Final Environmental Impact Report

El Dorado Forebay Dam Modification Project

State Clearinghouse No. 2013032036

Prepared for:

El Dorado Irrigation District

AECOM

March 2014

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Prepared for:

El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA, 95667

Contact:

Brian Deason
Hydroelectric Compliance Analyst
530/622-4513

Prepared by:

AECOM
2020 L Street, Suite 400
Sacramento, CA, 95811

Contact:

Richard Hunn
916/414-5800

60301373
01.20.14

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ACRONYMS AND OTHER ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
ADA	Americans with Disabilities Act
af	acre-feet
BMP	best management practice
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CWA	Clean Water Act
dB	decibels
DEIR	draft environmental impact report
DSOD	Division of Safety of Dams
EID	El Dorado Irrigation District
FEIR	final environmental impact report
FERC	Federal Energy Regulatory Commission
gpm	gallons per minute
L_{eq}	equivalent sound level
LTS	less than significant
NI	no impact
PM&E	Protection, Mitigation, and Enhancement
Project	El Dorado Forebay Dam Modification Project
S	significant
SCH	State Clearinghouse
State CEQA Guidelines	California Environmental Quality Act Guidelines
SU	significant and unavoidable
SWPPP	storm water pollution prevention plan
SWRCB	State Water Resources Control Board
U.S. 50	U.S. Highway 50

1 INTRODUCTION

1.1 DOCUMENT OVERVIEW

This final environmental impact report (FEIR) for the El Dorado Irrigation District (EID) El Dorado Forebay Dam Modification Project (Project) includes comment letters and responses to comments on the *El Dorado Forebay Dam Modification Project Draft Environmental Impact Report* (DEIR). This document and the DEIR together make up the FEIR. The State Clearinghouse (SCH) assigned SCH No. 2013032036 to the DEIR.

1.2 ORGANIZATION OF THE FEIR

Chapter 2, "Summary of Conclusions and Findings," presents the findings developed as a result of completing the impact analysis. Chapter 3, "Project Description Summary," presents a summary of the project description from the DEIR. Chapter 4, "Responses to Comments," contains identified comments received on the DEIR and presents responses to significant environmental issues raised in the comments, as required by Section 15132 of the California Environmental Quality Act Guidelines (State CEQA Guidelines).

The comment letters are labeled to correspond with an index table in Chapter 4. Each individual comment is assigned a number (e.g., 1-1) that corresponds with the response that follows the comment. Chapter 5, "Revisions to the DEIR," presents specific changes that were made to the text of the DEIR in response to comments raised. Chapter 6, "References," identifies the documents and personal communications cited in this document.

For those comments that have resulted in corrections or revisions to the DEIR, the text of the DEIR is reproduced in the comment and in Chapter 5. Changes to the text are indicated by strikethrough (~~strikethrough~~) where text has been removed and by underline (<u>underline</u>) where text has been added.

1.3 COMMENTS THAT REQUIRE RESPONSES

Section 15088(c) of the State CEQA Guidelines specifies that the focus of the responses to comments shall be on the disposition of significant environmental issues. CEQA requires responses to comments concerning the environmental impacts of the project. Therefore, if the comments do not address the environmental impacts of the project and whether they were properly addressed, responses may not be possible or warranted. Nevertheless, where feasible and relevant, responses have been provided to supply as much information as practical about the Project to the public, interested agencies, and decision makers.

1.4 ENVIRONMENTAL REVIEW PROCESS

The environmental review process was initiated with the publication of the notice of preparation for the DEIR on March 13, 2013. EID conducted a public scoping meeting on April 1, 2013, at the Pollock Pines–Camino Community Center located at 2675 Sanders Drive, Pollock Pines, California, to solicit input on the scope of the environmental impact report from public agencies and interested parties. The DEIR was circulated for a 60-day public review period beginning on October 4, 2013. EID conducted a public meeting in Pollock Pines on October 30, 2013, to receive comments on the contents of the DEIR. The comment period closed on December 4, 2013.

This FEIR is being released and sent to agencies that commented within the DEIR's 60-day review period. Lead agencies are required to provide responses to the commenting agency's comments on DEIRs at least 10 days before the certification of the FEIR (Section 15088[b] of the State CEQA Guidelines).

After the 10-day agency review period, the EID Board of Directors will review the DEIR and this FEIR document, which together form the complete FEIR. The Board of Directors will consider comments provided on this document, as well as other information pertaining to the FEIR, and will determine whether the FEIR should be certified as adequate under CEQA. If so, the Board of Directors will adopt a resolution certifying the FEIR, under Section 15090 of the State CEQA Guidelines.

After the FEIR is certified, the Board of Directors will decide whether to approve the El Dorado Forebay Dam Modification Project as proposed. If the Board of Directors decides to approve the Project as proposed, it will adopt findings of fact, under Section 15091 of the State CEQA Guidelines, for each significant effect. For each significant environmental effect identified in the DEIR, the Board of Directors must issue a written finding reaching one or more of following three permissible conclusions (Section 15091 of the State CEQA Guidelines):

- Changes or alterations have been required in, or incorporated into, the project that avoid or substantially lessen the significant environmental effect as identified in the FEIR.
- Such changes or alterations are within the responsibility and jurisdiction of another public agency and not the agency making the finding. Such changes have been adopted by such other agency or can and should be adopted by such other agency.
- Specific economic, legal, social, technological, or other considerations, including provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or project alternatives identified in the FEIR.

In addition, if the Board of Directors decides to approve the Project, it will adopt a separate mitigation monitoring and reporting plan—consistent with Section 15097 of the State CEQA Guidelines—that describes when each of the mitigation measures adopted for the project will be implemented, identifies who is the responsible implementing party, and provides a mechanism for monitoring their implementation.

2 SUMMARY OF CONCLUSIONS AND FINDINGS

Sections 3.1 through 3.14 in Chapter 3, "Environmental Setting, Impacts, and Mitigation Measures," of the DEIR evaluate in detail the environmental impacts that would result from implementing the Project and set forth mitigation measures required to avoid or reduce environmental impacts, where feasible. Chapter 5 of the DEIR presents an evaluation of potential cumulative impacts.

No changes to the DEIR findings and conclusions were made as a result of receiving comments from interested agencies and public during the 60-day DEIR review period.

Table 2-1 lists each of the environmental impacts of the Project. It also identifies the level of significance of each impact before mitigation, mitigation measures for significant and potentially significant impacts, and the level of significance of each impact after mitigation. As shown in Table 2-1, implementing the Project could significantly affect several environmental resources and issue areas, but mitigation is included to reduce these impacts to a less-than-significant level, where feasible.

The two impacts identified in the DEIR are considered to be significant and unavoidable because no mitigation is available to reduce their impact to a less-than-significant level.

IMPACT 3.2-1 Loss and/or Conversion of Forestland. *Tree removal would be required in the borrow area, below the dam, and within the new high-water mark of the reservoir. Areas harvested would be converted to non-timber-producing uses. This impact would be* ***significant****. Post-Project operations of the Forebay would not result in the loss or conversion of additional forested land or timber resources.* ***No impact*** *would occur with post-Project operation of the Forebay.*

During Project construction, tree removal would be required in the borrow area, below the dam, and within the new high-water mark of the reservoir. EID has identified primary and secondary areas for obtaining the earth-fill material from the borrow area, which would potentially reduce the amount of tree removal at the site. The secondary area would be used only if the material obtained from the primary area were insufficient for completing the construction activities (EID 2013). Additionally, EID has incorporated measures within the construction contractor specifications for the Project to minimize removal of trees, including limiting the clearing, grubbing, and stripping of land within the designated borrow area to those portions that the Contractor would actually use to obtain borrow material.

The loss of forest acreage could be up to approximately 66 acres from the primary borrow area, 11 acres from the secondary borrow area, 6 acres from the area below the dam, and 5 acres to accommodate the new high-water mark of the Forebay. Disturbed areas would be reseeded after construction with nonwoody species (i.e., herbaceous vegetation) for erosion control purposes and would not be returned to timber production although natural recruitment of trees would be allowed to occur. Because the borrow area lands would be altered for extraction of dam materials, they would not be suitable for continued commercial timber production. This effect is unavoidable. In total, up to approximately 89 acres of forestland could be removed from timber production during Project construction.

The conversion of timber-producing land to non-timber-producing uses would be a **significant** impact.

IMPACT 3.10-4 Construction Noise Levels Exceeding Ambient Conditions. *Project-related construction may expose local residents to noise levels substantially higher than existing ambient conditions. The construction-related impact would be* ***significant****. No* ***impact*** *would occur as a result of post-Project operation of the Forebay.*

Average daytime ambient noise levels at residential properties in the Project area ranged from approximately 39 to 45 decibels (dB) hourly L_{eq} (equivalent sound level), depending on location. Assuming an average ambient daytime noise level of about 43 dB L_{eq} in the Project area, a significant, short-term construction noise impact would be expected if Project-related noise levels were to exceed 48 dB L_{eq} (i.e., 5 dB above ambient noise levels).

Project construction–related noise levels would be approximately 56–73 dB L_{eq} for non-transportation sources and 55 dB L_{eq} from traffic on Forebay Road between Pony Express Trail and Blair Road at the closest residences. Construction-related noise emissions are temporary and would cease upon completion of the Forebay Dam Modification Project. Measures are available to reduce the level of construction noise; however, these measures are not capable of eliminating construction-related noise that exceeds a 5-dB increase above ambient noise levels. Because these noise levels would exceed a 5-dB increase over ambient conditions, this construction-related impact would be **significant**.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
Section 3.1, "Aesthetic Resources"			
3.1-1: Substantial Adverse Effect on a Scenic Vista	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	No impact
3.1-2: Substantial Damage to Scenic Resources within a State Scenic Highway	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	No impact
3.1-3: Adverse Effect on Day or Nighttime Views in the Area Resulting from New Source of Substantial Light or Glare	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.
3.1-4: Degradation of the Existing Visual Character or Quality of the Site and Its Surroundings	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.2, "Agricultural and Forestry Resources"			
3.2-1: Loss and/or Conversion of Forestland	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No feasible mitigation is available.	Construction-Related Effect: SU Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
Section 3.3, "Air Quality"			
3.3-1: Potential for Conflict with or Obstruction of Implementation of the Applicable Air Quality Plan	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.3-2: Potential for Violation of an Air Quality Standard or Substantial Contribution to an Existing or Projected Air Quality Violation	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.3-2: Reduce Construction-Related Emissions of Fugitive Dust. 3.3-2b: Minimize Construction-Related Smoke Emissions.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.3-3: Cumulatively Considerable Net Increase of a Criteria Pollutant for Which the Project Region is Classified as Nonattainment under a Federal or State Ambient Air Quality Standard	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.3-4: Exposure of Sensitive Receptors to Substantial Pollutant Concentrations	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.3-5: Creation of Objectionable Odors That Would Affect a Substantial Amount of People	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.4, "Biological Resources"			
3.4-1: Potential Direct Effects on Wetlands and Riparian Habitat as a Result of Vegetation Removal	Construction-Related Effect: S Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.	3.4-1: Implement Measures to Avoid, Restore, and Compensate for the Loss of Wetlands and Riparian Vegetation.	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.

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Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
3.4-2: Potential Indirect Effects on Wetlands as a Result of Erosion, Sedimentation, and/or Contamination	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.4-2: Implement Mitigation Measures 3.9-1a and 3.9-1b.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.4-3: Direct Effects from Removal of Terrestrial Vegetation and Removal of Common Terrestrial Wildlife Habitat	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.4-3a: Minimize Impacts on Nesting Birds on the Project Site during Construction Activities. 3.4-3b: Develop Worker Environmental Awareness Program.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.4-4: Potential Direct Effects on Special-Status Plant Species	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.4-4a: Implement Mitigation Measure 3.4-3b, Develop Worker Environmental Awareness Program. 3.4-4b: Conduct Surveys for Pleasant Valley Mariposa Lily and Stebbins' phacelia, and Establish Avoidance Zones.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.4-5: Removal of Habitat, Disturbance, or Direct Mortality of Western Pond Turtle, Special-Status Bats, and Ringtail	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.4-5a: Implement Mitigation Measure 3.4-3b, Develop Worker Environmental Awareness Program. 3.4-5b: Initiate Western Pond Turtle Relocation. 3.4-5c: Conduct Habitat Assessment and Implement Other Protective Measures for Special-Status Bat Species. 3.4-5d: Conduct Preconstruction Surveys for Ringtail in Riparian Zones and Areas of Rocky Outcrops.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
3.4-6: Fishery Impacts	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.4-6a: Implement Mitigation Measures for Fishery Management at Forebay. 3.4-6b. Implement Mitigation Measures Requiring the Use of Best Management Practices for Erosion/Sedimentation, Management of Hazardous Substances, and Implementation of Hydrology and Water Quality Measures.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.5, "Cultural Resources"			
3.5-1: Possible Destruction of or Damage to As-Yet-Undiscovered Archaeological Resources	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.5-1: Cease Work If Cultural Resources Are Encountered during Project-Related Ground-Disturbing Activities, Assess the Significance of the Resource, and Implement Appropriate Avoidance or Treatment Measures.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.5-2: Possible Discovery of Human Remains during Construction	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.5-2: Stop Potentially Damaging Work If Human Remains Are Uncovered during Construction, Assess the Significance of the Find, and Pursue Appropriate Management.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.6, "Geology, Soils, and Seismicity"			
3.6-1: Possible Risks to People and Structures Caused by Surface Fault Rupture	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.6-2: Possible Risks to People and Structures Caused by Strong Seismic Ground Shaking	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
3.6-3: Seismically Induced Risks to People and Structures Caused by Liquefaction	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.6-4: Seismically Induced Risks to People and Structures Caused by Landslides	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.6-5: Potential for Substantial Soil Erosion or Loss of Topsoil	Construction-Related Effect: S Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.	3.6-5: Prepare and Implement a Storm Water Pollution Prevention Plan and Best Management Practices.	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.
3.6-6: Potential Geologic Hazards Related to Construction in Unstable Soils	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.6-6: Inspect and Approve All Foundation Surfaces Prior to Placement of Embankment	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.7, "Greenhouse Gas Emissions"			
3.7-1: Direct or Indirect Generation of GHG Emissions That May Have a Significant Impact on the Environment	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.7-2: Conflict with an Applicable Plan, Policy, or Regulation Adopted for the Purpose of Reducing the Emissions of GHGs	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
Section 3.8, "Hazards and Hazardous Materials"			
3.8-1: Potential Hazards from the Routine Transport, Use, or Disposal of Hazardous Materials or through Possible Accident Conditions Involving the Release of Hazardous Materials into the Environment	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	Mitigation Measure 3.8-1: Reduce Exposure Risk from Lead-Based Paint Exposure.	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.
3.8-2: Potential Emission or Handling of Hazardous Materials within 0.25 Mile of a School	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.8-2: Store and Handle Hazardous Materials More Than 0.25 Mile from Pinewood Elementary School Whenever Feasible, and Prepare and Implement an Emergency Response Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.8-3: Potential Interference with Emergency Evacuation Routes and Emergency Vehicle Access during Project Construction and Operation	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.8-3: Implement Mitigation Measure 3.13-2, Prepare and Implement a Traffic Control Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.8-4: Potential to Expose People or Structures to a Significant Risk of Loss, Injury, or Death Involving Wildland Fires	Construction-Related Effect: PS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.	3.8-4a: Implement Mitigation Measure 3.13-2, Prepare and Implement a Traffic Control Plan. 3.8-4b: Prepare a Fire Protection and Prevention Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.9, "Hydrology and Water Quality"			
3.9-1: Violate Water Quality Standards or Waste Discharge Requirements	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.9-1a: Implement Water Diversion and Control Plan. 3.9-1b: Implement NPDES General Permit and SWPPP.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
3.9-2: Substantially Depleting Groundwater Supplies or Interference with Groundwater Recharge Such That There Would Be a Net Deficit in Aquifer Volume or a Lowering of the Local Groundwater Table Level	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.9-3: 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 That Would Result in Substantial Erosion or Siltation On- or Off-Site	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.9-3: Implement Mitigation Measure 3.9-1b.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.9-4: 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	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.9-4: Implement Mitigation Measure 3.9-1b.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.9-5: Creating or Contribute Runoff Water That Would Exceed the Capacity of Existing or Planned Storm Water Drainage Systems or Provide Substantial Additional Sources of Polluted Runoff	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.9-5: Implement Mitigation Measures 3.9-1a and 3.9-1b.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.9-6: Otherwise Substantially Degrade Water Quality	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.9-6: Implement Mitigation Measures 3.9-1a and 3.9-1b.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
Section 3.10, "Noise and Vibration"			
3.10-1: Construction Noise Levels Exceeding Jurisdictional Standards	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.10-2: Potential Exposure to Excessive Groundborne Vibration during Construction	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.10-3: Long-Term Increase in Noise Levels during post-Project Operation	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.10-4: Construction Noise Levels Exceeding Ambient Conditions	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.10-4: Implement Measures to Reduce Construction Noise Levels.	Construction-Related Effect: SU Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.11, "Public Services"			
3.11-1: Impact on Emergency Access Routes Used by Fire and Police Protection Services.	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.11-1: Implement Mitigation Measure 3.13-2, Prepare and Implement a Traffic Control Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.11-2: Increased Demand for Fire Protection Services	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

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Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
3.11-3: Increased Demand for Police Protection Services	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.11-4: Impact on School Bus Routes.	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.11-4: Implement Mitigation Measure 3.13-2, Prepare and Implement a Traffic Control Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.11-5: Impact on Access to Parks and Recreation Areas	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.12, "Recreation"			
3.12-1: Increase in Use of Existing Neighborhood and Regional Parks or Other Recreational Facilities Such That Substantial Physical Deterioration of the Facility Would Occur or Be Accelerated	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.12-2: Potential for Substantial Degradation of Recreation Experiences	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.13, "Transportation/Traffic"			
3.13-1: Reduction in LOS for Designated Roads or Highways	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.	3.13-2: Prepare and Implement a Traffic Control Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: LTS Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
3.13-2: Increased Traffic Hazards on Local Roadways	Construction-Related Effect: PS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.13-2: Prepare and Implement a Traffic Control Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.13-3: Decreased Performance of Alternative Modes of Transportation	Construction-Related Effect: S Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	3.13-3: Implement Mitigation Measure 3.13-2, Prepare and Implement a Traffic Control Plan.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
Section 3.14, "Utilities and Service Systems"			
3.14-1: Potential to Exceed Wastewater Treatment Requirements of the Applicable Regional Water Quality Control Board	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.14-2: Potential Need for a New Water or Wastewater Treatment Facility, the Construction of Which Could Cause Significant Environmental Effects	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.14-3: Potential Need for New Stormwater Drainage Facility, the Construction of Which Could Cause Significant Environmental Effects	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: NI Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.
3.14-4: Potential for Insufficient Permitted Landfill Capacity to Accommodate the Project's Solid Waste Disposal Needs	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Table 2-1
Summary of Project Impacts and Mitigation Measures

Impact	Impact Significance Before Mitigation[1]	Mitigation Measure(s)	Impact Significance After Mitigation[1]
3.14-5: Relocation of Utility Service Infrastructure	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.	No mitigation required.	Construction-Related Effect: LTS Post-Project Operations Related Effect: NI Cumulative Effects: No considerable contribution to a cumulative effect.

Notes:

[1] NI = no impact, LTS = less than significant, PS = potentially significant, S = significant, SU = significant and unavoidable.

Source: Data compiled by AECOM in 2013

3 PROJECT DESCRIPTION SUMMARY

The El Dorado Forebay is an offstream reservoir impoundment, created by an earthen embankment dam, in El Dorado County, California, within Pollock Pines on the north side of U.S. Highway 50 (U.S. 50). The Forebay is a component of the El Dorado Hydroelectric Project, which is owned and operated by EID and licensed by the Federal Energy Regulatory Commission (FERC) as FERC Project No. 184. EID operates Project No. 184 facilities to provide water for drinking water supply and renewable hydroelectric power generation. A portion of the water delivered to Forebay is conveyed through the Main Ditch to a water treatment plant for distribution in EID's drinking water system. The remaining portion of water delivered to Forebay is conveyed to the El Dorado Powerhouse for renewable hydroelectric power generation.

The El Dorado Forebay Modifications Project is required to satisfy specific regulatory mandates issued, to EID, by both the California Division of Safety of Dams (DSOD) and FERC to meet dam safety standards. Additionally the Project would improve the reliability of the drinking water supply and minimize impacts on EID ratepayers through optimized power generation revenue. The Project involves constructing an earthen stability buttress on the dry side of the Forebay Dam, raising the Forebay Dam 10 vertical feet, and remediating associated facilities.

3.1 PROJECT OBJECTIVES

The Project is designed to meet the following objectives:

- Protect public safety by protecting residents, life, and property below the dam
- Comply with DSOD and FERC dam safety requirements
- Regain and optimize full reservoir operational use to improve the reliability of the drinking water system and optimize renewable hydroelectric power generation revenue

DSOD and FERC have ordered EID to restrict the reservoir to below the normal operational level because of dam stability and freeboard deficiencies to protect the residents, life, and property below the dam (DSOD 2009; FERC 2009). The Project would increase dam stability and provide sufficient freeboard to relieve the regulatory reservoir level operating restriction and meet DSOD and FERC dam safety requirements, thereby protecting public safety. The Project would also effectively recover reservoir capacity lost because of sediments accumulated in the reservoir since the reservoir construction.

Additionally, the Project would improve EID's ability to effectively manage water distribution for both drinking water supply and renewable hydroelectric power generation. The Project would not affect or increase EID's diversion capacity, canal conveyance capacity, water rights, or hydropower generation capacity. The modified Forebay would continue to serve water for drinking water and hydroelectric demands with a normal maximum operating storage capacity of approximately 554 acre-feet (af) as compared to the existing storage capacity of approximately 381 af. This capacity does not reflect the current operational restriction imposed by DSOD and FERC, which limits storage to approximately 314 af.

3.2 PROJECT LOCATION

The Project is located in El Dorado County, California, within Pollock Pines, on the north side of U.S. 50, in the Pollock Pines U.S. Geological Survey Quadrangle map, Sections 25 and 30, Township 11 North, Range 12 East and Range 13 East. The Project site is on land owned either by EID or private parties; no construction, staging, or access would occur on or through federal lands. Portions of the Project are within the existing FERC Project No. 184 boundary.

The total Project footprint is approximately 158 acres. Of this total area, major features of the Project would occupy the following areas:

- Primary and secondary borrow areas—77 acres
- Construction areas around the dam, including staging areas—54 acres
- Existing and expanded Forebay reservoir inundation area—26 acres

Existing facilities on the Project site include the Forebay Dam, reservoir, and appurtenant facilities (e.g., spillway, penstock, drinking water intake); the El Dorado Canal, which supplies water to the Forebay; the Main Ditch, which supplies water to EID's drinking water system; and two recreational day-use areas.

3.3 DESCRIPTION OF PROJECT ELEMENTS

The Project is composed of the following elements:

- Constructing an earthen stability buttress and raise the Forebay Dam to meet DSOD and FERC dam safety stability/freeboard requirements and improve emergency water storage and hydroelectric generation efficiency
- Remediating the emergency spillway structure, outfall, and stabilizing the unstable slope along the spillway channel to prevent continued erosion
- Repairing the existing unstable reservoir inlet to prevent further erosion and improve public safety
- Relocating the drinking water valve house to accommodate the stability buttress
- Relocating the dam seepage pump-back station to accommodate the stability buttress
- Abandoning the two unused penstocks within the dam and installing a control valve on the active penstock within the reservoir
- Armoring the reservoir side of the dam with ripap and repairing the wave-induced erosion
- Replacing the drinking water intake structure, installing a new control valve, and clearing accumulated sediments in front of the drinking water intake

Embankment material for the earthen stability buttress and raising the Forebay Dam would be obtained from a borrow area developed on EID property located adjacent to the dam. Activities at the borrow area would include:

- Preparing the borrow site for materials excavation and removal by clearing the timber and vegetation

- Excavating and grubbing suitable soil
- Revegetating disturbed areas to control surface erosion and runoff

Additional information regarding these Project elements is provided in Chapter 2, “Project Description,” in the DEIR.

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4 RESPONSES TO COMMENTS

This chapter of the FEIR contains comments received during the public review period for the DEIR, which concluded on December 3, 2013. In conformance with Section 15088(a) of the State CEQA Guidelines, written responses were prepared addressing comments on environmental issues received from reviewers of the DEIR.

4.1 PUBLIC MEETING SUMMARY

EID conducted a meeting in Pollock Pines on October 30, 2013, to receive comments from the public and interested agencies on the contents, findings, and conclusions presented in the DEIR. EID did not receive any substantive comments raising environmental issues or disagreement with the findings and conclusions of the analysis.

EID received a series of questions regarding Project features and elements of the project description. These comments are summarized in Appendix A along with responses provided at the meeting.

Several of the comments raised during the meeting warranted clarification to Chapter 2, "Project Description." These clarifications are presented in Chapter 4, "Revisions to the DEIR," of this document.

4.2 LIST OF COMMENTERS ON THE DEIR

Table 4-1 indicates the numerical designation for each comment letter received, the author of the comment letter, the date of the comment letter, and the number of individual comments identified and addressed in each comment letter.

Table 4-1
Comments Received on the DEIR

Comment Letter #	Entity	Author of Comment	Date	No. of Comments
1	California Department of Transportation	Marlo Tinney	November 18, 2013	1
2	Native American Heritage Commission	Rob Wood	October 14, 2013	1
3	Shingle Springs Rancheria	Daniel Fonseca	October 28, 2013	1
4	U.S. Forest Service	Cindy Oswald	October 31, 2013	2
5	State Water Resources Control Board	Michael Maher	December 3, 2013	21
6	United Auburn Indian Community of the Auburn Rancheria	Gene Whitehouse	November 20, 2013	2

4.3 COMMENTS ON THE DEIR AND RESPONSES

The written individual comments received on the DEIR and the responses to those comments are provided in this section. Each comment letter is reproduced in its entirety and is followed by the response(s) to the letter. Each comment is indicated by a line bracket and an identifying number in the margin of the comment letter.

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY

Letter 1

DEPARTMENT OF TRANSPORTATION
DISTRICT 3 – SACRAMENTO AREA OFFICE
2379 GATEWAY OAKS DRIVE, MS 19
SACRAMENTO, CA 95833
PHONE (916) 274-0638
FAX (916) 263-1796
TTY 711

Flex your power!
Be energy efficient!

November 18, 2013

032013-ELD-0033
03-ELD-50/PM 30.93
SCH# 2013032036

Mr. Brian Deason
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

El Dorado Forebay Dam Modification Project – Draft Environmental Impact Report

Dear Mr. Deason:

Thank you for the opportunity to comment on the **Draft Environmental Impact Report (DEIR) for the El Dorado Forebay Dam Modification Project**, dated October 2013. As mentioned in the DEIR, the Project proposes to repair the existing El Dorado Forebay Dam and its associated facilities to satisfy regulatory and safety requirements issued by both the California Division of Safety of Dams and the Federal Energy Regulatory Commission. Additionally the project will improve the reliability of the drinking water supply and optimize power generation. The project will be implemented in two construction seasons beginning in the spring of 2015 with completion in the fall of 2016, and with an estimated total of 3,000 highway truck trips during construction. The project is located approximately 0.5 miles north of U.S. Highway (US) 50/Sly Park Road Interchange.

The DEIR (page DS-14) references the preparation and implementation of a Traffic Control Plan (TCP), and we request US 50 construction trips be included in the Plan. Given the traffic volumes referenced in the document and the significance of US 50 accesses to the project site, Caltrans requests that the TCP include US 50. We note that our comment letter, dated April 11, 2013 (enclosed), indicates that a Transportation Management Plan may be needed for this project and recommends construction vehicles be limited to travel on US 50 during off-peak hours. 1-1

Please provide our office with copies of any further actions regarding this project as we would appreciate the opportunity to review and comment on any changes.

"Caltrans improves mobility across California"

If you have any questions regarding these comments or require additional information, please contact Susan Wilson, Intergovernmental Review Coordinator for El Dorado County, at (916) 274-0639 or by email at: susan.wilson@dot.ca.gov.

Sincerely,

MARLO TINNEY, Chief
Office of Transportation Planning – East

c: Scott Morgan, State Clearinghouse

Enclosure

Enclosure

Attachment to Letter 1

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 3—SACRAMENTO AREA OFFICE
2379 GATEWAY OAKS DRIVE, SUITE 150
PHONE (916) 274-0635
FAX (916) 274-0602
TTY 711

Flex your power!
Be energy efficient!

April 11, 2013

032013-ELD-0012
03-ELD-50 / PM 30.93
SCH# 2013032036

Mr. Brian Deason
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

El Dorado Forebay Dam Modification Project – Notice of Preparation (NOP)

Dear Mr. Deason:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the project referenced above. The proposed project will consist of repairing the existing reservoir to satisfy regulatory and safety requirements issued by both the California Division of Safety of Dams and the Federal Energy Regulatory Commission. Additionally the project will improve reliability of the drinking water supply and optimize power generation. The project will be implemented in two construction seasons in the summer of 2015 and 2016 with an estimated total of 3,000 highway truck trips. The project is located approximately 0.5 miles north of U.S. Highway (US) 50/Sly Park Road Interchange. The following comments are based on the NOP.

Transportation Management Plan (TMP)

If it is determined that traffic restriction and detours are needed on or affecting State highways, a TMP or construction Traffic Impact Study may be required of the developer for approval by Caltrans prior to construction. TMPs must be prepared in accordance with Caltrans' *Manual on Uniform Traffic Control Devices*. Further information is available for download at the following web address: http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/pdf/camutcd2012/Part6.pdf

Encroachment Permit

Please be advised that any work or traffic control that would encroach onto the State Right of Way (ROW) requires an encroachment permit that is issued by Caltrans. To apply, a completed encroachment permit application, environmental documentation, and five sets of plans clearly indicating State ROW must be submitted to the address below. Timothy Greutert, District Office Chief, Office of Permits, Caltrans, District 3, 703 B Street, Marysville, CA 95901. Traffic-related mitigation measures should be incorporated into the construction plans prior to the encroachment

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permit process. See the website linked below for more information.
http://www.dot.ca.gov/hq/traffops/developserv/permits/

Construction Traffic on US 50

During construction of the facility, it is recommended that construction vehicles be limited to travel on US 50 during off-peak hours.

Please provide our office with copies of any further actions regarding this project.

If you have any questions regarding these comments or require additional information, please contact Melinda Bacharach at (916) 274-0635 or by email at: melinda.bacharach@dot.ca.gov

Sincerely,

ERIC FREDERICKS, Chief
Office of Transportation Planning - South

c: Scott Morgan, State Clearinghouse

"Caltrans improves mobility across California"

Letter 1 Response	Marlo Tinney, Chief, Office of Transportation Planning – East, California Department of Transportation November 18, 2013
1-1	Available records indicate that traffic on U.S. 50, in the vicinity of Pollock Pines, is below roadway capacity during peak hours. Roadway segments located further west, near Placerville and El Dorado Hills, exhibit congestion during peak-hour traffic. The Traffic Control Plan will include provisions to address potential effects on U.S. 50 traffic movement and circulation, as noted in the discussion of Mitigation Measure 3.13-2. Measures to mitigate potential impacts, including limiting travel on U.S. 50 during peak traffic hours, will be considered.

STATE OF CALIFORNIA Edmund G. Brown, Jr., G

Letter 2

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

October 14, 2013

Brian Deason
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

RE: SCH #2013032036: El Dorado Forebay Dam Modification Project, Pollock Pines, El Dorado County

Dear Mr. Deason:

The Native American Heritage Commission (NAHC) has reviewed the draft EIR referenced above. *CEQA Guidelines* §15064.5(e), Health and Safety Code §7050.5, and Public Resources Code §5097.98 identify the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery. Mitigation Measure 3.5-2 (Page ES-9) does not adequately describe that process and should be revised. The specific steps outlined by these codes are as follows:

- Pursuant to Health and Safety Code §7050.5(b):
  - ✓ *In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains...*
  - ✓ The County Coroner must be immediately contacted to determine *the circumstances, manner and cause of death.*
  - ✓ The Coroner has two working days to mike his or her determination.
- Pursuant to Health and Safety Code §7050.5(c):
  - ✓ If the Coroner determines that the remains are Native American, within 24 hours of making the determination, the Coroner must contact the NAHC.
- Pursuant to Public Resources Code §5097.98(a):
  - ✓ The NAHC immediately notifies the person it believes to be the most likely descendent of the deceased Native American (MLD).
  - ✓ After being granted access to the site of the discovery, the MLD has 48 hours to make recommendations for the landowner or his or her designee to the *treatment or disposition, with appropriate dignity, of the human remains and any associated grave goods.*
- Pursuant to Public Resources Code §5097.98(b):
  - ✓ The landowner *shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this section, with the most likely descendants regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the descendants all reasonable options regarding the descendants' preferences for treatment….*
- Pursuant to Public Resources Code §5097.98(e):
  - ✓ *Whenever the commission is unable to identify a descendant, or the descendants identified fail to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendants and the mediation provided for in subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items*

2-1

associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance.

