the proposed Transmission Line from approximately 227 feet above the ground.

Source: Maraizon International, 2008.

FIGURE 3
Viewpoint 12 - Proposed Transmission Line
Upper American River Project

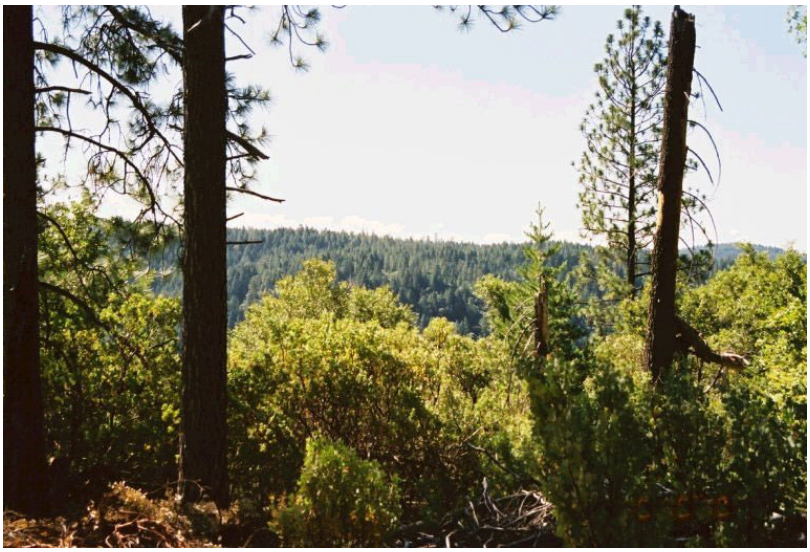
CH2MHILL



Viewpoint 10 looking east from the west side of the Slab Creek Reservoir from approximately 250 feet above the ground.

FIGURE 4
Viewpoint 10 - Proposed Tunnel Portal and Upper Reservoir Berm
Upper American River Project

Source: Maraizon International, 2008.



Source: Devine Tarbell & Associates, Inc. and Martha Goodavish Planning & Design, 2005.

FIGURE 5A
Viewpoint 1 - Cableview Court
Upper American River Project

CH2MHILL

3-D visual simulation from the same location as Figure 5A.

Source: Maraizon International, 2008.

FIGURE 5B
Viewpoint 1 - Cableview Court
Upper American River Project

CH2MHILL

Source: Devine Tarbell & Associates, Inc. and Martha Goodavish Planning & Design, 2005.

FIGURE 6A
Viewpoint 2 - Log Cabin Lane
Upper American River Project

CH2MHILL

3-D visual simulation from the same location as Figure 6A.

Source: Maraizon International, 2008.

FIGURE 6B
Viewpoint 2 - Log Cabin Lane
Upper American River Project

CH2MHILL

Source: Devine Tarbell & Associates, Inc. and Martha Goodavish Planning & Design, 2005.

FIGURE 7A
Viewpoint 3 - East Sky Ranch Lane
Upper American River Project

CH2MHILL

3-D visual simulation from the same location as Figure 7A.

Source: Maraizon International, 2008.