- ✓ *To protect these sites, the landowner shall do one or more of the following:*
  - *Record the site with the commission or the appropriate Information Center.*
  - *Utilize an open-space or conservation zoning designation or easement.*
  - *Record a document with the county in which the property is located. The document shall be titled "Notice of Reinterment of Native American Remains" and shall include a legal description of the property, the name of the owner of the property, and the owner's acknowledged signature, in addition to any other information required by this section. The document shall be indexed as a notice under the name of the owner.*

cont. 2-1

- ➢ Pursuant to Public Resources Code §5097.98(f):
  - ✓ *Upon the discovery of multiple Native American human remains during a ground disturbing land development activity, the landowner may agree that additional conferral with the descendants is necessary to consider culturally appropriate treatment of multiple Native American human remains. Culturally appropriate treatment of the discovery may be ascertained from a review of the site utilizing cultural and archaeological standards. Where the parties are unable to agree on the appropriate treatment measures the human remains and items associated and buried with Native American human remains shall be reinterred with appropriate dignity, pursuant to subdivision (e).*

If you have any questions, please contact me by email at rw_nahc@pacbell.net.

Sincerely,

Rob Wood

Rob Wood
Associate Government Program Analyst

CC: State Clearinghouse

Letter 2 Response	Rob Wood, Associate Government Program Analyst Native American Heritage Commission October 14, 2013
2-1	Reference to Public Resources Code Section 5097.98 will be added to Mitigation Measure 3.5-2 to ensure consistency with applicable regulations and processes for managing human remains that may be accidentally discovered. This revision will make this measure consistent with the steps outlined in this comment. EID will include a Protection, Mitigation, and Enhancement (PM&E) measure in its FERC license amendment application incorporating this mitigation.

Letter 3

SHINGLE SPRINGS RANCHERIA

Shingle Springs Band of Miwok Indians,
Shingle Springs Rancheria
(Verona Tract), California
5281 Honpie Road, Placerville, CA 95667

October 28, 2013

El Dorado Irrigation Disrtict
2890 Mosquito Road
Placerville, CA 95667

Dear Brian Mueller

The Most likely Descendant, Daniel Fonseca would like to initiate consultation process with the El Dorado Irrigation District for the proposed El Dorado Forebay Dam Modification Project that is located in El Dorado County. Among other things, we would like this consultation to address the cultural and historic resource issues, pursuant to the regulations implementing Section 106 of the National Historic Preservation Act.

Prior to meeting we would like to request any and all completed record searches and or surveys that were done in or around the project area up to and including environmental, archaeological and cultural reports.

Please let this letter serve as a formal request for the Shingle Springs Band of Miwok Indians to be added as a consulting party in identifying any Traditional Cultural Properties (TCPs) that may exist within the project's Area of Potential Effects (APE). 3-1

Please contact Andrew Godsey, Assistant Cultural Resource Director, (530) 391-7091 agodsey@ssband.org or Angela Rivera, Administrative Assistant at (530) 698-1557 anrivera@ssband.org, to schedule a consultation meeting pursuant to Section 106 of the NHPA.

Sincerely,

Daniel Fonseca
Cultural Resources Director
Tribal Historic Preservation Officer (THPO)
Most Likely Descendent (MLD)

3-1 The Shingle Springs Band of Miwok Indians will be added as a consulting party in identifying Traditional Cultural Properties that may be encountered within the project Area of Potential Effects.

Letter 4

From: Oswald, Cindy -FS <coswald@fs.fed.us>
Sent: Thursday, October 31, 2013 4:26 PM
To: Deason, Brian
Cc: Nelson, Duane -FS; Livingston, Beth A -FS
Subject: FW: Comments to El Dorado Forebay Modification Project

Brian –

I've scanned through the 557-page Draft EIR (DEIR) for the Project, and the 169-page Initial Consultation Document (ICD) for Non-Capacity License Amendment, and I have not found in either document an assertion that the landline boundary between EID property & federal land will be located, marked, and recorded. What is the plan for accomplishing this work prior to breaking ground? 4-1

You've included my comment below on page 358 of the Draft EIR, but marking the land lines was not in the Mitigation Plan. I don't think you can assert that no federal lands will be affected by the Project without that provision. 4-2

I understand the Forest Supervisor has until December 30, 2013 to comment on the ICD, but wanted you and Beth to have a heads up on the need for landline work.

Cindy Oswald
(530) 647-5320
coswald@fs.fed.us

From: Oswald, Cindy -FS
Sent: Wednesday, April 10, 2013 12:53 PM
To: Brian Deason (bdeason@eid.org)
Cc: Nelson, Duane -FS
Subject: Comments to El Dorado Forebay Modification Project

Dear Brian:

I have reviewed the Draft EIR for the subject Project. The boundary between EID property and National Forest property needs to be located, marked, and recorded to BLM standards (Sec. 24/25, T11N, R12E). Our records indicate that the nearest located corner is the section corner 23/24/25/26.

Cindy L Oswald
Lands & Resource Officer
c/o Placerville Ranger Station
4260 Eight Mile Road
Camino, CA 95709-9583
(530) 647-5320
coswald@fs.fed.us

1

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2

Letter 4 Response	Cindy Oswald, Lands & Resource Officer El Dorado National Forest October 31, 2013 (Received via e-mail)
4-1	EID will coordinate with the U.S. Forest Service to locate, mark, and record the property boundary shared by EID and the U.S. Forest Service. The boundary will be defined prior to initiating Project construction in the vicinity of the shared boundary.
4-2	As stated in the DEIR project description, the Project area is located on EID property and does not include any federal land. As provided in the response to Comment 4-1, EID will coordinate with the U.S. Forest Service to locate, mark, and record the property boundary shared by EID and the U.S. Forest Service. The boundary will be defined before Project construction in the vicinity of the shared boundary is initiated. No mitigation is needed because no impact will occur as a result of the property boundary survey.

Letter 5

CALIFORNIA
Water Boards

GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

DEC 0 3 2013

Mr. Brian Deason
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

Dear Mr. Deason:

COMMENTS ON THE INITIAL CONSULTATION DOCUMENT AND DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE EL DORADO FOREBAY MODIFICATION PROJECT; EL DORADO HYDROELECTRIC PROJECT, FEDERAL ENERGY REGULATORY COMMISSION PROJECT NO. 184; EL DORADO, ALPINE AND AMADOR COUNTIES

This letter is in response to the release of the initial consultation document (ICD) and draft environmental impact report (DEIR) for the El Dorado Forebay Modification Project (Project) by the El Dorado Irrigation District (EID). The ICD was released for public review on September 27, 2013 with a 90-day public comment period ending on December 30, 2013. The DEIR was released for public review on October 4, 2013 with a 60-day public comment period ending on December 3, 2013. The ICD and DEIR describe the same impacts associated with the initiation of Project activities, therefore comments made on these aspects of the DEIR also apply to the ICD. After review of the ICD and DEIR documents, State Water Resources Control Board (State Water Board) staff respectfully submits the following comments. Comments on specific sections of the DEIR follow the relevant DEIR passage which has been reproduced in italics for context.

Water Quality Certification

Issuance of a water quality certification (certification) is required before Project construction activities may commence. The need for certification is triggered by two federal license or permit requirements, the first being the requirement of a Federal Energy Regulatory Commission (FERC) license amendment for a project that may result in a discharge into navigable waters. Additionally, the United States Army Corps of Engineers (USACE) must issue a Section 404 permit for the Project activities. The issuance of a single certification may be sufficient to fulfill the requirements of both of these federal requirements.

ES.3 Overview of the Project

> *The Project is designed to satisfy these specific regulatory mandates while also improving the reliability of the drinking water system and minimizing impacts on EID ratepayers through increased hydroelectric revenue.*

State Water Board staff understands that the hydroelectric power generation capacity will not be increased as a result of the Project. Additionally, EID has given State Water Board staff assurances that it will not be increasing its diversions, nor increasing the diversion season or pattern of diversion for any of its water rights. Please describe the mechanism through which hydroelectric revenue for the Project will be increased in greater detail. Additionally, please substantiate the assertion that water diversions will not increase and the season and pattern of diversion will not change following Project completion. 5-1

2.4 Description of Project Elements; 2.10 Borrow Material

> *[2.4] The Project is composed of the following primary elements:*
>
> *Armoring the reservoir side of the dam with riprap and repairing the wave-induced erosion.*
>
> [2.10] *Aggregate and riprap materials would be obtained from commercial sources, most likely in the El Dorado County area.*

In order to protect water quality, best management practices should include actions to ensure that introduced materials are free of contaminants including fine sediment, chemicals, and invasive species. Therefore all imported riprap, rocks, and gravels used for the Project should be prewashed before use at the Project site. 5-2

3.3.3 Air Quality; Impacts and Mitigation Measures

Mitigation Measure 3.3-2: Reduce Construction-Related Emissions of Fugitive Dust

> *EID will comply with EDCAQMD [El Dorado County Air Quality Management District] Rule 202, Visible Emissions; Rule 205, Nuisance; Rule 223, Fugitive Dust – General Requirements; and Rule 223-1 Fugitive Dust – Construction, Bulk Material Handling, Blasting, Other Earthmoving Activities, and Carryout and Trackout Prevention. In compliance with Rule 223.1, EID will require the contractor to submit a Fugitive Dust Plan…*

The creation of fugitive dust during Project construction activities has the potential to introduce sediment to waters at and/or near the Project site. State Water Board staff would appreciate the opportunity to review the Fugitive Dust Plan when available. 5-3

3.4.3 Biological Resources; Impacts and Mitigation Measures

Impact 3.4-1 Potential Direct Effects on Wetlands and Riparian Habitat as a Result of Vegetation Removal: Construction-Related Impact

A total of 26.11 acres of waters of the United States, including wetlands, were determined to occur within the Project site (ICF 2013). USACE concurred with this finding in its letter responding to the preliminary jurisdictional determination on March 19, 2013 (USACE 2013). Permanent loss of wetlands below the dam is necessary to achieve the Project objectives. Direct effects on wetlands and riparian habitat located below the existing dam and along the existing shorelines of the Forebay would result from construction activities. Wetlands and riparian habitat located along the shorelines of the existing Forebay would be below the new increased high-water level following Project implementation. Some of these wetlands and riparian habitat areas would be inundated to an extent that may result in loss or impacts to these features.

The amount and type of wetland and riparian habitat estimated to be lost due to the Project is unclear. In order to better assess the anticipated impacts of the Project, please describe the amount of habitat expected to be lost by habitat type. 5-4

The Project includes the replacement of a seepage pump facility that captures seepage from the Forebay Dam and returns it to the Main Ditch for use in EID's drinking water system. The current facility is not functioning correctly and does not capture all the seepage from the dam as it has in the past. As a result, this water is currently conveyed into the North Fork Long Canyon Creek. Once replaced, the seepage pump facility would capture more seepage and therefore contribute less water to the North Fork Long Canyon Creek.

Please provide information regarding the water quality of the dam seepage. State Water Board staff is interested in whether the dam seepage has constituents of concern, such as elevated levels of iron or mercury. 5-5 Additionally, please provide information regarding the magnitude of water that currently seeps from the dam versus the amount of predicted seepage once the seepage pump facility is replaced. 5-6 Please detail the specific impacts associated with the decrease in seepage due to pumping, such as the expected acreage of lost wetlands habitat or riparian cover downstream. 5-7

Mitigation Measure 3.4-1: Implement Measures to Avoid, Restore, and Compensate for the Loss of Wetlands and Riparian Vegetation

EID will avoid, minimize, and/or compensate for damage and/or loss of wetlands and riparian vegetation resulting from Project construction by implementing one or more of the following measures:

► *Through regulatory authorization for fill of waters of the United States under Nationwide Permit 3 (maintenance), implement specific agency-required mitigation for direct and indirect impacts on wetlands and riparian vegetation to achieve no net loss of habitat under CWA [Clean Water Act] jurisdiction. This could include, but not be limited to, developing on-site mitigation and/or paying in lieu mitigation fees to compensate for loss of wetlands and riparian areas.*

► *The loss of wetlands around the reservoir could be partially or wholly mitigated by creation of new inundated areas that would develop the same qualities as the existing areas that would be lost (in-kind mitigation).*

► *Purchase off-site mitigation credits from an appropriate mitigation bank or other available preserve.*

► *If wetland and riparian areas can be avoided during construction, these areas would be identified as avoidance areas and delineated with construction fencing or other methods.*

State Water Board staff recognizes that the loss of identified wetlands and riparian vegetation may be unavoidable during Project construction due to inundation and development of the borrow areas. The DEIR proposes the mitigation measures above to minimize and/or compensate for the loss of these important features at the Project site. State Water Board staff believes that avoidance, if possible is the most effective method to prevent the loss of wetlands and riparian vegetation. When avoidance is not possible and sections of wetlands and/or riparian vegetation is lost due to the effects of inundation or Project construction, EID should make every attempt to reestablish these lost habitat types in an amount equal to or greater than the acreage lost and in a location near the original location.

The State Water Board released a *Preliminary Draft Wetland Area Protection Policy* in January 2013. If a final wetlands policy is adopted by the State Water Board prior to issuance of a water quality certification for the Project, EID would likely need to comply with the provisions of the policy. 5-8

Impact 3.4-3 Direct Effects from Removal of Terrestrial Vegetation and Removal of Common Terrestrial Wildlife Habitat: Construction-Related Impact

In mid- December, EID would resume the El Dorado Canal operations to the Forebay. The BMI [benthic macroinvertebrate] community would be affected by the drawdown, and only the population supported by the residual pool, if any, would remain. However, the short life cycle of BMIs and the occurrence of the drawdown during the annual canal outage period are expected to minimize the effect of the drawdown.

The aquatic invertebrates in the Forebay are expected to recolonize rapidly during the next spring and summer (the growing season) as typically is the case because most BMI adult taxa would recolonize from other water bodies. In addition, BMI drift entering the El Dorado Canal from the South Fork American River would facilitate aquatic invertebrate recovery in the Forebay for those species adapted to Forebay conditions. The temporary impact on the aquatic invertebrates of the Forebay is not considered significant because recovery would occur naturally in a short period following Forebay rewatering.

The discussion of impacts to BMI populations is inappropriate for a section focused on impacts to terrestrial habitat. BMI communities are associated with aquatic habitat and should be evaluated and discussed in a section of the DEIR related to aquatic habitat.

State Water Board staff recommend that a plan be developed to monitor and report on the recovery success of BMI populations in the post-construction phase of the Project. The plan should include contingency measures in the event that BMI populations do not recover as expected. 5-9

Impact 3.4-5 Removal of Habitat, Disturbance, or Direct Mortality of Western Pond Turtle, Special-Status Bats, and Ringtail: Construction-Related Impact.

The Forebay would be drawn down in October 2015, and it would be refilled to its original water level in December 2015. In December 2016, the water level would be raised an additional 10 vertical feet. Western pond turtles, a California species of special concern, are known to occur within the Forebay and might be affected by manipulations of water level during construction, which would be outside the normal historical operating range.

Ringtails use large, dead snags in riparian zones or rock outcrops on hillsides near water for dens. Although rock outcrops are lacking on the Project site, removal of large snags in the riparian area below the dam or in borrow areas could affect ringtails by exposing ringtails to increased threat of predation or road mortality. Also, depending on timing, young might be abandoned and a loss of recruitment would occur.

A ramping rate should be proposed for the Forebay dewatering and rewatering activities if a slow rate of change would mitigate for the impact on denning ringtails or facilitate efforts to capture and relocate existing western pond turtles and fish. 5-10

Conversely, if western pond turtles have begun seasonal dormancy when dewatering commences, dewatering might strand dormant turtles in Forebay substrate and expose individuals of all size classes to increased predation pressure by avian and terrestrial scavengers (e.g. common raven, striped skunk [Mephitis mephitis], raccoon [Procyon lotor], coyote [Canis latrans]).

What is the likelihood that the commencement of dewatering activities planned for October 2015 will occur during the period for western pond turtle seasonal dormancy? What is the trigger that initiates seasonal dormancy? 5-11

Female pond turtles generally deposit nests within 150 feet of shore, and neonate turtles hatch in the fall of a given year, remaining in the nest over winter and emerging the following spring. Nests might be flooded and turtles drowned when the water level is raised to its new elevation. That result would constitute a loss of the year's recruitment.

Despite the proposed trapping and relocation efforts, it may be possible that gravid female western pond turtles are able to successfully deposit eggs within the Project area. Surveys should be performed to identify possible occupied upland nests that may be flooded when the Forebay is refilled to a higher elevation. If occupied upland nests are found, measures should be taken to relocate neonate western pond turtles or eggs. 5-12

Mitigation Measure 3.4-5b: Initiate Western Pond Turtle Relocation.

Despite the aforementioned trapping efforts, smaller nonbreeding individuals will likely remain after the cessation of trapping. As a result, a qualified biological monitor will be retained and will be on-site during drawdown of the reservoir. The monitor will collect turtles opportunistically as they are exposed by receding water and will relocate them to a preapproved recipient site.

Efforts to relocate western pond turtles should continue during the early phases of the Project construction activities. 5-13

No action will be taken to restock the Forebay with pond turtles because it is believed that colonization will take place naturally. It is anticipated that these actions will reduce the significant impact of the Project on western pond turtles to a less-than-significant level.

During the post-construction period of colonization, habitat areas should be restored to mitigate for the loss of wetland vegetation and other habitat features used by western pond turtles for cover and basking sites. 5-14 The Mitigation Monitoring and Reporting Plan located in Appendix H of the DEIR should include measures to verify the post-construction success of western pond turtle colonization as well as measures to improve colonization should monitoring indicate that colonization is unsuccessful. 5-15

Mitigation Measure 3.4-6a: Implement Mitigation Measures for Fishery Management at Forebay

Based on observations from visual surveys and if deemed appropriate, EID will develop a plan for a fish salvage operation in consultation with CDFW [California Department of Fish and Wildlife] to further minimize fish loss.

The criteria that would trigger the need for a fish salvage operation should be specified. 5-16

3.9.3 Hydrology and Water Quality; Impacts and Mitigation Measures

Mitigation Measures 3.9-1a and 3.9-1b

Mitigation Measure 3.9-1a, "Implement Water Diversion and Control Plan," and Mitigation Measure 3.9-1b, "Implement NPDES [National Pollutant Discharge Elimination System] General Permit and SWPPP [Storm Water Pollution Prevention Plan]," are identified as methods to reduce several Project impacts to a "less than significant" level. Because several of the identified impacts have a water quality nexus, the State Water Board would appreciate the opportunity to review the Water Diversion and Control Plan and SWPPP when available. 5-17

Impact 3.9-4 Substantial Altering 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 That Would Result in Flooding On- or Off-Site: Construction-Related Impact.

During an anticipated 3-month timeframe of construction activities, the water level at the El Dorado Forebay reservoir would be drawn down by releasing water through the powerhouse penstock and to the Main Ditch adjacent to the reservoir. Water could also be discharged from the El Dorado Forebay reservoir into nearby surface waters.

The final EIR should specify what nearby surface waters could receive the discharge from the Forebay dewatering activities and what steps would be taken to ensure that the water quality of the receiving waters are not impaired. 5-18

Impact 3.9-6 Otherwise Substantially Degrade Water Quality: Post-Project Operation-Related Impact; Temperature

With the larger storage amount available in the Forebay, water could be retained for a longer period of time, potentially affecting its temperature. This increase would not be sufficient to increase water temperature in any substantial manner because the retention time of water stored in Forebay is not expected to substantially change. Such a minor increase in water temperature would not result in a temperature that would affect existing fisheries or other beneficial uses. Therefore, this impact would be less than significant with post-Project operation of the Forebay. No mitigation is required.

What studies or other data are the basis of the assertion that the increase in water storage amount would not substantially increase the water temperature? 5-19 What amount of water is anticipated to be stored over what timeframe and season of the year? 5-20 State Water Board staff recommends that additional information be provided in the final EIR to support the less than significant determination or that appropriate mitigation be identified. 5-21

State Water Board staff would like to thank EID for the opportunity to comment on the DEIR for the Project. If you have questions regarding this letter please contact Mr. Michael Maher, Project Manager, at (916) 341-5408 or by email at michael.maher@waterboards.ca.gov. Written correspondence should be directed to:

State Water Resources Control Board
Division of Water Rights
Water Quality Certification Program
Attention: Michael Maher
P.O. Box 2000
Sacramento, CA 95812-2000

Sincerely,

Michael Maher
Environmental Scientist
Water Quality Certification Program

cc: Ms. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Ms. Pamela Creedon, Executive Officer
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670

Ms. Beth Livingston
United States Forest Service
100 Forni Road
Placerville, CA 95667

5-1 The Project would not increase the amount of electricity generated; instead, it would facilitate greater power generation flexibility to better meet Californian's electrical energy demand patterns. Power prices are generally proportional to power demand. With the improved flexibility in the timing of generation, generation income is expected to improve.

The State Water Resources Control Board (SWRCB) letter dated December 3, 2013, confirms that EID has sufficient existing water rights for the Project and specifically that implementing the Project would not increase water diversions, seasons, and patterns of diversion. SWRCB's confirmation letter was based on the licensee's statements below:

- The El Dorado Canal diverts on average approximately 90,000+ af of water per year, predominantly from the South Fork American River basin, under the numerous existing water rights we have previously documented. Approximately 80,000 af of the annual flow into Forebay goes to the El Dorado Powerhouse and 10,000–15,080 af into the drinking water system. Detention time in the Forebay reservoir for this water volume would average about 1 day over the course of the year because the Forebay serves only as a regulating reservoir that aids in providing hydropower and drinking water supply. With the dam raise, detention time would increase to about 1.5 days. During summer, the Forebay inflow decreases and detention time lengthens to about 2 days. Both the average annual and summer Forebay detention times would still be well below the 30-day threshold that defines "storage."

- The primary purpose of this mandated project is to correct dam stability deficiencies identified by state and federal dam safety regulators. The increased reservoir space afforded by the Project also would enhance public health and safety by increasing the emergency drinking water available at the Forebay in the event of a potential failure or outage in the supply canal system upstream. However, implementing the Project would not increase overall water supplies for either power production or consumptive use. Nor would it change the quantity or pattern of diversions under the existing water rights. Implementing the Project also would not alter EID's ongoing compliance with all minimum bypass flow, minimum lake level, and other conditions of the existing SWRCB-issued rights, and with all FERC license requirements for Project 184.

5-2 EID would require that imported riprap, rocks, and gravels used for the Project (specifically, the riprap products Type 6 and 6A, the riprap bedding Type 5, and the drain gravel Type 3) be prewashed before use at the Project site.

5-3 EID would provide a copy of the Fugitive Dust Plan for review by SWRCB when completed.

5-4 The discussion found on page 3.4-13 of the DEIR itemizes the amount and types of wetland and riparian habitat that would be affected with Project implementation. The acreage and habitat types reported in the DEIR include:

- 23.4 acres of open water
- 1.31 acres of riparian wetland
- 0.53 acre of canal
- 0.36 acre of emergent wetland
- 0.26 acre of seasonal wetland

- 0.13 acre of ephemeral drainage
- 0.12 acre of perennial drainage

It has been determined that some of these features are located outside of the Project site and would not be affected by the Project. These features include 0.26 acre of seasonal wetland and 0.04 acre of canal.

On December 20, 2013, EID submitted a permit application to SWRCB under Section 401 of the Clean Water Act (CWA). This permit application includes the updated estimates of the amount and types of potential waters that are within the Project site and could be affected by Project activities:

- 3.40 acres of open water
- 1.31 acres of riparian wetland
- 0.49 acre of canal
- 0.36 acre of emergent wetland
- 0.13 acre of ephemeral drainage
- 0.12 acre of perennial drainage

5-5 Water quality data are collected at the EID Reservoir 1 Water Treatment Plant, which receives raw water from the Forebay and includes seepage water from the dam that is captured and pumped back to the Main Ditch. Source water quality monitoring (raw water prior to being treated at Reservoir 1) is conducted on a triennial basis in accordance with drinking water regulations. Data from the two most recent monitoring events (2010 and 2013) are presented in Appendix B. The data show that no elevated levels of iron or mercury, or other constituents of concern, are present in the raw water from the Forebay and seepage.

5-6 GEI Consultants, Inc., conducted a study to characterize the seepage flows from the Forebay Dam in the current and future configurations (GEI 2014). This analysis is included in Appendix C of this document. The analysis utilized previous seepage analyses and measurements from weirs located below the toe of the dam to characterize existing surface/subsurface seepage flows and to project seepage flows to Long Canyon Creek after the dam modification project is complete. The dam modification and raise would induce higher seepage gradients on the dam, foundation, and abutments, as well as submerge a larger area of the reservoir rim. This would increase the amount of seepage below the dam. The reconstructed seepage pump-back station is designed to handle this additional seepage and return it to the EID water system. Under the current conditions (restricted reservoir), flows to Long Canyon Creek are estimated to be 60 gallons per minute (gpm). After the dam is modified, flows to Long Canyon Creek are estimated to be 60 gpm as well. Based on GEI's analysis, the proposed dam modifications would not have an effect on the magnitude of water flows to Long Canyon Creek.

5-7 No change would occur with continued dam seepage pumping, as indicated in the response to Comment 5-6, above.

To complete the Project, it is necessary for construction activities to occur in the area below the dam, which includes areas of wetland and riparian habitat created by seepage from the existing dam.

Following completion of Project construction activities, the construction access road would remain and be used for future operations and maintenance activities. Other portions of the affected wetland area not needed for future operations and maintenance activities would be

allowed to revert back to natural conditions. The overall existing drainage pattern of the wetlands in the affected area would be restored following completion of the Project. Much of the temporarily disturbed wetlands not affected by the permanent construction access road would likely recover its wetland character because of continued surface and subsurface water flow and natural recruitment of riparian vegetation.

As stated on page 3.4-24 of the DEIR, EID proposes to mitigate the loss of affected wetland features through the Section 404 CWA permitting process. No impacts on wetlands beyond those associated with construction activities would occur. Water from dam seepage, as well as from naturally occurring springs not associated with seepage from the dam embankment, would still provide surface and subsurface flow to North Fork Long Canyon Creek. Therefore, no impacts associated with the amount of seepage or continued operation of the pump-back facility would occur.

5-8 EID would comply with applicable policies and regulations in effect when the Section 401 CWA Water Quality Certificate is issued by SWRCB.

5-9 EID consulted with the California Department of Fish and Wildlife (CDFW) (Kundargi, pers. comm., 2014) and agreed to work collaboratively with CDFW to prepare a plan to characterize and assess the preconstruction and postconstruction benthic macroinvertebrate population inhabiting the Forebay.

5-10 The ramping rate for Forebay dewatering and refilling would not adversely affect denning ringtails or existing pond turtles and fish based on the timing of the drawdown, the rate of the drawdown, and the mitigation measures incorporated into the DEIR, as discussed below.

EID would initiate the reservoir drawdown by discontinuing diversions into the El Dorado Canal in preparation for the annual canal maintenance outage. EID would continue to route flows through the hydroelectric penstock and drinking water system until water surface elevations are drawn down to typical minimum reservoir operation levels.

When the reservoir elevation reaches the typical minimum reservoir operation level for hydroelectric generation, the drawdown would continue through the drinking water intake at flow rates consistent with current operations. When the reservoir water surface is below an elevation where flows can no longer be gravity fed through the drinking water intake, a pump system that conveys water from the remaining pool in the reservoir to the drinking water system would be used to complete the reservoir drawdown. The drawdown of the remaining pool by pumping would require a minimum of 3–15 days, depending on the equipment used by the construction contractor.

Ringtails would not be adversely affected as a result of the Forebay drawdown rate. Potential impacts on ringtails identified in the DEIR include loss of habitat attributable to the removal or disturbance of rock outcrops or large snags that could provide denning habitat. Implementing Mitigation Measure 3.4-5d would mitigate this potential impact. Ringtails reproduce in early spring, and young are born in May and June. The reservoir drawdown is planned to occur from October through December, which is outside of the denning season. Because no impacts on ringtails are associated with the drawdown rate, no additional mitigation measures are necessary.

The discussion of Mitigation Measures 3.4-5b identifies actions to be conducted before and during the drawdown to minimize impacts on western pond turtle. EID consulted with CDFW (Kundargi, pers. comm., 2014) and agreed to work collaboratively with CDFW on a plan to implement western pond turtle relocation activities.

The discussion of Mitigation Measures 3.4-6a identifies actions to be conducted before and during the drawdown to minimize impacts on fish in the Forebay. EID consulted with CDFW (Kundargi, pers. comm., 2013) to develop the measures identified in the DEIR. EID consulted with CDFW (Kundargi, pers. comm., 2014) and agreed to work collaboratively with CDFW on the plan to implement fish management activities.

5-11 Aquatic turtles, similar to other ectotherms (cold-blooded species) found in temperate climates, experience a period of seasonal dormancy (referred to as brumation for reptiles) in response to reduced water and air temperatures that occur with the onset of seasonal shorter photoperiods and reduced food supplies. This period of dormancy is an energy-saving mechanism that allows turtles to survive inclement late fall, winter, and early spring environmental conditions.

The western pond turtles at the Project elevation of 3,787 feet above mean sea level experience brumation each year as mean daily water temperatures decline to less than about 50 degrees Fahrenheit (°F) (10 degrees Celsius [°C]) between the end of September and late October. The end of the dormancy period typically occurs between mid-May and mid-June, when water temperatures increase to about 50°F.

Dewatering of the Forebay would occur between October and December 2015. In most years, the active turtle season ends by the end of September; however, activity could extend under mild climatic conditions through October. Because the western pond turtles in the Forebay undergo dormancy, they would be potentially exposed to the impacts of dewatering if they were present. Project Mitigation Measure 3.4-5b, "Western Pond Turtle Relocation," addresses this potential impact by removing turtles from the Forebay to suitable alternative locations before seasonal dormancy.

5-12 The discussion of Mitigation Measure 3.4-5b has been revised to include performing surveys for western pond turtle nests of the Forebay within the boundaries of the new high-water elevation before Forebay refilling, if found necessary during consultation with CDFW. Turtles encountered would be collected and relocated in accordance with guidance provided by CDFW. EID will include a PM&E measure in its FERC license amendment application addressing this mitigation.

5-13 The discussion of Mitigation Measure 3.4-5b has been revised to include continuing efforts to relocate western pond turtles during the early phases of the Project construction activities. EID will include a PM&E measure in its FERC license amendment application addressing this mitigation.

5-14 Potential western pond turtle habitat at the Forebay is expected to reestablish after the Forebay is stabilized at the new water surface elevation. No additional active habitat restoration is proposed or warranted. Also see the response to Comment 5-15.

5-15 The Project does not involve postproject stocking of western pond turtle. EID consulted with CDFW (Kundargi, pers. comm., 2014) and agreed to work collaboratively with CDFW to identify what actions may be appropriate to reestablish western pond turtle in the Forebay after completion of the Project, if determined appropriate. EID will include a PM&E measure in its FERC license amendment application addressing this mitigation.

5-16 EID consulted with CDFW (Kundargi, pers. comm., 2014) and agreed to work collaboratively with CDFW. CDFW will determine the criteria that would be used to identify when the fish salvage operations are triggered.

5-17 EID would provide the Water Diversion and Control Plan to SWRCB for review upon completion of the plan. EID would coordinate with SWRCB in preparation of the storm water pollution prevention plan (SWPPP) to obtain a Construction General Permit.

5-18 The only identified surface water that could receive discharges from the Project construction area is North Fork Long Canyon Creek. Implementing Mitigation Measure 3.9-1b, presented in the DEIR on pages 3.9-9 and -10, would minimize the potential impact of Project construction on surface water quality. The following text identifies the components of this measure.

EID will prepare a SWPPP before the start of construction activities. As required under the National Pollutant Discharge Elimination System General Permit, the SWPPP will identify implementation measures necessary to mitigate potential construction-related impacts on water quality.

These measures identified in the SWPPP will include best management practices (BMPs) and other standard pollution prevention actions, such as erosion and sediment control measures, proper control of nonstormwater discharges, and hazardous-spill prevention and response. The SWPPP will also include requirements for BMP inspections, monitoring, and maintenance. The following items are examples of BMPs that will be implemented during construction:

- Erosion-control BMPs, such as the use of mulches or hydroseeding to prevent detachment of soil, that follow guidance presented in the California BMP Handbooks—Construction. A detailed site map will be included in the SWPPP outlining specific areas where soil disturbance may occur, and the drainage patterns associated with excavation and grading activities. In addition, the SWPPP will provide plans and details for the BMPs to be implemented before and during construction to prevent erosion of exposed soils and to treat sediments before they are transported off-site.
- Sediment control BMPs such as silt fencing or detention basins that trap soil particles.
- Construction staging areas designed so that stormwater runoff during construction will be collected and treated in a BMP such as a detention basin.
- Management of hazardous material and wastes to prevent spills.
- BMPs for vehicle and equipment fueling so these activities will occur only in designated staging areas with appropriate spill controls.
- Maintenance checks of equipment and vehicles to prevent spills or leaks of liquids of any kind.

Measures to control on-site spills will be included in the SWPPP. In addition to the spill prevention and control BMPs presented above, the SWPPP will contain a visual monitoring program and a chemical monitoring program for nonvisible pollutants, to be implemented if there is a failure of BMPs.

Materials storage and handling and equipment servicing will occur only in designated areas. If a spill occurs, local regulatory agencies will be informed appropriately and a spill response

program will be implemented as outlined in the SWPPP. The following items are examples of BMPs that will be implemented as part of the SWPPP and spill response program:

- All hydraulic hoses and lines will be regularly inspected for cracks and leaks and maintained appropriately to prevent contamination.
- Drilling activities will not use ammonium nitrate fuel oil because it dissolves in water and releases ammonia and nitrates.
- Contractors will submit plans for containment measures for drilling fluids caused by hose breaks and other sources, and for shutdown and cleanup of spills.
- All refueling and servicing will occur at designated locations that are at least 100 feet from the reservoir's high-water mark and at least 50 feet away from sensitive water features and wetlands, with appropriate containment measures in place to control hazardous materials.

5-19 Page 3.9-14 of the DEIR addresses potential changes to Forebay water temperature resulting from longer water retention times that are associated with greater storage volume. The DEIR concludes that increased retention times would not be sufficient to increase water temperature in a substantial manner.

To provide additional information confirming this conclusion, EID conducted a study using the SSTemp computer model to simulate the various heat flux processes that determine the potential temperature change. SSTemp was developed as a scaled-down version of the Stream Network Temperature Model (Bartholow 2004). The model considers physical processes, including convection, conduction, evaporation, as well as heat to or from the air (long-wave radiation), direct solar radiation (short wave), and radiation back from the water.

It has been found that stream models, such as SSTemp, can simulate conditions of short-detention-time reservoirs, which are modeled as slow, deep rivers (Deas and Lowney 2000).

Based on an average inflow/ouflow rate of 93 cubic feet per second found in July and August periods, the existing El Dorado Forebay has an average storage retention time of about 2.07 days (49.7 hours). With modification of the Forebay, the retention time would increase to 2.77 days (66.5 hours). The additional 16.8 hours of water retention are not sufficient to increase water temperatures that would affect beneficial uses. In fact, as shown in Table 4-2, the additional 130 af retained in the Forebay would result in minor cooling of the stored water over the increased retention time. This is believed to result from the increased mass of cool water in the Forebay offsetting increases from exposure to warm air temperatures and solar input during the longer retention period.

Table 4-2 summarizes the change to Forebay water temperature as a result of Project implementation.

Table 4-2
Estimated Water Temperature Changes to the El Dorado Forebay

	Existing Forebay	Project	Difference
Forebay storage capacity (af)	381	554	+173
Forebay retention time (hours)	49.7	66.5	+16.8
Inflow temperature (°F)	68	68	--
July outflow temperature change (mean/maximum)	0.02/0.45°F	0.02/0.44°F	0.0/-0.01°F
August outflow temperature change (mean/maximum)	0.00/0.37°F	0.06/0.36°F	0.0/-0.01°F

This analysis confirms that no substantial change in Forebay water temperature would occur as a result of implementing the Project. No change to the information and conclusion presented in the DEIR is warranted.

Screen capture images of the SSTemp graphic user interface showing results for the existing Forebay and Project in July and August are presented in Appendix D of this document.

5-20 The Forebay is an offstream reservoir designed to remain full throughout the year. It receives water from the El Dorado Canal, which originates at the El Dorado Diversion Dam on the South Fork American River at Kyburz, California. Diversions into the canal are controlled by EID in accordance with EID's water rights, FERC license conditions, and other parameters. The Forebay is operated to meet hydroelectric power generation and drinking water demands and fluctuates on a daily to weekly basis depending on those demands. The modified Forebay would continue to serve water for drinking water and hydroelectric demands with a maximum operating storage capacity of approximately 554 af (DEIR, page 1-1).

5-21 See the response to Comment 5-19.

Letter 6

MIWOK MAIDU United Auburn Indian Community of the Auburn Rancheria

Gene Whitehouse, Chairman | John L. Williams, Vice Chairman | Danny Rey, Secretary | Brenda Adams, Treasurer | Calvin Moman, Council Member

RECEIVED
NOV 27 2013
ADMINISTRATIVE SERVICES

November 20, 2013

Brian Deason
Hydroelectric Compliance Analyst
El Dorado Irrigation District
2890 Mosquito Road
Placerville, CA 95667

Subject: El Dorado Forebay Dam Modification Project, DEIR

Dear Mr. Deason,

Thank you for requesting information regarding the above referenced project. The United Auburn Indian Community (UAIC) of the Auburn Rancheria is comprised of Miwok and Southern Maidu (Nisenan) people whose tribal lands are within Placer County and whose service area includes El Dorado, Nevada, Placer, Sacramento, Sutter, and Yuba counties. The UAIC is concerned about development within its aboriginal territory that has potential to impact the lifeways, cultural sites, and landscapes that may be of sacred or ceremonial significance. We appreciate the opportunity to comment on this and other projects in your jurisdiction. 6-1

In order to ascertain whether or not the project could affect cultural resources that may be of importance to the UAIC, we would like to receive copies of any archaeological reports that have been, or will be, completed for the project. We also request copies of future environmental documents for the proposed project so that we have the opportunity to comment on potential impacts and proposed mitigation measures related to cultural resources. The information gathered will provide us with a better understanding of the project and cultural resources on site and is invaluable for consultation purposes. Please contact us if any Native American cultural resources are in, or found to be within, your project area. 6-2

Thank you again for taking these matters into consideration, and for involving the UAIC early in the planning process. We look forward to reviewing the aforementioned documents as requested. Please contact Marcos Guerrero, Cultural Resources Manager, at (530) 883-2364 or email at mguerrero@auburnrancheria.com if you have any questions.

Sincerely,

Gene Whitehouse,
Chairman

CC: Marcos Guerrero, CRM

Tribal Office 10720 Indian Hill Road Auburn, CA 95603 (530) 883-2390 FAX (530) 883-2380

6-1 Section 3.5 of the DEIR addresses the potential impacts of implementing the Project on cultural and historical resources. As described in the DEIR, implementing the Project would not affect known cultural resources. Measures are provided to minimize potential impacts on cultural or historical resources that may be discovered during Project construction.

6-2 EID would implement Mitigation Measures 3.5-1 and 3.5-2 if unknown cultural resources are encountered during project construction. These measures include contacting appropriate Native American representatives in accordance with the California Public Resources and Health and Safety Codes.

5 REVISIONS TO THE DEIR

5.1 INTRODUCTION

This chapter presents specific text changes made to the DEIR since its publication and public review. The changes are presented in the order in which they appear in the original DEIR and are identified by the DEIR page number. Text deletions are shown in strikethrough (~~strikethrough~~), and text additions are shown in underline (<u>underline</u>).

5.2 CORRECTIONS AND REVISIONS

Executive Summary

Several changes were made to the information presented in Table ES-2, "Summary of Project Impacts and Mitigation Measures," to be consistent with the discussion and analysis presented in Chapter 3 of the DEIR. No substantive changes to findings or conclusions were made.

Section 1.4.2, "Agency Roles and Responsibilities"

Section 1.4.2 is modified to read:

Regional and Local Agencies

- *El Dorado County Air Quality Management District:* Review of effects on air quality; ~~authority to construct and permit to operate~~

Section 2.4.3, "Repair Reservoir Inlet"

Section 2.4.3 is modified to read:

The reservoir inlet is a 600-foot-long unlined earthen canal serving as the transition of the El Dorado Canal to the Forebay originating from a tunnel under Forebay Road. The vertical canal slopes are unstable along their entire length. These conditions pose public safety concerns and are a source of sediment to the reservoir.

To stabilize this canal reach, the existing tunnel under Forebay Road would be extended to the reservoir by constructing a reinforced-concrete conduit that would be backfilled above the conduit to mitigate the steep, unstable slopes. At the transition of the conduit to the reservoir, a concrete apron would be installed, and the side slopes and base would be flattened and lined with riprap to reduce the potential for erosion. A portion of this work would occur within an EID easement on private property.

<u>The culvert outlet would be constructed with a sloped concrete apron, extending about 24 feet to the channel bottom, which would be covered with large rock riprap. The apron and rock would protect the channel bottom from scour.</u>

<u>Water depth exiting the culvert outlet would vary depending on the reservoir elevation. At higher reservoir elevations, the gradient between the reservoir and the culvert outlet would be less and result in a relatively smooth flow into the reservoir. At lower reservoir water surface elevations, the gradient would</u>

increase and result in a cascading waterfall feature. At higher reservoir elevations, water would fully cover the concrete apron and rock riprap, inundating these features. At lower reservoir water surface elevations, portions of the concrete apron and rock riprap would be visible; however, the gradient between the outlet of the culvert and the reservoir is anticipated to create turbulent water that would resemble a natural rapid and cover the engineered stabilization features.

Section 2.4, "Description of Project Elements"

Section 2.4.9 is added and reads:

2.4.9 OTHER PROJECT ELEMENTS

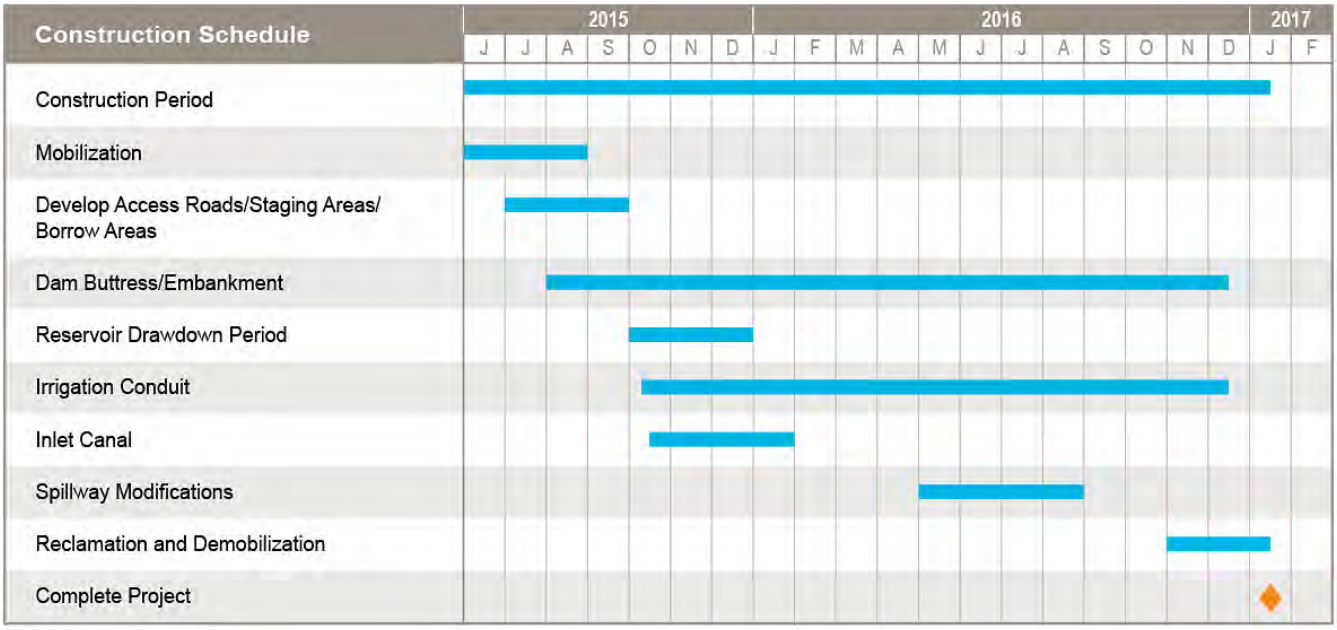
The Project includes replacing several recreational features that would be removed, relocated, or altered during the modification of the Forebay Dam. Specifically, portions of an informal hiking trail located between the two day-use areas would be inundated by the higher Forebay water surface elevation and would be realigned. In addition, two existing benches next to the reservoir would be inundated by the higher Forebay water surface elevation and would be replaced at suitable sites.

Existing fencing that is removed during construction of the Project would be replaced, including areas adjacent to the spillway and Forebay inlet canal. At the inlet canal, replacement fencing would be installed around the culvert outlet structure for public safety. It is anticipated that there would be less fencing overall in the canal inlet area because the public safety hazard associated with the unstable vertical canal slopes would be corrected.

The Forebay main day-use and fishing access areas would be closed to the public during Project construction for safety reasons. As part of the Project, portions of the main day-use area would be upgraded to comply with current Americans with Disabilities Act (ADA) requirements. Upon completion of Project construction activities, the recreational features would be reopened for public use.

Section 2.5.2, "Anticipated 2016 Activities"

Exhibit 2-3 is modified to show the updated Project construction schedule. As shown, the initiation of construction would start 2 months later than the original schedule and extend into January 2017. Other minor changes to scheduled activities would also occur.



Source: Data provided by EID in 2013, adapted by AECOM in 2014

Exhibit 2-3 **Project Construction Schedule**

Section 3.3, "Air Quality"

Mitigation Measure 3.3-2 has been renumbered 3.3-2a.

Mitigation Measure 3.3-2b has been added and reads:

> Mitigation Measure 3.3-2b: Minimize Construction-Related Smoke Emissions.
>
> EID will comply with El Dorado County Air Quality Management District Rule 300, Open Burning. In compliance with Rule 300, EID will require the contractor to prepare and submit a Burn Plan and Smoke Management Plan that includes the following key elements:
>
> - Arrange material so that it will burn with a minimum of smoke
> - Plan operations so that only the amount that can reasonably be expected to completely burn within the following 24 hours would be ignited in any 1 day, except for large trees (diameter of 6 or more inches)
> - Ignite outdoor fires only with approved ignition devices as defined in Section 300.2 of Rule 300
> - Implement measures to ensure that the material is ignited as rapidly as practicable within applicable fire control restrictions
> - Prepare contingency plans to curtail burning when smoke drifts into a nearby populated area and becomes a public nuisance

- Implement measures to ensure that no material is burned unless it is free of tires, household rubbish, tar paper, and construction debris; is reasonably free of dirt, soil, and moisture; and is loosely stacked in such a manner to promote drying and ensure combustion with a minimum of smoke

Timing: During all Project construction phases

Responsibility: EID and construction contractor

Significance after Mitigation: Implementing Mitigation Measures 3.3-2a and 3.3-2b would fulfill all requirements of EDCAQMD to reduce the potentially significant impact associated with fugitive dust (PM_{10}) emissions to a **less-than-significant** level.

Section 3.4, "Biological Resources"

Mitigation Measure 3.4-1 has been modified to read:

Mitigation Measure 3.4-1: Implement Measures to Avoid, Restore, and Compensate for the Loss of Wetlands and Riparian Vegetation.

EID will avoid, minimize, and/or compensate for damage and/or loss of wetlands and riparian vegetation resulting from Project construction by implementing one or more measures, including the following examples, to be defined in consultation with the U.S. Army Corps of Engineers:

- Through regulatory authorization for fill of waters of the United States under Nationwide Permit 3 (maintenance), implement specific agency-required mitigation for direct and indirect impacts on wetlands and riparian vegetation to achieve no net loss of habitat under Clean Water Act jurisdiction. This could include, but not be limited to, developing on-site mitigation and/or paying in lieu mitigation fees to compensate for loss of wetlands and riparian areas.

- The loss of wetlands around the reservoir could be partially or wholly mitigated by creation of new inundated areas that would develop the same qualities as the existing areas that would be lost (in-kind mitigation).

- Purchase off-site mitigation credits from an appropriate mitigation bank or other available preserve.

- If wetland and riparian areas can be avoided during construction, these areas would be identified as avoidance areas and delineated with construction fencing or other methods.

Timing: Consultation with agencies and acquisition of all necessary permits will occur before construction. Compliance with all permitting requirements including but not limited to the following actions will occur during construction: ~~f~~Fencing and avoidance zones will be established and marked before and during construction, and ~~new~~ wetlands and riparian areas ~~will be created~~ are anticipated to develop following construction as a result of ~~during raising of~~ the new high-water mark ~~level~~ of the Forebay.

Responsibility: EID and contractor.

Significance after Mitigation: Implementing Mitigation Measure 3.4-1~~.1~~ will reduce the potentially significant impact of Project construction on wetlands and riparian vegetation to a **less-than-significant** level. Some wetlands may be avoided, additional riparian areas and waters will be created though the refilling of the reservoir to the new high-water mark. Additionally, EID will implement other mitigation as needed to achieve no net loss of habitat under CWA jurisdiction.

Mitigation Measure 3.4-5b has been modified to read:

Mitigation Measure 3.4-5b: Initiate Western Pond Turtle Relocation.

Mitigation to reduce the impact of the Project on western pond turtle will involve consultation with CDFW, trapping of turtles and relocation off-site, and opportunistic capture during Forebay drawdown. If necessary, as determined through consultation with CDFW, EID will survey for turtles within the boundaries of the new high-water elevation before the Forebay is refilled.

~~Beginning in April 2015, t~~Trapping for turtles will commence in agreement with CDFW. Surveying for and trapping of turtles will continue during the early phases of construction.

Captured turtles will be relocated to a suitable nearby water body subject to CDFW prior approval. Trapping will be performed by a qualified biologist operating under an active California state Scientific Collecting Permit. This action will have the effect of removing egg-laying females from the reservoir prior to egg deposition (late April though early August) in 2015 and 2016, thus eliminating the potential for drowning of eggs or hatchlings in nests when water is raised to its new elevation in December 2016.

Although hatchling and small size-class turtles are notoriously difficult to trap and are usually underrepresented in trap efforts (Bury et al. 2012), the use of specialized traps (i.e., altered, floating minnow traps) deployed in shallow water at the drinking water intake, emergency spillway channel, and along the southern edge of the reservoir might be deployed to capture small turtles with some success. As with for breeding adults, captured small-sized turtles will be relocated to a preapproved recipient site.

Despite the aforementioned trapping efforts, smaller nonbreeding individuals will likely remain after the cessation of trapping. As a result, a qualified biological monitor will be retained and will be on-site during reservoir drawdown, and, if determined needed by CDFW, before refill of the reservoir. The monitor will collect turtles opportunistically as they are exposed by receding water and will relocate them to a preapproved recipient site.

~~No action will be taken to restock the Forebay with pond turtles because it is believed that colonization will take place naturally.~~ EID shall coordinate with CDFW to identify what actions may be appropriate to reestablish western pond turtle in the Forebay after completion of the Project, if determined appropriate. It is anticipated that these actions will reduce the significant impact of the Project on western pond turtles to a **less-than-significant** level.

Section 3.5, "Cultural Resources"

On page 3.5-14, the regulatory requirements identified in Mitigation Measure 3.5-2 are revised to read:

> Mitigation Measure 3.5-2: Stop Potentially Damaging Work If Human Remains Are Uncovered during Construction, Assess the Significance of the Find, and Pursue Appropriate Management.
>
> If human remains are discovered, all work shall stop in the immediate vicinity of the find and the El Dorado County Coroner shall be notified in accordance with Section 7050.5 of the California Health and Safety Code. If the remains are determined to be Native American, the NAHC shall be notified and procedures outlined in State CEQA Guidelines Section 15064.5(e), California Health and Safety Code Section 7050.5, and Public Resources Code Section 5097.98 shall be followed.
>
> **Timing:** During construction
>
> **Responsibility:** EID
>
> **Significance after Mitigation:** Implementing Mitigation Measure 3.5-2 would reduce the construction-related impact to a **less-than-significant** level.

Section 3.6, "Geology, Soils, and Seismicity"

On page 3.6-14, the discussion of the potential impact is revised to read:

> **Construction-Related Impact**
> Construction activities such as excavation, grading, and hauling of soil would occur in soils that are rated by NRCS (2013) with a ~~severe~~ moderate to high erosion hazard. Conducting these activities would result in the temporary disturbance of soil and would expose disturbed areas to storm events. Rain of sufficient intensity could dislodge soil particles from the soil surface. If the storm is large enough to generate runoff, localized erosion could occur. Because steep slopes are present in certain areas of the Project site, access roads, and borrow area, severe erosion could occur as a result of some of the proposed activities. In addition, soil disturbance as a result of construction activities could result in soil loss because of wind erosion. Therefore, the construction-related impact would be **significant**.

Section 3.13, "Transportation"

The mitigation requirements listed in Mitigation Measure 3.13-2 have been expanded to read:

> Mitigation Measure 3.13-2: Prepare and Implement a Traffic Control Plan.
>
> Before construction begins, EID and/or its contractor would prepare and implement a traffic control plan to minimize construction-related traffic safety hazards on the affected roadways and ensure adequate access for emergency responders. EID and/or its contractor would coordinate development and implementation of this plan with jurisdictional agencies (e.g., El Dorado County), as appropriate. The traffic control plan would, at minimum:
>
> - Include a discussion of work hours, haul routes, work area delineation, traffic control, and flagging.

- Identify restrictions on haul routes, time of day, or other circumstances to avoid degrading existing traffic movement, including periods of traffic congestion on U.S. 50.

- Determine the need to require workers to park personal vehicles at an approved staging area and take only necessary Project vehicles to the work sites.

- Develop and implement a plan for notifications and a process for communication with affected residents and landowners before the start of construction. Public notification would include posting of notices and appropriate signage of construction activities. The written notification would include the construction schedule, the exact location and duration of activities on each street (e.g., which roads/lanes and access points/driveways would be blocked on which days and for how long), and contact information for questions and complaints.

- Provide notification to the public advising them of alternative routes that may be available to avoid delays.

- Ensure that appropriate warning signs are posted in advance of construction activities, alerting bicyclists and pedestrians to any closures of nonmotorized facilities.

- Provide notification to administrators of police and fire stations, ambulance service providers, and recreational facility managers of the timing, location, and duration of construction activities and the locations of detours and lane closures, where applicable. Maintain access for emergency vehicles in and/or adjacent to roadways affected by construction activities at all times.

- Require the repair and restoration of affected roadway rights-of-way to their original condition after construction is completed.

Timing: Before and during construction activities, as appropriate

Responsibility: EID and contractor

Significance after Mitigation: Implementing Mitigation Measure 3.13-2 would reduce the potentially significant impact associated with traffic hazards to a **less-than-significant** level because the traffic control plan would be used to develop detours to ensure acceptable traffic flow through and/or around the construction zone, minimize impacts on multimodal facilities by providing alternate routes for users of the facilities, and minimize traffic congestion.

Section 4.6, "Alternatives"

Paragraph 4 on page 4-10 is revised to read:

> Implementing either Alternative 2 or 3 would require ~~annual~~ dredging of sediments from the Forebay to maintain ~~reservoir capacity~~ adequate water quality conditions of water conveyed into the penstock. It is estimated that annual sediment deposition rates are~~. About 3,500~~ 3,300 cubic yards. ~~of~~ Accumulated sediment would need to be periodically removed, transported, and disposed of, which would most likely

occur ~~in~~ at the primary borrow area. ~~Assuming a sediment disposal depth of 2 feet, this volume of sediment would annually affect about 1 acre of land. Additional land would receive this sediment each year over the foreseeable future.~~ Dredging activities to manage the accumulated sediments would need to occur as part of the Project construction under Alternative 2. Dredging activities could occur as part of the Project construction under Alternative 3 or be delayed for a period of time. The hauling and disposal of this sediment would further contribute to air pollutant and GHG emissions from excavators, haul trucks, and spreading equipment ~~each year~~. The loss of water supply and hydropower generation during the dredging period would adversely affect EID's water supply and revenue generation, as well as the renewable energy supply for California consumers.

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APPENDIX A

Public Meeting Notes

PUBLIC MEETING NOTES

October 30, 2013 Public Meeting on the El Dorado Forebay Dam Modification Project Draft EIR

Will the Project be putting a trail all the way around the reservoir?

Response: The project includes realignment of that trail and replacement of these benches. The project does not include constructing a trail around the reservoir but it does not prevent that from happening in the future.

Will the Project put a fence around the reservoir and how will that look?

Response: The project does not include adding fence around the reservoir. The project will remove and reinstall a fence along places where fences currently exist. This includes for example the spillway and sections of the reservoir inlet canal. As we work with a private landowner adjacent to the reservoir inlet And it is likely that there will be less fencing there in the future.

Will the project have anything to do with the little league field?

In the borrow area, will you replant that with trees once you harvest?

EID will reseed the area for erosion control purposes. EID is applying for a timber conversion permit with CalFire. EID does not plan to replant trees because the area may be needed for future uses. EID anticipates that natural recruitment of trees will occur and does not plan to preclude trees from establishing on their own.

What is the chance the state [DSOD] will come back in a few years and ask for something else? What is the chance that this will have to happen again?

The DSOD and FERC understand that the District is expending significant costs for this project to increase dam safety. This project is going through rigorous review of both DSOD and FERC with the addition of significant dam safety improvements. The District does not anticipate more significant work in the short-term.

Is the point of this project to increase storage capacity?

The main purpose is to stabilize the dam. These project costs can be offset by increasing the storage capacity to improve hydroelectric power revenue and increase emergency water supply reliability for our customers.

Why has the lost capacity not been excavated when the reservoir was dry? Why did we not excavate the silt that has built up in the last 90 years? I don't understand why dredging wouldn't provide a greater water storage value.

EID did assess dredging as part of the project, but found the cost exceeds the benefit. There is no foreseeable benefit of removing the silt other than for operations which may be needed within the next 20 years. We would have to shut down the facility for a significant period time and remove 270,000 cubic

yards of silt. In order to move the dirt, EID would need a place to put the wet dirt. This is not practical before the dam modification project occurs.

Because the drinking water intake is at a relatively high location within the dam, there is a significant amount of storage that is unavailable for use. This storage is referred to as "dead" storage. The historical siltation has primarily occurred in the dead storage portion of the reservoir. To make this dead storage volume available for District use, the District would then need to install a pump station, in place of the current gravity system.

We were told a year ago that there was no danger to people living downstream if Forebay Dam broke. Why does EID need to modify the dam?

The District takes safety issues seriously and has put a lot of effort into studying the safety of Forebay dam. EIS conducted a series of geotechnical investigations and found the dam does not meet current engineering dam safety standards. These findings have been concurred by both DSOD and FERC. While the dam is not in danger of an eminent failure, its safety is of concern and therefore the significant safety remediation project is underway to correct this public safety issue and regulatory mandate.

Would you describe the impact on Forebay Road?

The District has identified several access routes. The primary access is anticipated to be Forebay Road from Pony Express. Drop-off Road and Blair Road from Pony Express would also be used. As part of the mitigation and monitoring reporting program, the District will prepare a traffic management plan. In the plan we will identify traffic access routes and timing so that it won't interfere with school buses or emergency access. One area that we would anticipate traffic control is the area between Forebay Road and the dam. Most construction-related traffic would access through Forebay Road, not Blair Road.

I understand that the cost to do these repairs is about $85 million.

The estimated cost is about $17 million and the costs will be paid through the capital improvement program, which will be funded through a bond offering sometime in the next year or two.

I heard that there were federal grants. Would you elaborate?

The District has not received a federal grant for the Project; though we are always looking for funding sources.

What happened with the state's large bond measure for water supply projects that was supposed to go on the ballot and what is the amount of that bond?

The bond was taken off the ballot and is being rewritten and is expected to be coming back on the ballot sometime in 2015-2106 timeframe. It is expected to be smaller than the original bond measure planned. Our understanding is that these funds are to be used for larger projects, including raising Shasta Dam. However, we will continue to follow all potential fund source leads.

Why is the canal shut down?

We shut down the El Dorado Canal every year at this time to do maintenance. Once the Flume 41 and other areas are repaired, it won't be shut down anymore.

Did you consider including a trail around the lake as part of the project?

A trail around the lake was not considered as part of the project because adding recreational facilities is not part of the project objectives. The Project does include replacement of existing recreational facilities that would be displaced by the project.

What would it take to include a trail around the lake into the project? Or what would it take to do a different project to address that? How would we make that happen?

Any project that the District would consider would be subject to a CEQA process. Recreational amenities have ongoing operational costs. They may impact neighbors and there are issues with land ownership. This is purely a dam safety project and not a recreational enhancement project. At the time there was a discussion about creation of a community services district which would be a way to identify a funding source for all sorts of recreational facilities.

Once the project is completed, will the recreational and other facilities (benches/bathrooms, etc.) still be available to the public without a fee?

Once the project is done, the facilities will be reopened and there will continue to not be a use fee.

You are making some major modifications on the inlet. Are you considering the aesthetics of the improvements? Have you considered making the inlet look like a waterfall? Waterfalls and fast running water are attractive and could be a community asset. Could you illustrate what the inlet will look like? Consider redoing your design to maximize the view of the water?

The EIR does include viewpoints on aesthetics. The water will come out of the pipe, falling onto a cement apron into a rock structure. The falling water will be much closer to the fishing access area than currently. This will be more visible and could be a visual benefit.

Are you providing better access to the ditch from the top of the dam? Right now the access is down a steep incline. Are you including something in the design to make that trail a little more user friendly? What do we need to do to improve access to the trail?

That particular portion is not a maintained trail. The project does include a road to allow access for trucks but EID access the road from below the dam. In addition, we don't have the legal right to grant public access to a trail along the ditch. The District is not precluding public access to this area, but neither do we grant access to it.