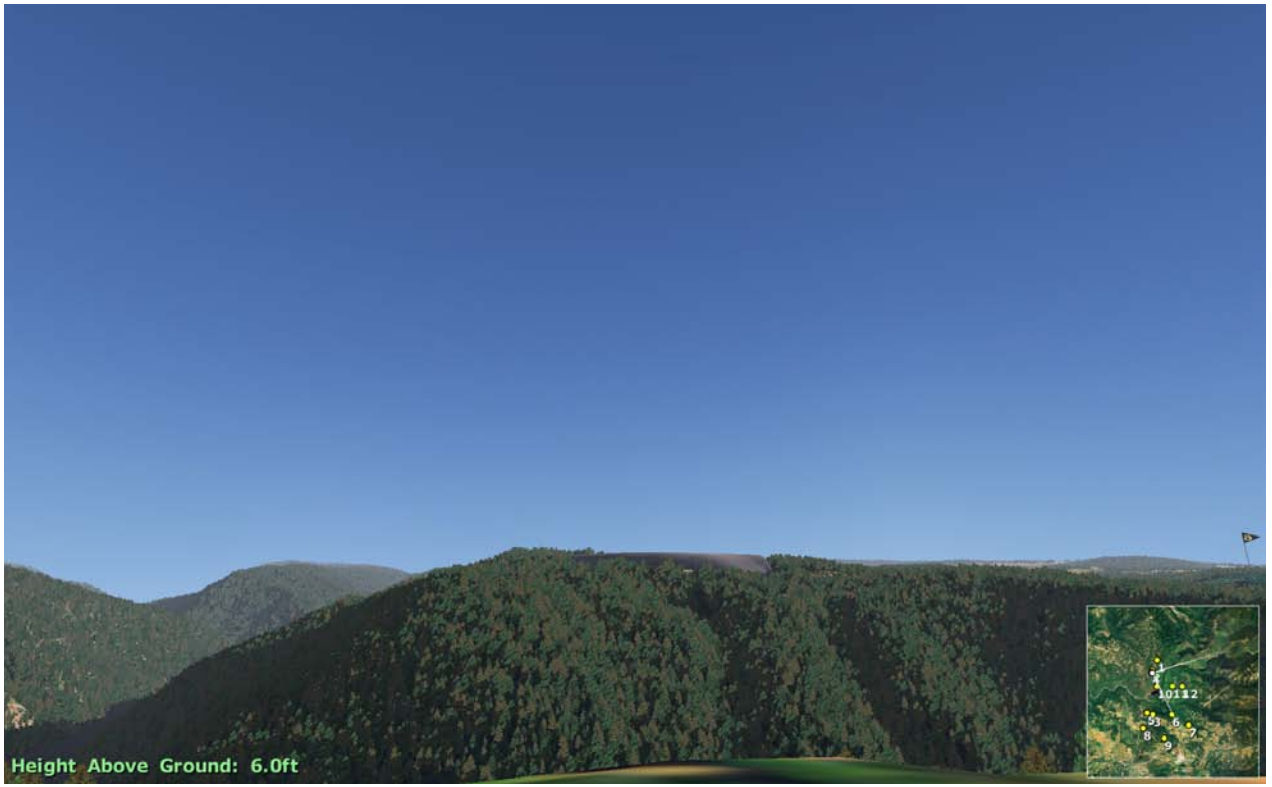
FIGURE 7B
Viewpoint 3 - East Sky Ranch Lane
Upper American River Project

CH2MHILL

Source: Devine Tarbell & Associates, Inc. and Martha Goodavish Planning & Design, 2005.