APPENDIX B

Water Quality Data

CALIFORNIA LABORATORY SERVICES

08/13/10 14:33

El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Metals (Drinking Water) by EPA 200 Series Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water	**Sampled: 07/21/10 11:45**		**Received: 07/21/10 14:00**							
Mercury	ND	0.15	1.0	µg/L	1	CT05407	07/26/10	07/26/10	EPA 245.1	
Aluminum	**140**	27	50	"	1	CT05381	07/23/10	07/23/10	EPA 200.7	
Barium	**12**	0.91	100	"	1	"	"	"	"	J
Boron	**22**	4.4	100	"	1	"	"	"	"	J
Beryllium	ND	0.43	1.0	"	1	"	"	"	"	
Chromium	ND	9.9	10	"	1	"	"	"	"	
Copper	ND	3.2	50	"	1	"	"	"	"	
Iron	**190**	6.8	100	"	1	"	"	"	"	
Manganese	**12**	0.92	10	"	1	"	"	"	"	
Nickel	ND	10	10	"	1	"	"	"	"	
Silver	ND	2.9	10	"	1	"	"	"	"	
Zinc	ND	9.3	50	"	1	"	"	"	"	
Antimony	ND	0.57	6.0	"	1	CT05380	07/23/10	07/23/10	EPA 200.8	
Arsenic	**0.37**	0.27	2.0	"	1	"	"	"	"	J
Cadmium	ND	0.17	1.0	"	1	"	"	"	"	
Lead	ND	0.23	5.0	"	1	"	"	"	"	
Selenium	ND	1.1	5.0	"	1	"	"	"	"	
Vanadium	**0.96**	0.44	3.0	"	1	"	"	"	"	J
Thallium	ND	0.11	1.0	"	1	"	"	"	"	
Finished Water Res 1 WTP (CTG0842-02) Water	**Sampled: 07/21/10 12:10**		**Received: 07/21/10 14:00**							
Aluminum	**29**	27	50	µg/L	1	CT05381	07/23/10	07/23/10	EPA 200.7	J
Copper	ND	3.2	50	"	1	"	"	"	"	
Iron	ND	6.8	100	"	1	"	"	"	"	
Manganese	ND	0.92	10	"	1	"	"	"	"	
Silver	ND	2.9	10	"	1	"	"	"	"	
Zinc	**80**	9.3	50	"	1	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

08/13/10 14:33

El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water	**Sampled: 07/21/10 11:45 Received: 07/21/10 14:00**									
Aggressive Index	**9.20**			N/A	1	CT05420	07/26/10	07/26/10	NONE	
Total Alkalinity	**13**	1.0	5.0	mg/L	1	CT05378	07/23/10	07/23/10	SM2310B	
Bicarbonate as CaCO3	**13**	0.50	5.0	"	1	"	"	"	"	
Carbonate as CaCO3	ND	0.50	5.0	"	1	"	"	"	"	
Hydroxide as CaCO3	ND	0.50	5.0	"	1	"	"	"	"	
Chloride	**2.3**	0.026	0.50	"	1	CT05339	07/22/10	07/23/10	EPA 300.0	
Fluoride	ND	0.0079	0.10	"	1	"	"	"	"	
Nitrate as NO3	**0.27**	0.021	2.0	"	1	"	"	"	"	J
Sulfate as SO4	**0.45**	0.010	0.50	"	1	"	"	"	"	J
Color	ND		1	Color Units	1	CT05307	07/21/10	07/21/10	SM2120B	
Specific Conductance (EC)	**36**	0.090	1.0	µmhos/cm	1	CT05358	07/23/10	07/23/10	EPA 120.1	
Cyanide (total)	ND	0.0020	0.0050	mg/L	1	CT05404	07/26/10	07/26/10	SM4500-CN E	
Methylene Blue Active Substances	ND	0.067	0.10	"	1	CT05324	07/22/10	07/22/10	SM5540 C	
Calcium	**3.0**	0.031	1.0	"	1	CT05381	07/23/10	07/23/10	200.7/2340B	
Magnesium	**0.66**	0.028	1.0	"	1	"	"	"	"	J
Potassium	ND	0.87	1.0	"	1	"	"	"	"	
Sodium	**2.9**	0.021	1.0	"	1	"	"	"	"	
Hardness as CaCO3	**10**		1.0	"	1	"	"	"	"	
Nitrite as N	ND	0.0022	0.10	"	1	CT05339	07/22/10	07/23/10	EPA 300.0	
Threshold Odor Number	ND		1	T.O.N.	1	CT05307	07/21/10	07/21/10	EPA 140.1	
Perchlorate	ND	0.98	4.0	µg/L	1	CT05402	07/26/10	07/26/10	EPA 314.0	
pH	**7.21**	0.01	0.01	pH Units	1	CT05319	07/22/10	07/22/10	SM4500-H B	HT-F
Total Dissolved Solids	**26**	10	10	mg/L	1	CT05335	07/22/10	07/23/10	SM2540C	
Turbidity	**1.6**	0.036	0.50	NTU	1	CT05307	07/21/10	07/21/10	EPA 180.1	

California Laboratory Services

08/13/10 14:33

El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Chlorinated Acids by EPA Method 515.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water Sampled: 07/21/10 11:45 Received: 07/21/10 14:00										
Surrogate: 2,4-DCAA	*98 %*		*50-150*	µg/L		*CT05325*	*07/22/10*	*07/27/10*	*EPA 515.1*	
Bentazon	ND	0.025	2.0	"	1	"	"	"	"	
2,4-D (2,4-Dichlorophenoxyacetic acid)	ND	0.032	10	"	1	"	"	"	"	
Dalapon	ND	0.00062	10	"	1	"	"	"	"	
Dicamba	ND	0.034	1.5	"	1	"	"	"	"	
Dinoseb	ND	0.022	2.0	"	1	"	"	"	"	
Pentachlorophenol	ND	0.035	0.20	"	1	"	"	"	"	
Picloram	ND	0.025	1.0	"	1	"	"	"	"	
2,4,5-T	ND	0.030	1.0	"	1	"	"	"	"	
2,4,5-TP (Silvex)	ND	0.028	1.0	"	1	"	"	"	"	

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El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Chlorinated Pesticides and PCBs by EPA Method 508

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water	**Sampled: 07/21/10 11:45 Received: 07/21/10 14:00**									
Surrogate: Tetrachloro-meta-xylene	*63 %*		*50-150*	µg/L		*CT05422*	*07/26/10*	*07/27/10*	*EPA 508*	
Surrogate: Decachlorobiphenyl	*95 %*		*50-150*	"		"	"	"	"	
Aldrin	ND	0.011	0.075	"	1	"	"	"	"	
Chlordane	ND	0.099	0.10	"	1	"	"	"	"	
Chlorothalonil	ND	0.0083	5.0	"	1	"	"	"	"	
Dieldrin	ND	0.011	0.020	"	1	"	"	"	"	
Endrin	ND	0.011	0.10	"	1	"	"	"	"	
gamma-BHC (Lindane)	ND	0.000070	0.20	"	1	"	"	"	"	
Heptachlor	ND	0.010	0.010	"	1	"	"	"	"	
Heptachlor epoxide	ND	0.010	0.010	"	1	"	"	"	"	
Hexachlorobenzene	ND	0.0092	0.50	"	1	"	"	"	"	
Hexachlorocyclopentadiene	ND	0.0040	1.0	"	1	"	"	"	"	
Methoxychlor	ND	0.0069	10	"	1	"	"	"	"	
Propachlor	ND	0.0060	0.50	"	1	"	"	"	"	
Toxaphene	ND	0.12	1.0	"	1	"	"	"	"	
Polychlorinated Biphenyls (Total PCBs)	ND	0.090	0.50	"	1	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

08/13/10 14:33

El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

EDB and DBCP by EPA Method 504.1

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water	**Sampled: 07/21/10 11:45 Received: 07/21/10 14:00**									
Ethylene dibromide	ND	0.00080	0.020	µg/L	1	CT05456	07/27/10	07/28/10	EPA 504.1	
1,2-Dibromo-3-chloropropane	ND	0.0027	0.010	"	1	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Nitrogen/Phosphorus Pesticides by EPA Method 507

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water	**Sampled: 07/21/10 11:45 Received: 07/21/10 14:00**									
Surrogate: EPN	*92 %*		*50-150*	µg/L		*CT05421*	*07/26/10*	*07/27/10*	*EPA 507*	
Alachlor	ND	0.10	1.0	"	1	"	"	"	"	
Atrazine	ND	0.14	0.50	"	1	"	"	"	"	
Bromacil	ND	0.18	10	"	1	"	"	"	"	
Butachlor	ND	0.14	0.38	"	1	"	"	"	"	
Diazinon	ND	0.0023	0.25	"	1	"	"	"	"	
Dimethoate	ND	0.012	10	"	1	"	"	"	"	
Metolachlor	ND	0.099	1.0	"	1	"	"	"	"	
Metribuzin	ND	0.12	1.0	"	1	"	"	"	"	
Molinate	ND	0.13	2.0	"	1	"	"	"	"	
Prometryn	ND	0.13	2.0	"	1	"	"	"	"	
Propachlor	ND	0.13	0.50	"	1	"	"	"	"	
Simazine	ND	0.12	1.0	"	1	"	"	"	"	
Thiobencarb	ND	0.15	1.0	"	1	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

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El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Purgeable Organic Compounds by EPA Method 524.2

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water Sampled: 07/21/10 11:45 Received: 07/21/10 14:00										
Surrogate: 1,2-Dichloroethane-d4	*102 %*		*66-135*	µg/L		*CT05338*	*07/22/10*	*07/22/10*	*EPA 524.2*	
Surrogate: Toluene-d8	*97 %*		*70-130*	"		"	"	"	"	
Surrogate: 4-Bromofluorobenzene	*108 %*		*70-130*	"		"	"	"	"	
Benzene	ND	0.057	0.50	"	1	"	"	"	"	
Carbon tetrachloride	ND	0.092	0.50	"	1	"	"	"	"	
Chlorobenzene	ND	0.11	0.50	"	1	"	"	"	"	
1,2-Dichlorobenzene	ND	0.042	0.50	"	1	"	"	"	"	
1,4-Dichlorobenzene	ND	0.061	0.50	"	1	"	"	"	"	
1,1-Dichloroethane	ND	0.12	0.50	"	1	"	"	"	"	
1,2-Dichloroethane	ND	0.054	0.50	"	1	"	"	"	"	
1,1-Dichloroethene	ND	0.092	0.50	"	1	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.15	0.50	"	1	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.13	0.50	"	1	"	"	"	"	
1,2-Dichloropropane	ND	0.057	0.50	"	1	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.097	0.50	"	1	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.12	0.50	"	1	"	"	"	"	
Ethylbenzene	ND	0.090	0.50	"	1	"	"	"	"	
Methyl tert-butyl ether	ND	0.092	3.0	"	1	"	"	"	"	
Methylene chloride	ND	0.24	0.50	"	1	"	"	"	"	
Styrene	ND	0.059	0.50	"	1	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.13	0.50	"	1	"	"	"	"	
Tetrachloroethene	ND	0.12	0.50	"	1	"	"	"	"	
Toluene	ND	0.10	0.50	"	1	"	"	"	"	
1,2,4-Trichlorobenzene	ND	0.092	0.50	"	1	"	"	"	"	
1,1,1-Trichloroethane	ND	0.18	0.50	"	1	"	"	"	"	
1,1,2-Trichloroethane	ND	0.098	0.50	"	1	"	"	"	"	
Trichloroethene	ND	0.11	0.50	"	1	"	"	"	"	
Trichlorofluoromethane	ND	0.20	5.0	"	1	"	"	"	"	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.15	10	"	1	"	"	"	"	
Vinyl chloride	ND	0.17	0.50	"	1	"	"	"	"	
Xylenes (total)	ND	0.30	0.50	"	1	"	"	"	"	
Total Trihalomethanes (THM)	ND	0.50	0.50	"	1	"	"	"	"	

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08/13/10 14:33

El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Semivolatile Organic Compounds by EPA Method 525.2

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
RW Res 1 WTP (CTG0842-01) Water Sampled: 07/21/10 11:45 Received: 07/21/10 14:00										
Surrogate: Triphenyl phosphate	*151 %*		*60-140*	µg/L		*CT05331*	*07/22/10*	*07/26/10*	*EPA 525.2*	*QS-HI*
Benzo (a) pyrene	ND	0.10	0.10	"	1	"	"	08/04/10	"	
Bis(2-ethylhexyl)adipate	ND	0.44	5.0	"	1	"	"	07/26/10	"	
Bis(2-ethylhexyl)phthalate	ND	0.48	3.0	"	1	"	"	"	"	

CALIFORNIA LABORATORY SERVICES

08/13/10 14:33

El Dorado Irrigation District 4625 Latrobe Road El Dorado Hills CA, 95762	Project: Annual Project Number: Graham Project Manager: Nicole Graham	**CLS Work Order #: CTG0842** COC #:

Notes and Definitions

QS-HI	Surrogate recovery was greater than the upper control limit. A reanalysis was not performed since the analytes associated with the surrogate were not detected.
QR-2	The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
QM-7	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS/LCSD recovery.
QM-4X	The spike recovery was outside of QC acceptance limits for the MS and/or MSD due to analyte concentration at 4 times or greater the spike concentration. The QC batch was accepted based on LCS and/or LCSD recoveries within the acceptance limits.
QM-1	The spike recovery was outside acceptance limits for the LCS or LCSD. The batch was accepted based on acceptable MS/MSD recoveries & RPD's.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration.
HT-F	This is a field test method and it is performed in the lab outside holding time.
A-COM	Surrogate elevated but all other qc criteria are within limits and all associated samples are non detect.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Sierra Foothill Laboratory, Inc.

255 Scottsville Blvd
PO Box 1268
Jackson, CA 95642

Phone 209/223-2800
Fax 209/223-2747
Email info@sierralab.com

Results for Project 227013

774524 **Annual Finished Res A WTP** Liquid Taken: 07/09/2013 1130 By: TW Rec:07/09/2013

Annual Finished at 3 sites: Finished Res A WTP, Finished Res 1 WTP, Finished EDH WTP
Do not include bottles for MTBE or Thiobencarb per client instrucs

Parameter	Result	Unit	Flag	RL	Method	Analyzed	By	CAS
Manganese, ICP/MS	<10	ug/L		20	EPA200.8	07/11/2013	MCC	
Silver, ICP/MS	<0.12	ug/L		0.19	EPA200.8	07/11/2013	MCC	
Sodium, ICP/MS	5	mg/L		0.1	EPA200.8	07/11/2013	MCC	
Zinc, ICP/MS	3.2	ug/L	J	5.0	EPA200.8	07/11/2013	MCC	
Chloride	2.8	mg/L		0.50	EPA300.0/SM4110B	07/17/2013 1401	LV	
Sulfate	0.61	mg/L		0.50	EPA300.0/SM4110B	07/17/2013 1401	LV	
Color, Apparent	<3	unit		3	SM2120B	07/09/2013 1345	C&R	
Odor	1.0	unit		1.0	SM2150B	07/09/2013 1345	C&R	
Hardness as CaCO3	21	mg/L		5.0	SM2340C	07/22/2013 1530	CW	
Temperature, Field	8.6	degree C		0.5	SM2550B	07/09/2013 1130	TW	by Client
Calcium, Titrimetric	3.1	mg/L		3.0	SM3500Ca-D	07/18/2013 1300	CW	
Magnesium, Calculation	3.2	mg/L		2.0	SM3500Mg-E	07/26/2013	KL	
pH, Field	7.7	unit		0.1	SM4500-H+B	07/09/2013 1130	TW	by Client
pH, Lab*	7.3	unit		0.1	SM4500-H+B	07/09/2013 0905	CRL	*past hold
Chlorine Residual,Free, field	.95	mg/L		0.10	SM4500Cl G	07/09/2013 1130	TW	by Client
Foaming Agents (MBAS)	<0.10	mg/L		0.10	SM5540C	07/10/2013 1200	RK	

774525 **Annual RW Res 1 WTP** Liquid Taken: 07/09/2013 1300 By: TW Rec:07/09/2013

Annual Raw Water 3 sites: RW Res A WTP, RW Res 1 WTP, RW EDH WTP

Parameter	Result	Unit	Flag	RL	Method	Analyzed	By	CAS
Cation/Anion Balance	0.519 / 0.240	meq/meq				08/08/2013	KL	
Specific Conductance	32.6	umhos/cm		1.00	EPA120.1/SM2510B	07/09/2013 1055	CRL	
Solids, Total Dissolved	40	mg/L		10	EPA160.1/SM2540C	07/13/2013 1450	DS	
2,3,7,8-TCDD dioxin only	<0.298	pg/L		5	EPA1613B	07/19/2013 2022	MCC	
Turbidity	1.8	NTU		0.10	EPA180.1/SM2130B	07/09/2013 1600	C&R	
Aluminum, ICP/MS	170	ug/L		50	EPA200.8	07/11/2013	MCC	
Antimony, ICP/MS	<0.26	ug/L		0.5	EPA200.8	07/11/2013	MCC	
Arsenic, ICP/MS	0.31	ug/L	J	0.5	EPA200.8	07/11/2013	MCC	
Barium, ICP/MS	10	ug/L		5.0	EPA200.8	07/11/2013	MCC	
Beryllium, ICP/MS	<0.07	ug/L		0.5	EPA200.8	07/11/2013	MCC	
Cadmium, ICP/MS	<0.04	ug/L		0.25	EPA200.8	07/11/2013	MCC	
Chromium, ICP/MS	0.17	ug/L	J	0.5	EPA200.8	07/11/2013	MCC	
Copper by ICP/MS	0.31	ug/L	J	0.5	EPA200.8	07/11/2013	MCC	
Iron, ICP/MS	180	ug/L		20	EPA200.8	07/11/2013	MCC	
Lead by ICP/MS	<0.1	ug/L		0.5	EPA200.8	07/11/2013	MCC	
Manganese, ICP/MS	<10	ug/L		20	EPA200.8	07/11/2013	MCC	

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Sierra Foothill Laboratory, Inc.

255 Scottsville Blvd
PO Box 1268
Jackson, CA 95642

Phone 209/223-2800
Fax 209/223-2747
Email info@sierralab.com

Results for Project 227013

774525 **Annual RW Res 1 WTP** Liquid Taken: 07/09/2013 1300 By: TW Rec:07/09/2013

Annual Raw Water 3 sites: RW Res A WTP, RW Res 1 WTP, RW EDH WTP

Parameter	Result	Unit	Flag	RL	Method	Analyzed	By	CAS
Mercury, ICP/MS	<0.01	ug/L		0.025	EPA200.8	07/11/2013	MCC	
Nickel, ICP/MS	0.089	ug/L	J	0.5	EPA200.8	07/11/2013	MCC	
Selenium, ICP/MS	<0.12	ug/L		0.5	EPA200.8	07/11/2013	MCC	
Silver, ICP/MS	<0.12	ug/L		0.19	EPA200.8	07/11/2013	MCC	
Sodium, ICP/MS	2.6	mg/L		0.1	EPA200.8	07/11/2013	MCC	
Thallium, ICP/MS	<0.04	ug/L		0.5	EPA200.8	07/11/2013	MCC	
Zinc, ICP/MS	1.6	ug/L	J	5.0	EPA200.8	07/11/2013	MCC	
Chloride	2.7	mg/L		0.50	EPA300.0/SM4110B	07/19/2013 1033	LV	
Fluoride	ND	mg/L		0.10	EPA300.0/SM4110B	07/29/2013	BSK	
Nitrate + Nitrite as N	<0.050	mg/L		0.050	EPA300.0/SM4110B	07/16/2013 1144	LV	preserved
Nitrate + Nitrite as N, Calc.	<0.050	mg/L		0.050	EPA300.0/SM4110B	07/25/2013	KL	
Nitrogen, Nitrate as NO3	<0.22	mg/L		0.22	EPA300.0/SM4110B	07/25/2013	KL	
Sulfate	<0.50	mg/L		0.50	EPA300.0/SM4110B	07/19/2013 1033	LV	
Alkalinity, Bicarbonate	10	mg/L		5.0	EPA310.1/SM2320B	07/19/2013 1130	RK	
Alkalinity, Carbonate	<5.0	mg/L		5.0	EPA310.1/SM2320B	07/19/2013 1130	RK	
Alkalinity, Hydroxide	<5.0	mg/L		5.0	EPA310.1/SM2320B	07/19/2013 1130	RK	
Alkalinity, Total as CaCO3	10	mg/L		5.0	EPA310.1/SM2320B	07/19/2013 1130	RK	
Perchlorate by IC	ND	ug/L		2.0	EPA314.1	07/18/2013	BSK	
504.1 EDB,DBCP	All ND	BSK		ML	EPA504.1	07/16/2013	BSK	
505 Organohalide Pesticides	All ND	ug/L		DLR	EPA505	07/16/2013	BSK	
515.3 Chlor. Acids(herbicides	All ND	ug/L		DLR	EPA515.3	07/18/2013	BSK	
VOCs by GC/MS	All ND	ug/L		DLR	EPA524.2	07/15/2013	BSK	
Semi-Volatile Organic Compoun	All ND	ug/L		DLR	EPA525.2	07/16/2013	BSK	
531 Carbamates	All ND	ug/L		DLR	EPA531.1	07/22/2013	BSK	
547 Glyphosate	ND	ug/L		25	EPA547	07/22/2013	BSK	
548 Endothall	ND	ug/L		45	EPA548.1	07/15/2013	BSK	
549 Diquat	ND	ug/L		4.0	EPA549.2-Diquat	07/12/2013	BSK	
Color, Apparent	12	unit		3	SM2120B	07/09/2013 1345	C&R	
Odor	1.0	unit		1.0	SM2150B	07/09/2013 1345	C&R	
Corrosivity, Langelier Index	-3.12	LSI			SM2330B	07/26/2013	KL	
Hardness as CaCO3	19	mg/L		5.0	SM2340C	07/22/2013 1530	CW	
Calcium, Titrimetric	3.1	mg/L		3.0	SM3500Ca-D	07/18/2013 1300	CW	
Magnesium, Calculation	2.7	mg/L		2.0	SM3500Mg-E	07/26/2013	KL	
Chlorine Residual, Free	<0.10	mg/L		0.10	SM4500-Cl G	07/09/2013 1245	C&R	
pH, Lab*	7.0	unit		0.1	SM4500-H+B	07/09/2013 0905	CRL	*past hold
Nitrogen, Nitrite as N	<0.050	mg/L		0.050	SM4500-NO2B	07/10/2013 1420	LV	

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Sierra Foothill Laboratory, Inc.

255 Scottsville Blvd
PO Box 1268
Jackson, CA 95642

Phone 209/223-2800
Fax 209/223-2747
Email info@sierralab.com

Results for Project 227013

774525 **Annual RW Res 1 WTP** Liquid Taken: 07/09/2013 1300 By: TW Rec:07/09/2013

Annual Raw Water 3 sites: RW Res A WTP, RW Res 1 WTP, RW EDH WTP

Parameter	Result	Unit	Flag	RL	Method	Analyzed	By	CAS
Cyanide, Total	ND	mg/L		0.0050	SM4500CN-E	07/15/2013	BSK	
Foaming Agents (MBAS)	<0.10	mg/L		0.10	SM5540C	07/10/2013 1200	RK	

Nitrate analyzed within 28 day hold from H2SO4 preserved aliquot.

774526 **Annual Finished Res 1 WTP** Liquid Taken: 07/09/2013 1335 By: TW Rec:07/09/2013

Annual Finished at 3 sites: Finished Res A WTP, Finished Res 1 WTP, Finished EDH WTP

Do not include bottles for MTBE or Thiobencarb per client instrucs

Parameter	Result	Unit	Flag	RL	Method	Analyzed	By	CAS
Cation/Anion Balance	0.209 / 0.174	meq/meq				08/05/2013 1020	ANH	
Asbestos	<0.2	MFL		0.2	EPA100.2	07/11/2013 1305	FOR	
Specific Conductance, Field	67	umhos/cm		1.0	EPA120.1	07/09/2013 1335	TW	by Client
Specific Conductance	45.6	umhos/cm		1.00	EPA120.1/SM2510B	07/09/2013 1055	CRL	
Solids, Total Dissolved	32	mg/L		10	EPA160.1/SM2540C	07/13/2013 1450	DS	
Turbidity	<0.10	NTU		0.10	EPA180.1/SM2130B	07/09/2013 1600	C&R	
Aluminum, ICP/MS	<10	ug/L		50	EPA200.8	07/11/2013	MCC	
Copper by ICP/MS	0.73	ug/L		0.5	EPA200.8	07/11/2013	MCC	
Iron, ICP/MS	<10	ug/L		20	EPA200.8	07/11/2013	MCC	
Manganese, ICP/MS	<10	ug/L		20	EPA200.8	07/11/2013	MCC	
Silver, ICP/MS	<0.12	ug/L		0.19	EPA200.8	07/11/2013	MCC	
Sodium, ICP/MS	4.8	mg/L		0.1	EPA200.8	07/11/2013	MCC	
Zinc, ICP/MS	2.2	ug/L	J	5.0	EPA200.8	07/11/2013	MCC	
Chloride	5.3	mg/L		0.50	EPA300.0/SM4110B	07/17/2013 1401	LV	
Sulfate	1.2	mg/L		0.50	EPA300.0/SM4110B	07/17/2013 1401	LV	
Color, Apparent	<3	unit		3	SM2120B	07/09/2013 1345	C&R	
Odor	1.0	unit		1.0	SM2150B	07/09/2013 1345	C&R	
Hardness as CaCO3	15	mg/L		5.0	SM2340C	07/22/2013 1530	CW	
Temperature, Field	21.3	degree C		0.5	SM2550B	07/09/2013 1335	TW	by Client
Calcium, Titrimetric	<3.0	mg/L		3.0	SM3500Ca-D	07/18/2013 1300	CW	
Magnesium, Calculation	<2.0	mg/L		2.0	SM3500Mg-E	07/26/2013	KL	
pH, Field	7.5	unit		0.1	SM4500-H+B	07/09/2013 1335	TW	by Client
pH, Lab*	7.4	unit		0.1	SM4500-H+B	07/09/2013 0905	CRL	*past hold
Chlorine Residual,Free, field	.77	mg/L		0.10	SM4500Cl G	07/09/2013 1335	TW	by Client
Foaming Agents (MBAS)	<0.10	mg/L		0.10	SM5540C	07/10/2013 1200	RK	

Sample Preparation Steps for Project 227013

Continued

APPENDIX C

Seepage Analysis Technical Memorandum

Memo

To: Jake Eymann

From: Enrico Rufini, Alberto Pujol

CC: Bill Rettberg, Dan Wanket

Date: January 31, 2014

Re: El Dorado Forebay Dam Modifications
Order-of-Magnitude Estimate of Seepage Flows from El Dorado Forebay Dam in the Current and Future Configurations

---

Purpose

As part of the CEQA environmental review process, the State Water Resources Control Board has requested information regarding the magnitude of water that currently seeps from El Dorado Forebay Dam (dam) and the water that will seep from the dam after the dam is raised and the existing seepage pump-back station is replaced. This memo presents our assessment of the requested seepage amounts.

Approach

We assessed three components of seepage flows emanating from the dam site:

(1) Seepage that currently daylights at the downstream toe of the dam. This seepage is measured at two weirs (numbered 17D and 17F) at the dam toe and is routed to the existing seepage pump-back facility, from where it is returned to EID's Main Ditch. Weir locations are shown on **Figure 1**.

(2) Flows that were first encountered in the dam footprint during the original (1922) construction of the dam and were collected in a system of subsurface drains installed in the dam foundation. The subsurface drains discharge to a single clay tile pipe that extends downstream of the dam and daylights downstream of the seepage pump-back facility. The flow from this pipe is measured at a weir (numbered 17E) at the discharge point shown on **Figure 1**.

(3) Seepage through the subsurface soil and rock that does not immediately daylight at the downstream toe of the dam and is not collected by the seepage pump-back facility. Some of this seepage flow daylights downstream of the dam. It is not captured nor routinely measured.

We assessed the seepage flows for three reservoir water levels:

(1) Existing dam configuration – period of EID weir records prior to reservoir operating level restriction (1997 to June 2009) – estimated average reservoir level at El. 3,788.0 feet NGVD datum.

(2) Existing dam configuration – period of EID weir records after reservoir operating level restriction (June 2009 to 2013) – estimated average reservoir level at El. 3,786.3 feet NGVD datum.

(3) Future dam configuration – dam raised, and estimated average operating reservoir level at El. 3,795.0 feet NGVD datum.

We used EID's weir measurement records to evaluate seepage flows that daylight at the toe of the dam and the flows collected in the clay tile pipe, for both the pre-restriction and post-restriction reservoir water levels. We then extrapolated these seepage measurements to estimate the corresponding seepage values for the higher reservoir level associated with the dam raise.

We used the pump test data and other subsurface information collected during the dam foundation exploration programs to assess the seepage through the subsurface soil and rock that does not immediately daylight at the downstream toe of the dam and is not collected by the seepage pump-back facility.

Evaluation of Seepage Flows with Current Reservoir Configuration

Weir Flows

Table 1 below summarizes the average flows in gallons per minute (gpm) at Weir 17D (which collects seepage from the right side of the dam at the downstream toe), Weir 17F (which collects seepage from the left side of the dam), and Weir 17E (which measures the flow from the clay tile pipe) before and after the reservoir level restriction. **Attachment 1** provides supporting weir data plots.

Table 1 shows that the seepage measured at the downstream toe of the current dam (the sum of weir flows 17D and 17F) increases with a higher reservoir level. This is to be expected, since a higher reservoir level results in a larger area of reservoir submergence and increases the hydraulic gradient applied to the reservoir floor and dam foundation.

TABLE 1 – AVERAGE WEIR SEEPAGE RATES AT EL DORADO FOREBAY DAM (GPM)

WEIR	BEFORE RESTRICTION (Jan 1997 to May 2009) Max Normal RWSE 3,790.6 feet NGVD datum	AFTER RESTRICTION (June 2009 to Dec 2013) Max Normal RWSE 3,787.6 feet NGVD datum	CHANGE IN SEEPAGE DUE TO RESTRICTION
17D Right Side of Dam	83.9	57.8	26.1
17F Left Side of Dam	5.7	5.2	0.4
Subtotal	90	63	27
17E Clay Tile Pipe	11.8	10.3	1.5
Total	**102**	**73**	**29**

NOTES: RSWE = Reservoir Water Surface Elevation

Based on the data tabulated above, the seepage daylighting at the downstream toe of the dam is estimated to be on the order of 90 gpm before the reservoir level restriction. This flow decreased to an average of about 63 gpm under the reservoir level restriction, indicating a significant influence of the reservoir level on the magnitude of seepage flows.

The flow collected in the clay tile pipe was estimated to be on the order of 12 gpm before the reservoir level restriction, decreasing to about 10 gpm under the reservoir level restriction.

Evaluation of Foundation Seepage with Current Reservoir Configuration

We estimated the order of magnitude of seepage through the subsurface soil and rock based on the geotechnical data developed during our 2011 foundation exploration for the dam modification and using the approximate Darcy formula:

$Q = K \times i \times A$ where

- Q: estimated seepage
- K: hydraulic conductivity
- i: hydraulic gradient
- A: cross-sectional area of flow.

An estimate of the hydraulic conductivity for the intensely fractured and weathered rock at the downstream toe of the dam was developed based on pump tests performed during our 2011 foundation exploration. An analysis of the pump test data is included in **Attachment 2**. The results of the pump tests suggest a hydraulic conductivity on the order of 10^{-3} cm/sec. The average hydraulic gradient from the reservoir to the toe of the dam is on the order of 0.2. An estimate of the cross-section of flow below the dam was developed based on the results of the geotechnical exploration and seismic refraction survey conducted in 2011 (GEI, 2011). A cross-sectional area of 15,000 square feet is estimated. Based on these parameters

the order-of-magnitude seepage flow occurring through subsurface materials is estimated to be on the order of 50 gpm.

Estimation of Seepage Flows with Raised Reservoir Configuration

The dam modification is intended to increase the stability of the downstream slope and raise the dam crest, but will not create a seepage cutoff. Therefore, it is expected that the seepage that reports to the downstream toe under current conditions will continue to report to the downstream toe of the modified dam. As indicated by the available data and as discussed above, the amount of seepage is expected to increase due to the higher hydraulic gradient and larger area of reservoir submergence resulting from the raised reservoir level.

The curves shown on **Figure 2** plot the average seepage flows at the reservoir levels for which seepage measurements are available and extrapolate the seepage flows up to the anticipated maximum future reservoir level. For an estimated future average reservoir operating level at El. 3,795 NGVD, the estimated seepage reporting to the weirs at the downstream toe of the dam would be on the order of 220 gpm, and the estimated clay tile pipe flow would be on the order of 20 gpm.

The magnitude of seepage through the subsurface soil and rock that does not immediately daylight at the downstream toe of the dam is expected to increase modestly with the dam raise. The increase in reservoir level is estimated to increase the hydraulic gradient through the dam foundation by up to about 15 percent, thus resulting in a proportional 15 percent increase in subsurface seepage, from an order of magnitude of 50 gpm to about 60 gpm.

In summary, the order-of-magnitude average seepage flows for the current and raised reservoir elevations are tabulated below.

TABLE 2 – ESTIMATED ORDER-OF-MAGNITUDE SEEPAGE FOR CURRENT AND RAISED DAM (GPM)

Order-of-Magnitude Seepage Flows	Average Reservoir Elevations	
	Current Reservoir (El. 3,786.3 ft)	Future Raised Reservoir (El. 3,795 ft)
Seepage Daylighting at the Base of the Dam at Weirs 17D and 17F	63	220
17E Clay Pipe Flow	10	20
Subsurface Seepage	50	60
Total Seepage	123	300

Under the current conditions (restricted reservoir), the existing seepage pump-back facility returns the seepage collected at the weirs at the toe of the dam to the Main Ditch (estimated to be on the order of 63 gpm from the above table). The clay tile pipe flow and subsurface seepage flow continue downstream toward Long Canyon Creek (estimated to be a combined 60 gpm from the above table).

For the raised dam, the reconstructed seepage pump-back facility will return the seepage collected at the weirs at the toe of the dam, including the flow of the clay tile pipe, to the Main Ditch. The flow of seepage through the subsurface soil and rock that does not immediately daylight at the base of the dam will continue downstream toward Long Canyon Creek. From the above table, the order-of-magnitude flow continuing downstream is 60 gpm.

Based on the weir data and order-of-magnitude seepage estimates determined in this evaluation, we conclude that the proposed dam modifications will not have an effect on the magnitude of the water flows to Long Canyon Creek.

REFERENCES

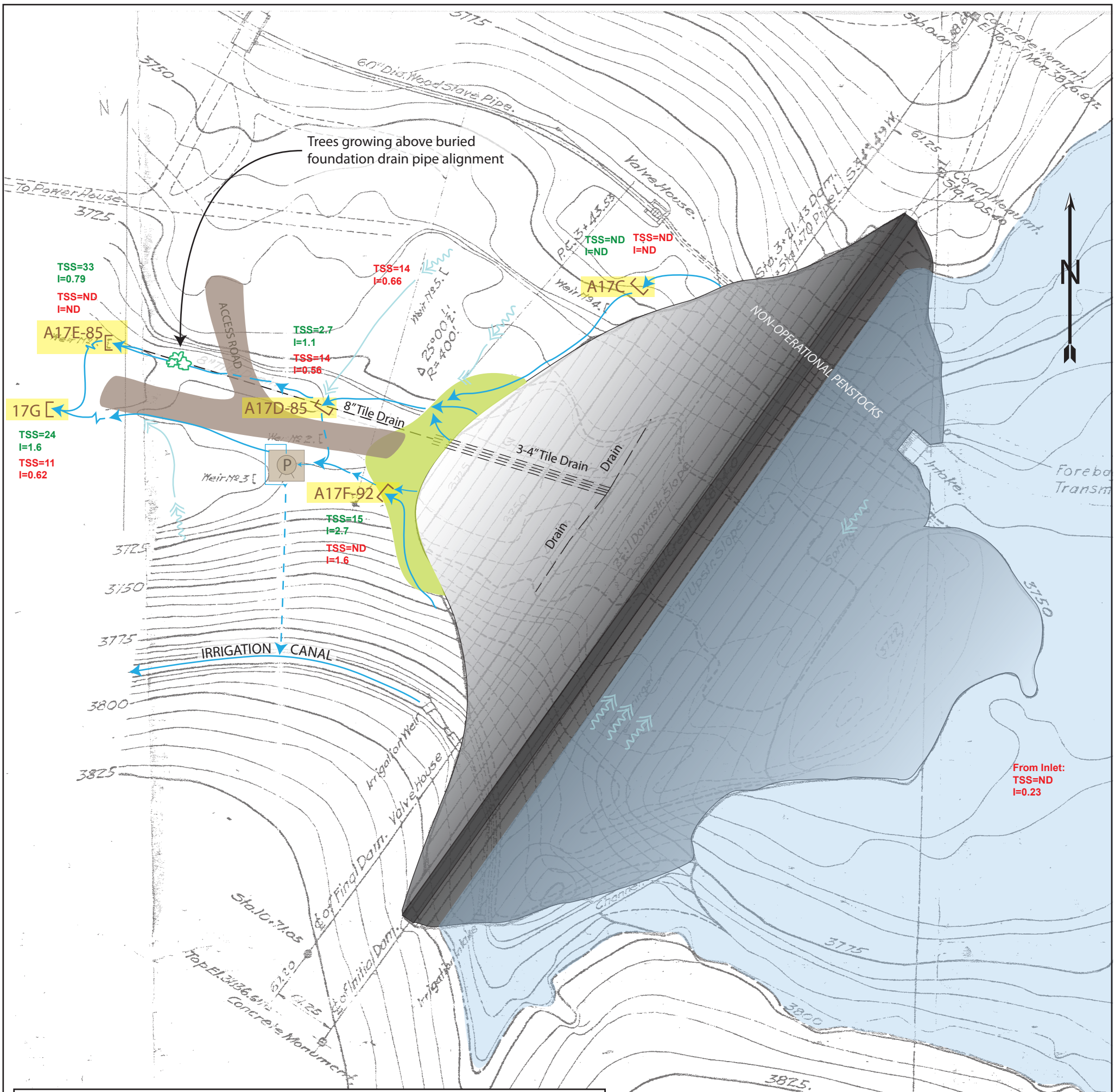
1. EID, *Excel Spreadsheet with Historic Instrumentation Database for El Dorado Forebay Dam*.
2. GEI Consultants, Inc., "*Geotechnical Data Report – El Dorado Forebay Dam Upgrades, Pollock Pines, CA*", August 26, 2011

FIGURES

Figure 1	Site Plan with Weir Locations.
Figure 2	El Dorado Forebay Dam – Order-of-Magnitude Seepage Versus Reservoir Elevation

ATTACHMENTS

Attachment 1	El Dorado Forebay Dam Plots – Weirs Flow Versus Time
Attachment 2	GEI Memo – "Summary of Well Pumping Data, El Dorado Forebay Dam, dated August 25, 2011



LEGEND

- Water Flow (surface)
- Water Flow (underground)
- Spring
- Springwater Flow
- 17G — Weir Box
- Dam Embankment Footprint
- Saturated Area
- Forebay Dam Reservoir
- Field-Observed Structure/Feature
- TSS=ND I=ND — August 2007 Test Result (mg/l)
- TSS=ND I=ND — October 2007 Test Result (mg/l)
- (ND= Not Detectable)
- P — Pump

Base map source:
Topographic Map of Forebay Reservoir Based on Final Topography After Dam Construction, 22 Jan. 1924 updated 22 Oct. 1968.

1" = 100'
0 50 100

El Dorado Irrigation District **Placerville, California**	GEI Consultants Bookman-Edmonston Division	**SITE PLAN WITH** WEIR LOCATIONS	**Forebay Dam** **Pollock Pines, California**
February 2008		Project 064320-17	FIGURE 1

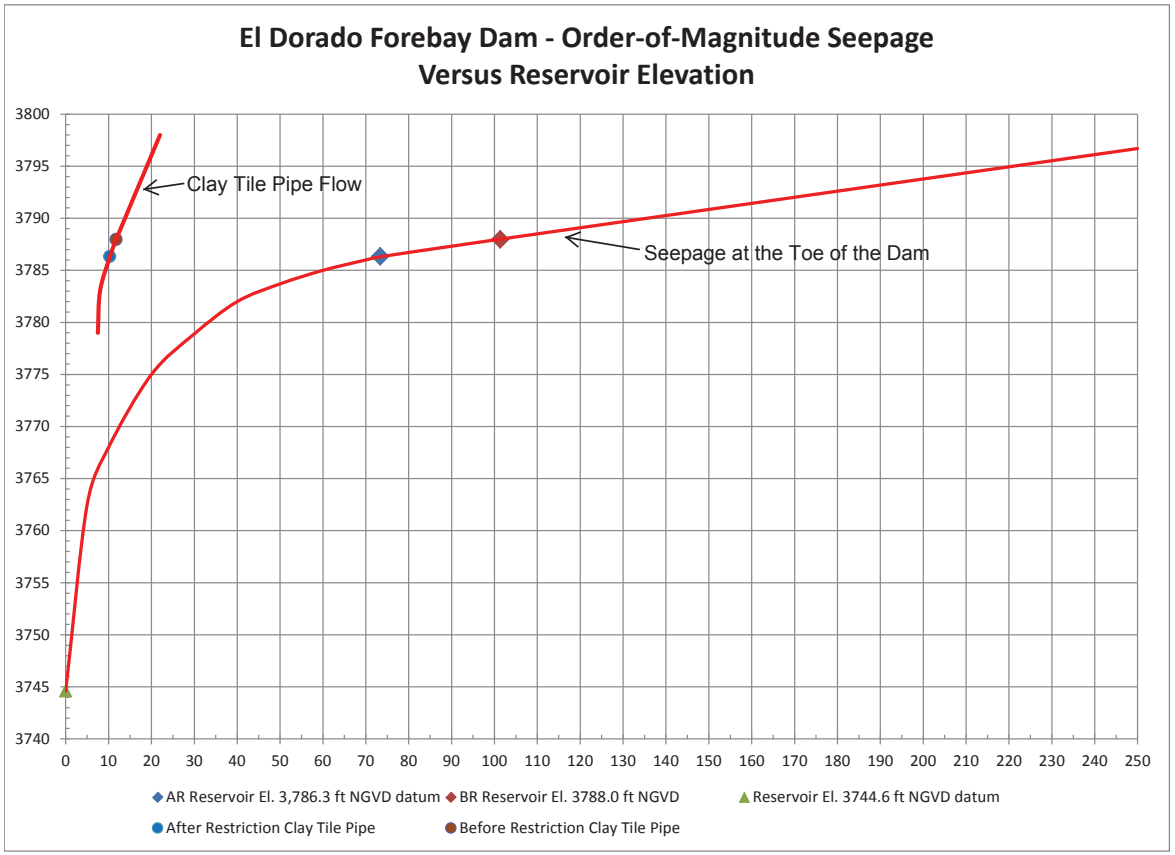
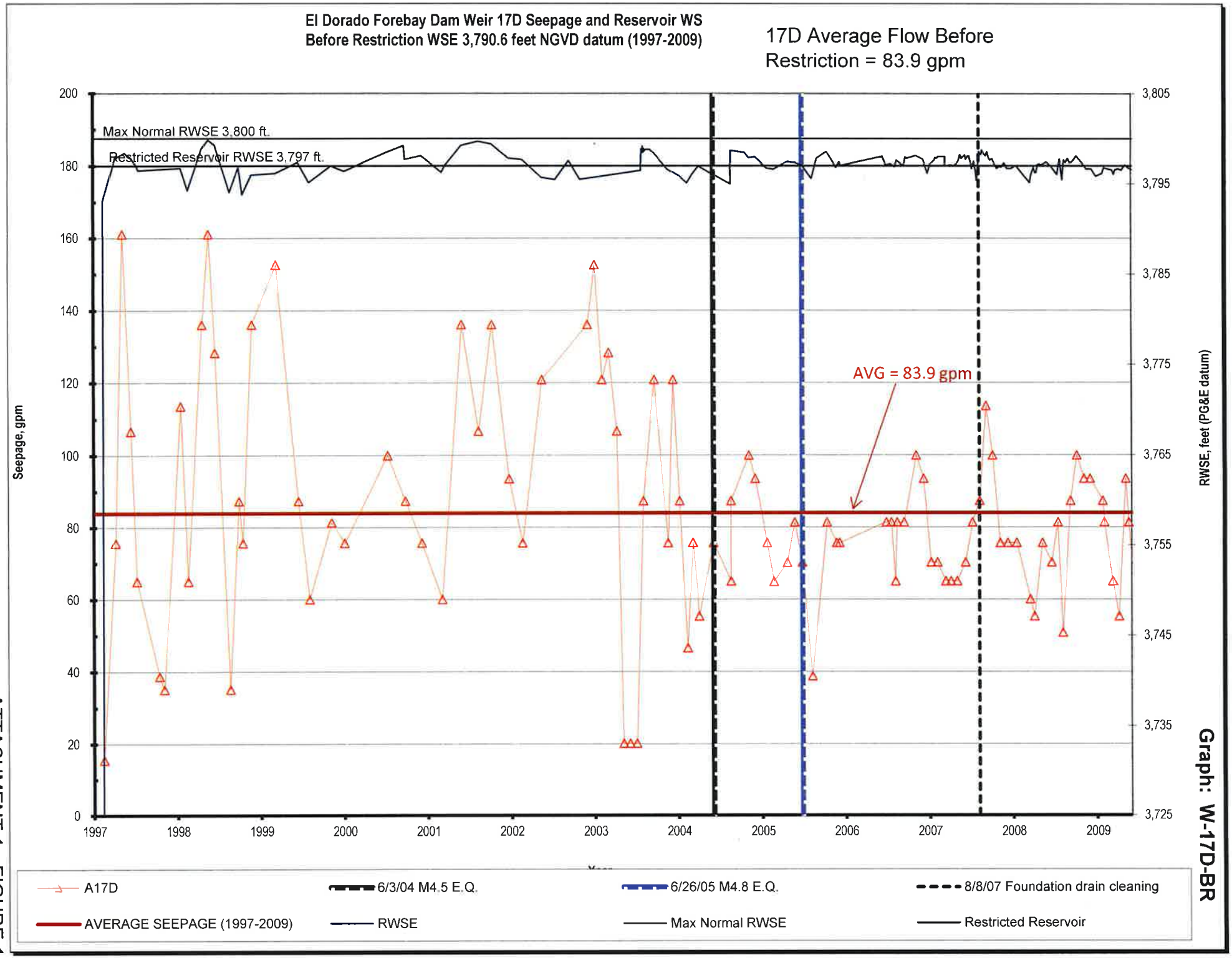

El Dorado Forebay Dam - Order-of-Magnitude Seepage Versus Reservoir Elevation
3800
3795
3790
3785
3780
3775
3770
3765
3760
3755
3750
3745
3740
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
Clay Tile Pipe Flow
Seepage at the Toe of the Dam
AR Reservoir El. 3,786.3 ft NGVD datum
BR Reservoir El. 3788.0 ft NGVD
Reservoir El. 3744.6 ft NGVD datum
After Restriction Clay Tile Pipe
Before Restriction Clay Tile Pipe

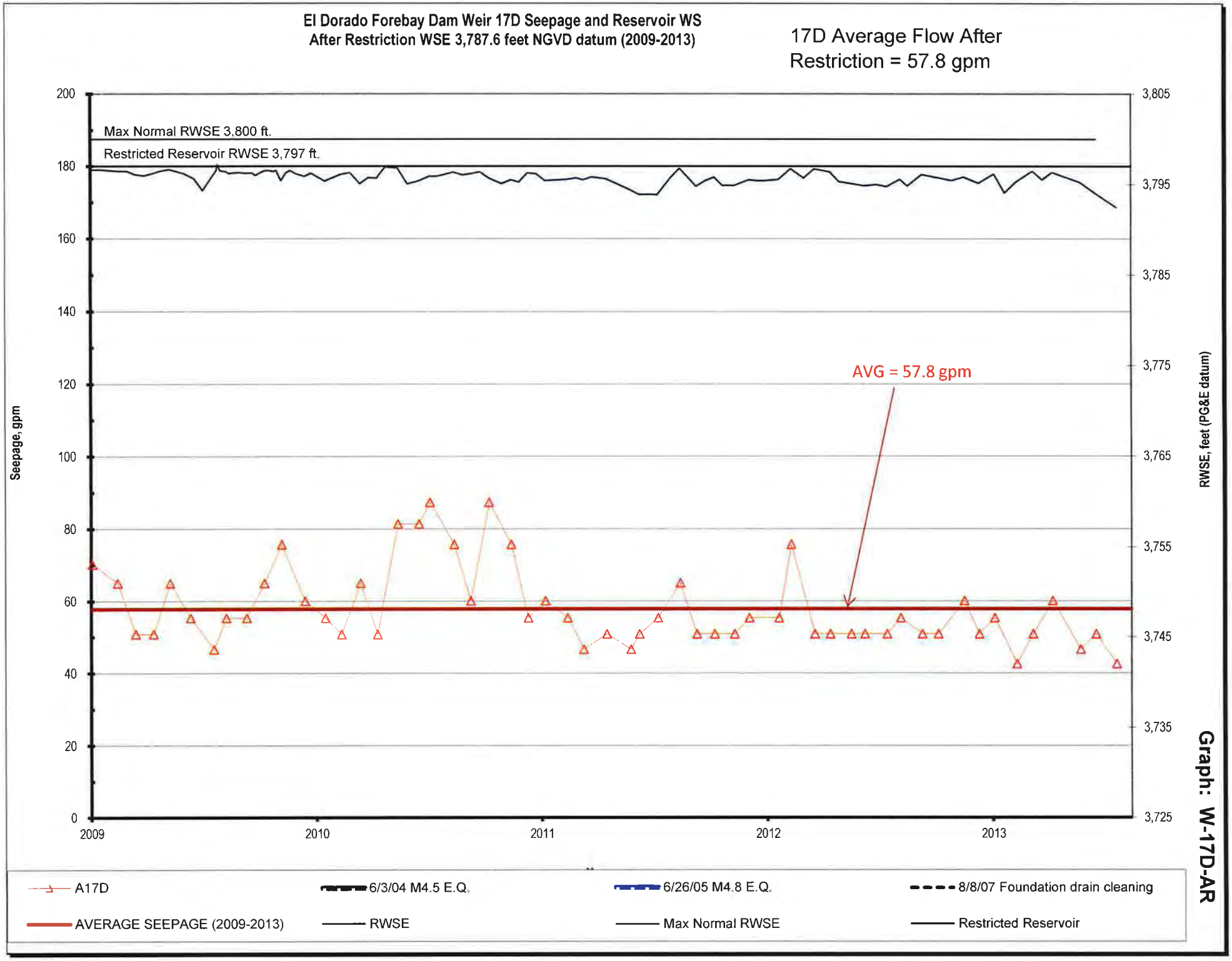
FIGURE 2

ATTACHMENT 1:

- Figure 1: Graph W-17D-BR – El Dorado Forebay Dam Weir A17D Seepage and Reservoir WS Before Restriction WSE 3,790.6 feet NGVD datum (1997-2009)
- Figure 2: Graph W-17D-AR – El Dorado Forebay Dam Weir A17D Seepage and Reservoir WS After Restriction WSE 3,787.6 feet NGVD datum (2009-2013)
- Figure 3: Graph W-17E-BR – El Dorado Forebay Dam Weir A17E Seepage and Reservoir WS Before Restriction WSE 3,790.6 feet NGVD datum (1997-2009)
- Figure 4: Graph W-17E-AR – El Dorado Forebay Dam Weir A17E Seepage and Reservoir WS After Restriction WSE 3,787.6 feet NGVD datum (2009-2013)
- Figure 5: Graph W-17F-BR – El Dorado Forebay Dam Weir A17F Seepage and Reservoir WS Before Restriction WSE 3,790.6 feet NGVD datum (1997-2009)
- Figure 6: Graph W-17F-AR – El Dorado Forebay Dam Weir A17F Seepage and Reservoir WS After Restriction WSE 3,787.6 feet NGVD datum (2009-2013)

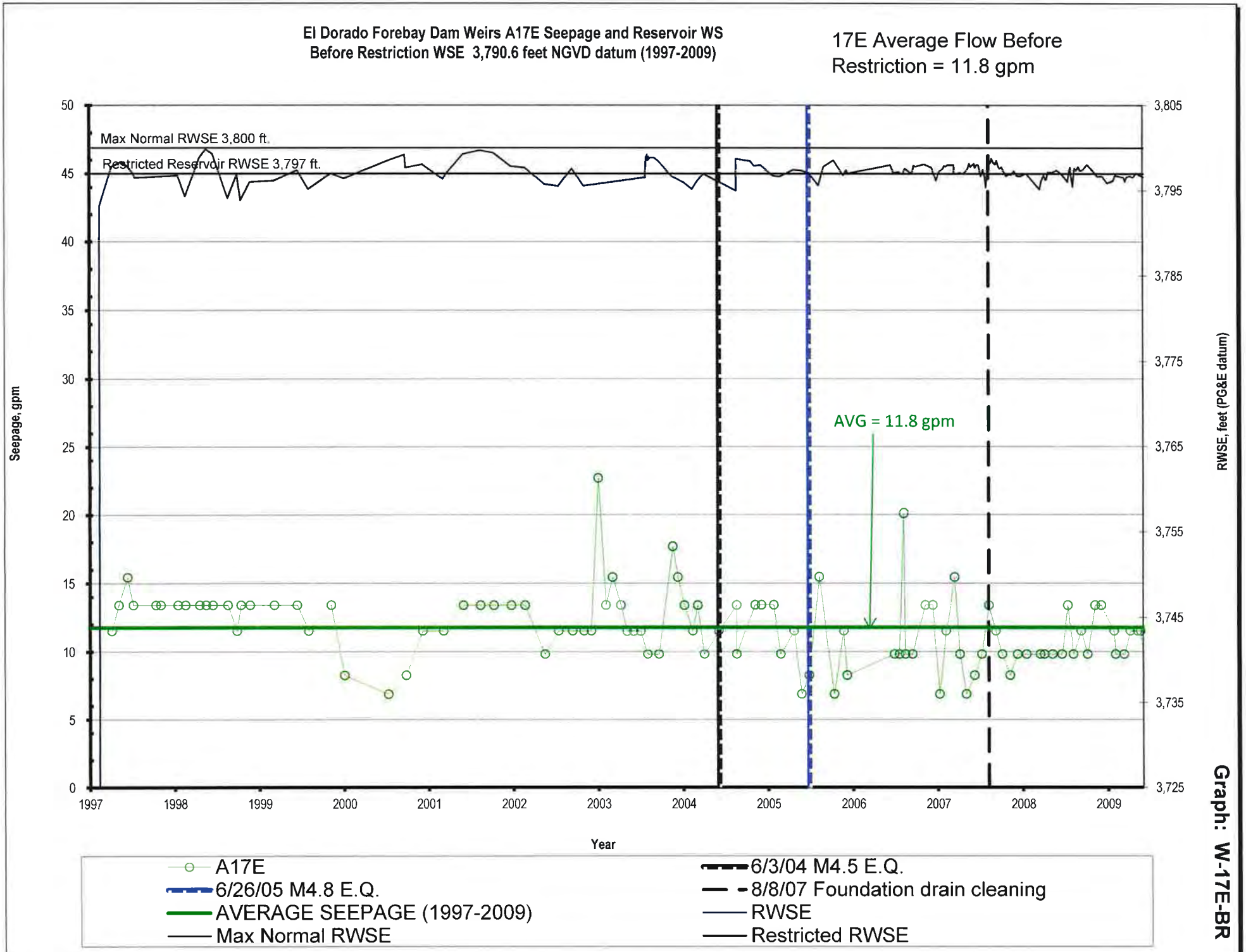


ATTACHMENT 1 - FIGURE 1



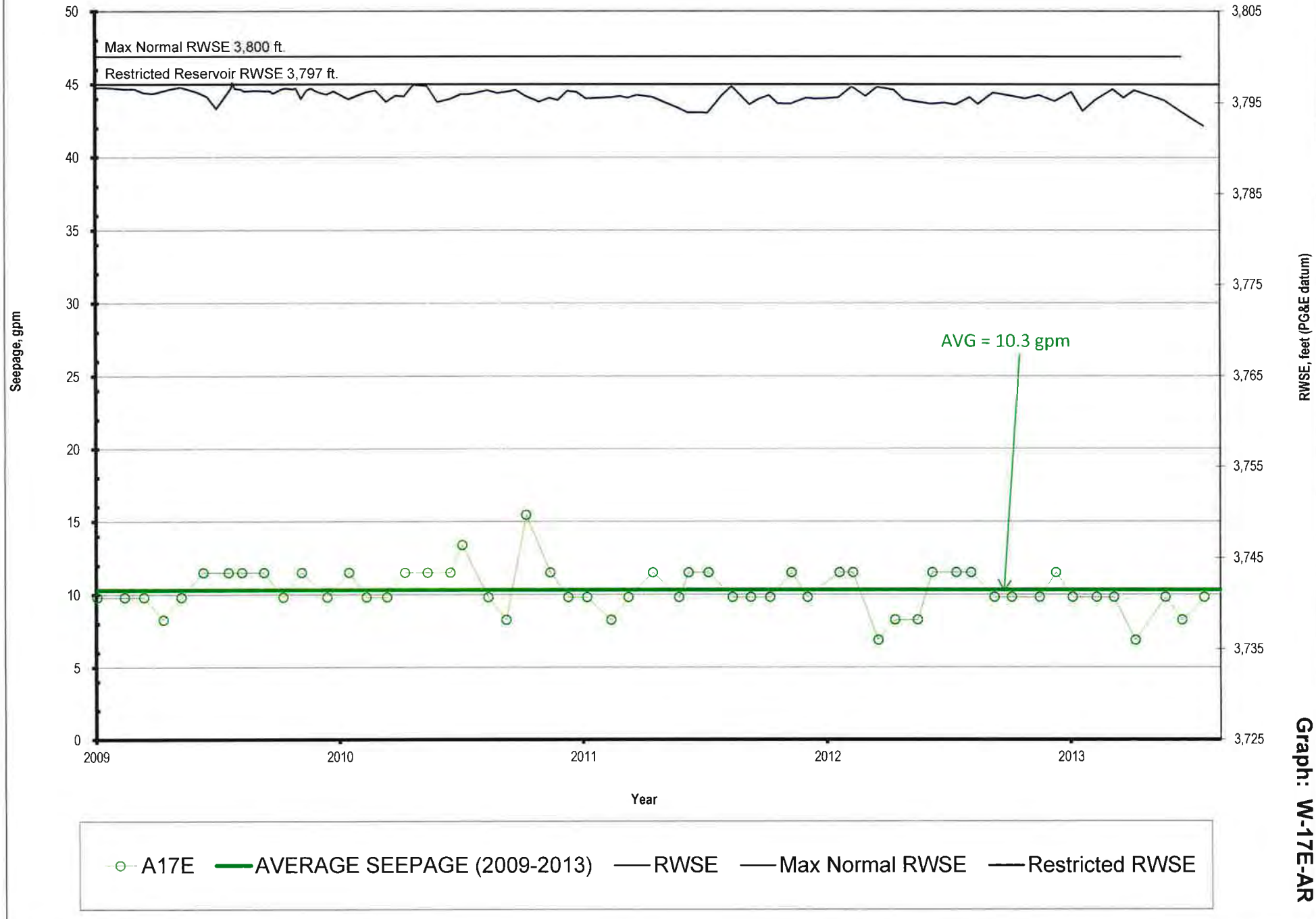
ATTACHMENT 1 - FIGURE 2

ATTACHMENT 1 - FIGURE 3



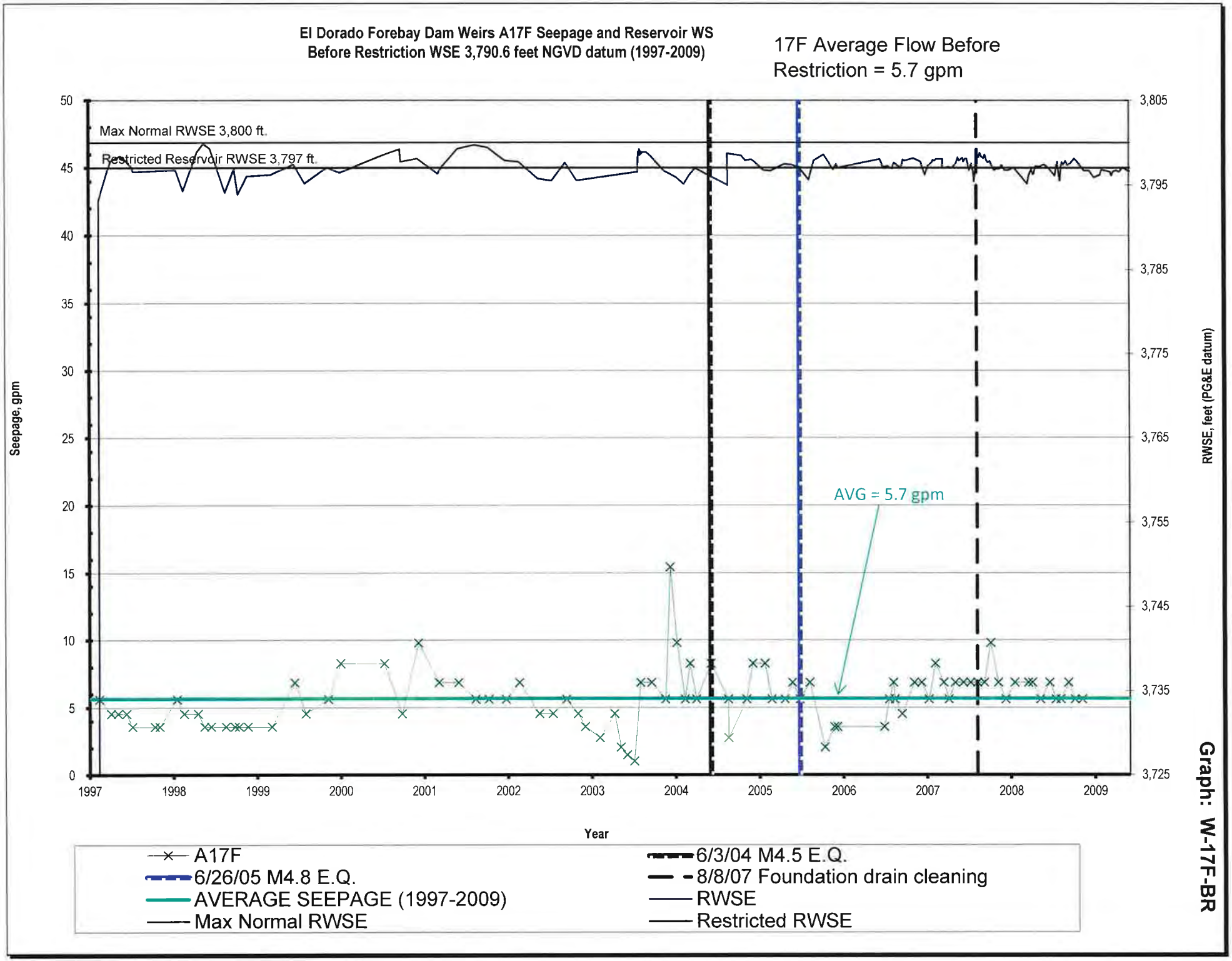
El Dorado Forebay Dam Weirs A17E Seepage and Reservoir WS
After Restriction WSE 3,787.6 feet NGVD datum (2009-2013)

17E Average Flow After
Restriction = 10.3 gpm



Graph: W-17E-AR

ATTACHMENT 1 - FIGURE 4



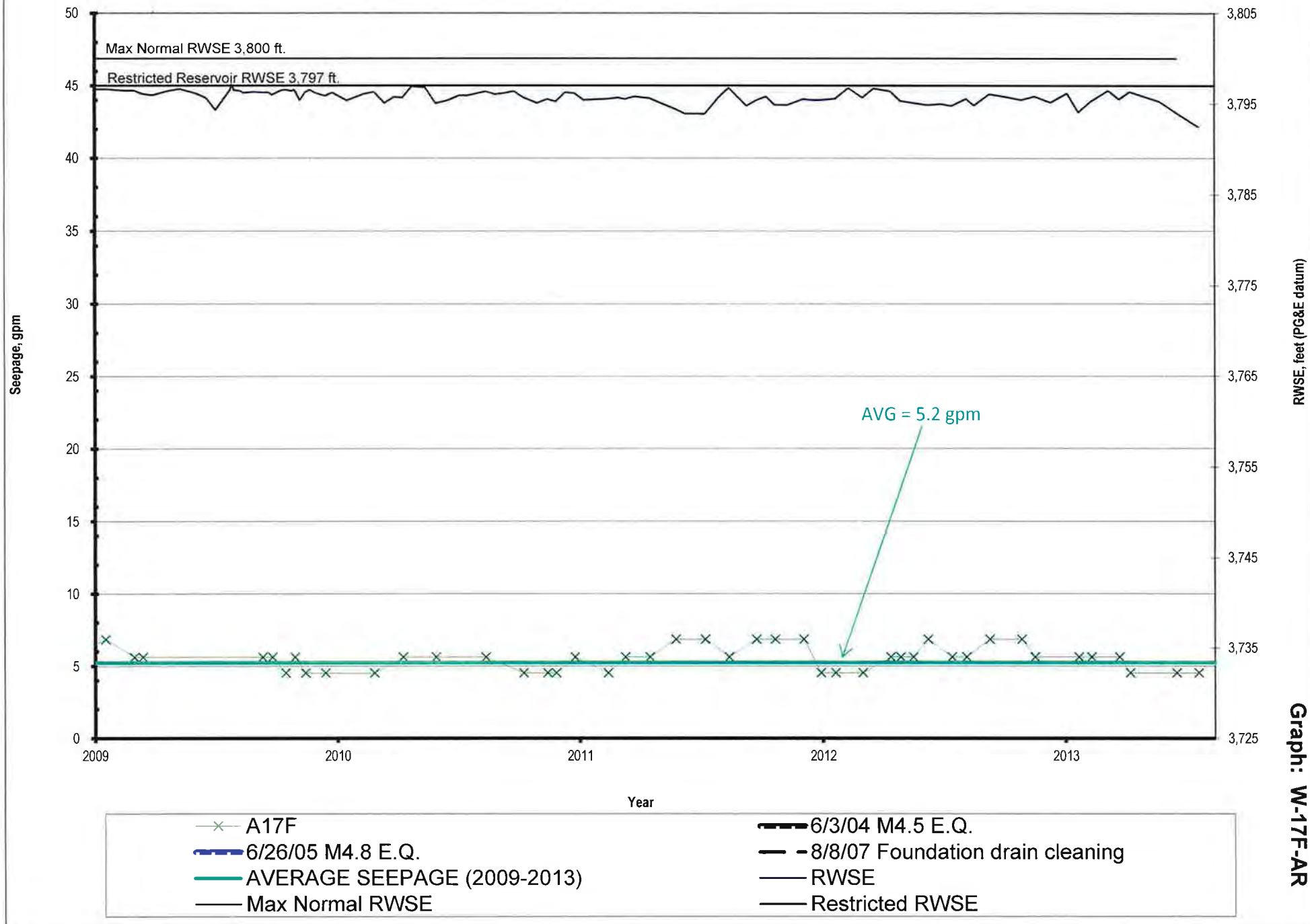
Graph: W-17F-BR

ATTACHMENT 1 - FIGURE 5

ATTACHMENT 1 - FIGURE 6

El Dorado Forebay Dam Weirs A17F Seepage and Reservoir WS
After Restriction WSE 3,787.6 feet NGVD datum (2009-2013)

17F Average Flow After
Restriction = 5.2 gpm



Graph: W-17F-AR

Memo

To: Alberto Pujol

From: Matt Powers

CC: Enrico Rufini

Date: August 25, 2011

Re: Summary of Well Pumping Test Data, El Dorado Forebay Dam

This memo provides a summary of the preliminary analysis of the pump test data performed by GEI for the El Dorado Forebay Dam Project.