FIGURE 8A
Viewpoint 4 - Slab Creek Court
Upper American River Project

CH2MHILL

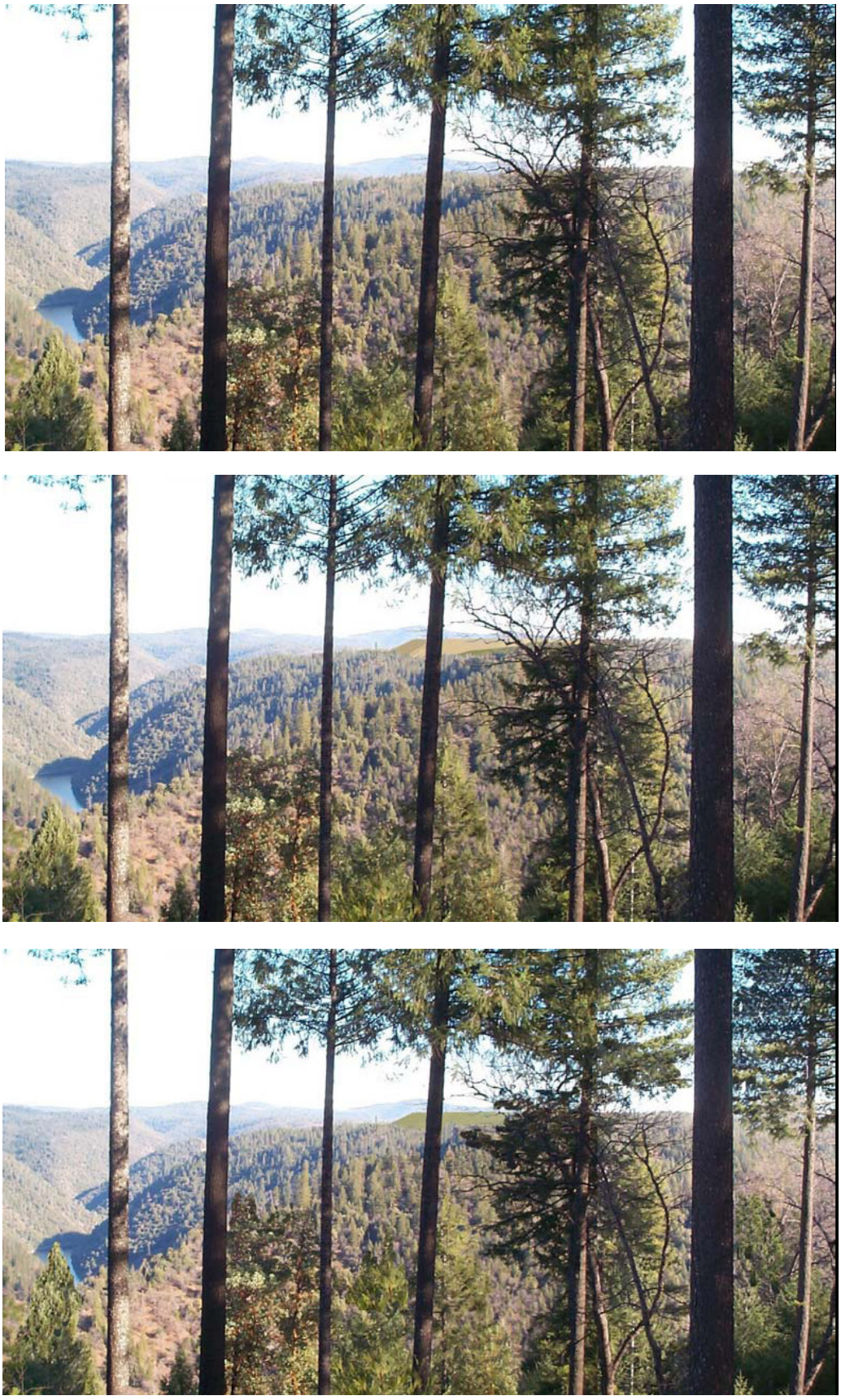


3-D visual simulation from the same location as Figure 8A.

Source: Maraizon International, 2008.

FIGURE 8B
Viewpoint 4 - Slab Creek Court
Upper American River Project

CH2MHILL



Source: Devine Tarbell & Associates, Inc. and Martha Goodavish Planning & Design, 2005.

FIGURE 9A
Viewpoint 5 - West Sky Ranch Lane
Upper American River Project

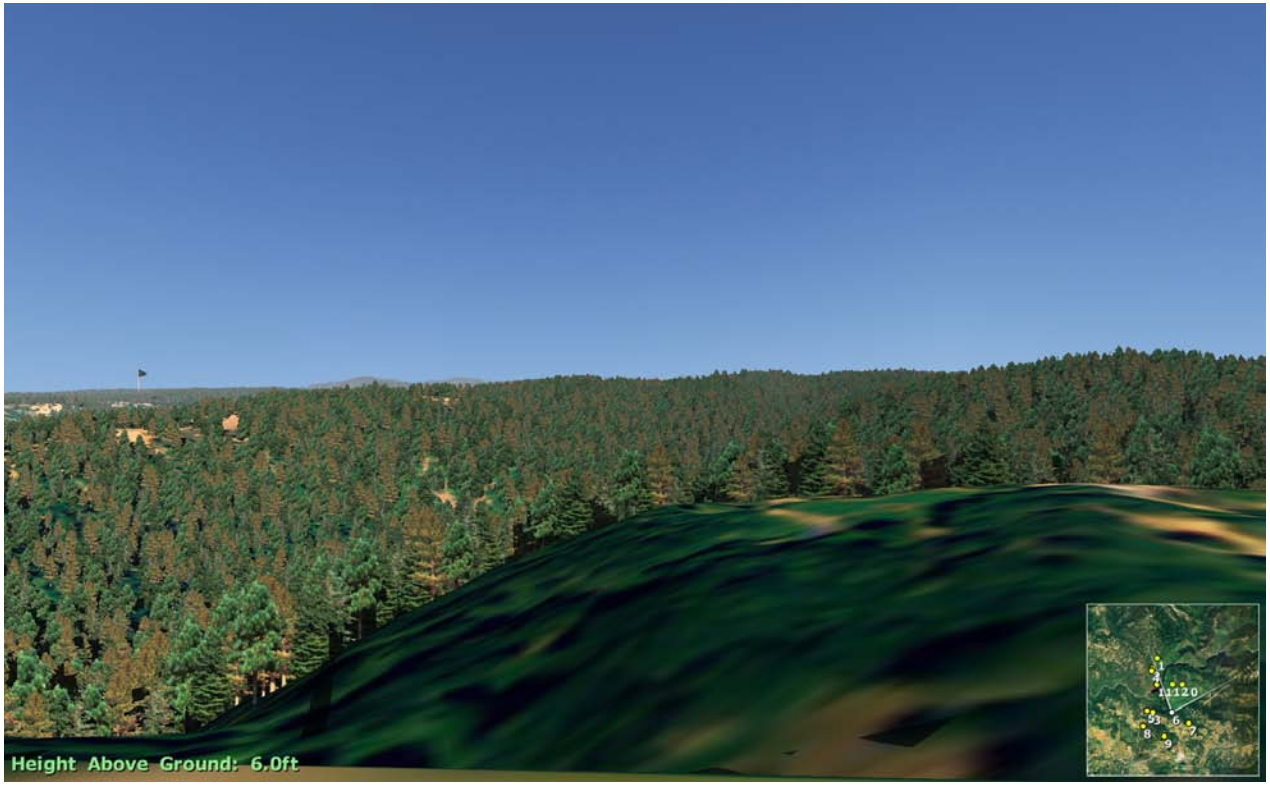
CH2MHILL

3-D visual simulation from the same location as Figure 9A.