Background

On May 23 through May 25th, 2011, two open standpipe piezometers (B-303 and B-305) were installed by Taber Consultants of West Sacramento, California and observed by GEI representatives. Piezometers B-303 and B-305 are located beyond the downstream toe of the existing dam along an access road, approximately 90-feet and 25-feet from the toe of the dam, respectively. The locations of these piezometers are shown on **Figure 1**. Both piezometers were screened over the entire length using 4-inch slotted PVC pipe. The annular space between the approximate 6-inch diameter hole and the PVC pipe was backfilled with filter pack (#3 Monterey sand) using tremmie methods.

Both piezometers were developed and pump-tested in accordance with contract specifications by Taber Consultants on May 26th and 27th, 2011, and observed by GEI representatives. The development and pump test procedure followed for B-303 and B-305 was generally as follows:

- Each piezometer was developed through several intervals of surging over the entire screened length of the casing. Material from the foundation or filter pack entering the piezometer during development was removed by bailing. Surge and bail cycles continued until no additional material from the foundation or filter pack was present within the casing. Surging and bailing was followed by pumping of the piezometer until water exiting the well flowed clear.
- Each piezometer was allowed to rebound to original static water level before the start of the pumping test.
- During the pumping tests, the pump flow rate was maintained at 1 gpm for B-303 and 6.1 gpm for B-305.
- During the pumping test of each piezometer (pumped well), two adjacent piezometers were monitored as observation wells for drawdown and recovery. During the pump test for B-303, piezometers B-305 and an existing piezometer, P-4 (originally drilled as B-204; see Figure 1), were monitored as observation wells. During the pump test for B-305, piezometers B-303 and P-4 were monitored as observation wells.

- Water level measurements were electronically recorded using a pressure transducer in both the pumped well and the observation wells once per minute during the 2-hour pumping period. Likewise, water level measurements were electronically recorded in both the pumped well and the observation wells once per minute during an approximate 2-hour recovery period, after the pumping ceased.

Transmissivity Calculations

Calculations of transmissivity for B-303 and B-305 were performed using Theis's recovery method, utilizing the recovery data from the pumped wells and observation wells. The governing equation for this method is:

$$T = \left(\frac{2.3 \times Q}{4 \times \pi \times s'} \right) \times \log \frac{t}{t'}$$

Where:

T	=	transmissivity (ft^2/minute)
Q	=	pumping rate (ft^3/minute)
s'	=	residual drawdown (ft)
t	=	time since the start of pumping (minute)
t'	=	time since the cessation of pumping (minute)

The analytical methodology consists of plotting residual drawdown versus t/t', with residual drawdown on an arithmetic Y axis, and t/t' on a logarithmic X axis. If two different residual drawdown values are selected such that they span one log cycle (i.e. the change in drawdown between t/t' at 10 and 100, or 100 and 1,000), then the equation simplifies to the following:

$$T = \frac{2.3 \times Q}{4 \times \pi \times \Delta s'}$$

An alternate method for calculating transmissivity includes the Jacob-Cooper method which employs the drawdown data recorded in the observation wells. The governing equation for this method is:

$$T = \left(\frac{35 \times Q}{s'} \right)$$

Where:

T	=	transmissivity (ft^2/minute)
Q	=	pumping rate (ft^3/minute)
s'	=	residual drawdown (ft)

The analytical methodology is similar to that of the Theis method and assumes a symmetrical drawdown cone within the aquifer. The Jacob-Cooper method was used for the analysis where measurable drawdown occurred in the observation wells. During pump testing of B-305, drawdown and recovery were observed in observation well P-4 only, and this data was used in analysis. During pump testing of B-303, measurable drawdown was not observed in either observation well.

Values of transmissivity estimated using both the Theis and Jacob-Cooper methods range between 29 ft^2/day and 262 ft^2/day. A value of 300 ft^2/day is suggested for use in dewatering calculations.

Estimated Hydraulic Conductivity

Hydraulic Conductivity was estimated by dividing the calculated transmissivity by the approximate thickness of aquifer screened within each piezometer, interpreted from the boring and installation details of piezometers B-303, B-305, and P-4. Estimated values of hydraulic conductivity range from approximately 4×10^{-4} cm/sec to 9×10^{-3} cm/sec.

Conclusions and Discussion

A summary of transmissivity and permeability values estimated from pumping test analyses are presented in **Table 1** along with the parameters used in the calculations. Both the Thies and Jacob-Cooper analysis methods results result in similar values for transmissivity and hydraulic conductivity and results are within an acceptable range of variability. However, values for transmissivity and hydraulic conductivity estimated using the Jacob-Cooper method may less reliable that those estimated using the Theis method as the actual drawdown cone within the aquifer may not be symmetrical due to influence from the water surface in the adjacent reservoir. Graphical plots of the pump test data as well as drawdown and recovery data analyses are provided in **Attachment A**.

Figures:

Figure 1 – Geologic Plan and Exploration Locations

Tables:

Table 1 – Summary of Transmissivity and Hydraulic Conductivity Values

Attachments:

Attachment A – Pump Test Data Plots and Drawdown and Recovery Data Analyses

EXISTING ACCESS ROAD
EXISTING POWER INTAKE
EXISTING CREST EL. 3794.6
EXISTING IRRIGATION INLET
RAISED CREST EL. 3804.6
PROPOSED RAISED SPILLWAY W/ WALLS
UNUSED PENSTOCK VAULT (EXISTING)
EXISTING IRRIGATION CANAL VALVE HOUSE
EXIST. CONC. STRUCTURE
ROCK OUTCROP (TYP)
TOE OF PROPOSED DAM RAISE
TOE OF EXISTING FILL
15" PVC
EXISTING ~200 FT PERFORATED TILE LATERAL DRAIN 4" DIA.
PROPOSED VALVE HOUSE
PROPOSED IRRIGATION CANAL FILL
2.5H:1V
EXISTING 3 - 4" TILE DRAINS
OPEN TUB
SPILLWAY CHANNEL
EXISTING SPILLWAY
EXISTING VALVE HOUSE
BERM EL. 3725
EXISTING IRRIGATION CANAL
12" CMP
GROUNDSURFACE PROJECTION OF FOUNDATION DRAIN, TRANSITION FROM ONE SOLID PIPE TO THREE PERFORATED PIPES
MEASURING STATION (NON OPERATIONAL)
EXISTING 72" STEEL CULVERT OUTLET
EXISTING WALKWAY
EXIST. SPILLWAY 72" STEEL CULVERT OUTLET FL: 3775.03'
EXISTING IRRIGATION CANAL
TEMPORARILY DEVELORED AS MONITORING WELLS
10" CC PIPE
PROPOSED IMPROVED SPILLWAY CHUTE
10" IRON PIPE CULVERT
EXISTING 8" TILE DRAIN
EXISTING PUMP HOUSE
12" CULVERT
EXISTING DITCHES
EXISTING ACCESS ROAD
8" PVC CULVERT
Location of Piezometers

NOTES
1. VERTICAL DATUM = NGVD 29.
2. STATE PLANE ZONE II, NAD 83.

LEGEND
- B-3 ● PREVIOUS BORINGS BY PG&E (1967)
- B97-3 ● PREVIOUS BORINGS BY PATZKOWSKI (1997)
- B104 ● PREVIOUS BORINGS BY GEI (2004)
- B204 ● PREVIOUS BORINGS BY GEI (2006)
- TP-4 ⊠ PREVIOUS TEST PITS BY GEI (2006)
- TP-22 ▭ 2011 TEST PITS
- B310 △ 2011 BORINGS
- SEISMIC REFRACTION LINES
- CP-300 ◎ SURVEY CONTROL POINT
- POWER POLE
- 17-D SEEPAGE WEIR
- EXISTING CULVERT
- 53 STRIKE AND DIP OF FOLIATION
- 70 STRIKE AND DIP OF PRIMARY JOINT SET

0 30 60
SCALE, FEET

ATTACHMENT 2
FIGURE 1

FIGURE 9 07-22-11 PYM

GEI Consultants
180 Grand Ave, Suite 1410
Oakland, CA 94612
510-350-2900

EL DORADO IRRIGATION DISTRICT
2890 Mosquito Road
Placerville, California

GEI Project 06432-0

El Dorado Forebay Dam Upgrades
Pollock Pines, California

GEOLOGIC PLAN AND EXPLORATION LOCATIONS

TABLE 1

El Dorado Forebay Dam Improvement Project

Summary of Estimated Transmissivity and Hydraulic Conductivity Values

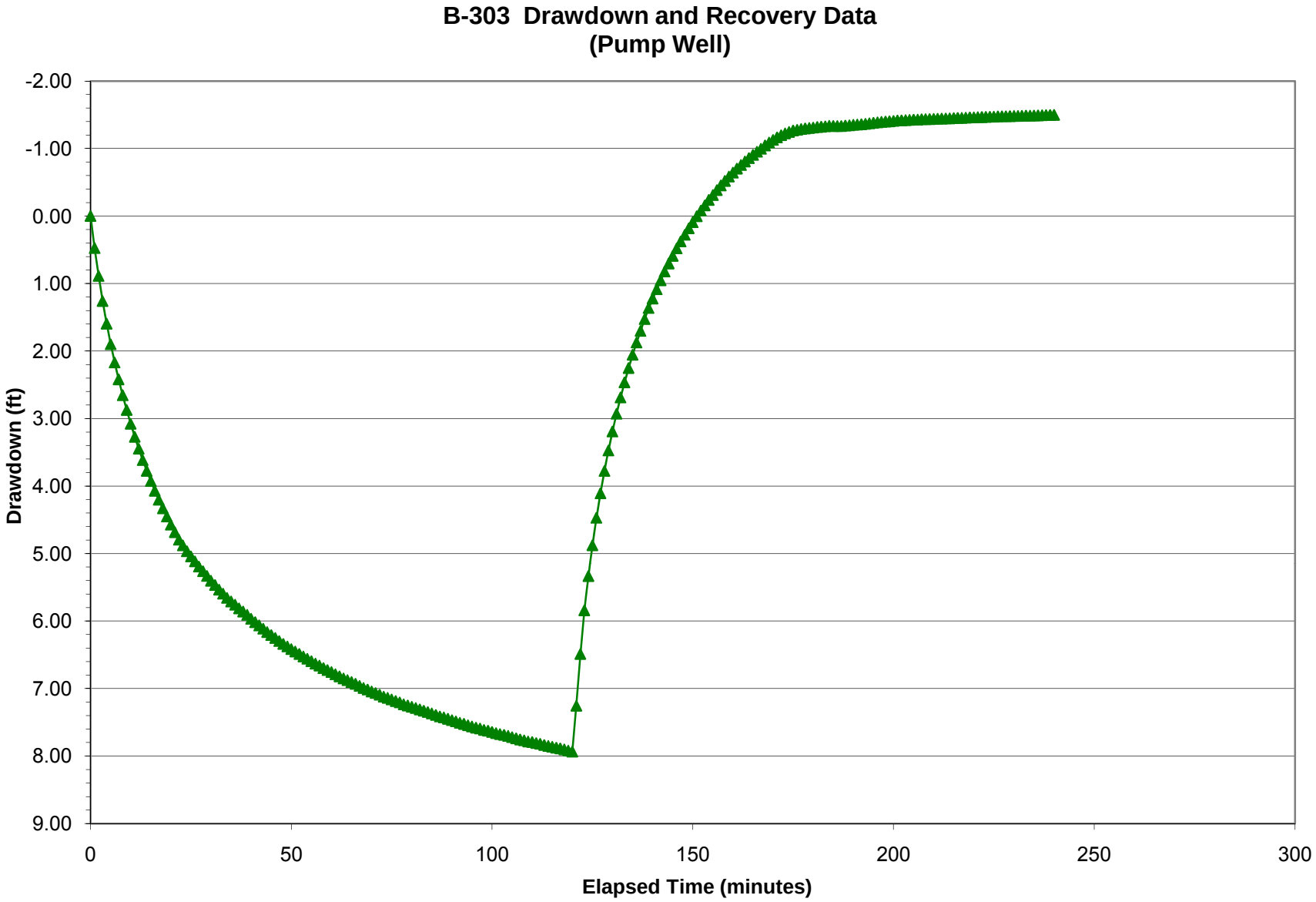
Pump Well ID	Date of Pump Test	Analysis Method	Observation Well	Analysis Data Source	Discharge Rate (gpm)	Residual Drawdown Δs' (ft)*	Transmissivity (ft^2/day)	Aquifer Thickness** (ft)	Hydraulic Conductivity (ft/day)	Hydraulic Conductivity (cm/sec)
B-303	5/27/2011	Theis	N/A	Pumped Well Recovery Data	1.0	1.20	29.4	29.0	1.01	3.6E-04
B-305	5/26/2011	Theis	N/A	Pumped Well Recovery Data	6.1	5.40	39.8	16.0	2.5	8.8E-04
		Theis	P-4	Observation Well Recovery Data	6.1	0.82	262.1	10.0	26.2	9.2E-03
		Jacob-Cooper		Observation Well Drawdown Data	6.1	1.32	162.8	10.0	16.3	5.7E-03

* Indicates change in residual drawdown over one log cycle, as estimated from recovery curves

** Thickness of permeable material intersected by each well as interpreted from the piezometer boring logs

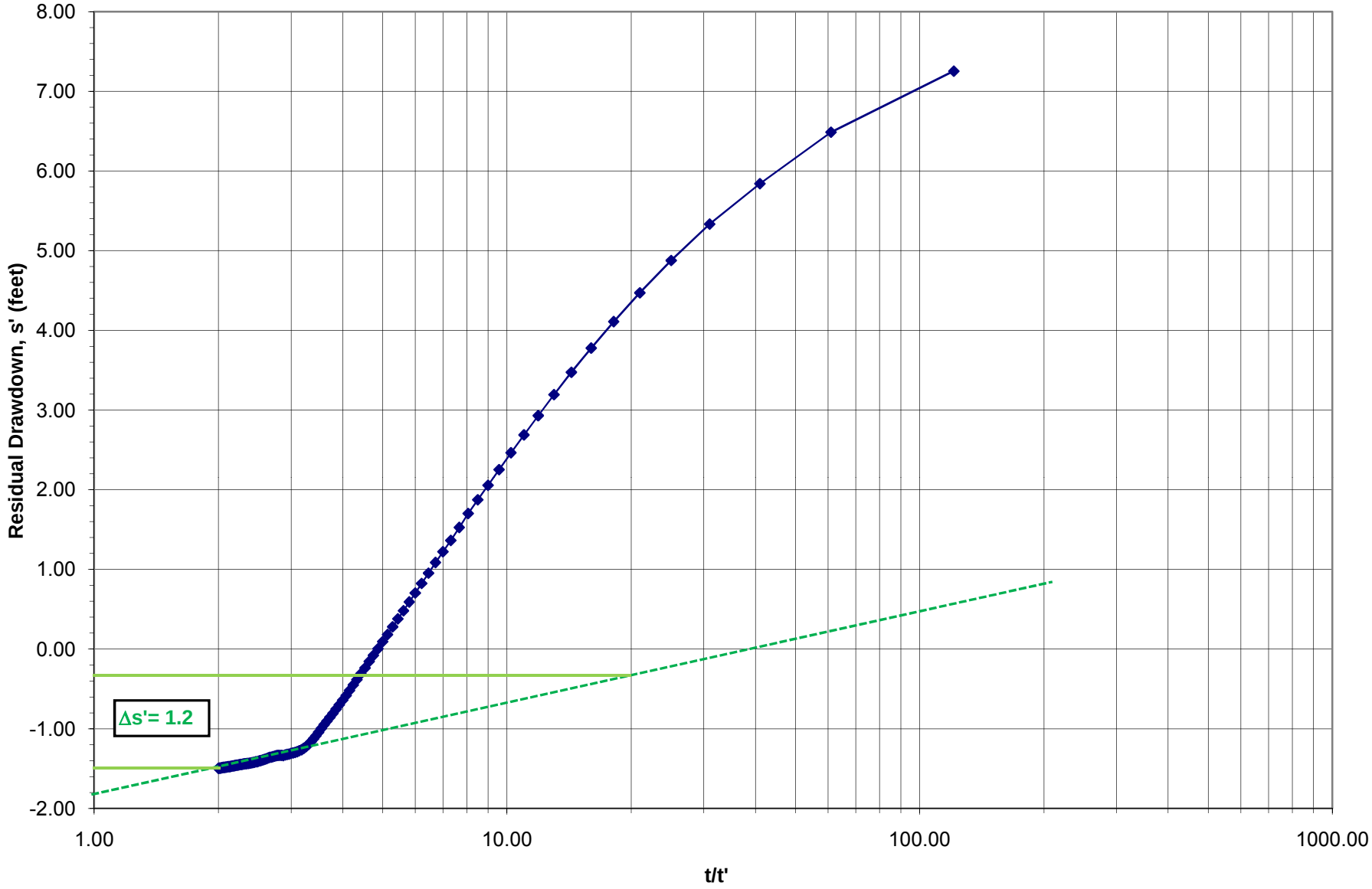
Attachment A

Pump Test Data Plots and Drawdown and Recovery Data Analyses

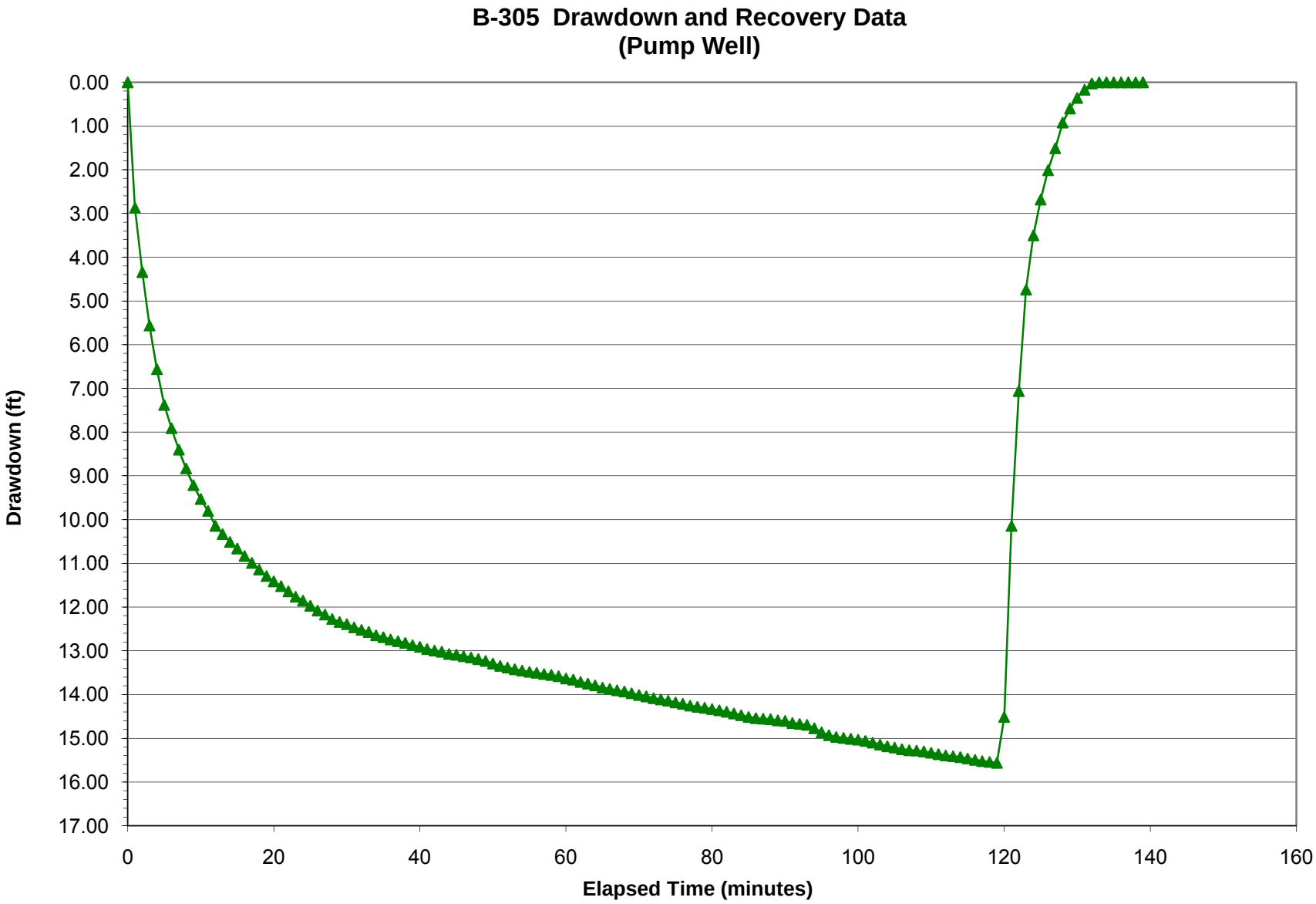


ATTACHMENT 2

B-303 Recovery Data Analysis
(Theis Method - Pump Well)

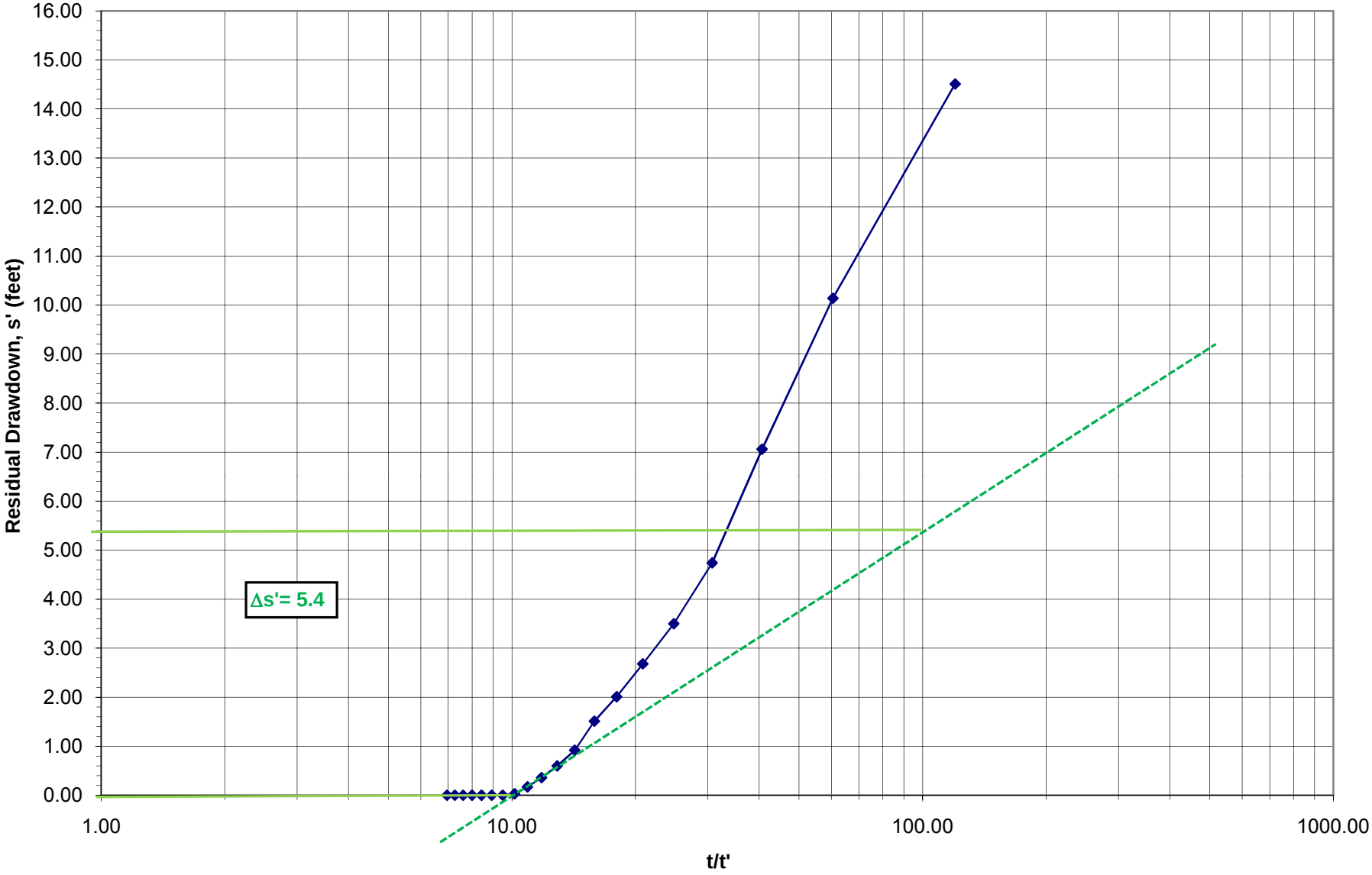


ATTACHMENT 2

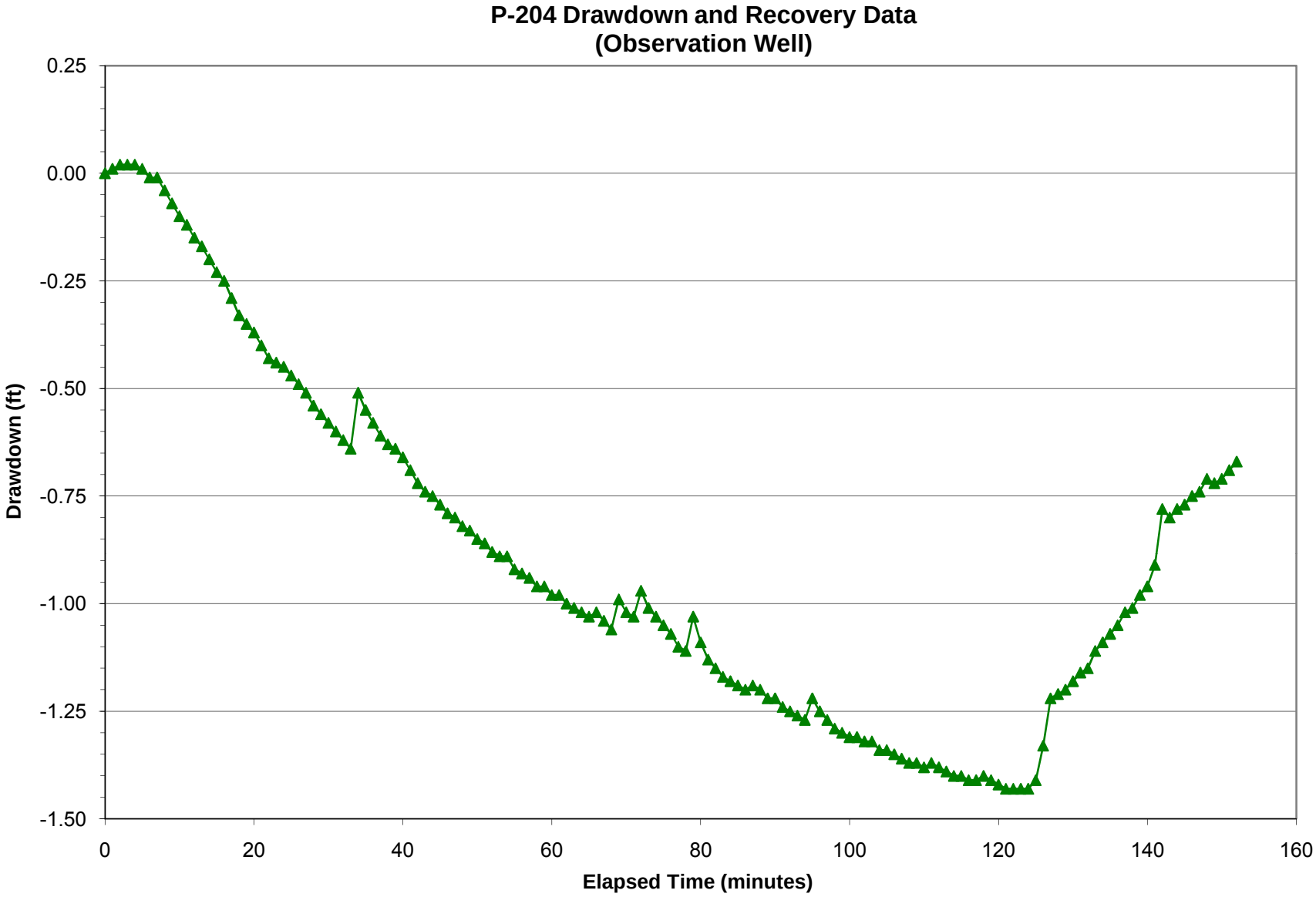


ATTACHMENT 2

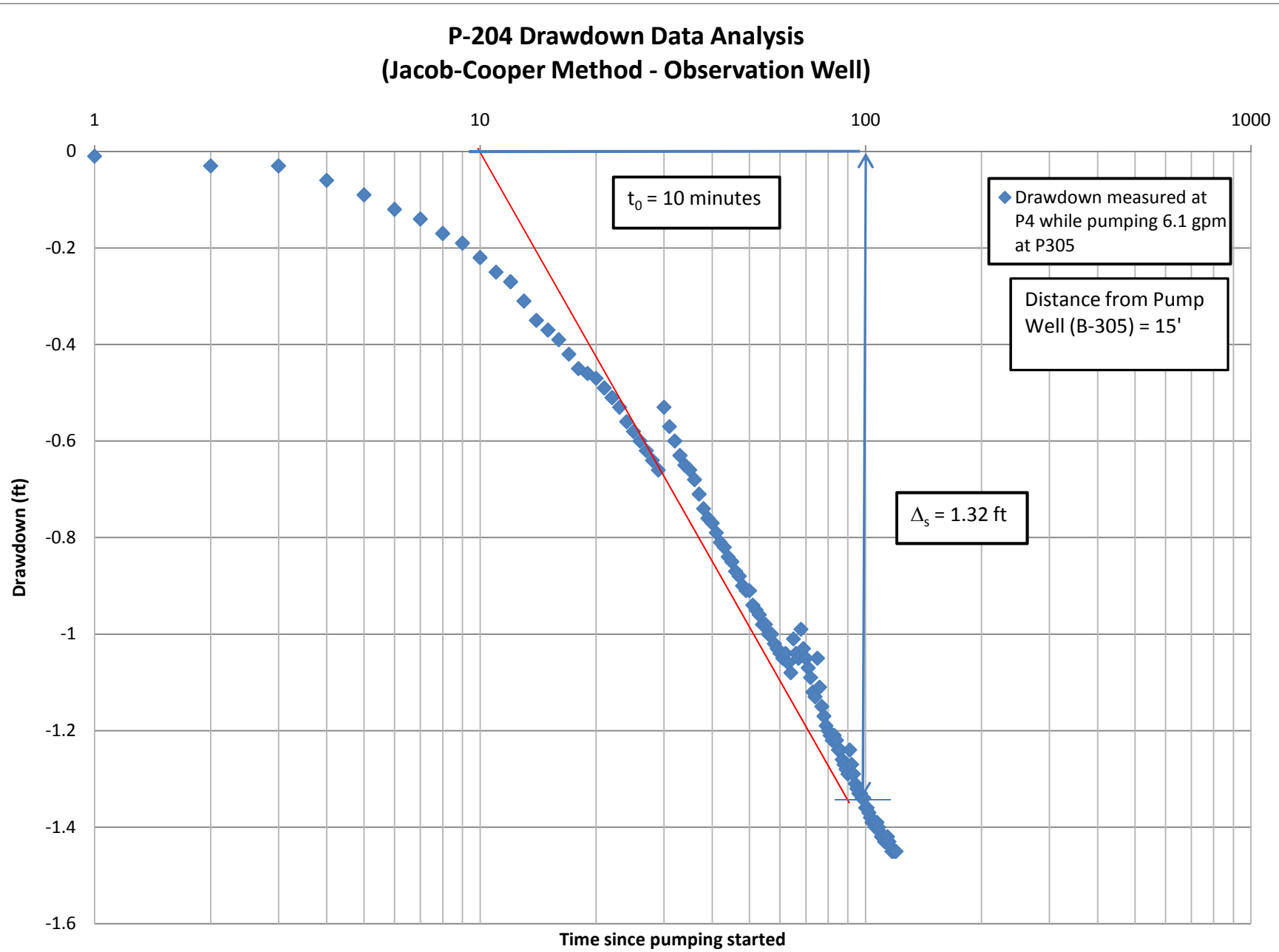
B-305 Recovery Data Analysis
(Theis Method - Pump Well)



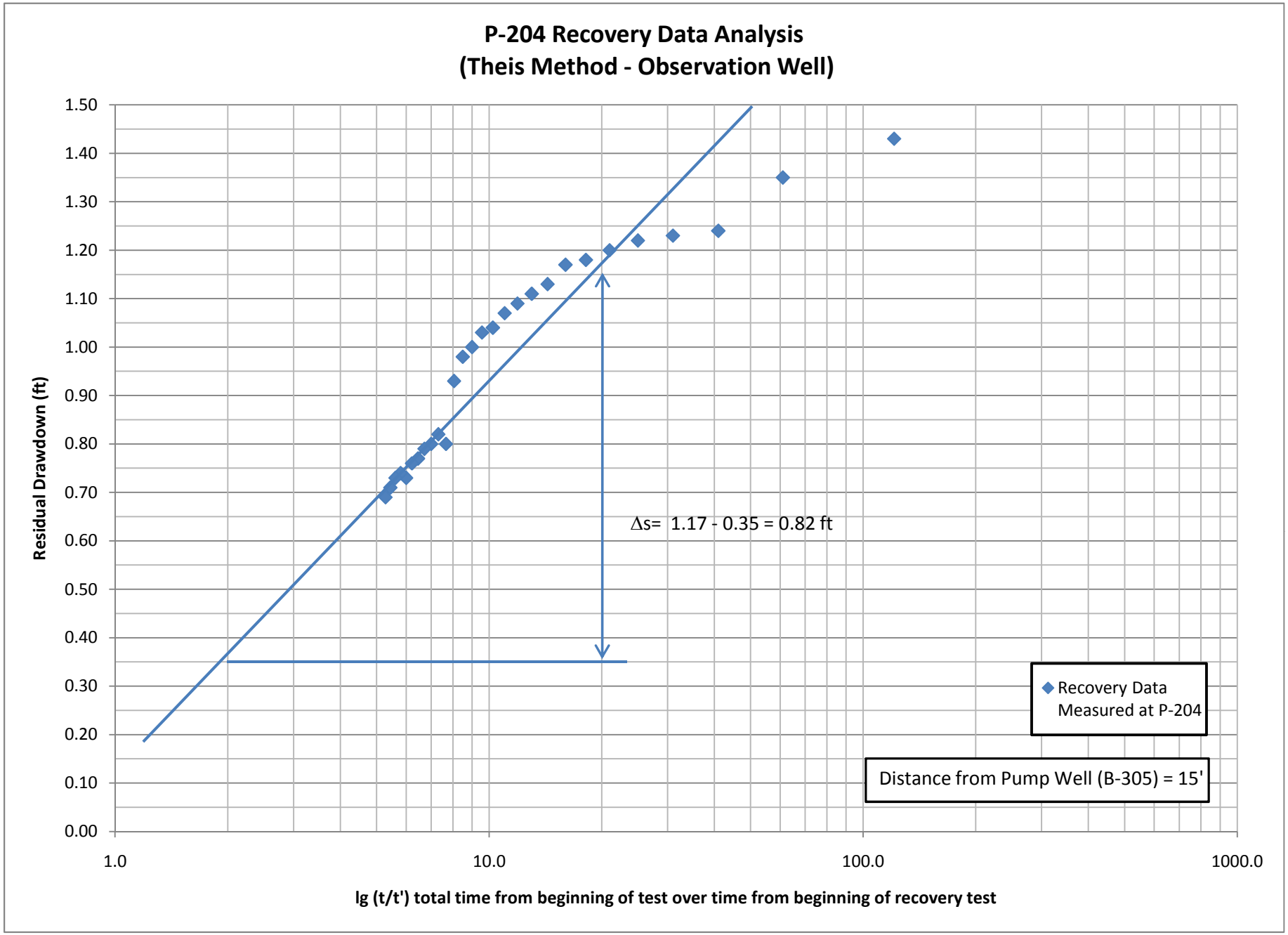
ATTACHMENT 2



ATTACHMENT 2



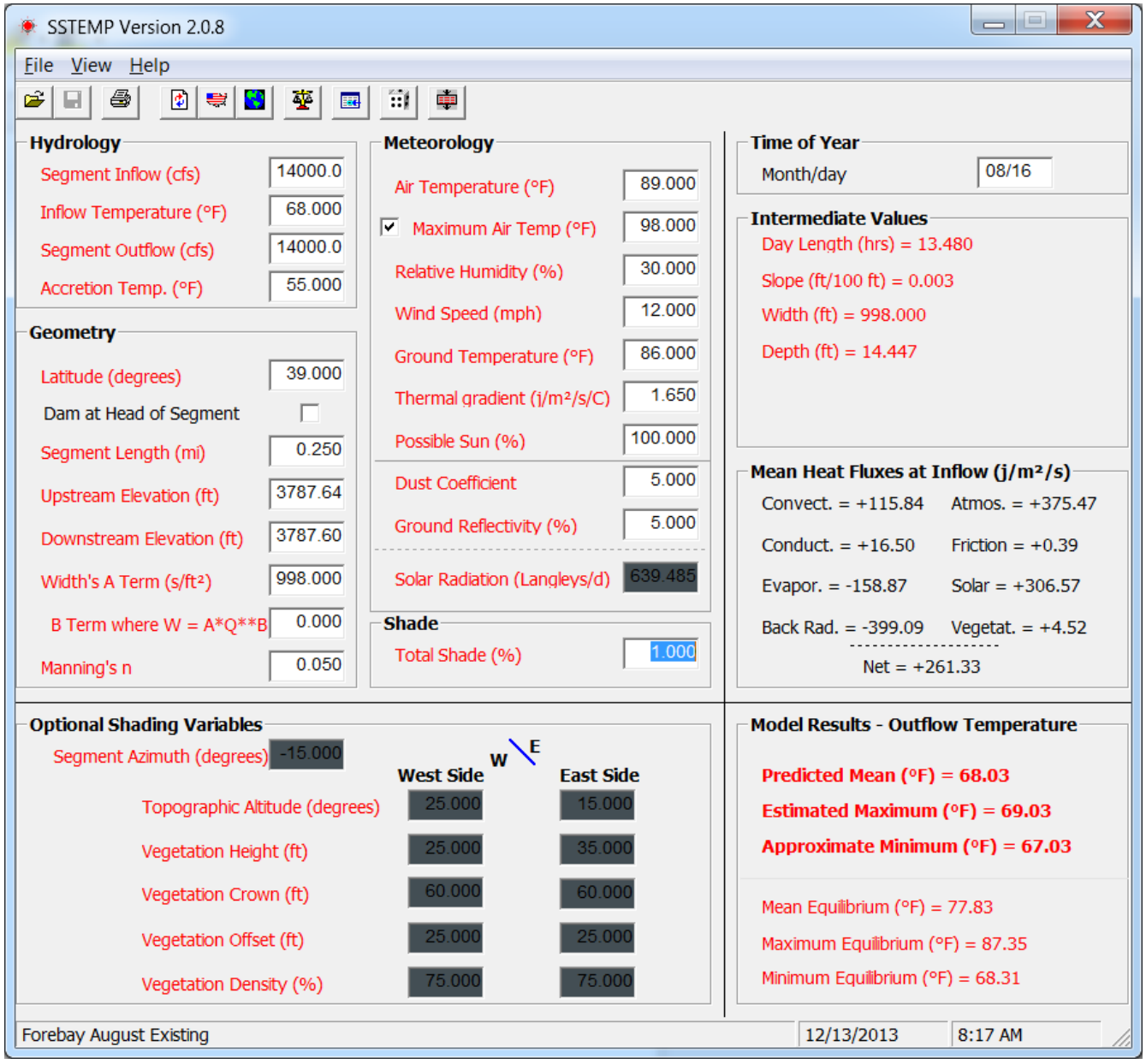
ATTACHMENT 2

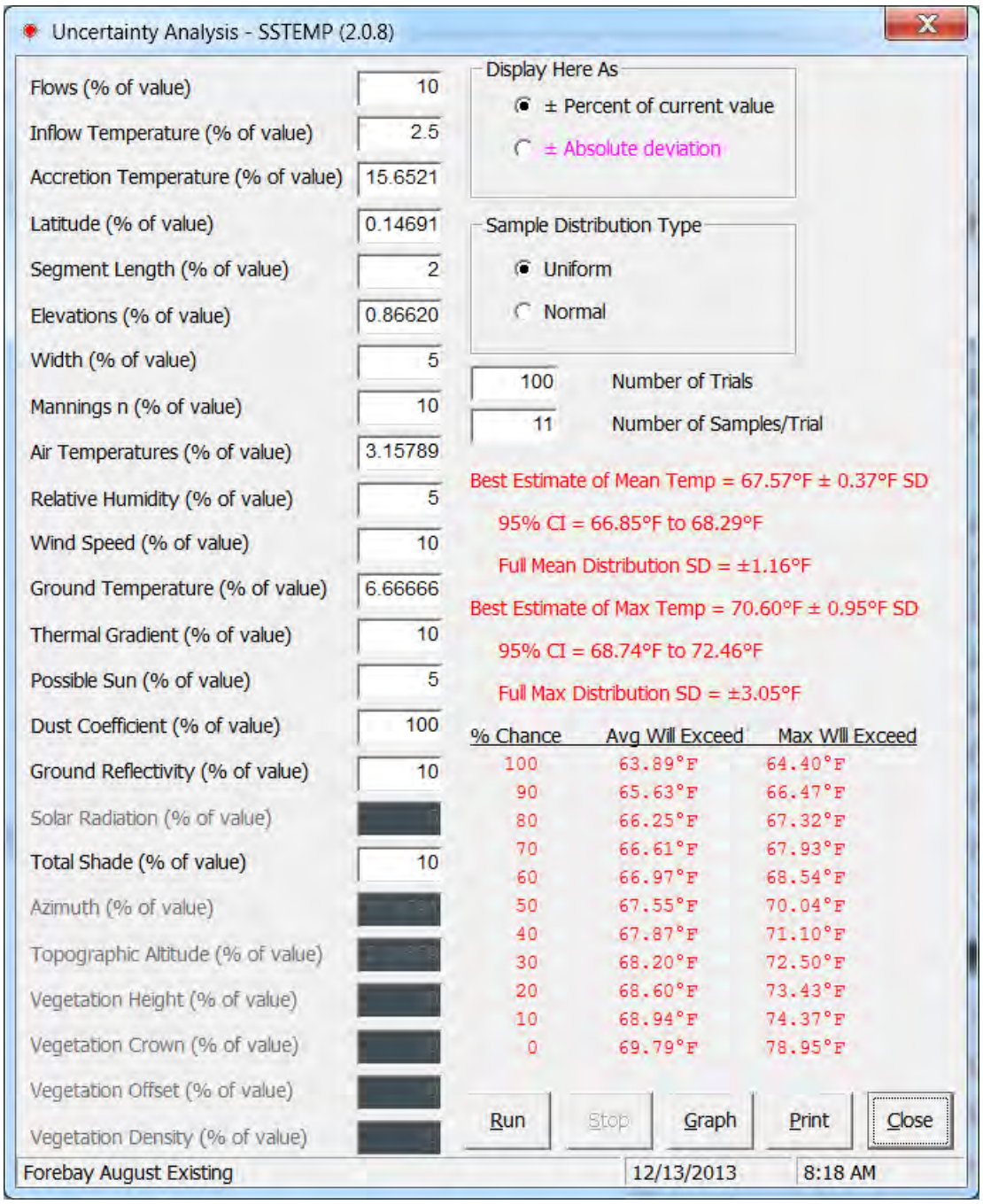


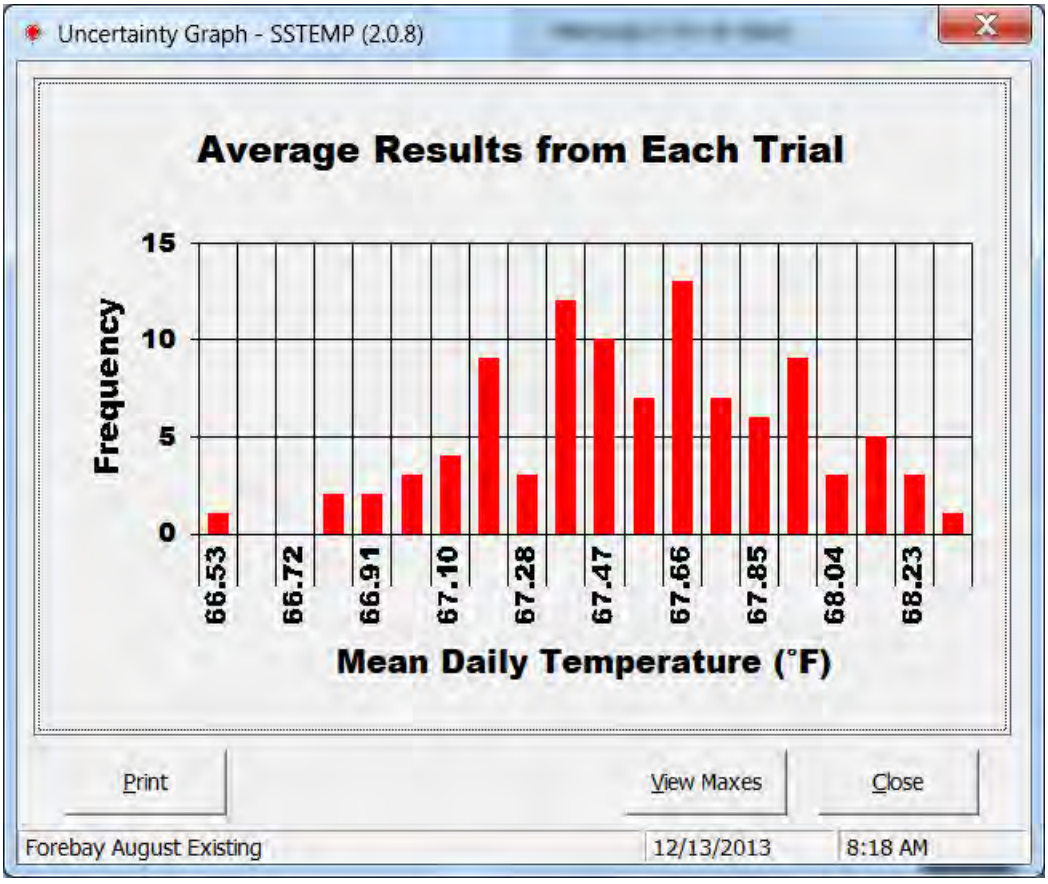
ATTACHMENT 2

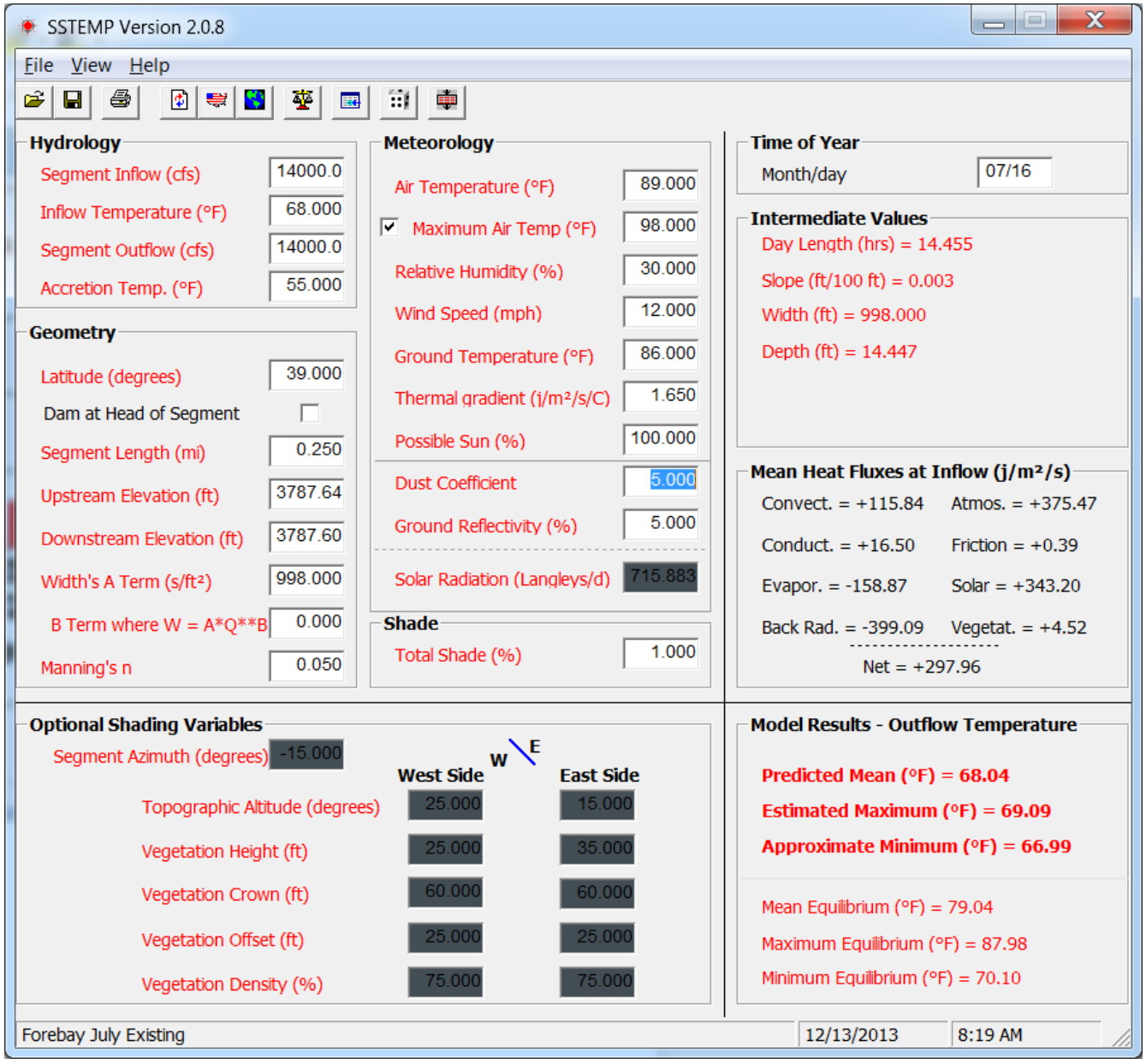
APPENDIX D

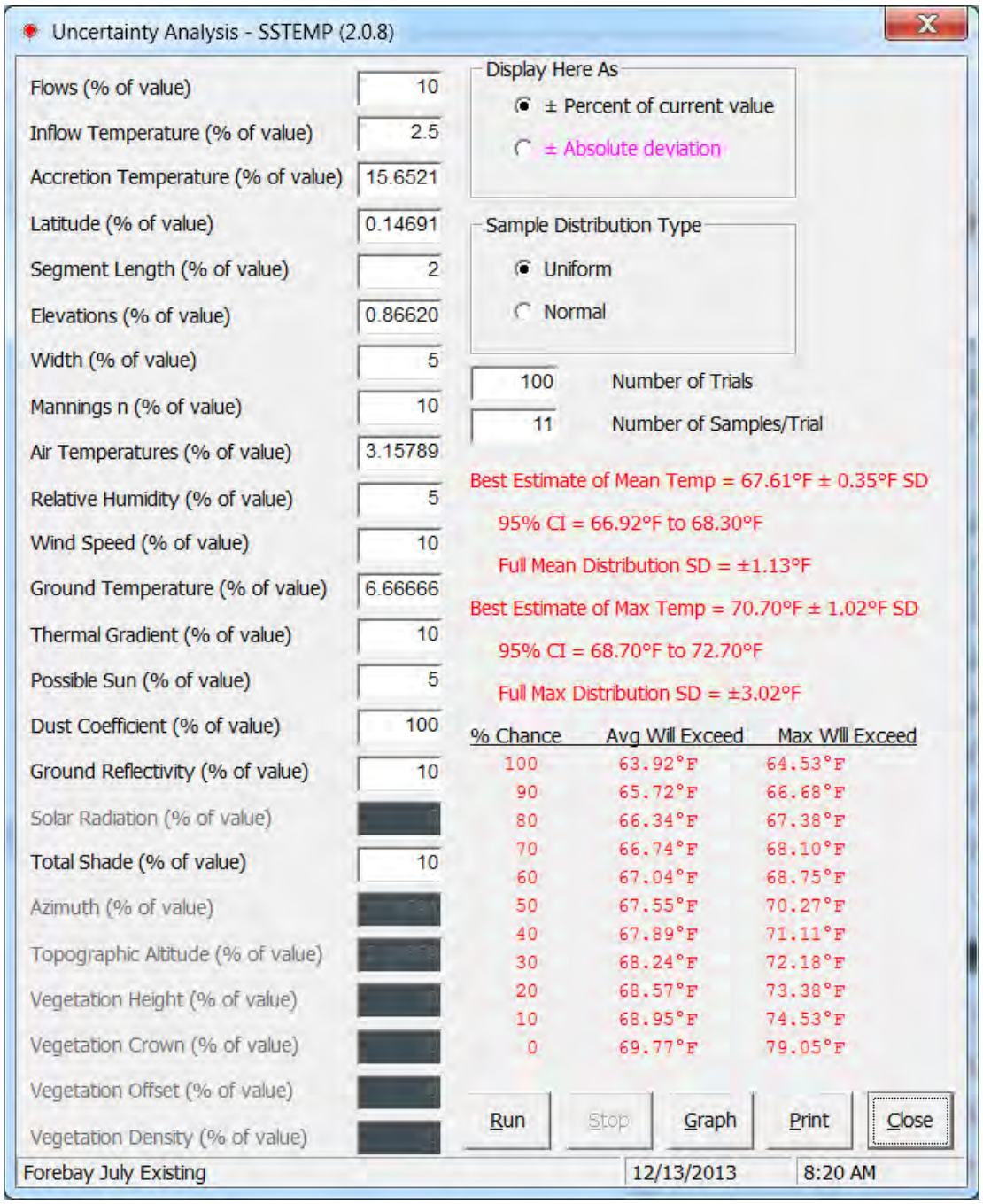
Water Temperature Calculations

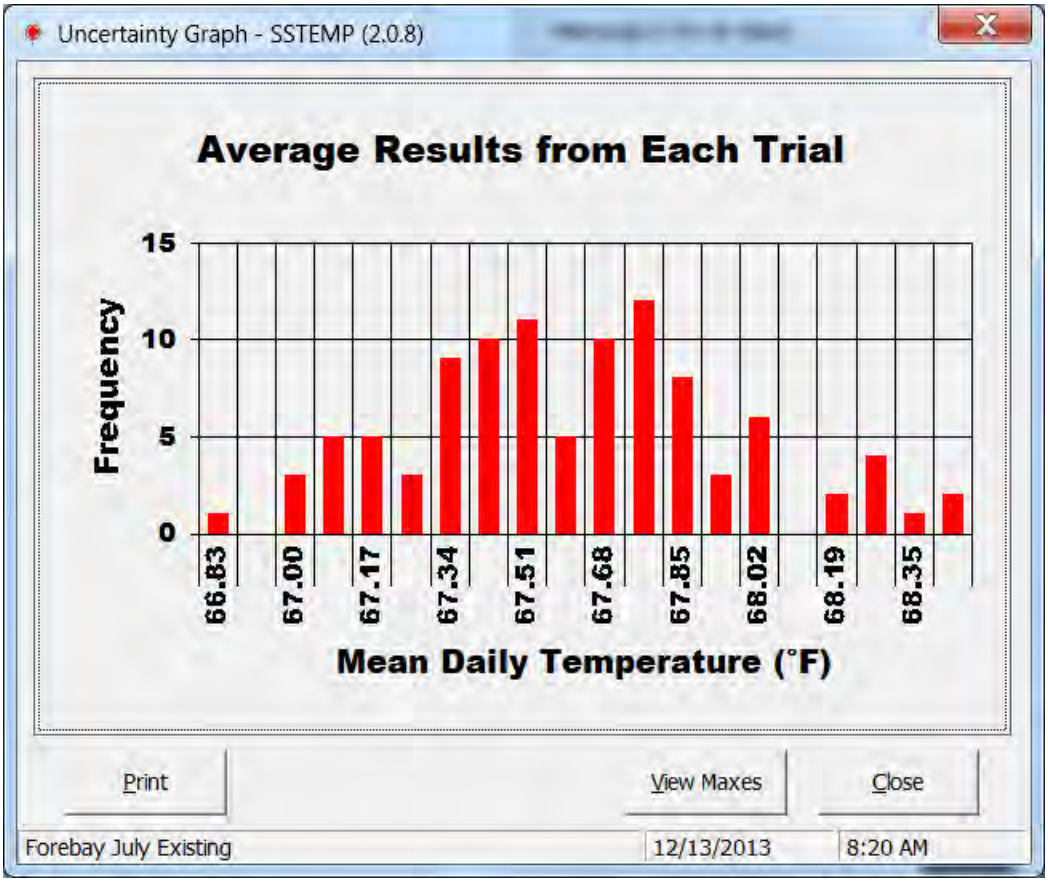

SSTEMP Version 2.0.8
File View Help
Hydrology
Segment Inflow (cfs) 14000.0
Inflow Temperature (°F) 68.000
Segment Outflow (cfs) 14000.0
Accretion Temp. (°F) 55.000
Geometry
Latitude (degrees) 39.000
Dam at Head of Segment
Segment Length (mi) 0.250
Upstream Elevation (ft) 3787.64
Downstream Elevation (ft) 3787.60
Width's A Term (s/ft²) 998.000
B Term where W = A*Q**B 0.000
Manning's n 0.050
Meteorology
Air Temperature (°F) 89.000
Maximum Air Temp (°F) 98.000
Relative Humidity (%) 30.000
Wind Speed (mph) 12.000
Ground Temperature (°F) 86.000
Thermal gradient (j/m²/s/C) 1.650
Possible Sun (%) 100.000
Dust Coefficient 5.000
Ground Reflectivity (%) 5.000
Solar Radiation (Langleys/d) 639.485
Shade
Total Shade (%) 1.000
Time of Year
Month/day 08/16
Intermediate Values
Day Length (hrs) = 13.480
Slope (ft/100 ft) = 0.003
Width (ft) = 998.000
Depth (ft) = 14.447
Mean Heat Fluxes at Inflow (j/m²/s)
Convect. = +115.84 Atmos. = +375.47
Conduct. = +16.50 Friction = +0.39
Evapor. = -158.87 Solar = +306.57
Back Rad. = -399.09 Vegetat. = +4.52
Net = +261.33
Optional Shading Variables
Segment Azimuth (degrees) -15.000
W E
West Side East Side
Topographic Altitude (degrees) 25.000 15.000
Vegetation Height (ft) 25.000 35.000
Vegetation Crown (ft) 60.000 60.000
Vegetation Offset (ft) 25.000 25.000
Vegetation Density (%) 75.000 75.000
Model Results - Outflow Temperature
Predicted Mean (°F) = 68.03
Estimated Maximum (°F) = 69.03
Approximate Minimum (°F) = 67.03
Mean Equilibrium (°F) = 77.83
Maximum Equilibrium (°F) = 87.35
Minimum Equilibrium (°F) = 68.31
Forebay August Existing
12/13/2013
8:17 AM

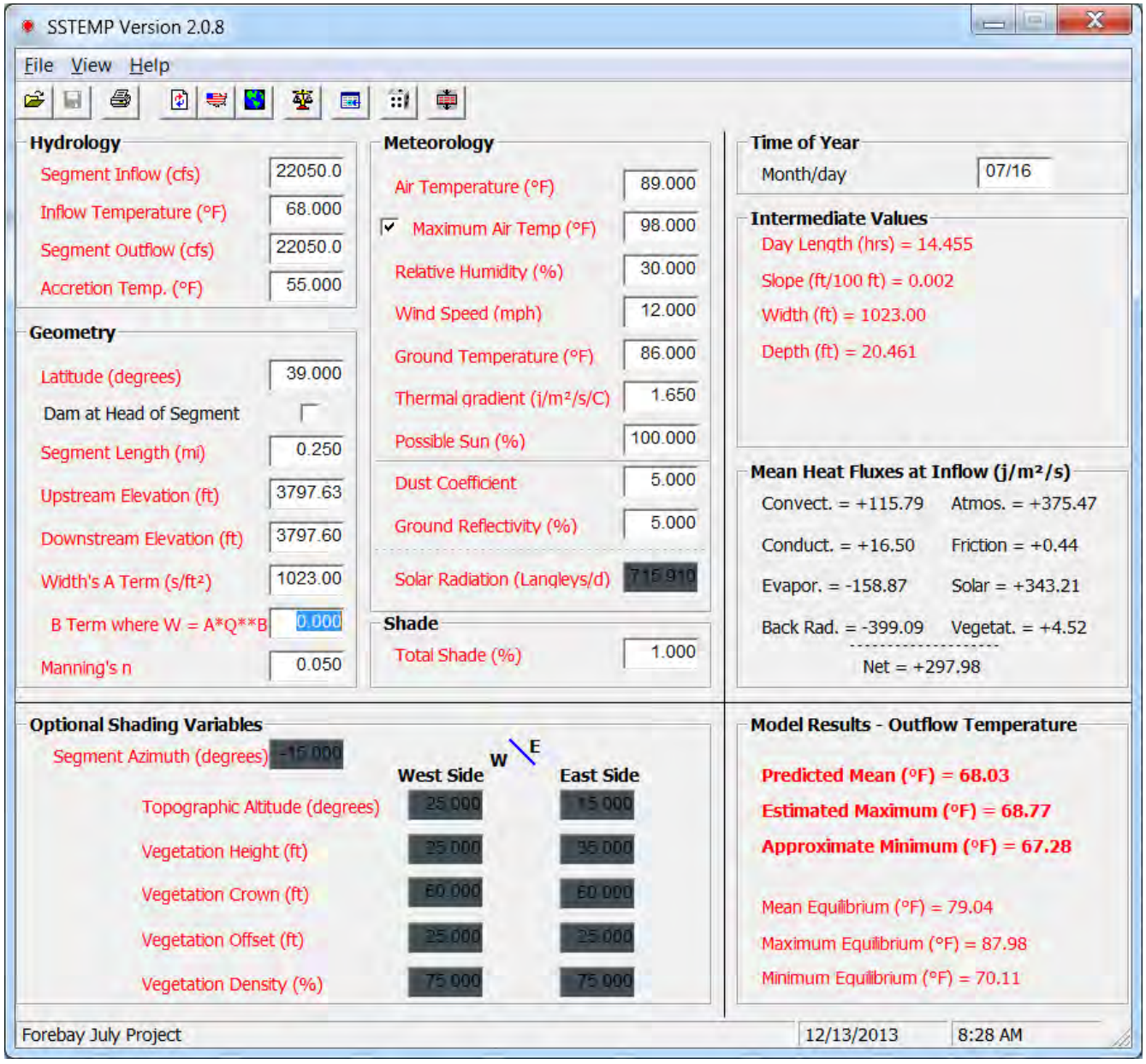

Uncertainty Analysis - SSTEMP (2.0.8)
Flows (% of value) 10
Inflow Temperature (% of value) 2.5
Accretion Temperature (% of value) 15.6521
Latitude (% of value) 0.14691
Segment Length (% of value) 2
Elevations (% of value) 0.86620
Width (% of value) 5
Mannings n (% of value) 10
Air Temperatures (% of value) 3.15789
Relative Humidity (% of value) 5
Wind Speed (% of value) 10
Ground Temperature (% of value) 6.66666
Thermal Gradient (% of value) 10
Possible Sun (% of value) 5
Dust Coefficient (% of value) 100
Ground Reflectivity (% of value) 10
Solar Radiation (% of value)
Total Shade (% of value) 10
Azimuth (% of value)
Topographic Altitude (% of value)
Vegetation Height (% of value)
Vegetation Crown (% of value)
Vegetation Offset (% of value)
Vegetation Density (% of value)
Display Here As
± Percent of current value
± Absolute deviation
Sample Distribution Type
Uniform
Normal
100 Number of Trials
11 Number of Samples/Trial
Best Estimate of Mean Temp = 67.57°F ± 0.37°F SD
95% CI = 66.85°F to 68.29°F
Full Mean Distribution SD = ±1.16°F
Best Estimate of Max Temp = 70.60°F ± 0.95°F SD
95% CI = 68.74°F to 72.46°F
Full Max Distribution SD = ±3.05°F
% Chance Avg Will Exceed Max Will Exceed
100 63.89°F 64.40°F
90 65.63°F 66.47°F
80 66.25°F 67.32°F
70 66.61°F 67.93°F
60 66.97°F 68.54°F
50 67.55°F 70.04°F
40 67.87°F 71.10°F
30 68.20°F 72.50°F
20 68.60°F 73.43°F
10 68.94°F 74.37°F
0 69.79°F 78.95°F
Run
Stop
Graph
Print
Close
Forebay August Existing
12/13/2013
8:18 AM