FIGURE 9B
Viewpoint 5 - West Sky Ranch Lane
Upper American River Project

Source: Maraizon International, 2008.

CH2MHILL



3-D visual simulation from an Apple Vista Lane residence.

Source: Maraizon International, 2008.

FIGURE 10
Viewpoint 6 - Apple Vista Lane
Upper American River Project

CH2MHILL

ES012008002SAC Figure_10.ai 1/28/2008 afint

3-D visual simulation from an Apple Tree Lane residence. The Upper Reservoir is not visible in this view.

Source: Maraizon International, 2008.

FIGURE 11
Viewpoint 7 - Apple Tree Lane
Upper American River Project

CH2MHILL

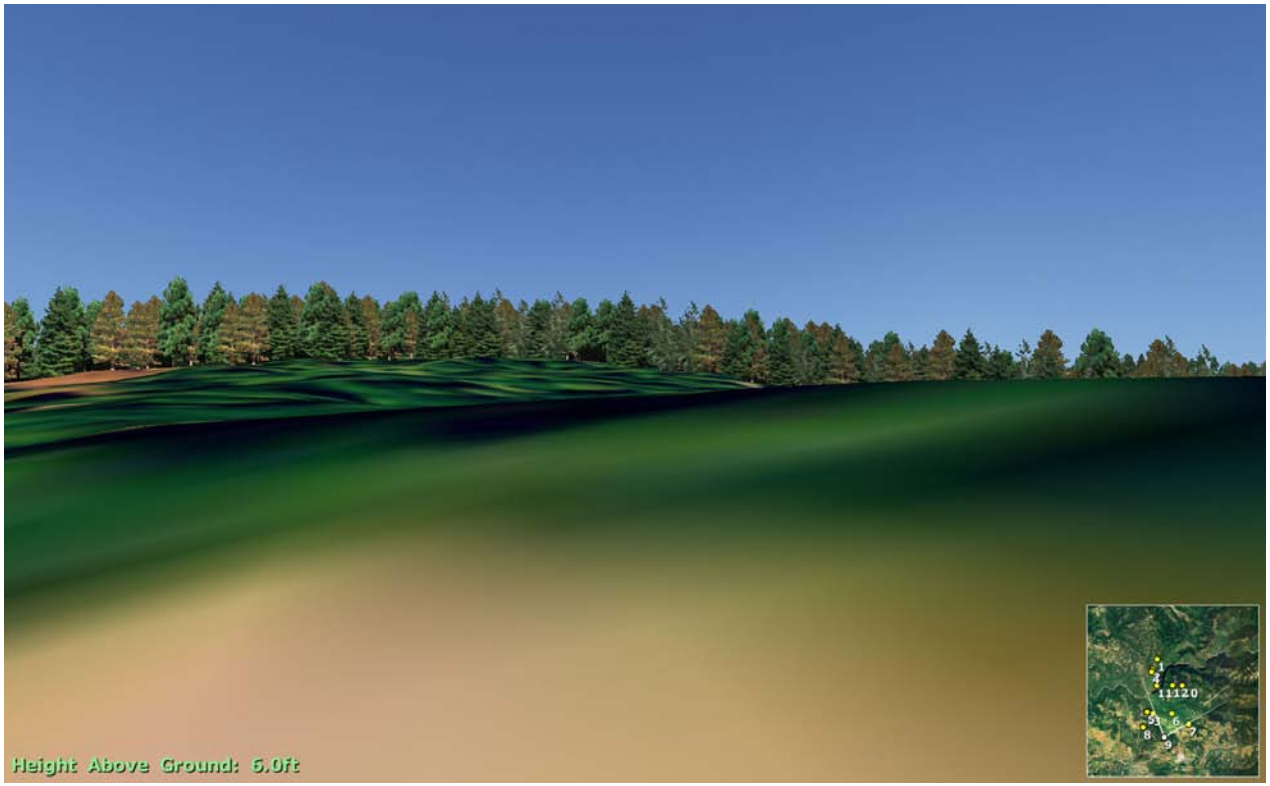
ES012008002SAC Figure_11.ai 1/28/2008 afint

3-D visual simulation from a Waxwing Lane residence. The Upper Reservoir is not visible in this view.

Source: Maraizon International, 2008.

FIGURE 12
Viewpoint 8 - Waxwing Lane
Upper American River Project

CH2MHILL



3-D visual simulation from a Heron Lane residence. The Upper Reservoir is not visible in this view.

Source: Maraizon International, 2008.

FIGURE 13
Viewpoint 9 - Heron Lane
Upper American River Project

CH2MHILL

ES012008002SAC Figure_13.ai 1/28/2008 afint