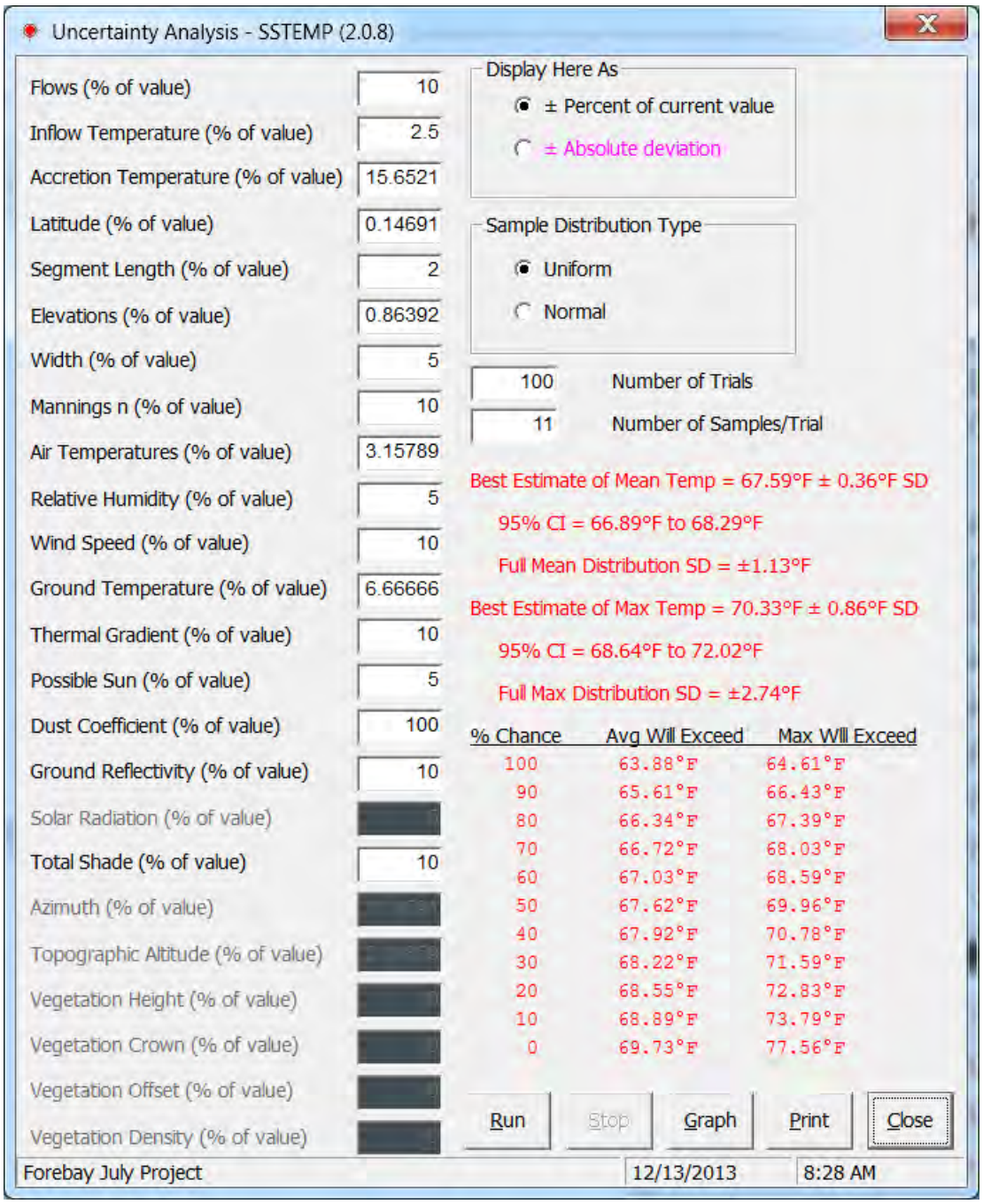

Uncertainty Graph - SSTEMP (2.0.8)
Average Results from Each Trial
Frequency
15
10
5
0
66.53
66.72
66.91
67.10
67.28
67.47
67.66
67.85
68.04
68.23
Mean Daily Temperature (˚F)
Print
View Maxes
Close
Forebay August Existing
12/13/2013
8:18 AM

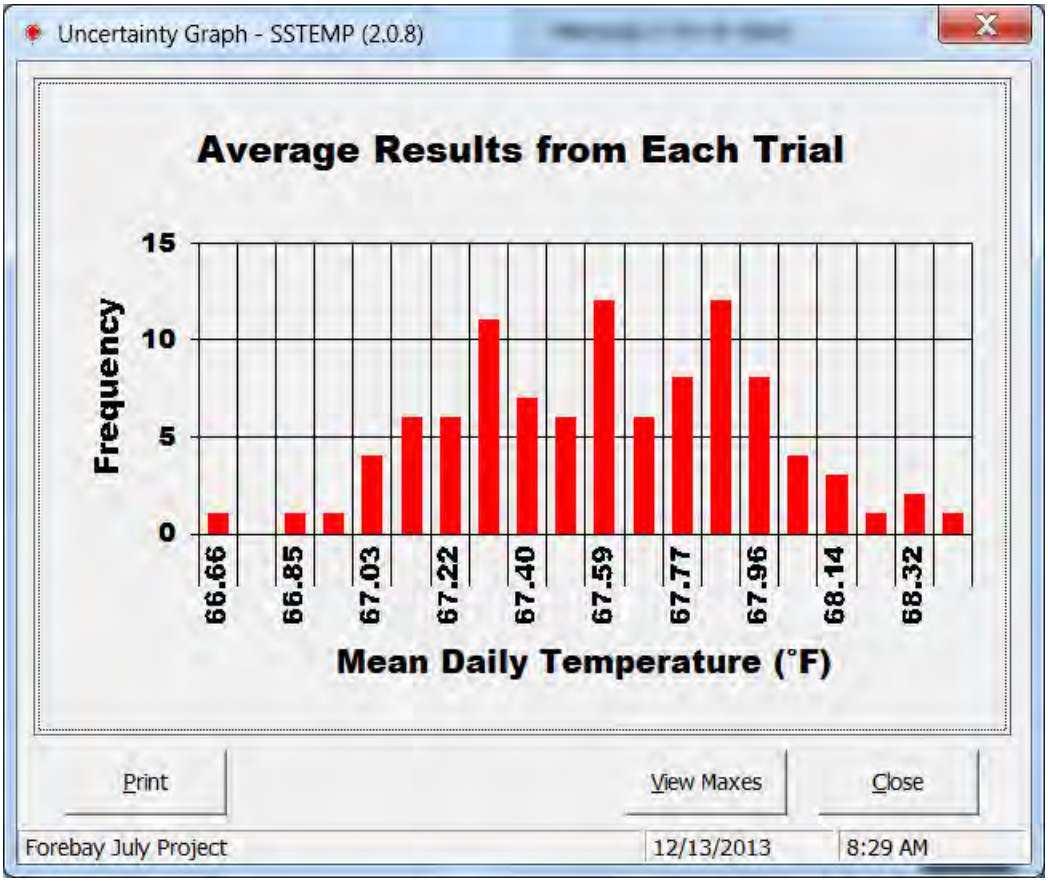

SSTEMP Version 2.0.8
File View Help
Hydrology
Segment Inflow (cfs) 14000.0
Inflow Temperature (°F) 68.000
Segment Outflow (cfs) 14000.0
Accretion Temp. (°F) 55.000
Geometry
Latitude (degrees) 39.000
Dam at Head of Segment
Segment Length (mi) 0.250
Upstream Elevation (ft) 3787.64
Downstream Elevation (ft) 3787.60
Width's A Term (s/ft²) 998.000
B Term where W = A*Q**B 0.000
Manning's n 0.050
Meteorology
Air Temperature (°F) 89.000
Maximum Air Temp (°F) 98.000
Relative Humidity (%) 30.000
Wind Speed (mph) 12.000
Ground Temperature (°F) 86.000
Thermal gradient (j/m²/s/C) 1.650
Possible Sun (%) 100.000
Dust Coefficient 5.000
Ground Reflectivity (%) 5.000
Solar Radiation (Langleys/d) 715.883
Shade
Total Shade (%) 1.000
Time of Year
Month/day 07/16
Intermediate Values
Day Length (hrs) = 14.455
Slope (ft/100 ft) = 0.003
Width (ft) = 998.000
Depth (ft) = 14.447
Mean Heat Fluxes at Inflow (j/m²/s)
Convect. = +115.84 Atmos. = +375.47
Conduct. = +16.50 Friction = +0.39
Evapor. = -158.87 Solar = +343.20
Back Rad. = -399.09 Vegetat. = +4.52
Net = +297.96
Optional Shading Variables
Segment Azimuth (degrees) -15.000
W E
West Side East Side
Topographic Altitude (degrees) 25.000 15.000
Vegetation Height (ft) 25.000 35.000
Vegetation Crown (ft) 60.000 60.000
Vegetation Offset (ft) 25.000 25.000
Vegetation Density (%) 75.000 75.000
Model Results - Outflow Temperature
Predicted Mean (°F) = 68.04
Estimated Maximum (°F) = 69.09
Approximate Minimum (°F) = 66.99
Mean Equilibrium (°F) = 79.04
Maximum Equilibrium (°F) = 87.98
Minimum Equilibrium (°F) = 70.10
Forebay July Existing
12/13/2013
8:19 AM

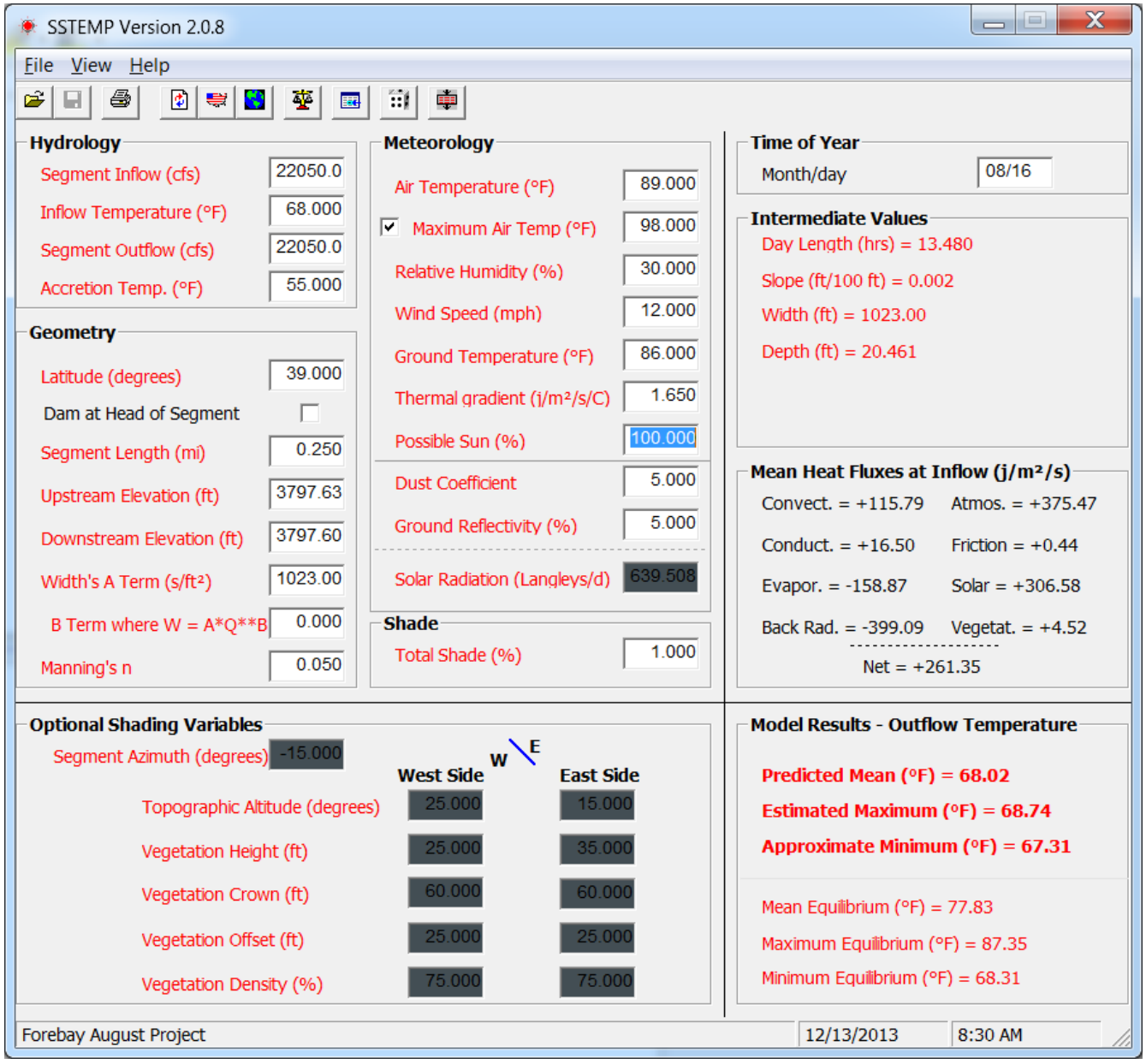

Uncertainty Analysis - SSTEMP (2.0.8)
Flows (% of value) 10
Inflow Temperature (% of value) 2.5
Accretion Temperature (% of value) 15.6521
Latitude (% of value) 0.14691
Segment Length (% of value) 2
Elevations (% of value) 0.86620
Width (% of value) 5
Mannings n (% of value) 10
Air Temperatures (% of value) 3.15789
Relative Humidity (% of value) 5
Wind Speed (% of value) 10
Ground Temperature (% of value) 6.66666
Thermal Gradient (% of value) 10
Possible Sun (% of value) 5
Dust Coefficient (% of value) 100
Ground Reflectivity (% of value) 10
Solar Radiation (% of value)
Total Shade (% of value) 10
Azimuth (% of value)
Topographic Altitude (% of value)
Vegetation Height (% of value)
Vegetation Crown (% of value)
Vegetation Offset (% of value)
Vegetation Density (% of value)
Display Here As
± Percent of current value
± Absolute deviation
Sample Distribution Type
Uniform
Normal
100 Number of Trials
11 Number of Samples/Trial
Best Estimate of Mean Temp = 67.61°F ± 0.35°F SD
95% CI = 66.92°F to 68.30°F
Full Mean Distribution SD = ±1.13°F
Best Estimate of Max Temp = 70.70°F ± 1.02°F SD
95% CI = 68.70°F to 72.70°F
Full Max Distribution SD = ±3.02°F
% Chance Avg Will Exceed Max Will Exceed
100 63.92°F 64.53°F
90 65.72°F 66.68°F
80 66.34°F 67.38°F
70 66.74°F 68.10°F
60 67.04°F 68.75°F
50 67.55°F 70.27°F
40 67.89°F 71.11°F
30 68.24°F 72.18°F
20 68.57°F 73.38°F
10 68.95°F 74.53°F
0 69.77°F 79.05°F
Run
Stop
Graph
Print
Close
Forebay July Existing
12/13/2013
8:20 AM

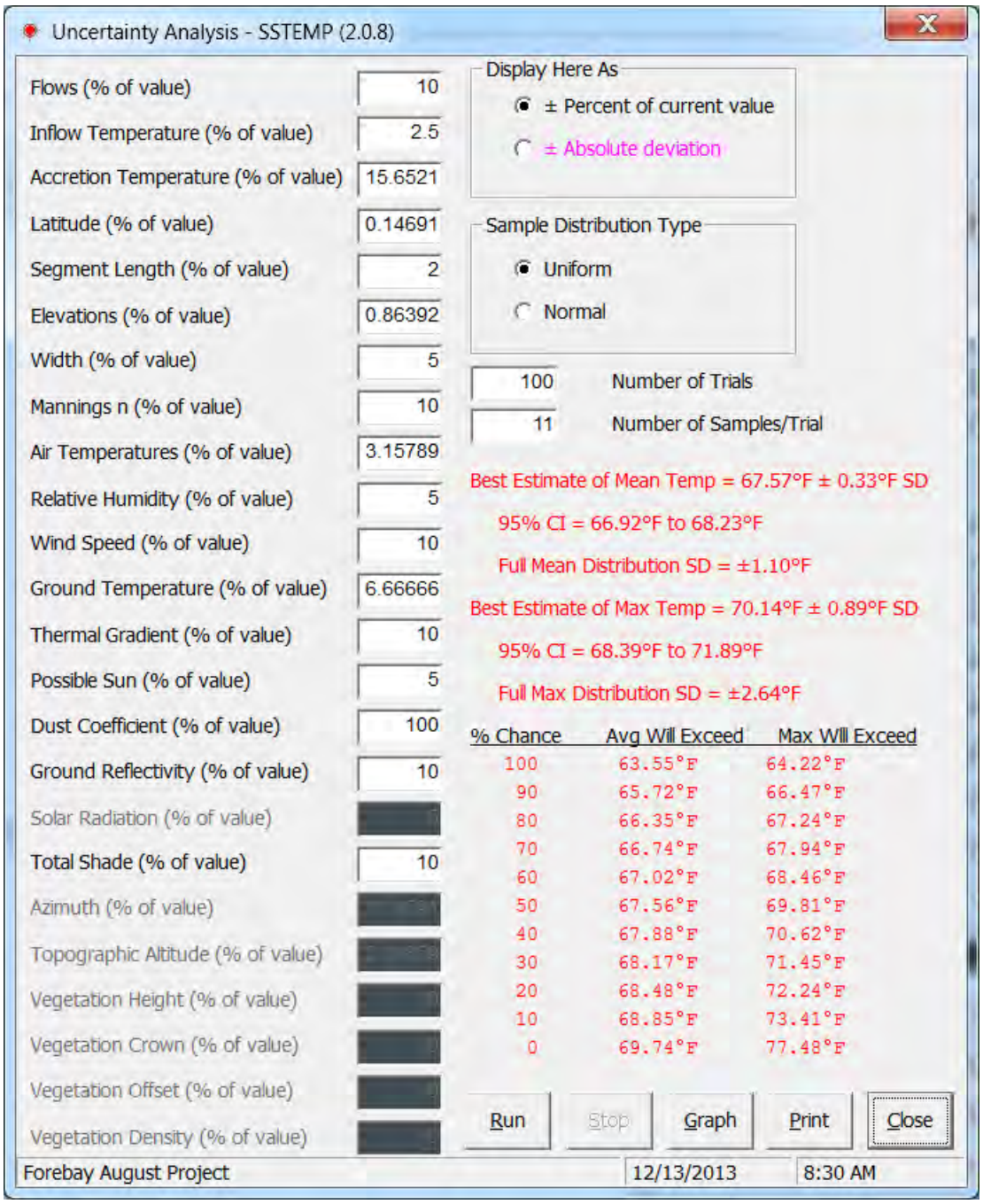

Uncertainty Graph - SSTEMP (2.0.8)
Average Results from Each Trial
Frequency
15
10
5
0
66.83
67.00
67.17
67.34
67.51
67.68
67.85
68.02
68.19
68.35
Mean Daily Temperature (˚F)
Print
View Maxes
Close
Forebay July Existing
12/13/2013
8:20 AM

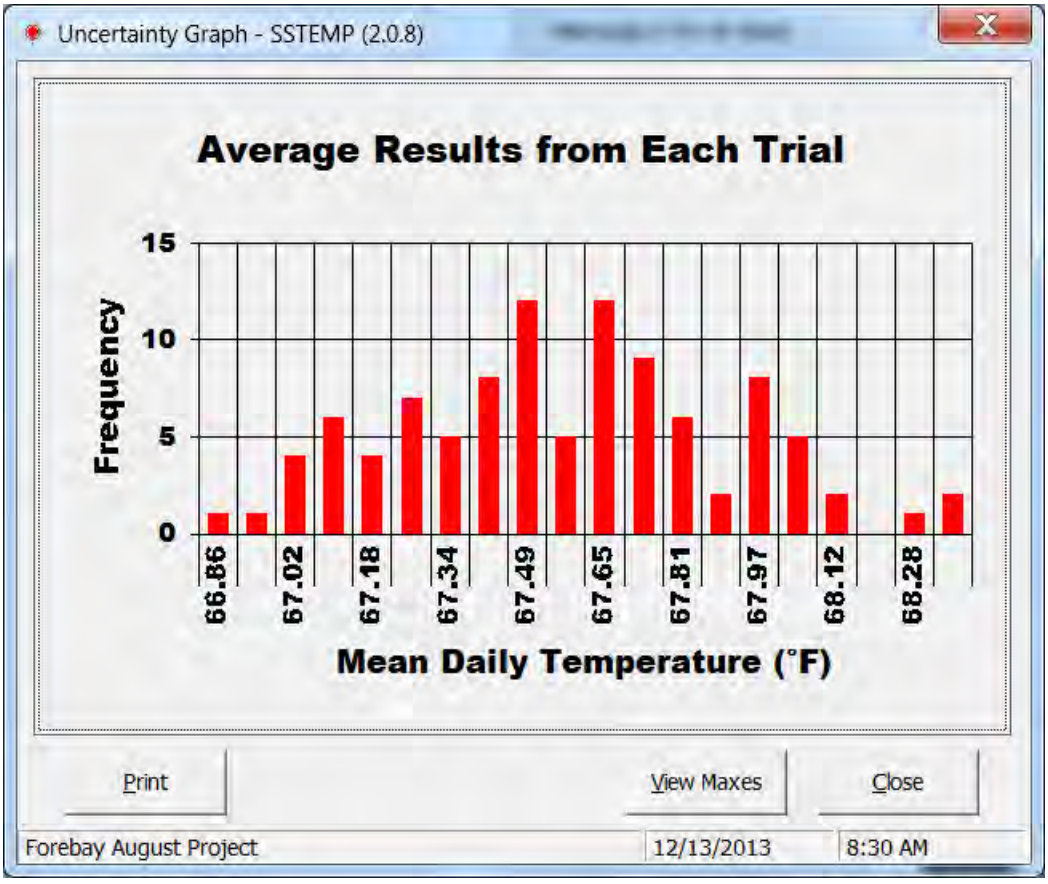

SSTEMP Version 2.0.8
File View Help
Hydrology
Segment Inflow (cfs) 22050.0
Inflow Temperature (°F) 68.000
Segment Outflow (cfs) 22050.0
Accretion Temp. (°F) 55.000
Geometry
Latitude (degrees) 39.000
Dam at Head of Segment
Segment Length (mi) 0.250
Upstream Elevation (ft) 3797.63
Downstream Elevation (ft) 3797.60
Width's A Term (s/ft²) 1023.00
B Term where W = A*Q**B 0.000
Manning's n 0.050
Meteorology
Air Temperature (°F) 89.000
Maximum Air Temp (°F) 98.000
Relative Humidity (%) 30.000
Wind Speed (mph) 12.000
Ground Temperature (°F) 86.000
Thermal gradient (j/m²/s/C) 1.650
Possible Sun (%) 100.000
Dust Coefficient 5.000
Ground Reflectivity (%) 5.000
Solar Radiation (Langleys/d) 715.910
Shade
Total Shade (%) 1.000
Time of Year
Month/day 07/16
Intermediate Values
Day Length (hrs) = 14.455
Slope (ft/100 ft) = 0.002
Width (ft) = 1023.00
Depth (ft) = 20.461
Mean Heat Fluxes at Inflow (j/m²/s)
Convect. = +115.79 Atmos. = +375.47
Conduct. = +16.50 Friction = +0.44
Evapor. = -158.87 Solar = +343.21
Back Rad. = -399.09 Vegetat. = +4.52
Net = +297.98
Optional Shading Variables
Segment Azimuth (degrees) -15.000
W E
West Side East Side
Topographic Altitude (degrees) 25.000 15.000
Vegetation Height (ft) 25.000 35.000
Vegetation Crown (ft) 60.000 60.000
Vegetation Offset (ft) 25.000 25.000
Vegetation Density (%) 75.000 75.000
Model Results - Outflow Temperature
Predicted Mean (°F) = 68.03
Estimated Maximum (°F) = 68.77
Approximate Minimum (°F) = 67.28
Mean Equilibrium (°F) = 79.04
Maximum Equilibrium (°F) = 87.98
Minimum Equilibrium (°F) = 70.11
Forebay July Project
12/13/2013
8:28 AM


Uncertainty Analysis - SSTEMP (2.0.8)
Flows (% of value) 10
Inflow Temperature (% of value) 2.5
Accretion Temperature (% of value) 15.6521
Latitude (% of value) 0.14691
Segment Length (% of value) 2
Elevations (% of value) 0.86392
Width (% of value) 5
Mannings n (% of value) 10
Air Temperatures (% of value) 3.15789
Relative Humidity (% of value) 5
Wind Speed (% of value) 10
Ground Temperature (% of value) 6.66666
Thermal Gradient (% of value) 10
Possible Sun (% of value) 5
Dust Coefficient (% of value) 100
Ground Reflectivity (% of value) 10
Solar Radiation (% of value)
Total Shade (% of value) 10
Azimuth (% of value)
Topographic Altitude (% of value)
Vegetation Height (% of value)
Vegetation Crown (% of value)
Vegetation Offset (% of value)
Vegetation Density (% of value)
Display Here As
± Percent of current value
± Absolute deviation
Sample Distribution Type
Uniform
Normal
100 Number of Trials
11 Number of Samples/Trial
Best Estimate of Mean Temp = 67.59°F ± 0.36°F SD
95% CI = 66.89°F to 68.29°F
Full Mean Distribution SD = ±1.13°F
Best Estimate of Max Temp = 70.33°F ± 0.86°F SD
95% CI = 68.64°F to 72.02°F
Full Max Distribution SD = ±2.74°F
% Chance Avg Will Exceed Max Will Exceed
100 63.88°F 64.61°F
90 65.61°F 66.43°F
80 66.34°F 67.39°F
70 66.72°F 68.03°F
60 67.03°F 68.59°F
50 67.62°F 69.96°F
40 67.92°F 70.78°F
30 68.22°F 71.59°F
20 68.55°F 72.83°F
10 68.89°F 73.79°F
0 69.73°F 77.56°F
Run
Stop
Graph
Print
Close
Forebay July Project
12/13/2013
8:28 AM


Uncertainty Graph - SSTEMP (2.0.8)
Average Results from Each Trial
Frequency
15
10
5
0
66.66
66.85
67.03
67.22
67.40
67.59
67.77
67.96
68.14
68.32
Mean Daily Temperature (˚F)
Print
View Maxes
Close
Forebay July Project
12/13/2013
8:29 AM


SSTEMP Version 2.0.8
File View Help
Hydrology
Segment Inflow (cfs) 22050.0
Inflow Temperature (°F) 68.000
Segment Outflow (cfs) 22050.0
Accretion Temp. (°F) 55.000
Geometry
Latitude (degrees) 39.000
Dam at Head of Segment
Segment Length (mi) 0.250
Upstream Elevation (ft) 3797.63
Downstream Elevation (ft) 3797.60
Width's A Term (s/ft²) 1023.00
B Term where W = A*Q**B 0.000
Manning's n 0.050
Meteorology
Air Temperature (°F) 89.000
Maximum Air Temp (°F) 98.000
Relative Humidity (%) 30.000
Wind Speed (mph) 12.000
Ground Temperature (°F) 86.000
Thermal gradient (j/m²/s/C) 1.650
Possible Sun (%) 100.000
Dust Coefficient 5.000
Ground Reflectivity (%) 5.000
Solar Radiation (Langleys/d) 639.508
Shade
Total Shade (%) 1.000
Time of Year
Month/day 08/16
Intermediate Values
Day Length (hrs) = 13.480
Slope (ft/100 ft) = 0.002
Width (ft) = 1023.00
Depth (ft) = 20.461
Mean Heat Fluxes at Inflow (j/m²/s)
Convect. = +115.79 Atmos. = +375.47
Conduct. = +16.50 Friction = +0.44
Evapor. = -158.87 Solar = +306.58
Back Rad. = -399.09 Vegetat. = +4.52
Net = +261.35
Optional Shading Variables
Segment Azimuth (degrees) -15.000
W E
West Side East Side
Topographic Altitude (degrees) 25.000 15.000
Vegetation Height (ft) 25.000 35.000
Vegetation Crown (ft) 60.000 60.000
Vegetation Offset (ft) 25.000 25.000
Vegetation Density (%) 75.000 75.000
Model Results - Outflow Temperature
Predicted Mean (°F) = 68.02
Estimated Maximum (°F) = 68.74
Approximate Minimum (°F) = 67.31
Mean Equilibrium (°F) = 77.83
Maximum Equilibrium (°F) = 87.35
Minimum Equilibrium (°F) = 68.31
Forebay August Project
12/13/2013
8:30 AM


Uncertainty Analysis - SSTEMP (2.0.8)
Flows (% of value) 10
Inflow Temperature (% of value) 2.5
Accretion Temperature (% of value) 15.6521
Latitude (% of value) 0.14691
Segment Length (% of value) 2
Elevations (% of value) 0.86392
Width (% of value) 5
Mannings n (% of value) 10
Air Temperatures (% of value) 3.15789
Relative Humidity (% of value) 5
Wind Speed (% of value) 10
Ground Temperature (% of value) 6.66666
Thermal Gradient (% of value) 10
Possible Sun (% of value) 5
Dust Coefficient (% of value) 100
Ground Reflectivity (% of value) 10
Solar Radiation (% of value)
Total Shade (% of value) 10
Azimuth (% of value)
Topographic Altitude (% of value)
Vegetation Height (% of value)
Vegetation Crown (% of value)
Vegetation Offset (% of value)
Vegetation Density (% of value)
Display Here As
± Percent of current value
± Absolute deviation
Sample Distribution Type
Uniform
Normal
100 Number of Trials
11 Number of Samples/Trial
Best Estimate of Mean Temp = 67.57°F ± 0.33°F SD
95% CI = 66.92°F to 68.23°F
Full Mean Distribution SD = ±1.10°F
Best Estimate of Max Temp = 70.14°F ± 0.89°F SD
95% CI = 68.39°F to 71.89°F
Full Max Distribution SD = ±2.64°F
% Chance Avg Will Exceed Max Will Exceed
100 63.55°F 64.22°F
90 65.72°F 66.47°F
80 66.35°F 67.24°F
70 66.74°F 67.94°F
60 67.02°F 68.46°F
50 67.56°F 69.81°F
40 67.88°F 70.62°F
30 68.17°F 71.45°F
20 68.48°F 72.24°F
10 68.85°F 73.41°F
0 69.74°F 77.48°F
Run
Stop
Graph
Print
Close
Forebay August Project
12/13/2013
8:30 AM


Uncertainty Graph - SSTEMP (2.0.8)
Average Results from Each Trial
Frequency
15
10
5
0
66.86
67.02
67.18
67.34
67.49
67.65
67.81
67.97
68.12
68.28
Mean Daily Temperature (˚F)
Print
View Maxes
Close
Forebay August Project
12/13/2013
8:30 AM